

# Explaining the topic of vitamins for 7th graders through a project-based teaching method

Maksud Ravshanov  
Khurshida Tursunova  
Laylo Kholiyeva  
Samarkand State Pedagogical Institute

**Abstract:** This article explores the implementation of a project-based learning (PBL) method for teaching the topic of vitamins to 7th-grade students. PBL is a dynamic classroom approach that actively engages students in real-world, meaningful projects, fostering deeper understanding and retention of scientific concepts. By integrating inquiry, collaboration, and creativity, PBL transforms abstract topics like vitamins into tangible, experiential learning. This article discusses the theoretical foundations of PBL, outlines a detailed project framework for teaching vitamins, and reflects on the pedagogical benefits, including enhanced critical thinking, interdisciplinary connections, and lifelong healthy habits.

**Keywords:** project method, teaching the topic of vitamins, creative approach

## INTRODUCTION

### The Challenge of Teaching Abstract Scientific Concepts

Middle school science education often grapples with making abstract topics - such as biochemistry, nutrition, and human physiology - accessible and engaging for young adolescents. Vitamins, essential organic compounds required in small quantities for normal metabolic functioning, are a cornerstone of health education. Traditional didactic methods, which rely on rote memorization of vitamin names, sources, and deficiencies, frequently fail to inspire student interest or contextualize learning within students' daily lives. Consequently, there is a growing pedagogical shift toward student-centered approaches like project-based learning. PBL empowers students to explore complex questions through sustained investigation, collaboration, and the creation of authentic products. This article posits that a well-designed PBL unit on vitamins can bridge the gap between scientific theory and practical application, making learning both memorable and impactful for 7th graders.

### Theoretical Framework: Principles of Project-Based Learning

Project-based learning is grounded in constructivist theories of learning, particularly the work of John Dewey and Jean Piaget, which emphasize knowledge construction through experience and social interaction.

Core principles of PBL include:

**Driving Question:** A central, open-ended question that frames the project and sparks curiosity. For a unit on vitamins, a driving question might be: “How can we, as health advocates, design a public awareness campaign to combat vitamin deficiencies in our community?”

**Sustained Inquiry:** Students engage in an extended process of asking questions, researching, and refining their understanding.

**Authenticity:** Projects relate to real-world issues, such as public health, diet, and wellness, increasing relevance and motivation.

**Student Voice and Choice:** Learners make decisions about project directions, methods, and final products, fostering ownership and autonomy.

**Reflection:** Ongoing reflection helps students consolidate learning and evaluate their progress.

**Critique and Revision:** Students give and receive feedback to improve their work, mimicking professional practices.

**Public Product:** The project culminates in a tangible product presented to an audience beyond the classroom, enhancing accountability and purpose.

By embedding the study of vitamins within this framework, educators can transcend mere content delivery, instead cultivating skills like research, collaboration, communication, and problem-solving.

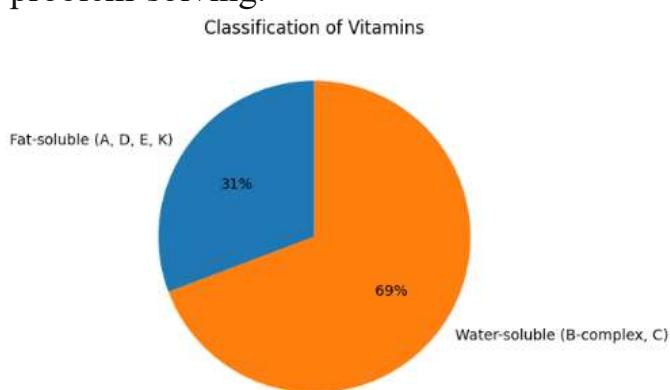


Fig.1. Classification of Vitamins

#### Project Design: A PBL Unit on Vitamins for 7th Graders

This section outlines a four-week PBL unit structured around vitamins, aligned with Next Generation Science Standards (NGSS) for middle school life sciences (e.g., MS-LS1-7: Food Molecules for Growth and Energy).

#### *Week 1: Launching the Project - From Curiosity to Inquiry*

The unit begins with an engaging “entry event,” such as analyzing case studies of historical vitamin deficiency diseases (e.g., scurvy among sailors, rickets in industrial cities) or examining modern nutritional labels. The teacher introduces the driving question: “How can we promote optimal vitamin intake for a healthy lifestyle in our school community?” Students form small groups and brainstorm initial questions: What are vitamins? Why are they essential? What happens if we lack them? How do

our diets measure up? This phase establishes prior knowledge and sets the stage for inquiry.

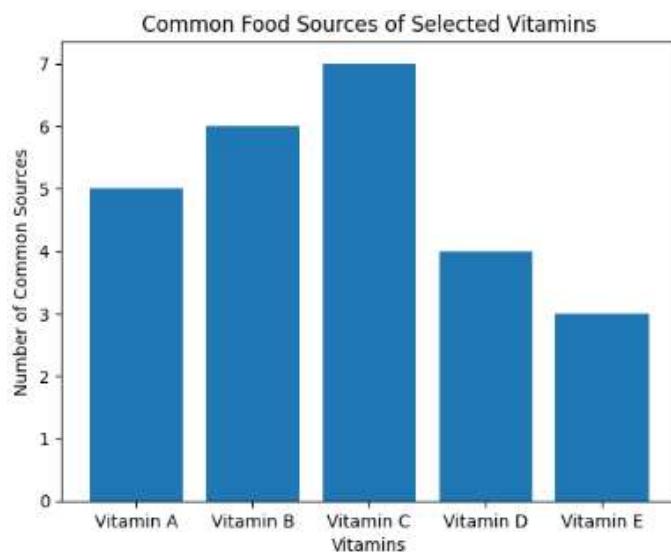


Fig.2. Common food sources of selected vitamins

#### *Week 2: Knowledge Construction - Research and Investigation*

Groups delve into structured research, exploring: Classification: Distinguishing between fat-soluble (A, D, E, K) and water-soluble (B-complex, C) vitamins, including their chemical properties and storage in the body. Functions and Sources: Investigating roles in immunity, vision, bone health, energy metabolism, etc., and identifying natural food sources (e.g., vitamin C in citrus fruits, vitamin D from sunlight and fish). Deficiency and Toxicity: Studying symptoms of deficiencies (e.g., night blindness from lack of vitamin A) and risks of excessive intake. Students utilize diverse resources: textbooks, reputable websites, interviews with nutritionists, and laboratory experiments (e.g., testing for vitamin C using iodine solution). Teachers facilitate mini-lessons on scientific terminology (e.g., antioxidants, coenzymes, recommended dietary allowances) and research skills.

#### *Week 3: Application and Creation - Developing the Product*

Each group selects a specific vitamin or a related health focus (e.g., "Vitamin D and Sun Safety," "Boosting Immunity with B-Vitamins and Vitamin C") to anchor their project. They then design an authentic product, such as: A Public Service Announcement (PSA) video explaining the importance of their chosen vitamin. A Healthy Recipe Booklet featuring vitamin-rich meals, with nutritional analysis. An

Interactive School Exhibit with posters, models, and demonstrations (e.g., a "vitamin wheel" showing sources and benefits). A Proposal for a School Garden growing vegetables high in essential vitamins.

Throughout this phase, students apply their research, collaborate on design, and incorporate multimedia tools. Emphasis is placed on accurate science communication tailored to a peer audience.

#### *Week 4: Presentation, Reflection, and Assessment*

Groups present their final products at a “Health Fair” attended by peers, parents, and community members. This public presentation encourages polished communication and pride in work. Afterward, students engage in structured reflection: What did they learn about vitamins? How did their understanding evolve? What challenges did they face in collaboration? Assessment is multifaceted, combining: Formative Assessments: Research notes, group check-ins, and draft evaluations. Summative Assessments: Quality of the final product, accuracy of scientific content, creativity, and presentation skills. Self and Peer Assessments: Reflections on individual contribution and teamwork. The unit concludes by connecting back to the driving question, discussing real-world impact, and encouraging ongoing healthy choices.

**Educational Benefits and Outcomes:** Implementing PBL for teaching vitamins yields significant pedagogical advantages: Deep Conceptual Understanding: Students move beyond memorization to comprehend the biochemical roles of vitamins in context, fostering higher-order thinking. Interdisciplinary Learning: The project naturally integrates science with health education, math (calculating nutritional values), language arts (writing scripts or brochures), and art (designing visuals). Development of 21st-Century Skills: Collaboration, critical thinking, creativity, and communication are honed through authentic tasks. Increased Engagement and Motivation: By tackling a real-world problem, students see the relevance of science to their lives, enhancing intrinsic motivation. Promotion of Health Literacy: Students become informed advocates for nutrition, potentially influencing family and community habits. Inclusivity: PBL accommodates diverse learning styles through varied roles (researcher, designer, presenter) and multimodal products.

**Challenges and Considerations:** While promising, PBL implementation requires careful planning. Teachers must scaffold complex concepts, manage group dynamics, and ensure access to resources. Time constraints and curriculum alignment can pose challenges, but these are mitigated by the depth of learning achieved. Professional development and collaborative planning among educators are essential for success.

## CONCLUSION

**Transforming Science Education One Project at a Time:** Project-based learning offers a powerful paradigm for teaching vitamins - and science at large - to 7th graders. By framing learning around inquiry, authenticity, and creation, PBL makes the invisible world of micronutrients visible and vital. Students emerge not only with a solid grasp of vitamins but also with the skills and curiosity to navigate future scientific and health-related challenges. As educators, our goal is to cultivate informed, critical thinkers; through projects like this, we nourish both mind and body, laying the foundation for a healthier, more scientifically literate generation.

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