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## POSSIBILITIES OF EFFECTIVE FORMATION OF NATURAL CONCEPTS IN CHILDREN OF SENIOR PRESCHOOL AGE

Olena Havrylo, Svitlana Kondratiuk, Olha Shapovalova, Yevdokiia Kharkova

*The possibility of forming natural concepts in older preschool children is proved. Analyzed and selected in accordance with the purpose of the study, the definition of the term "concept" indicates that natural concepts are part of ecological competence of the child. Unlike representations, which reflect the object in a set of many different features, both significant and insignificant, the concepts carry a general, social experience, denote the essence of the object and distinguish it from all other objects. An important task of the teacher is to stimulate students' desire to acquire knowledge independently, to transform children in active participants in the educational process, to understand the essential features and connections of phenomena and objects of nature, which means to form concepts about them.*

*In the process of forming a natural concept, it is impossible to do without thinking operations, which include comparison, analysis, synthesis, abstraction and generalization. At about 5 years of age, there are significant changes in the child's thinking, but purposeful pedagogical influence will significantly increase the effectiveness of this.*

*In the course of the research methods, forms and techniques for the formation of natural concepts in students were selected. Verification of data formation initially took place at the ascertaining stage of the experiment and after the forming stage. Compared to the initial study, after organized work, the number of children with a high level of formation of natural concepts increased by 10 %, also the number of children with a medium level of formation increased by 7 %, and the number of low level decreased by 18 %. Thus, specially organized forms of work, selected methods and techniques help to form natural concepts in older preschool children*

**Keywords:** *natural concepts, ideas, preschool education, children of senior preschool age, ecological competence, ecological education*

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### 1. Introduction

Among the most important competencies that society expects from a graduate of preschool education is environmental. The aggravation of the ecological crisis makes it necessary to form a generation with a special view of the human place in the world. The attitude to nature begins with an understanding of the processes in it, the causes of each phenomenon and the consequences of active changes in the human environment. Accordingly, the view of preschool education as a way to convey to students a set of facts, known to mankind, is outdated, because it does not provide a holistic system of knowledge about the natural environment. Therefore, an important task of educators is to stimulate students' desire to acquire knowledge independently, to turn children into active participants in the educational process, to understand the essential features and relationships of phenomena and objects of nature, which means to form concepts about them.

### 2. Literary review

Educational work with children is always based on the psychological characteristics of preschool age,

which are taken into account in innovative pedagogical achievements. The last decade has been marked by a variety of approaches to the study of the natural environment from traditional, including acquainting children with certain topics without delving into the essence of these phenomena, to new ones, which include a wide variety of forms, methods and tools. At the beginning of the study of the formation of natural concepts in preschool children, it turned out that, with a wide arsenal of methods and tools of acquaintance with nature, the activities of educators of preschool education are aimed only at developing ideas about certain phenomena and objects. The reasons for this may be: lack of understanding of the differences between ideas and concepts, adherence to traditional methods and structure of classes, inadequate attention to the importance of nature in psychic (including mental) development of the child, previously prevailing opinion that in preschool concepts are not yet available for formation.

To overcome the difficulties in understanding natural concepts in older preschool children, teachers need to clarify what this means. The term "concept" is considered in many philosophical, legal, psychological

studies. Its definitions are analyzed quite deeply and at the same time concisely in the "Dictionary of Intranslatability: Philosophical Lexicon" [1]. Convenient for learning and active use of this word are the publications of the American company Merriam-Webster, which has existed for almost 200 years, since 1828 [2, 3]. It is these publications that help to understand the possibility and conditions of the formation of natural concepts in students of preschool education.

Methodical principles of formation of knowledge about objects of nature are reflected, in particular, in many works of Z. Plokhyy, where we can see a holistic system of formation of ecological ideas, which are the basis for creating concepts in early preschool age. We believe that the content of environmental education, the principles of its construction, the organization of children's activities and methods, proposed by the author, meet the pedagogical conditions for the development of concepts in preschoolers [4]. N. Kot also developed a technology of ecological education of preschool children as a consistent ecological and pedagogical work of preschool education, taking into account the natural environment, social conditions of the settlement, activities of pupils, etc. [5]. The works of N. Lysenko describe in detail the methods and means of environmental education of preschool children, emphasize the formation of deep knowledge as the basis of environmental culture of the individual [6]. That is, the theoretical basis for the formation of natural concepts in Ukrainian preschool education has been created, but in practice it is given insufficient attention. [6].

### 3. Research aim and tasks

The aim of the article is to prove the possibility of effective formation of concepts about natural phenomena and objects in older preschool children.

To achieve this goal the following tasks are set:

1. To define the term "natural concepts", to choose the appropriate definition of this term on the basis of the study of scientific sources.
2. To choose forms, methods and techniques, aimed at forming natural concepts in older preschool children.
3. To check and prove the effectiveness of purposeful pedagogical influence in the formation of concepts about natural phenomena and objects in preschool children.

### 4. Materials and methods

To determine the terms "concept" and "representation" a theoretical analysis of scientific sources was carried out.

The selection of forms, methods and techniques of work with students was based on the study of scientific and pedagogical literature, pedagogical observation, survey of ecological and developmental environment of the research base – Sadivka preschool institution (kindergarten) "Topolka" of Sadivka village council of Sumy district of Sumy region. The experimental part of the study was conducted in 2020–2021 and covered 2 academic years; 27 older preschool children took part in the study. The parents of the pupils gave their consent to the experiment.

The verification of the formation of natural concepts in preschool children was carried out using the methods of "Sugar" by L. Prokhorova, "Shipwreck" and "Flower" by T. Kireeva and O. Babayeva [7, 8].

## 5. Research results and discussion

### 5.1. Theoretical bases of formation of natural concepts in children of preschool age

To achieve the goal of the study it is necessary to clarify the term "concept" and choose a definition that describes the natural concepts, formed in preschool children. In our opinion, the most complete definitions of the term "concept" are defined in the "Philosophical Encyclopedic Dictionary", which interprets it as a way of understanding, an abstract idea of the results of cognition through awareness of the essential characteristics of objects; as well as a special form of thinking, characterized by the reflection of the relations and properties of objects in the form of an idea of their general and specific features. The process and conditions of concept formation are also quite clearly indicated in this source [9]. In the "Modern Explanatory Dictionary of the Ukrainian language" the definition of the concept is given more simply, but it is formulated closer to the subject of research - the concepts, formed in children. Here, too, this term is interpreted as a form of thinking, generalization of the essential features of the object, as well as understanding that has formed on the basis of information and is acceptable in a particular field of application [10].

A. Konversky calls such forms of thinking as concepts, judgments and inferences interrelated. Some scholars argue that the concept is formed first, and from it follow judgments, and then – inferences; but the author himself, agreeing with V. Zeget, Y. Ivlev, V. Bochorov, V. Markin and others, believes that judgments should precede inferences, and only then the concept of the object is formed. At the same time, the concept itself is considered here as a way of reflecting reality, in which the subject is revealed through a set of its essential features [11]. This means that to have an idea of an object is to know and understand its inherent features, relationships and connections with other objects, common and distinctive features with them. That is, A. Konversky correlates the concept with the class of objects by their general and specific features, but it is clear, that the object of individual thought is a generalized image of a particular object. Hence the word "term" – that is, the linguistic form of expression of the object of thought. For example, they can be proper names or descriptive terms, terms of sets, classes, and so on. In this case, the object itself is the meaning of the term, and the meaning of the term – information about the object, its features.

A detailed interpretation of the concept is made in the already mentioned "Dictionary of Intranslatability: Philosophical Lexicon", which analyzes in detail the statements of E. Kant as the most thorough in relation to this form of thought processes [1]. The most universal definitions and clear and well-founded classification of concepts can be found, for example, in I. Khomenko: concepts are singular, general and empty; concrete and abstract; composite and non-composite; relevant and irrelevant; also positive and negative, respectively, they indicate the presence or absence of any sign [12]. It

should be noted, that in modern science "concept" has evolved from the philosophical and psychological term into separate definitions in different fields, where the classification of concepts is carried out according to the specifics of the scientific field [13, 14].

Thus, based on all the above, we define the term "natural concepts of preschool children" as elements of the knowledge system, characterized by understanding of natural objects and phenomena as integral systems, the properties of which are reflected in significant relationships with other inanimate objects and phenomena and animate ones.

Since we know that the concept is a special form of thinking that allows us to reproduce the most important features of objects and phenomena in consciousness, we can assume that the natural concept is an imaginary picture of nature, its holistic reflection in human mental activity. The most important thing here is that the concept does not reproduce all the known features of any object, but only the essential ones.

Natural concept – the result of deep knowledge of objects or phenomena of nature; to form it, it is necessary to study the object in all its manifestations and connections with other inanimate and animate objects. Each object or phenomenon in nature has many different features in importance. Essential features are those that reflect the nature of the object, its essence and distinguish it from all other objects; general and necessary, those that belong to all objects of this class and without which this object ceases to be itself. The presence or absence of insignificant features does not change the nature of the object or phenomenon. Such features are mostly unstable, external, isolated and do not reflect the properties of the object. A feature that is irrelevant in one case may be significant in another, depending on how we view the object. The criterion of the significance of the features that are reproduced by the concept is the social practice of human [12].

Accordingly, the child can learn and test the signs and properties of natural objects in direct repeated interaction with them during the use of various forms of organization of children's activities. In the process of forming a natural concept, it is impossible to do without mental operations, which include comparison, analysis, synthesis, abstraction and generalization. Comparison is used in the study of the object and the selection of its essential features to distinguish this object from others. This action makes it possible to identify common and distinctive features of the considered objects, which helps to highlight the essential features of each of them, to group objects into classes and so on. Comparison is based on the interaction of analysis and synthesis. Analysis – is an imaginary selection of the object under study, its constituent parts, "disassembly" of its components. Synthesis is the opposite, but inextricably linked to the previous action, which consists in the imaginary combination of selected parts of the object into a single whole. These operations are included in mental activity in the formation of concepts, they are interconnected and interdependent. Therefore, in order for the concept to take its place in the human mind, it is necessary to select

from a number of all the features and components, selected by the analysis, only the essential ones, those that correctly reproduce the features of the object.

Therefore, in the process of developing concepts, of course, such a logical method as generalization is used. When forming a concept, it is not necessary and impossible to consider all objects of a certain class, but only the most typical for it. Significant features that can be identified in some typical representatives of this class of objects, generalized in the human mind, seemingly apply to other objects of the class, and the whole class as a whole. Generalization is a mental operation that allows an imaginary transition from the image of a particular object to the general through the association of homogeneous objects into classes based on their common features.

Concept formation is a long and complex cognitive process, which is determined by the practical activities of the child. The basis for the formation and development of natural concepts, as their truth, is direct contact and interaction with the objects being studied. At the same time, the finished concept becomes a means of studying the environment in the future. In the institution of preschool education, pupils first of all form ideas about the elements of the natural environment and their interaction with the environment at the general level. To correlate the terms "concept" and "representation", we compare them. The latter, as well as the concept, reflects in the mind of the object on its basis. However, in contrast to concepts, the representation reflects the object in a set of many different features, both significant and insignificant in this context. The representation can include an unlimited variety of features of the object and is even more vividly reproduced in the imagination, but the concept shows the full depth of the object, reveals the knowledge of the internal connections in the structure and properties of the object. Because ideas are created on the basis of life experience, passing through the peculiarities of the child's mental activity, they are an individual construction and have a subjective impression of objects and phenomena. Representations are necessary for everyday use (operating them in the imagination and external expression through activity). Concepts, on the other hand, carry a general, social experience, a certain generalized picture of the world, "adjusted" to effective communication with other people on the subject of this object; for a preschooler it is, first of all, communication with both adults and peers, so the child must also master the terms that denote these concepts. But the representation does not always have to be expressed in words, because here the subjective significance, which has adapted to the generally accepted terms, may disappear. But let's not forget that the concepts are based on previously created representations.

From research in the field of child psychology we know that children's above mental operations (analysis, synthesis, generalization) are actively developing during preschool age, and, with the proper guidance of adults (relatives, teachers), gradually lead to understanding phenomena and objects. G. Kostyuk defined understanding as the inclusion of an object, initially incomprehensible, in the already established system of own knowledge [15]. According to the results of this study, A. Bogush and N. Gavrish built the work on the method of acquaint-

ing children with the environment on the basis of understanding. [16]. The result of understanding is judgments, concepts, conclusions, views, beliefs.

Significant changes in the child's thinking are observed at about 5 years. It is during the transition from middle to senior preschool age that the little person seeks the purpose of each element of the environment, both near and far, begins to associate the external features of inanimate objects with their use or living objects – with adaptation to living conditions. The understanding of causal relationships gradually accumulates and grows by the end of preschool age in several areas: from the reflection of external causes, the child moves to the selection of hidden, internal; the global understanding of causes is changing to a more differentiated and accurate explanation; understands not only the isolated cause of any phenomenon, but also the generalized pattern. Thus, it indicates the readiness of the child's thinking to form concepts about objects and phenomena known to him/her.

## 5. 2. Experimental verification of the possibility of forming natural concepts in preschool children

Having chosen a preschool institution to conduct the experimental stage of the study, we made sure that its ecological and developmental environment is sufficiently enriched with natural objects both in and around it: corners of nature are organized in group rooms, the territory is sufficiently landscaped, there is a steppe beam, gardens, birch grove, artificial ponds, etc. For the successful use of the ecological and developmental environment, the attention of teachers should be focused on the proper organization of educational work with students.

Having analyzed the work of scientists in the field of preschool pedagogy, we have identified effective methods of forming natural concepts in children of the experimental group: experiments; observation; methods of situational modeling; role-playing the problem situation; solving and completing puzzles; didactic games of interactive nature. These methods were carried out within the following forms of educational activities: classes, excursions, walks, work. Classes were held with children using the following organizational forms of work: work in pairs, work in small groups, general discussion of the problem, as well as techniques: microphone, unfinished sentences, brainstorming. In our opinion, the most interesting and effective were the forms of organizing children to work in pairs, small groups, and only then – a discussion using the technique of "microphone".

Checking the level of formation of natural concepts was carried out before the purposeful use of these methods and techniques and after the formative experiment. The results of the two stages of verification are shown in Table 1.

As can be seen from Table 1, the number of children with a high level of concept formation in the experimental group became more by 11 %, and with low – less by 18 %. The number of children with a medium level also increased by 7 %.

As a result of conducting classes using the above forms, methods, techniques, children have acquired basic

natural knowledge; explain the relationships in natural systems available for study; have the opportunity to easily and consciously use knowledge and operate with it during classes, in personal life, in their own attitude to nature; substantiate their own responsibility for nature conservation; wish to participate in environmental and research activities; have skills of behavior in the natural environment.

Table 1  
Levels of formation of natural concepts in children of the experimental group at the beginning and end of the experiment

Formation levels	At the ascertaining stage of the experiment, %	After the formative stage of the experiment, %
High	22.22	33.33
Medium	48.15	55.56
Low	29.63	11.11

This study only proves the possibility of effective formation of natural concepts in older preschool children. Methodological and substantive principles of forming concepts about the phenomena and objects of the environment should be embodied in achievements of teachers and their implementation in the practice of preschool education. We believe that the process of concept formation in preschool children takes place even within the traditional educational forms, if teachers aim not only to give a set of knowledge to students, but also to ensure their active cognitive activity.

## 6. Conclusions

The analysis of the definitions of the term "concept" and mental development of older preschool children allowed to prove the possibility of forming natural concepts in them.

1. The definition of the term "concept" showed that the formation of natural concepts corresponds to modern pedagogical views on the requirements to the educational process in preschool education. In the context of the study, natural concepts of preschool children are identified as elements of the knowledge system, characterized by understanding natural objects and phenomena as integral systems, the properties of which are reflected in significant relationships with other objects and phenomena of inanimate and animate nature.

2. The forms, methods and receptions which provide active interaction of children with the natural environment, comprehension of the information, received from various sources, formation of own relation to the studied objects and formation of concepts about them are separated.

3. The results of testing the effectiveness of selected forms, methods and techniques allow us to say that natural concepts in children can already be formed in senior preschool age, provided targeted pedagogical influence on them.

## Conflict of interests.

The authors declare that they have no conflicts of interest.

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**Olena Havrylo\***, PhD, Associate Professor, Department of Preschool and Primary Education, Sumy State Pedagogical University named after A. S. Makarenko  
Romenska str., 87, Sumy, Ukraine, 40002

**Svitlana Kondratiuk**, PhD, Professor, Department of Preschool and Primary Education, Sumy State Pedagogical University named after A. S. Makarenko, Romenska str., 87, Sumy, Ukraine, 40002

**Olha Shapovalova**, PhD, Associate Professor, Department of Preschool and Primary Education, Sumy State Pedagogical University named after A. S. Makarenko, Romenska str., 87, Sumy, Ukraine, 40002

**Yevdokiia Kharkova**, PhD, Associate Professor, Department of Preschool and Primary Education, Sumy State Pedagogical University named after A. S. Makarenko  
Romenska str., 87, Sumy, Ukraine, 40002

*\*Corresponding author: Olena Havrylo, e-mail: leih972@gmail.com*