CHESS
FOR OVERALL DEVELOPMENT

The Educator's Guide to Teaching Chess in Primary School

Volume 2

Special Edition for the ISCAR 2017 Congress

CHESS

FOR OVERALL DEVELOPMENT

Editor's Guide to Teaching Chess in Primary School

Volume 2

Special Edition for the ISCAR Congress 2017

Reichl Publishing St. Goar
Printed in Quebec

Editors:

Viktor Zaretskii – Ph.D. in Psychology, Professor, Department of Counseling and Clinical Psychology, Moscow State University of Psychology and Education, Moscow, Russia. Research supervisor of the Chess for Overall Development Project that has been taking place in Satka (Russia) since 2004;

Amir Gilyazov – FIDE Master, Chief Operating Officer of the "Vertical" Chess Club in Satka.

Reviewer:

Vladislav Nasybullin –
International Master.

CHESS FOR OVERALL DEVELOPMENT. Volume 2. *The Educator's Guide to Teaching Chess in Primary School* // Ed. Viktor Zaretskii, Amir Gilyazov. – M.: Publisher "Otto Reichl Ltd (Moscow)". 2017 – 174 p.

ISBN 978-3-87667-443-8

This Educator's Guide will be useful to primary school teachers, psychologists, and chess club coaches who aim at overall development of children and further translation of the abilities that are developed during chess training to other school subjects and activities. The theoretical part of the Guide outlines the essence of the Reflection and Activity Approach to designing chess training targeting development of the ability to perform mentally. The authors delineate the chess training program (from the basics of Chess to solving mate-in-one problems in one's head). The Guide describes the process of developing the ability to make a mental move. Specific exercises (chess problems) and an exemplary lesson plan are provided. The Guide rests on the principles and techniques of the Reflection and Activity Approach to developmental psychology and the evidence obtained in terms of the Chess for Overall Development Project that has been evolving in Satka since 2004.

The Educator's Guide's contributors include Viktor Zaretskii, the Chess for Overall Development research supervisor (Introduction, Chapters 1–3, Conclusion); Margarita Gordon, the Project's counselor, Assistant Professor, Department of Counseling and Clinical Psychology, Moscow State University of Psychology and Education (Chapters 2, 3, Appendix); Ivan Lebedev, facilitator, Secondary School No 37, Moscow, Master Candidate, the COD project counselor (Chapters 1, 2, Appendix); Yuri Zaretskii and Alexander Shabanov, the COD project counselors (Appendix); Satka school teachers participating in the COD project – namely, Irina Burilova, Lyubov Volgutova, Oksana Glukhova, Raisa Gumerova, Yulija Ikonnikova, Tatiana Kirillova, Irina Komarova, Milya Muksimova, Svetlana Pavlova, Dina Ryazanova, Elena Sazhina, Oksana Teplyakova, Liliya Shekhmetova (Chapters 2.2, Appendix 3).

The Guide was published with the organizational and financial support of the Satka German-Russian Chess Foundation.

Dedicated to the memory of
Nikita Alekseev and Yuri Razuvaev

CONTENTS

INTRODUCTION

Method's Essence

The method's name accurately reflects its essence, i.e. teaching Chess for the purpose of children's overall development rather than preparing competent professional chess players. This approach views Chess as a subject of learning or a substance that creates the basis for developmental training. Why Chess? Nikita Alekseev, a Russian scientist, PhD in Psychology, Chess Candidate Master, and an author of the idea of using Chess to support overall development of children, gave an answer to this question. In a work devoted to using Chess to assist children's development, he wrote, "Chess is a created-by-God material or a model for development of the ability to act in one's head" (1990, P. 45). In order to play chess (rather than merely move pieces on a chessboard), one needs to be able to make a mental move, that is, to make a move in one's head. Thus, when learning Chess, the child may develop his/her ability to perform mentally under certain conditions. This ability may limit itself purely to chess play without exhibiting in other activities, or it may develop as a general ability originating in Chess and later embracing other activities, including learning. **The main question is what conditions are prerequisite for developing the ability to perform mentally during chess training and for translating this ability to other activities.**

Developing the ability to perform mentally is the core of the COD method. However, the method has other uses as well. The training design observing certain principles (see Chapter 1 for their detailed description) has a specific developmental effect shaped as positive changes in the cognitive functioning and personality of the children receiving the COD training, as well as improvement in their academic performance.

The COD method has been designed and validated within the framework of a corresponding project in Satka (a city in the Chelyabinsk Region, Russia), which has been evolving for 12 years now. Therefore, we would like to briefly present the outcomes of this project.

Experience of Implementing "Chess for Overall Development" Project

The COD Project, which gave birth to this chess training method, started in 2004 and has been evolving since then. **The idea of the project** was, firstly, to test the hypothesis that it was possible to design chess lessons so as to facilitate overall development and, secondly, to create a method of designing such training. The project embraced three stages. During Stage 1, Chess was taught in a pilot class (Class 2B, Satka School 14). A team of 12 teachers and psychologists, who volunteered to participate in the project and successfully went through the selection process, ran the training. As Stage 1 was virtually pilot, the researchers divided the class into 6 groups (4 children in each) who were trained by co-teachers (a tandem of a teacher and a counselor). This design allowed for monitoring children's individual progress in learning Chess and overall development; registering and analyzing all the lesson components that were relevant for the COD method. Professional psychologists employed with the Moscow Municipal University of Psychology and Education (now – Moscow State University

of Psychology and Education) selected and trained teachers; analyzed lessons and provided corresponding supervision, and designed the COD method.

During Stage 1, the researchers carried out three cross-sectional examinations of the pilot class students and students of the two control classes, one of which had a higher level of academic performance than the pilot class, and the other – a lower level. The first examination took place before the start of the training (September 2004); the second one – in the middle of the project (January 2005); the third one – at the end of the academic year (May 2005). An employed array of psychological tests allowed for monitoring developmental dynamics of higher mental functions in the experimental and the control classes. The study findings showed that, in the beginning, the experimental class students outstripped the control classes as far as their development rate was concerned, and, by the end of the academic year, they showed better results as to development of auditory and visual memory, attention, cognitive performance, nonverbal intelligence and the key indicator – the ability to perform mentally (as measured by two tests). The experimental class students also improved their academic performance faster than the controls.

These positive outcomes of the experimental class students inspired the researchers to make a decision to continue the project and the training method design efforts. During Stage 2, the team arranged a Summer School for the teachers who wished to be trained in using the COD method for the student training and for children with learning difficulties. Twenty teachers employed with nine Satka and Satka Region schools received training in the new method during the Summer School. The team started designing the Year-2 training method (currently, the COD method's design is incomplete). The participants practiced ways of translating modes of actions that took shape in the COD training to other school subjects. The positive effect of the COD training for the children with learning difficulties consisted in the fact that during these 14 days the children made a significant progress as far as bridging the gaps in other school subjects was concerned, in addition to taking their first steps in Chess. The cross-sectional examination that took place at the outset and at the end of the Summer School showed that the children became more attentive, and enjoyed memory and verbal intelligence improvement. The training turned out to be especially efficient for children aged 7 to 10 years old.

Due to the fact that the Summer School had prepared a group of teachers and psychologists, Stage 3 unfolded in 8 general education schools (Grades 1 to 4), and a special education school for mentally retarded children. In this school, the team attempted to adjust the method so that it might create conditions for developing children with cognitive deficits. All classes, but for the experimental one, received the Year-1 COD training. The training in the experimental class included elements of the Year-2 COD training, the essence of which was to further develop the ability to perform mentally in learning Chess theory, developing thinking and reflection. The Year-2 training method is under development.

The findings of the cross-sectional examinations of all students who received the COD training as compared to the chess-as-usual (CAU) and no-chess control groups in 2007 and 2008 confirmed efficiency of the COD method. The evidence showed that the COD experimental classes improved their outcomes on a wider range of measures as contrasted to the controls. The CAU control group showed better results than the no-chess group but was behind the COD group.

The comparison of the results of tests in Russian and Mathematics at the beginning and the end of the academic year evidenced that the COD students improved their academic performance significantly better than their peers from other classes. Assumingly, it was the COD training that facilitated improvements in academic performance in other school subjects.

The team registered an apparent effect of the COD training on the development of the children with learning difficulties, developmental delays and even mental retardation. For instance, the diagnosis of "a delay in mental development" was removed for 3 children after 14 days of the training in the Summer School. Later, a team of chess players was formed in Satka special education school for mentally retarded children. This team turned in a fine performance in the City Regular School Championship. Even children with mental retardation demonstrated good developmental progress. Although the design of lessons with these children differed from the regular COD training, the COD method's fundamental principles were preserved.

The success of the COD project laid the basis for preparing this Educator's Guide for teaching primary school children during Year 1 of the COD training. The COD method is designed for students of Grades 2 to 4.

Who COD Method is Designed for

Initially, the COD method was designed for children who were unfamiliar with Chess, i.e. for those who started from the scratch. However, the experiment's findings have provided evidence for the possibility to use the COD method (with some adjustments) when teaching both the beginners and those who are aware of the Chess basics.

The students of the experimental class, wherein the development of the COD method took place, were divided into the following groups according to their level of expertise in Chess:

- Chess players (i.e. knowing the basic rules and how to move pieces on a chessboard);
- Children who knew something about Chess, non-players displaying interest in Chess;
- Children who knew something about Chess, non-players lacking interest in Chess;
- Children who knew almost nothing about Chess, non-players displaying no special interest in Chess.

Thus, you can use this method to teach children with different levels of expertise in Chess and various attitudes to this game. Taking into account that the COD class (supposedly 24 students) will be divided into 2 groups of 12 students each, the division principle may be based on the children's initial expertise in Chess and their interest in the game. The training design in the groups will differ, although it will still follow the general logic of the method.

Initially, the COD method was designed for children aged 8 to 10 (Grades 2 to 3 of a regular school). **Developing the internal plane of action is crucial for this developmental period.** The COD method focuses on facilitating and supporting this essential process. In order to use the method with other ages, one needs to adjust it taking account of the specific age-related aspects.

The teacher intending to provide the COD training needs to continuously improve his/her competence in the field of psychology (mastering the technology of the Reflection and Activity Approach to training design; understanding the method of the stage-by-stage formation of mental actions and being competent in practicing it; and learning to work with reflection and other developmentally relevant processes) and his/her expertise in Chess.

Training Goals and Objectives

The goal of the COD training course is to create conditions for development of children in learning and mastering Chess. The COD method focuses on the objectives relating to overall development of children rather than on the training of chess players.

Developmental objectives: designing specific conditions to develop the internal plane of action (the ability to perform mentally) and reflection, as well as attention; memory; spatial thinking; the ability to analyze; to autonomously cope with difficulties; to autonomously design one's own intention and to plan one's learning; to achieve individual goals; to identify causes of failure and to reform inappropriate modes of action.

From the perspective of Chess proper, the final goal of the Year-1 training for children is to learn basic concepts and rules of Chess so as to become able to solve problems (ranging from elementary mate-in-one problems to more challenging mate-in-two ones; to end the game in stalemate; to find a move in a certain position; to realize an advantage etc.). Chapter 2 delineates a complete program of the COD training.

The minimum Year-1 goal for the children who are interested in Chess as in a development-facilitating activity rather than a game as such is to start solving elementary chess problems. The Year-1 goal for the children who are interested in Chess as a game and advance in their training quicker than others is to start solving challenging problems, playing chess as such, and learning the game strategies and tactics. The gap between the children may be quite significant, and therefore, **they follow individual programs in their training.** Ideally, **the teacher works simultaneously with the whole class and with every student in this class individually, so that every student may make an appropriate step in development corresponding to his / her zone of proximal development.**

As far as the ability to perform mentally is concerned, children should learn to make a mental move. A move in Chess means visualizing how one is moving a piece from one square to another; it means "drawing a corresponding line on a chessboard" (Y. S. Razuvaev). If the child makes this move with full awareness, keeping an initial position in mind and visualizing an image of a resulting position, then we believe this child to have accomplished the Year-1 goal. This ability may be translated to other learning activities such as Native Language and Mathematics. The specifically arranged process of reflecting on the modes of analyzing chess positions, texts or problems enables children to develop general modes of analyzing. Further translation is possible for all new mental formations that may occur in the course of the chess training, including general modes of thinking, reflection, self-definition, and cooperation.

Factors influencing the basic level and the rates of progress in Chess include the levels of the child's overall development, education, learning skills, the ability to perform mentally, interest in the game, and initial expertise in Chess.

Review of Chapters

The Educator's Guide to the COD training outlines general principles; key milestones; overall logic and training design options. It includes three major chapters on the method's scientific foundations; the chess training program outline; description of the stages of shaping the internal plane of action (the ability to perform mentally) and appendices.

From the theoretical perspective, the COD method represents an attempt to operationalize some ideas and methods that the Russian psychologists have been developing throughout decades: the idea of the zone of proximal development (ZPD) (L.S. Vygotsky); the idea of interiorization as the transition of an external action into the internal plane (L.S. Vygotsky); the method of the stage-by-stage formation of mental actions that delineates the mechanism of

interiorization (P.Ya. Galperin); the conception of the role of reflection in cognitive development (N. G. Alekseev, V. K. Zaretskii et al.); the training design method resting on the Reflection and Activity Approach (RAA) to working with children with learning difficulties, which enables the teacher to exercise individual approach to all children in the classroom through the use of individual training programs (V. K. Zaretskii).

The use of RAA implies a specific training design, which is different both from traditional primary school lessons and chess training sessions with a coach, and specific principles of establishing and maintaining the teacher-student relationship in the classroom.

A unique feature of the COD training is a simultaneous progress in two directions (occurring in parallel but being interrelated): learning Chess and shaping the internal plane of action. Taking account of the essence of the method (the focus on the child's overall development), the teacher needs to work with a subject matter of the Chess training (a chessboard, moves, rules etc.) and to simultaneously monitor what the child can (cannot) do mentally; and which next developmental step the child may make at this stage.

If the teacher observes this principle, the chess training becomes individualized even when children deal with the same subject matter, do the same exercises or solve the same problems. The training becomes individualized due to the fact that each child works at his/her stage and at his/her "level" (see Chapter 3). Small group work is a variant of the individualized training. In this case, the teacher divides the class into small groups (2–4 people). The division principle may vary depending on the situation, training objectives and the teacher's intention. For instance, there may be a group of children who face the same learning difficulty, or the division principle may take account of shared interests or similar levels of expertise. Alternatively, a group may include children with different levels of expertise so that better performing students may share their learning experience with low performers.

Authors

It was Nikita Alekseev who authored the idea to design chess training aiming at overall development. In his young days, Alekseev went in for Chess and was qualified as a Candidate Master. At the beginning of his career, he worked as a school teacher and designed his lessons to be grounded in the principle of setting reflective objectives (objectives relating to awareness of one's mode of action) that he had invented. He spent over 40 years working in the field of psychology and became a PhD in Psychology and a Corresponding Member of the Russian Academy of Education. The list of references to this Guide includes Alekseev's article where he delineated the idea of using Chess to facilitate overall child development. Unfortunately, he never got a chance to realize it. Yuri Razuvaev, FIDE Grandmaster, Honoured Coach, who worked both with top chess players and children, initiated a project to implement this idea. Yuri Razuvaev and Viktor Zaretskii (PhD in Psychology, Alekseev's disciple and longstanding colleague) designed a project for creating a method of developing the ability to perform mentally in children of the primary school age in the course of chess training, and translating this ability to other school subjects and activities. A team of specialists representing Moscow State University of Psychology and Education (MSUPE), Satka Chess Club (run by Amir Gilyazov) and city teachers became the main enablers of the project in Satka, the Chelyabinsk Region. The project united the teachers and psychologists who showed an interest in it, appreciated its potential for improving the quality of their own practice and had the courage to engage in creative work. The project enjoyed the support of ITF Group Holding (President Sergey Korostelev) and the Satka and Satka Region Committee of Education.

Learning Materials

The main learning material for this guide is the «Chess for overall development» software that has been developed by V. Zaretskii and A. Chernysh. The design and the content of this software reflect the principles of the Reflection and Activity Approach, and its main objectives, such as designing specific conditions to develop the internal plane of action and reflection; attention; memory; spatial thinking; the ability to analyze; to autonomously cope with difficulties; to autonomously design one's own intention and to plan one's learning; to achieve individual goals; to identify causes of failure and to reform inappropriate modes of action. To access the software, please use the following link: http://chess-od.com.

Among other materials we can recommend "The Chess School" ("Shakhmatnaya Shkola") software that includes materials prepared by FIDE Grandmaster Yuri Razuvaev. It will suffice for the needs of the Year-1 training. You can find valuable advice; wordings; exercises and assignments in handbooks by Gorelik, Zhuravlev, Wolff, and Maiselis (see References). The Guide chapters and appendices include original contributions that our teachers authored in the course of the COD project implementation.

Acknowledgements

We, the editors and authors of this Guide, are grateful to everyone who initiated, supported and implemented the COD Project. First of all, we would like to express gratitude to Sergey Korostelev, whose organizational and financial support enabled us to launch the COD Project in Satka.

We also want to thank the officers on the Satka and Satka Region Committee of Education who promoted the idea of introducing Chess to school; the Principals of the schools who have hosted the COD project for 12 years; the "Vertical" Chess Club employees who have supported the project's participants.

We would like to say a special "Thank You" to the teachers who did more than simply mastered the method. Indeed they became its co-developers as it was due to their creative practice, original approach, ingenuity resulting in invention of new exercises and assignments that the ideas of using Chess to develop the ability to perform mentally have become true.

We also want to thank our children, especially, the students of the first pilot class who inspired all the project stakeholders to continue with the experiment, and we thank the parents of these children who agreed to the experiment.

We express a special gratitude to Lyubov Volgutova, School 14 Principal, and Liliya Shekhmetova, a School 14 teacher and the first teacher who used the COD method in her classroom.

Chapter 1

SCIENTIFIC FOUNDATIONS OF CHESS TRAINING AIMING AT OVERALL CHILD DEVELOPMENT

Rationale for Idea to Develop Ability to Perform Mentally during Chess Training

Most chess players learn this game at the preschool and primary school age, when the abilities for reflection and introspection remain underdeveloped. They fail to notice how this ability occurs and evolves, just as athletes fail to see changes in their body resulting from routine training. They just find it out one day that they have achieved a new level of quality. If the child likes to play, strives to win, and improves his/her game skills, the ability to make a mental move occurs and evolves in the course of playing in a similar way, just as the functional organs enabling the activity that is relevant for the person and his/her body develop.

However, as Galperin emphasized, when mental actions (and the ability to perform mentally is nothing but the ability to carry out mental actions) take shape spontaneously, these spontaneous modes of action usually have some deficits that exhibit occasionally. Nikita Alekseev and later Yuri Razuvaev, who analyzed some most glaring mistakes made by top chess players, inferred that these mistakes might relate to an impaired development of the internal plane of actions, which occurred early in life but was spontaneous and lacked control (Alekseev, 1992). Moreover, the actions that one needs to perform to make a mental move are quite challenging, especially for a six– or eight-year-old child.

If we look closely at the children of the preschool and primary school age who have only started learning Chess, attentively, we will see that the children of this age fail to find a required square; they fail to trace a diagonal with their eyes (the child starts moving along the straight line but gets to f8 (rather than to h8) from a1); they fail to perceive a chessboard as regularly alternating dark and light squares and to identify the figure of a Knight's tour from the background of the chessboard etc. They need to carry out all the aforementioned actions on the material plane and only then the ability to perform mentally, i.e. on the ideal or internal plane, occurs.

Some children who start playing Chess early, quickly master the modes of playing that rely on concrete operational thinking typical of this age. Their thinking is somewhat "tied" to the chessboard: they are helpless without it. Frequently, these chess players who may even have earned a Chess title, feel uncertain when they have to answer the question which colour, for instance, a1 is! This child may suddenly stop his/her progress and growth in Chess, as the ability, which is crucial for Chess, remains underdeveloped.

A game of chess may stop in a few moves or it may continue up until a hundred of moves or more is made. Nothing special is happening on the outside: two adults are moving wooden pieces. However, every move results from a careful calculation of multiple variants, assessment of the position, strategy design. All these actions take shape in one's head. The chess player's achievements and his/her class depend on this ability.

Nevertheless, this ability is not specific for Chess. The ability to perform mentally; to plan an action in one's head; to visualize its integral image; to amend it; to eliminate completely and to build a new plan is a general ability of thinking that humans need both for their professional practice and life.

Is it possible to translate the ability that develops in Chess to other activities? Alekseev posed this question to himself and found a general answer to it. We would like to share his line of reasoning.

As Alekseev emphasized, people noticed it long ago that the developmental effect of Chess was most apparent in the children aged 7 to 12 years old. In order to explain why it happened at that age, Alekseev turned to the findings of psychological research on cognition.

"When the child has mastered a vast sign system of a native language approximately by the age of 5 years, the next process of pivotal importance – the process of converting ac-

tions from the operational to the formal level that occurs in language through using its signs – starts developing. The language signs start to mediate any activity, to denote both actionswith objects and the objects themselves, and to replace the former and the latter. Specific actions, i.e. actions with signs, occur" (Alekseev, 1990, P. 43).

Different schools of psychology have different names for these actions. Jean Piaget, a famous Swiss and French psychologist, used the term "propositional" actions. He believed that the system of propositional operations, which normally took shape by the age of 12 years, included the ability to perform logic transformations verbally (in speech).

One of the most prominent Russian psychologists Piotr Galperin defined these actions as "mental". Representatives of Galperin's school extensively investigated mental actions and skills and singled out stages of formation of mental actions in the course of interiorization (Vygotsky's term), that is, the transition of an external action to the internal plane (Vygotsky, 1984).

Having gone through sequential stages of being performed on the material plane, then in speech (verbalization), then on the ideal plane (mentally), the external action becomes automatic and abbreviated which means that the result of the action occurs directly in one's thinking independently of movement and speech (Galperin, 1966).

Yakov Ponomarev, another Russian psychologist and a specialist in Psychology of Creativity, introduced the term "actions in one's head" reflecting the place where these actions occurred. "An action in one's head" precedes movement and verbal utterance; it somehow enacts a subsequent action before the latter takes shape. Ponomarev investigated spontaneous development of the internal plane of action and identified other stages. He also described the deficits in the internal plane of action that occurred in the course of spontaneous development (Ponomarev, 1967).

The question that Alekseev posed was: if the ability to perform mentally develops in chess training, could it be translated from Chess to other activities, such as routine school learning, for example? Alekseev gave a theoretical answer to this question in the same article (Alekseev, 1990). Below, we outline this answer in a most general way.

The goal of achieving overall development of the ability to perform mentally would imply designing some method that would ensure development of this ability in learning some subject (Chess) and its translation to another subject. That is to say, when teaching Chess to the child, the teacher would need to focus on the ability to perform mentally both when playing chess and in a general situation rather than on refining the game skills alone. When this ability took shape, the abilities that formed during chess training might be translated to other learning activities. Alekseev provided a conceptual outline of a potential method design in "Chess and cognitive development" (1990):

"…Having shaped the ability to perform mentally when playing Chess, we cannot be sure that it will automatically occur in other activities. In other words, interiorizing an activity in no way means that other potential activities get interiorized simultaneously. Even if this is the case, the result will never depend on the educator's actions; it will take shape independently, irrespective of the educator's specific and deliberate actions, and therefore, it may either be there or remain unrealized. One needs to identify a system of interventions so as to achieve the result. Identifying relevant interventions (and conditions) is the essence of what we have called a conceptual outline of the method.

Shaping the ability to perform mentally comprises four main aspects: training the ability to perform mentally in learning Chess; similar training in learning some other subject; setting a reflective objective to gain awareness of a mode of action in both cases; using a different subject (as compared to the previous two subjects) to validate whether the mode of action (hence, the ability) has been shaped" (Alekseev, 1990, P.14).

When the child starts learning Chess, he/she starts shaping modes of mental action. However, as Alekseev noted, "the skill that shaped within chess training in no way means that the corresponding ability shaped either. One should make no mistake about that. It is only the relevant substance for this ability that one has managed to prepare; it is only the first step on the way to this ability. Now, one would need some other substance to reinforce this step" (ibid).

This substance may indeed involve any cognitive assignments, including assignments in regular school subjects. The previous experience may facilitate easier and quicker development of the ability while learning this new subject. However, one needs to set up the reflective objective, or the objective to become aware of the mode of action, so that a general mode of action may result from the experience of applying this mode of action to dealing with two different subjects.

John Locke was the first to introduce the term "reflective" which means "directed or turned back on itself; focused on the interior as its subject"; reflection means experiencing experience, thinking over thinking.

Thus, Alekseev's original idea contains two essential ideas: 1) in order to train modes of mental action, one needs to use the stage-by-stage method of formation of mental actions (P. Galperin); 2) training design needs to rely on reflection, i.e. a process in the course of which the student builds a general mode of action him/herself (Alekseev, 1990, 2002), (Davydov, 1996).

Essence of Reflection and Activity Approach

The concept of interiorization, which is transformation of the exterior into the interior, is crucial for this method as the COD training relies on the transition of a material action to the ideal plane, and thus, learners perform all new actions (be it a move or analyzing a strategic idea) on a chessboard and only then in his/her head. It was Lev Vygotsky who developed the concept of interiorization in the Russian psychology, and it is fundamental for his cultural-historical theory of psychological development. The essence of Vygotsky's cultural-historical theory is that the child's development results from cooperation with the adult during which the child adopts and "owns" the experience accumulated by the humankind. The process of interiorization ensures that external actions, which the child performs independently or in collaboration with the adult (another child), become internal actions provided that certain conditions have been met. As we have already mentioned, Piotr Galperin, whose school of Psychology investigated the mechanisms of interiorization, proposed the term "mental actions", which we use as well.

Galperin's theory of the stage-by-stage (stepwise) formation of mental actions singles out stages representing the transformation of external actions (modes of action) into internal ones. The stages form a certain logical sequence.

At first, the child carries out an action purely on the material plane using material tools for all elements of the action. Performing the action on the material plane ensures that the child completes all elements of the action. Then the child verbalizes the action in a most detailed way, in overt out-loud speech (addressing another person). If the child is able to verbalize a detailed description of how he/she carries out the action, it means that the child is aware of the corresponding mode of action. Then, speech starts gradually shrinking, and the action starts being "abbreviated". Individual operations comprising the action consolidate into larger units; the pace of performing the action increases. Then, the child enters the stage of the covert speech, when the child verbalizes the action in his/her head, focusing only on the

main aspects of the action. Finally, the action converts to "a pure thought". It is possible to evaluate the potential speed of human thought if we recall that top Grandmasters play on a par with most sophisticated computers that perform a billion operations per second.

According to Vygotsky, development occurs when the child collaborates with the adult to perform some activity, with the adult being "an owner" of cultural tools that the child needs to master. Thus, development occurs in the course of learning. Vygotsky introduced the concept of ZPD to explain how learning-related development occurred. ZPD stands for a zone comprising actions that the child fails to perform independently but is able to complete in collaboration with the adult (see Volume 1 "To Development through Chess" for details).

The child-adult interaction around the subject matter of their joint activity is very simple: the adult does everything that the child fails to do, for the child. Imitating the adult, the child gradually adopts the adult's actions and starts performing them independently. In this case, the adult's help consists in exposing the child to a cultural tool representing some mode of action that the child gradually masters and adopts, that is, becomes its "owner". Nevertheless, **the range of things that the child adopts within this joint child-adult activity goes beyond the subject matter of their collaboration (that is, *what the adult teaches the child*) to embrace other *modes of action* displayed by the adult, which includes *how the adult teaches the child*.**

Correspondingly, if we go beyond the core process wherein the child is adopting the mode of action that the adult is demonstrating deliberately, and consider other processes that may take place within the child-adult interaction, **we may pose another question concerning the adult's help: *how can the adult use the situation when the child fails to overcome some difficulty independently but can do it in collaboration with the adult, so as to facilitate the child's development*?**

At this point of our reasoning, it is important to focus on a fundamental assumption: even within the framework of understanding the child as an agent of ***adopting*** the social and cultural experience, when the child and the adult collaborate to overcome the child's learning difficulties, the child arguably engages in activity at least in two dimensions simultaneously.

The first dimension is learning the subject matter wherein the difficulty has occurred; the second dimension relates to overcoming the difficulty itself. Keeping in mind the existence of these two activity dimensions, we can consider the child both ***as an agent of learning the subject matter***, and ***as an agent of coping with his/her difficulties***. Correspondingly, we can single out at least two zones of proximal development that lie in different dimensions: a zone that is determined by the child's capacity to master the subject matter of learning in collaboration with the adult, and the zone wherein the child develops his/her ability to overcome learning difficulties.

If we take a broader perspective on the child viewing him/her as an agent of implementing his/her intentions and the adult's intentions (rather than an agent of adopting the cultural and historical experience from the adult or an agent of overcoming learning difficulties alone), then a multitude of various dimensions grounded in the aforementioned intentions may grow from ZPD. Development may occur in every of them, if the adult takes into account the child's intention when building the adult-child interaction (Figure 1).

The content of a vast variety of processes relating to learning the subject matter and unfolding within the collaborative process of adopting the mode of action may go far beyond learning the subject matter and produce changes in the child's thinking, personality, self-control, interpersonal relationship etc. Vygotsky's catchphrase that "a single step in learning can represent a hundred steps in development" (Vygotsky, 1982, P. 230) obtains a slightly different meaning in this context: the richer in meanings the adult-child interaction is, the more dimensions go through a point of challenge, the larger developmental effect it may produce.

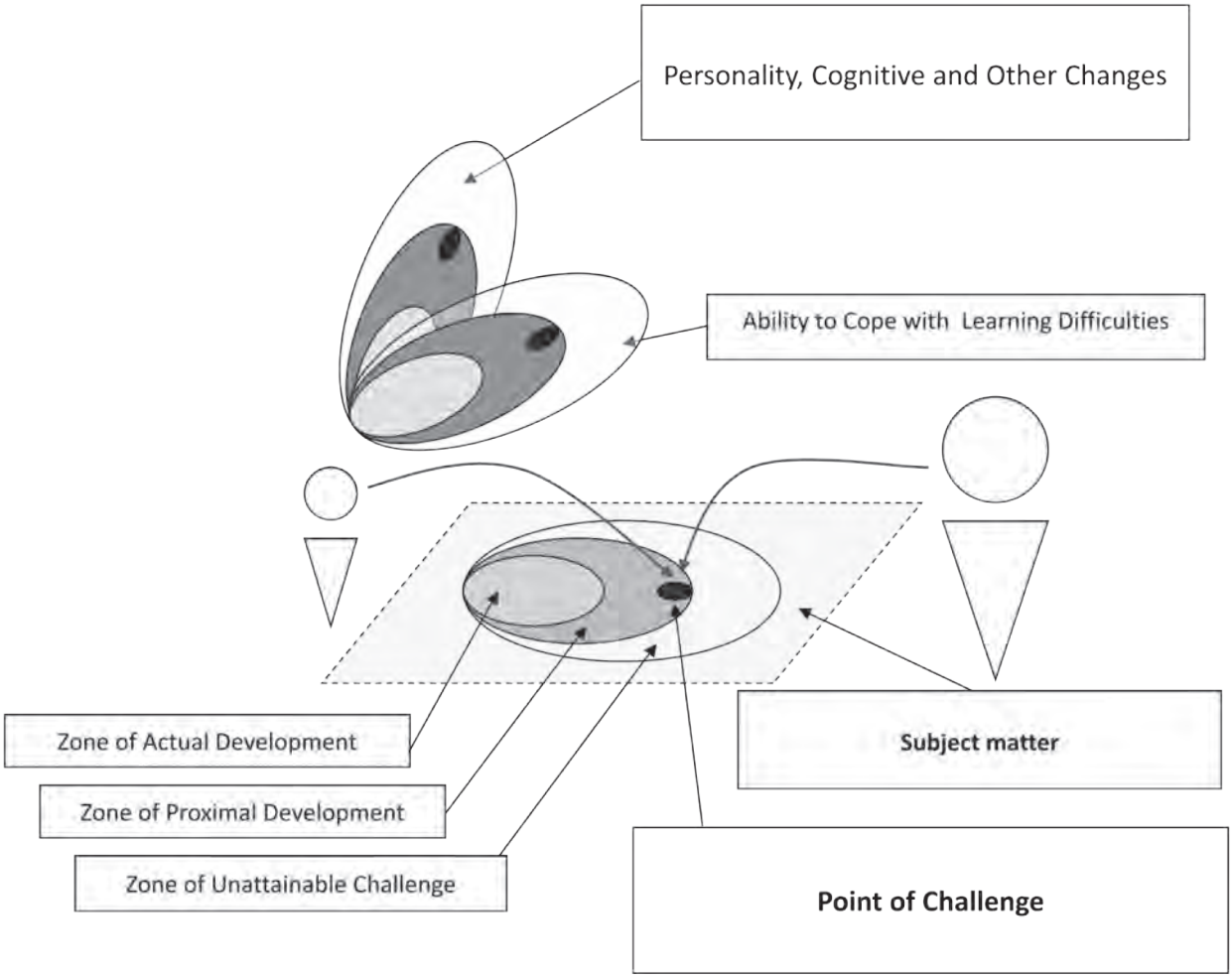


Fig. 1. Dimensions of potential cognitive and personality changes that the child may enjoy as a result of collaborating with the adult within his/her ZPD as determined by the child's and the adult's intentions (Zaretskii, 2007)

"We have given the child a penny's worth of instruction and the consequence has been a dollar's worth of development" (ibid, P. 230).

This assumption and the aforementioned multidimensional model of ZPD may be well illustrated by an example of a typical challenging situation that became part of a documentary about our Summer Schools for children with learning difficulties[1] that we ran in a summer camp in the Nytvensky District of Perm Krai, Russia, in 1996 – 2002 (Zaretskii, 2008). The documentary includes an episode of a dialogue between a student and a teacher who observed the principles of the Pedagogy of Cooperation and the Reflection and Activity Approach in her work (Zaretskii, 2008).

Student (pointing at his workbook): *I don't know how to write it here…*

The child was speaking about spelling a word with an unstressed root vowel – a challenge that typically persists throughout primary and secondary school.

Apparently, the teacher's response may have varied here. She had the following options:

1) Telling the child how to accomplish his task correctly (the teacher might demonstrate the correct spelling);

[1] "One Day and the Whole Life". Directed by R.P. Gurevich. Screenplay by R.P. Gurevich and M. M. Gordon. 2001.

2) Showing how the child could figure out the right spelling in similar words (the teacher might demonstrate the algorithm of using the corresponding rule);
3) Asking the child how he was going to figure out how to spell this word (the teacher might initiate the process of reflection and then would act depending on the situation);
4) Addressing the child with a question to initiate other processes that might ensure the child's progress in developmental dimensions specific for this challenging situation.

The teacher chose the fourth option. Teacher: *Do you want me to give you a hint, or do you want to try to do it yourself?*

Student: *I want to do it myself.*

Teacher: *And what do you need to do so as to figure out how you should spell this word?*

Student: [I] '*Need to verify it somehow… Ah! I need to find a word with the same root!* (*The student returned to his seat and started working autonomously*).

Let us analyze this case using the concept of ZPD. The student approached the teacher with an unclear request. The request was virtually lacking: he just told the teacher that he had difficulty spelling a word. The teacher's question activated the process of self-definition ("*Do you want a hint or do you want to try it yourself?*"). Self-definition resulted in the words "I want to do it myself". If we imagine the "agent of activity" dimension within the zone of proximal development, then we may say that the child made certain progress in this dimension – that is, he made a decision to cope with the challenge himself. The teacher's subsequent question focused on the mode of action. The fact that the student gave a quick and correct answer to the teacher's question might mean that he had the answer in his head. The difficulty was that he simply failed to ask himself this question that indeed was a clue to solving the challenging situation. Furthermore, this question lay both in the dimension of "expertise in Native Language (Russian)" and in the dimension of reflection. If the student learnt to ask himself this question relying on the experience of efficient collaboration with the adult, he would need the adult's help no longer, i.e. the ZPD boundary would shift to extend the zone in the reflection dimension.

Assumingly, the child's development in this case occurred in at least one more dimension, which might be called "Self-efficacy". As the student coped with the challenging situation by himself, his self-efficacy improved.

Thus we see that the teacher's creative actions in this challenging situation brought about conditions for the child's development in several ZPD dimensions: improvement of the sense of agency in learning; reflection; self-efficacy and the ability to identify correct spelling using a specific rule (the dimension of expertise in Native Language).

We would like to emphasize that in this case the adult (teacher) demonstrated neither the correct spelling nor the strategy to identify it: rather, she modeled a pattern of behavior and thinking in a challenging situation. Firstly, you need to identify whether you want to cope with a challenge yourself; if you do – then ask yourself a question how you can find out which mode of action you can use; if you have an answer to this question, you need help no longer, and you will be able to do everything by yourself next time.

Thus, ZPD can be viewed as a sphere formed by the generality of dimensions that go through a "point" of challenge and that represent a variety of areas of the child's potential development (including potential changes in cognitive functioning, personality etc.), rather than a plane consisting of the modes of joint action that the adult and the child use when the child is mastering some subject matter.

During the COD training, the teacher's efforts focus, for the most part, on helping the child to learn Chess (dimension at the bottom of Figure 2) and to develop the ability to perform mentally.

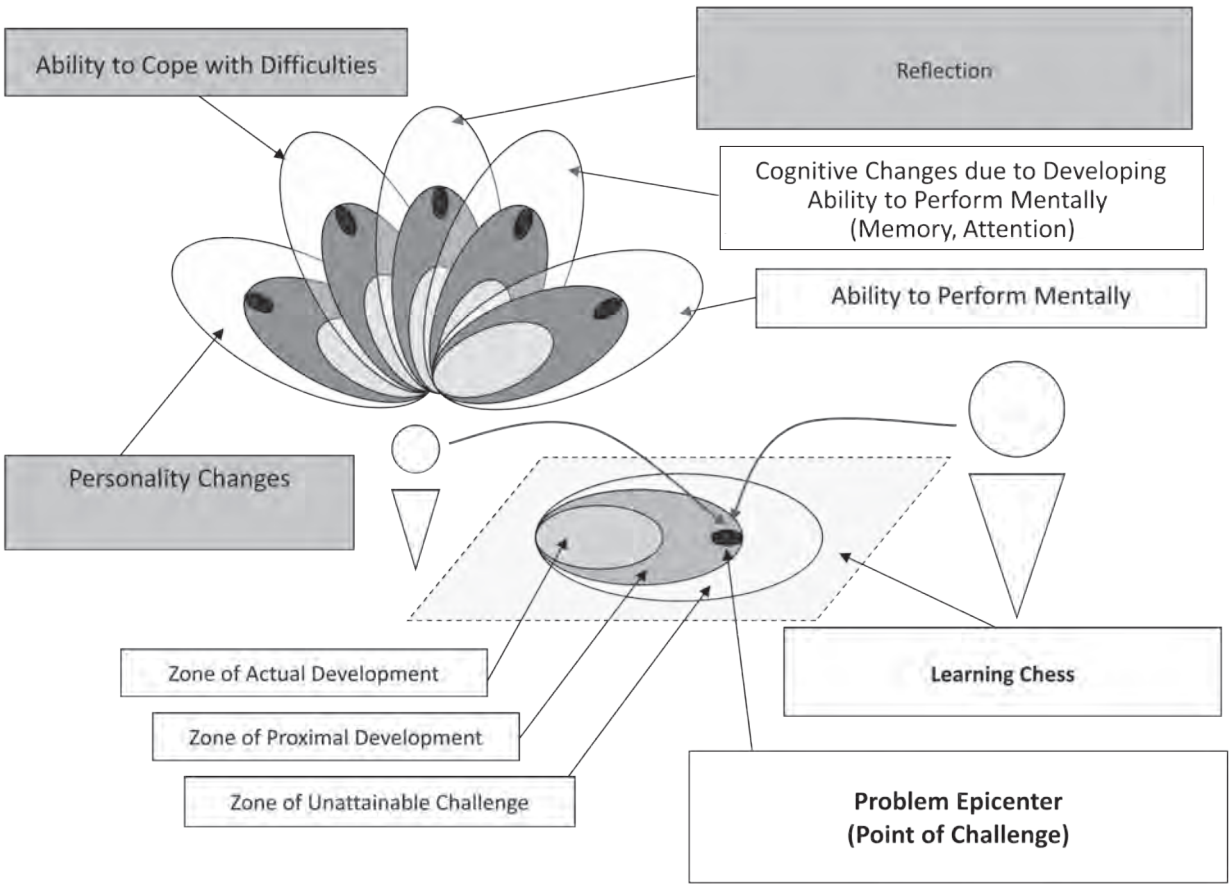


Fig. 2. ZPD as a generality of dimensions of potential developmental steps. The diagram represents the Chess potential for the child's overall cognitive and personal development.

If the teacher relies on the RAA principles when interacting with the child, this interaction initiates improvement in other dimensions, including the crucial ones such as the ability to cope with difficulties, reflection and personality changes resulting from facilitation of the child's sense of agency (Figure 2).

The practical experience of helping children with learning difficulties by means of RAA (Zaretskii, 2007, 2008, 2013) shows that various relevant developmental dimensions may occur within ZPD depending on the child's sense of agency, which emerges due to efficient collaboration with the adult. Alternatively, if the adult helping the child makes mistakes and arranges activity that goes beyond the child's ZPD, this may have an adverse effect on development. According to Vygotsky, it is the activity that the child carries out with the adult's help within his/her ZPD that facilitates development.

Development emerges only when the child is facing a challenge, when he/she fails to perform some activity autonomously. Then the child feels the need for new modes of actions that the adult owns. However, when assisting **the child, the teacher needs to be aware of specific causes of every type of mistakes and difficulties so that the teacher may help the child to arrange the activity that will be beneficial for this very child**. Furthermore, the teacher's task is to help every child in his/her classroom, and this help should address specific needs of each child. Here it is important that the child **independently** do everything he/she can do, and the teacher helps the child exclusively with the things that the child fails to accomplish by him/herself.

Vygotsky's assumption that development occurs when the adult arranges the joint activity with the child within the child's ZPD has an essential implication for the practice of

teaching and learning: **the extent to which learning benefits the child depends on the extent of the child's progress within his/her ZPD with the adult's appropriate help**. It further follows that *the child's actions in the zone of actual development (ZAD) are pointless as they produce no development, and his/her actions beyond ZPD's upper boundary in the zone of unattainable challenge (ZUC) are more than simply useless: they are even harmful to the child*. The harm relates to the fact that the child will always fail when acting within ZUC, irrespective of how hard the child and the adult try. Moreover, the child and the adult will always get negative feedback: no matter what they do within ZUC, they fail to accomplish it.

The best help that the teacher can provide to the student is **to facilitate the process of his/her reflection** so that the child could become aware of the causes of his/her challenges or mistakes. It is only in this case that the child may get a chance to cope with a challenge by him/herself, which results in the child's development. Moreover, regularly obtaining appropriate support and reflecting on the joint activity within his/her interaction with the teacher, the child adopts both the modes of actions and the modes of its reflection (including the modes that the adult demonstrates). The process of adopting the modes of reflection is even more important from the developmental perspective as in doing so, the child refines his/her ability to study (to teach **him/herself**).

Therefore, help that the adult (a teacher, a psychologist or a parent) provides to the child when working with his/her learning difficulties, may not only focus on supporting the process of learning a specific subject matter, but also take account of other processes that are relevant for developing **the child as an agent of learning**.

Principle of Enhancing Child's Sense of Agency and Principle of Collaboration

The principle of performing joint activity within the child's ZPD relates closely to the principle viewing the child as an agent of his/her activity and the principle of collaboration. The principle of the person's agency is fundamental for the Russian psychology. It means that a person has an active and transformative attitude to the world, and is an agent of this transformation which includes changing oneself as well.

In General Psychology, the principle of the person's agency has always been significant in terms of research and methodology (Leontiev, 1975; Rubinshtein, 1946). In Pedagogy and Educational Psychology, this principle exhibits clearly at the operational level: denying or recognizing the person's agency in his/her development lays ground for development of different approaches to instruction and education of children; occurrence of alternative and largely incompatible educational systems. The literature on the history of pedagogy shows that these two trajectories of its development seem to have roots in the very beginnings of educational practice. These trajectories differ in two crucial aspects: the child as the object of instruction versus the child as an agent of his/her development; the teacher as an agent of instruction versus the teacher as a co-worker and an assistant facilitating the process of the child's self-development. Alexander Dzhurinski (2003) investigated these trajectories in the history of educational thought in ancient China, Egypt, India, Mesopotamia, Greece and Byzantium in a most elaborate way. We will make a brief trip to the history of education. Although someone may find this journey superfluous in this Guide, we want to undertake it so as to provide evidence that the idea of collaboration has deep roots; that cooperation is a tradition which has existed and developed over the centuries, rather than an exotic invention of the twentieth-century enthusiasts who gave birth to "The Manifesto of Pedagogy of Cooperation", as regrettably, many educators think.

For instance, Confucian scholars compiled "The Book of Rites" (Liji), a collection of texts, some of which discussed the role of a teacher:

"In his teaching the superior man guides his students but does not pull them along; he urges them to go forward and does not suppress them; he opens the way, but does not take them to the place. The teacher and the student are growing together" (cited in Konstantinov, Medynski, Shabaeva, 1982).

Teaching techniques that "The Book of Rites" delineated focused on developing and enhancing the child's sense of agency so that he/she would learn to overcome difficulties by him/herself ("opens the way, but does not take them to the place", "urges … and does not suppress").

This dichotomous perception of the child's role in the educational process existed in ancient Greece too. To give an example, let us cite the Pythagorean position on education: "Proper education… occurs by the mutual consent of the teacher and the student; any education in art and sciences, if it is voluntary, reaches its goal effectively, and if it is involuntary, then this education is inappropriate and fruitless". When discussing education, sophists emphasized the crucial role of the person as an agent of his/her education.

Socrates' conversations (Socratic dialogs) aiming at stimulating self-genesis of truth in the student undoubtedly belonged to practices that enabled the student to become an agent of his/her education. Alternatively, Plato believed that the goal of education was to "create" a perfect citizen who would be able either to obey or to rule others.

The key word there was "to create", which a priori precluded the attitude to a person as an agent of self-development and turned him/her into an object of education. In China, dogmatization of neo-Confucianism resulted in a significant change in the teacher-student relationship.

For instance, Wang Shouren (1472-1528) described the Chinese education of the time as follows, "Today, like in earlier days, teachers of our children do nothing but teach them to repeat statements and reproduce the textbook … They show incapability to guide children by propriety … Children view school as a prison, resisting entering; they regard teachers as enemies, resisting seeing them" (Dzhurinski, 2003, P. 88).

Both threads of pedagogic thought regulating the teacher-student relationship go through the Middle Ages, the early and late modern period and continue evolving nowadays.

Christian Gotthilf Salzmann, an outstanding German educator who advocated liberal education, emphasized the crucial role of the child's autonomy for his/her development. He believed that another essential premise of the child's appropriate development was congruence between the adult's "word and action", and argued that the discrepancies between "word and action" (i.e. when the adult teaches the child to what the adult never does or has absolutely no idea of) were the major cause for developmental deviations. Salzmann wrote his books on the cusp of the 19th century, but the Russian translation occurred as late as in 2011. Nevertheless, his books remain very popular and relevant nowadays.

The pedagogic thought in Russia at the beginning of the 20th century evolved under significant influence of Pavel Blonsky, who Alexey Leontyev (1990) believed to be Vygotsky's teacher. Just like many Western educators, Blonsky criticized the contemporary approach to education severely, "I believe that the teachers who treat modern imperfect school with whole-hearted devotion, do most harm to children" (Blonsky, 1979, P. 84). He argued that school's overarching goal was supporting the child's desire to obtain knowledge and training skills that would facilitate and ensure one's further self-education rather than stuffing children with knowledge. "Even the best school never gives as much knowledge as one needs for life" (Blonsky,1979, P. 28). Blonsky believed that the child's successful development depended on supporting the child's initiative and creativity. "We need… to educate the person who is

able to create his/her own life; the person who is capable of self-definition… Public school is a place of rational organization of the self-education process of a creator of the new Russian life. The teacher is only the child's co-worker and assistant and advisor guiding the child in his/her own autonomous work. School is the place where children train their autonomous ways of performing rather than learn" (Blonsky, 1979, P. 42). However, Blonsky (just like many other outstanding educators) never saw his ideas come true during his lifetime. Even now, these ideas are not so widely spread and fail to enjoy absolute recognition in the community of educators.

The Pedagogy of Cooperation emerged in our country as late as in the 1970s. This approach counterpoised the principle of cooperation between the teacher and the student as equal agents of education with the traditional principle of the teacher's dominance over the student. The innovative teachers' report that appeared in "The Teacher's Newsletter" (Russian "*Uchitelskaya Gazeta*") in 1986 formulated the dichotomy of the teacher-student relationship in a clear and decisive way, "There have always been "specialists" and "educators" among school teachers. The former go with the subject to children; the latter go with children to the subject" (The School of Cooperation, 2002, P. 5). Simon Soloveychik, one of the founders of the Pedagogy of Cooperation, believed that leading the child as such necessitated the child's subordination, with this relationship resulting in a power struggle, which was the worst thing in education. He argued that it was the teacher him/herself who needed to initiate and to model partnership so that the teacher might expect cooperation and understanding on the part of the child.

"Collaborating means respecting and appreciating other people, being able to compromise your desires, needing others and being needed by them" (Soloveychik, 2000, P. 434).

Thus, the fundamental principle of the Pedagogy of Cooperation is lack of coercion.

Focusing on the differences between these two perspectives (approaches, frames of reference), we can formulate core questions for each of them. The core question for the first perspective is how to influence the student so as to get what is needed from him/her. The core question for the second perspective is how to build a relationship with the student so as to help him/her to reach maximum human potential. Ways of supporting the child's development and enhancement of his/her sense of agency in education and shaping the ability to independently cope with learning difficulties become a major direction of the child-adult collaboration in this process.

The RAA methodology may address the issue of how one can help the child to develop his/her sense of agency. A premise that ensures effectiveness of this help is a genuine (versus artificial), real (versus sham) position of a coworker that the teacher takes on. Another premise relates to the teacher-coworker's ability to call forth relevant developmental processes and, first and foremost, reflection. *When the child who is assisted by the teacher-coworker, becomes an agent of his/her learning and reflection; progresses at his/her own pace within ZPD, analyzing and designing his/her own modes of thinking and operation, the child becomes able to develop in several areas simultaneously, with these areas depending on the potential of a challenging situation and art of the helping adult.*

General Comments regarding Training

This text delineating scientific foundations of the COD training may seem complicated, cumbersome, lacking all the specific instruments necessary to design training based on these principles. In some sense, it is a fair reproach to the authors, as this Guide provides no "do-this-then-do-that-etc." algorithm. We view the technology of establishing the child-adult relationship as something very close

to the original meaning of the word "technology" (from *techne* – art). Creativity is a crucial element here. The intention to provide each child with individual help that he/she will best benefit from makes the process even more complicated. This is an ideal process, the process that may take place potentially if the teacher is well prepared for his/her practice; understands processes that he/she deals with; is quick at evaluating challenging situations and good at providing specific developmental help.

In practice, the teacher develops these competencies gradually in the course of mastering more simple and later complex actions. The main challenge that primary school teachers face relates to maintaining a coworker's attitude (a traditional teacher has difficulty viewing a little child as a fully-fledged agent of education) and working with reflection (traditional approaches to education almost lack reflective methods).

Keeping in mind that our developmental method relies on a number of innovative principles and deals with chess training, which is quite unusual for school teachers, we suggest that teachers should approach it step by step. In the beginning, it is better to focus on three basic constituents of the method: general training design relying on the RAA principles; arranging stepwise formation of mental actions in the course of chess training; providing students with reflective help within their ZPD when they face some difficulty (the point of challenge). As far as the ability to perform mentally is concerned (another crucial constituent of the COD method), the stages of mastering the action (from a material action through speech to an ideal action) may be represented as progress within ZPD. When the child has mastered some action on a chessboard (e.g. moving the Rook from a1 to h8), it may be carried out in speech. If the child has learnt to verbalize the action without using material tools, his/her ZPD boundary shifts (in the dimension of the ability to perform mentally) closer to the ideal plan. If the child can perform the action in his/her head without verbalizing it, this action has formed, and the child and the teacher may proceed to a more complex action such as using this Rook to attack two pieces simultaneously ("a double attack")[2].

When the teacher gets the main process going, he/she may set other developmental objectives that he/she may believe feasible for a concrete child.

We would like to reiterate that any challenging situation (and when moving within his/her ZPD, the child will inevitably face challenges) serves an opportunity for initiating and supporting a multitude of developmental processes in various developmental dimensions.

Let us discuss most serious mistakes that the teacher had better avoid as some of them are very hard to repair.

1. It is important to facilitate the child's interest in Chess and training in general.

   Not all children wish to learn to play chess. Not all children like it. The less interested in the game the child is, the greater difficulty he/she experiences making sense of Chess, and the harder the teacher finds it to rely on this sense-making in the classroom. If the child lags behind, the teacher needs to proceed with Chess further anyway, keeping in mind that modes of actions are assimilated better than the subject itself. If the child makes more progress that the others, the teacher needs to challenge this child with individual problems in the course of doing which he/she will face difficulties. Challenging tasks are most beneficial and interesting. If the child regularly faces challenges, overcomes them with the teacher's help and uses reflection "to skim off the cream of tools" that enable him/he to cope with a challenging situation efficiently, it is the process that we are looking for.

2. Many educators, especially primary school teachers, find the attitude of a coworker unusual and unfamiliar. The teacher-coworker faces some limitations of this attitude. There are many things that he/she cannot do, and in this sense, the teacher-coworker loses relevant operational levers that an authoritarian teacher has in abundance. Interventions that match

[2] See Chapter 3 for a detailed description.

the authoritarian attitude are inappropriate, impossible and harmful here. On the other hand, the teacher-coworker enjoys the resource of the child, as the child, who has formed a sense of agency, becomes a crucial resource for his/her development. ("The child's own activity is the source of development" Daniil Elkonin).

Losing the coworker's attitude or preventing the child from becoming an agent of his/her own activity are the mistakes that may neutralize the whole educational process, and may hinder (or even preclude) translation of the modes of action that the child has shaped in chess training, to other activities.

3. Enhancing the child's sense of agency should be viewed as a specific developmental dimension. The problems here relate to failures in the child-adult interaction, as in the beginning, the child starts to feel independent, and only later, after he/she has identified him/herself as an autonomous person, the child starts feeling responsibility for the course and the outcome of the joint activity. A fully-fledged collaboration becomes possible since that very moment.
4. Helping the child in a challenging situation is a very delicate issue. It is impossible to describe it in a general way how one needs to do it. However, it is safe to say that most types of "help" (i.e. explicit hints, leading questions, manipulations involving feelings and emotions) that teachers are used to providing are far from being real help. It no way means that the teacher cannot give a hint or make a joke. It means that the teacher needs to understand the process before interfering with it. If the process is unclear, one should postpone helping and clarify the process. The real help is possible only when the teacher understands the issue well and can initiate processes that may enable the child to overcome the difficulty by him/herself. A hint precludes potential development; a leading question replaces one's own progress with leading by hand (in a blindfold manner, to make things worse); any manipulations are incompatible with the coworker's attitude and result in its collapse, loss of this attitude.
5. It is beyond any doubt that the teacher needs to have some intention for the lesson and a plan for its implementation. However, if the teacher deals with real subjects of his/her activity, and if he/she by no means simply teaches some material but rather works with processes so as to ensure the overall development of children, then the teacher needs to be prepared (first and foremost, psychologically) to work creatively and to improvise during the lesson. The teacher needs to prepare him/herself for the fact that the lesson may deviate from the plan. Digression from the plan is a norm rather than deviation during the COD training. It is very useful to prepare several additional scenarios of the lesson in advance.
6. Teachers who feel themselves less confident in Chess and who learn Chess together with children may need to continuously improve their expertise in Chess and always keep it in mind during the lesson that it is important "to focus on the point of chess play". It means that the teacher needs to see and to be able to show children the sense of studying a specific subject matter for successful chess play. The sense in Chess is hard to grasp but is easy to lose. One can hardly compensate for the loss of it.
7. The teacher needs to constantly keep it in mind that in addition to the knowledge that the teacher intends to share with the child, the teacher translates all the modes of action that he/she displays when interacting with the child. Thus, the teacher translates his/her respect for Chess; the manner of experiencing a challenging situation; respect for other people; reflection; the ability to design modes of action etc. This fact presents both a challenge and a crucial resource for the teacher.

8. A healthy attitude to failure and mistakes is a key success factor: mistakes are inevitable; people learn from mistakes. However, mistakes are very different. It is important to face mistakes with courage and to be able to learn lessons from them so as to avoid them in the future; to correct them and to use them as a mirror to see something in yourself that would remain disguised unless a mistake happened.
9. The teacher needs to avoid getting stuck on Chess tasks, and at the same time, to avoid forcing the development of the internal plane of action. The teacher needs to accept the fact that the child may face unexpected challenges. Thus, one needs to look for material tools to complete the action on the external plane. If the child learns to act without mistakes on the material plane, the translation of the action to the internal plane is a matter of time and skill.
10. The teacher needs to constantly keep to another crucial objective of the COD method, namely, the idea of translating the abilities that develop as a result of chess training to learning and other activities. "Keeping to the objective" means keeping the following question in mind: how and where else (dealing with which subject matter) one may use this mode of action.

The two following chapters delineate the COD training program and discuss ways of shaping mental actions that constitute the ability to make a move in Chess.

Chapter 2

"CHESS FOR OVERALL DEVELOPMENT" TRAINING PROGRAM OUTLINE

2.1. TRAINING PROGRAM

Subjects / Basic Lessons (BL)	Lesson No
Introduction to Chess	1–2
Chessboard. **Identifying squares: "Chess Battleship"**	3–7
Identifying squares. Lines on chessboard	8–13
Movement and laws of Chess (review). Chess notation. **Starting position**	14–28
Movement. King	14
Movement. Queen	15
Movement. Rook	16
Movement. Bishop	17
Movement. Knight	18
Movement. Pawn (major rules)	19
Starting position	20–22
King's safe position. Castling	23–25
Review lessons	26-27
Game essence and possible outcomes: winning, losing, draw	28–30
Chess piece value	31–32
Chess position: analysis, evaluation	33-34
Game stages. Chess opening basics	35–37
Solving mate-in-one problems	38–62
Summing up and Reflecting	63–64

CLARIFYING COMMENTS TO THE TRAINING PROGRAM OUTLINE

Rationale for Sequence of Learning

This program represents the chess basis of the COD method during the Year-1 training. Here we would like to clarify some specific aspects of the proposed Chess learning sequence.

1. We suggest starting to study movement of pieces with the King's movement so that it may be possible to build development-facilitating training around real play positions or positions that are close to real ones, as these positions are impossible without Kings.
2. After the King, we suggest working with the pieces in descending order of their value: from the Queen to the Rook. This order facilitates the process of explanation why some pieces are stronger or weaker than the others, therefore, the lessons on the chess piece value (Lessons 31–32) become the lessons that help to consolidate knowledge rather than to acquire it.

3. It is important to introduce children to the game's essence and goal at the very beginning of the training. The teacher gives a general account of them before proceeding to working with movement, and when it becomes feasible (i.e. when they learn how the Queen and the King move), the teacher introduces children to the concepts of check, checkmate, stalemate and ways to defend oneself from check. These matters are discussed in detail during the corresponding lessons but it is important that students become aware of the King's exceptional value and the endgame variants from the very beginning.
4. The teacher needs to introduce chess notation and elementary chess problems (winning a piece, mate in one, stalemate) immediately upon mastering first pieces. Doing these problems allows for accomplishing the objective of shaping the mental actions of analysis.
5. When children have learned first pieces, the teacher needs to start alternating lessons aiming at studying the laws of Chess with playing lessons, during which children may play with each other using pieces that they have already learned and using their knowledge in practice. Students may start to play chess when they have learned the King's movement and function.
6. The program implies that starting from the initial lessons, the teacher gradually introduces the rules of chess notation, which is used every lesson throughout the training course. When the playing lessons start, the teacher invites children to record initial 10-15 moves and then continue playing without taking records. This approach enables children to exercise and use chess notation without becoming exhausted because of the extra effort (it is very difficult for primary school children to play and record moves throughout the whole game), and to go back to the opening of the game that they had played and try another variant at the next lesson. During the rest of the game, the players record 10-15 moves and, unless the game ends this lesson, the players may continue analyzing it and looking for new variants during the next lesson. However, the analysis will focus on the following game stages such as chess middlegame and endgame, rather than the opening.

For one thing, this design contributes to supporting children's motivation for the COD training and interest in Chess as such throughout the whole training course. The practice shows that if young chess learners, and especially those children whose main interest lies in chess play as such, remain devoid of the opportunity to play chess (as they have to learn all the rules at first etc.) for a long time, they lose motivation. Balancing time for learning and playing may enable the teacher to avoid these negative effects. The method has been designed for the age at which children learn best when playing.

For another thing, this design makes it possible to bring practical chess problems that children do when learning the rules of Chess, more in line with the objectives that they will need to accomplish when actually playing, i.e. analyzing positions, checkmating, defending one's pieces, attacking, winning the endgame etc. At any training stage, the teacher becomes able to select assignments working on which students may accomplish both developmental and chess training objectives, and may shape and train specific skills indirectly, i.e. as the means by which students may accomplish a more interesting objective (such as learning to checkmate the King).

Lesson Plan

The number of lessons within a specific module may vary significantly depending on every child's specific aspects, the starting level of his/her expertise in Chess and the level of development of his/her internal plane of actions.

The Table above indicates approximate upper and lower time bounds of the training modules. We believe that having grasped the essence, major ideas and principles of the COD method, the teacher will be able to decide when it may be more feasible to suggest moving to the next module depending on the situation of a concrete student or a group of students. We would like to emphasize that the time that is allocated for studying a specific module allows for only partial skill training and partial accomplishment of developmental objectives. Indeed the training has a different goal. The work on objectives that the child starts within a module needs to be carried forward to subsequent modules. An essential principle of the program is ***the overlapping learning activity***.

For instance, the program recommends allocating only one lesson to the Rook's movement ("Movement. Rook"). Apparently, it is not enough. Nevertheless, the subsequent modules imply that the child makes extensive use of the knowledge of how the Rook moves in learning such chess concepts as check, mate, defenses from check etc. Furthermore, later on, the teacher introduces specific playing tasks, e.g. "Give a checkmate in the position of a King and a Rook versus a King". Thus, during the following 5-6 lessons, children work with the Rook's movement but use it as a vehicle for solving other objectives. There is evidence that when people use knowledge and skills as a means of performing other activity, they learn them faster and more efficiently than when they make them a subject matter of specific learning. Shaping the ability to perform mentally in the course of the training relies on the same principle.

For instance, when studying the "Chessboard" module, children start shaping the mental image of the chessboard including the ability to mentally identify a square on a chessboard using its name and identify its colour; the ability to identify the mental image of a line or a group of squares from the background of the mental image of the chessboard etc. However, by the end of studying the module, these abilities remain underdeveloped in children. The work aiming at improving the mental image of the chessboard continues throughout all the following modules.

We would like to emphasize that the guidelines regarding the number of lessons no way imply that this plan should be fulfilled mechanically. There may be situations when all the students in the classroom face the same challenge (for example, if most of them make a mistake of moving a King to an attacked square and the teacher finds out that the reason for that is misunderstanding of the King's movement rules). Apparently, it would be a mistake to start a new module at that point, and the teacher needs to devote a lesson or part of a lesson to correcting the shared mistake. There may be other, seemingly similar situations, for instance, when children keep on confusing Latin letters identifying files by the end of studying the "Chessboard" module. In this case, it will be more efficient to proceed with the training making the use of the file names a vehicle for children's further work, and/or allotting several minutes to studying letters every lesson.

Delineating work within each module, we provide major criteria of its termination and moving to the next module. Nevertheless, one needs to account for the context of a concrete classroom and a concrete student in addition to these criteria. In each specific case, the teacher and the students will have to decide what will constitute the epicenter of the class' work, and which problems they need to focus on.

Playing Lessons

Starting from the "Movement. King" module, the program implies providing lessons of two types – "instructional" and "playing". Instructional lessons focus on learning a new subject matter; working on assignments, i.e. exercises, problems etc. Playing lessons enable learners to accomplish educational and developmental objectives indirectly in the course of playing chess with the pieces that they have learned by the time. The first three modules of the course include playing assignments as well, but we believe that since the fourth module, children need to have an opportunity to play with each other and this opportunity needs to be embedded in the program. If the curriculum presupposes two Chess lessons a week, then one lesson should be instructional and another lesson should be a playing one. Playing lessons are crucial as chess training makes no sense without chess play, and children who are most eager to learn to play Chess lose their motivation.

Watching the students play, the teacher, in his/her turn, becomes able to assess issues that the children may have. The teacher may dedicate some time during a playing lesson or dedicate the whole following lesson or part of it to working with these issues. Playing lessons are mandatory for the teacher (he/she needs to ensure that children get the opportunity to play), but they are optional for the child. During a playing lesson, the child has the right to do what he/she believes more interesting and relevant for him/her at the time (playing with a partner; solving problems; memorizing the position; working with some individual difficulty etc.).

The only exception is entertaining activities that contribute nothing to the child's development. One of the rules may be keeping to the subject matter of the module that the class is learning at the time, or working with some individual challenges. The child should explain why he/she needs to do what he/she wants to do and how he/she may benefit from this activity.

Another rule is that a playing lesson remains a lesson. When playing, one needs to talk chess language (chess terms, notation); to follow the already learned laws of Chess, and to record moves whenever possible etc. It is important to invest effort in arranging playing so that, ideally, children will feel the need for it (rather than perceive playing as a "prescribed" activity). Children may need playing lessons either to play chess successfully or to accomplish developmental objectives that they have consciously set for themselves.

The teacher and children need to discuss the rules of conducting playing lessons in detail and agree on them.

TRAINING PROGRAM OUTLINE

Introduction to Chess

This lesson is crucial for the whole following work throughout the year. **The teacher needs to ensure that children, who miss this lesson for any reason whatever, will NECESSARILY have this discussion during an individual session.**[3]

[3] The same principle is applied anytime when the child misses lessons, during which the teacher and the students have agreed on something, or the teacher has explained the point of some activity which the absentee needs to engage in. As an alternative to an individual session, the teacher may invite students to tell a newcomer why and what for they need to perform some activity (the teacher may also use this process as some additional feedback as to how the children make sense of what is happening).

The lesson's main objective implies that every child makes his/her own sense of learning Chess.

Another objective for the teacher and children, which is as important as the first one, is to develop a shared intention for working together; "to plan the journey"; to become aware of the outlook of the chess training.

The third objective is to establish links between the chess training and other lessons.

Additional objectives include assessing the class (or a training group) as far as their expertise in Chess is concerned; developing a general understanding of Chess in children who see Chess for the first time in their life.

What Happens during Lessons

1. Discussing who knows what about Chess –the game's history, essence, laws etc. – with children. The teacher may use a test to assess the level of the children's expertise in Chess.
2. Discussing the proposed chess training, and its double focus (on learning Chess and developing abilities and skills that are prerequisite for successful learning in general). Eliciting students' expectations of this training.
3. Discussing what sense the chess training makes to everyone (including the teacher)
4. (!) Defining the general outlook for the chess training; discussing the plan of working during the year. Designing "a developmental path" in collaboration with the children so that they may have a visual representation of potential outcomes and may address this diagram when planning their work in the classroom.

Recommendations for teaching. It is most natural to start the first lesson with a conversation with the children about who knows what about Chess; who plays at home with their parents or friends (establishing contact; initial assessment). The children may develop their initial representation of chess play during this conversation.

It is better to structure the dialog with the children according to the following principle: at first, the teacher invites the children to share their opinion on some question, and only after all volunteers have expressed their opinion, the teacher may voice his/her perspective. Observing this principle is crucial for this lesson and for the lessons that focus on sense-making. In order to make his/her own sense of the training, the child should have an active attitude to it. The dialog with children is a means of helping them to take on this attitude.

Having found out what Chess is and what the children know about this game, the teacher and the students start discussing how Chess can be helpful to them as far as their studies are concerned; why Chess is included in the school curriculum. The teacher's objective in this discussion is to communicate the idea that the children will engage in a very specific work in terms of the COD training. The teacher needs to discuss the idea of studying Chess to acquire abilities and skills that are prerequisite for successful learning rather than to learn to play Chess alone, with the children so that they may express their attitude to this idea. Let the children think how Chess can help them with their studies. The teacher may elaborate on their answers later.

The discussion of the idea is followed by the question what sense the prospective chess training makes for every child personally; what exactly they would like to learn; what they are most interested in; and why they will come to chess lessons. At this stage, it is important that the children have time to think, and then the teacher listens to everyone who

volunteers to speak. Alternatively, the teacher may invite the children to write the answers to these questions, or those who want to speak may do it, and then the teacher may ask the class to put down their ideas – everything depends on the situation. Eventually, each student identifies and words what sense he/she makes of learning Chess **personally** either verbally or on paper as a result of the conversation about the point of learning Chess.

Everyone will make his/her own sense. It does not matter whether the child takes account of the idea of using Chess for his/her overall development (although it is important that he/she understand it); whether he/she words this meaning him/herself or repeats it after a friend; whether this wording is a result of deep reflection or pure emotional. It is essential that the child decide something for him/herself. Sense evolves with time as well. The aim of this conversation is to offer the child a range of options (rather than "to attain the right meaning", as there is no "right meaning", it is always individual) and then to help the child to look into him/herself and to understand what he/she wants, what he/she is interested in.

Furthermore, the teacher needs to take notes of what each child wants. The teacher may use this information later (and actually the teacher needs to keep this information in mind) when selecting individual assignments, and establishing an individual developmental path for each child. The answer to the question whether the child is able to make his/her sense of the training during the lessons, frequently explains the challenges that the child faces and may be useful for identifying some way of help.

Having identified the sense of learning, the students and the teacher may proceed to developing a forward-looking plan of their work. The teacher may build the conversation around the image of a warlord discussing which essential skills and knowledge a warlord needs to have. Drawing on the image of a prospective battle and adding information regarding the laws of the chessboard battles, the teacher and the students paint a picture of the upcoming training with bold strokes.

For example, the warlord needs to investigate the battlefield; then, to get to know the army and its setup before the battle; then, to find out about capacities, strengths and weaknesses of every warrior and what this warrior can do to win the battle (to achieve the game's goal). You may use a different image, of course. If the students have already had some experience in Chess, planning may draw on their experience. It is important to build a forward-looking plan for the training in collaboration with children. The cornerstone of this process is authentically collaborative planning (the teacher discusses students' proposals, provides a rationale and arguments for his/her opinion if it contradicts the students' opinion, rather than "guides" the students to guess a foregone conclusion "by themselves"; any plan may be adjusted after all).

We advise to write the forward-going intention of work for the year down on a large sheet of paper during the lesson (when discussing it) so that the teacher and the students may be able to consult this plan if necessary. One may need it to regain one's sense of learning or to keep records of the children's progress as a result of reflection, or to use it as a reference when discussing more specific intentions for some stage, or to revise the overall intention if it is necessary. The form of documenting the intention is irrelevant; what is relevant is that this form reflects agreements and is clear to children (therefore, we suggest recording the ideas throughout the conversation. Furthermore, it is desirable that small groups that the class divides into "take the minutes" of their discussion. This work may end with joint planning of the coming lesson (for instance, "Let us start studying the chessboard").

Module 1. CHESSBOARD

Chess-related content: Familiarizing students with the chessboard (its shape; the rule of alternating dark and light squares; the total number of squares on a chessboard etc.). The orientation of the chessboard. Chessboard lines (ranks, files and diagonals). Line identifiers, the number of squares in a line. Square names as the first step in learning chess notation. The ability to identify a square using its name and to identify a square name of a specified square. Learning how to find any square starting with a1 (from left to right and from the bottom upwards looking at a chessboard either as White or as Black). The concept of the chessboard center; extended center; the rim (*students gain an initial understanding of these concepts, which will be elaborated when studying piece movement and capacities*). The children are introduced to the ethical conduct (handshake before and after the game; respectful and friendly attitude to the opponent) during the very first playing assignment.

Developing the ability to perform mentally: Starting to shape the mental image of the chessboard (we would like to reiterate that **this module aims at starting this process**).

It includes:

1. Starting to shape the ability to visualize a chessboard; to use a given square name to identify a square on the visualized chessboard and to identify its colour. The basis for this ability (the material plane of a mental action) forms when the child masters the ability to identify a square by its name on a regular chessboard or a drawing of a chessboard (*Translator's note*: hereinafter, chessboard diagram), and the ability to identify the name of any square on the chessboard.
2. Creating the basis for developing the ability to visualize a chessboard; to identify a line (a rank, a file or a diagonal) on the visualized chessboard and to announce the names and the colour of the squares along this line in direct, reverse or randomized order, and the ability to mentally identify a square where lines intersect. The basis for this ability forms both when children train to identify a square's location (tracing ranks and files, identifying points of their intersection) and when they work on assignments aiming at learning such concepts as ranks, files and diagonals.

Relevant complementary objectives:

1) Children familiarize themselves with a new style of learning and a new lesson design (see Chapter 1), and get used to being fully-fledged agents of their activity and to a supportive role of the teacher; to group work;
2) The teacher ensures that children start to get used to speaking the Chess language ("the second rank" instead of "this line"; "c3" instead of "this square");
3) Children start to work with various chessboard types and representations;
4) Children start to develop the ability to orient themselves in the space of the chessboard both from the White and the Black perspectives.

Criteria for proceeding to the next module:

– The child has no major difficulties identifying the square names (a major difficulty is the situation when the child has failed to build his/her own mode of identifying a square by its name and identifying the name of a specified square on the material plane; **the fact that the child continues using material tools is NOT considered a major difficulty**);
– The child may identify the colour of any square on a colourless chessboard (*Translator's note*: hereinafter, white chessboard), at least, by counting squares starting from a1,

i.e. the child is aware of a1's colour and understands how the chessboard squares alternate (the child may look at the letters on the chessboard to identify the order);

– The child understands what ranks, files, diagonals are and how they are labeled; the child can show and name them on a chessboard;
– The child can orient him/herself on a chessboard in the material, symbolic and verbal planes, that is, the child can work with a regular chessboard, with a chessboard diagram, with a display chessboard (or a chessboard image on a computer display) and verbalize his/her actions (the child start speaking Chess language).

Logic of Lesson Design:

Working with the chessboard starts from the basic lesson on this subject matter, during which children study the chessboard and the teacher introduces all the core concepts (the chessboard; a square; ranks; files; diagonals; rank and file names, square names and how to identify them; the orientation of the chessboard; diagonal names; the center of the board and the edge squares). The teacher needs to involve children in this process as actively as possible (just like in any other type of work). It is desirable that children be enabled to autonomously do everything that they are able to learn (to count, to identify or to guess) by themselves. For instance, the teacher may ask them to count all the squares (dark and light ones) on a chessboard; along a rank, or a file; the teacher may tell them that there are four central squares and ask them to identify which squares lie in the center of the chessboard (if the students show these squares, the teacher may ask the students to name them) etc. If the students are familiar with Chess, then the teacher arranges the group process of recovering the collective knowledge (in the same manner as during the first basic lesson), and adds new information.

The teacher records the main terms that he/she introduces during the lesson on a flipchart or a blackboard (or, if these terms are new or well-forgotten, it is preferable to put them down on a sheet of paper so that the children may have it at hand during the coming lessons as they will have to use these terms extensively). The teacher may introduce an easy-to-understand image or a diagram (so that the child may look at this diagram and recall the name of the line that the teacher is asking him/her about). Further, the teacher and the students discuss what they need to learn; which concepts they need to specifically work through so that they could orient themselves well in the space of the chessboard. The teacher provides a rationale for his/her proposals. The teacher and the students design an outline of the plan for their work together. To start with, the teacher may invite the students to play a game that will help them to familiarize themselves with the chessboard; to learn to identify the square names and to identify squares by their names, as these skills make all the other actions (relating to colour, lines etc.) possible. The teacher and the students start their joint work with playing "Chess Battleship".

The main types of problems:

– problems for identifying a square name and identifying a square on the chessboard by a specified name;
– problems developing the ability to identify the colour of a square using its name (on a white chessboard);
– problems developing understanding of the chessboard lines (concept, identification, naming);
– problems improving the ability to orient oneself in the space of the chessboard and laying the basis for shaping an integral mental image.

Module 2. PIECES

Chess-related content: Introducing chess pieces. The ability to distinguish between them both on the material plane (real pieces) and the symbolic plane (on a diagram or a display chessboard) and the ability to denote them when taking records (notation).

Consistency with the previous module: Students continue working with the squares' identifiers (identifying a square that a piece is occupying etc.). Complete succession of all complementary objectives.

Criteria for proceeding to the next module: One lesson will suffice for this module, unless any peculiar difficulty arises. The remaining difficulties with differentiating pieces or notation may be addressed during the next module. On the other hand, the best way to memorize the mental images of the pieces is to start using them actively (using notation, differentiating pieces for the purpose of arranging them into the starting position etc.). When working with the subsequent modules, children will need to deal with these objectives naturally.

Logic of lesson design: At the beginning of the lesson (or at the end of the last lesson of the Chessboard module), the teacher and the students need to reflect on the previous stage of working together (joint reflection process); to conceptualize challenges that they have faced; which challenges they have overcome, and which remain unaddressed. It is desirable to discuss the possibility to continue working on the remaining challenges while furthering studying the laws of Chess. The challenges and intentions are recorded in the Reflection Chart in the Workbook. Then, the teacher and the students may start studying chess pieces (what which piece looks like; which way it is represented in the diagram and in notation). It is important to teach the students to differentiate between pieces, especially those that look alike, and recognize a piece in its various guises, rather than simply introduce them to the students.

If the children have received Chess training earlier, they are recalling their knowledge in collaboration with the teacher; if otherwise – the teacher gives some information, but it is desirable to encourage the children's active participation and to establish dialogue.

For instance, the teacher may show pieces and name them. Then he/she may address the children with a question, "Which pieces do look alike?", and when the children name them, he/she may wonder, what is the difference between them and how one can differentiate between them. Perhaps, the teacher may invite the students to do it within small groups or pairs, and then present the groups' suggestions. Please keep in mind that there are no correct or incorrect answers here: if the child says that the King seems to look like the Rook, the child means it. The teacher may ask a specifying question, "What do you think, can they be confused?" If the child says "Yes", then he/she needs to work out a way how to differentiate between them. Then, the teacher demonstrates diagram symbols of pieces on a display chessboard. The teacher may invite the children to guess a piece's name and show a Knight to them. Then, the teacher may show a King and a Queen, and ask the children how which piece is called and how one may tell the difference between them (let the children seek for their own modes of distinguishing between these pieces in pairs or groups).

The teacher may introduce the remaining three pieces in the same way or even ask the children to look at the wooden chessmen and guess which diagram symbol denotes which piece.

Working with notation may be structured similarly: the teacher writes a letter on the blackboard, and the children guess which piece is denoted this way. There is only one issue with the Russian-speaking students: they often confuse the notation for the King (Korol') and the Knight (Kon'), because in the Russian notation they look very similar: "Kr" for the King

and "K" for the Knight. It may be worth discussing the notation symbols for the other three pieces and the Pawn and then asking students which pieces remain on the chessboard. Then the teacher invites students to take time and think and puts down 'Kr' and 'K' on the blackboard. Having thought it over, the children will quickly guess which notation denotes which piece. The teacher invites the students to justify all their answers ("Why do you think so?").

The main types of problems:

1) Distinguishing between pieces, piece symbols (the diagram) and their representations in notation.
2) Making an association between and juxtaposing a piece, its diagram symbol and notation.
3) Problems for mediated memorizing of various representations of the pieces (memorizing when using pieces as a means of accomplishing a play or learning objective).

Developing the ability to perform mentally: The juxtaposition of a real piece and different types of its symbolic representation is a logic continuation of the work with symbolic images of the chessboard (a regular diagram, a "mute" chessboard, a white chessboard diagram).

When identifying the location of a square that the child needs to move a piece to, or identifying the name of a square that a piece occupies, the child needs to use such material tools that he/she needs from the perspective of the maturity of his/her ability to perform mentally at the time. When working with one type of problems, children may use chessboards with marked and unmarked squares, and various chessboard diagrams depending on his/her capacities at the time. The main challenge that the child may face when working on the module is that he/she may confuse pieces or their names. The teacher can help the child overcome this challenge inviting the child to develop his/her own mode of action so as to distinguish between these pieces and teaching him/her certain mnemonics.

Module 3. MOVEMENT. REVIEW. KING

Key objectives of the lesson:

- building a bridge between the work during the previous modules and a new stage of work;
- giving an overview of the prospective work;
- introducing key concepts that are relevant for the whole "Movement" module and developing general understanding of the game's goal and essence so that thorough investigation of each piece may fit into an integral (even if it is still vague) vision of the laws of Chess and so that the basis for creating the assignments that will be close to the real play situations may emerge;
- creating a joint intention for a major stage of work.

The teacher introduces the following ideas. The main goal of the game is to attack the King so that it will face inevitable capture. This attack is called "checkmate" (or "mate"). If the King escapes the attack, then it is check, rather than checkmate. The variants of the game ending always relate to the King (winning means checkmating the opponent's King; losing means being checkmated by the opponent's pieces, and the game ends in a draw when both opponents fail to checkmate). The teacher introduces an understanding of a piece's move as of a step that leads the chess warlord to the goal (the outcome of

the game depends on careful consideration of prospective moves). The teacher helps the children to shape understanding of how pieces may move: the long distance or the short distance; straight or leaping over other pieces; in any direction or only in some directions. Each piece moves in its own way: some move only diagonally; others – only horizontally and vertically; the Knight can jump over other pieces but its move should necessarily form the letter "L", that is, each piece has some legal and some illegal moves. One needs to be aware of these rules so at to be able to play. Pieces can also attack the opponent's pieces, eat (capture, chop wood, take) the opponent's pieces, defend one's own pieces, be threatened with an attack and be eaten.

The essence of this module is **to review moves so that a thorough examination of each piece may fit into an integral (may it be vague yet) vision of the laws of Chess.** Children only familiarize themselves with these concepts; in practice, they will understand them later when they will be studying each piece in detail.

New chess-related content: The King's role in the game. The King's movement rule: moving one square in any direction. The rule that Kings are never removed from the chessboard – neither during the game nor at the end – as the game ends as soon as the King fails to escape capture. The rule that the King can never be put under threat; that the King can never occupy attacked squares (*plus* clarifying this concept in practice so that the children may arrive at the right understanding by themselves). Emphasizing that it is the King alone who may never occupy this position; other pieces may occupy an attacked square and may even sacrifice themselves intentionally for the sake of the game. If the King moves to an attacked square during the game, the player will have to make a different move. The squares controlled by the King, their number (and King mobility) in various positions (in the centre, on the rim, in the corner). Notation (recording moves).

Developmental objectives: Continuing to develop the mental image of the chessboard. Starting to shape the mental image of the King's movement. Starting to shape the ability to see attacked squares before making a move as a first step to developing the ability to see moves ahead and to anticipate a move's consequences. Developing reflection (it is desirable to give children an opportunity to reflect on the assignments that they have completed and to make a conclusion that the Kings can never occupy adjacent squares).

Consistency with the previous module: The starting position, notation, shaping the mental image of the board (identifying a square's name and finding a square's location using its identifiers, square colours, chessboard lines).

Logic of lesson design: The rules of the King's movement are introduced by means of explanation or dialogue (depending on what the children already know about Chess). Furthermore, the teacher words the rule that "you can never move a King to an attacked square" exactly this way and makes no additional inferences from this rule.

It is strongly desirable to give children an opportunity to draw all the conclusions (e.g. that the Kings may never occupy adjacent squares, or that there are situations when the King has no legal moves as all the squares are attacked ones) by themselves as a result of discussion or reflection on the assignments.

Having introduced the main rules of the King's movement, the teacher may invite the children to discuss the following questions in small groups or in terms of the general discussion:

- Does the King move along files? Ranks? Diagonals?
- How many moves does it take the King to cross an empty chessboard as fast as possible?

– How many squares does the King control? (The teacher needs to explain the term "to control" in simple language as the children encounter this word for the first time in practice). Does the King control the same number of squares in all positions? In which positions (when occupying which squares) does the King control the fewest squares (and how many)? In which positions does the King control the most squares?

Following the joint work, the teacher and the students start working on the assignments allowing for better awareness of and mastering the King's moves in practice, for understanding its capacities and limitations etc. When it is the right time (when the children feel the need for some skill to complete an assignment), the teacher shows the students how to record a move; how to record moves when playing.

Criteria for proceeding to the next module: The children play without glaring mistakes as far as the King's moves are concerned (they avoid jumping over the squares and moving the King to two squares at a time; they remember about the King's ability to move diagonally etc.). They understand that the King can never occupy an attacked square and understand what this square is (and hence, which squares the King controls). They understand how the King can capture other pieces.

Module 4. MOVEMENT. QUEEN

New chess-related content: The Queen's movement rules (it moves along any files, ranks and diagonals). Possible trajectories of the Queen's movement. Squares that are controlled by the Queen: their number depends significantly on the Queen's position on the chessboard. The maximum and the minimum of squares controlled by the Queen. The Queen's most and least advantageous positions on the chessboard. The Queen is the strongest piece (its value is 9 pawns). Capturing by the Queen. Queen as a long-range piece. The ability to move the Queen along a certain path observing the rules (following the movement rules; avoiding the opponent's threats; attacking the opponent's pieces).

The ability to move any number of squares in any direction makes the Queen not only the strongest but also most mobile piece. Demonstrating the Queen's advantage in the problems for identifying a sequence of moves and avoiding obstacles (e.g. getting from one square to another in as few moves as possible).

Developmental objectives: Continuing to master the chessboard and to work with diagonals. Shaping the integral mental image of the chessboard. Starting to shape the mental image of the Queen's movement understanding the Queen's movement as moving along a sequence of squares constituting a segment of a file, a rank, or a diagonal). The ability to identify various lines from the background of the chessboard and name them. The ability to use material tools when shaping the mental image of the Queen's movement: indicating the ending and the starting squares of its path with chips; placing a strip of paper or a ruler on a line. Vision of the Queen's possible moves when the Queen occupies a certain square on an empty chessboard, and in the position that includes other pieces. Identifying and naming all the feasible moves of the Queen in a specified position.

Shaping the mental image of a sequence of the Queen's moves when the Queen is moving from one square to another (in the presence of obstacles that it needs to avoid). Searching for a move results in drawing shapes ("figures") that are formed by the lines that the Queen has passed, on "the background" of a chessboard. Drawing the moving Queen's path on a

chessboard diagram. Starting to shape the ability to see squares that the Queen controls on a chessboard. As the Queen controls a maximum of 27 squares, one needs to group squares in order to memorize and name them. It is more convenient to use lines (rather than separate squares) to see the Queen's path and figure it out as the use of lines enables easier and better memorizing. Developing reflection.

Consistency with the previous modules: The King's moves in a horizontal, vertical, or diagonal direction.

Logic of lesson design: The teacher introduces the rule of the Queen's movement through dialogue and questions to children, relying on the expertise of the children who play chess and explaining additional material if necessary.

Questions for group discussion: Compare how the Queen and the King move. Describe similarities and differences between their moves. How many squares can the Queen control at a time in various positions on the board? How does the number of controlled squares depend on the Queen's chessboard position and positions of your pieces and your opponent's pieces? Find the Queen's most advantageous and most disadvantageous positions on the chessboard from the perspective of the number of squares that the Queen may control. Making sense of this in terms of Chess play: the Queen needs open lines to demonstrate its strength; the poor positioning of one's own pieces may devoid the Queen of its strength and keep it out of the game; alternatively, the appropriate positioning of the pieces may weaken the opponent's Queen. What conclusions can we arrive at if we connect the Queen's specific aspects to its position on the chessboard? Where and how is it better to place the Queen? Find and put down the Queen's most advantageous and most disadvantageous squares. Discussion: what weakens the Queen and what makes it stronger.

Criteria for proceeding to the next module: Children move the Queen correctly; they can name and record moves; use such concepts as "file", "rank", "diagonal"; find and identify these lines on the chessboard. Looking at the chessboard, children can solve problems for avoiding obstacles and can identify the Queen's path when it is moving from one square to another. Children understand how the Queen can capture other pieces and threaten the opponent's King.

Module 5. MOVEMENT. ROOK

New chess-related content: The Rook's movement rules. Possible trajectories of the Rook's movement. Squares that are controlled by the Rook: their number never changes in any position on an empty board (14), but it depends on the position of other pieces. This is the Rook's unique feature as the other pieces' "lethality" depends both on other pieces and their position on the board. Capturing by the Rook. The ability to move the Rook along a certain path observing the rules (following the movement rules, avoiding the opponent's threats, attacking the opponent's pieces). The concept of light and heavy pieces. The Rook is Top 2 of the strongest pieces (its relative value is 5 pawns).

Problems for identifying a sequence of moves (getting from *a1* to *h8* in as few moves as possible). The rule of solving problems "starting from the end goal", that is, the search for a move starts with planning the endpoint and proceeding from it to the starting point of movement while also identifying potential points of the lines' intersection (when moving from a1 to h8, the Rook can move along the first rank and the a-file). It can get to h8 by moving along the eighth rank or the h-file. The a-file intersects the eighth rank at a8, and the first rank intersects the h-file at h1. Therefore, the problem has two solutions:

1) the first variant is a1 – a8, a8 – h8;

2) the second variant is a1 – h1, h1 – h8.

Developmental objectives: Starting to shape the mental image of the Rook's movement (understanding the Rook's movement as moving along a sequence of squares). It includes the ability to identify ranks and files on the chessboard. In software products, such identification is carried out through highlighting the line with some colour.

When shaping the mental image of the Rook's movement, highlighting is performed by means of indicating the ending and the starting squares of a line with chips; placing a line (a strip of paper or a ruler) on a file or a rank (depending on which line the Rook will move along).

It is important that the child mark the line by him/herself as the child's autonomous performance consists in acting in a specific way when identifying the line that he/she fails to see. At first, the child identifies the line using his/her hands to point at it; then he/she verbalizes it; then he/she starts making out the line when looking at it, i.e. the child acquires the ability to identify it mentally; finally, the child becomes able to reproduce the Rook's path in his/her head without looking at the chessboard (blindfold).

Naming the squares that the Rook is passing by when making a move. Consolidating the image of ranks and files as a sequence of alternating light and dark squares.

Shaping the mental image of a sequence of the Rook's moves when the Rook is moving from one square to another (in the presence of obstacles that it needs to avoid).

Example. You need to move the white Rook from a1 to a6. The obstacles (the opponent's black pawns) occupy the following squares: a5; b3; c4; d6; e2; g3; h2. (The desired sequence of moves: 1. Ra1-f1; 2.R1-f7 (f8); 3. Rf7(f8)-a7(a8); 4.Ra7(a8)-a6.) Searching for a move results in drawing "figures" that are formed by the lines that the Rook has passed, on "the background" of the chessboard.

Starting to shape the ability to see squares that the Rook controls on the chessboard. Developing reflection.

Consistency with the previous module: The King's and the Queen's horizontal and vertical moves, the attacked square concept, capturing pieces, the starting position, the image of the chessboard, notation.

Logic of work design.

The teacher introduces the rule of the Rook's movement in the same manner as when introducing the King's and the Queen's moves.

Questions for group discussion:

Compare how the Rook, the Queen and the King move. Describe similarities and differences between their moves. How many squares can the Rook control at a time in various positions on the chessboard? Does the number of controlled squares depend on the Rook's chessboard position (it does not, but it does depend on the position of your pieces and your opponent's pieces)? Making sense of this in terms of Chess play: the Rook needs open lines to demonstrate its strength; the poor positioning of one's own pieces may devoid the Rook of its strength; alternatively, the appropriate positioning of the pieces may weaken the opponent's Rook. Group assignment: Give examples of the positions.

Discussion: When is the Rook strongest? When is the Rook weak and helpless? What weakens the Rook and what makes it stronger?

How can you identify the Rook's path in a problem for avoiding obstacles? – The teacher invites the children to describe (to reflect on) their own mode of doing this. The modes of action are discussed, compared and an optimum mode of action is designed. The teacher and

the children discuss a potential significance of this mode of action for other activities (assignments in other school subjects): e.g. a technique of "solving the problem starting from its end goal" is useful for doing mathematical problems. Tracing the move's trajectory, registering and naming each square seem similar to actions that a person performs when writing difficult words in Russian when one needs to pay attention to each letter. It may turn out that depending on the challenges that the children may face when working on this assignment, the children may name other modes that may be relevant as far as their learning is concerned.

When (in which conditions) may the King and the Rook checkmate the opponent's lone King? – The opponent's King is in the corner; one's own King precludes its movement along a diagonal and a line that the Rook cannot attack; the Rook occupying another rank or file can check (and actually checkmates) the opponent's King. What other outcomes may this situation of checkmating a lone King have? There are two types of a draw, namely, a stalemate and impossibility to checkmate because there is insufficient material left if the lone King eats the attacking Rook. If these situations occur in real play, the teacher needs to necessarily introduce corresponding concepts (draws, stalemate) and to emphasize that there will be specific lessons devoted to studying these concepts thoroughly in the future.

The teacher avoids speeding the chess material up on purpose, but if these situations occur, they represent a reasonable opportunity to advance learning Chess, and the teacher needs to utilize this opportunity.

Criteria for proceeding to the next module.

Children move the Rook correctly; they can name and record the Rook's moves; use such concepts as "file" and "rank". Children can solve problems for avoiding obstacles and find the Rook's path when it is moving from one square to another without using additional material tools but looking at the chessboard (not necessarily mentally, without a chessboard). Children understand how the Rook can capture other pieces and threaten the opponent's King.

Module 6. MOVEMENT. BISHOP

New chess-related content: The Bishop's movement rules. The Bishop's path. Light-squared and dark-squared Bishops. Squares that are controlled by the Bishop: their number depends on the Bishop's position on the chessboard. The maximum and the minimum of squares that the Bishop controls.

The Bishop's most advantageous positions on the chessboard (on the longest diagonals closer to the chessboard centre). Comparing the Bishop to the Rook whose "lethality" never depends on its position on the chessboard. Comparing the Bishop's and the Rook's value. Specifying the concept of light and heavy pieces. The Rook with its relative value is 5 pawns is Top 2 of the strongest pieces (Top 1 is the Queen). What are the Rook's strengths as compared to the Bishop? How much stronger (as measured by Pawns) is the Rook as compared to the Bishop? Capturing by the Bishop. How does capturing by the Bishop, the Rook and the Queen differ from capturing by the King? The Bishop and the Rook are long-range pieces (they can cross the chessboard to capture other pieces). The King is dangerous only in close combat.

The ability to move the Bishop along a certain path observing the rules (following the movement rules, avoiding the opponent's threats, attacking the opponent's pieces).

Problems for identifying the sequence of moves (e.g. getting from a1 to h8 in as few moves as possible). The rule of solving problems starting from the end goal, that is, the search for a move starts with planning the endpoint and proceeding from it to the starting point of

movement while also identifying potential points of the lines' intersection (just as the child acted to solve the problems with the Rook).

Chess endgame: the King and the Rook versus the King and the Bishop. An illustrative example of the chess piece value: the King and the Rook can checkmate the opponent's King, and the King and the Bishop cannot – this position results in a draw. The teacher may invite the children who are advanced in Chess to solve a problem for checkmating a lone King with two Bishops, or to play this position one-to-one swapping their sides by turns.

Developmental objectives:

Continuing to master the chessboard; starting to work with diagonals as lines that are important in chess play. Starting to shape the integral mental image of the chessboard. Starting to shape the mental image of the Bishop's movement (understanding the Bishop's movement as moving along a sequence of squares lying on a certain diagonal). It includes the ability to identify diagonals on the chessboard and name them. In software products, such identification is carried out through highlighting the line with colour. When shaping the mental image of the Bishop's movement, highlighting is performed by means of indicating the ending and the starting squares of its path with chips; placing a line (a strip of paper or a ruler) on a diagonal.

Similar to learning the Rook's movement, it is important that the child mark the line by him/herself as the child's autonomous performance consists in acting in a specific way when identifying the line which he/she fails to see. At first, the child identifies the line using his/her hands to point at it; then he/she uses eyes and speech; then, the child acquires the ability to identify the line mentally, including the ability to identify the lines and their combinations without looking at the chessboard (blindfold).

Naming the squares that the Bishop is passing by when making a move. Consolidating the image of diagonals as sequences of the like-coloured squares, either dark or light ones. Shaping the mental image of a sequence of the Bishop's moves when the Bishop is moving from one square to another (in the presence of obstacles that it needs to avoid). Searching for a move results in drawing "figures" that are formed by the lines that the Bishop has passed, on "the background" of the chessboard.

Starting to shape the ability to see squares that the Bishop controls on the chessboard. Developing reflection.

Consistency with the previous modules: The King's and the Queen's diagonal moves; the attacked square concept; capturing; the starting position; the image of the board; notation; the chess piece value and mate-in-one problems.

Logic of work design.

The teacher introduces the rule of the Bishop's movement in the same manner as when introducing the other pieces' moves (in a dialogue, wondering, drawing on the expertise of the children who know how to play Chess, and explaining the material if necessary).

Questions for group discussion:

Compare the Bishop's and the Rook's movement with other pieces. Describe similarities and differences. How many squares can the Bishop control at a time in various positions on the chessboard? How does the number of controlled squares depend on the Bishop's chessboard position and how does it depend on the position of your pieces and your opponent's pieces)? Find the Bishop's most advantageous and most disadvantageous positions on the chessboard from the perspective of the number of squares that the Bishop may control. Making sense of this in terms of Chess play: the Bishop needs open diagonals to demonstrate its strength; the poor positioning of one's own pieces may devoid the Bishop of its strength; alternatively, the appropriate positioning of the pieces may weaken the opponent's Bishop. Group assignment: Give examples of the positions. Find and put down the Bishop's most advantageous and most disadvantageous squares. Discussion: what weakens the Bishop and what makes it stronger.

When solving problems for identifying the Bishop's path (with avoiding obstacles), children need to recall the mode of action that they designed when studying the Rook. The teacher gives the children an assignment to describe this mode and validate how it works with the Bishop. The teacher and the children may refine and generalize the mode.

Proceeding with designing an optimum mode. Continuing to discuss a potential meaning of this mode of action for other activities (assignments in other school subjects). Discussing whether the children tried applying this mode of action during other lessons. What was the result? These digressions from the chess-related agenda are especially relevant for the children who are less interested in Chess and are far from being enthusiastic about the game. Such conversations help them to regain the ability to make sense of learning Chess.

When playing the endgame of "the King and the Rook versus the King and the Bishop", the teacher may show the meaning of the fifty-move rule (the game ends in a draw if no piece has been captured and no pawn has been moved in these fifty moves). The defense and attack options may be recorded in reference cards or note books as well as on a blackboard or a flip chart. When playing the endgame of "the Rook versus the Bishop", the teacher may divide the children into threes (two children play and one observes the game and counts moves). The teacher needs to invite children who have made it to the two-Bishop-checkmate problems, to describe the mode of making this mate. How do they need to act so as to checkmate? Presenting the mode of action and the corresponding demonstration may be an activity for the whole class.

Criteria for proceeding to the next module.

Children move the Bishop correctly; they can name and record the Bishop's moves; they use such a concept as "diagonal"; find and identify diagonals from the ground of the chessboard.

Children can solve problems for avoiding obstacles and find the Bishop's path when it is moving from one square to another without using additional material tools but looking at the chessboard (not necessarily mentally, without a chessboard). Children understand how the Bishop can capture other pieces and threaten the opponent's King.

Module 7. MOVEMENT. KNIGHT

New chess-related content: The Knight's movement rules. Specific aspects of the Knight's movement as compared to other pieces: the Knight is the only piece that has an L-shaped path; it is the only piece that may leap over other pieces, and always alters the colour of the square when it makes a move (it moves from a light to a dark square and form a dark square to a light one).

The Knight's path: three ways to define the Knight's movement: 1) the Knight's move looks like the letter "L" (two squares horizontally or vertically and one sideways); 2) the Knight moves one square diagonally (like a pawn), and then two squares straight); 3) the Knight may move to any square of the opposite colour on a 5 by 5 board that are not adjacent to the square where it stands.

Squares that the Knight controls: their number depends significantly on the Knight's position on the chessboard. The maximum and the minimum of squares that are controlled by the Knight (8 squares in the centre and 2 – in the corner). The Knight's most advantageous positions on the chessboard. Comparing the Knight to the Rook, the Bishop and the Queen (the Knight is not a long-range piece). What is the Knight's strength and weakness as compared to the Bishop? The Knight's value (it is almost as strong as the Bishop with

the Knight's relative value being 3 pawns). Comparing chess pieces in terms of their value (prioritizing the pieces according to their value).

Shaping the concept of light and heavy pieces. Analyzing specific features of the Knight's moves. Solving such problems as: "Move the Knight from c3 to c4 (c5, c6, c7, c8)"; "Find the quickest way". Making sense of knowing these specific features in terms of Chess play: For instance, in the endgame, the King may be in the position that is least convenient for the Knight's attack (validating this assumption in practice when playing the Knight endgame).

The ability to move the Knight along a certain path observing the rules (following the movement rules; avoiding the opponent's threats; attacking the opponent's pieces).

The rule of solving problems starting from the end goal is crucial as far as the Knight's movement is concerned as the Knight's path is invisible (as compared to other pieces' paths). Training modes of action relating to this rule in solving such problems as "Capture all the opponent's pawns in as few moves as possible" (eating one pawn every move).

The danger of the Knight's attack. The Knight fork (a kind of a double attack). There are only two defenses against the Knight check (it is impossible to interpose another piece between the King and the attacking Knight). An outpost is the Knight's most favourable location. A checkmate delivered by the Knight is very specific as it allows for using the opponent's own pieces surrounding the opponent's King as allies for checkmating it (a smothered checkmate).

A mate in one in positions with various pieces. Playing endgames during playing lessons: the Knights versus the Bishops; the Bishop and the Knight versus the two Bishops; the Rook versus the Knight; the Queen versus the Knight and others; the King and the Rook versus the King and the Knight. The chess piece relative value. The Knight may be stronger, weaker or as strong as the Bishop depending on the Knight's position. Making sense of this in terms of Chess play: exchanging chess pieces involves analyzing whether the player will benefit from an exchange in this particular case or not. The teacher may invite the advanced chess learners to develop a rule when an exchange is useful and when exchanging pieces of almost equal value is hardly to their advantage.

Developmental objectives:

Proceeding with mastering the chessboard. Starting to shape the mental image of the Knight's movement. Mastering the Knight's movement boosts development of the internal plane of action. All the pieces that the child has already learned move along lines that comprise the chessboard's space and the child needs to identify them from the contour, to make them out as a figure on the ground of the chessboard squares. The Knight's path is unusual; the child has to devise it; it is a polygonal path (rather than a straight line) that a person draws on the chessboard rather than makes out of the contour. Shaping the ability to figure out and see the squares that the Knight controls. They never lie on straight lines (as with other pieces) and never adjoin one another (as with the King and the Queen). Analyzing specific aspects of moving the Knight from one square to another. The Knight makes three moves to cross the board and three moves to get to an adjacent square. Learning when the Knight needs to make an even number of moves and when it needs to make an uneven number of moves; how the number of the Knight's moves depends both on a square's location on the chessboard and its colour. It is especially important that the child mark the Knight's path when learning how the Knight moves, by him/herself as this path may be very peculiar. The child's exploratory activity and his/her own inferences as to what he/she has seen and become aware of when learning and analyzing the Knight's movement, is essential. Developing reflection.

Consistency with the previous modules: other pieces' paths on the chessboard; the attacked (controlled) square concept; capturing; the starting position; the image of the

chessboard; notation; the chess piece value; mate-in-one problems; a threat; a double attack (a fork)

Logic of lesson design.

Even though the rule of the Knight's movement is very unusual, the teacher introduces it in the same manner as when introducing the other pieces' moves (in a dialogue; wondering; drawing on the expertise of the children who know how to play Chess, and explaining the material if necessary).

Questions for group discussion:

Having discussed and demonstrated the Knight's movement, the teacher gives various assignments for group work and invites the children to infer which distinctive features this piece has.

The assignments may include such problems as: "Describe how the Knight moves" (let the children word the rule of the letter "L" themselves); "Get from one square to another"; a problem focusing on the Knight's ability to jump over pieces; a smothered mate problem.

Each group may get the same set of problems. However, the sequence of the problems within each set should differ so that the children may exchange exploratory experience, if there is little time left for completing all problems.

Compare how the Knight and other pieces move and describe differences. Identify the Knight's advantages and its weakness as compared to other pieces. Can one piece block the Knight's path?

How many squares can the Knight control at a time in various positions on the chessboard? How does the number of controlled squares depend on the Knight's chessboard position and how does it depend on the position of your pieces and your opponent's pieces? Find the Knight's most advantageous and most disadvantageous positions on the chessboard from the perspective of the number of squares that the Knight may control. Making sense of this in terms of Chess play: which Knight's moves are the strongest in the opening, and which Knight's moves should be avoided at the starting position? Group assignment: Give examples when the Knight is positioned "well" and "poorly". Find and put down the Knight's most advantageous and most disadvantageous squares. Discussion: What weakens the Knight and what makes it stronger? When solving problems for identifying the Knight's path (which includes avoiding obstacles), children need to try the mode of action that they designed when studying other pieces. The teacher invites the children to describe this mode and to validate how it works with the Knight whose path is more difficult to identify. Identifying the Knight' path looks like a simultaneous movement from two locations (a destination square and a starting square). One needs to stop at the junctions and work it out which direction represents a quickest way. When children start learning the Knight's movement, they need to necessarily use material tools (marks).

When playing endgames of "the King and the Knight versus the King and other pieces (the Bishop, the Queen, the Rook)", the teacher draws the students attention to how they may use the Knight for defense; how they may avoid the Knight's attack on their King; what are the principles of playing against the Knight during the endgame (it is especially useful for advanced chess players).

Criteria for proceeding to the next module.

Children move the Knight correctly; they can name and record the Knight's move; identify the Knight's path when moving from one square to another in several moves. They can find all the squares that the Knight controls in a given position; they understand what advantageous and less advantageous positions mean, and how the chess piece value relates to its chessboard position. They can solve problems for avoiding obstacles and find the Knight's path when it is moving from one square to another, using additional material tools (if neces-

sary). Children understand how the Knight can capture other pieces and threaten the opponent's King.

They can explain why there are only two options to defend oneself from the Knight check (to capture the attacking Knight with the King and to move the King to a safe square), as interposing a piece between the King and the Knight is useless. Children explain how this specific feature of the Knight's attack relates to the piece's paths.

Module 8. MOVEMENT. PAWN

New chess-related content: The Pawn as the weakest piece and its specific features. The Pawn's movement rules. Specific aspects of the Pawn's s movement: the Pawn may advance two squares the first time it is moved, then it may move only one square at a time; the Pawn moves only forward. The rule of capturing by the Pawn. The Pawn never captures the opponent's pieces the way it moves (it moves vertically forward and captures diagonally). When the students have learned how the Pawn moves, the teacher introduces the rule of promoting the Pawn to another piece of your colour (but for the King) if the Pawn reaches the eight rank (for White) or the first rank (for Black). The teacher may suspend introducing the rule of the en passant capture so far (unless this situation occurs in playing).

As the Pawn never moves backwards, it means that the Pawn's position changes irreversibly. Introducing the concept of the chess piece value and that the chess piece value is measured "by Pawns".

The endgame of "the King and the Pawn versus the King": what it means "to promote a Pawn"; when promotion is possible and when it is impossible. Playing: a Pawn ending. Problems like "Capture all the opponent's pawns". Chess position: recording the Pawn's moves (putting down only the starting and destination square names without the Pawn symbol). If promotion results in stalemate, the teacher needs to use this opportunity and tell the children about stalemate as a possible outcome of the game.

Technically, the Pawn is the weakest piece of all (an infantry private soldier whose value equals a pawn). Nevertheless, it is the Pawns who determine the position's strength and weakness. André Danican Philidor, an outstanding chess player of the 18th century, called the pawns the soul of chess. Depending on a specific position (whose examples will be provided in the "Chess Piece Value" module after the children have learned all the pieces), the Pawn may become much stronger and sometimes even as strong as the Queen (the famous endgame of the White King and the Queen versus the Black King and the Pawn), when it occupies *c2* or *f2*, and the King is moving between the corner of the chessboard and *b1* or *g1*, respectively. If White fails to get the King over to engage it in attacking the Pawn, the game ends in a draw (repetition of moves or stalemate if the White Queen captures the Pawn as the position of Qc2 Ka1 will emerge (the Black King cannot leave the corner, but the Queen fails to check it – hence, a stalemate)).

The teacher may introduce the advanced chess trainees to the rule of the square, inside of which the King can stop a queening Pawn, and outside of which the King fails to prevent the Pawn from queening (or the teacher may invite the children to deduce this rule themselves). Shaping an initial understanding of the importance of tempo in Chess and of defeating the opponent's by gaining tempo in a double-edged fight.

Developmental objectives:

Proceeding with shaping the mental image of the chessboard. Starting to shape the mental image of the Pawn's movement, and squares that the Pawn controls. Proceeding with

developing the ability to see the attacked squares before moving a piece. Starting to shape the ability to anticipate changes in the position after a prospective move. Developing reflection. For instance, it is desirable to give children an opportunity to infer it by themselves under which conditions the situation of the King and the Pawn versus the King ends in the Pawn's promotion and vice versa (they will have to come back to this subject later but the children may make some conclusions at that point). The teacher may use problems challenging their ingenuity "Promote the White Pawn in the following position: White a5, b5, c5; Black a3, b3, c3". If White plays properly, the White Pawn stays alone versus three Black Pawns but queens eventually.

Consistency with the previous modules: The starting position; notation; developing the image of the chessboard (identifying the square name and identifying a square on the chessboard using its name; square colours; chessboard lines); mastering the King's movement (the Pawn's movement reminds the King's movement, although the Pawn never moves backwards, and the Pawn moves diagonally only to capture).

Logic of lesson design:

Like with other pieces, the teacher introduces the rule of the Pawn's movement by means of explanation or a dialogue (depending on the children's expertise in Chess). When children are training capturing with the Pawn, it is important that the Pawn capture various pieces. The teacher emphasizes that capturing a strong piece with a weaker one benefits the game. Introducing the rule of promoting the Pawn to another piece of your colour if the Pawn reaches the last rank (the eighth rank for White and the first rank for Black). Promoting the Pawn to Queen is a strategy for winning the game. Proceeding to the endgame of the King and the Pawn versus the King.

As the students have just started familiarizing themselves with the pieces, when learning movement, the students need to use material tools that illustrate how the Pawn moves, which squares it controls depending on its position on the chessboard.

The children should name squares, use the modes of identifying squares that they have learned when studying the Chessboard. The Pawn's capacity to move vertically forward, and capture diagonally represents a good opportunity to return to "the Lines" module and reinforce the knowledge of the difference between files, ranks and diagonals or clarify it (especially for the children who missed that module or have difficulty with it): the Pawn moves along files, captures diagonally and never moves along ranks. The children who have mastered the lines; know how to identify them, and differentiate between concepts may start working on converting this ability to the internal plane of action through solving "King-and-Pawn-versus-King" problems, the rule-of-the-square problems, and other problems aiming at visualizing a position that occurs after a move. The children may use material tools, including fingers, which the children use to mark the square that they are going to move their piece to. The use of material tools facilitates visualization of the position that occurs after a move.

In the course of playing lessons, the teacher may invite the children to play with the King and pawns, giving them such assignments as promoting a pawn; capturing all the opponent's pieces; blocking a pawn promotion. After the game, the teacher and the children reflect on the game process. For this purpose, you may keep records of one or two games and then make them a subject of discussion using a display chessboard. It is desirable to give children an opportunity to make autonomous conclusions in the course of discussion or reflection.

Criteria for proceeding to the next module.

Children can move and capture other pieces with the Pawn.

Module 9. CHECK, CHECKMATE, DEFENSES FROM CHECKMATE, DRAWS

Chess-related content: Goal and essence of Chess. Concepts of check and checkmate, three ways to defend from check (capturing an attacking piece; interposing one's piece between the King and an attacking piece, or moving the King to a safe square: children infer these options themselves). Potential game outcomes – winning, losing, draws (examples). Types of a draw (review; a stalemate and perpetual check, the teacher may give examples).

The concept of material advantage. Using examples of positions with Kings, Rooks and Pawns. The ability to check, to checkmate, and to identify whether the King has been checkmated. The basics of the chess analysis and chess problem solving. Developing the ability to perform mentally: solving mate-in-one problems.

Consistency with the previous modules: Proceeding with working with the mental image of the chessboard (memorizing the position, notation); working with piece movement.

Logic of lesson design:

The work within the module is mostly based on the mate-in-one problems. Furthermore, the positions include only Kings, Rooks and Pawns. It is desirable to select problems with various check options but a single legal mate (so that the children may train defenses against check). The teacher uses a problem that includes a move resulting in stalemate to explain the concept of stalemate. Assignments aiming at inventing checkmate and stalemate positions may be used to deepen the understanding of these concepts. The students also work on memorizing and analyzing positions. Positions may be evaluated in terms of the pieces' location on the chessboard (more or less advantageous) and material advantage.

Criteria for proceeding to the next module: The children may proceed to the next module if they have shaped practical understanding of check, checkmate, differences between them (and hence defenses against check), and if each child has tried the "starting-from-the-end-goal" analysis when solving a chess problem, and has familiarized him/herself with a sequence of problem solving (memorizing the position, analyzing it; analyzing the King's position; formulating conditions for checkmate (what one needs to do in order to checkmate); then, identifying a move that may meet these conditions). Ideally, each child should work through this sequence from the beginning to the end in terms of either individual or small group or pair work.

Main problem types (using pieces whose movement the children are aware of – Kings, Pawns and Rooks):

– problems for identifying whether there has been checkmate;
– problems for identifying positions involving check and involving checkmate;
– mate-in-one problems;
– playing with pieces that the children have learned.

Module 10. CHESS PIECE VALUE

These lessons aim at reviewing and reinforcing the knowledge, as children gain understanding of the chess piece relative value when studying each piece.

Module 11. STARTING POSITION

Chess-related content: The starting position (familiarizing children with the starting position, memorizing it). Familiarizing children with the concept of a position as such.

Introducing the concept of the chess piece value. Introducing the rule of setting the position up in a certain order (according to the chess piece value). The ability to set up the starting position in accord with this rule. Getting to know the rules of recording the position. The ability to record the starting position in line with these rules. Introducing the concept of flanks (the Queen's and the King's flanks).

Consistency with the previous modules. Continuing to work with square names; (identifying a square that a piece occupies etc.). Continuing to work with chess pieces and their symbols in diagrams and notation; if children keep experiencing related difficulties, these difficulties are identified and worked through during this module: either in the course of doing problems on the starting position or when specifically addressing these challenges if the child needs it. Proceeding with developing the image of the chessboard: including the image of a piece occupying not only a particular square but also the point where certain lines intersect on a chessboard. Complete succession of all complementary objectives (See Module 1).

Developmental objectives: Introducing the order of setting the pieces up on a chessboard is relevant in terms of any position, including the starting one. Later, the children will follow the same order when analyzing, evaluating and memorizing the position. However, there is no need demanding that the children should memorize the order of the pieces in terms of their value as children are capable only of rote memorization at this stage. They will make sense of the concept of the chess piece value later, in the course of learning moves and comparing capacities of the pieces. Therefore, at this stage, children may use individual or shared (written on a poster or a flip chart) memory aids. The only crucial thing is to keep the setup order in mind.

The ability to visualize the starting position has just started to develop. You may stimulate shaping of this ability by inviting the child to slightly raise the difficulty level of his/her assignments if he/she is willing to do it (e.g. when the child has memorized the starting position in general, the teacher may invite the child to record the starting position looking at an empty chessboard, putting down what he/she remembers first, and then set up the pieces, check him/herself, and supplement his/her records with the symbols that the child experienced difficulty to recall without looking at the pieces). However, when working on this module, the teacher does not insist that each student should become able to record the starting position from memory without looking at a chessboard. If some children do this, it is great, however, it is the result that every child will achieve in due course of time rather than the goal of this module.

Criteria for proceeding to the next module.

The child may proceed to the next module if the child can set up the starting position in the order of the chess piece value (using memory aids to reproduce this order), starting from the King and verbalizing his/her actions; the child can show the Queen's flank and the King's flank with the pieces on the chessboard (i.e. the child understands what these flanks are). The child does not need to have formed the mental image of the starting position and hence to complete such tasks as showing the King's flank on an empty chessboard (this task presupposes that the child visualizes the pieces in the starting position on a chessboard; finds the King and shows the King's flank only afterwards). This ability develops later, when studying piece movement and value and working on the analysis of the position. At this stage, the maturity level of the ability to perform mentally is usually insufficient to accomplish this objective.

Logic of lesson design.

During the experiment, the teachers introduced the students to the chess position using an image of the two armies facing each other. The teacher's presentation activated the children's imagination and added some flavour of the game to the lesson. The teachers introduced the concept of a piece's place within the initial setup and used images to introduce the concept of the chess piece value (a rank or a position in the army). You can invent

other images. It is crucial that you introduce students both to the rule of chess piece setup and shape an initial understanding of each piece value. It is important to structure working with the starting position keeping in mind that it is not only about the rule of setting the pieces up – indeed, it is the first position that the children encounter in their training. The teacher introduces the rules of arranging the starting position as the rules of dealing with any position. The pieces are positioned on the chessboard starting from the King as the most valuable piece, and then other pieces follow in descending order of their value; White pieces come first, and Black ones follow; from the a-file to the h-file, from the 1st rank to the 8th rank (i.e. if two Rooks are on the same diagonal, the child names the a-file Rook first and then the h-file Rook). The same order is observed when reproducing a position that is being memorized; when dictating and recording a position when playing a game; when analyzing positions in chess play and problems. This rule is determined not only by the laws of Chess. The COD course' ultimate goal is to help children to acquire the ability to reflect on the position and to think one or several moves ahead. It presupposes analyzing the position in one's head. In order for the mental action to be efficient, it should be shaped as a structured and consistent action in every detail on the material plane. Chaotic thinking always contains mistakes, such as blunders in Chess. Following the same sequence in working on the position eventually ensures an efficient design of the action in one's mind. The teacher needs to discuss all these things when introducing the order of arranging the starting position.

When working with the concept of flanks, the teacher needs to explain to the children why they need to distinguish between them. This differentiation is essential for playing as people play differently on the King's flank and the Queen's flank: most often (although not always) they build up defense to protect the King on the King's flank, and prepare for the attack and attack the opponent Queen's flank. Later, the teacher may include questions about the flanks in other assignments: wondering where which flank is or asking the children to show some piece on the Queen's flank or the King's flank. If there is enough time, at the end of the module, the teacher may wonder, "Which flank is on the player's left and which is on the player's right?" It is a tricky question that may cause a discussion if there is time for that as the debate may take half the lesson. This question is nonetheless a good one as it implies using the knowledge of the starting position for solving another problem. By the way, this question may serve a home assignment provided that the teacher warns the students that it is catchy and they should keep reflecting on it after they have arrived at the first answer. You know what the catch is, don't you?

If the students face difficulties memorizing the position, then the further work will generally focus on developing an individual mode of memorizing by each child (using mnemonics if necessary). Then, the reflection process may also bring about awareness of the modes of memorizing that the child has invented and that he/she may use during the chess training and other lessons later.

Problems aiming at analyzing the starting position in terms of the chessboard geometry (which lines the pieces occupy) may also be helpful for shaping a clear mental image of the starting position. They create the basis for understanding the play value of pieces in the starting position and the need to develop pieces. This understanding will emerge later in actual chess play.

Challenges. Children confuse the King's and the Queen's squares in the starting position, sometimes they confuse locations of other pieces too. Overcoming challenges: figuring out what underlies the challenge (whether the child confuses locations or pieces). Invite the child to memorize the pieces' location (or to differentiate between pieces) using his/her own mode of memorizing and mnemonic techniques.

Types of problems. Memorizing the starting position; analyzing the starting position in terms of the chessboard geometry; arranging and recording the starting position; recording and naming the position from memory (using relevant material tools); learning the location of the flanks; starting to work with memorizing other positions (3-4 pieces).

Module 12. KING'S SAFE POSITION. CASTLING

Chess-related content. One of the main goals in Chess is to keep your King safe. Castling is the main way to provide for the King's safety in the chess opening. Castling may be performed in two ways – castling short and castling long. Moving the King and a Rook when playing as White and as Black both queenside and kingside. Castling rules. During castling, the King moves first and the Rook follows. If a player moves the Rook first, this will be considered as a Rook's move under the touch-and-move rules.

Castling is forbidden if:

1) The King has previously moved;
2) The Rook has previously moved;
3) The King is in check;
4) The King passes through an attacked square when castling;
5) The King ends up in check.

The reason why castling is a way to protect the King in the opening. Cases when castling puts the King at threat rather than keeps it safe. The reason why sometimes you benefit from castling short and sometimes from castling long, depending on the position.

Consistency with the previous modules: Castling is considered a special move. The "Movement" module ends with learning castling.

Developmental objectives. Problems for identifying whether castling is legal in some position facilitate development of the ability to visualize the position; to identify lines and squares that are controlled by the enemy's pieces and, furthermore, that are important for understanding castling options.

Criteria for proceeding to the next module.

The student knows what castling is; can castle long and short as Black and as White; the student is aware of the rules when castling is forbidden. Looking at the position on the chessboard (not necessarily mentally), he/she can identify whether castling is legal; understands the significance of castling in the opening; the student knows that he/she can castle different sides depending on the situation or avoid castling, but the child can identify whether castling is reasonable in some position.

Logic of lesson design.

Children familiarize themselves with this unusual move and master it: they learn rules forbidding castling; understand the relationship between castling and keeping the King safe. They exercise castling on a chessboard using real pieces; use the out-loud speech to verbalize the King's and the Rook's movement both as White and as Black; they learn to identify whether castling in a particular position is legal, looking at the chessboard and visualizing it mentally.

Challenges. Children tend to fail to learn it immediately that castling starts with moving the King; it may lead to arguments in playing with peers and sad mistakes in playing with a computer. Even having memorized the rules forbidding castling, children have difficulties applying them to practice, as they fail to relate the rules to the real position or they fail to imagine which squares a King will pass when castling.

Types of problems. Questions about the castling rules; castling in various positions; analyzing positions in terms of legality and feasibility of castling, which includes positions for mental problem solving.

Module 13. CHESS POSITION: ANALYSIS, EVALUATION. GAME STAGES. OPENING BASICS

We give no detailed account of the chess content of these lessons as you may easily find well-represented chess material, related problems and assignments in multiple chess training software programs and handbooks. For example, you may use corresponding sections of Yuri Razuvaev's software (CD) "Shakhmatnaya Shkola dlya Nachinayushchikh" ("Chess School for Beginners") and other CDs and handbooks listed in *References*.

At this stage, the teacher needs to teach the subject matter of the modules to different children at quite a deep level taking into account their individual progress. The teacher needs to tell all children about types of draws; two unusual pawn moves and castling, demonstrating various real chess positions and showing what advantage castling gives etc. It is also crucial that all children train these rules in playing with each other (it is especially important for pawn promotion and castling) or solving problems (stalemate problems, en passant capture problems etc.). Another unusual chess move – en passant capture – is well illustrated by a famous problem when a player who is unaware of this rule is checkmated and the player who knows this rule checkmates the opponent's King[4].

It makes sense for the children who are keen on playing Chess to study chess-related content more actively towards the end of the year and to spend as much time and effort on analyzing their own games as on solving chess problems, and, correspondingly, proceed to discussing typical mistakes in openings, to analyzing a rationale behind the moves made (their own and the opponent's moves; evaluating the position when playing). These elements of the Year-2 training aiming at developing reflection and thinking will enable the children who are enthusiastic about Chess, to play Chess with their friends and parents in summer so that this playing may benefit them in the best possible way.

Developmental objectives of this stage are accomplished both in playing and in solving chess problems that gradually grow increasingly challenging. We delineate the principles of dealing with chess problems in Chapter 3 when discussing Chess Thinking Development Levels 4, 5 and 6.

The Year-1 COD training ends with the process of deep reflection of each child's work accomplished during this year. It is crucial that each child get an opportunity to look back and reflect on the experience that he/she obtained both in terms of the ability to perform mentally when solving Chess and other problems (including other school subjects), and in terms of the personality development.

2.2. COD TRAINING PROGRAM LEARNING ACTIVITIES

This chapter includes the description of learning activities and assignments that educators may use when applying the COD method. Nevertheless, we have had no intention to provide an exhaustive list of all activities as the work with many modules (especially, during the second half of the Year-1 training) draws on exercises and chess problems that exist in

[4] The following position may serve an example of this (a joke chess problem):
White: Kh2, Rg8, Nf3. Ne5, g2, h3
Black: Kh5, Qf1, Nf5, g5, h6, h4.
White to move:
g2-g4+
If Black is unaware of the en passant capture rule, Black is checkmated, as the King has no defense against check. If Black is aware of the en passant capture rule, Black makes the following move – h4:g3X (!).

abundance in chess literature. Therefore, we focus on the assignments of the first half of the Year-1 training, most of which were designed specifically for the COD training method.

Some of them serve as sample assignments, and you may find similar or other assignments for corresponding modules in chess handbooks or on CDs that we mention in References. You may find many exercises (chess problems) in the Workbook. This chapter provides a description of problems and comments relating to their use.

This description includes information on where you can find a problem in the Workbook or in the Educator's Guidelines.

The exercises that are not included in the Workbook may be used during additional lessons or as additional assignments.

Problem 1. "Chess Quiz for Children and Adults" (authored by V.K. Zaretskii). See the test's form in the Workbook.

Module: "Introduction".

Point of exercise: Assessing a trainee's expertise in Chess and level of the ability to visualize the board, pieces, their moves etc.

Description: The Quiz consists of 8 puzzles. Only one of them requires pure knowledge (the colour of a1). The rest of them focus on the ability to visualize the board, pieces, and squares that they control etc. One item includes memorizing a position of 4 pieces.

Recommendations on exercise design.

The teacher needs a display chessboard for the Quiz.

The Quiz is used as a means of helping children who have studied Chess as usual to find out what they can, and to make a decision as to whether they want to engage in the training and – if they do, why they need it.

Problem 2. "Quiz for Those Who Know Chess Basics" (authored by M. M. Gordon).

See the test's form in Appendix 3 "Tests and Quizzes"

Module: "Introduction".

Point of exercise: Assessing the initial level of expertise in Chess.

Description: The Quiz includes questions to check trainees' knowledge of Chess (the chessboard, pieces, and moves). It is designed for children who have just started to read.

Recommendations on exercise design.

The Quiz may be used to assess first-grade students at the beginning of the training or some time later.

Problem 3. Chess Battleship (authored by V. K. Zaretskii; recommendations on problem design – V. K. Zaretskii, I.A. Burilova). The problem is included in the Workbook and Appendix 2 "Handouts and Recommendations on Exercises".

Module: "Chessboard".

Point of Exercise: The game implies that the child uses chess notation actively; identifies a square name; identifies a square by its name (all these skills are prerequisite for chess play and, therefore, the child masters them easily). Furthermore, the problem establishes conditions for using chess terminology and starting to work with the mental image of the chessboard.

Description: The rules of the game are almost the same as in the traditional Battleship. Children play in pairs. There are two chessboard diagrams in front of each player. One of the diagrams is one's own playing field, where the child places six (three white and three black) ships. There is a rule that the ships can touch each other neither with their sides nor corners, neither vertically, nor horizontally nor diagonally. The child records the opponent's shots

and checks whether the opponent hit his/her ship using the playing field with his/her fleet for that. The second diagram stands for the opponent's playing field, which the child attacks and where he/she records his/her own hits. The opponents conceal their fleets from each other. The players take turns calling "shots" at each other's ships. Having hit the opponent's ship, the player gets the right to shoot one more time, out of turn. The game continues until a player has had all his/her ships sunk. As both players often make mistakes in the beginning (announcing some target square and marking a different one), we invite children to announce the colour of the target square so as to check themselves (with both players – the attacking and the attacked – announcing both the square's name and colour). Verbalizing the colour is important as it facilitates a gradual formation of the mental image of the chessboard. Moreover, reflecting on the game allows for approaching and understanding such concepts as game tactics and strategy, for inferring that the rules are important (many beginners keep forgetting that the ships should never touch each other, and waste time shooting the squares adjacent to the ship that they have hit).

Recommendations on exercise design.

1. In the beginning, the teacher may give the children diagrams with unmarked squares so that the players may letter and number them by themselves before the game (this activates an additional kinesthetic channel for memorizing a sequence of letters and numbers). As the children get more familiar with chess notation, they omit some symbols when marking diagrams or leave them completely unmarked.
2. I.A. Burilova, a COD project teacher, invited students to title a diagram with their fleet "Being attacked" and a diagram representing the opponent's territory "Attacking". These titles (denoting an action) serve to help children to overcome challenges relating to the distribution of attention in the course of playing, which many children have faced.
3. In training Russian-speaking students, it is better to use the word "territory" when inventing titles for the diagrams and to avoid the word "pol'e" (Russ. field, playing field). Using the term "pol'e" threatens confusion of terminology as in Chess, "pol'e" means a square. During the COD experiment, some groups temporarily used the term "pol'e" to denote the chessboard, and squares were called "kletki", i.e. "cells", which is certainly incorrect.
4. Please see Chapter 3 for the discussion of the development of the material plane of the ability to visualize a square, to mentally see lines and points of their intersection on the chessboard.
5. Please see I.A. Burilova's additional recommendations on the game's design and the process of its reflection in Appendix 2 "Handouts and Recommendations on Exercises".

Problem 4. "Find an ambush" (authored by I.A. Burilova). This problem is included in the Workbook and Appendix 2 "Handouts and Recommendations on Exercises"

Module: "Chessboard".

Point of exercise: Learning to identify a square name.

Description: There are several trees depicted on random squares of a chessboard diagram. The problem statement: "You know that there is a hide-and-seek player hiding behind each tree. Use square names to identify points of ambush. Write down a square's name and indicate its colour".

Recommendations on exercise design.

I.A. Burilova invites children to solve this problem as a warm-up for "Battleship" in order for them to learn actions on a sequential basis rather than several actions at once (as the latter manner of learning actions causes confusion and difficulties sometimes).

Problem 5. "Deliver mail" (authored by I.A. Burilova). This problem is included in the Workbook and Appendix 2 "Handouts and Recommendations on Exercises".

Module: "Chessboard".

Point of exercise: Learning to identify a square name.

Description: Children get a chessboard diagram and a list of "addresses" (square names). Children need to draw houses in the squares whose address is on their mail delivery list.

Recommendations on exercise design.

I.A. Burilova invites children to solve this problem as a warm-up for "Battleship". This enables the teacher to work with the children's modes of action step-by-step when the child faces one difficulty at a time rather than all challenges at once. However, some children may fail to translate an acquired mode of action to a new game and need help to achieve this.

Problem 6 (Authored by I.A. Burilova , O.V. Glukhova).

Module: "Chessboard".

Point of exercise: Identifying a square by a square name. Children work in pairs.

Description: "Place a chip on a square that your friend will announce. Identify the colour of this square" (A version for independent work: children get chips with square names indicated on them).

Recommendations on exercise design.

Children may work at various difficulty levels: using a regular chessboard; a chessboard diagram with unmarked squares ("a mute chessboard"); a white chessboard diagram.

Problem 7.1. "Encryption".

Problem 7.2. "Encryption" for Pair Work (authored by I.A. Burilova, modified by M.M. Gordon). This problem is included in the Workbook and Appendix 2 "Handouts and Recommendations on Exercises".

Module: "Chessboard".

Point of exercise: Identifying a square by a square name. Identifying a square name. Pair work includes children's collaborative work. An advanced version aims at improving working memory span, distribution of attention, and the ability to perform mentally.

Description: There are several letters depicted at random on a chessboard diagram. There is a list of ciphered words (each letter is coded by a square name)

1) Children need to decipher words.

2) Children need to cipher their names.

Pair work: place all the letters of the alphabet on the chessboard at random and invite children to write ciphered messages to each other.

Recommendations on exercise design.

It is the child who decides which chessboard (regular or "mute") he/she will work with.

Advanced Problem.

The game may take place at different difficulty levels as far as the development of the ability to perform mentally is concerned. For instance, when the children have learned to

identify square names without material tools, the teacher may invite them to play in pairs without using records. A player needs to cipher some word announcing addresses of letters that are being coded in the course of ciphering, and another player is simultaneously deciphering the letter keeping silent until he/she deciphers the whole word.

The children improve their working memory span and distribution of attention.

If children find this problem difficult, they may use some tools in the beginning (closing the letter that they have named, pointing at it with a finger etc). In this case, it is preferable that both players have similar chessboard diagrams with letters and play *sitting with their backs to each other*.

Problem 8. "On Your Fingertips" (authored by M.M. Gordon).

Module: "Chessboard".

Point of exercise: Memorizing a letter sequence. A game for a group of children.

Description: The letter sequence is denoted by fingers (each finger stands for a letter:

a b c d – little finger, ring finger, middle finger and index finger of the left hand, respectively; e f g h – index finger, middle finger, ring finger and little finger of the right hand). Each child has a chessboard diagram in front of him/her. The game host announces letters, at first, in their order, and then at random, and players need to repeat the letter and point at a file that this letter indicates with a corresponding finger. Visualizing the chessboard, one can play this game in any environment. When children have memorized most letters, they may play differently, with some players "looking at the chessboard" as White and others – as Black. Correspondingly, Black's left little finger will stand for h.

Recommendations on exercise design.

Finger movement ensures kinesthetic reinforcement for memorization.

The game host needs to speak slowly, allowing the players time to think, and to increase the pace gradually as long as the players make progress.

It is better to play the game in groups of four or six children sitting in a circle or in a row. You can play two versus two, or three versus three, accruing penalty scores for mistakes.

However, the same game may be played one-to-one. It is crucial to repeat the letter when playing: speech facilitates memorizing. In order for the children to memorize letters better, the teacher may introduce the rule – if the child makes a mistake, he/she needs to announce the whole letter sequence from the beginning to the letter that the child has misplaced.

Problem 9. "Accommodate Guests" (authored by I.A. Burilova , O.V. Glukhova). This problem is included in the Workbook and Appendix 2 "Handouts and Recommendations on Exercises".

Module: "Chessboard".

Point of exercise: Figuring out the colours of the first rank squares. Inferring a regularity of alternation of dark and light squares.

Description: Children need to use arrows to connect the first-rank square names that are written at random with white and black stars on the same card.

Reflecting on the process of completing the exercise: "What was your line of reasoning when doing this problem?"

Recommendations on exercise design.

If the children experience difficulties, offer them a tool, i.e. a white chessboard, a coloured mute chessboard or a regular chessboard.

You may prepare similar tasks for other ranks; for the first and the second ranks together; for any squares.

Problem 10. Quiz "Do you Know the Chessboard?" (authored by I.A. Burilova, O.V. Glukhova). See Appendix 3 "Tests and Quizzes".

Module: "Chessboard".

Point of Exercise: Interim assessment and self-assessment of the knowledge of the letter sequence and the maturity level of the ability to identify the square colour by the square name.

The problem provides substance for discussing the essence and the intention for the future work.

Description: The Quiz consists of 5 questions. Most questions relate to the ability to identify a square's colour by its name

Recommendations on exercise design (proposed by I.A.Burilova).

The Quiz creates the situation of success and progress, and comprises questions that allow for arranging work to shape the mental image of the chessboard during the next lesson. After the Quiz, it is recommended that the teacher and the students analyze its results. This process will be useful for making sense of the further activities relating to studying the chessboard.

Problem 11. "Searching for the Colour" (authored by I.A. Burilova , O.V. Glukhova).

This problem is included in the Workbook and Appendix 2 "Handouts and Recommendations on Exercises".

Module: "Chessboard".

Point of Exercise: Identifying a square by a square name. Identifying a square's colour on a white chessboard. Working in pairs (a version of the problem).

Description: The teacher gives the child a chessboard diagram with white squares and a form with a sequence of square names. The child needs to find a square and if it is light, he/she needs to write "L" on this square, and if it is dark, the child writes "D". The teacher may invite the children to work in pairs (with a white chessboard diagram): one player announces square identifiers and another one repeats the square name and says which colour it is.

Recommendations on exercise design.

Please see "The Educator's Guidelines" for the description of the reflection process and the children's analysis of regularities of the square colour alternation and the corresponding questions.

Problem 11.2. "Searching for the Colour" Bingo –Problem 11modification for group work (authored by I.A. Burilova , M.M. Gordon).

There are no handouts for this problem: the teacher needs to make them by him/herself. If necessary, the problem statement may be adjusted.

Module: "Chessboard".

Point of Exercise: Identifying a square by a square name. Identifying a square's colour on a white chessboard.

Description: "Searching for the Colour" may be modified so that it becomes Bingo (a game played in groups of six children and conducted by a game host – a teacher or a counselor). Playing cards are white chessboard diagrams with a similar number (e.g. eight) of heavily drawn squares. Each card contains a different pattern of squares (regularly "scattered" over the diagram). The game host draws chips with square names from a bag at random and announces them, and players check whether their card has a highlighted square with this name, and if they find the specified square, they ask the game host to give them this card. In order to get the card from the game host, the player needs to tell the specified square's colour first. The player who is the first to fill in the card wins.

An improved version of the game includes modified double-faced square chips (dark on one side and light on the other). The player announces the colour and places the chip onto his/her playing card with the corresponding face up. The game continues as long as there are cards left. A player who has correctly identified colour of more squares than others wins the game. (The players check whether they guessed colours correctly at the end of the game).

Recommendations on exercise design.

The best way to prepare for this exercise is to make a set of eight cards, with each containing eight highlighted squares (so as to include all the chessboard squares in the game). If there are 8 players, each gets a card; if there are four players, each gets two cards, and when the number of players is different, the game host keeps the remaining cards.

Problem 12. "Fire Fight" (authored by M.Yu. Muksimova, T.N. Kirillova). The handouts are quite simple and you can easily make them yourself.

Module: "Chessboard".

Point of Exercise: Identifying a square by a square name. Identifying a square's colour on a white chessboard

Description: The group divides into two teams; one team fires a shot (announces a square name), and another team needs to guess the colour of this square to return the shot (the team scores a point for the right answer).

Recommendations on exercise design. This is a group exercise helping both to shape the mental image of the chessboard and to facilitate the children's enthusiasm about the chess training at the beginning of the COD course.

Problem 13. "Blow the Clouds Away" (authored by M.Yu. Muksimova, T.N. Kirillova).

The handouts are quite simple and you can easily make them yourself.

Module: "Chessboard".

Point of Exercise: Identifying a square by a square name; identifying a square's colour on a white chessboard.

Description: The teacher places several cards on a white chessboard so that they cover squares. The cards have images of white and black clouds on them, but children cannot see them. Children announce the cloud's "address" and guess the colour of the corresponding square. They turn the card over to check whether their answer is right.

Problem 14. "Soccer" (authored by M.Yu. Muksimova, T.N. Kirillova). The handouts are quite simple and you can easily make them yourself.

Module: "Chessboard".

Point of Exercise: Identifying a square using a square name; identifying a square's colour on a white chessboard.

Description: There are balls (black and white ones) on the teacher's desk. The teacher announces a square's name; a student chooses a ball of the relevant colour and places it on a white chessboard justifying his/her answer. If the student guessed the colour correctly, then he/she scores a goal.

Problem 15. "Cards" (authored by V. K. Zaretskii)

Module: "Chessboard".

Point of Exercise: Identifying a square by a square name; identifying a square's colour on a white chessboard.

Description: You will need two sets of cards with letters and two sets of cards with numbers that are used in chess notation, and a white mute chessboard diagram. The game is played by four players, two against two. Each team gets two sets of cards, with one player holding cards with letters and another one holding cards with numbers. One player gives his/her opponents a letter, and another one – a number. The other team needs to place cards on a respective square (guessing it by its name) and announces the colour of the square. If the team has found the square and identified its colour correctly, they get the right to challenge their opponents with their cards. If they make a mistake, they take the cards. The team who is the first to get rid of the cards wins the game.

Recommendations on exercise design: The cards may be dealt out randomly. At the beginning of the game, the players need to identify the location of a1. The best choice is to play a mini-tournament of 8 games each, changing places with opponents after each game clockwise (or turning the chessboard anticlockwise). Thus, each player will identify squares looking at the board as White twice, and twice as Black. Children may share their functions: one player may indicate a square and another one announces its colour, and vice versa during the next game. Children may discuss the answer and give it together.

Problem 16. "Kolobok's Journey" (authored by M.Yu. Muksimova, T.N. Kirillova) (*Translator's note*: Kolobok (a yellow round cake) is the main character of a Russian national fairy tale, the plot of which is similar to that of "The Gingerbread Man").

Module: "Chessboard".

Point of Exercise: Identifying a square by a square name; identifying a square's colour on a white chessboard.

Description: Kolobok's path is written on a blackboard as a sequence of square names. Children need to tell the colours of the squares correctly to guide Kolobok along the path.

Problem 17. "Getting a Bunny Back in Its Cage" (authored by M.Yu. Muksimova, T.N. Kirillova).

Module: "Chessboard".

Point of Exercise: Identifying a square by a square name; identifying a square's colour on a white chessboard.

Description: There are cards with white and black rabbits on the teacher's desk. The teacher announces a square name; a student chooses a bunny of the relevant colour and puts it in the bunny's cage (placing it on a white chessboard).

Problem 18. "Guess a Vocabulary Word" (authored by M.Yu.Muksimova, T.N. Kirillova)

Module: "Chessboard".

Point of Exercise: Identifying a square by a square name; identifying a square's colour on a white chessboard.

Description: There is a code on the blackboard (each letter is ciphered by a square name). The chessboard squares have letters on them. Having announced a square name, a student finds an encoded letter on this square and gradually compiles a difficult word (the game may be shaped as students' independent work).

Recommendations on exercise design: Children perform this exercise either before or during a Native Language lesson (Russian, in our case) devoted to studying a new vocabulary word.

Problem 19 (authored by I.A. Burilova (with some amendments)). You can use chessboard diagrams on Page 144 of Appendix 2 "Handouts and Recommendations on Exercises". We suggest amending the problem statement and the sequence of doing the problem if necessary.

Module: "Chessboard".

Point of Exercise: Discovering regularities of the dark and light squares' alternation. The exercise facilitates emergence of a clearer mental image of the chessboard and development of one's own modes of identifying/memorizing square colours.

Description: The teacher gives students forms containing mute coloured chessboard diagrams (there should be at least eight diagrams, so that the child may be able to invent various modes of action). The coloured diagrams are prerequisite so that the coloured image may get imprinted in the child's mind.

Problem statement: 1) Divide a chessboard into two equal parts; 2) into 4 equal parts, 3) into 8 equal parts. The teacher may also say that there may be different ways of doing this. 4) The goal is to guess how to divide the chessboard into the maximum number of equal parts, and to count these parts. Then, the teacher and the children discuss how this exercise may help them in "Searching for the Colour". Then, they may play this game (Problems 11 or 11.2).

Recommendations on exercise design: It is important to conduct the discussion so that the teacher avoids prompting the children. If the students experience difficulties when answering the question, it is better to let them play "Searching for the Colour" and invite them to find out whether the previous exercise may help them, in the course of playing the game. The teacher may present square names in a certain order that will facilitate this discovery, and then the teacher and the students may continue this discussion. The students who make this discovery start identifying square colours during the game quicker than the others. It is desirable to invite children to perform this exercise autonomously; then to arrange the discussion of the results in small groups, and eventually, each group may demonstrate their configurations in front of the class. Configurations may vary. The class may discuss which configurations are similar in shape, and which are equivalent both in shape and colour.

The exercise facilitates using the mental image of the chessboard when figuring out (counting) square colours, rather than using a square colour sequence that is memorized by ear ("a1-dark", "b1 – light" etc).

In the course of working with the mental image of the chessboard in terms of the COD project, we have paid attention to the fact that when children start to count squares with a1, the mental image of the chessboard takes shape slowly or fails to take shape at all. The thing is that this mode of action cannot be used without specific memory aids, and if people try to visualize the chessboard in this case, they hardly visualize the whole chessboard, but rather the first rank and a file that they are moving along when counting squares to identify their colours. The exercise may boost development of an integral image of the chessboard.

Problem 20 (opposite to Problem 19). "Puzzles" (authored by M.M. Gordon). We invite teachers to amend the exercise if necessary. You can use images on Page 144 of Appendix 2 "Handouts and Recommendations on Exercises" for making puzzles.

Module: "Chessboard".

Point of Exercise: Discovering regularities of the dark and light square alternation. The exercise facilitates emergence of a clearer mental image of the chessboard and development of one's own modes of identifying/memorizing square colours.

Description: Five coloured chessboard diagrams of the same size are cut in different ways (8 ranks; 4 pieces comprising two ranks; 4 pieces comprising two files; 4 square pieces

consisting of 16 chessboard squares, and 16 square pieces consisting of 4 chessboard squares). All pieces are mixed together. The goal is to put pieces together so that they form 5 chessboards. Then a small group or general group discussion of the follows.

Recommendations on exercise design: You may hand out a set of puzzles to a group of 4 children for joint work if the children have already learned to work fruitfully as a team.

It is useful to combine this exercise and "Searching for the Colour" (or a similar game aiming at identifying a square's colour on a white chessboard) during a lesson.

There may different configurations of puzzles: not necessarily only those that include similar parts. If children create such configurations, the teacher needs to accept them as correct.

Potential mistakes include wrong orientation of the resulting chessboard (e.g. if the child confuses files and ranks). However, the teacher never prompts children. Moreover, when checking the result of completing the exercise, the teacher needs to ask each child to show him/her where the players are on each chessboard (rather than asking where a1 is, as it is a prompt). If the child 's answer provides evidence for the fact that he/she put the pieces together in a wrong way, the teacher says that the child has made a mistake without indicating what this mistake is: the child needs to figure it out by him/herself. If he/she fails to do that, the child may invite a friend to help him/her (the child chooses this friend him/herself).

Problem 21 (authored by I.A. Burilova). See Appendix 2 "Handouts and Recommendations on Exercises".

Module: "Chessboard".

Point of Exercise: Working with chessboard lines.

We provide a whole module of exercises that enable children to autonomously figure out regularities pertaining to the lines on the chessboard. All these exercises are included in Appendix 2.

Problem 22. Green Patrol (authored by M.Yu.Muksimova, T.N. Kirillova)

Module: "Chessboard".

Point of Exercise: Working with chessboard lines.

Description: The child solves the following problems on a personal chessboard:

- Plant fir trees along the c1-c8 line (how is this line called?);
- Plant fir trees along the a4-h4 line (how is this line called?);
- Plant fir trees along the a8-h1 line (how is this line called?).

Problem 23. "Light a star" (authored by M.Yu. Muksimova, T.N. Kirillova).

Module: "Chessboard".

Point of Exercise: Working with chessboard lines.

Description: The child solves the following problems on a personal chessboard:

- Draw a star at the point where the dark-squared longest diagonal and the fourth rank intersect (d4);
- Draw a star at the point where the f-file and the seventh rank intersect (f7);
- Draw a star at the point where the b1-h7 diagonal and the g-file intersect (g6).

Recommendations on exercise design: this exercise enables children to focus their attention on imagining the chessboard as consisting of intersecting lines. This creates the basis for shaping the mental image of the pieces interaction and the mental image of the squares that may be potentially controlled.

Problem 24.

Module: "Chessboard".

Point of Exercise: Learning the concept of a diagonal and developing one's understanding of the chessboard.

Description: Small group work alternates with general discussion.

Small group assignments: 1) Counting all the diagonals. Small group discussion followed by general discussion. 2) What is the difference between diagonals? Small group discussion followed by general discussion. 3) How many squares are there on a diagonal (how long can diagonals be)? Small groups identify and mark all possible variants, count the number of diagonals of each type.

Someone announces a diagonal (using its starting and ending squares as identifiers), and the students need to identify its colour and path looking at a white chessboard (the teacher needs to think over the small group design of working with this part of the exercise).

Recommendations on exercise design: This exercise enables children to autonomously explore the concept of a diagonal; to discover what they can be like; how many diagonals are there on the chessboard. Moreover, this exercise enables the students to train learning in small groups and during the general discussion. Having finished the chess-related part of the lesson, the teacher may facilitate the process of reflection on the group work as such.

Problem 25 (authored by E.A. Sazhina, Yu.S. Ikonnikova).

Module: "Chessboard".

Point of Exercise: Learning the concept of a diagonal and developing one's understanding of the chessboard.

Description: As a rule, children see the following short diagonals: gl-h2 and a7-b8. We invite them to turn the chessboard to the right clockwise so as to help them to see other short diagonals. Then they will be able to see such diagonals as g8-h7 и a2-b1. The children work with other diagonals in the same way in ascending order.

Recommendations on exercise design: The exercise enables children to find diagonals easily and improves their understanding of the geometry of the chessboard.

Problem 26 (authored by I.A. Burilova).

Module: "Chessboard".

Point of Exercise: Introducing the concept of the chessboard centre.

Description: I.A. Burilova suggests introducing the concept of the chessboard centre with the help of a fairy tale.

See Appendix 2 "Handouts and Recommendations on Exercises"

Problem 27. Quiz "What do I Know about the Chessboard?" (authored by I.A. Burilova). See the test's form in Appendix 3 "Tests and Quizzes".

Module: "Chessboard".

Point of Exercise: Assessing the knowledge of the lines and the concept of the chessboard centre.

Description: The Quiz includes questions about the chessboard lines and ways to identify them; about the centre of the chessboard.

Recommendations on exercise design: The teacher may use the Quiz to justify the need to continue working with the Chessboard for the children and to assess their progress closer to the end of the Module.

Problem 28 (authored by I.A. Burilova).

Module: "Chessboard". The exercise may be also used to integrate the student's knowledge and skills obtained when studying the Chessboard, Chess Pieces and Starting Position modules.

Point of Exercise: assessing or integrating the child's knowledge and skills obtained as a result of working on the Chessboard module (or the three first modules together).

Description: The teacher hands out cards with the following numbers: 2, 4, 8, 26, 32, 64.

Question: Which things that you know about the chessboard are associated with these numbers? Children answer one after another; if no answer follows, the right to answer goes to the next student; those who answer correctly, get a chip.

Recommendations on exercise design: This activity may be performed in small groups and the whole class. The teacher may divide the class into two groups and organize a contest, with the teams giving one answer at a time in turns. The team that answers correctly gets chips; any team has the right to take time out to discuss their answer during one minute (however, the opponents can discuss the answer as well). The team, who collects more chips, wins.

Problem 29 (authored by R.F. Gumerova).

Module: "Chess Pieces".

Point of Exercise: Distinguishing between chess pieces. This exercise may be adjusted for small group work.

Description: Chess pieces are put into an opaque bag. The child needs to put his/her hand in a bag; choose a piece and feel it to understand which piece it is. There may also be a task to feel the pieces with one's hand and take a necessary piece out of the box.

Recommendations on exercise design: Concentrating on the shape enables children to distinguish between pieces better. Another version of the exercise may be carried out in pairs or small groups. At the beginning of a game, children use a counting-out rhyme or draw lots to choose a game host – that is, a child who suggests which piece should be taken out. In the course of the game, leadership goes to a player who has guessed a piece correctly. Players guess pieces in turns.

Problem 30 (authored by I.A. Burilova , O.V. Glukhova). See the Table in Appendix 2 "Handouts and Recommendations on Exercises".

Module: "Chess Pieces".

Point of Exercise: Distinguishing between piece symbols on diagrams, learning notation.

Description: The teacher invites children to fill in empty boxes in the table. The first column includes diagram symbols of chess pieces; the child needs to fill in the second column (a piece's name) and the third one (notation).

Problem 31. "Post Officer" (authored by I.A. Burilova, O.V. Glukhova).

Module: "Chess Pieces".

Point of Exercise: Writing piece and square names; pair work.

Description: Place chess pieces as indicated by your friend's notes. Children write notes to each other observing the rules of writing pieces and their locations. A child writes a note, another child places pieces on the indicated squares and then they swap roles.

Problem 32.
Module: "Chess Pieces".
Point of Exercise: Writing pieces; identifying a square name.
Description: The teacher places pieces one by one on a display chessboard to form a random playing position (starting with a King in descending order of the chess piece value, placing White pieces first and then Black ones), and invites children to write down a piece's name and its location (a square name) observing the rules of chess notation. The teacher places a piece, and the children make records; then, the teacher places the next piece. Then, the teacher removes the pieces from the display chessboard and invites the children to reproduce the position on their chessboards using their records. Then, children may check each other's results or the teacher may reset the position up on the chessboard so that the children may check themselves.
Recommendations on exercise design: It is crucial that the teacher set up the position one piece after another in the aforementioned order. It is important that the children record the position correctly from the very beginning, however, at that point of the training the children are unaware of these rules. Nevertheless, if they follow the teacher when recording the position, they will get a proper record of the position.
This exercise enables children to master notation for recording pieces and their locations (square names) in practice as a means of recording a position so as to reproduce it later, and train reproducing the position using relevant records.

Problem 33.
Module: "Starting Position".
Point of Exercise: Memorizing the starting position.
Description: At first, children analyze the pieces' setup in relation to each other in the starting position, paying attention to the symmetry of the initial setup etc. Then they verbalize the starting position (naming the pieces' locations) from memory, using a memory aid, i.e. looking at an empty chessboard.
There is another option for working with the starting position. Children may set the starting position up in descending order of the chess piece value, naming the pieces and their locations aloud; then they record the position; remove it from the board and attempt at verbalizing it from memory looking at the chessboard (they may place chips or checkers (as a material tool) on the mentioned squares lest they should get mixed up). Then they attempt at announcing or recording the position sitting with their back to the chessboard.

Problem 34.
Module: "Starting Position".
Point of Exercise: Mastering the concepts of the Queen's flank and the King's flank.
Description: The teacher asks the children where the King's flank and the Queen's flank are at the end of solving each problem concerning the starting position.

Problem 35.
Module: "Starting Position".
Point of Exercise: Arranging the starting position.
Description: It includes assignments that invite children to set the whole starting position up or to arrange only some pieces in the starting position (the pieces may be selected at random with the unnecessary pieces being removed, but keep in mind that Kings should always be present on the chessboard) in descending order of the chess piece value. The exercise

is performed in pairs, and the children name the squares that they place their pieces on. When the children start doing it correctly, the teacher may facilitate the children's enthusiasm and invite them to have a contest who will be the first to set the position up (a child will set White pieces up, and another – Black ones) provided that they observe the order of arranging pieces on the board.

Another version: Children work in pairs, with one arranging White pieces and another – Black pieces. Then, they swap roles to complete the other assignment.

Problem 36.

Module: "Starting Position".

Point of Exercise: The rules of dealing with the position (the order of arranging the position, the rules of notation). Understanding of the chess piece value is a side effect of this exercise.

Description: Arranging the starting position (as White or Black, or the whole position) from memory and subsequent recording of the position (the one that the child has set up). It may be an assignment for pair work on one chessboard (one child sets White pieces up, and another – Black ones; then they record their positions and check each other's results).

Recommendations on exercise design: The teacher invites children to set the position up in a certain order (in the order of recording the position – K, Q, BB, RR, NN, pp) from the very beginning. If the children experience difficulties memorizing it, they can make a memory aid reflecting the sequence of the pieces. This sequence will make more sense to children when the concept of the chess piece value fills with specific meaning in the course of learning piece movement.

Problem 37 (authored by I.A. Burilova, O.V. Glukhova). See Appendix 2 "Handouts and Recommendations on Exercises".

Module: "Starting Position" and "Chessboard".

Point of Exercise: Diagonals and the starting position; working with the diagram of the starting position.

Description: The teacher invites children to answer the questions about diagonals that are occupied by a certain number of pieces in the starting position. There are two versions of the problem depending on the level of the ability to perform mentally: one using a diagram of the starting position and another using a mute chessboard.

Recommendations on exercise design: As performing this exercise using a mute chessboard may be too difficult at this stage, I.A. Burilova invites children to complete the two types of the problem one after another, working with the diagram first, and then attempting at answering similar questions using a mute chessboard. This facilitates memorizing and enhances an emerging mental image of the starting position. If a child faces difficulties working with the diagram, the teacher needs to invite the child to set the starting position on a regular chessboard and work with the chessboard.

Problem 38.

There are no ready-made handouts for this problem; the teacher needs to make them by him/herself.

Module: "Starting Position".

Point of Exercise: Memorizing the starting position. Learning the rules of working with the starting position.

Description: The teacher provides children with ready-made records of the starting position that contain two types of mistakes: a confused location of pieces and a confused order of recording pieces. The teacher invites the students to check the records and find mistakes. The Children may also play with the teacher (the teacher playing Neznayka (*Translator's note*: Neznayka, Dunno, or Know-Nothing, is a character created by Nikolay Nosov, a Soviet children's writer), records the starting position with mistakes on a blackboard and the children "catch" him/her on making the mistakes).

Problem 39. "Remember the Position" (authored by I.A. Burilova, O.V. Glukhova).

Module: "Working with Position".

Point of Exercise: The ability to record a position; set the position up using records; memorize the position consisting of 3-4 pieces.

Description:

Version 1: The teacher hands out cards with a position of 3-4 pieces (White and Black Kings are prerequisite; the position should follow the laws of Chess). The goal is to set the position up, to announce it aloud and to try to memorize it. Then children remove the position from the chessboard and reproduce it.

Version 2: The teacher sets up a position of 3-4 pieces on the chessboard. The child's task is to write the position down; to announce it; to remove pieces and to try to reproduce it without using his/her notes (and to check him/herself using the records). I.A. Burilova invites the children who find this problem simple to complete an advanced version of the problem: having memorized the position that they have previously set up, children need to reproduce it after they have removed the pieces and rotated the board 180 degrees.

Recommendations on exercise design: Children benefit best when they work with technically correct chess positions; therefore, we suggest that it should be the teacher who designs them. At this training stage, children lack sufficient knowledge to arrange pieces competently (avoiding getting Kings in check, pawns occupying the first or the eighth ranks etc.). The teacher may also invite children not only to reproduce the position but also to arrange it and make records when looking at the chessboard as Black.

Problem 40. Starting Position Quiz (authored by I.A. Burilova).

See the test's form in Appendix 3 "Tests and Quizzes".

Module: "Starting Position".

Point of Exercise: The mental image of the starting position; orienting oneself in the space of the chessboard.

Description: The test assesses how children orient themselves in the space of a chessboard that is occupied by pieces in the starting position (the questions relate to the lines and squares that pieces occupy). It also assesses the knowledge of notation for pieces.

Recommendations on exercise design: Children may use the Quiz to assess knowledge; to identify difficulties that they are experiencing so as to work on them later. The Quiz may also be used as a problem statement at Level 2 of learning the starting position. Children may work on the Quiz at different levels of the maturity of the mental image of the chessboard: working with the mental image of the chessboard; using some chessboard diagram (complete, mute, white); working with a diagram representing the initial setup; working with a regular chessboard; with a chessboard and the starting position set up by the child; with a chessboard occupied by pieces in the starting position and additional material tools such as a ruler, strips of paper etc.

Problem 41. Starting Position Hands-on Test (authored by I.A. Burilova).

See the test's form in Appendix 3 "Tests and Quizzes".

Module: "Starting Position".

Point of Exercise: The mental image of the starting position; orienting oneself in the space of the chessboard.

Description: The test assesses how children orient themselves in the space of a chessboard that is occupied by pieces in the starting position (the questions relate to the lines and the squares that pieces occupy). It also assesses the knowledge of notation for pieces.

Problem 42. (authored by V. K. Zaretskii).

Modules: "Chessboard", "Movement. Bishop", "Movement. Queen"; subsequent modules.

Point of Exercise: Developing the mental image of diagonals.

Description: Finding a specific path or just a path (when working with the Chessboard module) or a Bishop's / Queen's path (when working with the Movement modules) along dark diagonals from *a1* to *h8*, so as to pass all diagonals. Children may pass several squares of a diagonal and turn, but they need to pass the remaining squares on this diagonal later. They may place a piece twice on the same square and they may cross the diagonals that they have already passed. It is forbidden to move along the same way twice (neither forwards, nor backwards). The goal may be to move along all the diagonals and get to *h8* in as few moves as possible. Children need to write their path down.

Recommendations on exercise design: In some time, it is useful to give children a similar assignment of getting from *a8* to *h1* moving along light diagonals. When working on this exercise, the child learns to visually identify diagonals from the ground of the chessboard. Therefore, targeting light diagonals is especially useful as the mental image of these diagonals usually takes shape more slowly.

The exercise implies that the child may draw lines on white chessboard diagrams (the child may make the necessary number of chessboard grids in his/her squared notebook) and may use a chessboard, pieces and other material tools when experiencing some difficulty. When explaining the exercise, the teacher needs to demonstrate what children can do and what they cannot in completing it.

The teacher may put these rules down on the blackboard, or the child writes them down in his/her notebook.

Problem 43 (authored by M.M. Gordon).

Module: "Movement. King".

Point of Exercise: Shaping the mental image of the King's movement. Developing the ability to see squares that a piece controls before making a move.

Description: The child needs to get to a certain square avoiding obstacles in as few moves as possible (the obstacles may be pieces of the same colour as the King, and the problem statement includes a specification that it is the King alone who can move; you may also use immobile chips that interfere with the King's movement but can neither attack nor capture the King, nor make a move).

Recommendations on exercise design: The difficulty level should increase gradually with time (the path becomes longer; the obstacles grow in number). If the problem includes the opponent's pieces, one needs to ensure that the King never gets in check (as children lack knowledge of how other pieces move at this stage). It poses some challenges. Therefore, it is better to use the opponent's King alone in assignments.

Problem 44 (authored by M.M. Gordon).

Module: "Movement. King" + "Chessboard".

Point of Exercise: The exercise is used if the child experiences some difficulties relating to the image of the chessboard at this stage.

Description: Includes such problems as "Get to a certain square".

The child completes the exercise once or twice using a King on a chessboard, then – using a chip representing the King on a white chessboard diagram (or using a pen). In small groups of three students: a child announces the task (written by the teacher on a card in advance or invented by the child in the course of the game and written down on a sheet of paper so that the children may check themselves). Another child fulfills the task (announcing his/her moves). The third child keeps record of the moves so as to check them later.

The problem's type: "The King is on a dark square" (a player decides which square the King will start from). "The King moves diagonally, horizontally, diagonally, vertically" making 6-8 moves. "Which square – dark or light – does the King occupy? The player decides in which direction he/she moves the King by him/herself (left or right, up or down etc.) Apparently, all players will get the same answer (unless anyone confuses line names or moves the King more than a square in any direction). It is useful to do this problem on a white chessboard (imagining the chessboard and verbalizing actions).

Recommendations on exercise design: Children may play the game in small groups: a game leader and three to four players (completing the task silently or whispering square names). The game leader may also make moves on a white diagram (drawing moves with a pen so that the answer will be valid).

Problem 45 (authored by M.M. Gordon)

Module: "Movement. King" (Prohibition against the King occupying an attacked square).

Point of Exercise: Studying the rules of the King's movement (prohibition against occupying a square that is under attack of an opponent's piece), chessboard lines, notation for a move.

Description. Two types of problems:

1) The White King is in the starting position. The Black King is on e5. The child plays as White. How can the White King get to e8 in as few moves as possible? How many moves will it need? The same problem but the Black King is on f6. The same problem but the Black King is on d7 (the solution is that the White King cannot get there).
2) Problems relating to the King's path and combining the use of chips and the opponent's immobile King. The chips are placed on d2, e3, e5, f1, g2. The Black King is on b2.

You can use these sample problem statements to create our own.

Recommendations on exercise design: Children work in small groups of three students: a child announces the problem written on a card. Another child makes a move and names it. The third child records the move (the teacher explains how to record moves before the children start working). The teacher asks the children to announce the problem slowly so that the others may have time to think, to move the piece and to write down the move. The game host may use a pencil to mark what he/she has already announced. The problem statement to be announced is: "The White King is in the starting position. It moves diagonally. It moves vertically. It moves horizontally. It moves vertically. It makes three moves left horizontally. It moves diagonally. *Let's check*: Where did the King stop?" (Solution – c5). "How many moves did it make? Read the record of

the moves backwards to get to the starting position again". If the children fail to return to the starting position, then, they check the records together (looking for a mistake). If everything is correct, or when they identify the mistake, children swap roles and do a similar problem.

Problem 46 (authored by M.M. Gordon).

Module: "Movement. King" (Capturing by the King and prohibition against the King occupying an attacked square).

Point of Exercise: Mastering the rule that the King cannot occupy a square that is attacked by the opponent's piece in practice.

Description: The teacher arranges chips symmetrically on the chessboard (some in the center; some on the left and on the right on the third, fourth, fifth and sixth ranks; some on the flanks) so that they had an equivalent position in relation to the Kings in the starting position. The Kings move according to the rules and can eat pawns observing the rule of capturing by the King. White is the first to move. Players alternate moves. The player who eats more chips wins the game. Players swap the colour of the pieces that they control so that the player who has lost may have a chance to win.

Point of exercise: Children master the rule that the King cannot occupy a square that is attacked by the opponent's piece in practice. They learn that an attacked square is any square that the opponent controls even if it is occupied by a pawn (other piece); that a King standing near a pawn prevents it from being eaten by the opponent's King (i.e. the King protects it). Children may also discover that it is more beneficial to capture chips in the centre of the chessboard at first, as it may help them to prevent the opponent's King from moving to one of the flanks and win in terms of chips.

Recommendations on exercise design: The game may be modified by using chips of different colours (ideally, white and black), and a rule that a King never captures chips of the King's colour (it may protect them instead). The player who is the first to eat all the opponent's chips wins the game. The game ends in a draw if the player to move fails to eat the opponent's last chip. However, a draw may be announced only if it occurs to someone that a draw is at all possible. The teacher may invite the children to keep records of a game (according to the rules of recording moves in a game of chess, having explained these rules to the children in advance).

Problem 47 "King versus King" Games (authored by V. K. Zaretskii).

Module: "Movement. King".

Point of Exercise: Mastering the King's moves in practice. Playing with each other.

Description: The game rules: the Kings move within a limited space.

Alternative problem statements:

The Kings move:

a) vertically, along the h-file only (h1-h8);
b) within the space of the h-file and the g-file (squares lying on h1-h8 and g1-g8);
c) within the space of the h-file, the g-file and the f-file (squares lying on h1-h8, g1-g8 and f1-f8);
d) diagonally, along a1-h8;
e) diagonally, along b1-h7;
f) within the space of the a1-h8 and b1-h7 diagonals (squares lying on these diagonals);
g) within the space of the a1-h8, b1-h7 and a2-g8 diagonals (squares lying on these diagonals);

There may be other variants of the problem statement.

The beginning of the game. The starting position is the Kings in the corners of the chessboard facing each other. In Version (e), they occupy a2 and h7. The starting positions may differ but the crucial thing is that the Kings were in the equal position.

Winning the game (types of the game objectives): The player wins the game if he/she (1) "blocks" the opponent's King; (2) outstrips the opponent's King (being the first to achieve the last opposite square – the problem statement specifies who needs to get where).

The game ends in a draw if positions repeat.

Recommendations on exercise design: Having finished a game, players swap places irrespective of the result (they alternate playing as White and Black on the same conditions). Playing along a single file aims at testing the King's capacities. Children grasp it quite quickly that a player who moves first wins the game, and hence, they need to proceed to playing under other conditions. It is useful to play along the b1-h7 diagonal after playing along the a1-h8 diagonal.

Problem 48 (authored by M.M. Gordon).

Module: "Movement. King". (The rule that the Kings never occupy adjacent squares; writing the position).

Point of Exercise: Inferring the rule that the Kings can never occupy adjacent squares, basics of recording the position.

Description: Find a mistake (the teacher provides 8-10 records of the position consisting of the two Kings: some of them are correct and some are not, i.e. the Kings occupy adjacent squares). The teacher invites the children to check the records for mistakes and say which positions can never occur during the game. The teacher invites the children to guess it using the records alone (e.g. they may guess that such position as "White K a1, Black K a2" is wrong). Then they may check other positions looking at a chessboard diagram. If they fail to find the mistakes, the positions may be arranged on a regular chessboard.

Recommendations on exercise design: Having completed the exercise, children proceed to reflecting on whether it is possible to identify which positions are wrong looking solely at the records. They can discuss this question in small groups. A teacher may invite children to solve a similar problem once again and to attempt at identifying mistakes using the records, after a fruitful reflection process.

Exercise 49 (authored by M.M. Gordon).

Module: "Movement. King" (a King's attack on a King).

Point of Exercise: Gaining awareness that in order to win, the Kings need pieces.

Description: The problem statement: can a King force another King to move to the edge of the board (make it to move to the rim)? The teacher invites children to check it in practice (having a King-versus-King struggle, attempting at driving the opponent to the rim). Another question is whether a King may attack another King. If the children have doubts, the teacher invites them to check it in practice. Can anyone win if there are no pieces left on the chessboard but the two Kings?

The answer is that the King can never win alone: it always needs other pieces. Proceeding to the next module.

Recommendations on exercise design: Criteria for proceeding to the next module: The children play without mistakes as far as the King's moves are concerned (they avoid jumping over the squares and moving the King to two squares at a time; they remember about

the King's ability to move diagonally etc.). They understand that the King can never occupy an attacked square and understand what this square is (and hence, which squares the King controls). They understand how the King can capture other pieces.

Problem 50.

Module: "Movement. Rook".

Point of Exercise: Shaping the mental image of the Rook's movement; starting to develop the ability to see the squares that are controlled by the Rook on the chessboard.

Description: Types of problems: Yuri Razuvaev's software (CD) "Shakhmatnaya Shkola dlya Nachinayushchikh" ("Chess School for Beginners"); the Rook Practicum No 33, 35, 36, 37, 38. Problems 37 and 38 include capturing; Problem 33 includes inventing similar assignments (observing the rules).

Recommendations on exercise design: When shaping a proper mental image of the Rook's movement, the child needs to name each square of the Rook's path up to the destination square.

Problem 51.

Module: "Movement. Rook and King".

Point of Exercise: Shaping the mental image of the Rook's movement. First steps in analyzing problems "starting from the end goal".

Starting to work on analyzing the position; initial steps in analyzing the position. Description:

1. Squares that the Rook controls /the King's moves.
   Problem Statement: White: K e1. Black:
   K e8, R b4, R f4. White to move. *Question*: Can the White King get to b5? If it can, how can it get there?
2. Challenging Problem. Can the following position occur on a chessboard?
   White: K f4, Rf5
   Black: K f8, K 4
   Explain (justify) your opinion.

Recommendations on exercise design: This is a creative problem for small group work which is followed by a general discussion. This problem may also serve as an individual assignment for children who outstrip their peers as far as their progress in chess is concerned.

Problem 52. Playing Lesson (authored by S.V. Pavlova, L.P. Volgutova).

Module: "Movement. Rook".

Point of Exercise: Shaping the mental image of the Rook's movement. Learning the Rook's moves.

Description: One-to-one play. Players alternate moves. They can move a Rook any number of squares horizontally or vertically at a time. The player who is the first to move the Rook to h1wins the game (the game starts from *a1*).

The game may start from any square and end anywhere. The teacher and the children agree where the Rook is and where they need to move it to. Players alternate the right to move first.

Recommendations on exercise design: You can play similar games when studying any piece.

Problem 53. "Find the Bishop's Path" (authored by O.V. Glukhova, I.V. Komarova).

Module: "Movement. Bishop".

Point of Exercise: Shaping the mental image of the Bishop's movement.

Description: Children use paper chessboards with 2 Bishops (the white-squared Black Bishop and the black-squared White Bishop) arranged on them. The children use different colours to draw diagonals which the Bishops will move along. Then, they announce all the squares on a diagonal that the Bishops are moving along and that they have drawn.

Recommendations on exercise design: The teacher needs to draw the children's attention to the colours of the diagonals where white-squared and black squared Bishops may move. Therefore, the teacher asks the child to name both a square and its colour. The child may complete several assignments like that during a lesson (the Bishops position constantly changes).

Problem 54 (authored by L.N. Shekhmetova, O.M. Teplyakova).

Module: "Movement. Bishop".

Point of Exercise: Shaping the mental image of piece movement.

Description: A Bishop (Rook, Knight, Queen) needs to get to h7 from a8 and capture the opponent's piece occupying that square. The child records all the moves.

Recommendations on exercise design: This problem may be used to shape the mental image of any piece's movement.

Problem 55 (authored by V. K. Zaretskii).

Module: The end of "Movement" and "Chess Piece Value" Modules, subsequent modules.

Point of Exercise: Developing the ability to see the squares that a piece controls on the chessboard; materializing the concept of the chess piece value; developing an understanding of pieces' advantageous and disadvantageous positions, of the relationship between the chess piece value and a piece's position on the chessboard. Working with an opening.

Description: The students need to arrange like-coloured pieces on the chessboard (the problem statement does not specify the colour of the pieces (white or black)), so that they control all the squares on the chessboard.

Increasing the difficulty level:

1) Try to use a minimum of pieces (find out what minimal number and composition of pieces you need to solve this problem). Optional problem statement: Find a way to achieve the goal without using pawns.
2) Solve the problem so that all pieces protect each other.

When the students solve the main problem, the teacher may invite them to change the position so that they fulfill the first condition and all the pieces protect each other.

An additional problem that the teacher poses upon the completion of the first one: "Count how many squares are controlled by three pieces simultaneously? How many are controlled by two pieces? Are there any squares that are controlled by more pieces?"

The children need to write the position and answers to additional questions down.

Recommendations on exercise design: In order to solve the problem, children may need material tools that the teacher provides to them, – namely, medium-size white or black-and-white chessboard diagrams (the squares on the diagrams exceed squares in a squared notebook). The teacher allows the children to draw on the diagrams (using notation symbols to denote pieces; using lines to mark squares controlled by a piece; using as many attempts as needed).

The teacher may invite the children to solve a new problem after they have completed the previous assignment.

The teacher and the children may reflect on the completed assignment: Which squares are most advantageous for the Queen, or for the Bishop? What specific features does the Rook have? What capacities does the King have? etc. However, the teacher needs to take a careful stance when asking the questions as it is the Queen and the Bishop (rather than Knights) who occupy the most advantageous positions when the placement of forces is optimal. When working on the main and optional assignments, the child may discover that the King is a real driving force on the chessboard; that the Rooks in the corners are as strong as in the centre etc. The teacher may invite children to solve alternative problems in order to facilitate understanding of the Knight's strength, other variants of strong positions and interaction of pieces (e.g. an alternative problem statement may be to occupy the maximum number of squares without a Queen).

Problem 56. Playing Lesson (authored by O.V. Glukhova and I.V. Komarova).

Module: This kind of playing with an opponent may be used at the stage of learning the Movement module when children start playing with each other using pieces that they have learned.

Point of Exercise: Developing the ability to analyze the position.

Description: The child who makes the first move, names his/her move and explains the point in making this move. The children participating in the discussion share their ideas about the significance of this move. The child who responds to the move, explains why his/her move makes sense too, and analyzes the opponent's position and his/her potential actions.

1) Announce your move.
2) Show it on the chessboard.
3) Explain why you have chosen to move a piece to some particular square.
4) Why have you moved any particular way?
5) How do you think your opponent will respond to your move?
6) What does threaten the piece in this position?
7) Is this move to your advantage?
8) What do you think, is the Knight's position advantageous in this situation, and why?

Recommendations on exercise design: The children who are observing the game may also share their ideas. The teacher may ask facilitating questions that help the child to understand and analyze the position.

Problem 57.

Yuri Razuvaev's software (CD) "Shakhmatnaya Shkola dlya Nachinayushchikh" ("Chess School for Beginners"), "Developing Intelligence/ Attention", "Practice", Problem 1

Module: "Movement. Queen".

Point of Exercise: Shaping the mental image of the Queen's movement. The ability to see attacked squares. Analyzing the problem starting from the end goal.

Description:

Position:

White: Qh1 p. e3, g5

Black: Be5, Be8 p. b4, b5, c2, c7, e6, f3, g4

Problem Statement: The Queen needs to get to a8 in as few moves as possible. It is White alone who moves. Players cannot capture the opponent's pieces and expose their pieces to an attack.

Recommendations on exercise design: You may find similar problems for the Queen's, Rook's, Knight's, Bishop's and King's movement and problems for capturing all pieces in as few moves as possible on the aforementioned CD (see "Tests", "Practice" and "Movement"). The teacher needs to allow the child to use any material tools that he/she needs when solving the problem. It is crucial to use such problems to demonstrate the efficacy of analyzing starting from the end goal. The teacher may invite the students to check which is quicker – searching an answer starting from the end goal or sequentially selecting variants – by giving them several problems of similar content and difficulty (they need to check the assumption several times to avoid coincidence).

Problem 58. Playing Lesson (authored by I.A. Lebedev).

Module: "Movement. King and Pawn".

Point of Exercise: Mastering the King's and the Pawn's moves, their interaction during the game.

Description: Playing with each other.

Pawn endgame: White: Ke2, p. a2, b2, c2, g2, h2. Black: Ke7, p. a7, b7, c7, g7, h7.

Recommendations on exercise design: This is a real-play position, starting with which children may play with each other, even though they lack knowledge of how other pieces but the King and the Pawn move. They will need some knowledge for pawn promotion, but the teacher may prompt the students in such situations (thus, the children will be learning movement of some pieces ahead of the training program).

Problem 59. Playing Lesson (authored by I.A. Lebedev).

Module: "Movement. King. Pawn. Rook".

Point of Exercise: Mastering the King's, the Pawn's and the Rook's moves, their interaction during the game.

Description: Playing with each other.

Rook endgame: White: Kg1, Re1, p. a2, f2, g2, h3. Black: Kg8, Rb8, f7, g7, h7.

Recommendations on exercise design: This is a real-play position, starting with which children may play with each other, even though they lack knowledge of how other pieces but the King, the Pawn and the Rook move. They will need some knowledge for pawn promotion, but the teacher may prompt the students in such situations (thus, the children will be learning movement of some pieces ahead of the training program).

You may find mate-in-one, stalemate, mate-in-two, en passant capture problems on CDs mentioned in References. I.A. Lebedev, one of the developers of the COD training, has selected problems from Sergey Ivashchenko's e-handbook "Shakhmatnaya taktika. Zadachnik po taktike dlja nachinajushchikh. [Chess tactics. Tactics problems for beginners], having modified some of them. This selection will be useful for teachers as it facilitates the process of matching assignments to children depending on their individual needs (how many pieces in a position the child can memorize; movement of which piece the child is learning etc.). Please find this selection below.

Problem	Number of Pieces, Position
Ivashchenko, Step 1, Mate-in-one, Rook, No4	4 pieces: W: Kd3, Ra7, Rh1; B: Ke8
Ibid., No 5	4 pieces. W: Kc7, Rh3; B: Ka8, p. b7
Ibid., No 9	4 pieces. W: Kf3, Ra8; B: Kg1, p. h2
Ivashchenko, Step 2, Mate-in-one, No 135	9 pieces. W: Kg4, Rc7, Rf6, p. f4, g5; B: Kh7, Rg8, Re3, p. a7, g7
Ibid., No 158	4 pieces. W: Kc5, Rc8; B: Kc3, Ra7
	Rook's Movement
Ivashchenko, Step 2, Draws, No 135	4 pieces. W: Ka5, Rh4; B: Kc6, Qc1
Ibid., No 242	4 pieces. W: Kg8, Rf1; B: Kg6, Qh6
Ibid., No 259	6 pieces. W: Kg1, Rb1, p. g3, h2; B: Kf3, Re3, p. g4. Black to move
Ivashchenko, Step 1, Mate-in-one, Rook, No 1	3 pieces. W: Ke6, Ra2; B: Ke8
Ibid., No 2	8 pieces. W: Kg2, Ra1, p. f2, g3; B: Kg8, p. f7, g7, h7
Ibid., Bishop, No 31	4 pieces. W: Kg6, Bh2, Ba2; B: Kh8
Ibid., No 32	4 pieces. W: Kb6, Bh3; B: Ka8, Bb8
Ivashchenko, Step 2, Winning material, Rook, No 154	7 pieces. W: Kd1, Rh2, Bg2, p. b4; B: Ka2, Ra6, p. b5
	9 pieces. W: Kg3, Ra2, Rd1, Bf6, p. d3, h5; B: Ke3, p. h7
Ivashchenko, Step 2, Draws, No 248	4 pieces. W: Ka3, Qe2; B: Kb1, Qb6, Qg1
Ibid., No 256	7 pieces. W: Kg2, Bf2, p. a4; B: Kb6, Qc5, p. a5, c6
Ivashchenko, Step 2, Winning material, Rook, No 151	8 pieces. W: Kd1, Qc6; B: Ke7, Rh2, Nb8, p. f5, g6, h7
Ivashchenko, Step 2, Mate-in-one, No 130	7 pieces. W: Ka4, Rg7, Bh2, Nb4, p. b7; B: Kb8, Ne5
Ibid., No 132	7 pieces. W: Ke4, Qa2, Na8, p. c7, d7; B: Kb7, Nc8.
Ivashchenko, Step 1, Mate-in-one, Bishop, No 34	4 pieces. W: Kg6, Ba3, Nh6; B: Kh8
Ibid., Knight, No 43	5 pieces. W: Kb1, Na1; B: Ka3, Nb4, p. a4
Ibid., No 46	6 pieces. W: Kh6, Nb7, Ne6; B: Ke8, Nd7, Ne7
Ibid., Pawn, No 56	6 pieces. W: Kf5, Rh3, p. g2; B: Kh5, Rh4, p. h6
Ivashchenko, Step 2, Mate-in-one, No 128	7 pieces. W: Ka4, Rf7, Bh2, Nb4, p. b7; B: Ka7, Nd7

	Goal	Main Subject	Additional Subjects	Comments
	Checkmate	Rook's Movement	Mate-in-one	
	Checkmate	Rook's Movement	Mate-in-one	
	Checkmate	Rook's Movement	Mate-in-one	
	Checkmate	Rook's Movement	Mate-in-one, Pin	
	Capture			
	Discovered check			
	Stalemate	Rook's Movement	Stalemate	In 2 moves
	Stalemate	Rook's Movement	Stalemate	The solution is more apparent than in the previous problem
	Stalemate	Rook's Movement	Stalemate	
	Checkmate	Rook's Movement	Mate-in-one	To be solved in mind
	Checkmate	Rook's Movement	Mate-in-one	To be solved in mind
	Checkmate	Bishop's Movement	Mate-in-one	To be solved in mind
	Checkmate	Bishop's Movement	Mate-in-one	To be solved in mind
	Capture	Bishop's Movement	Discovered check	
	Checkmate	Bishop's Movement	Mate-in-one	The position has been adjusted. See the original position in Ivashchenko, Step 1, Mate-in-one, Bishop, No 1
	Stalemate	Queen's Movement	Stalemate	Black to move – mate-in-two
	Stalemate	Queen's Movement	Stalemate	Pawn ending is possible after capturing the Queen (Black wins)
	Capture	Queen's Movement		
	Checkmate	Knight's Movement	Mate-in-one, Pin	
	Checkmate	Knight's Movement	Mate-in-one, Pawn promotion	
	Checkmate	Knight's Movement	Mate-in-one, Bishop's Movement	The Bishop checkmates the King, but the Knight's role is crucial as it blocks the Black King
	Checkmate	Knight's Movement	Mate-in-one	To be solved in mind
	Checkmate	Knight's Movement	Mate-in-one	
	Checkmate	Pawn's Movement	Mate-in-one, Pin	
	Checkmate	Pawn's Movement	Mate-in-one, Pawn promotion, Pin	

Chapter 3

STAGES OF CHESS THINKING DEVELOPMENT

Outline of Stages of Development of Ability to Make Mental Chess Move

Outline of Stages of Development of Ability to Make Mental Chess Move

The material stage (Levels 1–2) means working with a chessboard, pieces, and other material tools if necessary.

The action is gradually released of the material tools (Levels 3-5). In the picture, the child is using chips instead of pieces. The chips help the child to keep the position in mind. The child is performing the action mostly on the material plane. Out-loud and extended speech enables the conversion of the action to the ideal plane. Speaking loudly and describing the action in detail, the child understands its logic; becomes aware of the relationships between its elements and builds an integral mental image of the action.

Here the child is performing an action mainly on the ideal plane (Levels 6-9). Some elements of the action are partly tangible (chess notation, a chessboard diagram, dots on the chessboard instead of pieces etc.). In the photo, partial fulfillment of the task on the material plane is evidenced by a pen in the girl's hand.

The chessboard is lying face down on the desk; the pieces standing nearby are not used. At this stage, gradual "abbreviation of an action" occurs.

Out-loud and extended speech gives way to internalized external speech (abbreviated, fragmentary, illustrative of the most significant elements of an action) and then it becomes inner speech (when a person is verbalizing mentally nothing but the elements that are prerequisite for accomplishing the action without mistakes).

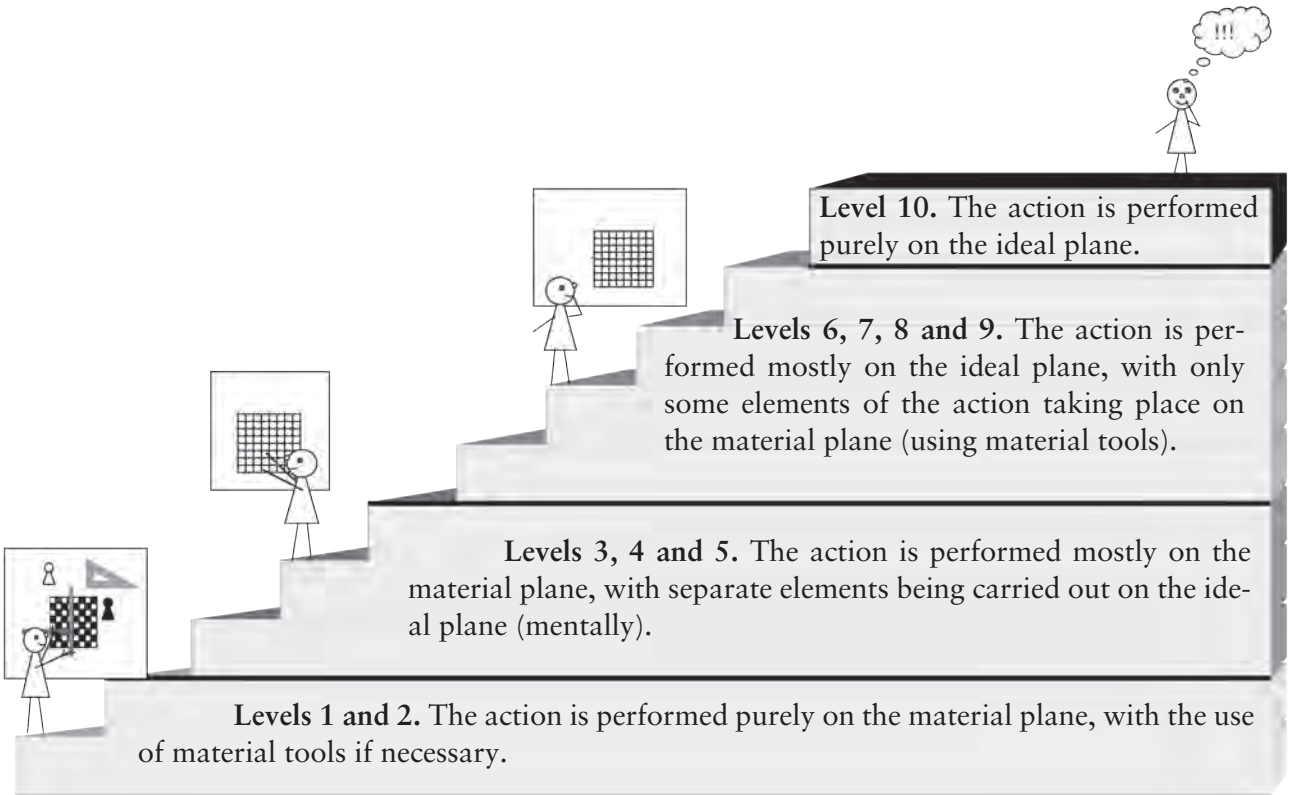
The final stage (Level 10). The child is performing all the actions mentally, that is, on the ideal (internal) plane. There is a blank sheet of paper on the desk lying there just in case (if the child fails to perform "in the head"). There are pieces and a chessboard nearby (in case the sheet of paper and the pen prove useless). If the child has performed a mental action efficiently, then he/she may proceed to pursuing a more complicated action (the next stage of developing the ability to make a mental chess move).

When converting from the material form into the ideal one, each action goes through ten assumed levels.

Chapter 3 considers the process of shaping 6 core actions that add up to the ability to make a mental chess move:

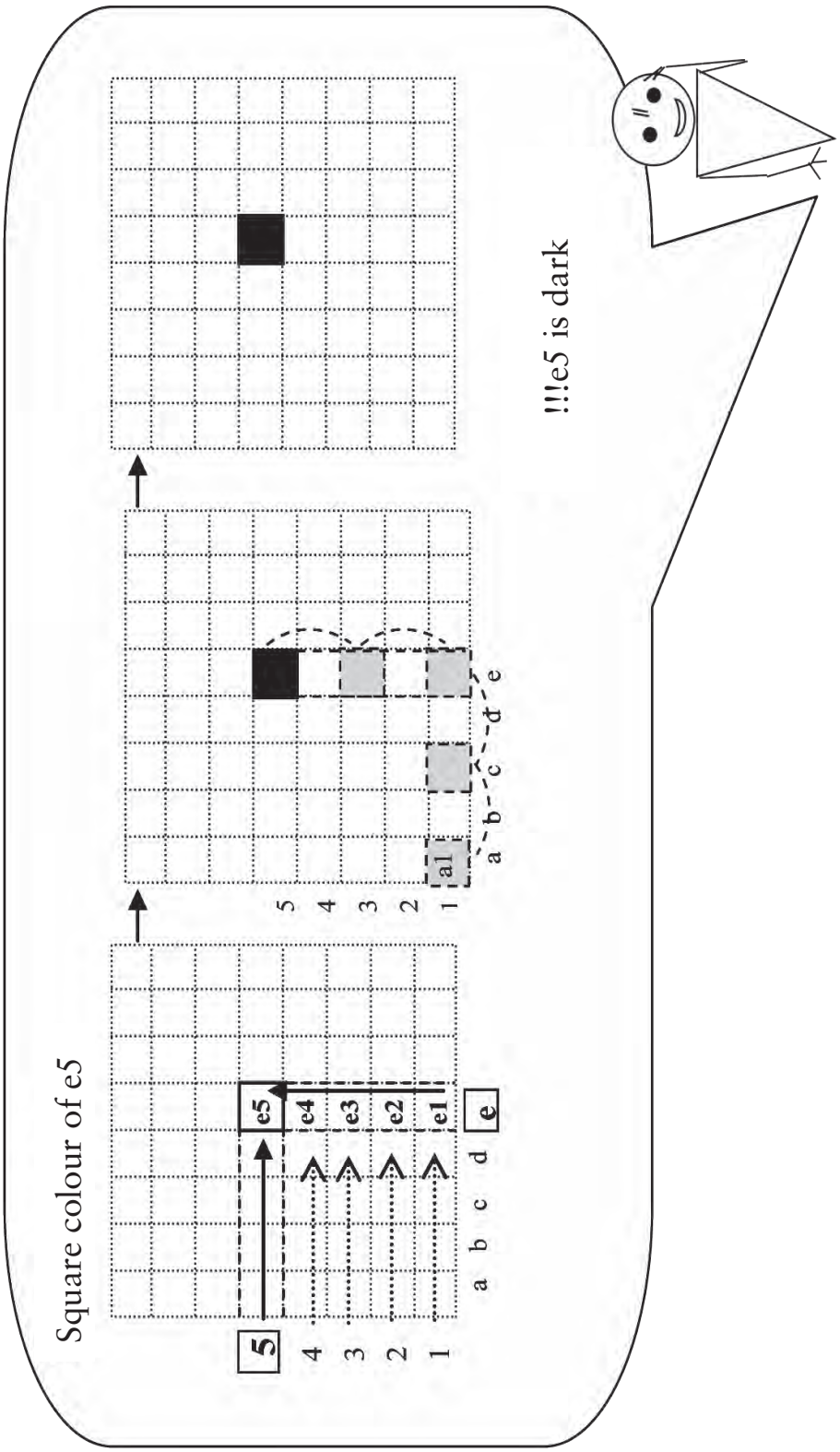
1) Identifying a square on the chessboard.
2) Identifying a line from "the background" of the chessboard.
3) Identifying a combination of squares from "the background" of the chessboard.
4) Finding a square where two paths that are relevant for a concrete position intersect (problems of the "double-attack" type).
5) Perceiving the position and any changes in it resulting from a mental move as a whole (problems of the "mate-in-one" type).
6) Perceiving the position and any changes in it resulting from a mental move as a whole, and being able to act mentally in the imagined position ("mate-in-two" problems, advanced "mate-in-one" problems involving alternative variants of moves and defenses).

Accordingly, we consider the whole process of shaping the ability to make a chess move mentally as comprising six stages. In order to proceed from one stage to another, the person needs to complete ten levels within each stage. Thus, the whole "stairway" comprises 60 steps (levels).



CHESS THINKING DEVELOPMENT STAGE 1: IDENTIFYING SQUARE ON CHESSBOARD

Chess Thinking Development Stage 1: Developing Mental Image of Square



Chess Thinking Development Stage 1: Developing Mental Image of Square
Composition of Mental Actions upon Stage Completion

During Stage 1, the child develops the ability to identify the location and colour of a specified square on the chessboard relying on an emerging mental image of the chessboard. It is not only about the development of the ability to figure out the square colour (although this ability emerges as well) but also about developing a mental image of a square, i.e. the ability to visualize its approximate location on the chessboard and its colour.

Types of problems that the child can solve mentally if he / she has developed this ability:

1. Imagining a square when hearing someone say its name, and identifying its colour.
2. Naming squares of a certain colour that are located on a rank or a file whose name is announced.
3. Naming any 8 dark squares. Naming any 8 light squares (a problem assessing whether the child is ready to proceed to the following stage).
4. Naming all the dark squares. Naming all the light squares (a problem assessing whether the child is ready to proceed to the following stage).

The actions that the child is carrying out mentally when doing a problem (Problem No 1 in the corresponding Diagram):

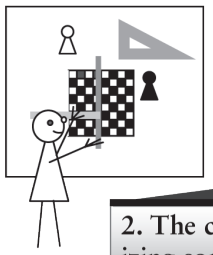
- keeping the problem statement in one's mind;
- visualizing the chessboard's contours (not clearly as a square shape yet; with lines and squares being drawn very approximately);
- finding a file, a rank, and the point of their intersection mentally; seeing a specified square "in one's head";
- identifying the colour of the identified square mentally (starting to count from reference squares: a1; other first-rank squares, other squares that the child has memorized, or using any other mode of action);
- visualizing the identified square as a coloured square on the imagined chessboard.

Please note: **presence (occurrence) of a visual image is essential. The child's ability to identify a square colour by ear relying on a logically memorized location of the dark and light squares and without using imagination is insufficient, and it can be inferred that the child has not completed this stage yet. The teacher needs to select developmental exercises that stimulate development of a visual image.**

Chess Thinking Development Stage 1: Developing Mental Image of Square
Developing the action on the material plane

Identifying a square by its name is a challenging action. In order to complete it, the child needs to understand, what a square name is: a letter denotes a file, a number denotes a rank, and a square is located at the point where these lines intersect (and correspondingly, the child needs to understand what a rank and a file are). Secondly, the child needs to be able to find a file, a rank and the point of their intersection. Before the child is able to identify a square by its name looking at the chessboard (which implies tracing a file and a rank and finding the square of their intersection with one's eyes, i.e. acting mentally in part), he/she needs to master modes of these actions on the material plane verbalizing his/her actions. Thus, the first steps in developing the ability to see a square include mastering the ability to identify a square by its name on the material plane. This level also involves mastering a reverse action, i.e. identifying a name of a specified square. The composition of this action is different: tracing the lines starting from the square and identifying their names.

It is worth mentioning that in the beginning and up to Levels 9–10, the teacher gives the child an assignment either in writing or verbally (the child perceives it by ear) but so that the child may write it down (although the child may wish to attempt at keeping the problem statement in mind at different levels).



10. The child can visualize the square by its name and identify its colour mentally without any material tools.

9. The child can visualize the square by its name and identify its colour mentally after writing the problem statement down.

8. The child can visualize the square using its name and identify its colour looking at a partial chessboard diagram (a square contour without a grid).

7. The child can find the square by its name and identify its colour using a visual aid of a white "mute" chessboard.

6. The child can find the square by its name and identify its colour using a visual aid of a white "mute" chessboard diagram with the coloured *a1* square.

5. The child can find the square by its name with the help of a white "mute" chessboard diagram and can figure out its colour using material tools (pointing with a finger, marking squares with dots etc.).

4. The child can find the square by its name using a visual aid of a coloured "mute" chessboard diagram (he/she needs symbols no longer, but is still unable to identify the square colour mentally).

3. The child can find the square by its name using a visual aid of a regular chessboard or a coloured chessboard diagram with letters and numbers (all or some of them).

2. The child can find the square by its name on a chessboard or a coloured chessboard diagram marked with letters and numbers materializing some part of the action (e.g. indicating a file with a ruler and tracing a rank with eyes).

1. The child can find a square by its name on a regular chessboard marked with letters and numbers using all material tools available (rulers, chips etc.).

Chess Thinking Development Stage 1: Seeing Square Developing Action on Material Plane

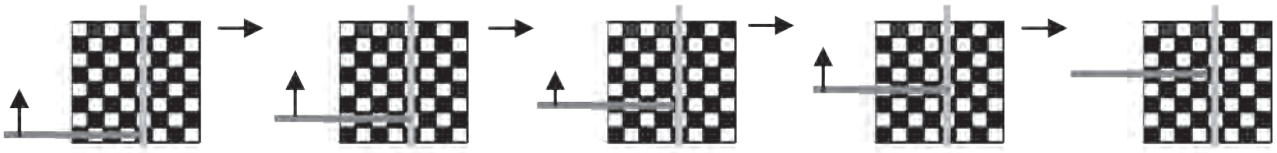
There are two main ways to identify a square by its name. The first method involves finding a letter; tracing the corresponding file; finding a number; and tracing the rank up to the point of its intersection with the identified file. The second method implies finding a letter; finding the file; finding a specified square by moving along the file's squares and naming them (*e1, e2, e3* etc.). From the perspective of the mental action development, the ideal mode integrates these two methods: using the second method as the basic one but integrating it with an understanding (and a mental image) that one needs to look for a square at the point where the two lines (a rank and a file) intersect.

Acting on the material plane according to this method will look as follows. Let us assume that the task is to find *e5*.

1) Identifying a file. Unless the child has memorized the sequence of letters denoting files, he/she had better carry out a search for a file by announcing the whole sequence of letters one after another up to the letter in question (a, b, c, d, e). If the child (*Translator's note*: in case of the Russian speaking students) has difficulty memorizing Latin letters, the teacher may offer him/her to make a memory aid, i.e. to place double-faced cards, with one face depicting a Latin letter, and the other – its transcription in Russian letters, near the challenging letters. The cards lie with their Latin face up, and when the child experiences difficulty, he/she can turn the card over and look at a prompt. The advantage of the double-faced cards is that the child may look at them when necessary, rather than constantly, and at the same time, the child may access them easily any time.

2) Marking the file. The child will be able to keep his/her eyes on the identified file in due course. However, on the material plane, the file is marked by placing a ruler or a strip of paper on it.

3) Moving along the file squares. In order for the image of the square as the intersection of the two lines to occur and last, the child needs to use a ruler or a strip of paper that he/she places on the first rank and gradually moves to the fifth rank, as a pointer helping to count the file's squares. While moving the pointer, the child names each square aloud:

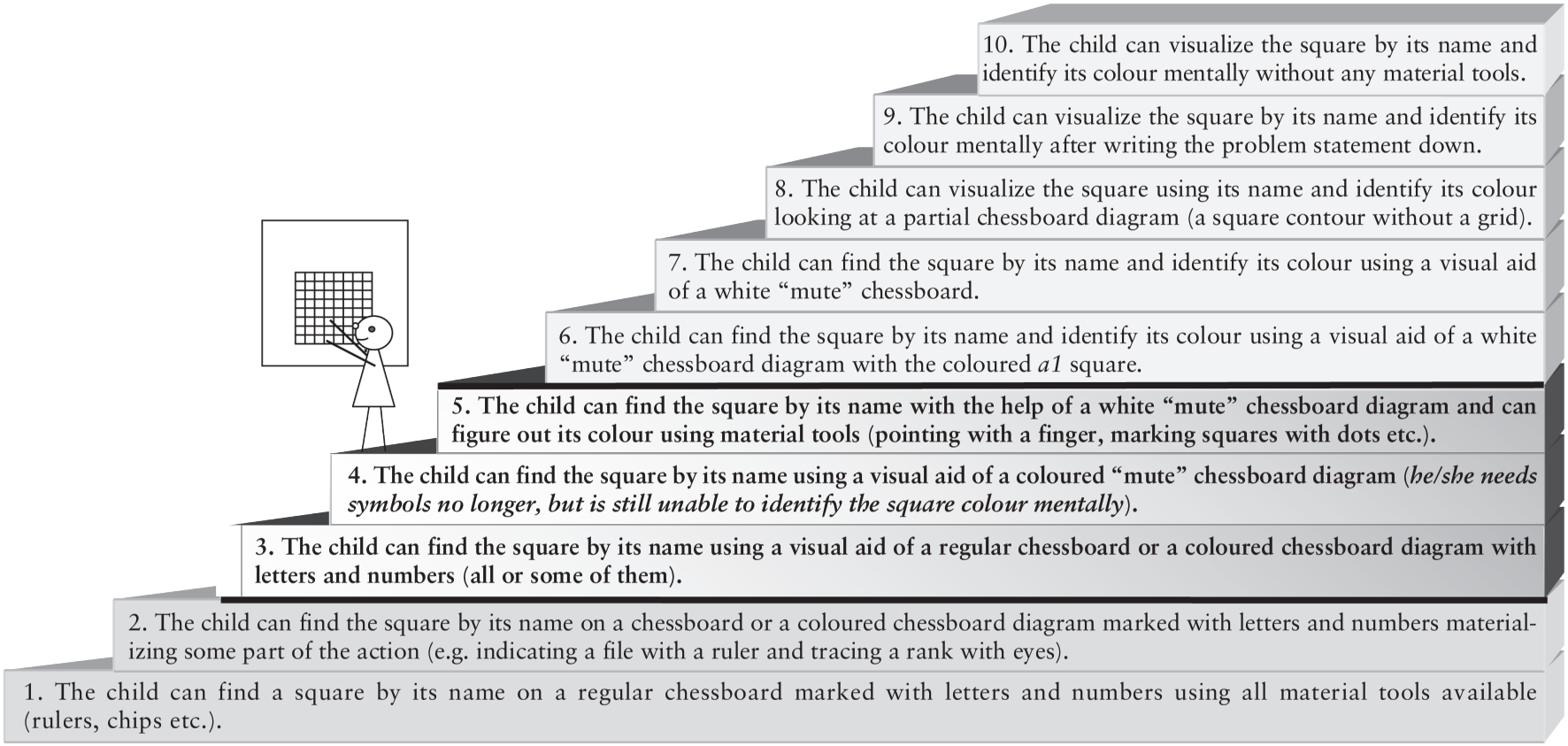


This method of identifying a square has several merits. Firstly, it encourages the child to use speech as announcing letters and naming squares does make the process easier. Secondly, when the child works using this method, not only the image of a square begins to shape, but also the basis for shaping the image of chessboard lines emerges.

When the child has mastered the action on the material plane, and started to consistently identify a square using all material tools, one may offer the child to give up some tools, for instance, a ruler marking a file, for a start. At that point, the teacher invites children to engage in assignments and games that encourage them to give up material tools (i.e. when children work on these assignments, identifying a square by its name serves as a supplementary action for achieving other goals, and consequently, performing the complete, extended action starts slowing the work down, and children may wish to abbreviate it). Reducing the number of tools, the child starts to perform some actions using visual and verbal aids, i.e. the child is getting prepared for the transition to performing the action mentally. It is important that the child continue using speech to support his/her actions. The teacher needs to account for this objective when preparing assignments, so as to make speaking prerequisite for fulfilling them. In order to prepare children to working with a white chessboard, it is desirable that the teacher invent such work design that children announce both a square's name and colour. For instance, when playing the Battleship, announcing colour facilitates mutual control and helps to avoid mistakes when searching for a square or identifying its name.

Chess Thinking Development Stage 1: Seeing Square
Acting on Material Plane, Ideal Plane of Action Starts Developing

When the child has mastered the action on the material plane, the process of a gradual conversion of the action into the internal (ideal) plane starts. At first, the child learns to identify a square by its name looking at the chessboard alone. To some extent, this is a mental action that implies concentration and distribution of attention. Then, the child no longer needs any chessboard identifiers (or needs only some of them) and can reproduce the letter sequence from memory. Eventually, the child makes another step in developing the mental image of the chessboard: the child starts to learn to tell the identified square's colour working with a white chessboard diagram, using various material tools at first. These steps and the action that has already shaped on the material plane form the basis for gradual development of the mental action, shaping the mental image of the chessboard and a square on the chessboard.



Chess Thinking Development Stage 1: Seeing Square Acting on Material Plane, Ideal Plane of Action Starts Developing

Level 3 involves completion of the process of giving up material tools when identifying a square by its name on the chessboard.

The transition from performing an action with the use of material tools to performing an action without them (save as visual and verbal aids, which are present so far) needs to be gradual. An abrupt abandonment of all material tools may cause destruction of the action. After the removal of rulers, let the child help him/herself with a finger moving it along the file while naming squares. The child will gradually use his/her hands less frequently, especially if the teacher facilitates this process (playing assignments wherein hand movement may serve as a clue for the opponent, suit this purpose best). Furthermore, it is desirable to select assignments, wherein the child needs to use speech[1].

Level 4 implies completion of the process of memorizing the letter sequence and the image of the chessboard identifiers in general. However, it no way means that children give up material tools at once and for good. Some children may still need individual aids, e.g. a card with a transcription of a difficult letter (or letters). This should not become an obstacle to further progress, to proceeding to working with a white chessboard. The only essential thing is that the child needs to develop a correct representation of how the chessboard lines are denoted and where the starting point for counting files and ranks is. In this respect, the problems that enable the child not to confuse chessboard identifiers when playing and looking at the chessboard both as White and as Black are useful.

At Level 5, the student starts to work with a white chessboard diagram, and to train the skill of identifying (figuring out by counting) the colour of a square in question. Initially, the child masters the action of identifying the colour on the material plane. In order to start learning this action, the child needs to have a minimum knowledge of how the squares alternate on the chessboard, and that *a1* is always dark. The most common way of identifying the colour on a white chessboard is counting squares starting from *a1*:

1) Identifying the colour of the first square of a file in question: tracing the first rank squares announcing their names and colour one after another ("*a1* is dark; *b1* is light; *c1* is dark; *d1* is light; *e1* is dark"). 2) Identifying the colour of a specified square on the file: tracing the squares along the file announcing their names and colour one after another ("*e1* is dark; *e2* is light; *e3* is dark; *e4* is light; *e5* is dark").

In the beginning, tracing squares is designed as an action on the material plane and is accompanied by moving a chip along the squares, or marking the squares that are being announced in some other way. Colouring squares on a white chessboard diagram and naming them aloud may help the image to emerge.

This mode of action is basic. The essential part of it is vocalizing the square names and colours in sequence. There may be individual variations of this mode of action (occurring in the very beginning or resulting from the main mode's evolution) relating to which squares whose colour the child remembers the child may use as a reference point for counting. Even when using the basic mode of action, the child starts to gradually memorize the colours of the first rank squares and the need for verbalizing these colours fades away over time. Offering the child problems facilitating the development of the chessboard representation and emergence of additional reference points (e.g. memorizing the colour of the central squares and the second rank squares; memorizing the squares constituting the longest diagonals; analyzing regularities that may help to memorize the square colour and orient oneself in the space of the chessboard better etc.) are helpful to develop their mode of action.

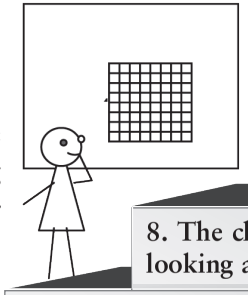
One needs to keep it in mind that as soon as the child starts working with a white chessboard, the mode of action relating to identifying a square by its name changes so as to account for the need to identify the colour (the search for a file is combined with identifying the colour of its starting square).

[1] This rule holds good at most levels of all the stages of the chess thinking development, as a mental action takes shape relying on speech. At higher levels, speech gets gradually abbreviated but is still present up until Level 9 of each stage.

Chess Thinking Development Stage 1: Seeing Square Acting on Ideal Plane Using Material Tools

During the previous developmental levels, actions are performed on the material plane, with the number of material tools being gradually reduced and the emphasis being shifted to the visual and verbal aids. During the following levels (*Level 6-9*), the action separates from the material tools completely, and starts to separate from the visual aids; and, eventually, speech gets abbreviated as well. Abandoning material tools takes place gradually; the attempts to act without them and a temporary recourse to them may alternate. Avoid accelerating this process (just as slowing it down artificially).

If the child experiences especially serious difficulties when acting without material tools, it either means that the child has failed to complete the preceding developmental stage and to shape the ideal plane of action, or the mode of action on the material plane that has developed has deficits that have remained unnoticed. In both cases, one needs to return to acting on the material plane. From that moment on, the reduction of material tools needs to slow down and include using interim options. If the need arises, the gaps in the mode of action are being identified and remediated. The aforesaid may refer to the transition of any action from the material to the ideal plane (including transitions that will take place during the following stages of developing the chess thinking).



10. The child can visualize the square by its name and identify its colour mentally without any material tools.

9. The child can visualize the square by its name and identify its colour mentally after writing the problem statement down.

8. The child can visualize the square using its name and identify its colour looking at a partial chessboard diagram (a square contour without a grid).

7. The child can find the square by its name and identify its colour using a visual aid of a white "mute" chessboard.

6. The child can find the square by its name and identify its colour using a visual aid of a white "mute" chessboard diagram with the coloured a1 square.

5. The child can find the square by its name with the help of a white "mute" chessboard diagram and can figure out its colour using material tools (pointing with a finger, marking squares with dots etc.).

4. The child can find the square by its name using a visual aid of a coloured "mute" chessboard diagram (*he/she needs symbols no longer, but is still unable to identify the square colour mentally*).

3. The child can find the square by its name using a visual aid of a regular chessboard or a coloured chessboard diagram with letters and numbers (all or some of them).

2. The child can find the square by its name on a chessboard or a coloured chessboard diagram marked with letters and numbers materializing some part of the action (e.g. indicating a file with a ruler and tracing a rank with eyes).

1. The child can find a square by its name on a regular chessboard marked with letters and numbers using all material tools available (rulers, chips etc.).

Chess Thinking Development Stage 1: Seeing Square Acting on Ideal Plane Using Material Tools

Level 6 is the transition to performing both actions (identifying a square by its name and identifying the square colour) mentally using visual and verbal aids alone. *Level 9* implies abandoning the use of any visual aids representing the chessboard and the transition to acting on the internal plane. In-between these developmental steps, the number of visual aids gets gradually diminished. Speech as a tool persists up to *Level 10* inclusive. The gradual abbreviation of visual aids may take place in different ways, depending on the child's individual challenges. In this book, we present an approximation of this process.

During *Level 6*, material tools are completely abandoned. As this step is challenging and the child has to focus his/her attention on many things simultaneously, in the beginning, the visual aids may be enhanced by colouring the reference square *a1* or several reference squares (depending on the child's individual mode of action) on a white chessboard. This enables the child to see the reference square (a slight simplification of the mental action) rather than to recall it.

Level 7 involves giving up such aids and proceeding to performing the assignment looking at a white chessboard diagram and announcing (like during the previous levels) one's actions out loud or in whisper.

Level 8 is an interim stage of the transition to working without visual aids (relying on a visualized chessboard, to be precise). Children may find it challenging to evoke an image of the chessboard in their imagination at once. They may master it using a visual aid – a chessboard contour – a square contour without a grid. Then, the child learns to complete constructing the mental image of the chessboard in his/her imagination at first, and only afterwards – to evoke the wholesome image in his/her imagination.

Level 9 involves giving up visual aids. The child starts performing the action purely on the internal plane, visualizing the chessboard, performing all the actions that are relevant for identifying a square by its name and identifying its colour, which the child has performed on the material plane at the beginning of this stage. In any case, this task is challenging. The first way to facilitate its accomplishment is using detailed verbalization of all actions that are being performed mentally.

For instance: "I am imagining a chessboard; I need to find *e5* and identify its colour; in order to do this, I need to count the colours of the squares starting from *a1* to *e1*, and then from *e1* to *e5*; *a1* is dark, *b1* is light, *c1* is dark, *d1* is light, *e1* is dark, *e2* is light, *e3* is dark, *e4* is light, *e5* is dark". This example also shows how one mode combines both actions – identifying a square and identifying its colour. Nevertheless, by that time, most children may have developed a simpler mode of action that is more abbreviated as compared to the initial one. Our practice shows that when children begin performing mentally without aids, children often have difficulty keeping the problem statement in mind when performing: striving to accomplish an interim task, or concentrating fully on a challenging mental action, they forget what they have been doing. Therefore, at *Level 9*, the child continues to rely on taking notes of the problem statement, so as to remove the need to keep it in mind.

Developing the ability to imagine a white square contour of a chessboard with a grid of squares may draw on the same principles.

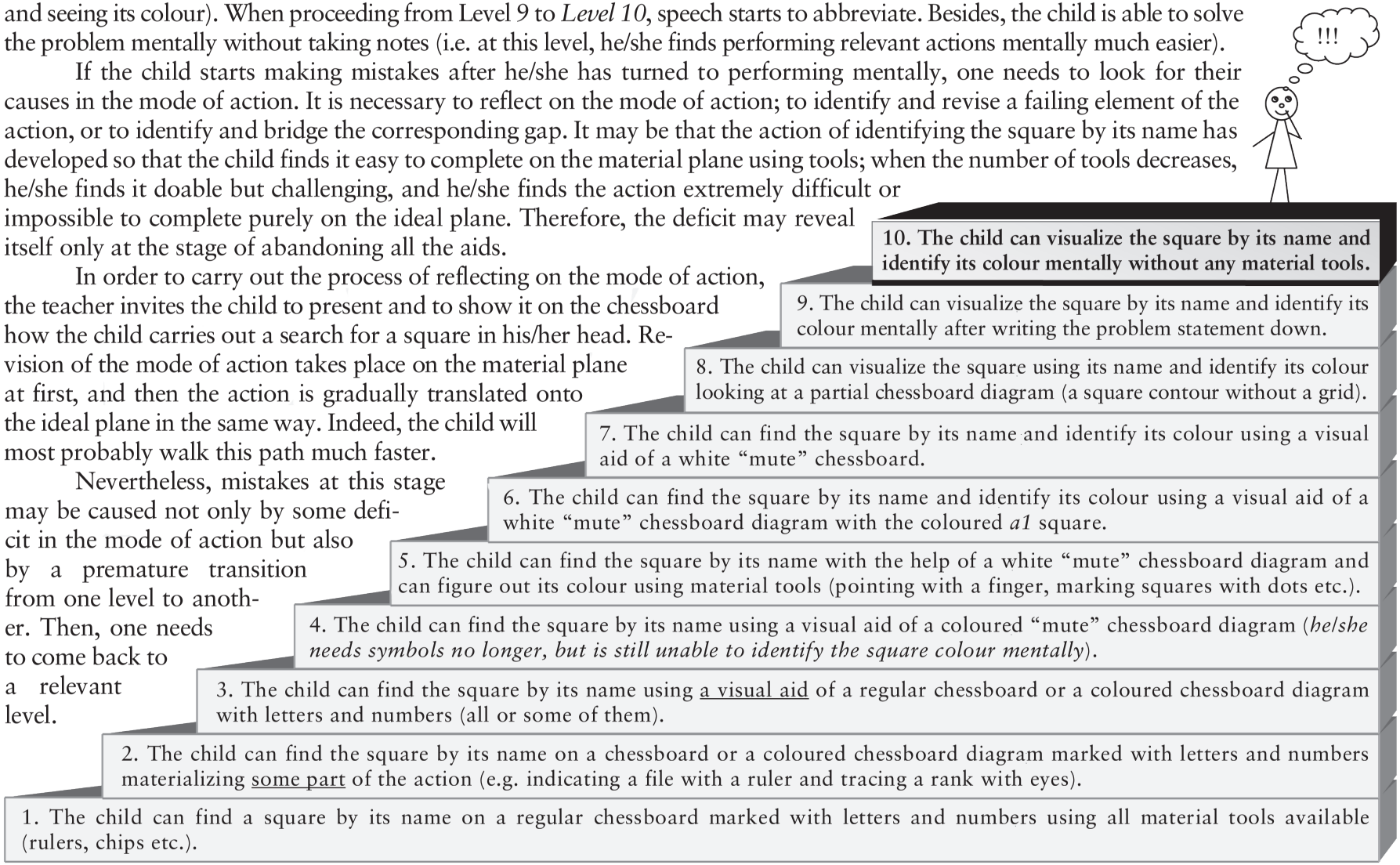
Chess Thinking Development Stage 1: Seeing Square Acting Fully on Ideal Plane

Proceeding to *Level 10* means completing the stage of developing the ability to visualize the square with a specified name on the imagined chessboard at a relevant location and coloured in a relevant colour (i.e. finding a square; identifying it from the background; identifying and seeing its colour). When proceeding from Level 9 to *Level 10*, speech starts to abbreviate. Besides, the child is able to solve the problem mentally without taking notes (i.e. at this level, he/she finds performing relevant actions mentally much easier).

If the child starts making mistakes after he/she has turned to performing mentally, one needs to look for their causes in the mode of action. It is necessary to reflect on the mode of action; to identify and revise a failing element of the action, or to identify and bridge the corresponding gap. It may be that the action of identifying the square by its name has developed so that the child finds it easy to complete on the material plane using tools; when the number of tools decreases, he/she finds it doable but challenging, and he/she finds the action extremely difficult or impossible to complete purely on the ideal plane. Therefore, the deficit may reveal itself only at the stage of abandoning all the aids.

In order to carry out the process of reflecting on the mode of action, the teacher invites the child to present and to show it on the chessboard how the child carries out a search for a square in his/her head. Revision of the mode of action takes place on the material plane at first, and then the action is gradually translated onto the ideal plane in the same way. Indeed, the child will most probably walk this path much faster.

Nevertheless, mistakes at this stage may be caused not only by some deficit in the mode of action but also by a premature transition from one level to another. Then, one needs to come back to a relevant level.



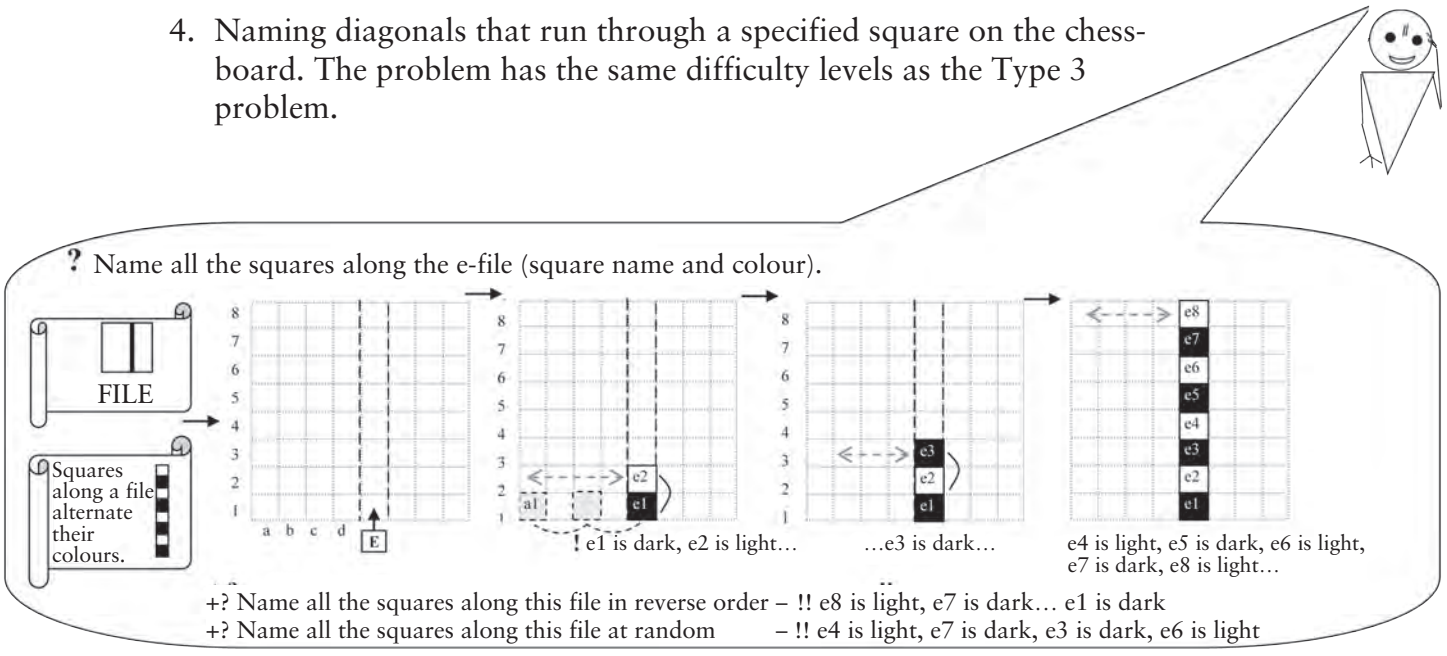
CHESS THINKING DEVELOPMENT STAGE 2: SEEING LINE

Composition of Mental Actions upon Stage Completion

During Stage 2, the child develops the ability to visualize a line on the chessboard (i.e. to see this line as consisting of respective squares of corresponding colours at a corresp onding location on an imagined chessboard) and name the squares comprising the line one after another and at random (their names and colours). The material action of identifying a line from the ground of the chessboard lays the basis for the ability to visualize the line.

Types of problems that the child can solve mentally if he/she has developed this ability:

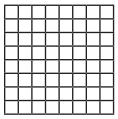
1. Naming all the squares (their name + colour) along a rank or a file in sequence (from left to right or from bottom to top). Doing the same in reverse order (from right to left or from top to bottom). Identifying colours of the squares along the line that is being considered, arbitrarily, in a certain order as specified by the teacher. (See Diagram).
2. Naming all the squares along a diagonal in direct or reverse order (a1-h8, h8-a1, a8-h1, h1-a8). Identifying the line's colour.
3. Naming ranks and files that are crossing a specified square.
   Difficulty level 1: the problem statement implies finding a corner square. Difficulty level 2: the problem statement implies finding an edge square. Difficulty level 3: the problem statement implies finding a central square or a square of the extended centre.
4. Naming diagonals that run through a specified square on the chessboard. The problem has the same difficulty levels as the Type 3 problem.



Chess Thinking Development Stage 2: Seeing Line

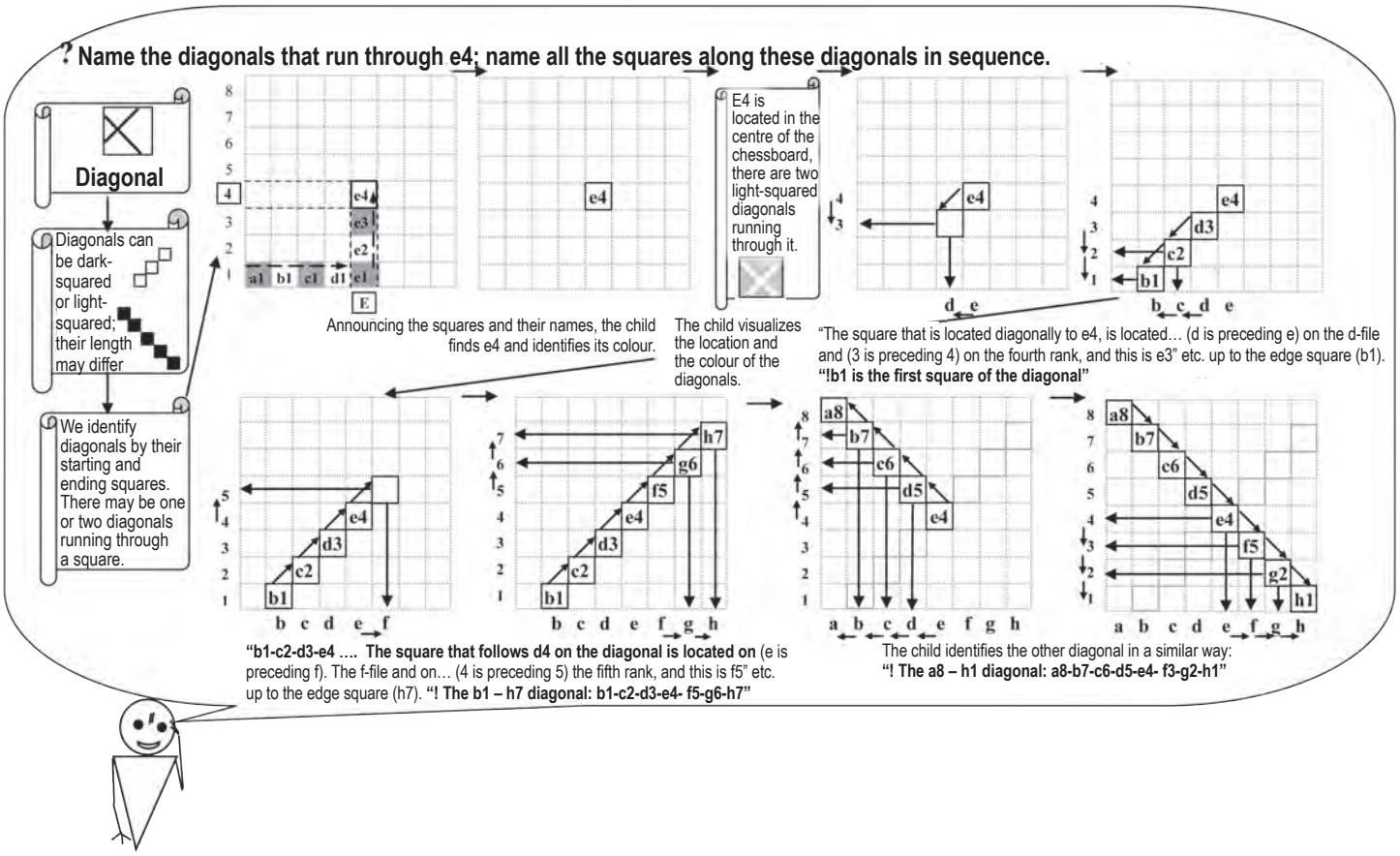
Composition of Mental Actions upon Stage Completion

The actions that the child is carrying out mentally when doing a problem (Type 1 Problem, see the corresponding Diagram):

General Composition of Mental Action (Applicable to Type 1 and Type 2 problems for different lines).	***Example on Diagram*** *(There will be individual differences in practice)*
1. Keeping the problem statement in one's mind.	*1. "Name all the squares along the E-FILE"*
2. Visualizing the chessboard – a contour, with ranks and files mapped in an approximate manner.	2. 
3. Analyzing the problem and how to solve it: a) actualizing one's understanding of the line; b) visualizes how the line is running; c) actualizing one's understanding of how the squares are located along the line in terms of their colour; d) planning problem solving.	*3. a) "A file is a line running "a particular way": vertically on a diagram or from one player to another on a chessboard" ;* *b) "The e1-e8 file is running from bottom to top on the diagram, closer to the centre of the chessboard";* *c) "The squares constituting the file alternate";* *d) "One needs to identify the colour of the first square – e1, and the colours of the following squares alternate".*
4. Identifying the colour of the first square in the line mentally by starting to count from *a1* or recalling it (as a reference square) or using any other mode of action (an individual mode of action).	*4. "a1 is dark, b1 is light, c1 is dark, d1 is light, e1 is dark".*
5. Visualizing the mental image of a square and the image of a line (as either divided or undivided into the squares that are still colourless) starting from this square; naming the square and its colour.	*5. Seeing the dark e1 square on the imagined chessboard in his/her head and the e-file running from e1 upwards; naming it: "e1 is dark".*
6. Visualizing the next square (identifying it on the line). Identifying its name and colour; seeing the square (its location and colour) as adjacent to the preceding square on the line, naming it.	*6. Identifying e3 on the imagined line. Seeing the dark e1 square, the light e2 square and the dark e3 square on the imagined e-file in one's head; naming it: "e3 is dark". Acting in the same way up to e8.*
7. Visualizing the next square (identifying it on the line). Identifying its name and colour; visualizing three squares on the line, naming the third square etc. If the child fails to use the visual image of the line, he/she performs a structurally more complex action relying on the auditory memory, and most likely he/she will flounder and get confused.	*7. Identifying e3 on the imagined line.* *Seeing the dark e1 square, the light e2 square and the dark e3 square on the imagined e-file in one's head; naming it: "e3 is dark". Acting in the same way up to e8/*
8. By the end of working on the problem, the child visualizes the line with the squares of the relevant colours.	*8. Seeing the e-file with the alternating dark and light squares clearly on the imagined chessboard, starting from dark e1 to light e8".*

If the teacher invites the child to announce the colours of the squares along the line in random order or in reverse order (top to bottom) right after completion of the answer, the child may do it quite quickly and without serious difficulties. The Diagram and the right column of the Table provide an example with a file. The composition of the mental action in case of a rank and a diagonal will be the same (Type 1 and Type 2 problems). The composition of the mental action in Type 3 and Type 4 problems will differ slightly.

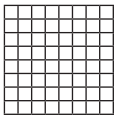
Chess Thinking Development Stage 2: Seeing Line
Composition of Mental Actions upon Stage Completion



Chess Thinking Development Stage 2: Seeing Line

Composition of Mental Actions upon Stage Completion

The actions that the child is carrying out mentally when doing Type3 and Type 4 problems (Type 4 Problem, Difficulty Level 3): At this level, children may solve such problems only with the help of speech (especially, Type 4 problems). Therefore, when arranging the children's work, the teacher needs to ensure that they can discuss their actions and verbalize them (and in his/her turn, the teacher invites them to do this).

General Composition of Mental Action (Applicable to Type 1 and Type 2 problems for different lines).	**Example on Diagram** (There will be individual differences in practice)
1. Keeping the problem statement in one's mind.	1. "Name the diagonals that run through e4; name all the squares along these diagonals in sequence"
2. Visualizing the chessboard – a contour, with ranks and files mapped in an approximate manner.	2. 

3. Analyzing the problem and planning how to solve it: a) actualizing one's understanding of the lines to be named: how they are located on the board and how they are called; b) actualizing one's understanding of how the squares are located along the line in terms of their colour; of how many squares the line includes; c) planning problem solving.	3. a) "A diagonal is a line running "in this or other way" (see Diagram). We identify diagonals by their starting and ending squares. b) "Diagonals may be light-squared and dark-squared, the number of squares in a diagonal may vary" (from 2 to 8)"; c) "One needs to identify the colour and the location of a specified square, and then imagine how diagonals are running through it. Then one needs to sequentially identify names and locations of the squares along a diagonal (firstly, moving from the specified square to the starting one and then from the specified square to the ending square). Then, one gives an answer. Then, one identifies the colours of the squares on the other diagonal in the same manner".
4. Identifying the name and the colour of the specified square. Seeing it on the imagined chessboard.	4. "a1 is dark, b1 is light, c1 is dark, d1 is light, e1 is dark, e2 is light, e3 is dark, e4 is light".
5. Visualizing the mental image of a relevantly coloured square located at an appropriate place on the chessboard. Visualizing lines (as either divided or undivided into the squares that are still colourless in case of ranks and files, or coloured appropriately in case of diagonals) running through this square. Choosing the line to start working with in the first place.	5. Seeing the light e4 square on the imagined chessboard in his/her head: "Then, diagonals running through e4 are light. As e4 is in the centre of the board, there will be two light diagonals running through it". Visualizing how these diagonals are running across the board (see Diagram). "At first, I will identify the name of the diagonal that is running from left to right, bottom to top".
6. Visualizing the square which is located diagonally on the specified square's left (or below it) (moving towards "the beginning" of the line). Identifying its name and colour if necessary; visualizing the square (its location and colour) and the preceding square.	6. Identifying the square that is located diagonally below e4 to the left from the ground of the chessboard. Identifying its name and colour – d3 (see Diagram for a possible thread of thought in this case). Visualizing the light e4 and d3 squares.
7. Visualizing the next square (identifying it on the line). Identifying its name and colour if necessary; seeing three coloured squares along the line, naming the third square etc. Having reached the square on the edge of the board, memorizing the line's starting square. Then, the child returns to the specified square keeping one's "mind's eye" on the "visible" segment of the diagonal and naming the squares in sequence beginning with the starting square, and continues to identify squares till the ending square of the line. This is an essential part of the mode of action. At this stage, most children fail to return to the specified square directly without losing the evolving image of the line.	7. Identifying the next square, identifying its name (c2), seeing three light squares along the diagonal. Identifying the last (edge) square of the diagonal, identifying its name (b1). Seeing four light squares along the diagonal. Registering b1 as the diagonal's starting square. Then, the child returns to the specified square relying on the "visible" segment of the diagonal in further work (and announcing the square names aloud): "b1 – c2 – d3 – e4…" – and continues identifying squares and their names along the diagonal moving from left to right: "…f5, …g6, …h7".
8. By the end of working on the problem, the child visualizes the line with the squares of the relevant colours.	8. Seeing the light-squared diagonal b1-h7 clearly on the imagined chessboard. Naming it.
9. Completing the second part of the assignment (if there is one) in the same manner. At this stage, the child fails to focus his/her "mind's eye" on the clear image of two lines simultaneously, therefore, the image of the first line fades away gradually as the child keeps on working with the other line.	9. Identifying the second diagonal on the chessboard in the same stepwise manner (square by square). At the end of the exercise, the child can clearly see the second diagonal (a8-h1) on the imagined chessboard and an approximate location of the first diagonal.

Chess Thinking Development Stage 2: Seeing Line Developing Action on Material Plane

The ability to visualize the chessboard lines is based on the abilities and skills that have emerged during the first stage of the chess thinking development, when the child can:

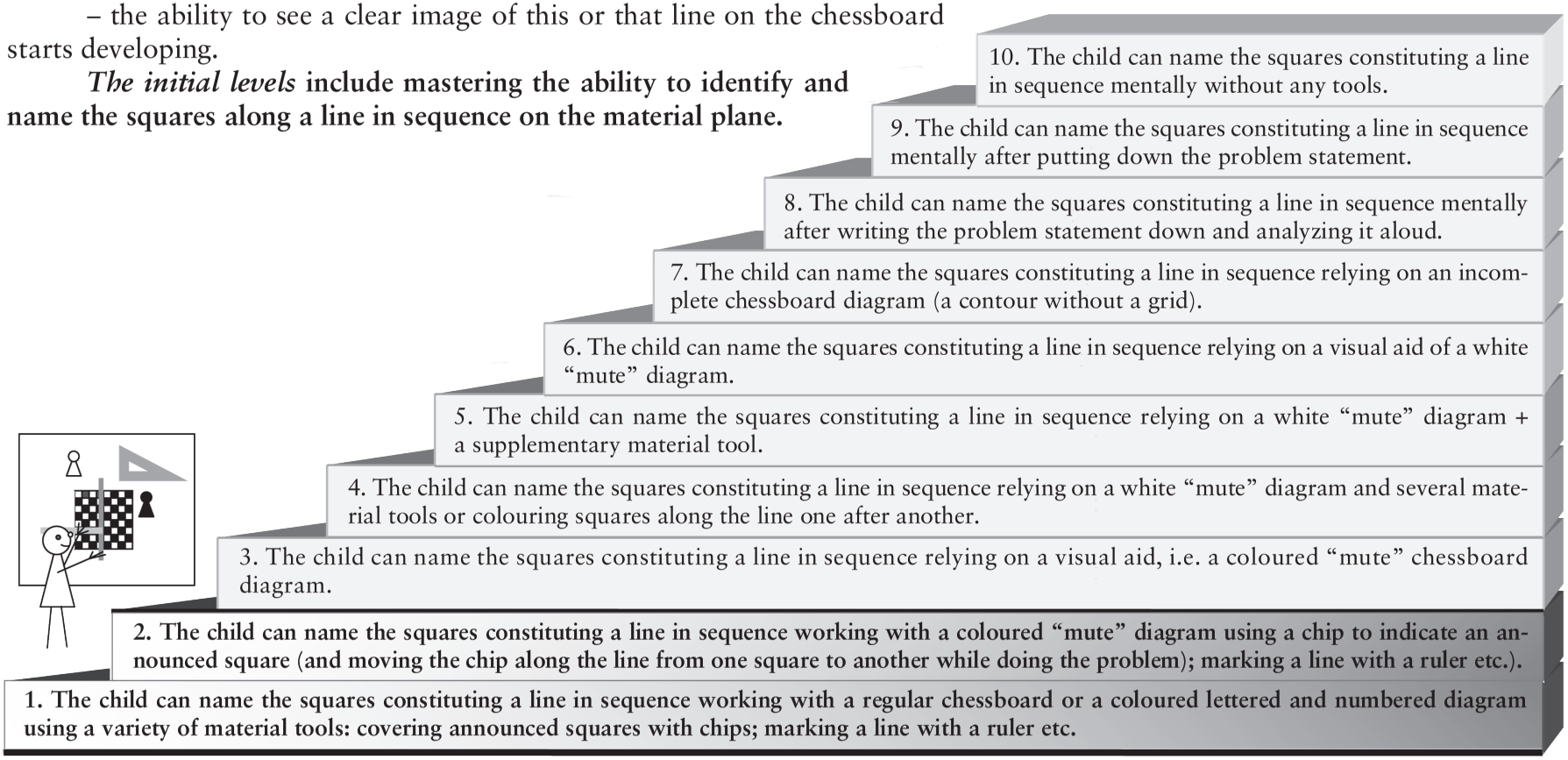
– trace the chessboard lines with his/her eyes (mastering this skill indirectly when identifying a square by its name and identifying its name or, in case of a diagonal, when doing certain problems);

– visualize a rank, a file or a diagonal as a line running over the chessboard in a particular way (the child is aware of the corresponding concepts and can show different lines);

– identify a specified square's name and colour looking at a white chessboard and visualize its location, and identify a square's colour by its name;

– the ability to see a clear image of this or that line on the chessboard starts developing.

The initial levels **include mastering the ability to identify and name the squares along a line in sequence on the material plane.**

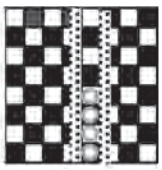


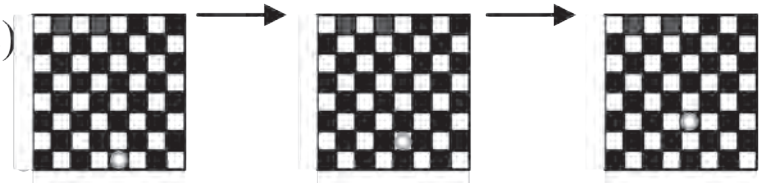
Chess Thinking Development Stage 2: Seeing Line Developing Action on Material Plane

If the child can confidently identify the name of a specified square looking at the chessboard, the child experiences little difficulty naming all the squares on a line in sequence looking at the chessboard. The sole challenge is the need to stay concentrated lest he/she should lose sight of the line and confuse named and unnamed squares.

The level of mastering this complex action on the material plane is crucial in terms of overcoming these challenges. During Level 1, the child works on this task using a chessboard or a lettered-and-numbered coloured chessboard diagram marking the line, whose squares he/she needs to name, with a ruler or a strip of paper (it is even better to use two strips of paper so as to stimulate shaping the image of a line showing up from the ground of a chessboard) and designating each square that the child names with a chip.

As the child does not really need the chessboard symbols at this stage (save for some individual cases), he/she starts working with a coloured mute chessboard as early as at Level 2. The number of tools gets gradually reduced: the child learns how to keep his/her eyes on a line, and marks only the last of the announced squares by placing a chip on it or pointing at it:

1) 

2) 

etc.

In order to prepare children to working with a white chessboard, it is desirable that at the stage of working with a coloured chessboard the teacher invent such work design that children announce both a square name and colour. It is also helpful to give additional assignments involving use of material tools that imply naming squares of a certain colour along a specified line.

Our practice shows that children experience most serious challenges when working with diagonals. When working with files and ranks, children may rely on simple regularities relating to a sequential order of squares: in files, the letter in square names remains constant and the numbers keep changing in ascending order; in ranks, the number is constant and the letters keep changing. As far as diagonals are concerned, the thing is more complicated: both parameters are changing, and furthermore, they may either change in ascending order (a1-h8), or may change differently (a8-h1). Moreover, children face more challenges when visualizing diagonals because children are used to working less with them as compared to files and ranks that children work with constantly, including cases when they use them as a tool for identifying square names. As a result, there is a need to allow more time for mastering the action on the material plane when working with diagonals and to help children to develop their own individual modes of action that will be useful for dealing with diagonals etc. It is worth mentioning that children will spend much less time to complete the levels relating to identifying the colour of diagonals later.

At this stage, the best option is playing assignments that include identifying square names as a means of accomplishing the game goal or as a means of making the game more challenging and, therefore, interesting. Any assignments that create and facilitate memorizing of the line image as showing up on the chessboard (according to the-figure-and-the-ground principle) are also very useful.

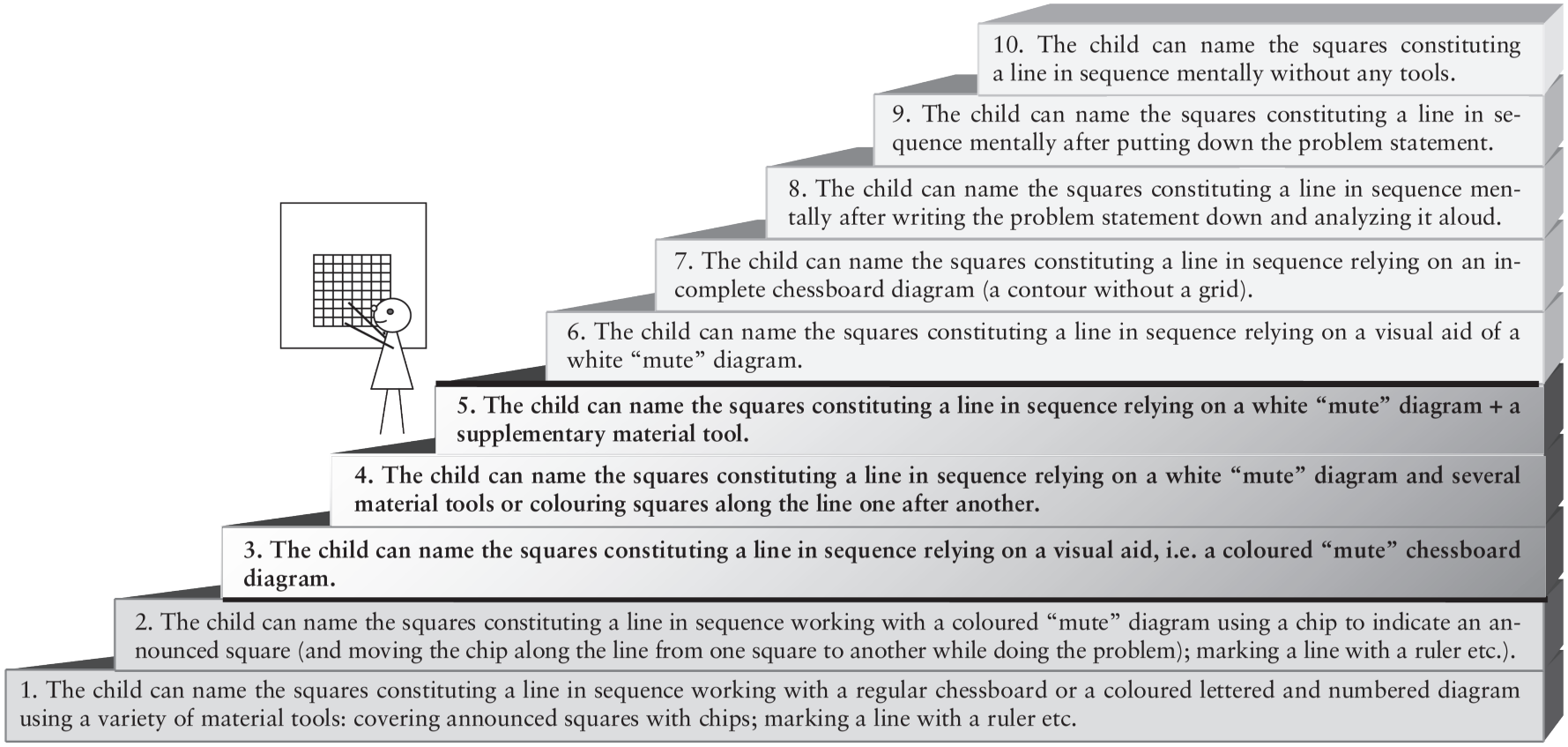
Besides, the teacher needs to set problems that both materialize the action of identifying the line from the ground of the chessboard and prepare children for the task of keeping the created image in their mind. For instance, having named the squares along a line in sequence, the child is invited to name them in reverse order, and then name the colours of the squares whose names the teacher or a peer student will announce at random.

Chess Thinking Development Stage 2: Seeing Line
Acting on Material Plane, Ideal Plane of Action Starts Developing

When the child has mastered the ability to identify and name all the squares using a chessboard or a coloured chessboard diagram and supplementary tools, the child gives up the material tools ***(Level 3), i.e.*** the child is able to identify the squares from the ground of the chessboard and name them simply looking at a coloured chessboard diagram.

Further, this **compound action** is supplemented with another action, namely, **identifying the square colours**, and children start working with a white chessboard diagram.

A more challenging action necessitates partial recurrence of material tools that are selected depending on which simple actions constituting a complex one the child finds difficult. That is, the set of material tools during ***Levels 4 and 5*** will be purely individual.



Chess Thinking Development Stage 2: Seeing Line Acting on Material Plane, Ideal Plane of Action Starts Developing

Just like during Stage 1, the transition from performing an action on the material plane to performing an action relying on visual aids alone is carried out gradually. In the beginning, the child may indicate the announced square with a finger, then he/she may help him/herself to mark a line placing his/her finger on the first square of the line etc. Using speech to accompany one's actions is the essential condition of a successful transition from material tools to visual aids. Speech facilitates visual actions, organizes and structures a mental action.

When the child can confidently name the squares along a line in sequence looking at a chessboard or a diagram, i.e. when the child can identify a line from the ground of a chessboard and keep it in focus, he/she may proceed to the next Level, i.e. Level 4. At this level, the child is invited not only to identify a line but also to visualize it in colour and learn to keep this image in mind looking at a white chessboard. Thus, several actions add on to the actions of identifying squares constituting the line; identifying the line and keeping it in mind, namely: identifying square colours, creating and keeping the coloured mental image of the line in one's mind.

At this stage, material tools come back again (or new ones appear), and, as we have already mentioned, their range depends on the child's individual challenges. What may these challenges be?

Firstly, the child may have difficulty combining the actions of identifying some square's name and colour, and keeping the line in mind. Then, the tool of rulers marking the line may be returned, and the child will need to visualize its squares in colour.

Secondly, the child may have difficulty shaping the coloured mental image specifically (the child may fail to visualize several squares at a time in colour). Then, the teacher may invite him/her to colour the squares along the line while he/she is identifying their names and colours. In this case, it is better to give the child a white chessboard with faint lines, so that the child may colour the dark squares and draw the contour of the light ones as if developing the line square by square. Another option is using black and white cards corresponding to the size of the squares on a white chessboard diagram that the child is working with. While identifying square names and colours, the child places the cards of a corresponding colour on the chessboard so that they form a line. This action is crucial for creating a material basis for a resulting mental image. After the child has arranged or coloured the line, the teacher may invite him to visualize this line in colour looking at a white chessboard. There may be other challenges, overcoming which implies selecting individual material tools.

Level 5 is characterized by a gradual reduction in the number of tools that help the child to visualize the line in colour. In the first instance, the child may help him/herself by pointing at the squares with his/her finger. In the second instance, the teacher may invite the child to colour squares in a make-believe manner, putting on a cover on a pen or using the end of the pencil. Whereas the child used to literally see a square in colour when performing such an action, now the child needs to visualize this square in colour.

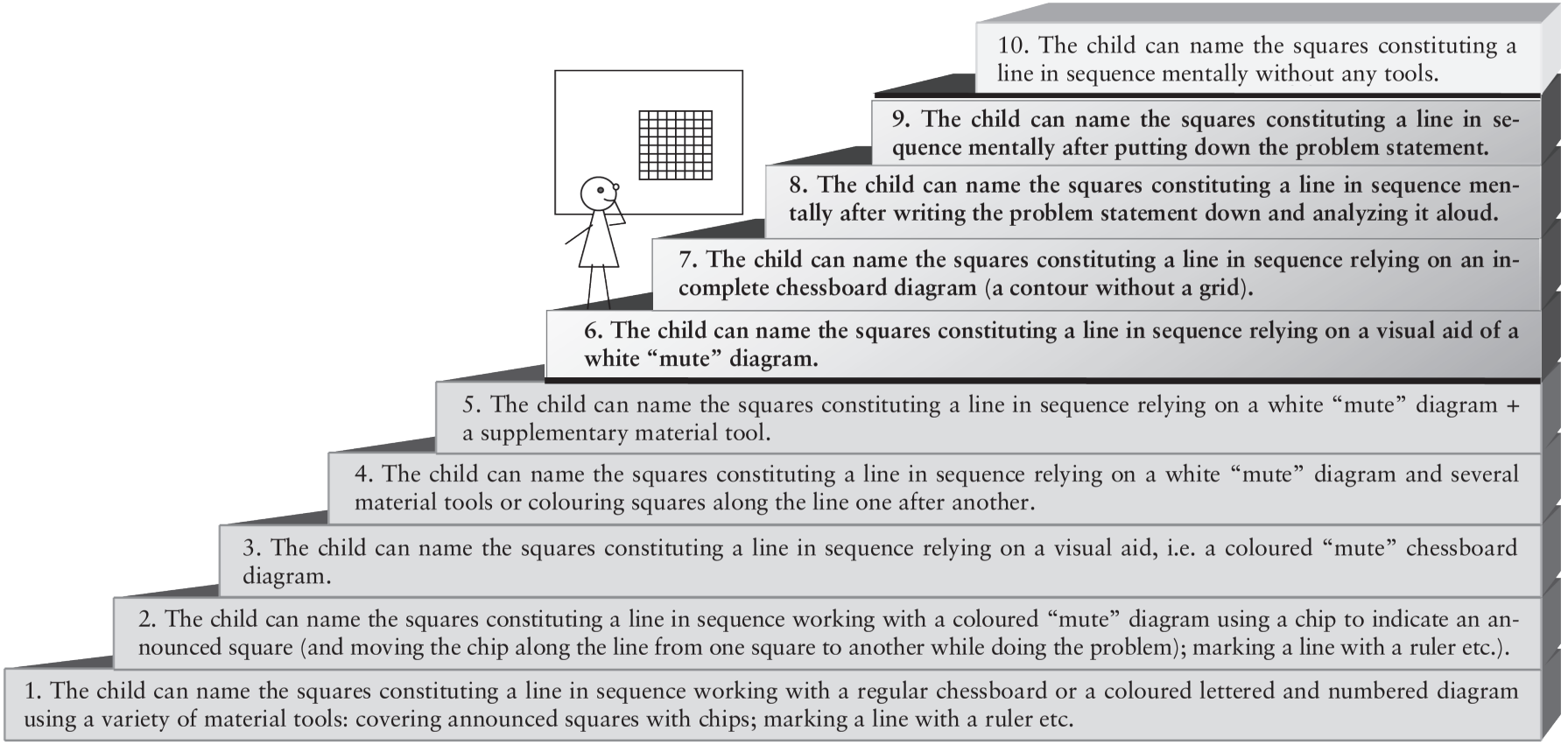
Speech combined with the hand action may be helpful (the child says "I am colouring the dark square" and colours it, then he/she says the same thing and makes the corresponding hand action using a pencil without a tip, and then he/she speaks while imagining the action). The child may use colouring the first square on the line as an interim tool (relying on which he/she will be able to visualize the other squares in colour).

This description is an approximation of the process of reducing the number of tools; the optimal way of reducing them will depend on an individual. During Levels 4-5, tools enable materializing the action of creating the coloured image, i.e. **the action of visualizing the line in colour**. The tool abbreviation process needs to be designed so that the action may be gradually converted into the internal plane. Relying on speech is the key to success.

Chess Thinking Development Stage 2: Seeing Line Acting on Ideal Plane Using Material Tools

When the child learns to identify a line (a rank, a file or a diagonal) and to visualize it on a white chessboard diagram using material tools, there occurs separation from the material tools that used to facilitate the child's imagination. During *Level 6*, the child performs the actions, which he/she used to perform on the material plane, in his/her head, verbalizing them in a detailed manner and relying on a white chessboard diagram.

When the child becomes able to do this without mistakes – both identifying the line, and keeping it in his/her mind clearly visualizing the location and the colour of each square – the process of the gradual abbreviation of visual aids starts (i.e. interiorization; converting them into the internal plane as a mental image). It happens during *Levels 7 to 9*. The process evolves gradually and relies on the use of speech.



Chess Thinking Development Stage 2: Seeing Line Acting on Ideal Plane Using Material Tools

Level 6 is characterized by the complete abandonment of material tools when performing the actions of identifying and keeping an integral image of a chessboard line (coloured and with named locations).

The problems that are crucial at this point include naming locations and colours of the squares along the line that the child has already visualized. For one thing, these problems may help to identify cases when the child memorizes the names and the colour of the squares constituting the line mechanically (recalling them and using his/her working memory when doing the problem, to be precise) rather than builds a mental image of the line. The problems that demand the child quickly name the colours of the squares along the line when they are announced, stimulate the child to attempt at building a visual image (as it is quite challenging to accomplish this task relying on one's auditory memory). As far as diagonals are concerned, the child may be given a similar problem, "Name the third (seventh; next to last) square from the left end of the diagonal". As we have already mentioned when describing the initial levels, the teacher needs to introduce such problems from the very beginning (so that the child may develop a need for relying on a visual image and develop the action of "keeping" the line's image in his/her mind).

For another thing, such problems are helpful as far as detecting deficits in the shaped mode of identifying the line from the ground and keeping its image in one's mind is concerned. Mistakes that the child makes when doing the problem provide an opportunity for analyzing the mode of action and reforming it if it is deficient or inaccurate. Just like during Stage 1, working on the mode of action starts from inviting the child to describe and to demonstrate how he/she is solving the problem mentally, what specifically he/she is imagining.

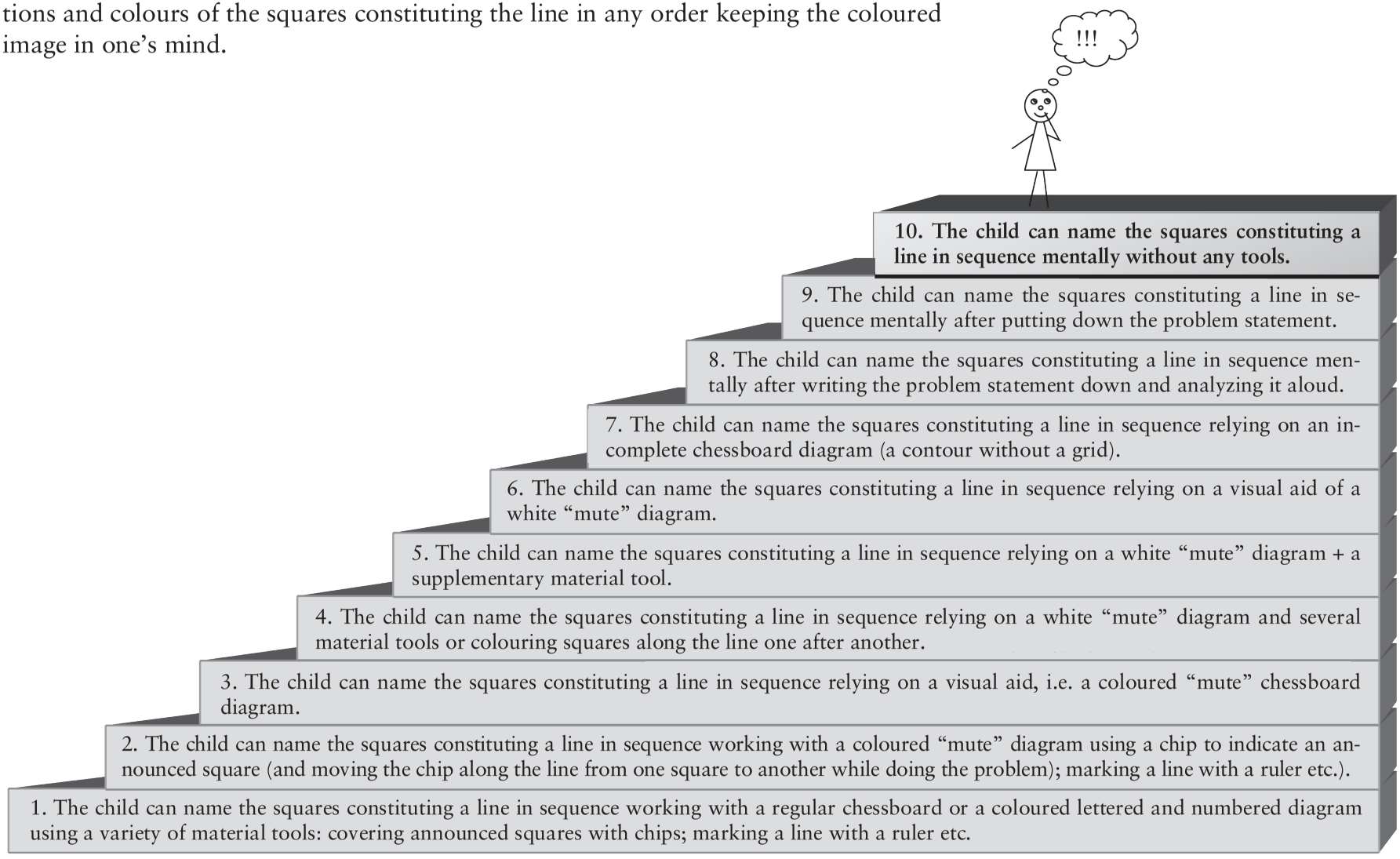
The objective of *Levels 7–9* is to convert the external visual aids into the ideal plane (as internal images). As we mentioned it when describing the similar levels of work at Stage 1 of the chess thinking development, developing the ability to visualize a contour of the chessboard with 64 uncoloured squares may follow the same principles. In this Chapter, we will discuss this assumption in detail.

So, when proceeding from *Level 6* to *Level 7* (from using the visual aid of a white chessboard to relying visually on a white square contour), the child needs to square the chessboard mentally (in his/her imagination). In order to do this, the child needs to draw eight files and eight ranks (or seven vertical and seven horizontal lines separating files and ranks from each other) in his/her head. In the beginning, the child trains this action on the material plane (therefore, it is useful to occasionally create situations when the child needs to draw a chessboard for him/herself rather than use a ready-made white chessboard diagram). Then the teacher may invite the child to use an interim option, i.e. to divide a chessboard into four squares (as a tool). Being aware of the fact that there are 8 files and 8 ranks and that there will be 4 files (ranks) to the left and to the right (above and below) of the central lines, the child can visualize the rest. Then the child proceeds to working with an empty square contour without additional lines (all lines are drawn in one's head). Eventually, the child gives up this tool as well and moves to Level 8 (when he/she imagines a white chessboard before doing a problem). In order to facilitate imagination, the child needs to verbalize his/her actions, and may draw lines that he/she needs to visualize with a finger. For instance: "I need to visualize a white chessboard. I am drawing a square (*drawing a square on a table or a wall with his/her finger*). I am dividing it in half vertically (drawing a line with a finger), there are four files to the left of the line (*tracing the imagined files with his/her finger*), and there are four files to the right of the line as well (*tracing them with a finger*). I am dividing the square in half horizontally (*drawing a line with his/her finger while speaking*); there are four ranks below the line and four ranks above the line (*tracing each imagined rank with his/her finger*)". Then the child proceeds with the task. The child gradually abandons the hand action; then, there is only speech left; then, as the image starts to occur more and more easily, speech is also abbreviated. It is desirable to start this work during Stage 1, and this work is essential at Stage 2 as well, because it prepares the child for Stage 3 of the chess thinking development, for acquiring the ability to see the chessboard as a whole.

Levels 8 and 9 are levels when speech as a verbal aid facilitating the action gets abbreviated. The only material tool that is left now is recording the problem statement. Speech abbreviation relates directly to the improved capacity of the line image to occur easily and its increased stability.

Chess Thinking Development Stage 2: Seeing Line Acting Purely on Ideal Plane

The transition to *Level 10* means completing Stage 2 of the chess thinking development, i.e. developing the ability to identify a line from the ground of the imagined chessboard; to visualize it in colour and to name locations and colours of the squares constituting the line in any order keeping the coloured image in one's mind.



CHESS THINKING DEVELOPMENT STAGE 3 – SEEING CHESSBOARD AS WHOLE, IDENTIFYING SQUARE COMBINATIONS FROM BACKGROUND OF CHESSBOARD

Chess Thinking Development Stage 3 – Seeing Chessboard as Whole, Identifying Square Combinations from Background of Chessboard

Composition of Mental Actions upon Stage Completion. During Stage 3, the abilities to see the chessboard as a whole and to identify arbitrary groups of squares from the ground of the chessboard develop. Besides, at this stage, the image of a chess piece (as standing and later moving) starts to become associated with the image of the chessboard.

Types of problems that the child can solve mentally if he/she has developed this abi-lity:

1. Problems aiming at assessing whether the child orients him/herself in the space of the chessboard in general ("Name all the squares constituting the chessboard centre telling their names and colour; name all diagonals consisting of three squares; name all squares of a certain colour located a certain half of the chessboard" etc.)
2. Problems assessing whether the child can identify an arbitrary configuration of squares from the ground of the chessboard, including a square configuration relating to the knowledge of chess pieces (e.g. "Name the location and the colour of all the squares that touch the f4 square"; "Name all the squares that are controlled by a certain piece in a certain position").
3. Problems of the "Fly" type relating to the ability to mentally trace a "fly's" or a "dot's" movement, or a piece's tour (moves) on the chessboard so as to identify the destination square of this tour.
4. "Drawing on Chessboard" aimed at shaping the mental image of a piece's movement as a line and at the ability to keep one's mind's eye on the piece's whole path consisting of several moves (keeping several segments of different lines in mind simultaneously). See the corresponding Diagram below.

The actions that the child is carrying out mentally when doing problems:

Type 1 problem.

Example 1: "Name all diagonals consisting of three squares, indicate their colour. Write down your answer".

Composition of Mental Actions:

1. Keeping the problem statement in one's mind.
2. Reflecting on (analyzing) the problem: actualizing corresponding
   - knowledge (what diagonals are; how they are located on the board and how they are called;
   - representations (what diagonals look like in terms of their size and colour; where the longest and the shortest diagonals are located; how many diagonals consisting of three squares are there; how they are oriented towards each other etc.);
   - images (the image of the chessboard and diagonals on the chessboard);

and planning problem solving (e.g. "Checking all diagonals that are close to the chessboard corners").

3. Visualizing the chessboard with squares and lines drawn on it, completely or partially "coloured" (the overall image is clearer than during the previous stages).
4. Consistently going through diagonals that are located close to the chessboard corners –mentally identifying a diagonal on the imagined chessboard and counting squares; then proceeding to the next one and repeating the action till he/she finds a relevant diagonal;
5. Having found the relevant diagonal, the child identifies its colour and names of the starting and the ending squares (the action is more or less abbreviated); names it and puts the result down;
6. Finding a diagonal and identifying the next one etc.

It may be the case that it is enough for the child just to "see" any line in colour at this stage. Then, going through diagonals, he/she sees the colour immediately, and when the child finds specified diagonals, the only thing that he/she needs to do is to identify or even to double-check their names.

Example 2: "Name all light squares that are located at the half of the chessboard that is occupied by Black pieces in the starting position".

Composition of Mental Actions:

1. Keeping the problem statement in one's mind.
2. Analyzing the problem: "The half of the chessboard that is occupied by the Black pieces in the starting position consists of the fifth, sixth, seventh and eighth ranks. That is, I need to identify light squares on these four ranks".
3. Visualizing the chessboard (a clear image, completely or partially "coloured").
4. Mentally identifying the fifth rank on the chessboard (a more or less abbreviated action); seeing it in colour; naming the locations of the light squares; identifying the next rank etc. till the child solves the problem. Options: mentally identifying two adjacent ranks on the chessboard (5 and 6); seeing them in colour ; naming the light squares (a6, b5, c6, d5, e6, f5, g6, h5); or mentally identifying four ranks on the chessboard; seeing them in colour ; naming the locations of the light squares (a6, a8, b5, b7, c6, c8, d5, d7 etc.).

Type 2 problems.

Example: "Name all the squares that are controlled by the white Rook on a5".

Composition of Mental Actions:

1. Keeping the problem statement in one's mind.
2. Reflecting on (analyzing) the problem:
   - actualizing corresponding representations relating to the Rook, its movement; understanding of what controlled squares are, which and how many squares the Rook controls on an empty chessboard;
   - planning problem solving (e.g. "Imagining a rank and a file running through a square that is occupied by the Rook; naming the file's squares at first, and then – the rank's squares").
3. Visualizing the squared chessboard, completely or partially coloured.
4. Finding a5; identifying (seeing) its colour; visualizing the Rook occupying this square.
5. Identifying the rank and the file running through a5 on the chessboard, i.e. the fifth rank and the a-file.
6. Seeing these lines in colour; naming the squares along these lines in sequence.

7. Keeping in mind which squares he/she has already named, and which he/she needs yet to name.

Chess Thinking Development Stage 3 – Seeing Chessboard as Whole, Identifying Square Combinations from Background of Chessboard Composition of Mental Actions upon Stage Completion

Type 3 Problems ("Fly").

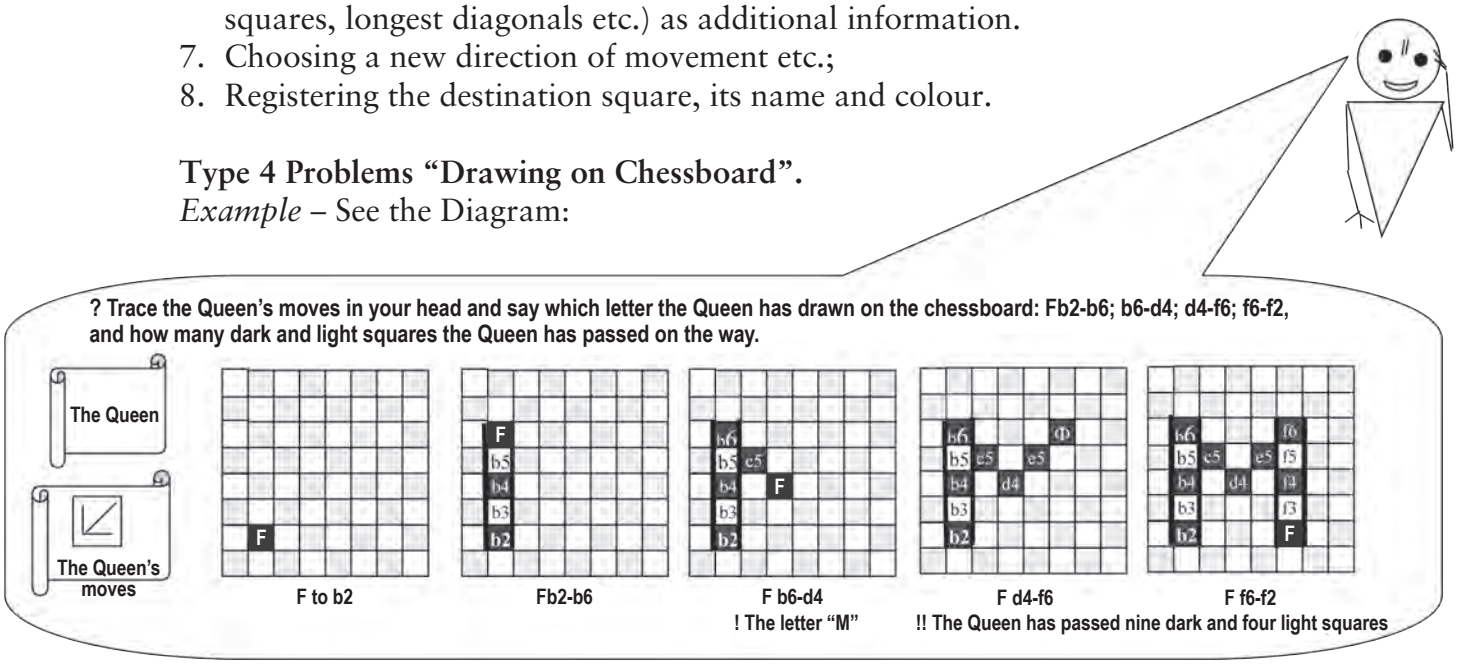
Example: a Queen (or a fly unless children have studied chess pieces) is on c3. The Queen moves (flies) two squares to the right; then three squares upwards; one square to the right and two squares bottom-left diagonally. What square has the Queen stopped at (landed on)? Which colour is this square?

Composition of Mental Actions:

1. Visualizing the squared chessboard, completely or partially "coloured.
2. Finding c3 which is occupied by the Queen in the beginning (which the fly starts from), mentally, identifying its name and colour (an abbreviated action).
3. Choosing the direction of movement following the problem statement.
4. Tracing the path with his/her "mind's eye";
5. Counting squares naming them in his/her head;
6. Registering a square where he/she stops; its name and colour; sometimes its location on the ground of the chessboard (its orientation towards the edge, corners, central squares, longest diagonals etc.) as additional information.
7. Choosing a new direction of movement etc.;
8. Registering the destination square, its name and colour.

Type 4 Problems "Drawing on Chessboard".

Example – See the Diagram:



Composition of Mental Actions:

1. Visualizing the squared chessboard, completely or partially "coloured.

2. Finding b2, which is occupied by the Queen in the beginning, mentally; identifying its name and colour (an abbreviated action); identifying it from the ground of the chessboard.

3. Making the mental move b2-b6, which the teacher has announced, announcing all the squares (their names and colour) that the Queen has passed to oneself; identifying the segment of the b-file containing b2, b6 and three squares that the Queen has passed when making a move, from the ground of the chessboard.

4. Registering a square where he/she stops (b6).

5. Making the mental move b6-d4, which the teacher has announced, saying all the squares that the Queen has passed ("b6 is dark, c5 is dark, d4 is dark») to oneself; identifying the segment of the diagonal consisting of these three squares from the ground of the chessboard, adding it to the image of the b2-b6 segment that the child keeps in mind. Registering orientation of these segments of the path towards each other, and, possibly, their location on the chessboard (additional information) (e.g. "The b2-b6 segment is close to the edge a-file; d4 is a central square"). The last action enables the child to keep the image in mind.

6. Registering a square where he/she stops (d4).

7. Acting in a similar way every time the Queen moves (making a mental move naming all the squares that the Queen has passed and hence identifying the covered segment of the line from the chessboard; keeping in mind the internal image of the segments of the path that he/she has previously identified adding the image of a new segment of the path to the image of the previous trajectory).

8. Seeing the whole path of the Queen's movement as a coloured figure showing up on the ground of the chessboard; naming the letter that he/she has got as a result of the exercise; counting and announcing the number of dark and light squares along this path relying on the mental image that the child has shaped. Being able to tell the names of the dark and light squares.

Thus, in the course of doing the problem, the child somehow connects the lines to form an integral geometric shape that is located on the chessboard in a specific way; keeps his/her "mind's eye" on it when tracing the next segment of the path, and complements the shape with this segment.

We would like to draw your attention that when doing problems of different types at the end of Stage 3, the child makes an extensive use of his/her abilities to see a square and a line that have taken shape at the previous stages. Whereas at the beginning of Stage 3, the child accompanies the action of identifying the line from the ground of an imagined chessboard with speech (more or less extended), by the end of Stage 3, speech has been practically abbreviated and the child is able to perform this action quite competently. Furthermore, the child enjoys development of the following abilities:

- the imagined chessboard becomes coloured (completely or partially) and its image becomes clearer;
- having performed certain mental action (relying on speech), the child becomes able to imagine a coloured chessboard and keep this image in mind;
- pieces occur on the imagined chessboard; mental images of chess pieces in certain positions are being formed; the images of the chess piece moves are being formed;
- the images of squares that are controlled by different pieces are formed;
- the child can identify arbitrary configurations of squares, several different lines or their segments simultaneously from the ground of the chessboard and keep them in mind etc.

Chess Thinking Development Stage 3 – Seeing Chessboard as Whole, Identifying Square Combinations from Background of Chessboard. Developing Action on Material Plane

At the end of Chess Thinking Development Stage 2, the child becomes able to imagine a white chessboard and to identify any line (a rank, a file or a diagonal) from its ground mentally; to visualize it clearly and in colour and, to name the location and colour of any square along this line relying on this image.

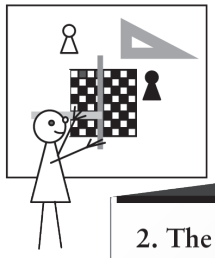
Development at Stage 3 relies on the abilities that have formed during Stages 1 to 2 and unfolds in several directions:

- shaping the images of chess pieces and their moves (that the children will learn when studying Stage 3 levels and/or that they have learnt earlier);
- the ability to mentally trace a piece's (chip's) tour on the chessboard;
- the ability to identify several lines or their segments simultaneously from the ground of the imagined chessboard and to clearly see them (the image, colour and names) in one's head; to keep this image in one's mind;
- the ability to visualize the whole chessboard in colour.

These directions of development of the ability to perform mentally are interrelated, and together they constitute the ability to see the chessboard as a whole and identify any squares' configurations from the ground of the chessboard.

Levels 1 to 2 on the journey to development of the ability to see the chessboard as a whole and identify pieces and configurations of lines from the ground of the chessboard involve materializing the actions that are relevant for this ability.

(The diagrams illustrate one's progress through the developmental levels using the example of a Type 4 problem.)



10. The child can mentally trace the piece's moves and visualize its whole tour in colour.

9. The child can trace the piece's moves and visualize its whole tour in colour taking notes of the squares where the piece has stopped.

8. The child can trace the piece's moves and visualize its whole tour in colour looking at an incomplete chessboard diagram (a contour without a grid).

7. The child can trace the piece's moves and visualize its whole tour in colour looking at an incomplete chessboard diagram (a contour without a grid) and taking notes of the squares where the piece has stopped.

6. The child can trace the piece's moves and visualize its whole tour in colour using a visual aid of a white "mute" diagram.

5. The child can trace the piece's moves and visualize its whole tour in colour using a visual aid of a white "mute" diagram and a supplementary material tool.

4. The child can trace the piece's moves and visualize its whole tour in colour using a visual aid, i.e. a white chessboard diagram with letters and numbers and several material tools.

3. The child can trace the piece's moves and visualize its whole tour using a visual aid, i.e. a coloured chessboard diagram with letters and numbers or without them.

2. The child moving the piece can trace its moves on the chessboard and visualize the whole tour.

1. The child can trace a piece's moves on the chessboard moving this piece and visualize the whole tour if the child marks the interim squares where the piece has stopped with chips.

Chess Thinking Development Stage 3 – Seeing Chessboard as Whole, Identifying Square Combinations from Background of Chessboard Developing Action on Material Plane

As the Stage 3 abilities develop in several directions, we will describe each of them. The initial Levels represent a material stage of mastering actions that the child performs mentally at the end of the Stage.

1. Developing the ability to visualize the whole chessboard in colour.

This ability emerges due to the development of the ability to visualize the line. The child learns to simultaneously see one, two, three and four lines that are located close to one another; to see various square configurations (the chessboard centre; the extended centre; squares constituting a fourth of the chessboard that is divided into four segments etc.). He/she may be able to visualize a clear image of the coloured chessboard with time. The material level of developing this ability (*Level 1*) involves doing various Type-1 problems: colouring squares on a white chessboard diagram (a diagram with faint lines; the child colours the dark squares black and draws a contour for the light squares). The training also involves problems that introduce various modes of representing the chessboard (as eight files; eight ranks, four like-coloured squares; four like-coloured groups of squares containing two files each etc.); problems that improve one's ability to orient oneself in the space of the chessboard (e.g. the aforementioned Type-1 problem).

Level 2 of the development of this ability includes doing problems on a white chessboard colouring several reference squares to invoke an image of squares or lines; in all the other cases, colouring takes place in one's imagination.

The teacher needs to give problems in such a way so that the fragment of a chessboard that the children need to imagine in order to solve them gradually grows in size.

2. Shaping the image of a chess piece and the image of the squares that it controls on an empty chessboard.

During the further stages of the chess thinking development, the child proceeds to working with chess positions. The required preliminary steps to this work include developing the ability to visualize a chess piece as occupying a certain square on the chessboard and to see all the squares that it controls during the position analysis.

From the developmental perspective, the ability to visualize the controlled squares on an empty chessboard represents the ability to identify the lines pertaining to the piece movement and running through the square that is occupied by the piece from the ground of the chessboard and see them simultaneously (rather than firstly seeing one line and then another like at Stage 2 of the chess thinking development). Furthermore, the lines that are comprised of the squares that the piece controls are not adjacent (in contrast to Type-1 Problems). Special cases include the King, the Pawn and the Knight. Besides, another crucial thing is associating the image of the squares that have been identified from the ground of the chessboard with the image of the piece that controls them.

Level 1 of developing this image involves working with the chessboard: the child places a piece on a specified square; then marks all the squares that the piece controls (announcing their names at the same time) with chips; then he/she writes down all the squares in the same order (the child writes down as many squares as he/she can from memory and may look at the chessboard for the other ones). Another Level 1 option is working on a white chessboard marking a square with a corresponding piece symbol and then colouring the squares that the piece controls (announcing them simultaneously). It is desirable to combine these alternative assignments. It is preferable to retain the same sequence of actions as in the problems for identification of the lines running through a specified square: firstly, a segment of a line that is located to the piece's left; then, a segment on its right, then, below and, then, above it.

Level 2 involves abbreviation of material tools. A piece is still placed on the chessboard, but lines are marked with strips of paper, and, then, the child traces them with a finger. The sequence of the actions is the same: at first, tracing everything, and then writing everything down.

Chess Thinking Development Stage 3– Seeing Chessboard as Whole, Identifying Square Combinations from Background of Chessboard Developing Action on Material Plane

3. Shaping the image of chess piece movement.

During the following stages of the chess thinking development, the child proceeds to developing the ability to deliberately make mental moves. A prerequisite preliminary step to this ability involves developing the ability to visualize a piece's movement as its tour on the chessboard (rather than "a leap" from one square to another) including not only the starting and the ending squares but all the interim squares, i.e. a line's segment. It concerns all the pieces but the Knight. Developing the ability to visualize the Knight's movement is a specific and complex subject. The material level of developing the ability to visualize a piece on the chessboard and its movement implies working with a chessboard and pieces.

Assumingly, the child learns to visualize a piece's movement either when he/she has familiarized him/herself with its movement rules, or in parallel with learning them. The most appropriate type of work to develop this ability is doing such problems as "The Rook advances from *a3* to *h3*. Which squares does the Rook pass when making a move?"

In order to visualize a piece's movement, one needs to imagine a piece occupying a certain square; a square that the piece is to move to; the whole path of movement and the piece's movement along this path from one square to another.

At *Level 1*, the child works with a chessboard. The child places a piece to the starting square, marks the destination square with a chip, or a strip of paper (which is better), and makes a move. The child verbalizes all the actions, e.g. "The Rook is occupying the dark a3 square; it should move to the light h3 square; the Rook is to move horizontally; the Rook starts moving from a3, it is passing (*the child is speaking while moving the piece*) b3-[which is] light, c3-dark, d3-light, e3-dark, f3-light, g3-dark, h3-light". Announcing all the squares is crucial for establishing an association between the action of identifying the line from the ground of the chessboard with the action of moving the piece. Then, the child returns the piece to the starting square and the child repeats the move but announces it in an abbreviated manner (the way the child writes it down: *a3-h3*). These actions, which the child performs in sequence, teach him/her to view movement as an indiscrete line when the child names it the way he/she reflects it in his/her records. Having identified the piece's path from the ground of the chessboard, the child becomes able to answer the question posed by the problem statement. The material tools may include marking the segment, which the piece covers when moving, with a strip of paper, or marking each square that the piece has passed with a chip.

Level 2 implies the process of abbreviating the material tools that performance relies on. The first tool to be abandoned is a tool that enables the child to focus on the destination square (the rest of the action remains unchanged). Then, the piece is replaced with a chip (the child visualizes the piece). Then, the starting square is marked with a chip, but the child never moves it and moves his/her finger along the path instead. Then, the child indicates the starting square with a finger and visualizes movement looking at the chessboard. In the course of reducing the number of tools, one may have recourse (and it is even desirable) to a coloured chessboard diagram, where the child marks the piece's starting position by placing a letter denoting the piece in chess notation on a corresponding square, and draws a line to denote movement. Then, the only tool left is a piece symbol on the starting square, and the child visualizes its movement.

Chess Thinking Development Stage 3 – Seeing Chessboard as Whole, Identifying Square Combinations from Background of Chessboard Developing Action on Material Plane

4. The ability to mentally trace a piece's tour consisting of several moves, identifying all the moves (as line segments) from the ground of the chessboard and keeping the whole image of the path in one's mind. Type 4 Problems, e.g. "Drawing on Chessboard".

Developing this ability follows shaping the image of a piece's movement and prepares the child to make two or more mental moves in sequence and to make deliberate moves (e.g. attacking another piece). Stage 3 Stairway Diagrams illustrate developing this ability. Level 1 includes materializing the action. The child moves a piece on a chessboard marking the starting and the ending squares of a move; announcing squares that the piece has passed and marking the path with strips of paper. Taking account of the fact that the child has already developed the ability to visualize a line by the time, some children may get along without marking the path with anything. The second option for doing problems on the material plane implies tracing the piece's moves on a white chessboard colouring each square that the piece has passed (i.e. literally drawing lines on the chessboard materializing the action that will become mental later). For this purpose, it is better to use assignments on paper. It is desirable to combine both options at this Level.

Level 2 involves abbreviation of material tools. The child becomes able to keep the visual image of the moves that he/she has made with a piece, therefore, he/she needs chips indicating the path's starting and ending squares no longer. Then, he/she becomes able to trace the piece's moves and visualize the whole path without moving the piece but tracing its path with a finger. It turns out that it is enough to colour the starting and the ending squares of each move on a white chessboard to visualize the whole path in colour.

5. Type-3 Problems ("Fly").

When working with these problems, the child develops the ability to identify any line's segment of an arbitrary length (be it a rank, a file or a diagonal) in any direction from the background of the chessboard starting with an arbitrary square.

Apparently, this enhances development of the image of the piece movement and prepares the child for developing the ability to identify a piece's possible path. The problem specifies the direction of movement and the number of squares that the piece needs to cover. At *Level 1*, the child performs the action using material tools. The child marks the line and a piece's ("fly's") movement direction along this line with a ruler, and the child moves the piece (or a chip symbolizing "a fly") counting and naming squares (announcing their name and colour) that the piece has passed. At this level, the child may do problems on a coloured chessboard diagram using drawing moves as a tool.

At *Level 2*, the material tools get abbreviated: at first, the child uses his/her hand (finger) to trace movement; then, he/she traces moves with his/her eyes, but when the child identifies a square that the piece has passed as a result of its move, the child marks it with a chip. The squares that the piece moves to during its tour on the chessboard diagram are also marked with a dot but the child traces the path that the piece is moving along with his/her eyes.

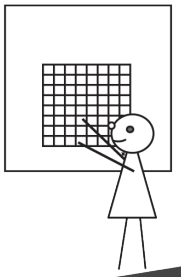
Chess Thinking Development Stage 3 – Seeing Chessboard as Whole, Identifying Square Combinations from Background of Chessboard Acting on Material Plane, Ideal Plane of Action Starts Developing

Level 3 for each of the five developmental directions of the ability to perform mentally that we have just discussed, implies transition from acting purely on the material plane to acting relying on a visual aid of a coloured chessboard diagram. At the beginning of this transition, some children may need written symbols as a tool but later the need for this tool disappears.

During *Levels 4 and 5* (just as it was at Stage 2), the child needs to see the colour of the squares, in this case, the squares that the piece is moving along. Correspondingly, the child uses material tools again: at first, several tools and, then, their number gradually diminishes. The composition of these tools depends on the challenges that the child may face when doing problems and, therefore, their selection will always be individual.

As far as Type-4 Problems ("Drawing on Chessboard", see the diagrams) are concerned, these tools are to enable the child to focus on a coloured image of a line segment while an image of another line segment or an image of the two connected segments is emerging, or while the child is identifying a third line segment from the ground of the chessboard etc.

They also help to connect segments of different lines in an integral image of some shape.



10. The child can mentally trace the piece's moves and visualize its whole tour in colour.

9. The child can trace the piece's moves and visualize its whole tour in colour taking notes of the squares where the piece has stopped.

8. The child can trace the piece's moves and visualize its whole tour in colour looking at an incomplete chessboard diagram (a contour without a grid).

7. The child can trace the piece's moves and visualize its whole tour in colour looking at an incomplete chessboard diagram (a contour without a grid) and taking notes of the squares where the piece has stopped.

6. The child can trace the piece's moves and visualize its whole tour in colour using a visual aid of a white "mute" diagram.

5. The child can trace the piece's moves and visualize its whole tour in colour using a visual aid of a white "mute" diagram and a supplementary material tool.

4. The child can trace the piece's moves and visualize its whole tour in colour using a visual aid, i.e. a white chessboard diagram with letters and numbers and several material tools.

3. The child can trace the piece's moves and visualize its whole tour using a visual aid, i.e. a coloured chessboard diagram with letters and numbers or without them.

2. The child moving the piece can trace its moves on the chessboard and visualize the whole tour.

1. The child can trace a piece's moves on the chessboard moving this piece and visualize the whole tour if the child marks the interim squares where the piece has stopped with chips.

1. Developing the ability to visualize the whole chessboard in colour.

During *Levels 3 to 5* of developing the ability to visualize the whole chessboard in colour, the child continues working with a white chessboard diagram, but the number of the squares being coloured diminishes and the number of the squares to be visualized in colour increases. Then, the colouring process becomes make-belief: the child colours squares using the other end of the pencil verbalizing his/her actions. Then, the hand action gets abbreviated, and the remaining tools include pointing squares with one's finger and verbalizing actions, which is prerequisite.

2. Shaping the image of a chess piece and the image of the squares that it controls on an empty chessboard.

Level 3 of developing the ability to visualize the image of the squares that a piece controls implies abandoning visual material tools. The child traces all the lines that a piece controls, looking at the chessboard. Then, the piece is removed from the chessboard, and the child keeps the position on the chessboard in his/her mind as well.

Levels 4-5 represent the transition to doing the problem on a white chessboard. The child needs to combine the action of identifying and visualizing a coloured line (that the child has worked through at Stage 2) and keeping the image of two or more lines in his/her mind simultaneously. When developing this action, the child may need to use chessboard identifiers, marking paths with lines; colouring the square that a piece occupies; tracing lines with a finger; marking the starting and the ending squares of a line etc. (depending on individual challenges). In the beginning, there may be several tools, later their number diminishes. Relying on speech is the key to success.

3. Shaping the image of a piece's movement

Level 3 of developing the ability to visualize a piece's movement implies abandoning visual material tools. Looking at a chessboard or a coloured chessboard diagram, the child visualizes the whole path (the piece's starting position; the destination square and the whole path that the piece covers) and can name all the aforementioned things.

Levels 4-5 represent the transition to doing the problem on a white chessboard. The child needs to associate the image of movement with the image of the line whose segment becomes the piece's path in colour. The child may need temporary tools, i.e. marking a path with a line; colouring the first square along the path or the square that the piece occupies at the move's outset; marking the piece's position at the move's outset on the diagram; recording a move that the child needs to visualize. However, there should be no serious challenges if the child has completed Stage 2 of the chess thinking development.

4. The ability to mentally trace a piece's tour consisting of several moves, identifying all the moves (as line segments) from the ground of the chessboard and keeping the whole image of the path in one's mind (Type 4 Problems, "Drawing on Chessboard").

Level 3 of developing the ability implies the transition from using material tools to using visual tools. Speaking and looking at the chessboard or the coloured chessboard diagram (lettered and numbered, with the identifiers being a supplementary tool), the child can trace a piece's movement and visualize its whole tour. At this point, it is very important to take slow pace and design this work in such a way so that children verbalize all the mental actions to someone else (e.g. the child may do the problem verbalizing his/her actions to his/her classmate who checks correctness of the actions to help the child avoid confusion).

Levels 4-5 represent the transition to doing the problem on a white chessboard. The child may need the following tools: marking each move with a line or marking the starting and ending squares of each move with an X; colouring the square that the piece occupies at the outset of the problem solving or each square that the piece stops at; tracing moves with a finger. The number of tools gradually diminishes.

5. Type 3 Problems ("Fly").

Level 3 is the transition to tracing the fly's movement on the chessboard without using material tools - using one's eyes alone. The chessboard identifiers (letters and numbers) may be used as a temporary tool.

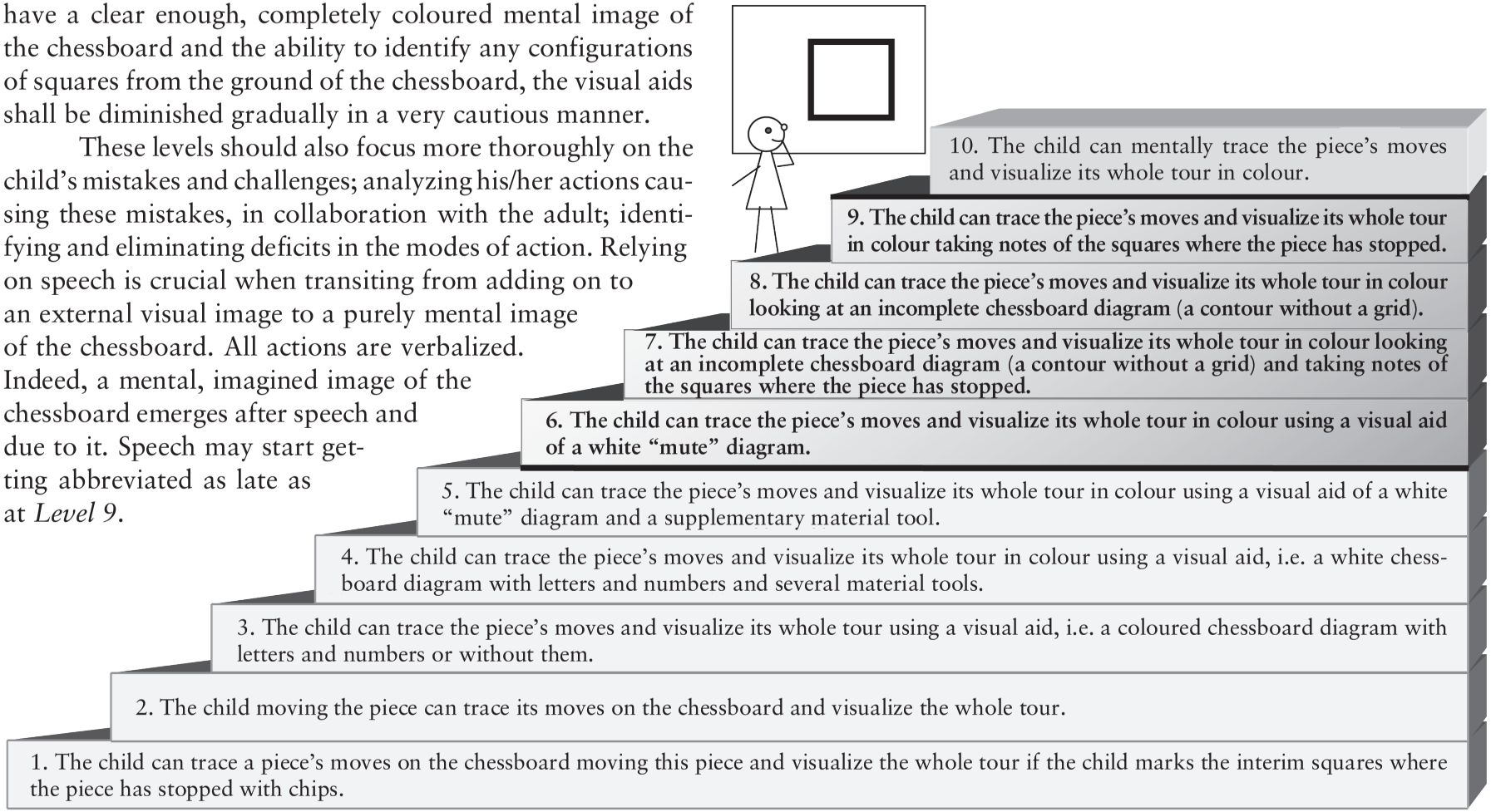
Levels 4-5 imply doing the problem on a white chessboard. The problem needs to be modified so that the child kept on constant monitoring of the colour of the squares that the piece is passing. At this point, the child has little difficulty tracing movement, the main challenge is to see all the squares in colour. The child may use the same tools as in "Drawing on Chessboard". Speech is essential.

Chess Thinking Development Stage 3 – Seeing Chessboard as Whole, Identifying Square Combinations from Background of Chessboard. Acting on Ideal Plane Using Material Tools

Starting from *Level 6*, developing the ability to see the imagined chessboard in colour and identify various configurations of squares from the ground of the chessboard, enters the stage of refining the action on the ideal plane. At *Level 6*, the child starts doing all the problems looking at a white mute chessboard without using any material tools.

Later on, at *Levels 7 to 9*, the visual aids start getting gradually abbreviated. As it is implied that by the end of the stage, children orient themselves well in the space of the chessboard; have a clear enough, completely coloured mental image of the chessboard and the ability to identify any configurations of squares from the ground of the chessboard, the visual aids shall be diminished gradually in a very cautious manner.

These levels should also focus more thoroughly on the child's mistakes and challenges; analyzing his/her actions causing these mistakes, in collaboration with the adult; identifying and eliminating deficits in the modes of action. Relying on speech is crucial when transiting from adding on to an external visual image to a purely mental image of the chessboard. All actions are verbalized. Indeed, a mental, imagined image of the chessboard emerges after speech and due to it. Speech may start getting abbreviated as late as at *Level 9*.



Chess Thinking Development Stage 3 – Seeing Chessboard as Whole, Identifying Square Combinations from Background of Chessboard Acting on Ideal Plane Using Material Tools

Developing the ability to visualize the whole chessboard in colour.

At *Level 6*, the child no longer needs any material tools: it is enough for him/her to look at a white chessboard diagram to visualize any part and later the whole chessboard in colour verbalizing all mental actions enhancing imagination. By that point, the child has developed his/her own mode of visualizing the chessboard in colour. Some children may build a mental image of the chessboard of files; some may make it of ranks; some may visualize it clearly as consisting of four equivalent squares; some may use square colouring for that etc. Relying on this individual mode of action and principles similar to the Stage 2 principles, the child proceeds from using visual aids to using a white chessboard, through working with an abbreviated visual aid (a contour without a grid) to working relying on one's imagination alone, and to the mental image of the chessboard (*Levels 7–10*).

All the other developmental directions draw on the child's emerging ability to visualize the chessboard in colour more or less clearly. At these stages, doing any problem trains this ability, no matter which tool the child uses: either a white chessboard diagram (*Level 6*), an incomplete chessboard diagram (*Levels 7–8*) or no visual aids at all (*Level 9*).

For instance, before visualizing a piece occupying a certain square and the squares that it controls, the child mentally does something (verbalizing it) so as to see the square colours looking at a white chessboard diagram. If the child succeeds, he/she will find problem solving much easier. It is true of any assignment.

Furthermore, all the developmental directions start converging. The transition of the ability to identify all the lines that are controlled by a piece (the Bishop, the Rook or the Queen) from the ground of the chessboard and focus one's attention on them facilitates the task of focusing on the identified piece's path that may consist of several moves, and vice versa. Solving problems like "Drawing on Chessboard" or "Fly" contributes to completing the process of shaping the mental image of the piece's movement. The transition from relying on the visual aid of a white chessboard diagram to the internal image is almost equivalent to the same process at Stage 2, but for the aforementioned introduction of the action of building the coloured image of the chessboard (both in case of a white chessboard diagram and an imagined chessboard).

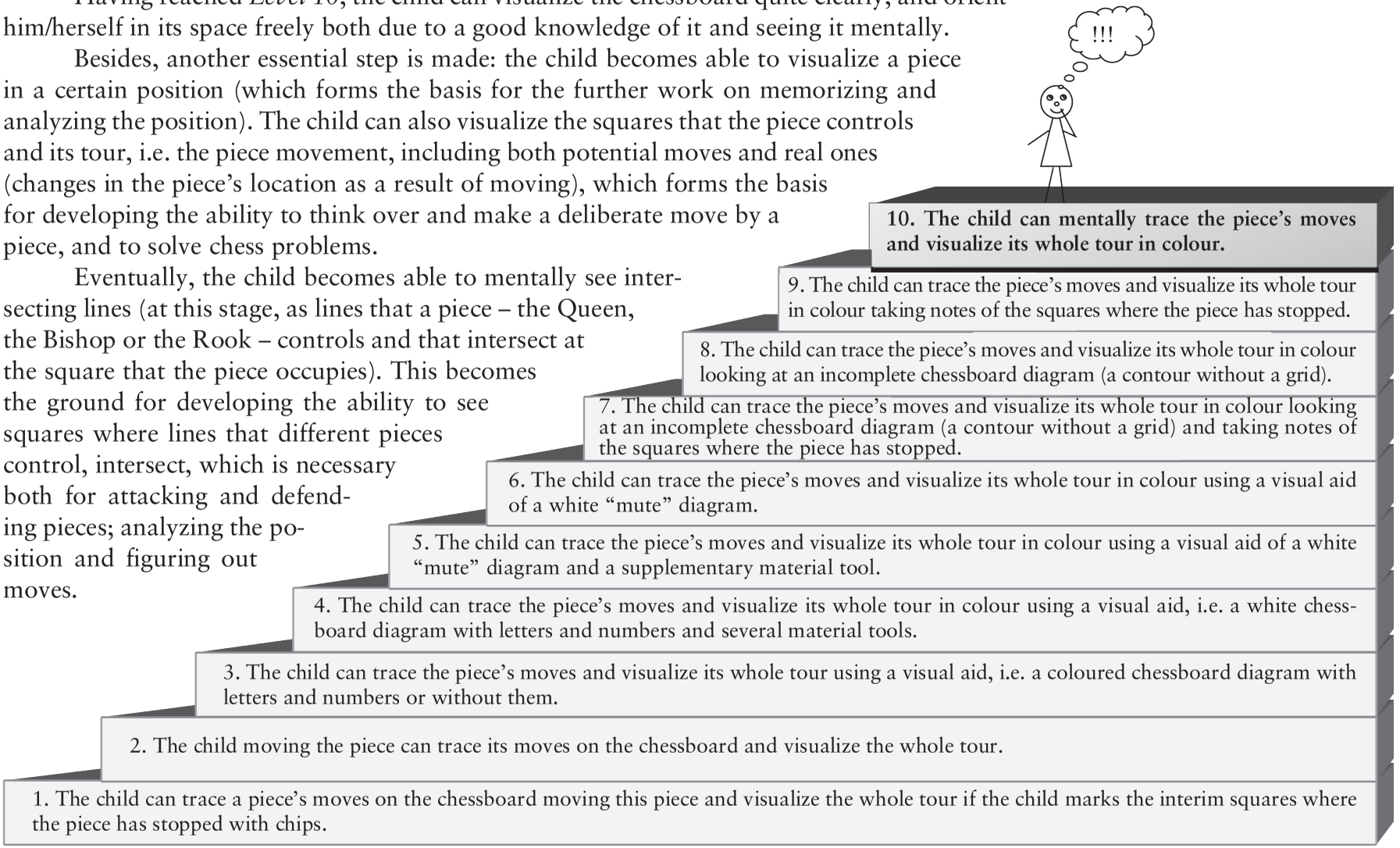
If we are speaking about developing the ability to trace a piece's tour consisting of several moves, the levels of which are illustrated by the diagram, we can add that recording the squares, at which the piece stops or recording the piece's moves may serve a supplementary tool when proceeding to building the image of the piece's tour in one's imagination alone.

Chess Thinking Development Stage 3 – Seeing Chessboard as Whole, Identifying Square Combinations from Background of Chessboard. Acting Purely on Ideal Plane

Having reached *Level 10*, the child can visualize the chessboard quite clearly, and orient him/herself in its space freely both due to a good knowledge of it and seeing it mentally.

Besides, another essential step is made: the child becomes able to visualize a piece in a certain position (which forms the basis for the further work on memorizing and analyzing the position). The child can also visualize the squares that the piece controls and its tour, i.e. the piece movement, including both potential moves and real ones (changes in the piece's location as a result of moving), which forms the basis for developing the ability to think over and make a deliberate move by a piece, and to solve chess problems.

Eventually, the child becomes able to mentally see intersecting lines (at this stage, as lines that a piece – the Queen, the Bishop or the Rook – controls and that intersect at the square that the piece occupies). This becomes the ground for developing the ability to see squares where lines that different pieces control, intersect, which is necessary both for attacking and defending pieces; analyzing the position and figuring out moves.



CHESS THINKING DEVELOPMENT STAGE 4 – ABILITY TO VISUALIZE SIMPLE POSITION AND MAKE DELIBERATE MOVE REQUIRING ELEMENTARY ANALYSIS AND ABILITY TO FIND SQUARE WHERE LINES INTERSECT

Stage 4 draws on the abilities that the child has developed during the previous Stages (visualizing the coloured chessboard image; identifying a line and a group of lines from the ground of the chessboard; focusing on several lines, which he/she has identified from the ground of the chessboard, simultaneously; visualizing a piece on the chessboard and seeing squares that this piece controls; making a mental move). At Stage 4, these abilities give ground for **developing the ability to visualize a simple position; to perform an elementary analysis of the position; to find a square of the lines' intersection; and to make a deliberate move mentally.**

Types of problems that the child can solve mentally if he/she has developed this ability:

1. Visualizing a position and identifying a combination of a piece's moves so as to reach a specified square. It is the specified piece that moves alone. (Problem types, whose solution includes 2 or more moves). Options to make a problem more challenging: a) solving the problem by "making a minimum number of moves"; b) solving the problem "avoiding squares that are controlled by the opponent's pieces".
2. Visualizing a position. Capturing an opponent's piece by making a minimum number of moves. The position implies that one can win using different pieces (this problem makes sense in terms of chess play as both parties play).
3. Visualizing a position. Capturing an opponent's piece by making a minimum number of moves (this problem makes sense in terms of chess play as both parties play).

Chess Thinking Development Stage 4 – Ability to Visualize Simple Position and Make Deliberate Move Requiring Elementary Analysis and Ability to Find Square Where Lines Intersect Composition of Mental Actions upon Stage Completion

The actions that the child is carrying out mentally when doing problems:

Illustrated by a Type-2 Problem (the intermediate difficulty level), see the Diagram. Apparently, as this analysis represents a model, it is delineated in a most comprehensive way on purpose. There will be individual differences in each case, and they may even be quite substantial.

1) Keeping the problem statement in mind;

2) Reflecting on the problem (this process is usually abbreviated; it may occur within seconds):

- actualizing the knowledge that the child may need when doing the problem regarding the movement rules; attacking by pieces; capturing a piece; what it means "to be exposed" what check is; what checkmate is; rules for getting the King out of check; what "a fork" is (and perhaps other things);
- planning problem solving (visualizing the chessboard; positioning pieces; seeing the position as a whole and memorizing it (enhancing the image); then, analyzing the position; finding an opportunity to "fork"; figuring out one's moves and opponent's moves);

3) Visualizing the chessboard in colour;

4) Mentally arranging a specified position verbalizing one's actions out loud or using "self-talk": "The White King is on h1, a light square; the White Bishop is on c2, a light square, i.e. the Bishop is a light-squared Bishop; the White Pawn is on h2, a dark square; the Black King is on e8, a light square; the Black Rook is on h5, a light square";

5) Mentally analyzing the orientation of pieces towards each other so as to reinforce the image of the position, "All the pieces occupy light squares but for the White Pawn on h2. The White Pawn on h2 and the White Bishop on c2 are located on one rank (the second rank); the White Pawn on h2 and the Black King on e8 are in the starting position; the White King on h1, the White Pawn on h2 and the Black Rook on h5 are located on the h-file. The White Pawn on h2 defends the White King on h1 from the Black Rook on h5, and the King protects the Pawn in its turn. The Black King on e8 and the Black Rook on h5 are located on the light-squared diagonal e8-h5";

6) Analyzing the problem statement (verbalizing it or using self-talk), "I need to capture the Rook. No pieces are attacking it at the moment. That is why, I need to attack it at first. Furthermore, I need to do it so that it does not escape";

7) Analyzing the position from the perspective of meeting the goal, "The only piece that can attack the Black Rook is the Bishop. Unless Black moves the Rook, he will move the King – they have only two pieces. I need to make him move the King. I may need a check. Yes, and a fork is when one attacks two pieces simultaneously. That's why, I need to attack both Black pieces simultaneously. And they occupy the light-squared diagonal e8-h5. And the Bishop on c2 is controlling the b1-h7 diagonal. These diagonals intersect";

8) Finding a square where diagonals intersect, "g6 is the square where diagonals intersect. It means that the Bishop on g6 can check the Black King on e8 and attack the Black Rook on h5; he will move the King to a safe square, and I will eat his Rook";

9) Visualizing the White Bishop's path – c2-g6; recording and keeping in mind the change of the position;

10) Visualizing the opponent's response, e.g. K e8-f8; recording it and keeping the change in the position in mind;

11) Visualizing the last move by White - Bg6:Rh5; recording it; keeping the change in the position in mind.

It is worth mentioning that the composition of mental actions when solving problems of the other two types is very similar. The first problem is somewhat easier as all the pieces but one are immovable and most often serve as simple barriers on the way (sometimes they may serve as challenging barriers when one cannot occupy the attacked squares while moving). The problem is based on visualizing free or partially free lines; identifying the square where the lines intersect and carrying out the analysis "starting from the end goal". The analysis in Type 3 problems is more complex and time consuming as it accounts for more factors.

Chess Thinking Development Stage 4 – Ability to Visualize Simple Position and Make Deliberate Move Requiring Elementary Analysis and Ability to Find Square Where Lines Intersect Developing Action on Material Plane

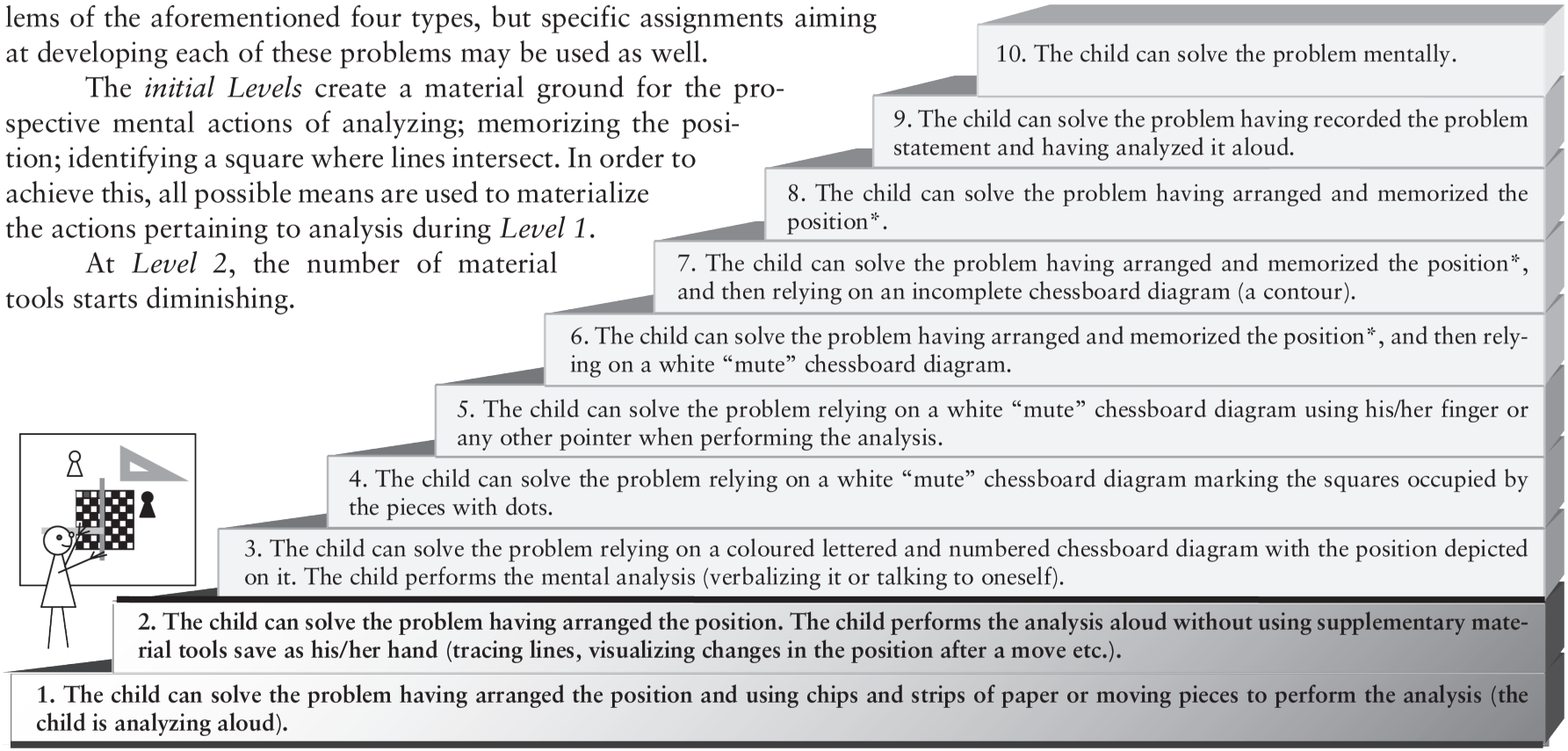
At Stage 4 (just like at Stage 3), development of abilities evolves in several directions simultaneously. The following abilities enjoy development:

1. Memorizing the position; visualizing it on the imagined chessboard and keeping this image in mind.
2. Identifying points of intersection of various chessboard lines mentally (both simple and complex variants).
3. Analyzing the position mentally relying on its image.

Development of these abilities emerges in the course of doing problems of the aforementioned four types, but specific assignments aiming at developing each of these problems may be used as well.

The *initial Levels* create a material ground for the prospective mental actions of analyzing; memorizing the position; identifying a square where lines intersect. In order to achieve this, all possible means are used to materialize the actions pertaining to analysis during *Level 1*.

At *Level 2*, the number of material tools starts diminishing.



Chess Thinking Development Stage 4 – Ability to Visualize Simple Position and Make Deliberate Move Requiring Elementary Analysis and Ability to Find Square Where Lines Intersect Developing Action on Material Plane

Let us consider how the problem in the example above is solved at *Levels 1 to 2* of Stage 4 of developing the chess thinking, i.e. with a maximum materialization of all actions that are new to the child. We will focus on the actions that exemplify specific features of working on the material plane.

1) The child needs to write down the problem statement. Records may be abandoned as late as when proceeding to Level 10, and before that Level, the child still needs this tool.

2) The child arranges the position using his/her records. The problem statement may be presented in parts so that the child may work with the position and only then proceed to solving the problem itself. That is, the teacher invites the child to memorize the position and arrange it on the chessboard from memory. Later on, the child continues working with the arranged position, but memorizing it and arranging it from memory enable the child to see it as a whole and keep it in the focus of his/her attention. Besides, the ability to visualize a position starts developing. One needs to start this work from smallest positions comprising 4 to 5 pieces, like in the aforementioned problem. As the ability to memorize evolves, the number of pieces gradually increases – maximum to 7-8 pieces at this Level. In order to memorize the position, the child needs to announce a piece's name, the name and the colour of the square where he/she wants to move the piece to. Furthermore, the arranged position may be analyzed for the purpose of memorizing it: how many White pieces there are; how many Black pieces are on the board; which pieces prevail; how the composition of Black and White pieces differs; how many pieces each of the players has on light squares, and on dark squares (and which pieces these are); which player has more pieces on which squares; paying attention to the pieces occupying the same lines (ranks, files, diagonals); focusing on the pieces occupying their starting position. There may be other landmarks for memorizing.

At *Level 1*, all actions pertaining to the analysis need to be verbalized (verbalization continues until *Levels 9-10*, and speech starts getting abbreviated no earlier than at that point). The actions are being materialized wherever possible: the child may use strips of paper to indicate lines that several pieces may share; the child may touch pieces naming them or point his/her finger at the pieces etc. At *Level 2*, the analysis enabling memorization may be performed without supplementary tools save as pointing with a hand. It is crucial that children use extended speech, i.e. speaking about a piece, the child announces its colour and location, and the colour of the square that it occupies every time the child mentions this piece. Having completed the analysis enabling memorization, the child announces the position once again, then removes the pieces from the chessboard and arranges them from memory in correct order (K, Q, RR, BB, NN – or NN, BB – in sequence from a to h, the Black pieces after the White ones).

We would like to draw your attention to the order of arranging pieces. It is more than a nod to the tradition. In order for the action to eventually become abbreviated in one's mind and become automatic and free of any deficits, it should have a clear structure as early as at the stage of creating its material basis, and then the same structure should be observed at all levels of its development. Arranging, naming and recording the position always in the same order, we create the basis that would allow us to quickly identify the position on the chessboard and keep track of the changes in the position that have occurred during the game, to memorize

it quickly. At *Level 2*, after the child has performed the analysis enabling memorization and removed the position from the chessboard, the teacher may invite the child to verbalize the position from memory turning his/her back to the chessboard (i.e. relying on the imagined chessboard and making steps in the direction of imagining the position in one's head).

Chess Thinking Development Stage 4 – Ability to Visualize Simple Position and Make Deliberate Move Requiring Elementary Analysis and Ability to Find Square Where Lines Intersect Developing Action on Material Plane

3) Analyzing the position. At *Level 1*, the analysis of the position aiming at solving the problem is carried out with a maximum number of material tools. These are chips or strips of paper marking squares or lines that pieces control; these are chips marking squares that a piece may move to; drawing lines that are controlled by pieces on a chessboard diagram; moving pieces when thinking over a move. The action of analysis needs to be materialized if possible. However, all these things will be useful and will boost the development of the ability to perform mental analysis if the child verbalizes the analysis. In order to achieve this, the teacher may introduce the rule of "saying first – doing next", and designing the problem solving in a specific way so that the child will tell his/her classmate or the teacher about his/her ideas. The action of analysis follows certain rules as well. The main rule is to analyze starting from the end goal, i.e. to analyze the problem statement and to figure out which conditions should be observed so as to solve the problem, and only then to look for means and modes of fulfilling these conditions.

Implementation of this rule varies in different problems. For instance, if you need to move a Rook from one square to another avoiding obstacles, then the problem may be solved in a quickest and easiest way if you start looking for the last move rather than the first (usually, there are fewer variants of the last move than of the first). In the example above, this rule led to formulating the condition of capturing the Rook on h5: the child needed to attack it so that it could not escape. Then in the course of reflecting how it could be realized in general, and taking into account the position on the chessboard, the player chose to attempt at attacking the Rook and the King simultaneously. The only thing yet to do was to find a relevant move.

Of course, training assignments differ from the real play in a certain way, as the problem implies that there is a solution, and there may be no solution in the game. Therefore, as soon as children become quite confident in solving elementary problems, it is desirable to invite them to doing more challenging ones including variants for attacking a piece with various pieces so that no variant seem correct at first sight. On the other hand, during the game a chess player seeks creating a position of a certain kind (the position "to his/her advantage") on the chessboard, i.e. he/she focuses on a desirable outcome.

It is not always possible to design a situation in which the child carries out this analysis. There is no need to ask the child to analyze the problem, if the child has figured out the answer at once. The child is not interested in analyzing as such (due to its complexity in particular); the child needs analysis only as a means of solving problems. Therefore, if the child solves problems as easy as shelling peas, without thinking over them, it means that he/she needs more challenging problems so that he/she may face a challenge and need analysis as a tool to address it. At *Level 2*, the number of material tools used for analysis gradually diminishes, and the ideal plane of the actions starts to take shape relying on speech and the ability to see the position.

Chess Thinking Development Stage 4 – Ability to Visualize Simple Position and Make Deliberate Move Requiring Elementary Analysis and Ability to Find Square Where Lines Intersect Developing Action on Material Plane

4) The ability to see the square where lines intersect. This ability draws on the development of the ability to identify lines and groups of lines from the ground of the chessboard. As a rule, at this stage, the child experiences no difficulty seeing a square where a rank and a file intersection. Nevertheless, challenges relating to clear perception of diagonals and squares at the points where they intersect other lines (diagonals, files and ranks) usually persist for quite a long time. Developing this ability at this stage requires much attention, both in the context of working with the problems of the aforementioned types and in the context of inviting children to perform specific assignments that enable each child to find his/her own mode of action in terms of seeing diagonals and the squares where they intersect other lines more clearly.

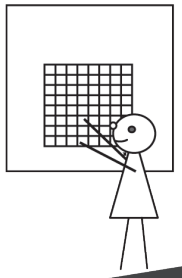
Firstly, these assignments should materialize the action of identifying diagonals from the ground of the chessboard (e.g. colouring diagonals on white chessboard diagrams with mandatory colouring of both dark-squared and light-squared diagonals). Secondly, these assignments may include problems relating to the analysis of specifically arranged positions, such as, identifying all the pieces occupying the same diagonal; all the pieces that a white Bishop may attack etc. There may be problems aiming at shaping the image of diagonals, e.g. identifying whether the specified diagonals intersect; how many diagonals (or lines in general) a certain diagonal intersects etc.

Various problems aiming at training the Bishop's and the Queen's moves also contribute to improving the perception of the diagonals. Finally, the problems providing the substance for discovering regularities of the diagonals' location on the chessboard (e.g. the question like how many light-squared rectangles that are formed by light-squared diagonals there are on the chessboard etc., and problems facilitating discovering and using the fact that the chessboard is symmetrical (including diagonal symmetry). The teacher needs to invent playing assignments that employ the image of diagonals and include the need of identifying squares where various lines intersect. However, the main thing is to do all problems verbalizing one's actions. The image may take shape only if it is supported by speech.

Working with the problems aiming at improving the clear perception of diagonals starts on the material plane (placing chips onto a chessboard along a line; colouring squares comprising diagonals on a white chessboard diagram; drawing lines on a chessboard diagram; placing strips of paper etc.). Later, the number of material tools gradually diminishes.

Chess Thinking Development Stage 4 – Ability to Visualize Simple Position and Make Deliberate Move Requiring Elementary Analysis and Ability to Find Square Where Lines Intersect Acting on Material Plane, Ideal Plane of Action Starts Developing

During *Levels 3 to 5*, the material tools supporting the action of analysis get abbreviated. During *Level 3*, the child still uses a visual aid of a position represented on a chessboard diagram. During *Level 4*, this tool gets abbreviated (the child marks the pieces' locations with dots, but keeps the composition of pieces, i.e. where which piece stands, in his/her mind). Finally, at *Level 5*, when doing the problem, the child keeps the position in mind and performs the analysis mentally too (relying on a visual aid of a white chessboard diagram in both cases). However, the child "captures" the position after a special memorizing process (as described above) rather than at once. Furthermore, as in the beginning, the child finds it very challenging to keep the position in mind and to analyze it mentally simultaneously, he/she may have a temporary recourse to elementary tools to perform the analysis (e.g. moving one's finger along the chessboard when analyzing). This tool also helps the child to keep the position's image in his/her mind.



10. The child can solve the problem mentally.

9. The child can solve the problem having recorded the problem statement and having analyzed it aloud.

8. The child can solve the problem having arranged and memorized the position*.

7. The child can solve the problem having arranged and memorized the position*, and then relying on an incomplete chessboard diagram (a contour).

6. The child can solve the problem having arranged and memorized the position*, and then relying on a white "mute" chessboard diagram.

5. The child can solve the problem relying on a white "mute" chessboard diagram using his/her finger or any other pointer when performing the analysis.

4. The child can solve the problem relying on a white "mute" chessboard diagram marking the squares occupied by the pieces with dots.

3. The child can solve the problem relying on a coloured lettered and numbered chessboard diagram with the position depicted on it. The child performs the mental analysis (verbalizing it or talking to oneself).

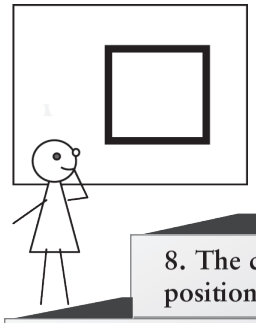
2. The child can solve the problem having arranged the position. The child performs the analysis aloud without using supplementary material tools save as his/her hand (tracing lines, visualizing changes in the position after a move etc.).

1. The child can solve the problem having arranged the position and using chips and strips of paper or moving pieces to perform the analysis (the child is analyzing aloud).

Chess Thinking Development Stage 4 – Ability to Visualize Simple Position and Make Deliberate Move Requiring Elementary Analysis and Ability to Find Square Where Lines Intersect Acting on Ideal Plane Using Material Tools

Level 6 is similar to *Level 5* in general, with the only difference being that the child is able to keep the position in mind and analyze it without any supplementary material tools (relying on a mute chessboard diagram alone).

Then, during *Levels 7 to 8*, the visual aids get increasingly abbreviated, and the child makes a more extensive use of visualization. Finally, as a result of constant work with memorizing positions, the child can imagine an elementary position right after recording the problem statement, and solve the problem relying on this image after that.



10. The child can solve the problem mentally.

9. The child can solve the problem having recorded the problem statement and having analyzed it aloud.

8. The child can solve the problem having arranged and memorized the position*.

7. The child can solve the problem having arranged and memorized the position*, and then relying on an incomplete chessboard diagram (a contour).

6. The child can solve the problem having arranged and memorized the position*, and then relying on a white "mute" chessboard diagram.

5. The child can solve the problem relying on a white "mute" chessboard diagram using his/her finger or any other pointer when performing the analysis.

4. The child can solve the problem relying on a white "mute" chessboard diagram marking the squares occupied by the pieces with dots.

3. The child can solve the problem relying on a coloured lettered and numbered chessboard diagram with the position depicted on it. The child performs the mental analysis (verbalizing it or talking to oneself).

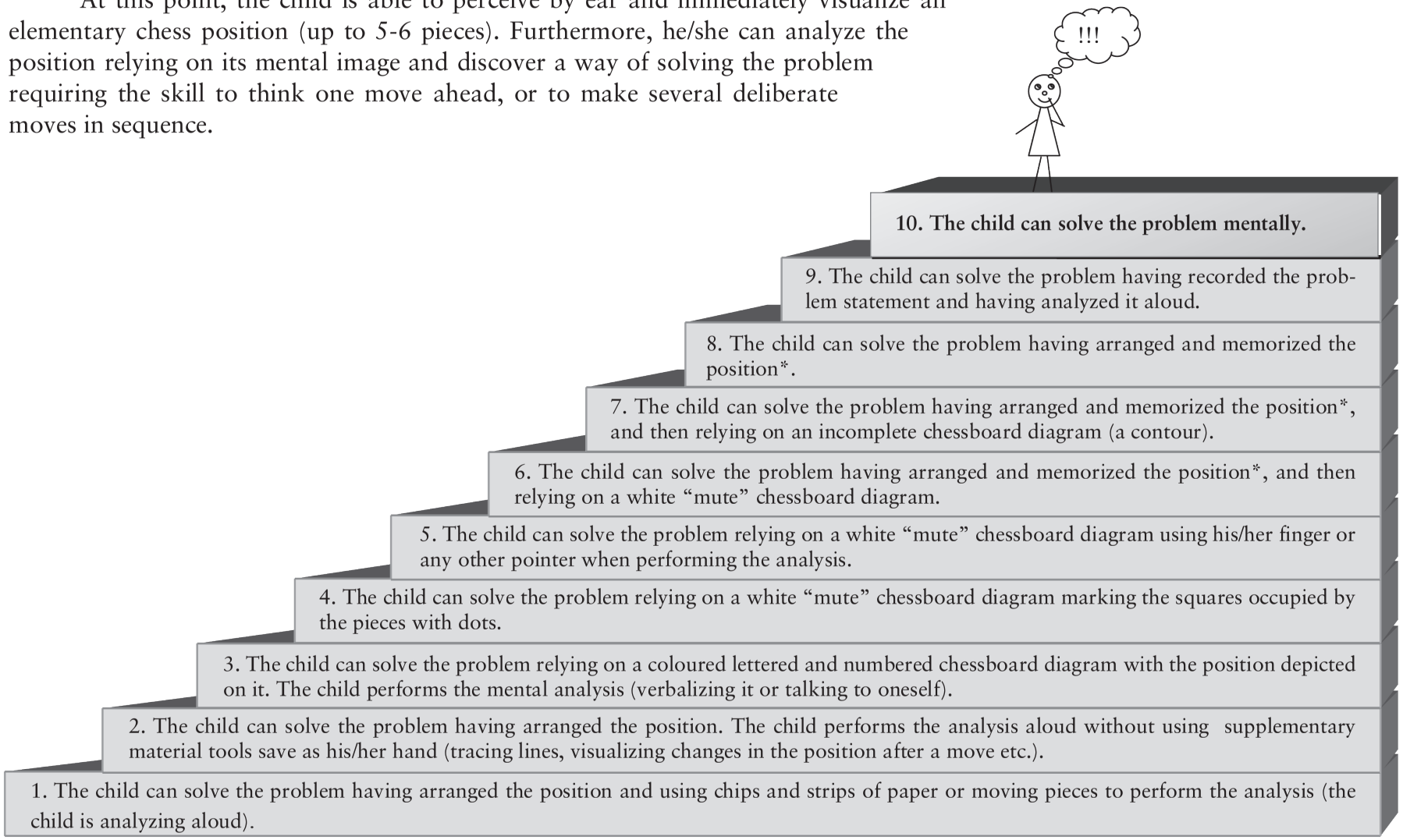
2. The child can solve the problem having arranged the position. The child performs the analysis aloud without using supplementary material tools save as his/her hand (tracing lines, visualizing changes in the position after a move etc.).

1. The child can solve the problem having arranged the position and using chips and strips of paper or moving pieces to perform the analysis (the child is analyzing aloud).

Chess Thinking Development Stage 4– Ability to Visualize Simple Position and Make Deliberate Move Requiring Elementary Analysis and Ability to Find Square Where Lines Intersect Acting Purely on Ideal Plane

Level 10 concludes Stage 4 of developing the chess thinking.

At this point, the child is able to perceive by ear and immediately visualize an elementary chess position (up to 5-6 pieces). Furthermore, he/she can analyze the position relying on its mental image and discover a way of solving the problem requiring the skill to think one move ahead, or to make several deliberate moves in sequence.



CHESS THINKING DEVELOPMENT STAGE 5 – SOLVING ELEMENTARY PROBLEMS THAT REQUIRE ABILITY TO ANALYZE; TO MAKE SENSE OF POSITION AND VISUALIZE CHESSBOARD AND POSITION WELL

Stage 5 draws on the achievements of the previous Stages:

- the ability to see the chessboard as a whole and visualize the position; the ability to perform an elementary analysis of the position from the perspective of the goal specified;
- the ability to identify squares; lines; line intersections; square and line configurations.

These abilities give ground for developing the ability to analyze the position identifying requirements to a move which is no longer reduced to drawing a line on the chessboard but needs to meet other requirements depending on a problem statement and specific aspects of pieces' positioning on a chessboard, and their interrelations. This is the ability to visualize the position that emerges as a result of a mental move, and to keep the image of this position in one's mind.

Types of problems that the child can solve mentally if he/she has developed this ability:

1. Doing mate-in-one problems, solving which goes beyond identifying an intersection point of the lines, one of which is occupied by a King and another – by a piece attacking the King, and implies analyzing the position to identify requirements to a move (the position consists of maximum 7–9 pieces).
2. Doing challenging mate-in-one problems that include different variants of checking the King and defending from check. In the course of solving the problem, the child needs to connect the position that has emerged after a move with requirements to it (conditions for checkmate).

Chess Thinking Development Stage 5 – Solving Elementary Problems that Require Ability to Analyze, to Make Sense of Position and Visualize Chessboard and Position Well Composition of Mental Actions upon Stage Completion

The actions that the child is carrying out mentally when doing problems: (as illustrated by the problem at the previous page). Actions that were considered as separate (identifying a square, a line etc.) before this stage, get consolidated in larger units here.

1) Visualizing a position (having memorized the position that has been displayed for a certain period of time that the child needs for memorizing; using the record of the position; having heard someone announce the pieces and the squares that they occupy).
2) Analyzing the position from the perspective of meeting the goal to make a mate in one.
3) Recalling the conditions, under which checkmate occurs (i.e. check that one cannot defend from).
4) Analyzing the opponent's King position identifying which squares it can and cannot move to, and, correspondingly, which lines it can and cannot move along.
5) Identifying the role that each opponent's piece plays from the perspective of meeting the goal to make a mate in one (protects the King; restricts its actions; controls important squares; attacks the player's pieces; immobilizes the King).
6) Identifying the role and the interrelationship between one's own pieces in terms of the attack: whether they restrict the actions of the opponent's King; control important squares, can check the opponent's King; attack the opponent's pieces; can block the lines that are important for the opponent).
7) Identifying under which conditions the King will be checkmated (the King will be in check and unprotected); e.g. if the King is on g8 (pawns on f7, g7, h7), the King can be checkmated from the 8th rank (by the Rook or the Queen).
8) Identifying a piece that can check the King and assessing whether there is a defense from check (recalling ways to defend from check: capturing the attacking piece; interposing another piece between the King and the attacking piece; moving the King to a non-threatened square); if the King is protected, evaluating whether this piece can check the King from another square.
9) If the King is protected, and this piece can never check the King from another square, evaluating who else (another piece) may check the King and analyzing whether the conditions for a checkmate are fulfilled and whether there is defense; identifying a piece that meets all the criteria (checking the King, lack of defenses).
10) Visualizing the position that emerges after the move and ascertaining that there are no ways to defend the King from checkmate; making an ultimate decision to make a corresponding move.

Chess Thinking Development Stage 5 – Solving Elementary Problems that Require Ability to Analyze, to Make Sense of Position and Visualize Chessboard and Position Well Developing Action on Material Plane

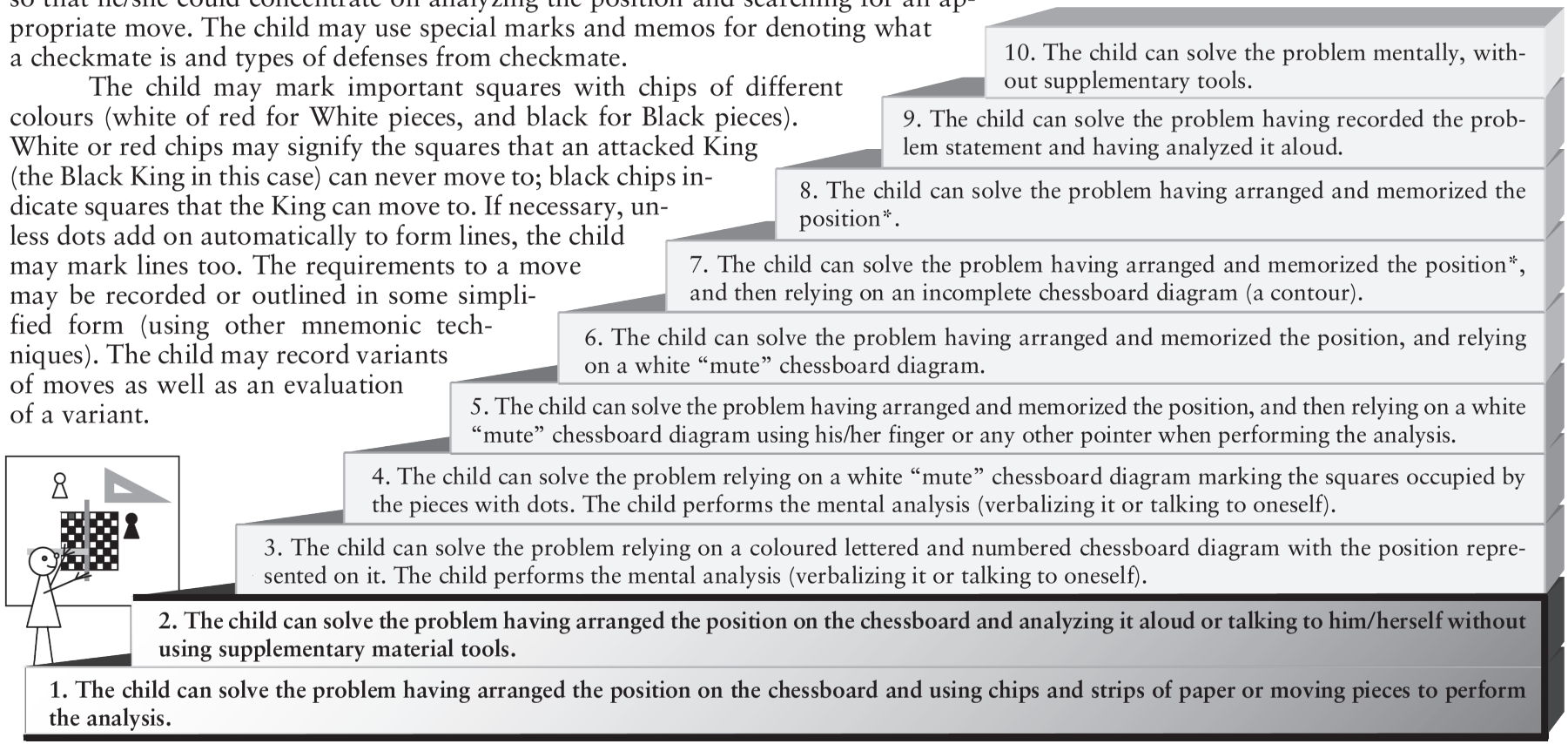
The child can learn to act at Stage 5 if he/she has learned to perform other modes of action mentally; if the child identifies lines and squares results without frustration and investing additional efforts.

The following abilities take shape at this stage:

1. Memorizing the image of the position and keeping it in mind for a long time.
2. Mentally analyzing the position identifying conditions under which one can checkmate the King in this position.
3. Visualizing the position that results from the move.
4. Making an informed decision to make a corresponding move.

At Levels 1 and 2, the child works with a chessboard and pieces using material tools to facilitate his/her memory and attention so that he/she could concentrate on analyzing the position and searching for an appropriate move. The child may use special marks and memos for denoting what a checkmate is and types of defenses from checkmate.

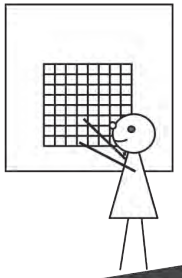
The child may mark important squares with chips of different colours (white of red for White pieces, and black for Black pieces). White or red chips may signify the squares that an attacked King (the Black King in this case) can never move to; black chips indicate squares that the King can move to. If necessary, unless dots add on automatically to form lines, the child may mark lines too. The requirements to a move may be recorded or outlined in some simplified form (using other mnemonic techniques). The child may record variants of moves as well as an evaluation of a variant.



Chess Thinking Development Stage 5 – Solving Elementary Problems that Require Ability to Analyze, to Make Sense of Position and Visualize Chessboard and Position Well Acting on Material Plane, Ideal Plane of Action Starts Developing

At *Levels 3 to 5*, the child works with symbolic representations of a chessboard and a scheme of a position on a chessboard diagram. The child may use the following material tools when working with a chessboard: recording move variants; marking lines on a diagram; marking important squares with chips (e.g. squares that characterize the position of the opponent's King and move-related requirements).

As the actions of analysis are new to the child, the child may preserve material tools to support these actions at this point (diagrams; memory aids; material signs denoting the conditions for checkmate or defense variants). As the child "walks up the stairs", the number of material tools gradually decreases. At the same time, speech (which is loud and extended) gets increasingly involved in the process: the child needs to verbalize not only all relevant aspects of an action but also the details of its implementation that are characteristic of one's individual challenges and modes of action.



10. The child can solve the problem mentally, without supplementary tools.

9. The child can solve the problem having recorded the problem statement and having analyzed it aloud.

8. The child can solve the problem having arranged and memorized the position*.

7. The child can solve the problem having arranged and memorized the position*, and then relying on an incomplete chessboard diagram (a contour).

6. The child can solve the problem having arranged and memorized the position, and relying on a white "mute" chessboard diagram.

5. The child can solve the problem having arranged and memorized the position, and then relying on a white "mute" chessboard diagram using his/her finger or any other pointer when performing the analysis.

4. The child can solve the problem relying on a white "mute" chessboard diagram marking the squares occupied by the pieces with dots. The child performs the mental analysis (verbalizing it or talking to oneself).

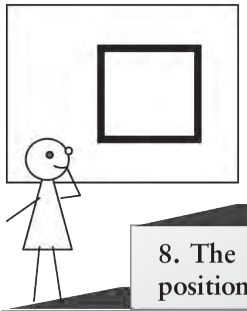
3. The child can solve the problem relying on a coloured lettered and numbered chessboard diagram with the position represented on it. The child performs the mental analysis (verbalizing it or talking to oneself).

2. The child can solve the problem having arranged the position on the chessboard and analyzing it aloud or talking to him/herself without using supplementary material tools.

1. The child can solve the problem having arranged the position on the chessboard and using chips and strips of paper or moving pieces to perform the analysis.

Chess Thinking Development Stage 5 – Solving Elementary Problems that Require Ability to Analyze, to Make Sense of Position and Visualize Chessboard and Position Well Acting on Ideal Plane Using Material Tools

At *Levels 7 to 9*, the remaining material tools include a "mute" and a "blind" chessboard and a pen by which the child draws supportive representations (of lines and squares) on a diagram. The child keeps the position in his/her mind; and proceeds with dealing with the content of the problem mostly mentally. The out-loud speech gives way to self-talk which converts into the inner speech by L*evel 9*.



10. The child can solve the problem mentally, without supplementary tools.

9. The child can solve the problem having recorded the problem statement and having analyzed it aloud.

8. The child can solve the problem having arranged and memorized the position*.

7. The child can solve the problem having arranged and memorized the position*, and then relying on an incomplete chessboard diagram (a contour).

6. The child can solve the problem having arranged and memorized the position, and relying on a white "mute" chessboard diagram.

5. The child can solve the problem having arranged and memorized the position, and then relying on a white "mute" chessboard diagram using his/her finger or any other pointer when performing the analysis.

4. The child can solve the problem relying on a white "mute" chessboard diagram marking the squares occupied by the pieces with dots. The child performs the mental analysis (verbalizing it or talking to oneself).

3. The child can solve the problem relying on a coloured lettered and numbered chessboard diagram with the position represented on it. The child performs the mental analysis (verbalizing it or talking to oneself).

2. The child can solve the problem having arranged the position on the chessboard and analyzing it aloud or talking to him/herself without using supplementary material tools.

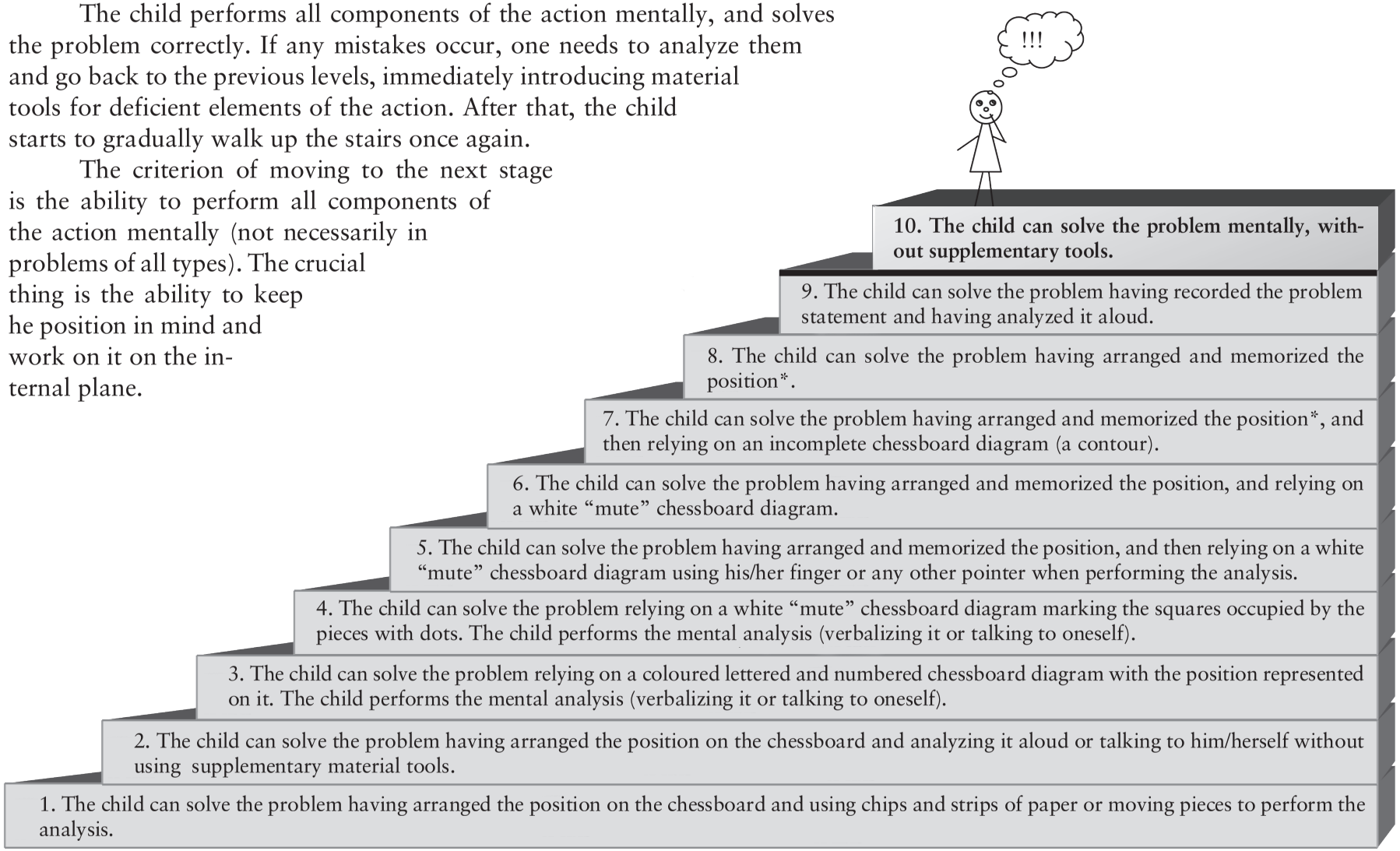
1. The child can solve the problem having arranged the position on the chessboard and using chips and strips of paper or moving pieces to perform the analysis.

*If the child needs to work on memorizing the position at first, then the teacher announces the problem statement when the position has been already memorized and removed from the chessboard.

Chess Thinking Development Stage 5 – Solving Elementary Problems that Require Ability to Analyze, to Make Sense of Position and Visualize Chessboard and Position Well Acting Purely on Ideal Plane

The child performs all components of the action mentally, and solves the problem correctly. If any mistakes occur, one needs to analyze them and go back to the previous levels, immediately introducing material tools for deficient elements of the action. After that, the child starts to gradually walk up the stairs once again.

The criterion of moving to the next stage is the ability to perform all components of the action mentally (not necessarily in problems of all types). The crucial thing is the ability to keep he position in mind and work on it on the internal plane.



CHESS THINKING DEVELOPMENT STAGE 6 – SOLVING PROBLEMS THAT REQUIRE GOOD VISUALIZATION OF POSITION AND ACCOUNTING FOR PIECES' INTERRELATIONSHIP; ABILITY TO VISUALIZE CHANGES IN POSITION AFTER MOVE; ABILITY TO ANALYZE AND THINK ONE MOVE AHEAD

Chess Thinking Development Stage 6 – Solving Problems that Require Good Visualization of Position and Accounting for Pieces' Interrelationship; Ability to Visualize Changes in Position after Move; Ability to Analyze and Think One Move Ahead Composition of Mental Actions upon Stage Completion

Stage 6 draws on the achievements of the previous Stages:

- the ability to see the chessboard as a whole and visualize the position; the ability to analyze the position from the perspective of the goal specified;
- The ability to analyze pieces' positioning and, first and foremost, that of the opponent's King, to identify requirements to a move;
- the ability to quickly identify squares; lines; line intersections; square and line configurations.

These abilities give ground for developing the ability to analyze a complex position; identify requirements to a move and move variants depending on the goal specified and specific aspects of the pieces' positioning on the chessboard, and their interrelationship. The main new mental formation of Stage 6 is the ability to visualize the changed position that emerges as a result of a mental move, and the ability to act mentally within this position keeping its image in one's mind.

Types of problems that the child can solve mentally if he/she has developed this ability:

1. Doing challenging mate-in-one problems that include different variants of checking the King and defending form check (a large number of pieces – exceeding 7 pieces).
2. Doing mate-in-two problems.
3. Doing such problems as "Win a Piece", "Find the best move in some position" (requiring analysis of the position to set the goal).

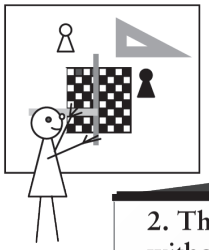
Chess Thinking Development Stage 6 – Solving Problems that Require Good Visualization of Position and Accounting for Pieces' Interrelationship; Ability to Visualize Changes in Position after Move; Ability to Analyze and Think One Move Ahead Developing Action on Material Plane

The child starts working with challenging problems when he/she has achieved significant progress in mastering chess, when he/she solves mate-in-one problems quite easily; when he/she can perform mental actions that were shaped during the previous levels. Therefore, work on the material plane is quite specific here. The child uses material tools when analyzing challenging positions to mark the key squares and to indicate changes in the position after the first move, i.e. in the position where the child will have to act identifying the opponent's move and the second (child's own) move (with this being crucial for achieving another quality of the ability to perform mentally). The position on the chessboard with material marks standing for the first move variants serves as the materialized representation of the position that the child needs to keep in mind. Combining material tools with speech (announcing the pieces' positions before and after the move on the chessboard); speaking out loud what has changed in the position as a result of the move (defense variants and checkmate attack ending variants) represent the substance to build the ability to make a mental move in the position, which is being kept in one's mind, and to visualize the changes that will emerge in this position.

In case of challenging positions, the child may use material tools to indicate requirements, (conditions) observing which results in checkmating the King.

At the beginning of doing challenging problems, one needs to make a most extensive use of material tools, as this both enables the student to accomplish all the elements of the action and informs the teacher of which components the student finds difficult and what kind of help the student needs.

At this point, it is very important to appropriately and carefully design work on the material plane; to avoid speeding the child up to proceed to the ideal plane and to abbreviate the out-loud speech (during the following levels) as all deficiencies of the action formation at this point will turn into errors, blunders, failure to appropriately perform mentally



10. The child can solve the problem mentally, without supplementary tools.

9. The child can solve the problem having recorded the problem statement and having analyzed it aloud.

8. The child can solve the problem having arranged and memorized the position*.

7. The child can solve the problem having arranged and memorized the position, and then relying on an incomplete chessboard diagram (a contour).

6. The child can solve the problem having arranged and memorized the position, and relying on a white "mute" chessboard diagram.

5. The child can solve the problem having arranged and memorized the position, and then relying on a white "mute" chessboard diagram using his/her finger or any other pointer when performing the analysis.

4. The child can solve the problem relying on a white "mute" chessboard diagram marking the squares occupied by the pieces with dots. The child performs the mental analysis (verbalizing it or talking to oneself).

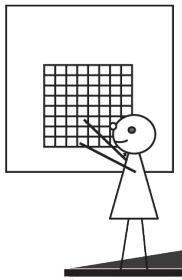
3. The child can solve the problem relying on a coloured lettered and numbered chessboard diagram with the position represented on it. The child performs the mental analysis (verbalizing it or talking to oneself).

2. The child can solve the problem having arranged the position on the chessboard and analyzing it aloud or talking to him/herself without using supplementary material tools.

1. The child can solve the problem having arranged the position on the chessboard and using chips and strips of paper or moving pieces to perform the analysis.

Chess Thinking Development Stage 6 – Solving Problems that Require Good Visualization of Position and Accounting for Pieces' Interrelationship; Ability to Visualize Changes in Position after Move; Ability to Analyze and Think One Move Ahead Acting on Material Plane, Ideal Plane of Action Starts Developing

If the training of the action on the material plane is accompanied with the aforementioned errors, it may result in incompleteness of the composition of mental actions as some components that are important for an appropriate performance may simply fall out. In practice, this results in inconsistent performance of an action and mistakes. Correspondingly, one may need to "overhaul" and "decompose" the action. One may tell that the child needs material tools no longer judging by the character of the action itself. Then, it is high time to start to get rid of them placing an emphasis on speech. During *Levels 3 to 5*, the child gradually gets rid of material tools and makes an increasingly extensive use of speech. Performing of the elements of the action in the out-loud speech facilitates awareness of the action's performance. When the child has trained the action in the out-loud speech, speech gradually starts gradually diminishing just as the material tools gradually disappear during the previous levels. These levels may result in creating a memory aid containing a mode of analyzing a complex position, figuring out move options and evaluating them. This mode of action is validated and refined during the following levels.



10. The child can solve the problem mentally, without supplementary tools.

9. The child can solve the problem having recorded the problem statement and having analyzed it aloud.

8. The child can solve the problem having arranged and memorized the position*.

7. The child can solve the problem having arranged and memorized the position, and then relying on an incomplete chessboard diagram (a contour).

6. The child can solve the problem having arranged and memorized the position, and relying on a white "mute" chessboard diagram.

5. The child can solve the problem having arranged and memorized the position, and then relying on a white "mute" chessboard diagram using his/her finger or any other pointer when performing the analysis.

4. The child can solve the problem relying on a white "mute" chessboard diagram marking the squares occupied by the pieces with dots. The child performs the mental analysis (verbalizing it or talking to oneself).

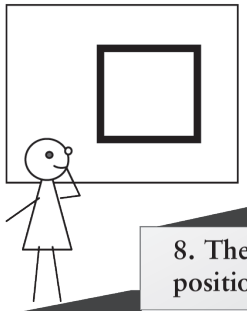
3. The child can solve the problem relying on a coloured lettered and numbered chessboard diagram with the position represented on it. The child performs the mental analysis (verbalizing it or talking to oneself).

2. The child can solve the problem having arranged the position on the chessboard and analyzing it aloud or talking to him/herself without using supplementary material tools.

1. The child can solve the problem having arranged the position on the chessboard and using chips and strips of paper or moving pieces to perform the analysis.

Chess Thinking Development Stage 6 – Solving Problems that Require Good Visualization of Position and Accounting for Pieces' Interrelationship; Ability to Visualize Changes in Position after Move; Ability to Analyze and Think One Move Ahead Acting on Ideal Plane Using Material Tools

During *Levels 6–9*, the child trains modes of analyzing a complex position; figuring out move options; visualizing an alternated position; keeping it in one's mind and playing its ending options depending on move variants in one's head. The action is carried out using a memory aid containing the mode of action (it should be made during the previous levels); speech gets gradually abbreviated; the material substantiating the action performance becomes less and less "tangible". The child is working with chessboard diagrams, diagrams of a position. At *Level 9*, the only thing that the child has at hand is the records of the position; all the other actions take place mentally.



10. The child can solve the problem mentally, without supplementary tools.

9. The child can solve the problem having recorded the problem statement and having analyzed it aloud.

8. The child can solve the problem having arranged and memorized the position*.

7. The child can solve the problem having arranged and memorized the position, and then relying on an incomplete chessboard diagram (a contour).

6. The child can solve the problem having arranged and memorized the position, and relying on a white "mute" chessboard diagram.

5. The child can solve the problem having arranged and memorized the position, and then relying on a white "mute" chessboard diagram using his/her finger or any other pointer when performing the analysis.

4. The child can solve the problem relying on a white "mute" chessboard diagram marking the squares occupied by the pieces with dots. The child performs the mental analysis (verbalizing it or talking to oneself).

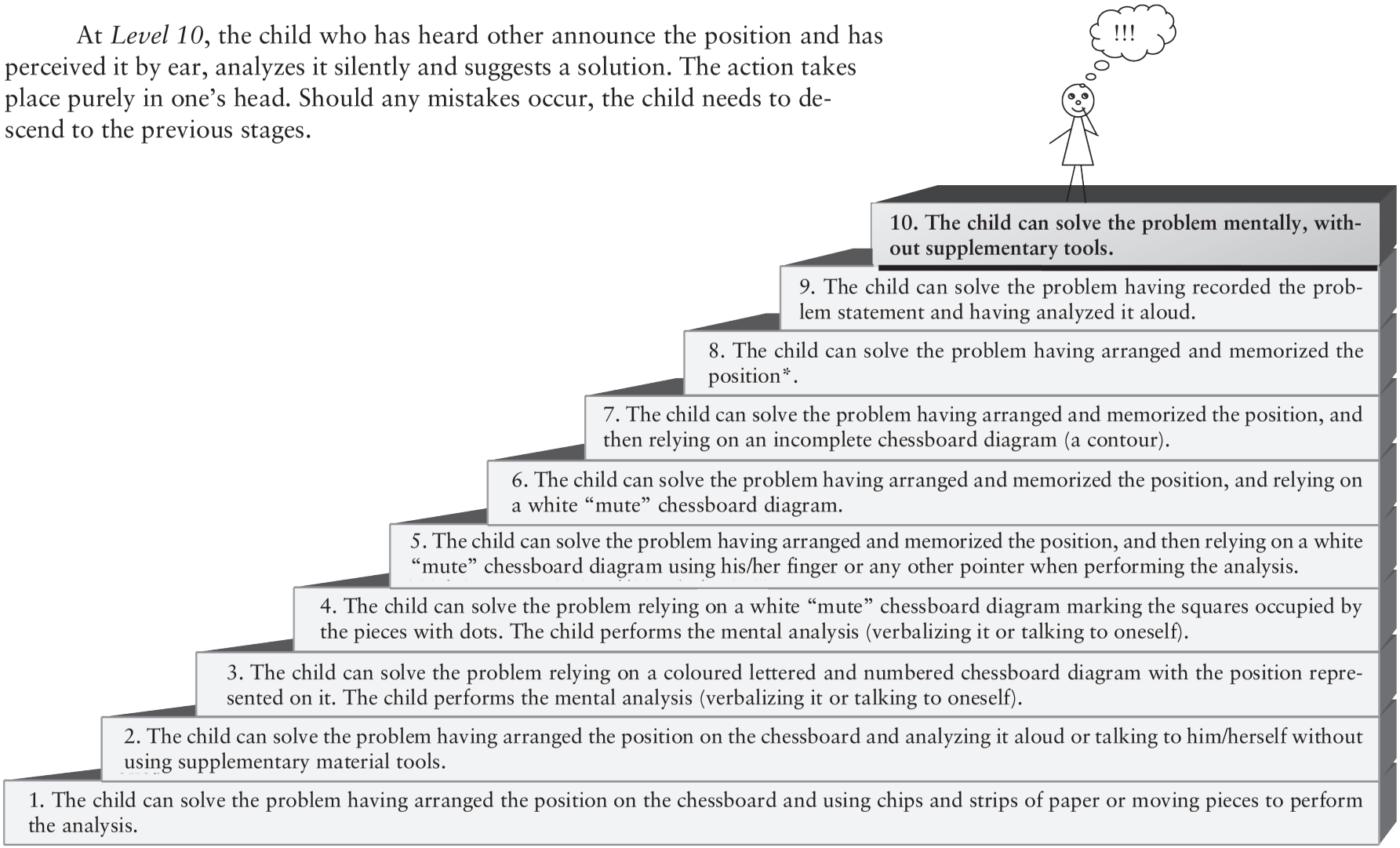
3. The child can solve the problem relying on a coloured lettered and numbered chessboard diagram with the position represented on it. The child performs the mental analysis (verbalizing it or talking to oneself).

2. The child can solve the problem having arranged the position on the chessboard and analyzing it aloud or talking to him/herself without using supplementary material tools.

1. The child can solve the problem having arranged the position on the chessboard and using chips and strips of paper or moving pieces to perform the analysis.

Chess Thinking Development Stage 6 – Solving Problems that Require Good Visualization of Position and Accounting for Pieces' Interrelationship; Ability to Visualize Changes in Position after Move; Ability to Analyze and Think One Move Ahead Acting Purely on Ideal Plane

At *Level 10*, the child who has heard other announce the position and has perceived it by ear, analyzes it silently and suggests a solution. The action takes place purely in one's head. Should any mistakes occur, the child needs to descend to the previous stages.



CONCLUSION

You have read our Educator's Guide. We hope that you have got insights about the design of the chess training aiming at the child's overall development and, first and foremost, his/her ability to perform mentally. You may have also understood that this Guide differs from a know-how book. Even if you study the text of the Guide very thoroughly, you will hardly be able to design lessons according to the proposed technology and observe its basic principles. In order to achieve this, one needs to master the technology of designing training in line with the RAA principles; look at oneself from the outside and ascertain that the attitude of the teacher-coworker is quite congruent with your style of teaching and interacting with students. One needs to understand the method of the stage-by-stage formation of mental actions; to master methods of establishing conditions for shaping mental actions and facilitating their conversion from the external material (materialized) plane to the internal plane. One needs to learn to view any educational situation from the two perspectives: the perspective of an educational psychologist working on developing the internal plane of action (the ability to perform mentally) and a teacher of Chess as a school subject, i.e. constantly focusing on how the training makes sense in terms of chess play. Due to the fact that this kind of practice is new to teachers and stimulates their ongoing development and self-improvement, we recommend teaching in the "teacher-psychologist", "teacher-teacher" or "psychologist-psychologist" tandem, so that both adults' attitudes (activity-related and reflective) may exist every moment throughout the training. Then training sessions will be creative, interesting both for students and teachers engaging in constant self-development and developing others. We hope that the COD method will evolve in the course of these lessons too. We will be grateful for feedback and suggestions regarding its improvement from those who will add this method to their armory in working with children during Chess lessons.

REFERENCES

1. *Alekseev N.G.* (1990). Shakhmaty i razvitije myshlenija [Chess and cognitive development]. V knige Shakhmaty: nauka, opyt, masterstvo [In Chess: Science, Experience, Mastery]. Moscow, Vysshaya Shkola. 41-53.
2. *Alekseev N.G.* (2002). Refleksija i formirovanije sposoba reshenija zadach [Reflection and formation of modes of problem solving]. Moscow, Kolledge predprinimatel'stva i sotsial'no-trudovogo proektirovanija.
3. *Blanco Y.* (1999). Why teach chess in school? – FIDE, Chess in Schools Committee, Milano, Verpal.
4. *Blonsky P.P.* (1979). Zadachi novoj narodnoj shkoly // Izbrannye psihologicheskie i pedagogicheskie sochinenija [Objectives of New National School]. Moscow, Pedagogika, 1979. Vol.1.
5. *Davydov V.V.* (1996). Teoriya razvivayushchego obucheniya [The theory of developmental education]. Moscow, INTOR.
6. *Dzhurinskij A.N.* (2003). Istorija obrazovanija i pedagogicheskoj mysli [History of Education and Educational Thought. Handbook for Higher Educational Institutions]. Moscow, Izd-vo VLADOS PRESS.
7. *Fischer Bobby et al.* (1966). Bobby Fischer Teaches Chess. Basic Systems, Inc. New York City.
8. *Galperin P.Ya.* (1966). Psikhologija myshlenija i uchenie o poetapnom formirovanii umstvennykh dejstvij [Psychology of thinking and stage-by-stage formation of mental actions theory]. In Issledovanija myshlenija v sovetskoj psikhologii [Cognition Research in Soviet Psychology]. Ed. E.V. Shorokhova. Moscow, Nauka. 236–277.
9. *Gorelik V.S.* (2005). Stupen'ki shahmatnoj igry (kn. 2) [Steps of Chess (Vol. 2)]. Dnepropetrovsk, Monolit.
10. *Kotov A.A.* (1985). Kak stat' grossmejsterom [How to become a Grandmaster]. Moscow, Fizkul'tura i sport.
11. *Ponomarev Ya.A.* (1967). Znanije, myshlenije i umstvennoje razvitije [Knowledge, thinking and cognitive development]. Moscow, Prosveshchenije.
12. *Razuvaev Ju.S., Zaretskii V.K.* (2004) Shakhmaty dlja obshchego razvitija [Chess for Overall Development]. Mir detstva, № 4
13. *Reti R.* (1981). Sovremennyj uchebnik shahmatnoj igry [Modern handbook o chess]. Moscow, Fizkul'tura i sport.
14. *Salzmann C.G.* (2011). Knizhka dlja rakov. Knizhka dlja murav'jov [The book for crayfish. The book for ants]. Moscow, Reikhl.
15. *Sukhin I. G.* (1994).Volshebnye figury, ili shakhmaty dlja detej ot 2 do 5 let [Magic pieces, or chess for 2-5 year-old children]. Moscow, Novaya Shkola.
16. *Sukhin I.G.* (2000). Udivitel'nye prikljuchenija v shahmatnoj strane [Wonderful adventure in the land of chess]. Moscow, Pomatur.

17. *Vygotsky L.S.* (1984). Problemy detskoi (vozrastnoi psikhologii) [Problems of childhood (developmental) psychology]. In Sobranie sochinenii v 6-ti tomakh [The Collected Works in 6 Volumes]. V. 4. Moscow, Pedagogika. 243–432.

18. *Wolff P.* (2005) The Complete Idiot's Guide to Chess, Third Edition. New York, Alpha Books.

19. *Zaretskii V.K.* (2007). Zona Blizhaishego Razvitija: O chem ne uspel napisat' L.S.Vygotskii [The zone of proximal development: What Vygotsky didn't have time to write]. Kul'turno-istoricheskaya psikhologiya [Cultural-historical psychology]. Vol. 3. 96—104.

20. *Zaretskii V.K.* (2008). Refleksivno-dejatel'nostnyj podkhod v rabote s det'mi, imejushchimi trudnosti v obuchenii [Reflection and Activity Approach to helping children with learning difficulties]/ In Pedagogicheskaja psikhologija: uchebnoe posobie [The Handbook of educational psychology]/ Ed. I. Ju. Kulagina. Moscow, TC SFERA. 81–99.

21. *Zaretskii V.K.* (2011) Kak uchitel' mozhet pomoch' neuspevajushchemu: teorija i praktika refleksivno-dejatel'nostnogo podkhoda [How teachers can help low-performing students: theory and practice of Reflection and Activity Approach]. Moscow, Chistye prudy.

22. *Zaretskii V.K.* (2013). Stanovlenie i sushchnost' refleksivno deyatel'nostnogo podkhoda v okazanii konsul'tativnoi psikhologopedagogicheskoi pomoshchi [Development and essence of reflectiveactivity approach in psychological and research subject]. Konsul'tativnaya psikhologiya i psikhoterapiya [Counseling psychology and psychotherapy]. Vol. 2, 8-37.

23. *Zaretskii V.K.* (2014). Esli situatsija kazhetsja nerazreshimoj [If there seems to be no way out]. Moscow, Forum.

24. *Zhuravlev N.I.* (1986). Samouchitel' po shakhmatam [Chess Self-Teaching Guide]. Moscow, Fizkul'tura i sport, 1986.

Software

1. Shakhmatnaya shkola dlja IV-II razrjadov [Chess school. Categories IV to II] (by N. Zhuravlev). ZAO "Novyj disk". 1999–2002.

2. Shakhmatnaya shkola. Samouchitel' dlja nachinajushchikh shakhmatistov [Chess school. Self-teaching guide for beginners] (by Razuvaev Ju.S.) ZAO "Novyj disk". 1999–2002.

3. Shakhmatnaya taktika. Zadachnik po taktike dlja nachinajushchikh. [Chess tactics. Tactics problems for beginners] (by S. Ivashchenko). ZAO "Novyj disk". 2000–2002.

APPENDIX 1
PROBLEMS, CHALLENGES, MISTAKES

How to Use COD Method

- When teaching, it is important to keep it in mind that improvement of chess skills is not the main goal of the training. The COD method implies using Chess as the material that is suited to developing the child. By this, we mean both cognitive development (thinking, attention, memory) and personality development (the ability to cope with challenges, developing self-confidence, making meaning of one's actions, will etc.).
- The essential element of the method is reflecting and developing one's own intention. The teacher needs to meet the children's needs as far as designing their individual training journey is concerned. Some children may "jump over" some lessons; others may get stuck on some modules. Challenges and individual intentions serve as developmental resources. Challenges enable children to become aware of the deficits in their modes of action through the process of reflection; the individual intention makes activity interesting and personally relevant.
- In case of a challenge, there are several levers that help to get the ball rolling again, – namely, reflecting on a mode of action; adding material tools; making sense of an assignment; connecting it to the previous material.
- Development emerges when the child is doing something challenging but doable. It is important to avoid both extremely difficult and extremely simple assignments. The former demotivate children, and the latter make children bored and lay the basis for a superficial attitude to the training. Therefore, the teacher avoids restricting the children if they learn the subject matter quickly and easily: the teacher can always make the task more challenging by converting it into the ideal plane inviting the children to do the same thing but mentally.
- The general principle is "Showing – Helping to do it – Allowing the child to do it by oneself – Helping to find a mistake – Repeating it until the child succeeds autonomously".
- If the process has been designed appropriately, the teacher does not need to explain the children why they are here; what they need to do and what the teacher needs to help them with.

Mistakes Relating to Lesson Design

When mastering the COD method, teachers often experience difficulty with designing them in line with the following framework: "intention – implementation – reflection". The most widely spread challenges are the following.

Replacing Sense-Making with Subject Matter. The main cause underlying this challenge is the teacher's professional habit "to teach a subject matter", "Today, we continue studying pieces…" The mistake relates to the fact that development of the ability to perform mentally in children relies on their awareness that their actions make sense, and on their personal trajectory of progress. In this case, the teacher may find the following questions helpful to facilitate the child's reflection, "Where did you stop at the previous lesson? Please remember what each of you has learnt at the previous lesson and what will you do today respectively?" etc.

Formal attitude to reflection. This is another challenge that the teacher may face. Questions that the teacher addresses to the children at the beginning of a lesson may turn into a formality rather than establishing a bridge to make sense of their actions and integrate them. It is dangerous to reduce the reflection process at the beginning of the lesson to a question "What can you or what would you like to do today?" Vary questions, however, even if you start with the aforementioned one, you can use it to address the previous lesson, "And why would you like to do this? What has happened to you during the previous lesson?" Varying questions prevents reflection from becoming a useless ritual.

Replacing Reflection with Knowledge Assessment. Sometimes, at the beginning of the lesson, the teacher checks students' knowledge (rather than facilitates reflection) asking them, "What have you learnt to do at the previous lesson?" Thus, the process of reflection turns into repeating the material learnt and fulfills no sense-making purpose. Children often "follow" the teacher as they are used to this situation, which is typical of school. Your partner (a teacher and /or a counselor) may help you in this case by taking on the reflective perspective and providing you with timely feedback (e.g. giving you some signal meaning that reflection is being replaced with assessment). Later, if you pay attention to this aspect, the habit will lose its power over you.

Lack of reflection at the end of the lesson. The lesson benefits children best when at the end of the lesson, in the process of individual reflection, children discuss how and what they have achieved of the things that they planned at the beginning of the lesson. Comparing the intention and the achieved result enables the child to see him/herself as an agent of activity and to become aware of what he/she has accomplished in terms of his/her intention (the teacher needs to praise the child for that). It also helps him/her to understand what presents a challenge and what the child needs to keep working on (this may become the child's intention for the next lesson). Reflecting at the end of the lesson is the main tool that enables the child to develop the intention for the next lesson, and lack of reflection is a serious mistake. Based on the experience of the COD training, we may say that keeping track of time is a challenging task for a teacher, and it is enough to leave some time for reflection at the end of the lesson. In this context, an alarm clock timed to go off 5-8 minutes before the end of the lesson, or your partner's (another teacher's or counselor's) cue may be helpful. Avoid keeping the children after the lesson is over.

Discussing the intention and the process of reflection are unrelated. This is the case when at the beginning of a lesson, the teacher runs the reflection process, and after the children verbalize what they did last time, the teacher introduces his/her intention (it is often "ready-made"), which the teacher believes to be most congruent with the content of the today's lesson. In this case, children's reflection becomes kind of formality. Oftentimes, a discrepancy between reflection and intention may be just huge. In this situation, the teacher needs to pay attention to what children say, and if he/she has his own intention, the teacher needs to discuss it with children – this is what we call coordinating intentions. You may come to some shared intention, and the whole group will benefit.

Failures of introducing the intention. They frequently relate to the previous type of mistakes. Children tend to avoid arguing with the teacher and agree to what he/she suggests. Therefore, unless the teacher who communicates his/her intention to the children expects the children to give him/her corresponding feedback (and creates relevant conditions for that), it turns out that he/she dictates his/her intention somehow. On the other hand, it may be that the teacher follows the children's intention without reflecting. Following the child no way means obeying his/her will blindly, but responding to the child, "How does it relate to your intention and your progress in training?"

Discussing "the other one" when reflecting. One of the key rules of reflecting is to speak for yourself and about yourself, about "what I was able to do today", "What I planned",

"What I am going to do next taking into account what happened today". Failure to follow this principles may result (and it actually did) in children speaking about others, judging them and simply telling tales. Invest efforts to preclude these behaviors during your lessons.

Help-related Mistakes

Challenges when working with a mode of action. Help-related mistakes often result from the challenges pertaining to working with the child's mode of action, either when there is a need for building and shaping this mode of action, or when there is a need for reforming it.

Working with the modes of action is a specific kind of work and one needs a specific skill for that. This skill emerges in the course of accumulating the relevant working experience. Teachers report that their actions in terms of eliminating the children's mistakes include inviting children to do various problems and providing them with various material tools to mark moves. This method may be appropriate when children are working on a new module and the mode of action is just being shaped; then this process relies on the principles of developing the internal plane of the action. If children make mistakes in a Quiz, it means that the mode of action is insufficient for solving problems, and the work with this mode implies different actions. If the child's mode of action results in a mistake, the teacher's primary objective is to understand which elements of the mode of action have formed inappropriately. In order to gain this awareness, the mode of action needs to be "unfolded". First and foremost, the teacher collaborates with the child to identify HOW and WHAT the child did: it is called facilitating the child's reflection on the mode of action. When the child has discovered a cause of a wrong operation (for instance, attention failure), the teacher may ask the child, "What may help you to avoid such mistakes?" The child may come to a suitable option by him/herself or with the help of the teacher. If the mistakes never occur again, it means that the child has fixed his/her mode of action.

Material-Related Challenges

Mistakes relating to the use of terminology. When training Russian-speaking students, it is better to avoid the word "pol'e" (Russ. field) to denote the chessboard even when playing "Battleship". It is desirable to use some other word, such as "territory". Using the term "pol'e" threatens confusion of terminology: as in Chess, "pol'e" means a square. During the COD experiment, some groups temporarily used the term "pol'e" to denote the chessboard, and squares were called "kletki", i.e. "cells" which is certainly incorrect.

In any case, in other languages, there may be other terminology-related challenges that may give ground to mistakes and that the teacher needs to be aware of.

Challenges relating to identifying a square by its name and identifying the name of a specified square. As our experience has shown, when studying the chessboard, the child encounters challenges for the first time when he/she needs to identify a square's name and to identify a square using its name. These challenges relate to the need to perform most of the action mentally even when working with a regular chessboard.

In order to identify the square's address, the child needs to visually trace a file when identifying a letter and to visually trace a rank when identifying a number keeping the square itself in the focus of his/her attention. Identifying the square using its name represents a different, reverse action. The child needs to find a relevant letter, trace and focus on the corresponding file; find a relevant number, trace the corresponding rank and find a square where

the rank intersects the identified file. Both actions are complex and demand concentration and observing a certain sequence of mental actions that the child finds challenging in the beginning. Mastering these mental actions is the first developmental objective of the training. It combines overcoming a specific challenge and initial work with mental actions.

See the discussion of development of the ability to perform mentally in the relevant Chapter. When describing the material level of Development Stage 1, we have described ways to help the child to master the ability to identify a square name and to identify a square using its name.

Furthermore, in all cases when the child's challenges in learning Chess relate to the need to perform mentally, you may find guidance on the help options in the Chapter dedicated to development of the ability to perform mentally.

Challenges relating to memorizing Latin letters. If children (e.g. Russian-speaking) have difficulty memorizing Latin letters, they may overcome this challenge by making aids (containing the Russian transcription of the Latin letters) in cooperation with the teacher. The teacher may invite children either to write the transcription under the Latin letters on the diagrams or to make double-faced cards containing a Latin letter on one side and its Russian transcription on the other. The cards are better as they are less convenient to use and the child will refuse from them quicker. However, there is no fundamental difference between these two methods. To speed up the process, the teacher may offer students ready-made prompt cards. However, the teacher offers them only to those students who have encountered this challenge, and he/she offers only those cards that the child needs (usually, only some letters are difficult to memorize). In our practice, when children did not know the Russian letters, we drew pictures of things or creatures that were associated with the letters' pronunciation. The teacher does not need to specifically focus on learning letters, as the child will memorize them in the process of the training.

If the child has been failing to memorize letters for a long time and he/she gets upset, the teacher may help him/her using mnemonics. Then, the teacher invites the child to look for and find a technique (the child's own one) for memorizing the letter sequence.

The teacher may invite the child to compose a funny sentence, whose first word begins with "a", the second – with "b", the third – with "c" etc. Alternatively, the child may draw a picture with characters somehow associated with the letters and doing something by turns reflecting the letter sequence. If the child fails to remember how the letters are written, the teacher may invite the child to draw the challenging letters shaped as animals so that one may recognize the letter. It is better to offer several options so that the child may choose from them, but it is essential that children create images, sentences and pictures and choose a memorization technique or invent it by themselves.

Challenges relating to establishing collaborative relationships between the child and the teacher.

The child wants to do something that he/she has already studied, something that he/she has already mastered and, therefore, will hardly benefit him/her. What does the teacher do?

This situation may occur in practice but one needs to keep it in mind that the reasons why the child makes this decision may differ. For instance, it may be due to the fact that the child no longer believes the work to be meaningful, or he/she simply does not know what to do next. Then, the teacher may solve this issue by collaborating with the child to reflect; to help the child to regain the vision of his/her journey, and to develop the meaningful purpose

of the training. Sometimes this issue may relate to the child's emotional state. For instance, the child may want to feel him/herself successful; may be upset with a recent failure or just tired of challenges. One needs to take it into account that students who strive to always succeed take even slightest failures heavily and may even lose interest in training because of that. In this case, the teacher needs to support the child emotionally; discuss his/her attitude to mistakes and challenges; draw the child's attention to what the child has already achieved and demonstrate how challenges enable the child to develop. Sometimes such issues may have roots in the child's unconscious attempts to check where the boundaries of his/her freedom and autonomy that he/she is allowed during the lessons, are. Take it easy, every teacher starting to work in the paradigm of collaboration encounters such situations. Avoid blaming the child: it is not his/her vicious will; it is a normal process of learning to be autonomous. Anyway, the teacher needs to be very alert, should this situation (when the child wants to do something that makes no sense from the teacher's perspective) occur, as this behavior serves to check the genuineness of the teacher's coworker's attitude – whether this attitude is authentic or not.

Firstly, keep it in mind that the child may see the point in what he/she is suggesting. Invite him/her to explain why he/she needs it; how it relates to what he/she has recently done. Sometimes the child may justify his/her choice – and then the issue is solved. However, what does one do if the child wants something "for the sake of it…"? What does one do? The teacher never makes the child do what the child intended to do earlier (or what the teacher planned to do) if the child insists on a new plan that may seem making no sense from the perspective of the training. The teacher may suggest another working option and provide a rationale for it, but he/she never engages in coaxing or forcing the child to do it. At the same time, the teacher avoids simply agreeing to the child's plan and allowing the child to entertain him/herself. If the child fails to provide arguments for his/her plan, invite the child to make some personal sense of this activity (play, assignment) from the perspective of the child's urgent objectives (let him/her do it independently or together with you). Discuss it with him/her what he/she did last time; what he/she planned to do and why. You may be able to find a way to make sense of the activity when playing the child's favorite game, but you may need to involve your creative imagination.

Let us consider a practical example. In the middle of the academic year, a child said that he wanted to do "Encryption". This is a problem aiming at learning chess notation and developing the ability to identify a square by its name and identify a square name. The letters of alphabet are scattered around the chessboard, the child needs to make words or phrases ciphering letters by the names of the squares that they occupy; and later someone decodes what the child has ciphered. The teacher was aware that the child had no difficulty identifying the square names. Therefore, she wondered, "You are studying the Rook's movement, why do you need ciphering?" The child failed to answer the question, but insisted on his intention in a very naughty manner (which was quite apparent). The teacher chose not to sort things out (as she suspected that the child was just tired after other lessons and upset because of a difficult family situation); however, she told the boy that he could do ciphering only if this activity related to the Rook's movement. She invited the child to write as many words as he could but the way the Rook would write them (rather than arbitrarily), i.e. the letters would represent the moves of the Rook, which was moving consistently from the first till the last letter of the word. The child got engrossed in the assignment and later on proceeded to the work that was more relevant in terms of the challenges that he encountered when working on this new version of ciphering.

There is no general answer to any "What to do?" question as every case is unique. We hope that your creative potential and pedagogical intuition will enable you to find the answer.

APPENDIX 2
Handouts and Further Recommendations on Chess for Overall Development Assignments

For one hand, this Appendix includes handouts prepared by the teachers and the counselors who provided the COD training to students. Wherever possible, the supplementary materials have a special layout so that educators may make a relevant number of copies, cut them and use as handouts. Furthermore, you can modify them using your personal computer (PC) (e.g. creating several variants of an assignment) or use diagrams as handouts for the assignments that you have invented.

At the beginning of the Appendix, you will find frequently used chessboard diagrams (regular, coloured and mute, white and mute ones etc.) of different sizes. We hope that having these materials at hand will enable you to invent assignments that suit the situation in the best possible way, and, may be, even during a lesson, or, at least, will save your effort when preparing to a lesson if you have new ideas.

Then, various handouts for various assignments follow. These assignments were invented by the COD project teachers and described in the Table summarizing learning assignments (Chapter 2.2.). The numbering of assignments corresponds to the numbering in the Table. Unfortunately, we have created such handouts only for some of the assignments but we have included everything what we have in this Guide. Please note that tests and quizzes constitute Appendix 3, which is called "Test Assignments".

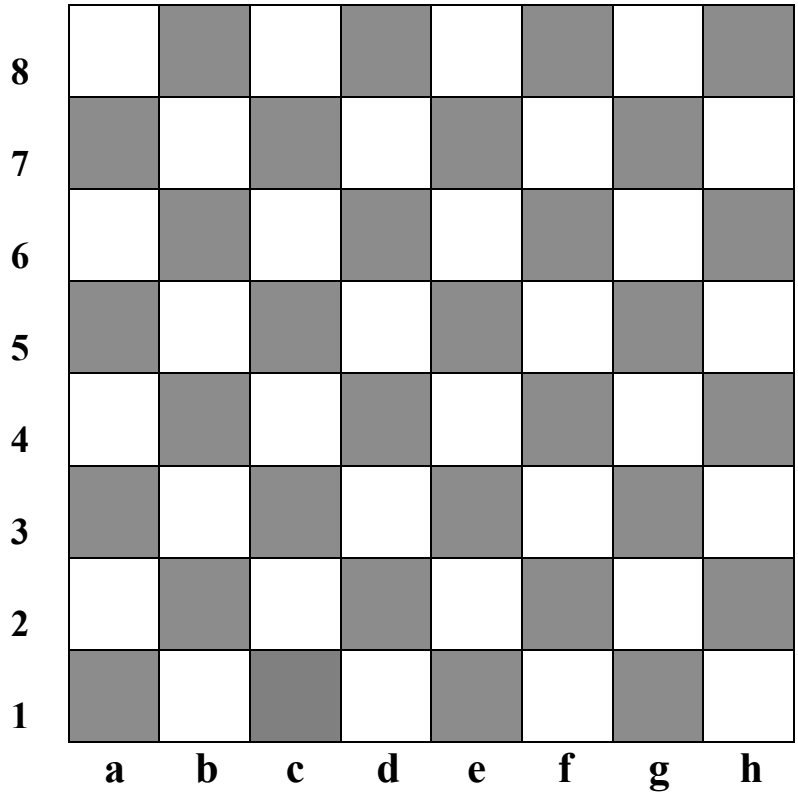
For another hand, this Appendix includes recommendations as to working with assignments that the Table in Chapter 2.2 could not embrace due to its limited space. At the same time, we wanted to share all our developments. The recommendations follow the numbering of the assignments, i.e. if an assignment includes supplementary materials, the recommendations follow this material. The Table provides reference to additional recommendations as well.

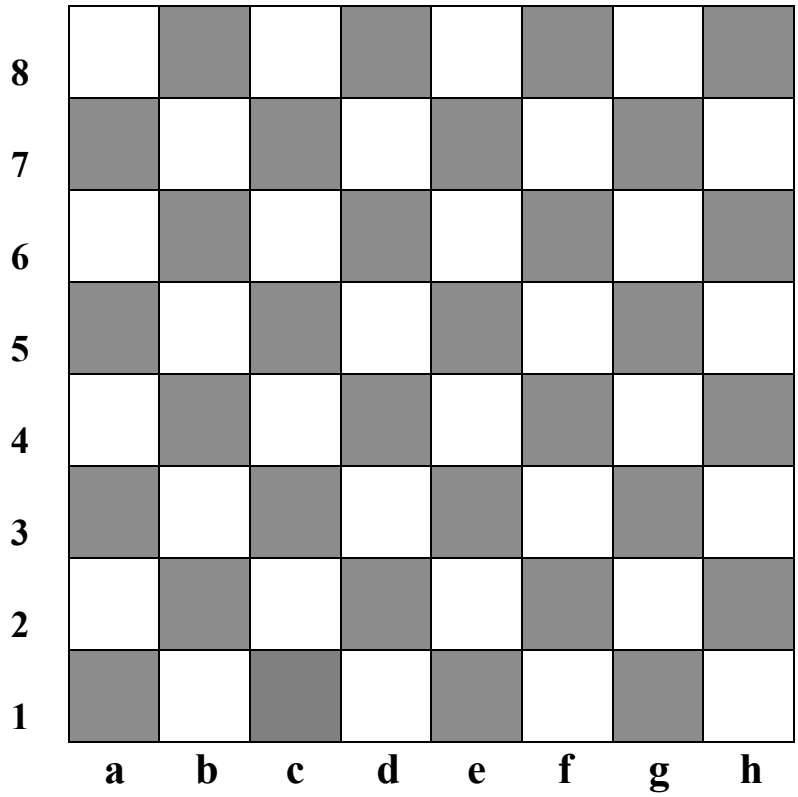
Most assignments are original and handouts contain references to the authors.

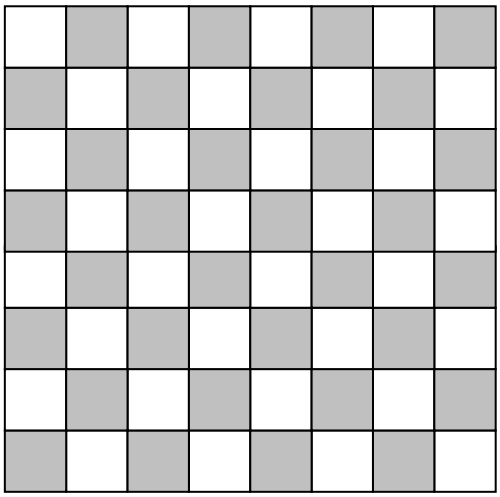
See Page 2 of the Guide for a full list of the authors.

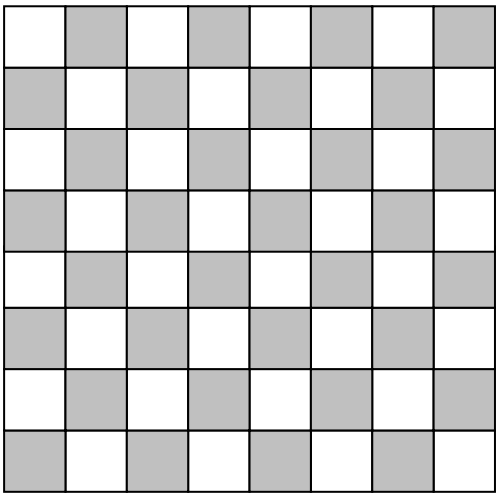
If you are missing from this list, please, join us! You can add your name to this list and become a co-author of the second edition of the Guide if you share the assignments, which you will invent when using the COD method, with us. Then, the next year, you and your colleagues may enjoy a much wider armoury of assignments, and it will be easier to adjust your work to the situation. Assignments facilitating group work in the classroom are especially wanted: there are few of them now.

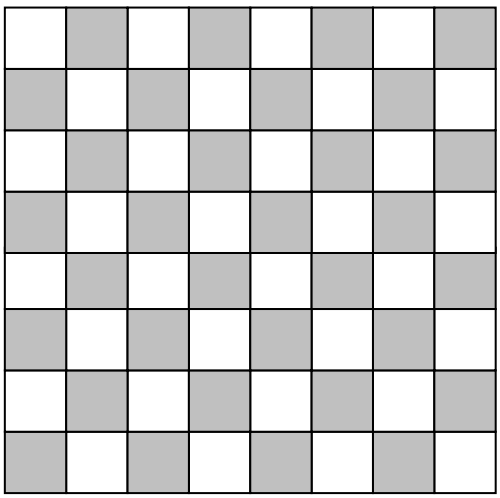
You may send assignments, handouts and recommendations on them, as well as ideas regarding other uses of the existing assignments to the COD project's academic supervisor to zar-victor@yandex.ru (V. K. Zaretskii), gordon.margarita@yandex.ru (M. M. Gordon), titling your mail "Chess Assignments Data Base". Enclose the materials in an attached file. Please, indicate your name and write who you are; what school you work at; which class you work with. Include your contact details so that we could contact you if there is a need to clarify something. We will be happy to get any comments and suggestions as to any materials of the method from you so as to prepare the second edition of the Guide.

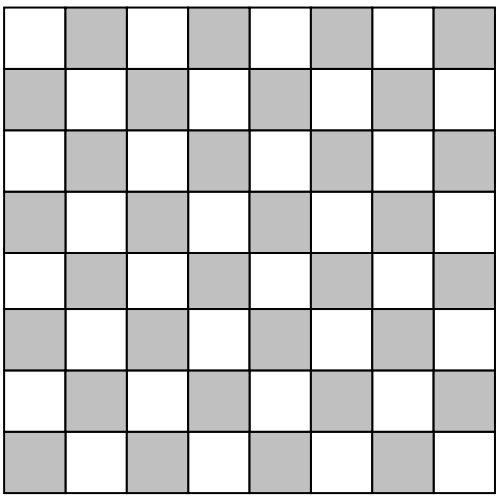

8
7
6
5
4
3
2
1
a b c d e f g h

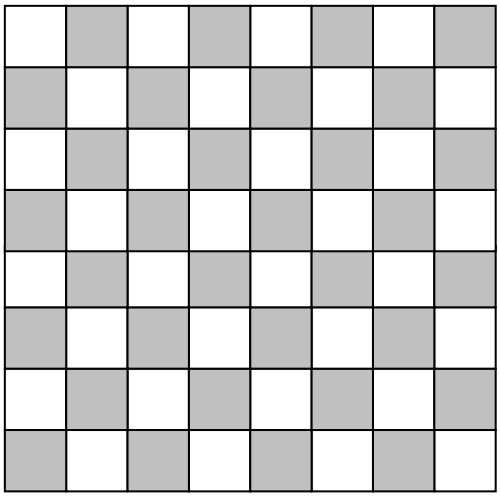

8
7
6
5
4
3
2
1
a b c d e f g h

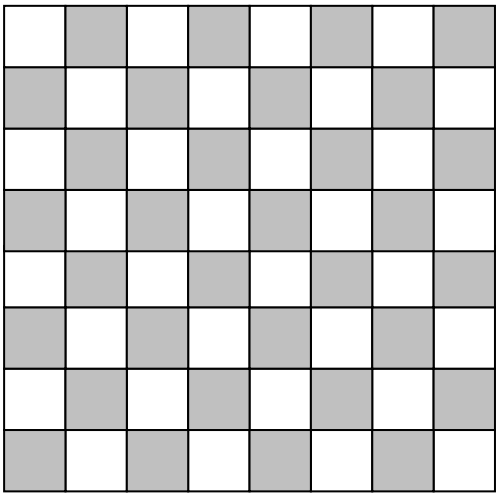


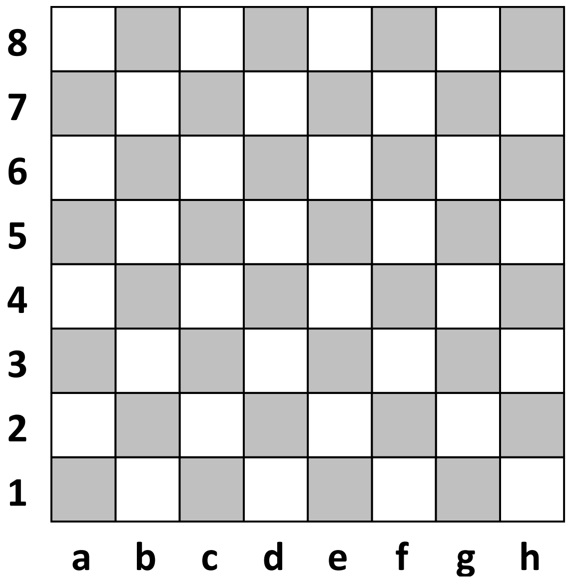


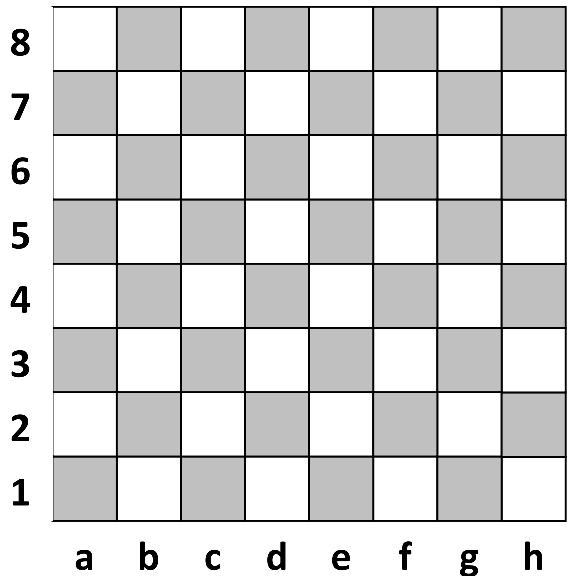


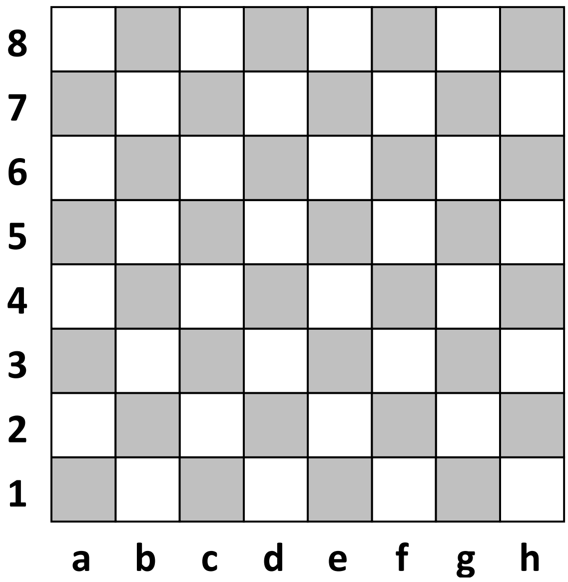


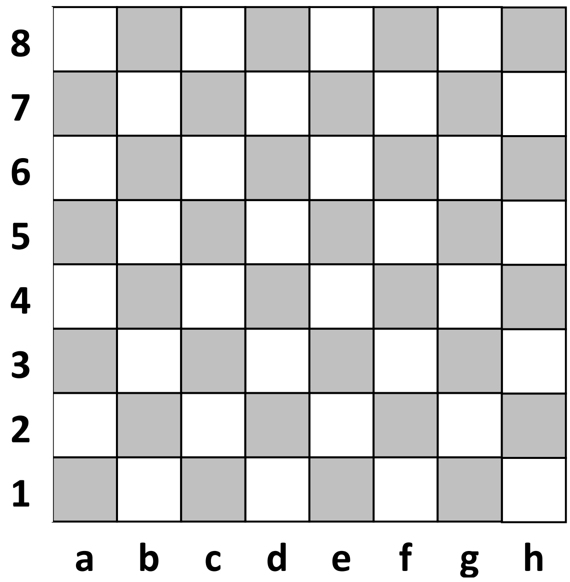


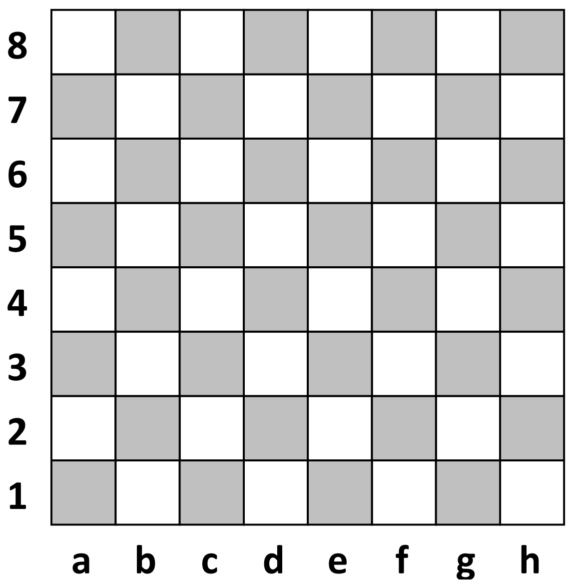


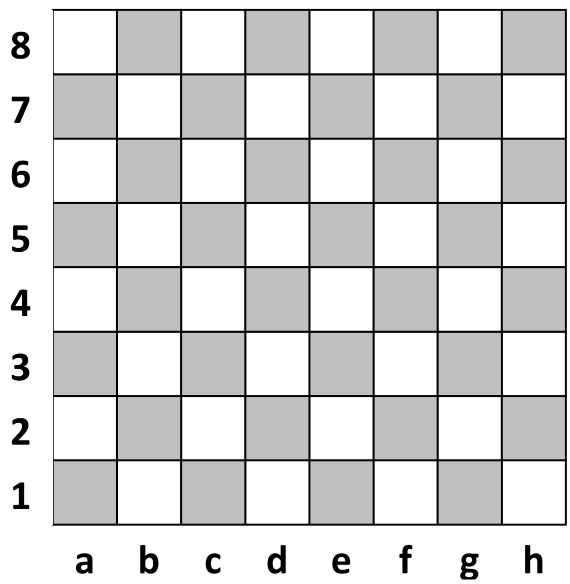

8
7
6
5
4
3
2
1
a b c d e f g h

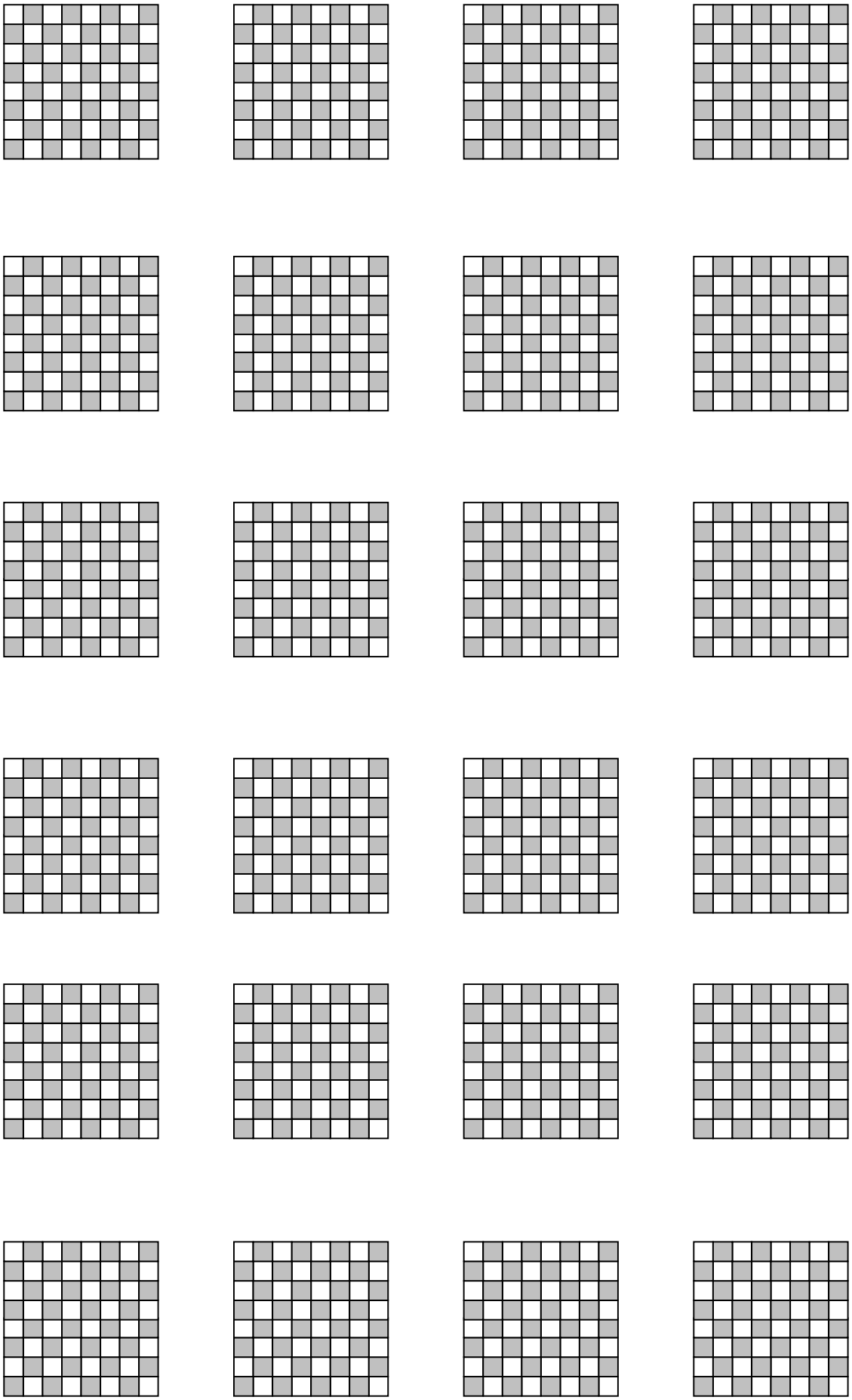

8
7
6
5
4
3
2
1
a b c d e f g h

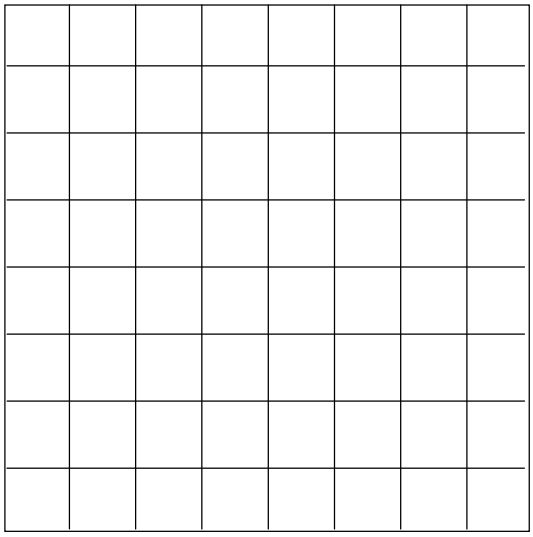

8
7
6
5
4
3
2
1
a b c d e f g h

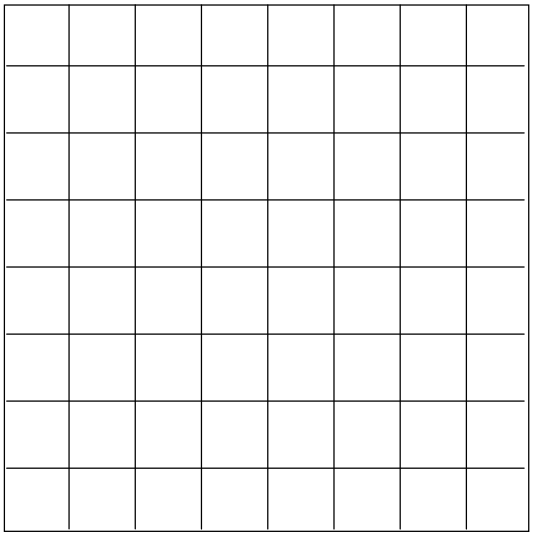

8
7
6
5
4
3
2
1
a b c d e f g h

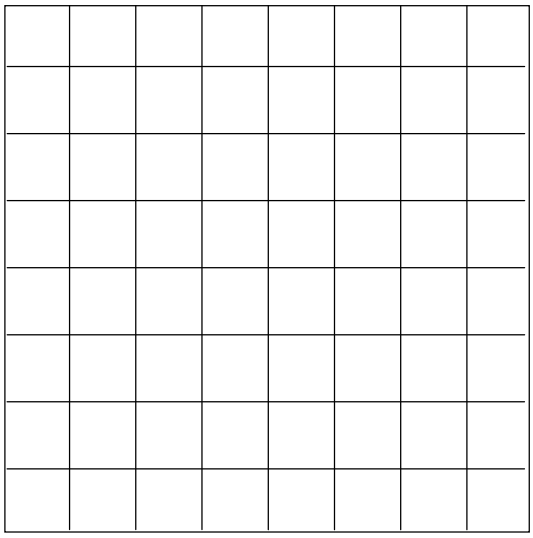

8
7
6
5
4
3
2
1
a b c d e f g h

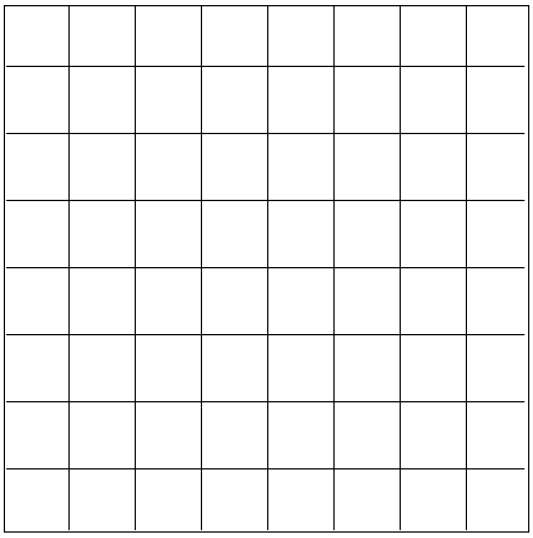

8
7
6
5
4
3
2
1
a b c d e f g h

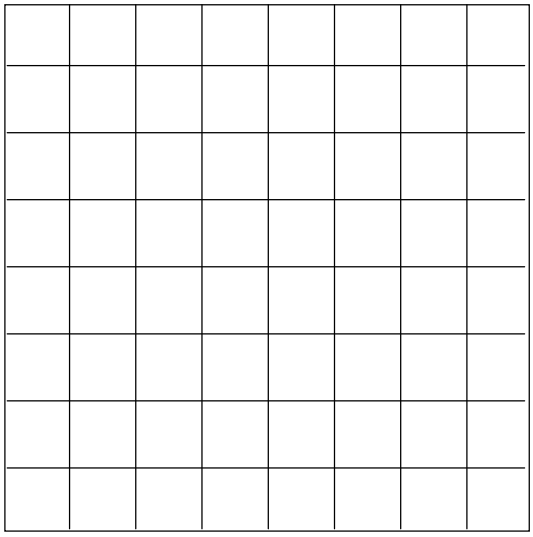


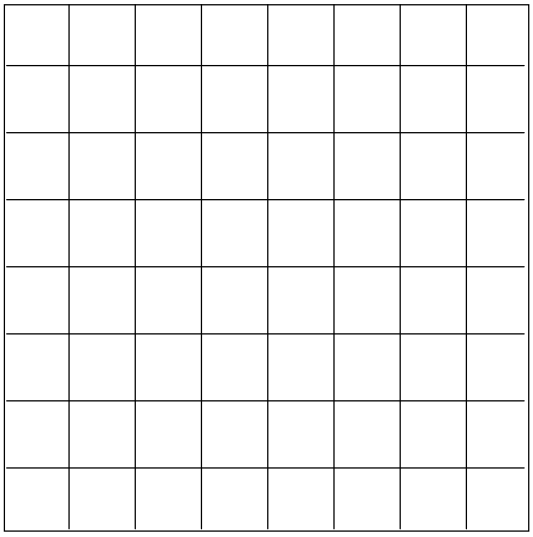


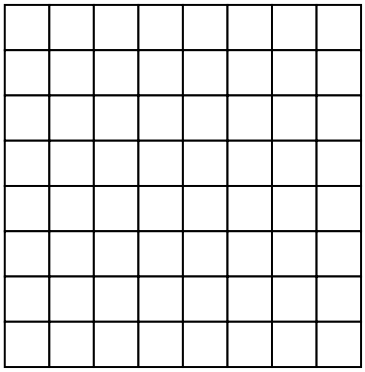
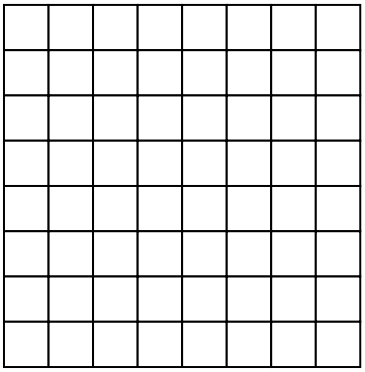
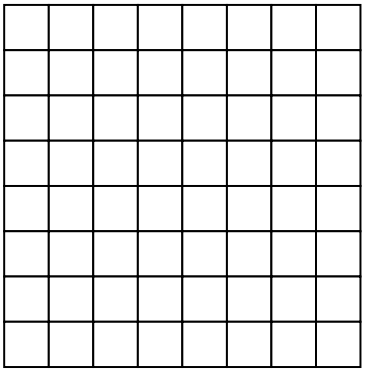
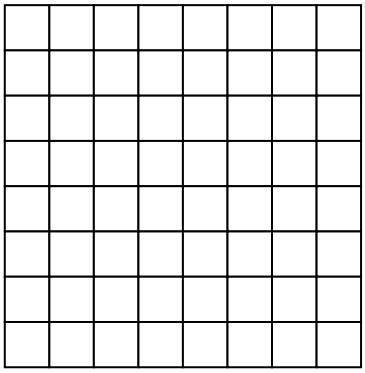
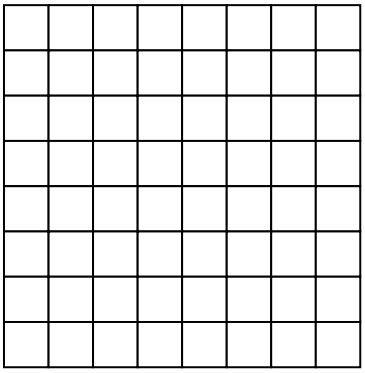
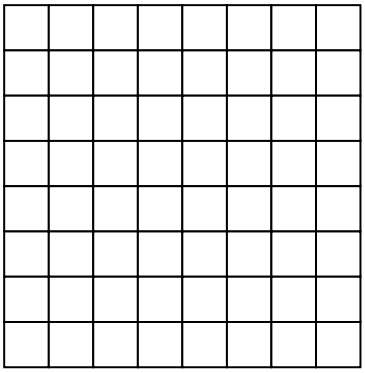
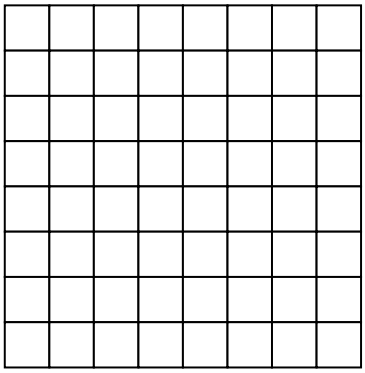
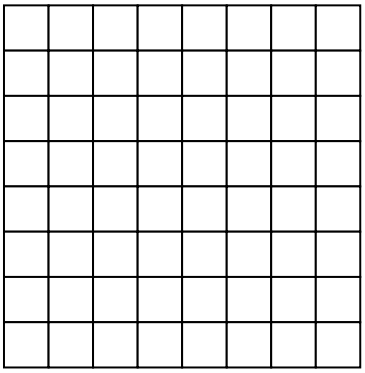
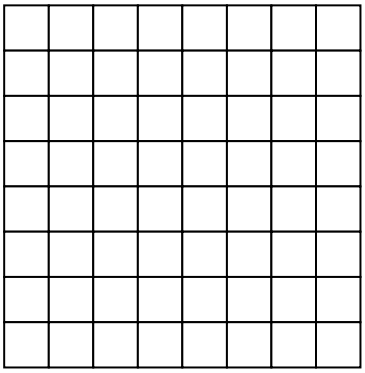
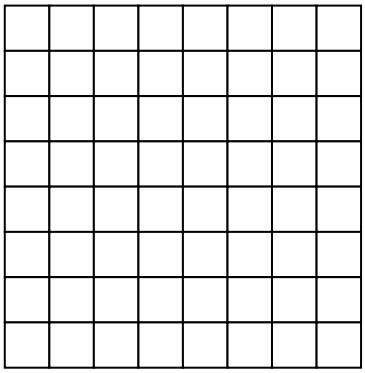
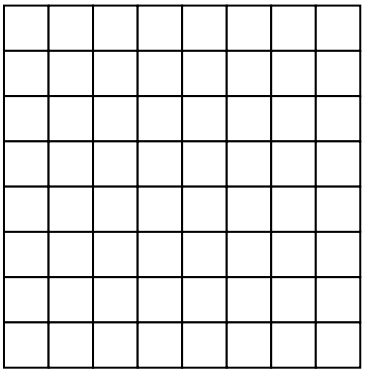
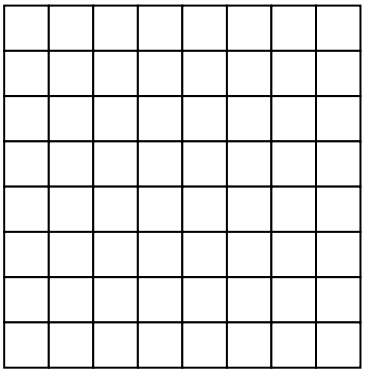


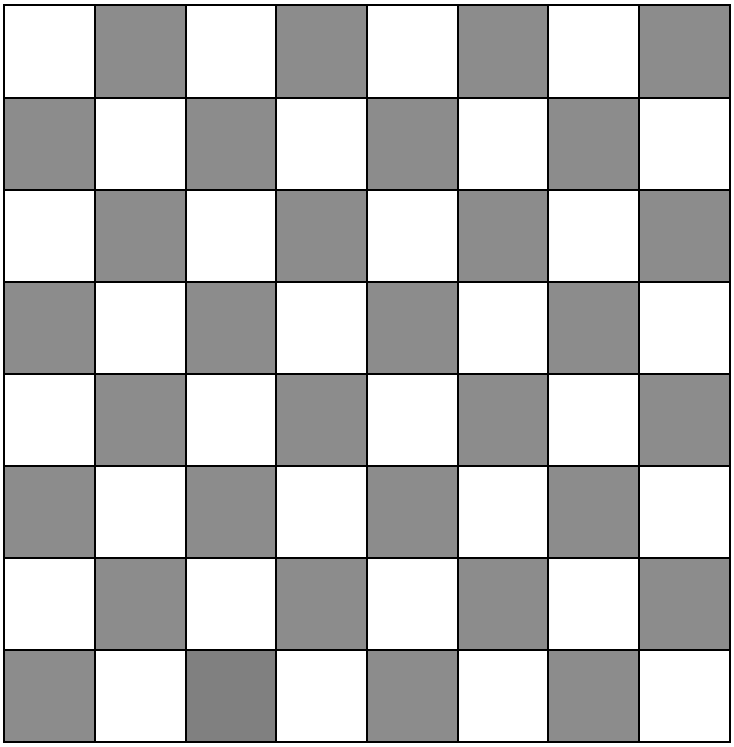


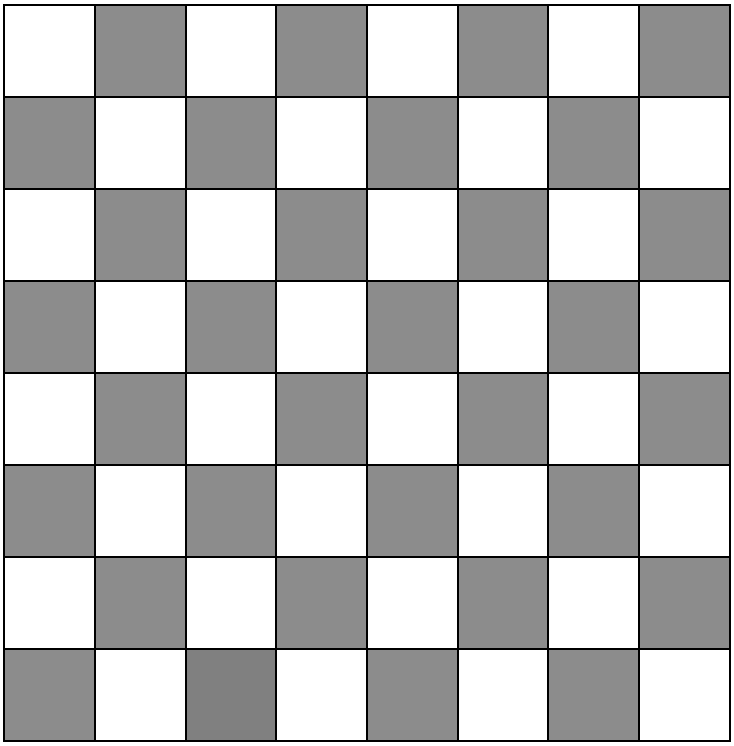


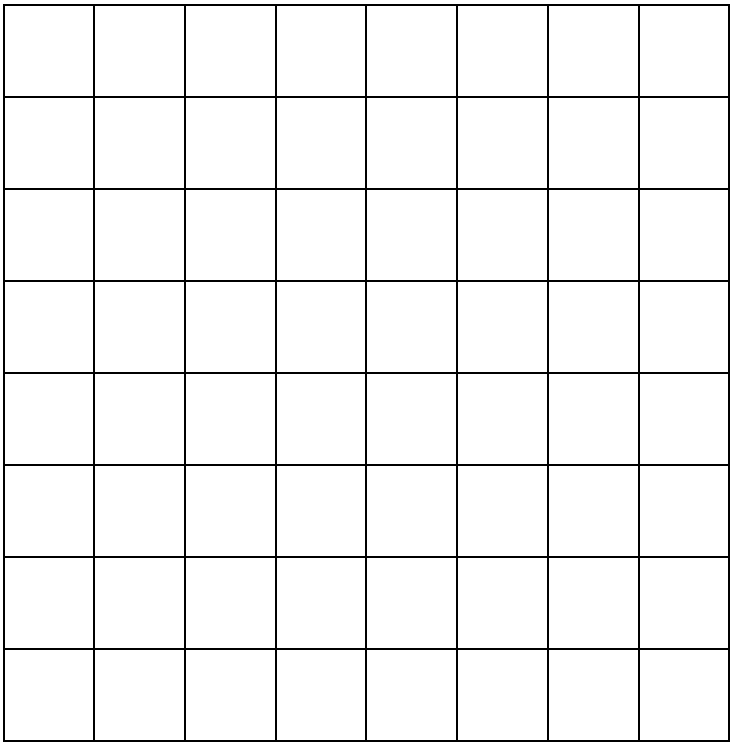


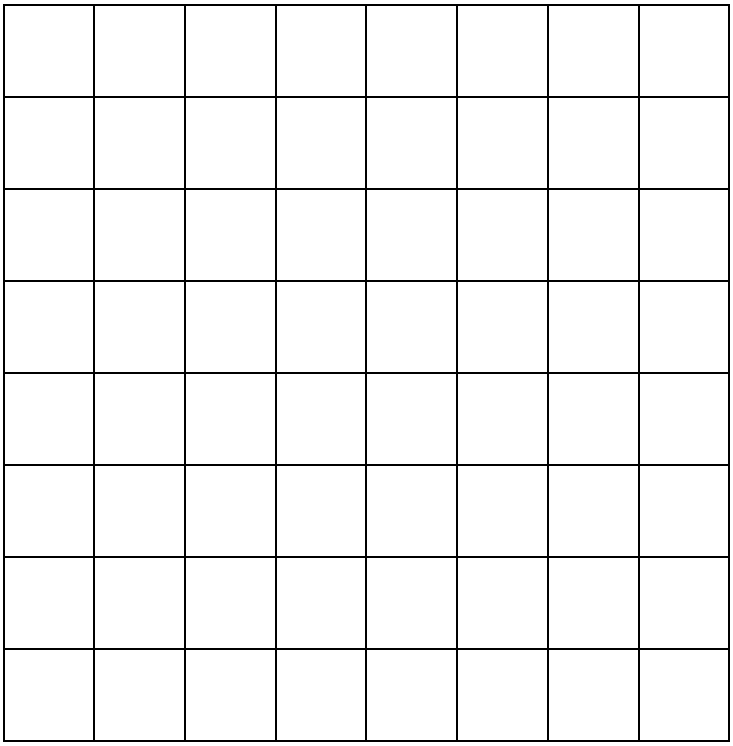




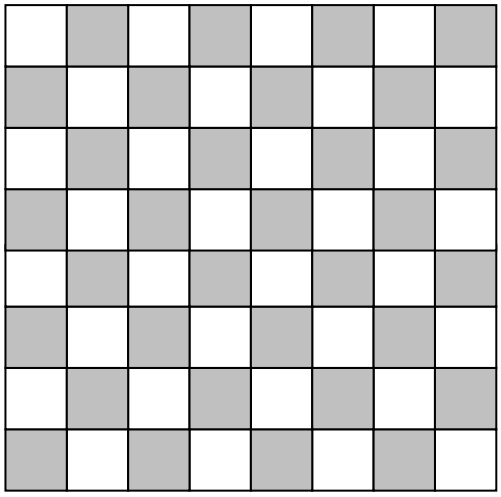




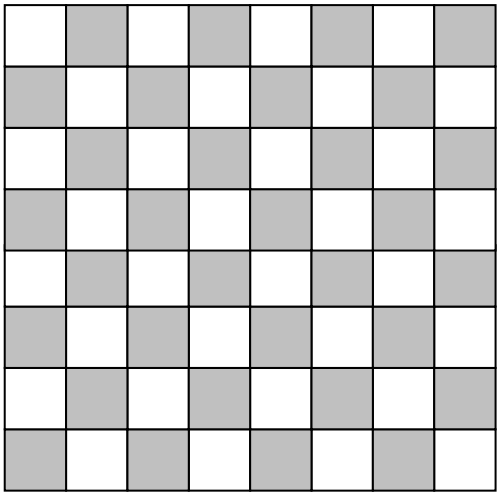


№ 3. Chess Battleship

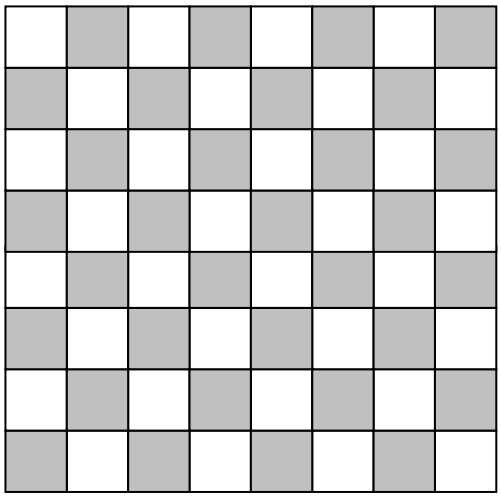
Attacking



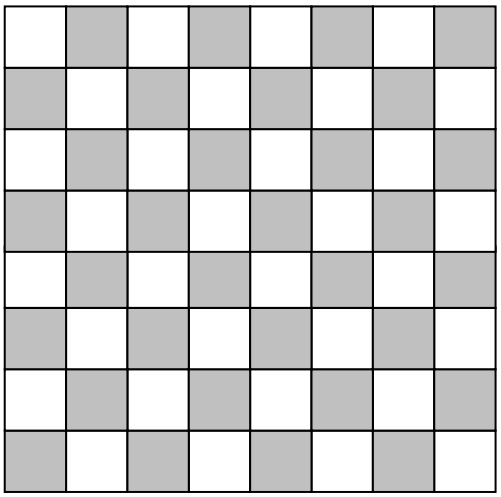
Being Attacked (My fleet)



Attacking



Being Attacked (My fleet)



I.A. Burilova's Recommendations as to Arranging "Battleship"

Discuss the rules with children before the start of the game and draw their attention to the following:

1) The ships can never touch each other ( , );

2) Having hit the opponent's ship, the player gets the right to shoot one more time;

3) The players alternate their moves;

4) When making a move, the player announces the name and the colour of the target square (and announces the square's name and colour when checking the opponent's shot so as to avoid mistakes when checking, and preclude the shooting player's mistakes).

Draw the children's attention to the fact that they need to use two diagrams to play. The child marks the squares that he/she attacks and the result of firing on the "Attacking" diagram (* – shot, missed; *× – shot, hit the target). The child arranges his/her own ships and marks the results of the opponent's shots on the "Being Attacked" diagram.

Suggested questions that you may use to arrange the process of children's reflection on the results of a game:

What was your goal in playing "Battleship"?

Who has won?

Do you consider this victory accidental or expected?

How did you make moves (arbitrarily or observing some rule)?

Which color was the square that the first move was made to?

Who remembers the color the square occupied by the first opponent's casualty? And what about yours?

Can someone reproduce the position of your own ships from memory? And what about the opponent's fleet?

Why do many of you fail to remember it?

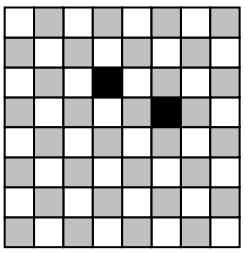
This conversation, which the teacher had better design as a reflective one, aims at discovering tactic mistakes made during the game, and to be more precise, at uncovering the fact that most children had no conscious tactics at all (which is usual for the beginning of the training). When reflecting on the game, we invite children to discuss challenges that they have encountered during the game and how they have overcome them if they have. Then, Irina Burilova suggests working specifically on tactic maneuvers using special problems. We believe that children will benefit more if they discover tactic maneuvers in the process of reflecting on the game. It will contribute more to the children's development. Furthermore, disclosing all the game's secrets by the teacher (or using his/her hints) deprives the game of its attractiveness and children lose interest in it quickly. Therefore, doing tactic problems may be an option when the game has exhausted almost all its developmental potential (i.e. children have practically no difficulties as far as modes of action are concerned), and only if, by that point, the children have failed to discover tactic tricks in the course of reflecting on the game. However, it is quite useful to arrange the reflection process within which the teacher draws the children's attention to the fact that they may attempt at looking for some tactic maneuvers (tricks) and be more alert to the rules without telling (prompting) the children what these tricks are. This reflection is most likely to boost the children's interest in the game.

Nevertheless, reflection may work if it is carried out immediately after the game. Reflection in the classroom may take place in groups – two or three pairs who finished playing at about one time. This reflection work is useful as it allows for drawing an analogy between Chess and Battleship when providing the rationale for the need to study the rules carefully,

and later on, for the need to play choosing strategy and tactics in a very aware way. However, it is not worth paying too much attention to tactics. We include Irina Burilova's tactics problems in this Appendix as you may need them if the students fail to discover tactic maneuvers by themselves. We adjusted the problems slightly by removing prompts so that discovery of the tactic maneuvers may be a creative task for children. The results of the children's work during the lesson are highlighted.

Students are encouraged to do a number of problems to work through the mistakes made and to understand tactic maneuvers, and then to attempt at having revenge. As the children have not shaped the image of the chessboard yet, it is better to provide them with diagrams with a represented problem statement rather than simply announce it.

Problems to Be Analyzed



1) The ship on d6 has been downed.

You call shot to e5.

Question: What mistake have you made? (Discussing the question in pairs, small groups or the general discussion).

How can you help yourself to avoid such mistakes in the future?

Sample answer: e.g., marking all the squares around the shot-up ship with dots.

2) How many squares are there on the chessboard? How many like-coloured squares are there? Can you hit the opponent's targets somehow quicker?

Sample answer: by shooting like-coloured squares.

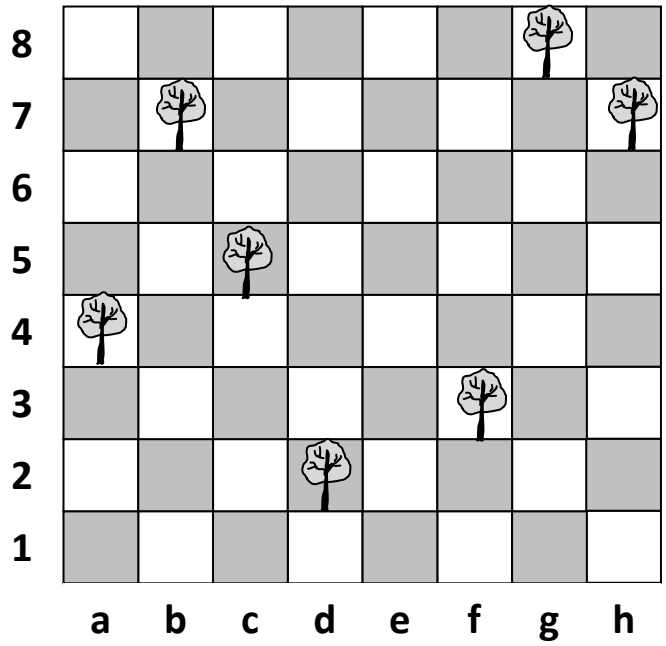
3) The ships on b2, d4, d8 have been destroyed. The next move is g5.

What mistake has been made?

Sample answer: there is no point in shooting the dark squares as there are no ships left on the dark squares.

The teacher invites the students to word the analyzed cases as rules. If the children wish, the rules may be titled. The children in our project suggested the following titles, (1) "Flies"; (2) "One colour"; (3) "When you have three".

№ 4. Find an ambush (*I.A. Burilova*)



You know that there is a hide-and-seek player hiding behind each tree. Use square names to identify points of ambush. Write down a square's name and indicate its colour.

_____

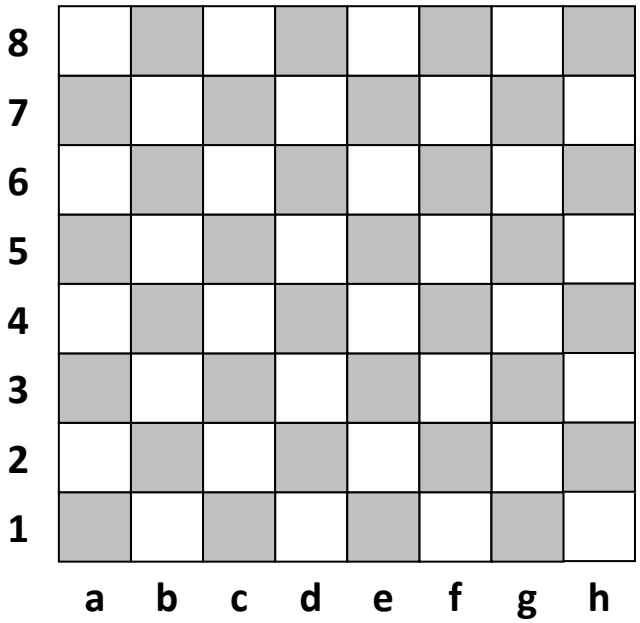
_____

№5 Deliver Mail (*I.A. Burilova*)

Draw a house  in a square

whose address is on your mail delivery list:

a6, b2, d4, h7.



№7. Encryption (*I.A. Burilova*)

1. D6 B4 F4 F4 F2. (QUEEN)

2. G7 C3 B8 C1 H4 E5. (BISHOP)

3. A7 F2 C3 D8 C1 E3. (KNIGHT)

4. A7 C3 F2 D8. (KING)

5. E5 G8 D5 F2 (PAWN)

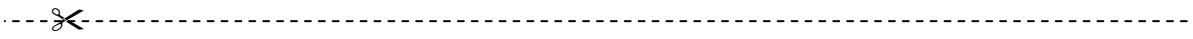
2. Cipher your name:

KEY

	A	B	C	D	E	F	G	H
8		S		G			A	
7	K						B	
6				Q				
5				W	P			
4		U				E		O
3			I		T			
2						N		
1			H					

№7.2 Encryption for Pair Work (Including All Letters of Alphabet).

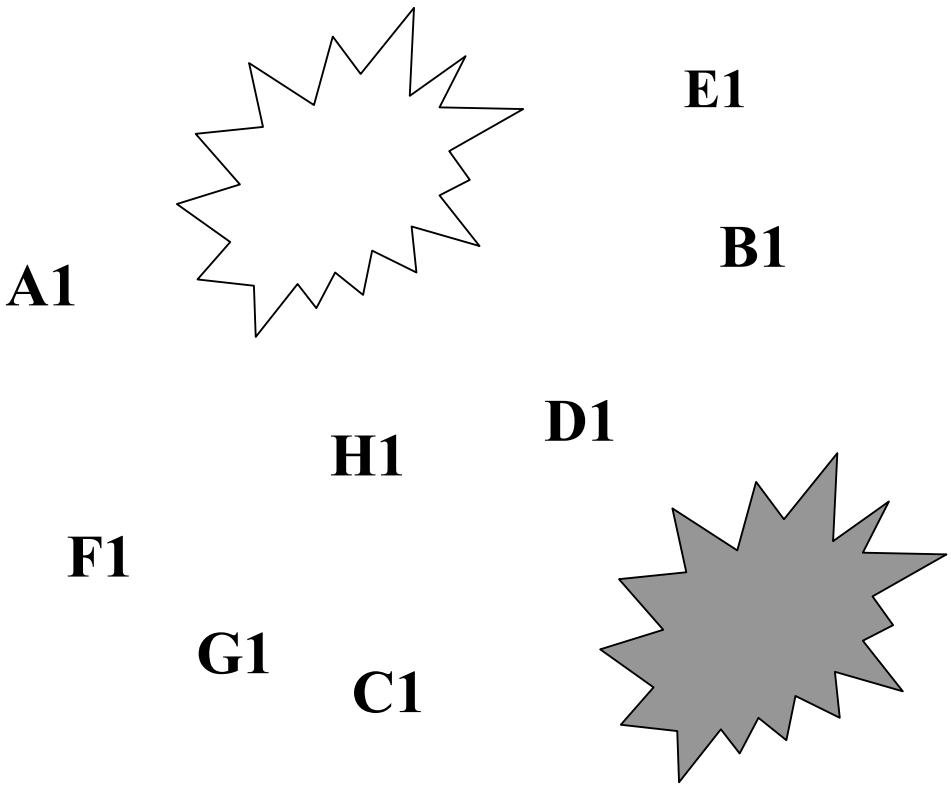
K			P	X			G
		Q			Z		
	E		A				N
H		O		Y	M		
C				T		V	
	B		I			F	
		W		U	J		
	R		D		S	L	



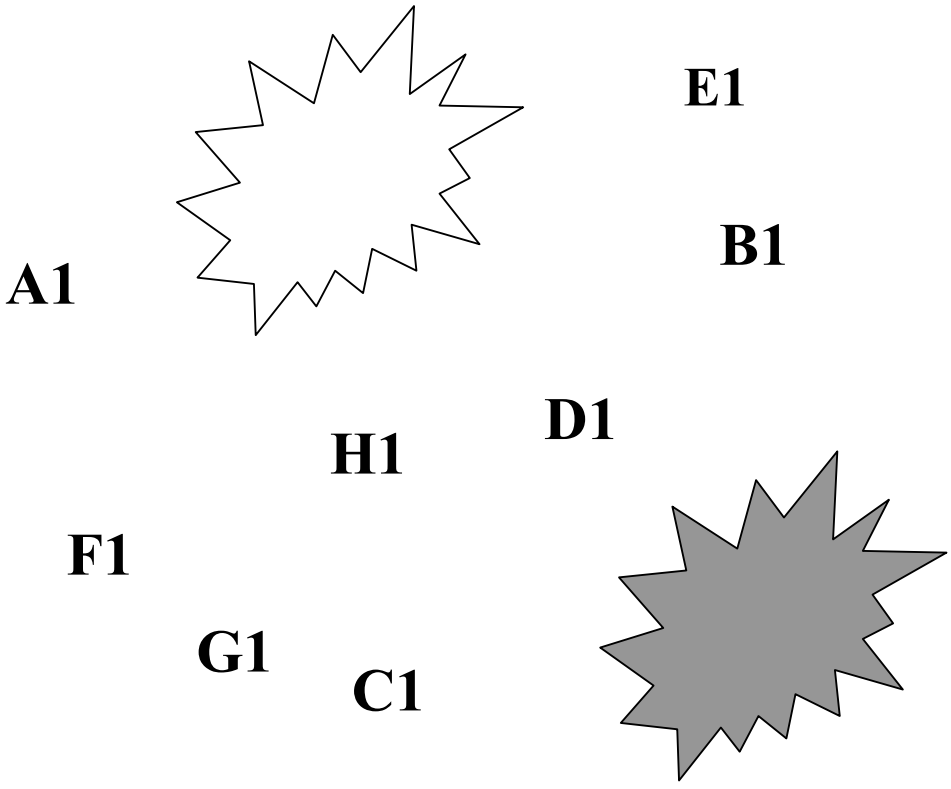
K			P	X			G
		Q			Z		
	E		A				N
H		O		Y	M		
C				T		V	
	B		I			F	
		W		U	J		
	R		D		S	L	

№ 9. Accommodate Guests (*I.A. Burilova*)

House the guests in the like-coloured "apartments":

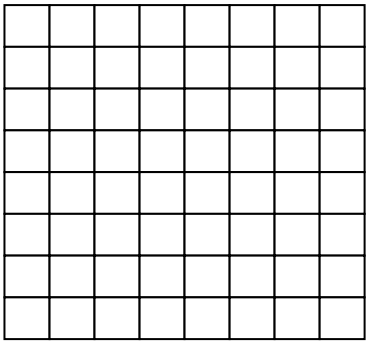


House the guests in the like-coloured "apartments":



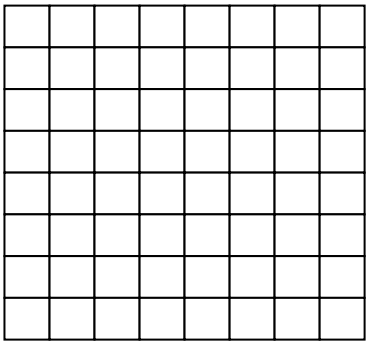
№ 11. Searching for the Colour (*I.A. Burilova*)

Put down "L" if the square that you have identified is light, and "D" if it is dark.



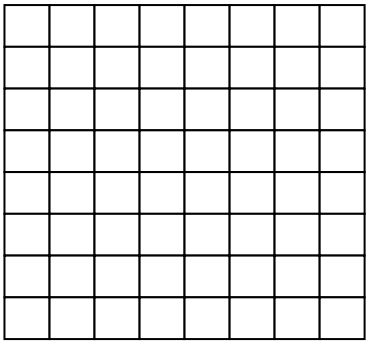
D6, F3, G7, A2, F2

Put down "L" if the square that you have identified is light, and "D" if it is dark.



D6, F3, G7, A2, F2

Put down "L" if the square that you have identified is light, and "D" if it is dark.



D6, F3, G7, A2, F2

Additional recommendations as to working with Problem № 11.

Reflecting on doing the problem and analyzing regularities of the square colour alternation on the chessboard in collaboration with children.

This work is most efficient if it follows the logic of a group discussion.

Questions for discussion suggested by I.A. Burilova when reflecting on "Searching for the colour":

? How has each of you identified a specified square and its colour?

Please note that when discussing the colour of the square in question we were moving from left to right. What is the name of this line? (It is a rank). Then, we were moving from the bottom upwards. What is the name of that line? (It is a file).

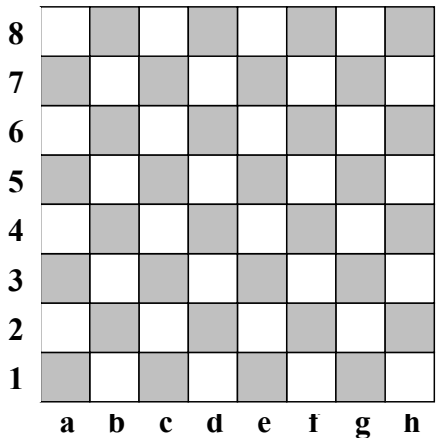
? What can you say about the colour of the squares along each rank? What can you say about the colour of the squares along each file?

? What do you think, do you need to memorize the colour of each square on the chessboard?

The children in our group inferred that it was enough to memorize the first-rank square colours (4 light or 4 dark ones), rather than 64 squares! All the other squares alternate their colours!

? Doing the problem, each of you was working with a chessboard diagram containing light squares alone. Each of you was moving along files and ranks. How have you managed to identify the colour of a square in question?

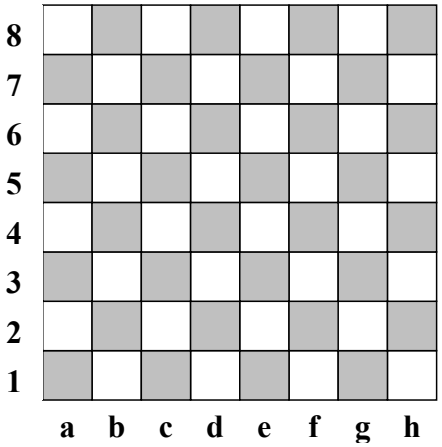
One of the children found the word "mentally"!



Problem Module № 21. Chessboard Lines (*I.A. Burilova*)

21.1. Rank and File

1. How many ranks are there?
2. How many like-coloured squares are there on a rank?
3. What can you say about the size of different ranks?

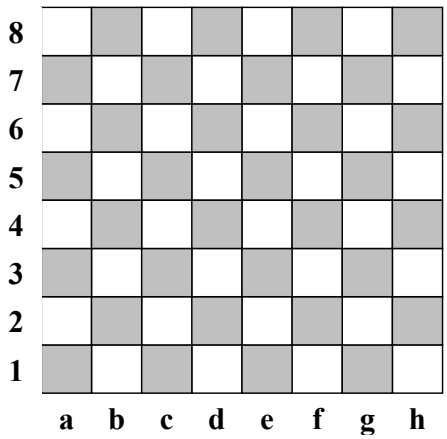


1. How many files are there?
2. How many like-coloured squares are there on a file?
3. What can you say about the size of different files?

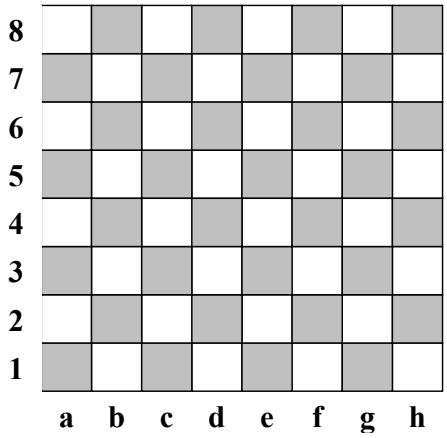
21.2. Diagonal

Problem statement:
Draw a line that links the like-coloured squares together.
· How many lines like that can you draw?
· What can you say about their length?

DIAGONAL



1. How many longest diagonals are there?
2. How many squares are there on a longest diagonal?
3. What can you say about the colour of the longest diagonals?



1. How many squares are there on a shortest diagonal?
2. How many shortest diagonals are there?
3. How many four-squared diagonals are there?

?!

1. How many diagonals are there?
2. How do you record a diagonal's name?

21.3 Problems on Various Modules (*I.A. Burilova*)

1) Draw a specified rank (a specified file) on a mute chessboard. What can you say about the length of the ranks? Files?

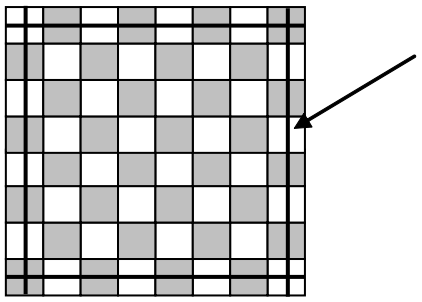
2) Draw a line that links the like-coloured squares together on a mute chessboard. How is this line called? Draw all such lines. (Some students draw lines along light squares, and some students draw them along dark squares). How many like-coloured diagonals are there? How many diagonals are there? What can you say about the length of the diagonals?

3) Each child gets cards with the following words: RANK, FILE, DIAGONALS. The teacher invites the children to divide the cards into two groups and explain the grouping principle. Example from Practice.

Rank File	Diagonal
· 8 lines; · Alternating colours; · Same length.	· 26 lines; · Like-coloured squares; · Various length.

4) Draw the following lines on a mute or regular chessboard (as the students wish):

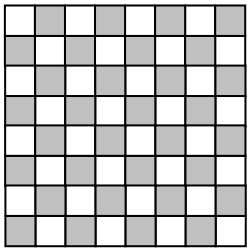
· The leftmost file. Name it.
· The rightmost file. Name it.
· The 1st rank.
· The 8th rank.



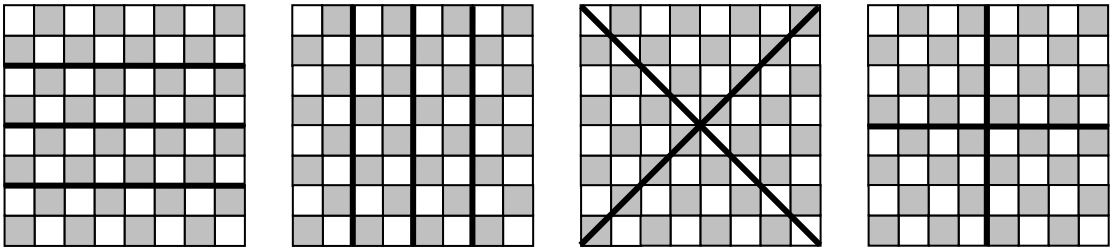
· Circle the corner squares. Name the corner squares and tell their colour. Name all edge squares.

№ 26. Suggested Way of Introducing Concept of Chessboard Centre
Fairy Tale

Once upon a time, there was a King who had three sons. The King grew old and decided to divide his kingdom between his sons so that they learn how to rule the country. Moreover, the King decided to leave something for himself as well. The King endowed his sons with equal shares so that everyone got his fair part. He specified that the Kingdom be divided in such a way that every estate would look like the original one. Divide the kingdom.



The group generated several options that the children discussed.



They decided to choose the last variant.

The King ordered his sons to have a meeting once a year so as to shake hands, talk about business and share experience. However, each of them had to stay in his own estate. Find and circle the squares where the four of them could meet at a conference table.

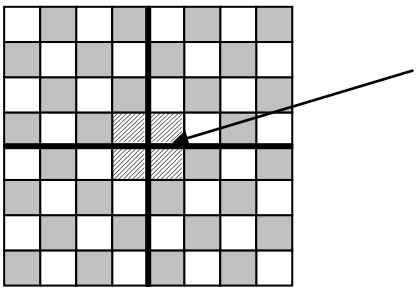
Students suggest their variants and, discussing them, come to a shared solution.

These squares constitute the chessboard centre

? Name the central squares on the chessboard.

? Which ranks are running through the centre?

? Which files are running through the centre?



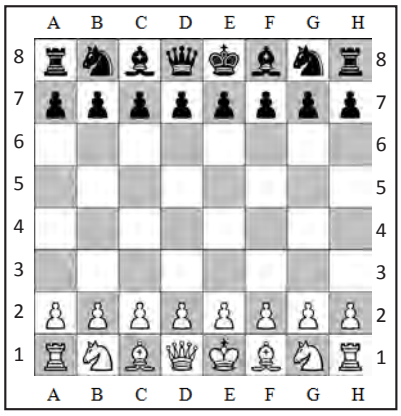
№ 30.

Symbol	Name	Notation
♔		
♕		
♗		
♘		
♖		
♙		

Symbol	Name	Notation
♔		
♕		
♗		
♘		
♖		
♙		

Symbol	Name	Notation
♔		
♕		
♗		
♘		
♖		
♙		

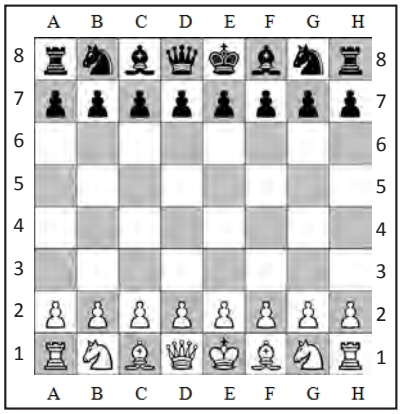
№ 37.



1. Find diagonals that contain two pieces in the starting position. Name them.
2. Find diagonals that contain three pieces in the starting position. How many diagonals have you found?
3. Name all diagonals that contain four pieces in the starting position.

_____

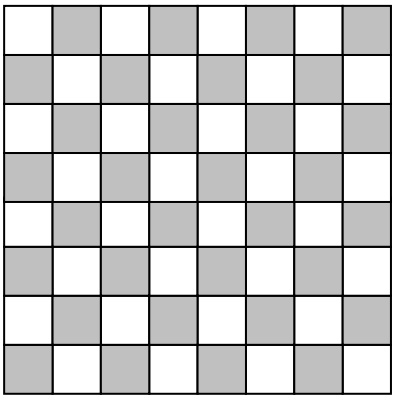
_____



1. Find diagonals that contain two pieces in the starting position. Name them.
2. Find diagonals that contain three pieces in the starting position. How many diagonals have you found?
3. Name all diagonals that contain four pieces in the starting position.

_____

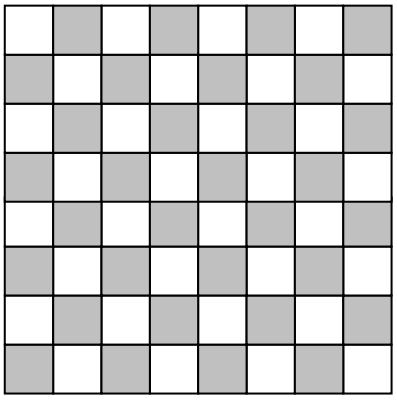
_____



Draw ranks that contain black and white pieces in the starting position.

Draw and record diagonals that contain 1) 2 pieces; 2) 3 pieces; 3) 4 pieces, in the starting position:

1. _____
2. _____
3. _____



Draw ranks that contain black and white pieces in the starting position.

Draw and record diagonals that contain 1) 2 pieces; 2) 3 pieces; 3) 4 pieces, in the starting position:

1. _____
2. _____
3. _____

APPENDIX № 3
Tests and Quizzes Used in Chess for Overall Development Training

№ 1. Chess Quiz for Children and Adults.

Please, read a question carefully;
choose and circle an answer that you believe to be correct.

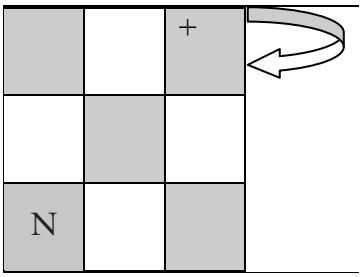
		Choices	
1.	Which colour is the **a1** square on the chessboard: light or dark?	Light	Dark

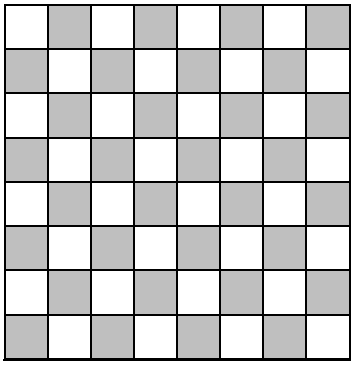
		Choices	
2.	Which colour is the **e4** square on the chessboard: light or dark?	Light	Dark

		Choices			
3.	How many squares does a Rook on **a1** control?	2	4	8	14

		Choices			
4.	How many squares does a Knight on **a1** control?	2	4	8	14

		Choices			
5.	How many squares does a Knight on **e4** control?	2	4	8	14

			Choices			
6.	How many moves does a Knight need to make to get to **c3** from **a1**?	Problems 6 and 7 are solved on a nine-squared chessboard diagram	1	2	4	5
7.	How many options does a Knight have to make his way to **a1** from **c3**?		1	2	3	4

		Choices			
8.	Look at the position on a display chessboard. Memorize it. Put down the names of the squares that have been occupied by Black and by White pieces. Unless you know chess notation, mark the pieces' locations on the chessboard	White King	White Pawn	Black King	Black Pawn
					

№ 2. Quiz for Those Who Know Chess Basics.

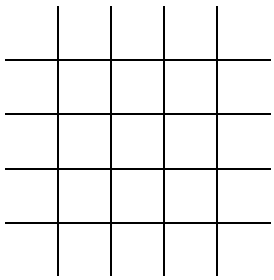
Try to answer the questions. If you do not know the answer, proceed to the next question.

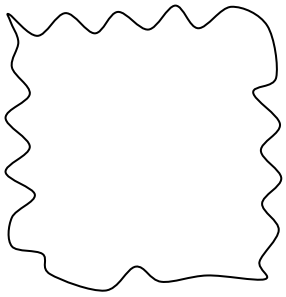
If a question is unclear, mark it with a question mark.

1.	What shape does a chessboard have? (Tick the right answer)	Choices	
		Square	Rectangular

2.	What size does a chessboard have? (Tick the right answer)	Choices		
		8 x 8 squares	10 x 10 squares	6 x 6 squares

3. There are dark and light squares on the chessboard. If you know how they are located, colour in this part of the chessboard.



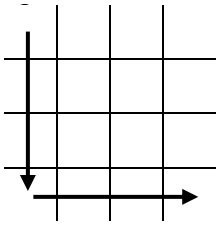
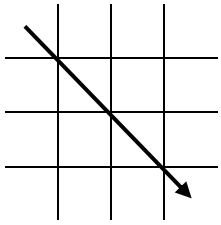
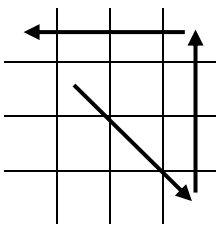
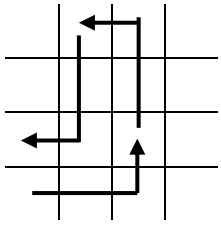


4. What chess pieces do you know? Put them down _____

_____

_____

5. If you know how all or some pieces move, answer the following questions (write the answers under the questions):

Which piece moves along straight lines alone, in this way?	Which piece moves along diagonal lines alone, in this way?	Which piece can move both in this and that way?	Which piece leaps over other squares along the L-path?
			

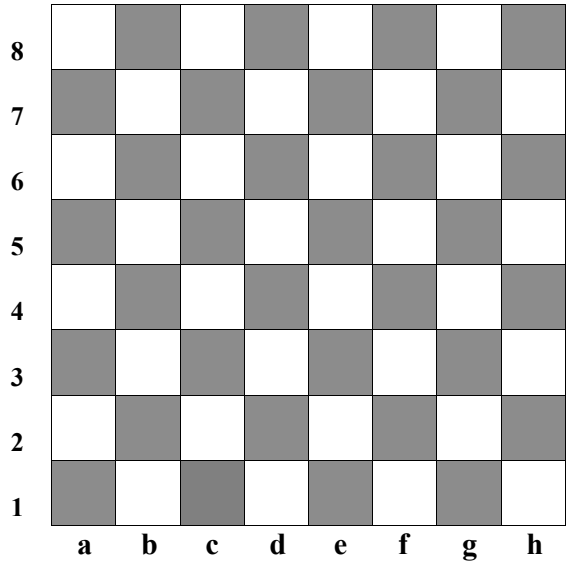
_____ _____ _____ _____

Which chess pieces are most numerous? _____

Which chess piece is the most important? _____

Which chess piece is the strongest? _____

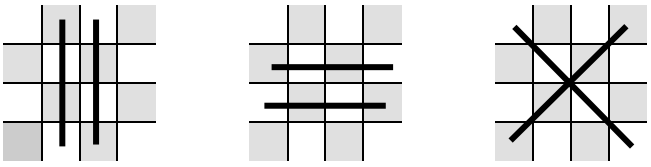
6. Look how pieces are arranged on a display chessboard. Try to memorize which squares White pieces and which squares Black pieces occupy. When the chessboard is removed, cross the squares that the pieces have occupied on a chessboard diagram. Write down their colour. Write down the names of these pieces if you know them.



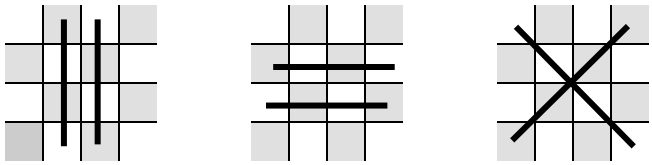
7. If you know how to designate a square name, put down the names of the squares which the pieces have occupied _____

_____

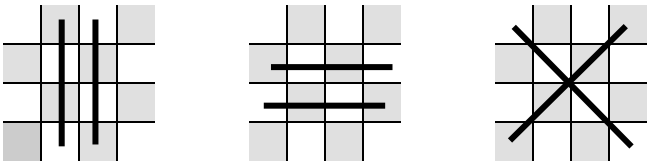
8. Which lines are called ranks (put a tick under the appropriate diagram):



Which lines are called files (put a tick under the appropriate diagram):



Which lines are called diagonals (put a tick under the appropriate diagram:



№ 10. Quiz "Do You Know the Chessboard?"

Please, read a question carefully; and choose only one answer of the three. Write down your choice (a letter) in your Answer Form in a corresponding box under the question number.

1. Indicate the colour of the a1 square on the chessboard:
   a) light;
   b) dark;
   c) I don't know.

2. Indicate the colour of the f1 square on the chessboard:
   a) light;
   b) dark;
   c) I don't know.

3. Indicate the colour of the e4 square on the chessboard:
   a) light;
   b) dark;
   c) I don't know.

4. Indicate the colour of the h8 square on the chessboard:
   a) light;
   b) dark;
   c) I don't know.

5. Which row represents the right sequence of letters in denoting chess squares:
   а) a, b, c, d, f, e, g, h;
   б) a, b, c, d, e, g, f, h;
   в) a, b, c, d, e, f, g, h

Answer Form

Question Number	1	2	3	4	5
Your choice					
Check yourself					

When you have answered all the questions, check yourself.

Find the correct answer to the question on the chessboard and compare it with your choice. Write "+" (if your answer is correct) or "–" (if your answer is wrong) in the "Check-Yourself" box under the number of a corresponding question).

№ 27. Quiz "What do I Know about the Chessboard?"

1. Write down how many ranks there are on the chessboard. ☐

2. Write down how many dark squares a file contains. ☐

3. Write down the names of the edge squares of the leftmost file.: ☐ ☐

4. Circle ranks that are running through the center of the chessboard:

1 2 3 4 5 6 7 8

5. Circle files that are running through the center of the chessboard:

a b c d e f g h

6. Write down names and colour of the central squares separating them by a comma:

☐ ☐ ☐ ☐

7. Write down the name of the light-squared longest diagonal: ☐

8. How many longest diagonals are there on the chessboard? ☐

9. How many diagonals are there on the chessboard? ☐

№40
Quiz 1. STARTING POSITION.

1. Which ranks do White pieces occupy in the starting position?

_____

2. Which ranks do Black pieces occupy in the starting position?

_____

3. Which files do chess pieces occupy in the starting position?

_____

4. How many pieces are there on a longest diagonal in the starting position?

_____

5. Can one diagonal contain 3 pieces in the starting position?

_____

6. Are there diagonals that contain 2 pieces in the starting position?

_____

7. Which piece occupies a1 in the starting position?

_____

8. Which piece occupies h8 in the starting position?

_____

9. How many Knights are there on the chessboard?

_____

10. Which squares do White Bishops occupy in the starting position?

_____

11. Which colour is the square that the Black King occupies in the starting position?

_____

12. Which piece occupies the square next to the White King on his left in the starting position?

_____

13. Write down the sequence of pieces in the starting position on the first rank (from left to right, looking at the chessboard as White).

_____

№ 41.
Starting Position Hands-on Test

Read a question. Give an answer. Compare your answer with the position on the chessboard. Write down the final answer.

1. Do all files contain chess pieces in the starting position?

_____

2. Do all ranks contain chess pieces in the starting position?

_____

3. Do all diagonals contain chess pieces in the starting position?

_____

4. How many pieces can a longest diagonal contain in the starting position?

_____

5. How many pieces are there on the a8 – h1 diagonal?

_____

6. Are there any pieces in the starting position that occupy the central squares?

_____

7. Which ranks do pieces occupy in the starting position?

White _____ Black _____

8. Which pieces occupy corner squares?

_____

9. Which piece occupies the square next to a Rook (a Bishop or a Knight)?

_____

10. Which colour is the square that the black Queen occupies in the starting position?

_____

11. Which colour is the square that the White King occupies in the starting position?

_____

12. Which file do the Queens occupy in the starting position?

_____

13. Which files are running across the King's flank?

_____

14. Write down Black pieces on the Queen's flank in sequence from left to right.

_____

APPENDIX 4.
How to use workbook

- The Workbook delineates basic lessons including a number of exercises. Each module encompasses a certain range of lessons so that the teacher may have freedom of maneuver when designing lessons rather than use a rigid scheme of "a lesson to introduce a new module; a lesson to reinforce the material; a lesson to review the material".
- The Workbook exercises serve as an example that a teacher may use in his/her own creative work rather than an unchangeable pattern. You may use them as they are; you may adjust them to suit your current objectives; you may use them to create your own similar assignments.
- The Reflection Form at the end of the lesson is an essential training element. Children need to learn to fill it out autonomously, but in the beginning they will find it challenging. It is important to help them so as to facilitate the child to word his/her ideas by him/herself rather than do it for him/her.
- It is important to keep the logic of the mental action formation in mind: the action on the material plane – the action with partial material tools – the mental action. The difficulty-related hierarchy of the Workbook exercises follows this very principle.

How to Keep Your Training Journal.

Journaling that represents the trajectory of a student's progress in training is important both for the teacher and for the student. In general, this Form is similar to the students' Reflection Form: what has the child done? What has the child done well? What has the child failed to do? What has the child been able to do with the adult's help? What challenges has the child faced? What is the developmental direction? Where do we need to move further? This journal will be helpful for designing an individual training process.

If the number of students precludes the opportunity to keep this journal for every child, the teacher may keep journals for a few students who have experienced greatest challenges and for whom individual lesson design is prerequisite.

Recommendation to Lesson 35 (p. 50).

In Problem 2, the student needs to make the first move (e7-e5) as Black. Unless the child makes this move, the teacher discusses disadvantages of the move that he/she has made and the advantages of the aforementioned move. Then the child continues to work on the assignment.

Recommendation to Lesson 19 (Problem 3)**.**

The Pawn differs from other pieces. It is useful to discuss this issue with children and single out Pawn's three major differences from other pieces:

1) The Pawn never moves backwards and sideways. Other pieces move in various directions.
2) Capturing by the Pawn differs from capturing by any other piece. The Pawn moves forward vertically and captures diagonally: the movement path and the capturing path never coincide. The other pieces' paths of movement and capturing coincide.
3) A Pawn can be promoted to a piece, and a piece can never turn into a Pawn.

Key to the Workbook problems.

1) Elementary 2) Difficult 3) Advanced

Lesson 38. 1) Ivashchenko 1-3 1. Qf7X. Without a pawn – 1. Qa8X; 2) Ivashchenko 1-18 1. Nb6X; 3) Ivashchenko 1-89 1. Q:g7X, 1. … Rc1X

Lesson 39. 1) Ivashchenko 1-6 1. Q:g7X; 2) Ivashchenko 1-30 1. R:g6X; 3) Blokh 30 1. Q:h7X, 1. … Q:h2X

Lesson 40. 1) Ivashchenko 1-54 1. Qf3X; 2) Ivashchenko 1-44 1. Nd7X; 3) Blokh 35 1. Ne7X, 1. ... Rh1X

Lesson 41. 1) Ivashchenko 1-10 1. Qh7X; 2) Ivashchenko 1-99 1. Kb6X; 3) Blokh 29 1. Q:f7X, 1. ... Q:h2X

Lesson 42. 1) Slavin A-9 1. Qd8X; 2) Ivashchenko 1-52 1. g4X; 3) Blokh 32 1. Rf8X, 1. … Qe1X

Lesson 43. 1) Ivashchenko 1-17 1. Qc8X; 2) Ivashchenko 1-80 1. ... Nf3X; 3) Blokh 33 1. Qh4X, 1. ... Ra8+ 2. Qa4 (a7) – R:a4 (a7)X

Lesson 44. 1) Ivashchenko 1-29 1. Qf6X; 2) Ivashchenko 1-82 1. ... Ng4X; 3) Blokh 38 1. Nf7X, 1. ... Ng3X

Lesson 45. 1) Ivashchenko 1-1 1. Ra8X; 2) Ivashchenko 1-91 1. ... Rf4X 3) Zaretskii. Variants: 1. Bh6X. 2.Qh8X. 3.Qf7X. 4. Rf7X.

Lesson 46. 1) Ivashchenko 1-2 1. Ra8X; 2) Ivashchenko 1-104 1. Bf7X; Maiselis (the Babson Task) 47 checkmate variants: Q – 6 variants; pawn on d3 – 1; Rd2 – 14 (discovered check); Bd5 – 11 (discovered check); Nf5 – 7;

White checkmates by promoting pawns to the Queen or a Bishop – 4 variants; to the Queen or a Rook – 4 variants. Total number of variants – 47.

Lesson 47. 1) Slavin A-2 1. Rh6X; 2) Ivashchenko 1-109 1. Qd8X

Lesson 48. 1) Ivashchenko 1-5 1. Ra8X; 2) Ivashchenko 1-110 1. b8NX

Lesson 49. 1) Ivashchenko 1-9 1. Ra1X; 2) Ivashchenko 1-111 1. c8QX

Lesson 50. 1) Ivashchenko 1-4 1. Be5X; 2) Ivashchenko 1-112 1. g8QX

Lesson 51. 1) Ivashchenko 1-23 1. Bg2X; 2) Ivashchenko 1-113 1. Bd4X

Lesson 52. 1) Slavin A-21 1. Bf6X; 2) Ivashchenko 1-122 1. 0-0-0X

Lesson 53. 1) Ivashchenko 1-24 1. B:f6X; 2) Ivashchenko 1-123 1. B:e5X

Lesson 54. 1) Ivashchenko 1-19 1. Nc2X; 2) Ivashchenko 1-128 1. Ng5X

Lesson 55. 1) Ivashchenko 1-20 1. Nd6X; 2) Ivashchenko 1-129 1. Qf4X

Lesson 56. 1) Ivashchenko 1-27 1. Ng3X; 2) Ivashchenko 1-130 1. Q:e2X

Lesson 57. 1) Slavin A-14 1. Nf7X; 2) Ivashchenko 1-131 1. b8QX

Lesson 58. 1) Slavin A-18 1. Nfe7X; 2) Ivashchenko 1-133 1. Nc6X

Lesson 59. 1) Ivashchenko 1-28 1. Nh6X; 2) Ivashchenko 1-142 1. Bb8X

Lesson 60. 1) Ivashchenko 1-31 1. Ne6X; 2) Ivashchenko 1-150 1. ... Qe6X

Lesson 61. 1) Ivashchenko 1-39 1. Na4X; 2) Slavin A-47 1. Rh5X

Lesson 62. 1) Ivashchenko 1-67 1. Nd6X; 2) Slavin A-51 1. Bg7X

Additional Assignments:

Elementary: 1) Ivashchenko 1-21 1. b7X; 2) Ivashchenko 1-22 1. h6X; 3) Slavin A-35 1. Ra6X; 4) Slavin A-36 1. Rh8X;

Difficult: 1) The ending of the endgame study by D. Gurgenidze Re2X; 2) The ending of the endgame study by A. Troitsky Qf6X; Maiselis R:g3X; 4) Zaretskii-Kanev Rf3X.

Advanced:

1) The ending of the endgame study by D. Gurgenidze (mate in two) 1. Kd4 c1Q; 2. Re2X.; 2) Maiselis (Petrov's problem "Mate in two") 1. Qd7 (!!) R:d7 2. Re8X … B:d7 2. Rh7X … N:d7 2. Re8X. 3) Maiselis (Loyd, Holzhausen, mate in two) 1.Bf8 (!) (including threat Qa1X) B:b2 2.B:h6X. 4) Maiselis (Havel, mate in two) Rg4 (!).

CHESS FOR OVERALL DEVELOPMENT

www.chess-for-life.com
www.chess-od.com

Published by Reichl Verlag, St. Goar
Special Edition: 100 Copies for the
ISCAR Congress in Quebec, Aug. 2017

Distribution:
For Russia and other GUS-Countries:
Otto Reichl Moscow
E-mail: reichl-verlag@yandex.ru

For all other countries:
Reichl Verlag, Auf dem Haehnchen 32,
56329 St. Goar, Germany
Tel. 0049-6741-1720
E-mail: info@reichl-verlag.de
www.reichl-verlag.de

ISBN 978-3-87667-443-8