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ENSURING CONTINUITY IN THE FORMATION OF NATURAL SCIENCE KNOWLEDGE OF PRESCHOOL CHILDREN AND PRIMARY SCHOOLCHILDREN

ЗАБЕЗПЕЧЕННЯ НАСТУПНОСТІ У ФОРМУВАННІ ПРИРОДНИЧИХ ЗНАНЬ ДІТЕЙ ДОШКІЛЬНОГО ВІКУ ТА МОЛОДШИХ ШКОЛЯРІВ

The purpose of the article *is to emphasize the importance of continuity between preschool and primary education, as well as to show the importance of the natural science circle for the senior preschool children's natural science knowledge formation.*

Methodology. *The main research methods were: the analysis of regulatory documents and psychological and pedagogical literature, observation of children in a natural educational environment, pedagogical experiment, diagnosis of the level of formation of natural knowledge using conversations, didactic games, experimental and research work.*

Scientific novelty. *It has been confirmed that ensuring continuity in the formation of natural science knowledge of preschool children and primary schoolchildren contributes to a gradual and productive transition from preschool to primary education, which facilitates the integration of knowledge acquired in a preschool educational institution with primary school programs, makes learning more holistic and meaningful; supports psychological comfort and a positive attitude to learning, as children feel the connection between what they studied in a preschool educational institution and what they study at school; ensures the early identification of children's abilities and interests in the field of nature. It has been established that one of the key aspects is the cooperation between a preschool educational institution and primary school. The article highlights the advantages of group work and its role in ensuring continuity in teaching natural sciences, as well as proves a positive impact of the conducted group work on ensuring continuity in the formation of natural science knowledge of preschool children and primary schoolchildren.*

Conclusions. *It was emphasized that the joint efforts of preschool teachers and primary school teachers helped children not only to learn basic knowledge, but also to become interested in more complex topics, than those offered – ecology and astronomy. After the implementation of the «Friends of Nature» group work into the experimental group, an increase in the quality of knowledge about nature was noted, which confirms its effectiveness.*

Key words: *continuity of education; group work; natural science knowledge; primary schoolchildren; senior preschool children.*

Мета статті. *Підкреслити важливість наступності між дошкільною та початковою освітою, а також показати значущість природознавчого гуртка для формування природничих знань дітей старшого дошкільного віку.*

Методи дослідження: *аналіз нормативно-правових документів та психолого-педагогічної літератури, спостереження за дітьми у природному освітньому середовищі, педагогічний експеримент, діагностування рівня сформованості природничих знань із використанням бесід, дидактичних ігор, експериментально-дослідної діяльності.*

Наукова новизна*. Підтверджено, що забезпечення наступності у формуванні природничих знань у дітей дошкільного віку та молодших школярів сприяє поступовому та продуктивному переходу від дошкільної до початкової освіти, що полегшує інтеграцію знань, отриманих у закладі дошкільної освіти, з програмами початкової школи, робить навчання більш цілісним та осмисленим, ніж зазвичай; підтримує психологічний комфорт та позитивне ставлення до навчання, оскільки діти відчувають зв'язок між тим, що вчили в ЗДО, і тим, що вивчають в школі; убезпечує раннє виявлення здібностей та інтересів дітей у природничій сфері. Встановлено, що одним із ключових аспектів є співпраця між закладом дошкільної освіти та початковою школою. У статті показані переваги*

гурткової роботи та її роль у забезпеченні наступності в навчанні природничих наук, а також доведено позитивний вплив проведеної гурткової роботи на забезпечення наступності у формуванні природничих знань дітей дошкільного віку та молодших школярів.

Висновки. *Наголошено, що спільні зусилля вихователів і вчителів допомогли дітям не лише засвоїти базові знання, але й зацікавитися складнішими темами, ніж ті, що пропонувалися, – екологія та астрономія. Після впровадження гурткової роботи «Друзі природи» в експериментальній групі було відзначено підвищення якості знань про природу, що підтверджує її ефективність.*

Ключові слова: *групова робота; діти старшого дошкільного віку; наступність освіти; природничі знання; учні початкової школи.*

Introduction. The Ministry of Education and Science of Ukraine (n.d.). defines continuity between preschool education and primary education as ensuring the continuity of getting education. «Continuity in education is necessary to create a unified educational process that logically continues from kindergarten to school. This process helps to achieve holistic personality development» (*Ministry of Education,* n.d.). Continuity in the formation of science knowledge of preschool children and younger schoolchildren is an important aspect of the educational process, which ensures a smooth transition from one stage of education to another one and contributes to the comprehensive development of the child. Ensuring continuity in the education of preschool children and younger schoolchildren is carried out in accordance with the Basic Component of Preschool Education, the State Standard of Primary General Education, the Model Educational Program of Primary Education, comprehensive and partial educational programs approved by the Ministry of Education and Science of Ukraine, which determine the priority of the competency-based approach to solve the main tasks of preschool and primary education. Currently, elementary schools are undergoing reforms related to the educational process, so the issue of continuity is becoming particularly relevant. Changes in the primary education system should be accompanied by changes in preschool education, as these two stages are closely interrelated. And compliance with the principle of continuity greatly facilitates the adaptation of the child to the performance of a new role – a schoolchild.

Analysis of the research and publications. The issue of continuity of education is the subject of a research by a number of modern scientists. Thus, O.O. Yastrub (2021) the aspects of synchronizing preschool education with primary education for the holistic formation of a child's competences are identified in her research. The conducted research proved that each of the competences from the Basic Component of Preschool Education gradually continues to be formed in primary school in accordance with the State Standard of Primary Education. T.I. Lushpai (2024) analyzed the modern research and emphasized the importance of creating uniform standards for both educational stages to ensure effective continuity. O.H. Kosenchuk (2021) characterized modern approaches to the formation of competences of preschool children, among which natural and ecological competence is the key.

Well-known Ukrainian scientists dealt with the issues of the formation of natural science knowledge of preschool children. H.V. Chorna and H.Z. Skirko (2021) and others reveal the essence of such concepts as «ecological competence», «ecological culture», «ecological education». N.V. Lysenko, L.O. Matsuk and O.M. Lysenko (2019) developed the so-called informal code of ecologically appropriate behavior during contact with nature. A.P. Dmytrenko (2023), L.P. Zahorodnia (2023), N.M. Horopakha (2023), I.L. Palasevych (2021) and others highlight the methods and forms of organizing work on familiarizing children with nature in modern preschool educational institutions. Succession in the formation of natural science knowledge of children of preschool age and primary school age is highlighted in the studies of V.V. Matiash et. al. (2023), T.V. Filimonova and K.Yu. Minasian (2024) and others. The issue of preparing pre-service preschool teachers for the natural science knowledge formation of children is highlighted in the works of N.M. Horopakha (2023), I.V. Karapuzova (2020), N.V. Lysenko, O.M. Lysenko, M.V. Matishak (2022) and others.

The purpose of the research is to study the effect of group work as for the natural science knowledge formation of preschool children.

The main research **methods** were: analysis of regulatory documents and psychological and pedagogical literature, observation

of children in a natural educational environment, pedagogical experiment, diagnosis of the level of formation of natural knowledge using conversations, didactic games, experimental and research activities. The results obtained allowed us to identify the positive impact of natural science group work on the quality of knowledge and the development of research skills in children of senior preschool age, which is a prerequisite for successful adaptation to studying in primary school.

Presentation of the main material. Continuity includes the coordination of content, methods and forms of education at different educational levels. It also includes harmonizing the content of educational programs, which involves the harmonization of topics studied in preschool age and primary school age. It means that the knowledge and skills acquired at one level are logically continued and deepened at the next one. For example, topics that begin to be studied in preschool should be logically integrated and expanded in elementary school, so that children can gradually learn new information based on already acquired knowledge. So in preschool age: the foundations of natural science knowledge are formed through games, observations, experiments, fairy tales and stories. Children get acquainted with natural phenomena, plants, animals, seasonal changes. In the early school age there is a continuation of studying nature at a more complex level with the use of scientific terms, deeper experiments and observations. Biology, geography, physics and chemistry is studied at the elementary level.

In addition, the coordination of the content also includes the adaptation of educational materials to the age and psychological characteristics of children, which allows to ensure the effectiveness of the educational process and the development of interest in learning. An important aspect is taking into account the individual educational needs and rates of each child development, which allows creating optimal conditions for learning and harmonious development as well.

Continuity also involves the coordination of methods and forms of learning used in preschool and primary education. It means that the methods used in preschool educational establishments should have their counterparts in primary school, but be adapted to more complex tasks and higher requirements. This approach helps children experience less stress during the transition from one stage of learning to another one, because the learning methods are already familiar to them, though they are complicated.

Continuity also includes collaboration between preschool teachers and primary teachers, which allows information about children's individual characteristics and progress to be shared, enabling a more personalized approach to learning at each stage.

There can be such examples of forms of continuity implementation as project activity: creation of projects that children can perform together with their parents or in groups (for example, «My little garden» for preschoolers and «Exploring nature» for younger students); excursions and observations: organization of joint excursions to natural objects (parks, zoos, botanical gardens) for children of different ages with further discussion of what they saw; playful activities: the use of game techniques, such as role-playing or nature quests, which encourage children to explore the world around them; joint projects of the preschool and primary school: conducting joint classes and events for children of senior groups in preschool educational establishments and first graders, which contribute to the continuity of education.

In our opinion, study group work is an effective form of formation of natural science knowledge in preschool children, which will contribute to better preparation for future studies in primary school. Study group work is an important form of organizing the life activities of preschool children, it is an integral part of the educational process in preschools, and it also provides wide opportunities for solving educational tasks. The effectiveness of study group work in a preschool educational establishment is largely determined by several key factors.

1. Qualification of teachers: teachers conducting study group classes must have appropriate education and experience working with preschool children. They should be familiar with modern teaching methods and technologies, as well as the have to possess the skills of effective communication with children. Constant improvement of teachers' qualifications through participation in seminars, trainings and courses contributes to the introduction of the latest approaches and methods in study group work.

2. Quality of programs and materials: study group programs should take into account the age and individual characteristics of children, be interesting and accessible to understanding. They have to include a variety of activities that contribute to the comprehensive development of the child. The use of high-quality and diverse materials that stimulate children's cognitive activity and creative imagination. These can be educational toys, didactic materials, natural objects, fiction, etc.

3. Organization of the educational process: clear organization of study group classes, taking into account the daily schedule of the preschool establishment and the characteristics of children. Lessons should have a logical structure, including an introductory part, the main activity and a concluding part; the possibility of adapting lesson plans depending on the interests and mood of children, which allows to ensure their active participation and interest in the educational process.

4. Involving children into activities: the use of interactive learning methods, such as game techniques, role-playing games, creative projects and experiments, which contribute to the active involvement of children into the learning process. Taking into account the individual characteristics and needs of each child, which allows creating conditions for the maximum development of their abilities and interests.

5. Cooperation with parents: regularly informing parents about the goal, tasks and achievements of study group work, which allows to involve them into the learning process and create conditions for supporting the child's development at home. Organization of joint events and projects with the participation of parents, which contributes to the creation of a educational space and increases the effectiveness of study group work.

6. Material and technical base: availability of modern equipment and materials that provide a variety of activities and contribute to the creation of an interesting and educational environment for children. Ensuring safe conditions for study group classes, including monitoring the technical condition of equipment and compliance with safety standards.

The goal of the natural science study group is to teach children carefully and with interest observe the natural environment – to see, listen, hear and feel, to expand their understanding of objects of living and non-living nature, the world around us, about themselves, to establish relationships and form the foundations of ecological awareness.

Study group work has its advantages in forming children's natural science knowledge. It does not interfere with the usual educational process and does not violate the schedule of classes in a preschool educational establishment; the teacher has the opportunity during the school year to adjust the work of the study group and, if necessary, make changes; the study group teacher can exceed the level of the standard in the set tasks and content within the limits of the awareness of the participating children. It is a great advantage of study group work.

Study group activity provides an opportunity to regulate the educational process and the process of children's assimilation of knowledge and skills, to direct it right. During the organization of the study group, the teacher can freely choose methods and forms of work, actively use interactive methods or give individual tasks to children. Working in a study group gives children more opportunities for research activities, which contributes to their interest and activation of their learning.

The organization of study group activities supports the main directions of development of preschool children, which will contribute to the gradual transition from game activity to learning as a new type of activity in the adaptation and game period of primary school.

With this in mind, we conducted an experimental study on the impact of the natural science study group work on the quality of preschool children's knowledge about nature. Focusing on the Basic Component of Preschool Education (2021), current comprehensive and partial educational programs for the formation of natural science knowledge in preschool children, we determined the criteria and their indicators, presented in table 1.

To determine the children's knowledge levels, we carried out diagnostics, which included conversations with children, parents and the preschool teacher, didactic games on the classification and grouping of natural objects, animals and plants; observation of children during daily activities and in classes on familiarization with nature, and also involved children into elementary research activities.

Generalized indicators of natural science knowledge of senior preschool children are presented in Table 2.

As can be seen from Table 2, the knowledge levels of children of both groups were approximately the same. In the experimental group, we organized the «Friends of Nature» study group, the purpose of which was to form children's natural science knowledge, elements of ecological awareness, and the ability to understand and love the surrounding world and nature. Table 3 lists some topics from the study group's work plan. We defined the tasks of the study group: to deepen the knowledge of senior preschool children about the fact that people are an integral part of nature; emphasize the importance of natural resources for human life; promote conscious, economical use of natural resources; to form an understanding of the value of nature, to form the correct behavior in nature and the desire to take care of one's own health.

Table 1

Criteria and indicators of the formation of natural science knowledge in children of senior preschool age

	High level	Intermediate level	Sufficient level
Cognitive criterion	The kid knows that the Earth is a part of the solar system, names the Earth's satellite (the Moon); can tell about the profession of an astronaut; knows that it is possible to classify living and non-living objects of nature, plants and animals; describes the general conditions and stages of development of living organisms. He/she knows the rules of safe behavior with plants and animals; names the dependence of natural objects on environmental factors; knows the main properties of inanimate objects of nature (water, sand, clay, stones, air); can name natural phenomena (snow, rain, hail, frost, dew); names individual properties of objects (hardness, softness, buoyancy, solubility, speed); realizes the need to preserve and protect nature.	The kid knows that the Earth is a part of the solar system; has an idea that space is being explored by people; knows that it is possible to classify living and non-living objects of nature, plants and animals; can describe the general conditions and stages of development of living organisms with the help of an adult; has partial knowledge of the rules of safe behavior with plants and animals; names some dependencies of natural objects on environmental factors; knows some basic properties of inanimate natural objects (water, sand, clay, stones, air); can name some natural phenomena (snow, rain, hail, frost, dew).	The kid classifies living and inanimate objects of nature, plants and animals only with the help of an adult; does not fully understand the conditions of development of living objects (stages of development, conditions, reactions to seasonal changes, division into groups); has knowledge of the basic properties of inanimate natural objects (water, sand, clay, stones, air), but cannot analyze or identify them independently; does not fully realize the importance of nature for human life; he/she is weakly oriented in human activity aimed at preservation, reproduction and protection of nature.
Emotional and valuable criterion	The kid responds positively and with interest to an adult's offer to observe something or someone; independently shows interest in various kinds of observations; responds enthusiastically to an adult's suggestions to preserve and improve the natural environment or provide assistance to living objects.	The kid shows an interest in learning nature, is interested in its objects and phenomena, is able to react emotionally to the natural environment, but does not actively show respect for various forms of life and interact with them.	The kid does not show interest in learning nature, is able to react emotionally to the natural environment, but does not actively show respect for various forms of life and interact with them.
Operational criterion	The kid is able to observe natural objects and phenomena; classifies and groups natural objects of flora and fauna according to characteristic features; takes care of plants and animals with the help of an adult; independently conducts simple experiments to learn the properties of natural objects and weather phenomena; knows how to sort garbage; does not forget to turn on the tap after washing hands.	The kid demonstrates the ability to observe natural objects and phenomena; able to grow plants and take care of animals with the help of an adult; can conduct experiments on learning the properties of natural objects based on the example of an adult; responds to an adult's suggestions to preserve and improve the natural environment or provide assistance to living objects.	The kid demonstrates the ability to observe natural objects and phenomena; able to grow plants and take care of animals with the help of an adult; responds to an adult's suggestions to preserve and improve the natural environment or provide assistance to living objects.

Table 2

Generalized indicators of natural science knowledge of preschool children

Group	High level	Intermediate level	Sufficient level
Control group (18 children)	20,3%	55,5%	24,2%
Experimental group (20 children)	21,6%	60%	18,4%

Table 3

The example of the perspective plan of the study group

The topic of the week	The aim	The contents
Planet Earth. Space	To consolidate and expand children's ideas about planet Earth as a place where people live. To give an idea of space and objects surrounding the Earth. To emphasize on the importance of the sun for life on the planet. To introduce children to the globe - a model of the Earth.	Watch a video about the planets of the solar system: «Planets of the solar system. Interesting facts about the planets. Children about the planets» Making a schematic map of our galaxy. Elements of the role-playing game «Space Journey». Design and construction activity: we are building a rocket.
What is soil, sand, clay?	To give children the concept of soil and how it differs from sand and clay.	Experimentation with soil, sand, clay and water. Examination of images of different types of soils. Conversation: «Who lives in the soil?»
Water. Water cycle in nature	Aggregate states of water. To form a realistic understanding of inanimate nature; consolidate knowledge that water can be in a solid state (snow, ice).	Experimentation «Water can pour and splash», the use of an artistic word. Watching the cartoon «Journey of a drop of water» Experimentation: «Water cycle in nature».
The air is all around us	To acquaint children with the concept of air and its necessity for life on the planet. Consolidate in the imagination of children that all living organisms need air.	Experimentation: «Who needs air?», «Air around us». Game «Who Needs Air?» Watching the video «Who Needs Air»
Why is there day and night?	To consolidate children's ideas about the globe as a model of the Earth. To explain why the parts of the day change.	Experimenting with a globe and a lamp. the game «When does it happen?» Watching the cartoon «Fixics. Globe». the game «Day and Night».
The sides of the world	To consolidate children's ideas about the globe. To introduce children to the concepts of «sides of the world», «map» and «compass».	Teacher's story. Compass observation. Watching the cartoon «The world is waiting to be discovered. Compass».
The wind	To expand children's understanding of the phenomena of inanimate nature: to tell children why wind is needed. Development of observation.	Observation, use of the artistic word, experimentation: «The wind blows, the boat sails». Work - making windmills.
Natural phenomena	To give concepts about water evaporation, cloud formation, sun, thunderstorm, hail, snow in an accessible form. To familiarize children with the rules of behavior during a thunderstorm	Observation, consideration of illustrations, reading encyclopedic information. Game «Recognize by sound» Creation of a reminder: «Rules of behavior during a thunderstorm». Watching the cartoon: «Natural phenomena»

When planning the work of the study group, special attention was paid to several key areas that ensure the comprehensive development of children and the assimilation of natural science knowledge.

The educational and entertainment direction is focused on familiarizing children with objects of living and non-living nature. It is important that this process takes place in an interesting, playful way, which contributes to better assimilation of the material and arouses in children a keen interest in the world around them. Children will learn about the variety of plants and animals, the peculiarities of their life, as well as about natural phenomena. An important component of this direction is the study of the impact of human activity on nature, which helps to form a conscious attitude to the environment in children. Playful forms of work, such as environmental games, quests and role-playing games, make learning exciting and effective.

The practical direction includes direct interaction of children with nature through various practical activities. This is the study of the diversity of flora and fauna, which is connected with activities. Children are involved into feeding birds, caring for plants, growing flowers and vegetables. Such activities contribute to the development of observation, responsibility and a caring attitude towards nature. Children learn to care for living organisms, understand how important it is to preserve natural resources. Practical activities also include creating your own small gardens or corners of nature, which promotes the development of creative skills and aesthetic taste.

The research direction is aimed at developing research skills and critical thinking in children through productive activities. This direction includes conducting excursions to natural objects, observing natural phenomena and organizing experiments. Children learn to make assumptions, conduct experiments, analyze results and draw conclusions. Such activity not only expands their knowledge about nature, but also forms critical thinking and independent decision-making skills. Excursions to a forest, a park, a botanical garden or to the banks of water bodies allow children to see what they have learned in theory and conduct their own research in a natural environment.

Thus, when planning the work of the study group, the importance of a combination of cognitive and entertaining, practical and research activities was taken into account, which ensures the harmonious development of children and contributes to their formation of deep and conscious knowledge about the natural environment.

During the work of the study group, preschool teachers used various forms and methods: excursions, targeted walks, observations, consideration of book illustrations and reproductions; reading literary works and encyclopedic materials, conversations with elements of dialogue, generalizing stories of the teacher; conducting various games, experimental and research activities, solving riddles, organizing children's productive activities, designing a herbarium of plants and fruits, making visual aids, etc.

At the end of the study group work, we once again conducted a diagnosis of children's knowledge about nature, the results of which are presented in Table 4. As we can see, the natural science knowledge of children in the experimental group has higher indicators than in the control group. Thus, the high level of formation of natural science knowledge among senior preschoolers in the experimental group increased by 8.4%, the intermediate level increased by 3.3%, and the sufficient level decreased by 11.7%. Indicators in the control group did not change significantly, however, the intermediate level of knowledge increased by 3.8%, and the sufficient level, accordingly, decreased by 3.8%. So we can state a positive result of conducting study group work on the formation of natural science knowledge of preschoolers.

Table 4

Generalized indicators of natural science knowledge of preschool children

Group	High level	Intermediate level	Sufficient level
Control group (18 children)	20,4%	59,2%	20,4%
Experimental group (20 children)	30%	63,3%	6,7%

Due to a complex and comprehensive approach to familiarizing senior group children with nature, adherence to the principle of continuity and perspective, as well as close cooperation of preschool teachers and primary school teachers, we observe positive results of study group activities. Children not only broadened and deepened their knowledge of

living and non-living nature, including natural phenomena, plants and animals, but also significantly developed their ability to observe and notice changes in nature, such as seasonal and weather changes, as well as growth and development processes. They began to show greater interest in nature protection and environmental activities, which indicates the formation of environmental awareness.

In addition, children's interest in scientific information, in particular encyclopedic literature, increased. They actively study various aspects of life on Earth and beyond, show interest in space research and various forms of life on our planet. It testifies on their readiness for deeper scientific knowledge and the development of critical thinking.

The common efforts of preschool teachers and primary school teachers helped children not only to learn basic knowledge, but also to become interested in more complex topics, such as ecology and astronomy. It creates a solid foundation for further learning and development in primary school, ensuring a smooth transition between levels of education and stimulating their natural curiosity about the world around them.

An experimental study showed that group work in preschool education institutions is an effective tool for THE NATURAL SCIENCE KNOWLEDGE FORMATION OF CHILDREN, which contributes to their comprehensive development and facilitates the transition to educational activities in primary school. It is based on a combination of cognitive and entertaining, practical and research activities, which provides a flexible and creative approach to learning, increases the level of environmental awareness and critical thinking.

Conclusions. Therefore, for the effective formation of natural science knowledge in first graders cooperation between preschool educational establishments and primary school is necessary. Preschool teachers must prepare the child for schooling, while primary school teachers, organizing the educational process, have to not only consider the existing knowledge of children, but also use methods that facilitate the assimilation of information, including wider use of game methods. It is also important to regard the age-specific characteristics of children's psychological development and actively use visualization. One of the ways to prepare preschoolers for studying at school is study group work, in particular in natural science.

Within the framework of further research, it seems promising to expand the experimental base in order to study the effectiveness of various forms of organizing the educational environment in preschool educational institutions that contribute to the formation of natural knowledge. In particular, it is advisable to study the impact of integrated approaches, STEM education, digital tools and media resources in the context of implementing the principle of continuity. In addition, further attention is required to develop methodological recommendations for teachers to ensure continuity at the practical level, including variable models of educational programs adapted to different types of preschool educational institutions and primary school, as well as systems of professional training and professional development of pedagogical personnel in this sphere.

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