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THE GENERAL DIDACTIC PRINCIPLES FOR THE FORMATION OF MATHEMATICAL CONCEPTS IN CHILDREN

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Abstract:*This article discusses general didactic principles for the formation of mathematical concepts in children and the didactic requirements for teaching mathematics.*

Basic terms and concepts: logical thinking, sound thinking, didactic principles, various age groups, principle of science, principle of integration of theory and practice, clarity principle, systematicity principle, consistency principle, individualized approach principle, training, pedagogical requirements.

The accuracy and perfection of the first mathematical concepts ensure that children will develop strong skills in logical thinking and reasoning. Mathematics teaches children how to think logically – to reason correctly and draw the right conclusions based on sound reasoning. It also helps to improve their speech skills. When the first mathematical concepts are introduced in a fun and age-appropriate manner, effective results are achieved. Along with general knowledge, these concepts help children develop qualities such as self-confidence, independence, and the ability to express themselves clearly.

The following didactic principles form the basis for the development of elementary mathematical concepts in children:

1. The scientific principle. This principle states that the facts taught in preschool educational institutions should be presented in a way that is consistent with the way they are presented in scientific research. That is, when discussing science, it is essential to ensure that the content of the knowledge being transmitted is structured based on scientific principles.

2. The principle of the unity of theory and practice. This principle demands that the connection between this theoretical knowledge and life, or practice, be broadened to encompass entire worlds. By moving from mathematical theory directly to various exercises and problem-solving, this principle is widely applied. Indeed, young children should be given classes on objects in their daily surroundings, such as those in the room, outdoors, and at home, as this promotes rapid comprehension and assimilation among children.

3. The principle of visibility. This depends on the particularities of children's development, from concrete thinking to abstract thought. The main goal of teaching mathematics is to foster logical thinking, but teaching mathematics should not be

detached from specific facts and images; rather, the examination of any issue should begin with an examination of these specific instances and images.

Visibility aids the assimilation of educational content and contributes to knowledge consolidation. For instance, when discussing a circle, children should grasp it with both hands, each holding a mug. This facilitates memorization as all the child's sensory receptors on the tips of their fingers are engaged, as the shape of the circle is round and flat.

4. The principles of systematicity, consistency, and coherence in knowledge acquisition. The significance of a systematic approach to presenting material in mathematics is significant, as logical connections between individual mathematical concepts are essential. Knowledge imparted to children should not be presented in a fragmented manner, but rather linked together, beginning with simpler concepts and gradually progressing to more complex ones.

On the other hand, developing skills is particularly significant in mathematics. The interconnected nature of mathematical concepts means that without a thorough understanding of the essential foundations, children may be unable to apply their knowledge in real-world situations and may find it more challenging to continue building on their mathematical skills.

In mathematics, it is essential to develop proficiency in a variety of skills, including number sense, counting, understanding of magnitude, and geometric concepts such as circles. Additionally, in mathematics and other fields, success is often dependent on having a solid foundation in certain areas and honing these skills.

5. The principle of individualization. This principle stems from the requirement to take into account age-related characteristics of children, i.e., their abilities and psychological traits, and must be applied during the learning process in mathematics.

In preschool educational institutions, education and training are provided by a qualified teacher. This role is central to the pedagogical process, and therefore, the teacher must have a thorough understanding of their subject matter, be well-versed in various teaching methodologies, and have received extensive training in pedagogy and psychology. In addition to this, it is essential for the teacher to be familiar with relevant legislation, such as the "Law on Education" and the "pedagogy of preschool education," as well as the state educational program "First Step" and the state standards for preschool education and childcare. The teacher should also be familiar with subjects such as "methods of preparing children for school" and other relevant topics.

By the time children start school, it is essential that they have acquired a relatively more integrated knowledge of sets, numbers, shapes, and magnitudes.

The requirements for carrying out educational activities in mathematics are:

1. In mathematics education, in addition to the numerical component, it is essential to plan other parts of the curriculum. The numerical component should occupy a central position in all classes within the curriculum.

2. For each educational session, two to three curriculum objectives are planned. The first objectives are new, while the subsequent ones are repetitions.

3. After completing six to eight instructional sessions, it is recommended to conduct educational activities using a repetition method.

4. Within mathematics education, the primary teaching method is the visual learning approach. A significant portion of the teaching methodology consists of motor play and didactic game techniques.

5. During mathematics education sessions, the curriculum content is presented to children through visual materials.

6. Towards the end of lessons in the younger and middle groups, teachers summarize the curriculum content in language that is understandable to children.

7. The event is held in senior and preparatory classes, with the participation of students.

When planning and implementing educational activities, educators are required to:

1. Knowledge of the fundamental laws and features of the scientific, psychological, and pedagogical development of children.

2. Understanding of the scientific basis for developing children's mathematical abilities.

3. Familiarity with the curriculum for developing elementary mathematical abilities in each age group, i.e., the content of work.

4. Mastery of methodological techniques for teaching children, or how to conduct the work.

5. Awareness that the assimilation of educational material is only carried out through special educational activities.

6. Ability to plan concepts of magnitude, shape, perimeter, time, together with numerical activities, in each learning activity.

7. Knowledge of the structure of educational activities in accordance with didactic principles.

8. Broad application of various sensory modalities in educational activities.

9. Knowledge that the widespread use of visual aids is a crucial condition.

10. It is essential for every child to understand that the use of handouts is an integral part of any educational experience.

Educational activities in mathematics should take place on a specific day of the week.

Therefore, a significant aspect of the intellectual development of children involves the application of general didactic principles for the formation of mathematical ideas, the level of which is determined by the quality of understanding of mathematical concepts such as counting, numbers, measures, magnitudes, geometric shapes, and spatial relationships. The aim of the development of children's fundamental ideas and concepts is to equip them with mathematical thinking skills, including the ability to compare, analyze, reason, generalize, and draw conclusions.

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