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PROJECT BASED LEARNING INTO PRIMARY LIFE SCIENCE LESSONS

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Abstract. Project-Based Learning (PBL) is an engaging, student-centered approach that encourages active exploration, problem-solving, and collaboration. In primary science lessons, it helps students connect learning to real-world situations, fostering creativity, critical thinking, and independence. Through PBL, students work on meaningful projects, practice teamwork, develop communication skills, and integrate multiple subjects such as science, math, and art. The method typically follows five stages: problem identification, planning and preparation, implementation, reflection and evaluation, and sharing results. By experiencing these steps, students gain confidence, motivation, and the ability to transfer knowledge across contexts while discovering the joy of learning. PBL not only improves academic skills but also equips students with life skills such as perseverance, collaboration, creativity, and curiosity, preparing them for future learning and real-life challenges.

Key words: creativity, life skills, collaboration, problem solving, education.

Introduction. While teaching, the teacher uses several strategies to increase the effectiveness of learning. One of these strategies is the project-based learning method, which emphasizes the planned, step-by-step implementation of the subject. The goal of project-based education is to nurture creative, active children who are capable of learning independently throughout their lives. When planning projects, teachers need to consider the principles of consistency and didactic organization, ensure systematic presentation of material, and maintain clarity so that students can fully engage with the learning process and achieve meaningful outcomes.

During training, the teacher uses several strategies to increase the effectiveness of the lesson. One of these strategies is the project method. The main feature of this method is the planned implementation of the subject. The goal of project-based education is to raise creative, active children who are capable of learning throughout their lives. When planning projects, it is necessary to take into account the principles of consistency and didacticism, the systematicity of the material, and clarity.

The main provisions that must be decided before starting work are:

– which problem will cause the greatest interest of students;

– not to limit the freedom of students when making decisions;

– what the approximate results will be;

– determining the time for completing the project;

– selecting the necessary materials;

– taking into account what knowledge and skills students need before starting the project or during the project.

The main part. The project method is a method of understanding the world, since it involves the student's purposeful activity in researching, searching for and solving a real problem, which allows them to acquire new knowledge and skills. This is an active form of learning, which differs from passively acquiring information, as it requires independent research, analysis, synthesis, and presentation of results. Unlike purely scientific or philosophical learning, the project method integrates these into a practical task, linking theory with practice. (PBLWorks. (n.d.). Why PBL? 2025).

Scientific literacy is significant to follow the advancements in the 21st century. Science education enables raising scientifically literate individuals with educational approaches. One of the approaches that is

used in science education is project-based learning (PBL). The aim of the study is to present the studies on PBL in terms of science education by using a comprehensive literature review. However, since that time, it has gained a following among classroom teachers, and the increasing attention of researchers and educators concerned about inclusion, earning loss, teaching language learners, and developing a 21st-century workforce with a high degree of science understanding and competence. Teachers act as facilitators, guiding students through inquiry-based learning processes (Machanova, 2025, p. 192).

About a hundred years ago, American scientist and philosopher John Dewey proposed that education should be based on purposeful activities that take into account students' personal interests and goals. For students to understand that knowledge is truly necessary, they should identify and solve problems that are meaningful to them and drawn from real life. In doing so, they apply existing knowledge and skills, acquire new ones they have not yet mastered, and ultimately achieve real, tangible results (Maçanova, 2023, p.142).

The goal of science education is to develop individuals who can recognize everyday problems, view them from a scientific perspective, make careful observations, think critically, and apply their knowledge to real-life situations (Kilinc et al., 2022). However, since the early 1990s, students' interest and comprehension in science have been declining (Krajcik, Blumenfeld, 2006); based science learning–where students actively engage with real-world problems and follow the methods that scientists use – has been proposed as an effective approach (Krajcik, Blumenfeld, 2006; Krajcik, Shin, 2014). In other words, PBL has been applied as a strategy to enhance students' motivation and deepen their understanding of science.

As more research has been undertaken, PBL has been shown to have an even wider influence on children's learning that its developers originally expected. Among many other benefits, it has been shown to contribute to language learning and science literacy, social-emotional learning, problem-solving in other subjects, and communication skills. Recent research has also shown that it helps decrease the learning gap for underserved populations.

Let's unpack what PBL is, how it works in the classroom, what the research says about its benefits, and some of the resources available to curriculum leaders who want to implement PBL in their school or district. One of the key benefits of PBL in primary science is that it sparks curiosity and motivation. Children are naturally inquisitive, and PBL encourages them to explore that curiosity through meaningful activities. For example, students might grow plants under different conditions to see how sunlight affects growth, mix colors to explore how new colors are formed, or create a simple baking soda and vinegar volcano to observe reactions. These activities give children a sense of ownership over their learning, encouraging them to engage actively rather than passively absorb information.

PBL also fosters critical thinking and problem-solving skills. When students work on projects, they plan, test, and adjust their approach based on results. For instance, if a class project involves building a paper bridge to hold small weights, students must think creatively about structure, balance, and materials. They learn to experiment, analyze outcomes, and improve designs skills that strengthen logical thinking and resilience, even at a young age.

Another important advantage is the development of collaboration and communication skills. Most projects are conducted in small groups, which teaches students how to work together, share ideas, and solve problems as a team. Young learners practice explaining their observations, listening to peers, and giving constructive feedback. These social skills are essential for holistic development and enhance the learning process.

PBL also helps children connect scientific concepts to the real world, making learning relevant and meaningful. Primary students can observe everyday phenomena like why shadows change throughout the day, how magnets attract certain objects, or how seeds grow into plants, and link them to the concepts learned in class. Seeing these connections reinforces understanding, encourages curiosity, and promotes exploration beyond the classroom.

Additionally, PBL supports differentiated learning. Each child can participate according to their abilities, interests, and creativity. Some may enjoy building models, others prefer drawing diagrams, conducting experiments, or recording observations. For example, measuring ingredients to create a baking soda and vinegar volcano, observing plant growth, or experimenting with floating and sinking objects introduces basic math, observation, and reasoning skills. Recording results develops writing abilities, while creating visual models encourages artistic expression. This flexibility makes PBL inclusive and engaging for all students.

PBL encourages interdisciplinary learning. Science projects often involve elements of math, art, language, and technology. Measuring quantities strengthens math skills, writing about experiments develops literacy, and drawing or building models nurtures creativity. By combining these areas, students gain a richer, more integrated understanding of the world around them.

Project-Based Learning in primary science lessons does far more than teach scientific facts. It cultivates curiosity, creativity, and critical thinking, strengthens collaboration and communication skills, connects learning to everyday experiences, and supports differentiated, interdisciplinary education. Through hands-on, meaningful, and playful experiences, primary students not only learn science but also develop a lifelong love for exploration and discovery.

The main goal of life science lessons in elementary school was to increase children's worldview and introduce them to the world around them.

The main task of the teacher was to activate the topics taught to the students by presenting them both visually and in a game format, and to transfer new knowledge and skills to them.

Project-based learning in life science lessons helps students:

1) Develop students' creative thinking skills

2) Help them apply critical thinking skills

3)Encouraging students to work together

As might be expected, the impact on the classroom and the teacher's role is profound. Let's take a look at the way a typical PBL activity is structured.

Project-Based Learning, or PBL, is a fun and powerful way to learn. Instead of only listening to the teacher or reading from a book, students work on real projects that solve real problems. This kind of learning helps students stay interested and excited about school. It also gives everyone, no matter their background or learning style a chance to succeed.

In PBL, students don't just memorize facts. They ask questions, find answers, build things, and work together to solve challenges. Projects are often about topics that connect to the real world like helping the environment, learning about the community, or creating something useful for others. This makes learning meaningful and fun.

When students do projects, they practice important life skills. They learn how to:

– Think carefully and solve problems.
– Work in a team and listen to others.
– Share ideas and explain their thinking.
– Be creative and try new solutions.

These skills are very helpful, not only in school but also in life. For example, teamwork and communication are the same skills people need when they grow up and work with others in a job.

PBL also helps students in many subjects at the same time. A single project can include reading, writing, math, science, and art. Students learn to connect ideas between subjects, just like in real life. They also learn how to plan their work, manage time, and finish what they start.

When students work on projects, they become more confident and independent. They learn to take charge of their own learning, ask for help when needed, and keep trying even when something is hard. This builds determination, the ability to keep going and never give up.

Most importantly, students discover the joy of learning. When they finish a project, they feel proud because they have created something meaningful. They don't just get a grade but also, they see that their ideas can make a difference.

The application of the project method to life science lessons in primary grades helps students develop their creative abilities to work with difficult structured and open-ended problems that reflect the real world, preparing them for academic and workplace situations. Since they must take into account the assumptions and limitations of the scenario when formulating the problem, students learn to construct the problem themselves, improving their ability to transfer learning from one context to another In teaching life sciences and other subjects, the following sequence should be expected (Accelerate Learning. (n.d.). The benefits of project-based learning in science, 2025).

1) Problem identification – The teacher first poses a real problem for students, using the learning outcomes of the curriculum to select appropriate questions for their inquiry. Depending on the age of the students, the problem may be complex and require several stages of further work, or it may be relatively simple and can be solved or completed in a single class session. It may be related to a local, regional, or global problem or phenomenon. The teacher relates the problem to issues or everyday events that are familiar or attractive to the students and guides the class discussion about the nature and nuances of the problem until they understand what their boundaries and limitations are.

Unlike traditional science teaching strategies, following a PBL approach involves starting with a real-world problem or situation and then coaching the students through a scientific process of discovery toward potential solutions. There are few stages of this process are described below.

2) Planning and Preparation – Working in small collaborative groups, students think about how they will solve the problem. Their plan typically includes identifying the resources they will need to complete the project, as well as gathering information and conducting research. The teacher circulates among the groups, providing direction or assistance when needed, and assessing each group's readiness to implement their action plan.

3) Implementing – In this phase, students apply their knowledge and skills to carry out the steps of their plan. The teacher may provide logistical support, elicit higher-level or analytical thinking from students, or facilitate team interaction or project management, as well as encourage students to be creative, innovative, and take risks in finding solutions to the problem.

4) Reflection and Evaluation – After completing the project, students take time to reflect on what they have learned, evaluate their performance, and assess the effectiveness and impact of the project in relation to a real-world problem. The teacher then provides an objective assessment of their knowledge of the topic.

5) Sharing Results – The process typically ends with students presenting their work to their classmates, the school community, or others, sharing both what they have learned and the results of their work. The teacher will provide guidance on structuring the presentation, presenting information effectively, and formal communication skills.

The purpose of teaching life skills is the communicative activity of students, that is, life skills are necessary for both practical mastery and application. The observations once again showed that the teacher's task is to activate the activity of each student, to create conditions for creative activity in the learning process. The use of new pedagogical technologies opens up great opportunities for expanding the educational base, undoubtedly carries great motivational potential and promotes the principles of individualization of learning. The project method allows students to act as authors, increases creativity, expands not only their general horizons, but also helps to expand language skills, as well as develop independence in the learning process.

The project method has a number of advantages over traditional teaching methods as an independent type of work. The main advantages are: increasing students' motivation when learning life skills, visual integration of knowledge in various subjects of the school curriculum, the scope of students' creative and constructive activities, starting from elementary grades, gives a chance to build a new system of projects, based on modern requirements. The efficient and effective use of the project method in training also necessitates that it be a nationwide and state-level work carried out on the basis of family, school, and community unity.

Project-Based Learning (PBL) is a way of learning where students discover new ideas by working on real projects. Instead of only listening to teachers or reading from books, children actively take part in their learning. They ask questions, explore answers, create things, and share what they find with their classmates. This hands-on approach makes learning more exciting and meaningful for every student.

The idea of learning through projects has been around for a long time. Many early educators noticed that children learn best when they can explore, create, and solve problems instead of just memorizing facts. Over the years, this approach has been adapted to schools of all levels, and today, more and more teachers are using it to make learning interesting, fair, and effective for every child.

In modern classrooms, PBL helps students in many different ways. It encourages children to think carefully and creatively, work together in teams, and communicate their ideas clearly. Projects often connect to real-life situations, such as learning about the environment, helping the community, or creating something useful. This makes learning relevant and gives students a sense of purpose in their work. "The resulting trusting attitude will allow the social pedagogue to become a companion for their students. Students on the basis of the trust aroused and positive results reflected in their lives in all spheres, as improving their quality, will be able to openly perceive the teacher" (Nasibova, 2023, p. 20).

PBL also supports students with different learning styles. Some children learn best by seeing and doing, while others learn by listening or reading. Because projects allow students to explore ideas in many ways, everyone can participate and succeed. It also helps children who are learning a new language or who need extra support, giving them opportunities to practice and improve in a fun and interactive way.

One of the greatest benefits of PBL is that it builds important life skills that students will use in the future. Children learn how to plan a project, divide tasks, take responsibility, and help their teammates. They also develop problem-solving abilities, critical thinking, and creativity, all of which are useful in school and later in life. Through projects, students learn that making mistakes is part of learning and that persistence and effort lead to success.

PBL helps students connect different subjects in one project. For example, a single project might involve reading, writing, math, science, and art. Students can see how the subjects relate to one another and how learning in school can be connected to the world around them. This interdisciplinary approach prepares children to think about problems in many ways and to apply what they learn in different situations.

Research and classroom experiences show that PBL can also help close the learning gap between students who have many resources and those who may face more challenges. Because projects are interactive and collaborative, they provide opportunities for all students to participate equally. Children gain confidence as they share their ideas, contribute to teamwork, and see the results of their effort.

Finally, project-based learning helps students discover the joy of learning. When children complete a project, they experience pride and satisfaction, knowing they have created something meaningful. They learn that school is not only about grades, but also about exploring ideas, solving problems, and making a difference. PBL gives students the chance to become curious, creative, and confident learners who are ready to face new challenges and succeed in the world.

In conclusion research has shown that when pedagogical conditions are observed for the effective organization of creative activities of primary school students, the application of the project method has a positive effect on the development of learning motivation and interest in learning.

1. Project-based learning in the subject of life sciences significantly increases the ability of students to investigate environmental problems and propose solutions. Thus, the results of the experiment we conducted showed that students are able to present creative and practical solutions to these problems in their projects.

2. In order to ensure the all-round development of students, the application of project-based learning in the subject of life sciences develops cooperation and teamwork skills in students, forms a sense of responsibility (Maçanova, 2024, p 173).

3. The ability to use the project method is an indicator of the teacher's high qualification, his progressive teaching and development methods. When a teacher creatively uses the experience of other teachers to form the motivation of students in his work, it is possible to improve the quality of teaching.

4. In order to ensure the comprehensive development of students, the application of project-based learning in the subject of Life Sciences deepens the sense of ecological awareness and productivity in students, encourages them to be more attentive to nature and take steps to protect it.

5. Studies have shown that when the form of presentation of material in the project-based learning process is flexible, students' understanding opportunities expand and the basis for improving quality is created.

6. Working on a project is one of the ways for a student to enter socially normalized activity, during which the child learns to determine the boundaries of his independence, freedom and responsibility. This technology allows the child to cultivate such qualities as morality, communication, develops creative skills, instills the ability to do useful work for society, and adapts the future generation to modern life.

In **conclusion,** implementing project-based learning in life science classes can enhance students' understanding of the subject matter and enable them to approach real-world problems more effectively. However, trends emerging in the process of organizing young students' project activities indicate the need to regulate the emerging experience, positively affecting both the academic and socio-emotional development of students, creating the foundation for their future growth as successful individuals.

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