ӘОЖ 371.398
ҒТАМР 14.35.09 **https://doi.org/10.51889/3005-6217.2023.78.4.005**

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USING PROJECT METHOS AT THE BIOLOGY LESSONS TO IMPROVE STUDENTS RESEARCH SKILLS

Abstract

This article discusses the features of the organization of research work in biology lessons by the design method. The openness of the project method and the humanization of the principles of learning are reflected in its features. In addition, the project-based learning method describes a number of strategies that guarantee the comprehensive personal development of the student. The article considers a methodological proposal designed to facilitate the implementation of educational projects related to the teaching of biology. The conclusions revealed by the test indicate the effectiveness of the project method for the formation of universal educational actions.

This article discusses the advantages of using the project method in a biology lesson. This method, the technology of the fourth generation, promotes independent learning among students, contributes to their academic and personal development. It is aimed at increasing the cognitive motivation, research skills and information culture of students with an emphasis on universal learning activities. The content of the article includes a review of the literature, reflects the value of project-based learning in the knowledge of biology and describes its ways to increase motivation, academic performance and activity of students.

The article analyzes the theoretical foundations and methodology for the development of research skills in biological education. The methodological foundations of the biology lessons of the design method include the identification of species of wintering birds, the study of the vitamin content in various products and the study of pests affecting various varieties of apples. In the article, we described that research competence, the development of creativity and critical thinking are influences on the fulfillment of these project tasks.

The article analyzed the problems faced by teachers, emphasizing the need to change learning strategies. In other words, we are talking about the possibilities of using distance learning in the process of organizing scientific projects and describes how important it is to adapt to new teaching methods, such as project-based learning.

During the experimental work and in the section "Materials and methods", the possibilities of equipping the biology classroom in project training were described. In order to effectively assimilate information, skills including analytical abilities and data processing skills were consolidated in the conclusion of the article. According to the proposal presented in the article, to improve the research skills of students, the widespread use of the project method of teaching biology lessons is effective.

Keywords: project, research, hypothesis, biology, problem, method.

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БІЛІМ АЛУШЫЛАРДЫҢ ЗЕРТТЕУ БІЛІМДЕРІН ЖЕТІЛДІРУ ҮШІН БИОЛОГИЯ САБАҒЫНДА ЖОБА ӘДІСТЕРІН ПАЙДАЛАНУ

Аңдатпа

Бұл мақалада жобалау әдісі арқылы биология сабағында жобалау жұмыстарының ұйымдастырылу ерекшеліктері қарастырылады. Жобалық әдістің ашықтығы мен оқыту принциптерін ізгілендіру оның ерекшеліктерінен көрінеді. Сонымен қатар, жобалық оқыту әдісі білім алушының жан-жақты тұлғалық дамуына кепілдік беретін бірқатар стратегияларды сипаттайды. Мақалада биологияны оқытуға қатысты білім беру жобаларын жүзеге асыруды жеңілдетуге арналған әдістемелік ұсыныс түрінде қарастырылды. Тест арқылы анықталған қорытындылар әмбебап білім беру әрекеттерін қалыптастыру үшін жоба әдісінің тиімділігін көрсетеді.

Осы мақалада биология сабағында жоба әдісін қолданудың артықшылықтары қарастырылады. Жоба әдісі, төртінші буын технологиясы білім алушылар арасында өз бетінше оқуға ықпал етеді, олардың академиялық жазылым және тұлғалық дамуына ықпал етеді. Ол әмбебап оқу іс-әрекетіне баса назар аудара отырып, оқушылардың танымдық мотивациясын, зерттеушілік біліктерін және ақпараттық мәдениетін арттыруға бағытталады. Мақала мазмұны әдебиеттерге шолуды қамтиды, биология біліміндегі жобалық оқытудың құндылығын көрсетеді және оның білім алушылардың мотивациясына, оқу үлгеріміне және белсенділік көрсеткішін арттыру жолдарын сипаттайды.

Мақалада биологиялық білім берудегі зерттеу дағдыларын дамытудың теориялық негіздері мен әдістемесіне талдау жасалады. Жобалау әдісінің әдістемелік негіздемесі, қыстайтын құс түрлерін анықтау, әртүрлі өнімдердегі витаминдердің мазмұнын зерттеу және алманың әртүрлі сорттарына әсер ететін зиянкестерді зерттеу жатады. Мақалада көрсетілген зерттеу құзыреттілігі, креативтілікті және сыни ойлауды дамыту - осы жобалық тапсырмаларды орындаудың ықпалы деп сипаттадық.

Мақалада оқыту стратегияларын өзгерту қажеттілігін көрсете отырып, оқытушылар кездесетін мәселелерге талдау жасалды. Яғни, ғылыми жобаларға қашықтықтан оқыту ұйымдастыруда қолдану мүмкіндіктері туралы айтылады және жобаға негізделген оқыту сияқты жаңа оқыту әдістеріне бейімделудің қаншалықты маңызды екені сипатталады.

Қатысушылар мен эксперименттік жұмыс барысында, материалдар мен әдістер бөлімінде жобалық оқытуды биология кабинеттеріне жабдықтау мүмкіндіктері сипатталды. Ақпаратты тиімді меңгеру үшін, талдау қабілеттері және деректерді өңдеу дағдыларын қамтитын біліктер мақаланың қорытындысында келдтірілді. Мақалада берілген ұсынысқа сәйкес, білім алушылардың зерттеу тәжірибесі мен біліктерін арттыру үшін биология сабақтарында жоба әдісін кеңінен қолдану тиімді.

Түйін сөздер: жоба, зерттеу, гипотеза, биология, мәселе, әдіс.

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ИСПОЛЬЗОВАНИЕ МЕТОДА ПРОЕКТОВ НА УРОКАХ БИОЛОГИИ ДЛЯ СОВЕРШЕНСТВОВАНИЯ ИССЛЕДОВАТЕЛЬСКИХ НАВЫКОВ УЧАЩИХСЯ

Аннотация

В данной статье рассматриваются особенности организации исследовательских работ на уроках биологии методом проектирования. Открытость проектного метода и гуманизация принципов обучения отражаются в его особенностях. Кроме того, метод проектного обучения

описывает ряд стратегий, которые гарантируют всестороннее личностное развитие обучающегося. В статье рассмотрено методическое предложение, призванное облегчить реализацию образовательных проектов, связанных с преподаванием биологии. Выводы, выявленные тестом, свидетельствуют об эффективности метода проекта для формирования универсальных образовательных действий.

В данной статье рассматриваются преимущества использования проектного метода на уроке биологии. Данный метод, технология четвертого поколения способствуют самостоятельному обучению среди обучающихся, способствуют их академическому и личностному развитию. Он направлен на повышение познавательной мотивации, исследовательских умений и информационной культуры учащихся с упором на универсальную учебную деятельность. Содержание статьи включает обзор литературы, отражает ценность проектного обучения в знании биологии и описывает его пути повышения мотивации, успеваемости и активности обучающихся.

В статье сделан анализ теоретических основ и методологии развития исследовательских навыков в биологическом образовании. Методическое основы на уроках биологии метода проектирования включает, определение видов зимующих птиц, изучение содержания витаминов в различных продуктах и изучение вредителей, поражающих различные сорта яблок. В статье мы описали, что исследовательская компетентность, развитие креативности и критического мышления - это влияние на выполнение этих проектных задач.

В статье был проведен анализ проблем, с которыми сталкиваются преподаватели, подчеркнув необходимость изменения стратегий обучения. То есть речь идет о возможностях применения в процессе организации дистанционного обучения для научных проектов и описывается, насколько важна адаптация к новым методам обучения, таким как проектное обучение.

В ходе экспериментальной работы и в разделе «Материалы и методы» были описаны возможности оснащения кабинета биологии в проектном обучении. Для эффективного усвоения информации в заключении статьи были закреплены умения, включающие аналитические способности и навыки обработки данных. Согласно предложению, представленному в статье, для повышения исследовательских умений обучающихся эффективно широкое применение проектного метода обучение на уроках биологии.

Ключевые слова: проект, исследование, гипотеза, биология, проблема, метод.

Introduction. Students can study independently, increase their level of knowledge, break free from rigid frameworks according to their personalities, and conduct extensive research when teachers employ the project method in the classroom in today's information-rich society.

The "Project" method is a fourth-generation technology that employs a method of step-by-step organization and description of activities carried out in a limited amount of time and with limited resources. It also applies an individual-active approach to learning. When implementing the project method, the instructor should consider the interests and psychological and physiological traits of the students; in other words, the project should include manageable, creative tasks.

The creation of universal learning activities is the primary objective of a teacher's job. Instead of being taught through "training" on a particular subject, students are taught to break down problems, come up with multiple solutions, and then identify the best solution [1, pp. 322-331].

Teaching through the project method fosters the development of many academic skills as well as the personal traits of business, energy, and responsibility. It also teaches students to take responsibility for the outcomes of their work and instills the belief that each person's contribution to the work process determines the final product. Finally, it gives students an opportunity to demonstrate their abilities and uniqueness through their practical activities. permits the development of research competencies and skills.

The development of students' cognitive motivation, their capacity to independently gather knowledge, their aptitude for navigating the information space, their ability to analyze received data,

their ability to independently generate hypotheses, and their mastery of cognitive, research, creative, and decision-making skills form the cornerstone of the project method [2, pp. 51-57].

Furthermore, it has been demonstrated that the project method, when applied in laboratory classes, influences the development of professional and practical skills and advances knowledge of biological processes. It boosts students' creativity in addition to their interest in the subject. It is the sole method for fusing theory and application [3, pp. 32-37].

The aim of the research is formation of universal learning activitie to find and create the techniquies of improvig the research skills of the biology speacialty students though project methods. Students are not taught by the method of "training" on some selected topic, but they are taught to divide the problem, to solve it in different ways and to find the most optimal way to solve it.

Teaching by the project method helps students to solve many educational tasks and develop personal qualities: business, energy, responsibility, teaches responsibility for the results of their work, creates the belief that the result of work depends on the individual contribution of each person, and allows students to show their abilities and individuality, their practical activities. enables formation of skills and abilities, research competences. implwmentation of the project method in the biology speacities classes to improve research skills of the students.

The study aims to develop theoretical foundations, methods of forming research skills of pupils in biological education, and experimental substantiation of its effectiveness. The following methods were used: analysis of psychological and pedagogical, biological, scientific, and methodological literature, the definition of the theory, the innovative methods of biological education, practical work, pedagogical practice, control, questionnaires, interviews, statistical analysis, identification, and implementation of training experiments. It is proposed to develop methods and determine the content of the formation of research competence through project activities, conduct and introduce them into the educational process. It is necessary to analyze the psychological, pedagogical, biological, scientific, and methodological literature to determine the theory, innovative methods of biological education, the organization of practical work, pedagogical practice, using a statistical method, which will lead to the creation of a methodology for the formation of research skills of pupils. Keywords: project-based learning, research, methodology, reflection, group work [4, pp. 86-88].

The article emphasizes the advantages of Project-based learning in building skills in biology teaching. Working on projects not only contributes to the development of students' critical thinking and creative abilities but also increases their motivation to learn. One of the most important conditions for increasing the effectiveness of the educational process is the organization of project-research activities and the development of research skills, which are its main component. However, currently, most secondary school teachers don't use the project method in biology teaching. Knowledge is given to students ready-made, it isn't got independently, and no search for additional information is required. [5, pp. 60-66].

At the beginning of the 21st century, the reconstruction, modernization of the education system in Azerbaijan and using active and interactive methods is considered a priority task. The development of the education system in Azerbaijan is characterized by the organization of activities in two directions. The first is to study, summarize and analyze the achievements in the field of education in the country. Secondly, the study and generalization of progressive aspects of the learning experience of developed foreign countries and their implementation, taking into account national and moral characteristics, is an important problem and is distinguished by its relevance. Project-based teaching is one of the most important active teaching methods for biology students. Research over the past 30 years has shown that student engagement and high motivation also lead to high academic performance. Project-Based Learning (PBL) is an instructional methodology that encourages students to learn and apply knowledge and skills through an engaging experience. PBL presents opportunities for deeper learning in-context and for the development of important skills tied to college and career readiness. While the benefits are clear, this shift in teaching and learning can be challenging for many educators. In this guide, you will learn: Research on how PBL improves student outcomes; Best practices for engaging students in PBL; Resources that can help you plan your PBL lessons with ease. [6, pp. 93].

This article examines the possibility of using the Project Approach as an alternative to Laboratory Practical work in the teaching and learning of Biology at ordinary level in Rural Secondary schools in Zimbabwe. The study was carried out in six rural secondary schools in the Manicaland province of Zimbabwe and three Teachers' Colleges in the same province. The sample was composed of twelve biology teachers from six schools and three lecturers from the three teachers' colleges. Data were collected through focus group discussion, lesson observations and questionnaires. To determine if it is possible to implement this method, the study examined teachers' knowledge of the project approach in theory, teacher confidence in using the method, and whether prevailing circumstances, such as time-tabling, assessment process and nature of curriculum permit the implementation of this approach.

The findings of this research suggest that it is possible to implement the Project Approach in developing problem solving skills in ordinary level Biology students. However, this should not be a substitute to regular laboratory methods, but rather would be used in conjunction with those other methods [7].

Citizen science projects can be used in college laboratory settings to allow students to gain hands-on experience in research during emergency remote learning. During the 2020 spring semester, we used the citizen science project, Budburst, in our introductory biology laboratory during the COVID-19-induced emergency remote learning period. The instructors were able to quickly adapt the project for emergency remote teaching because of the versatility of citizen science projects. The goals of this paper are to describe the project the students completed and to determine which data literacy and scientific writing skills were gained through the process. The students were provided with the research question: "How does temperature affect the phenophases of your trees?" Students collected their own data and downloaded Budburst data sets from the website to compare between years and to connect their results to long-term temperature data sets. The final project was a scientific paper based on their findings from both data sets. After the semester, a subset of papers was scored by two researchers using a previously validated rubric designed to evaluate students' research skills. We evaluated students' higher-order thinking by investigating their ability to develop a prediction statement, and to improve their qualitative skills by developing graphs, statements on the limitations for methods and results, and alternative explanations for their findings. We saw that using citizen science during remote teaching enabled the students to gain authentic research experiences and continue to improve their skill set even if they could not be in the laboratory [8, pp. 4-16].

In light of these authors' observations, it would be a good idea to encourage and lead workshops or training sessions for secondary school teachers on the successful integration of project-based learning (PBL) and the Project Approach into biology education, especially for those in Azerbaijan and Zimbabwe. The observed resistance of many teachers to use these active teaching techniques could be addressed by this initiative.

Training sessions ought to center around:

1. Methodology and Theory: Describe in detail the benefits, techniques, and theoretical underpinnings of project-based learning as they are emphasized in the literature. This can provide educators with the skills they need to successfully apply these strategies.

2. Real-World Application: Provide best practices and anecdotes from teachers who have successfully used the Project Approach and PBL in biology classes. To give teachers confidence that implementing these methods is feasible, address issues like curriculum alignment, time-tabling, and assessment procedures that have been brought up in the literature.

3. Sources and Equipment: Provide educators with useful materials, lesson ideas, and other resources to help them easily incorporate project-based learning into the biology curriculum. Give advice on how to modify projects for various situations, such as distance learning.

4. Engagement Strategies: Focus on techniques to raise motivation and engagement levels among students via project-based learning. Draw attention to the benefits, which include enhanced research abilities, creativity, and critical thinking, as shown by numerous studies.

5. Citizen Science Integration: Promote the use of citizen science initiatives, like the Budburst example, to offer practical research experiences even in difficult situations like emergency remote learning.

The goal of this all-encompassing strategy is to close the gap between the authors' highlighted practical implementation challenges and the theoretical understanding of project-based learning. We can encourage a wider adoption of these successful teaching techniques in biology education by equipping educators with the required information, tools, and techniques.

Materials and methods of research. Participants: Students from the Eurasian Agrarian College majoring in "Forestry" and "Agronomy" were included in this study. A special assignment was made to place 25 students from the specialty of "Forestry" and 25 students from the specialty of "Agronomy" in the experimental and control groups.

Using the project method to teach demonstrates, among other things, the usefulness of the practical-theoretical project method and the validity of the evaluation system. Therefore, the aim of teaching through the project method is to establish an environment in which students can learn from diverse sources of information on their own and learn how to apply what they have learned to solve practical and cognitive tasks. Among these techniques is the project method, which is utilized to teach a variety of subjects in schools today and is, in our opinion, the foundation of contemporary innovative technologies.

The following business serves as the foundation for the project activity:

- the capacity to see, formulate, and solve problems;
- autonomous application of knowledge in practice;
- orientation in the information domain;
- ongoing self-education; and critical and creative thinking [9, pp. 303].

We understand the concept of the project method as a generalized model of a certain way of achieving the educational and cognitive task, a system of approaches, a certain technology of cognitive activity. "Project" is the result of activity and it is important not to confuse the concept of "project" with a method of learning.

- independent application of knowledge in practice;
- orientation in the information space;
- continuous self-education;
- critical and creative thinking;
- the ability to see, formulate and solve problems.

A problem that necessitates both individual and group research exists in the project method. It can be applied in one or more lessons, or in multiple lessons. expands on the idea of research and design activities. According to scientists, research frequently takes on the role of a "project". Actually, the planning and execution of this research serve as the foundation for all other research [10, pp. 36-40].

The goals and outcomes of design and research activities differ. The goal of research is to master and discover new information by stimulating cognitive functions and activity. The project's activity is experimental by nature and is intended to produce a specific object (model). Although the two services differ, they are comparable [11, pp. 76].

The basis of the method of educational projects is its practical orientation to the result, which must be visible, understandable, and practical. In order to achieve such a result, students should have the ability to see the problem, draw up comprehensive knowledge, independently develop options for solving them, predict the result, adjust their action plan depending on the situation, etc.

One way to guarantee children's and adults' creativity and communication is through project-based learning. Additionally, in some circumstances, it can be claimed that there is a relationship between an individual's involvement in the design activity and the participants' self-development (i.e., their capacity for self-expression, self-determination, and creative growth). Children's involvement may be necessary for teachers to grow and become more receptive to criticism [12, pp. 102].

A learning project has a very rigid schedule, documentation requirements, and structure. Each project has a clear start and finish. Projects in education have a different scope. timely assignments from the students to gather information, evaluate it, etc. b. consists of three time-consuming categories: long-term, medium-term, and short-term.

Several aspects of this teaching approach must be emphasized while working on the project. Prior to anything else, a problem needs to be resolved in order to proceed with this project. The project's author should be personally invested in solving the issue, and he should be supported in doing so. The project method is an adaptable framework for setting up the training and education procedure. The following is a breakdown of projects by scope and direction:

1. A monodisciplinary project is one that adheres strictly to the classroom-educational system and is conducted within the parameters of a single academic discipline.

2. A project that incorporates knowledge from two or more disciplines is referred to as interdisciplinary. frequently employed as a supplement to mental work.

3. An extracurricular project is simply an extracurricular project; it is completed outside of the regular school curriculum and occurs at the nexus of various educational domains. It has a research quality and is added to educational activities. It is imperative to adhere to specific milestones during the project creation process [13, pp. 192].

There are many ways to create a project-based learning approach, but the ten-step option below works well: creating a project task; forecasting the goal; forming creative groups; developing stages; allocating responsibilities in accordance with the project plan (differentiating the child's role); developing the project; articulating the conclusions and outlining its forms; formalizing the outcomes; presenting the work; and reflecting on it. The existence of a design tradition is the most crucial factor in the organization of project work. A great deal of tradition exists. Here, the experience of collaborating with the teacher and project participants is more important than the presence of a problem when it comes to "project" work. In biology class, projects should begin in class; that is, participants will complete some of the work in class and some of it outside of it [14].

For instance: "entering the project" (topic, goal, tasks, etc.) is completed in class, along with work with literary sources and project preparation at home; the teacher guides the experimental portion, which is carried out in a dedicated classroom, and the results are presented in the classroom. Making the most of mixed lessons based on the activity approach, planning laboratory and practical work, and encouraging group interaction are all necessary for this. These classes get students more engaged and give them the opportunity to demonstrate independence [15 pp. 24-30].

There are many ways to create a project-based learning approach, but the ten-step option below works well: creating a project task; forecasting the goal; forming creative groups; developing stages; allocating responsibilities in accordance with the project plan (differentiating the child's role); developing the project; articulating the conclusions and outlining its forms; formalizing the outcomes; presenting the work; and reflecting on it. The existence of a design tradition is the most crucial factor in the organization of project work. A great deal of tradition exists. Here, the experience of collaborating with the teacher and project participants is more important than the presence of a problem when it comes to "project" work. In biology class, projects should begin in class; that is, participants will complete some of the work in class and some of it outside of it.

Student projects are a vital and effective part of biology education. This is explained by the fact that, when utilizing the explanatory-illustrative method, learners' task is to memorize and reproduce knowledge through training or by mastering some activity, whereas, when using the project method, students study objects and phenomena while creating an autonomously designed or suggested work plan. It establishes the routes, which is the explanation. It is made evident what knowledge or abilities must be gained by completing assignments that are either self-created or recommended by the instructor. As a result, students will need current information. When we employ the project approach, we concentrate student engagement on the creative acquisition of scientific knowledge and the acquisition of scientific knowledge techniques. The fundamental idea behind the method is to present an issue and let students solve it on their own. Every search has value. We used a variety of project typologies in our work. These can be individual, pair, or group projects depending on the number of participants; they can be short-term (due within a specific time frame of the lesson), medium-term (due within a week to a month), or long-term (due to the nature of the students' primary activity). The majority of projects that have been put into action have grown more complex, incorporating multiple types.

Let's discuss each kind of project in brief:A project titled "Determining the species composition of wintering birds in the territory of Almaty" was prepared by the LPH-110 (Forestry) group of biology students. The project's issue was determined to be the excessive increase in wintering birds, such as crows, blackbirds, sparrows, and sparrows, as well as the climate, weather, and decline in predatory bird populations.

Students find mini-studies such as comparing the characteristics of various synthetic food additives, proteins, and vitamin content in various food products to be highly engaging.

Conducting a brief practical exercise with biology group AG-108 (Agronomy) students on "Determination of vitamin C in some products" as part of the project work on the topic of "Vitamins". The lesson plans state that students research the amount of this vitamin in apple juice, compote, lemon juice, and cabbage sauce.

The use of the "project" method in biology lessons by teachers, in the implementation of such work, helps to establish equal relationships between like-minded students and team members engaged in common work. It also presents a great opportunity for children of different ages to cooperate within the general framework of work, and most importantly, for the development of research skills in them. offers.

We also completed project work on subjects like "Medicinal plants, their variety and importance in nature" and "Effect of ultraviolet rays on the skin" within the framework of our research.

Research results and their discussion. A project titled "Determining the species composition of wintering birds in the territory of Almaty" was prepared by the LPH-110 group of biology students. The project's issue was determined to be the excessive increase in wintering birds, such as crows, blackbirds, sparrows, and sparrows, as well as the climate, weather, and decline in predatory bird populations. This leads to serious harm being done to gardens, grain crops, and crops. One can observe the effects of damage to parks, alleys, monuments, and architectural buildings as a result of their excessive concentration. As per the project plan, the students collaborated in groups with the teacher's council to complete the assigned tasks. These data are used to identify the general characteristics of bird spatial crowding as well as the nature of bird distribution in geographic regions and biotopes. Data on biomass, aggregate density, and other aspects of wintering birds' life patterns as well as informative characteristics were gathered. Data on the total density, biomass, and other patterns of life of wintering birds were gathered, and information was provided. The distribution of birds by geographic regions and biotopes, as well as the general characteristics of the formation of spatial flocks of birds, were determined. The students in the group identified the type, color, body shape, and ability of the birds to find and eat food from under the snow (sharp beaks, strong, sharp claws) in the area marked by a specific route in order to observe the birds living in the local area during the winter.

For instance, he carried out research to identify their rivals and where they fit into the food chain based on similarities. Birds are caught between the hours of 800–1800 and 1900–2100, with consideration given to signs such as weight, sex, and wing and leg length.

During the working stages, dictionaries and atlases were used in conjunction with ornithological methods. The work's outcomes were discussed in class, supported by compelling information, and presented. The students who completed the project demonstrated their intellectual, creative, and personal abilities as well as their independence, responsibility, and activity. They also learned how to independently search for and analyze information, combine and apply previously acquired knowledge from other subjects, and master the design activity algorithm. Decision-making and planning abilities are developed. The project culminated in a photo shoot and celebration of the Day of the Birds. The students' research potential was realized, independence was taught, new knowledge was acquired, and entrepreneurship was fostered. Students learned about the fundamentals of conducting scientific research. Students gained motivation, learned how to set goals and objectives, and developed a research plan. They also developed research skills.

Students find mini-studies such as comparing the characteristics of various synthetic food additives, proteins, and vitamin content in various food products to be highly engaging.

A brief practical exercise titled "Determination of vitamin C in some products" was completed as part of the project work on the topic of "Vitamins" with the biology students in group AG-108. The students examined the vitamin's content in apple juice, compote, lemon juice, and cabbage sauce, per the instruction cards. They came to the conclusion that while vitamin C is absent from processed foods, it is present in fresh fruits and vegetables.

Students who are not particularly interested in biology were also drawn to this service because it allows you to plan the next work within the concepts of cancer, immunity, antioxidants, and other related topics. I assign brief assignments as homework for the class, like measuring, counting your pulse before and after the load, or researching your mood. Following this assignment, the kids will gather the required data and information about their new body and give a presentation. The use of the "project" method in biology lessons by teachers, in the implementation of such work, helps to establish equal relationships between like-minded students and team members engaged in common work. It also presents a great opportunity for children of different ages to cooperate within the general framework of work, and most importantly, for the development of research skills in them. gave topics like "Medicinal plants, their variety and importance in nature" and "Effect of ultraviolet rays on the skin" within the context of our research. On topics, project work was also completed. Differentiated tasks and questions were prepared for the students based on their interests, skills, and capabilities in order to organize the project activities. The research was completed in accordance with the plan, and during biology week, the findings were presented and defended. Students had a full opportunity to showcase their identities, apply their knowledge, and present their work in public thanks to the successful implementation of the project method in the lesson. Lessons became more focused on solving the real-world problems they encountered as their progress accelerated.

Information about the application of the project method in biology classes within the college's general education practice can be found in methodological literature and websites. We looked through the literature to find this information. We investigated the experience of biology teachers using the project teaching technology, based on the examination of the projects displayed on the websites (e.g., "Teachers site u-s kz"). According to our .

Students can use this website https://aibarorazbek5.wixsite.com/kingdom to upload their work and email it to me. I will assign ten points for grading the children's work. The analysis of the works, made possible by the computation of these grades, enabled us to conclude that the majority of the projects– 35.9-66.7% – are research, with only a minor portion – 1.9-8.9% – being games. An examination of the projects listed on the websites revealed that students also complete informational, practical, and interdisciplinary projects while working with teachers. As long as students participate in a variety of projects, the pedagogical potential of project activity as a way to foster students' cognitive motivation can be applied more successfully. Several project works were prepared with us during the training process specifically for this purpose. Additionally, within the framework of topics, methodical materials for the project were gathered, and technological maps of the classes were developed. These included topics like "Medicinal plants, their variety and importance in nature," "Effect of ultraviolet rays on the skin," and "Environmental factors." Tasks and questions have been created for the students based on their interests, skills, and capacities in order to structure the project activities. It was created while conducting the research. "Stepping into a new horizon of science" was the theme of the students' conference, where educational and methodological materials gathered under the project "Harmful food additives of the 21st century" were successfully tested.

It has been established that a significant trend in biology education is the diversity of approaches employed by instructors, one of which is the attention given to the arrangement of students' project activities in project-based learning.

As per the teachers' perspective, the project method's opportunities can be efficiently employed to enhance students' cognitive motivation, guarantee their involvement in diverse project kinds, and refine the biological education material base. Therefore, the purpose and content of project activities, as well as the educational and psychological foundations for project education in schools, were examined in our work.

In the biology class of JO-116 students, the developed program of the project "Investigation of the fauna of pests of apple varieties in the conditions of the Karatau mountain range" was tested. The goal of this curriculum is to instill a lifelong interest in biology in the students and to apply biological knowledge to everyday situations. The intended outcome is to teach students how to identify tomato and potato pests in their own gardens, summer homes, and on their own property. They will also learn about preventative measures and how to apply biological knowledge to practical problem-solving.

Teachers must put in a lot of work with the project method because their role as conductors is limited to controlling student behavior and guiding them toward predetermined conclusions.

Throughout the investigation, it was determined that the issue of helping students become more cognitively motivated during project training is pertinent to contemporary teaching methods. In this way, the purpose and content of the project were ascertained, and the pedagogical and psychological foundations as well as the subject matter of the project education in the classroom were examined. The breadth of options for fostering students' cognitive motivation during project training was defined and ascertained throughout the research process.

Conclusion. In summary, students learn new subjective facts and formulate new ideas on their own during "project" work rather than obtaining prefabricated knowledge from the teacher. They have a strong sense of personal significance from reading, which makes them feel like the first explorers and motivates them to learn more. As long as students participate in a variety of projects, the pedagogical potential of project activity as a way to foster students' cognitive motivation can be applied more successfully.

For this reason, encouraging students to use the project method more often ensures that the teacher's lesson will be successful. When the "Project" method was extensively employed, the following benefits of students taking part in the project work were discovered.

Students described in their evaluations of the work completed not only their emotional connection to it, but also what they learned from it, as well as its challenges and successes. Additionally, students developed cognitive universal learning activities during the course of the work.

Students started to understand information from texts, graphics, and diagrams more effectively. Learned how to classify and gather objects based on their qualities, present information in the form of a scheme, and identify cause-and-effect relationships. verifying data and utilizing reference materials to obtain more information. It became proficient in coming up with his own unconventional solution, figuring out how to change the object, improvising and coming up with new ideas, etc.

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ӘОЖ 373.574
ҒТАМР 14.25.09 **https://doi.org/10.51889/3005-6217.2023.78.4.006**

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ТАНЫМДЫҚ ХИМИЯЛЫҚ ЕСЕПТЕР ШЫҒАРУДЫҢ ТЕОРИЯЛЫҚ НЕГІЗДЕРІ

Аңдатпа

Мақалада оқу танымдық әрекеттерді арттыруға әсер ететін оқу үрдісінің әдістері туралы құнды ой-пікірлер айтылады. Оқушылардың танымдық белсенділігін арттыру бірінші кезекте ойлау белсенділігімен, оқудағы іс-әрекеттерімен байланысты екендігі тұжырымдалады. Танымдық тапсырмалар арқылы оқушыларда танымдық белсенділік орын алады. Сәйкесінше танымдық белсенділік оқушылардың білім алуға, оқуға, дағдыны меңгеруге деген ынта-ықыласының, қызығушылық, құштарлығының ерекше көрінісі ретінде сипатталады. Зерттеулерде танымдық тапсырмалар арқылы химия сабағында оқушылардың белсенділігін, қызығушылығын арттыру мүмкіндіктері қарастырылған. Оқушылардың танымдық белсенділігін арттырудың педагогикалық-психологиялық және әдістемелік негізі келтірілген. Химия жаратылыстану ғылымдарына жататын оқу пәні болғандықтан, оқушылардың санасында химияның жеке бейнесін қалыптастыру маңызды рөл атқарады. Мектепте химия пәнін оқытуда танымдық тапсырмаларды қолдану ерекшеліктері олардың бірқатар дидактикалық талаптарға толық сәйкес келуіне және жүйелі түрде қолданылуына байланысты. Химиядағы танымдық тапсырмалар оқушылардың белсенділігін арттыратын тапсырмалардың ерекше түрі болып табылады.

Түйін сөздер: танымдық белсенділік, танымдық тапсырма, білім алуға қызығушылық, танымдық іс-әрекет, әдістеме, оқыту үдерісі