

K12 BLOG

What Is Project-Based Learning? How Can I Incorporate PBL Into My Classroom?

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What is project-based learning (PBL)? How can I incorporate PBL into my classroom? To answer the first question simply, PBL is the act of learning through identifying a real-world problem and developing its solution. Students show what they learn as they move through the project, not just at the end.

A more complete explanation of PBL is that it is an ongoing act of learning about different subjects simultaneously. This is achieved by guiding students to identify, through research, a real-world problem (local to global); develop its solution using evidence to support the claim; and present the solution through a multimedia approach based on a set of 21st-century tools.

Project-based learning is learning through immersion. Students show what they learn as they develop their projects, interacting with the lessons, collaborating with other students, and assessing themselves and each other. They don't take a test or produce a product at the end to show their learning. Project-based learning emphasizes the process of science.

Project-based learning enables students to gain knowledge and skills by working for an extended period of time to investigate and respond to an authentic, engaging, and complex question, problem, or challenge. Good PBL projects

include the following components:

- Key knowledge, understanding, and success skills. The project is focused on student learning goals, including standards-based content and skills, such as critical thinking/problem solving, communication, collaboration, and self-management.
- Challenging problem or question. The project is framed by a meaningful problem to solve or a question to answer, at the appropriate level of challenge.
- Sustained inquiry. Students engage in a rigorous, extended process of asking questions, finding resources, and applying information.
- Authenticity. The project features real-world contexts, tasks and tools, or quality standards; has an impact in a real-world context; or speaks to students' personal concerns, interests, and issues in their lives.
- Student voice and choice. Students make some decisions about the project, including how they work and what they create.
- Reflection. Students and teachers reflect on learning, the effectiveness of their inquiry and project activities, the quality of student work, and obstacles and how to overcome them.
- Critique and revision. Students give, receive, and use feedback to improve their process and products.
- Public product. Students make their project work public by explaining, displaying, and/or presenting it to people beyond the classroom.

Teachers who have not used PBL are often afraid to try because they think they will have to completely redo their curriculum; however, this is not the case. This style of teaching doesn't ask you to replace your content; it asks you to create a vehicle with which to communicate your content. It embeds what is to be learned in a story, a problem that must be solved, or an activity that must be developed. The learning happens along the way toward the presentation of the solution. It isn't about writing a report and creating a poster about an animal; it's about the student using what she or he knows about animals to design a new animal equipped with the adaptations it needs to thrive and creating an articulating model of the animal, then developing a video that teaches people about the animal.

As you begin to look for ways of including PBL in your classroom, take a look at the By Design Science Grade 1-8 program. An engaging Open Inquiry activity (at the beginning of each unit) and an Engineering Practice activity (at the end of each unit) are included with the unit activities for each grade level. Both of these activities can be developed into PBL activities that correlate directly to the topics presented in each book. In addition to these activities, you may want to investigate the many online resources* that provide ideas for projects that you can incorporate into your school year. Project-based learning does not have to start out with some elaborate project. Keep it simple. Just Start!

Project-Based Learning—Web Resources

- BIE Tools—PBL Project Search: Here you will find a collection of 450 proven lesson plans to set any PBL design into action.
- West Virginia PBL Project Data Base: This is a site where teachers can search through the subjects of reading, language arts, math, science, social studies, dance, visual arts, theater, and music. You can select from grade 2 all the way through grade 12. These are PBL projects made by teachers for teachers!

Learning Reviews: This website claims to connect kids to learning on the web. It really connects kids to awesome, engaging, rigorous, and relevant projects. It points to numerous websites that house some great PBL possibilities. Be sure to check out all of the subjects and grade levels. There are more than 30 websites linking to these resources, with free PBL examples, guidance, rubrics, and templates, such as the following: PBL Language Arts Projects by grade level, PBL Science Lesson Ideas by topic, PBL Math Project Ideas by topic, PBL Social Studies Project Ideas by grade level.

Talladega School Collection: Great collection of PBL resources, projects, and ideas.

PBL Gallery: Some wonderful projects from teachers in Michigan.

Middle School Gallery: If you teach middle school, look at this expanded list from the PBL Gallery in Michigan.

Worcester Polytechnic Institute: Wonderful collection of industrial mathematics projects.

PBL Academy: A collection of PBL projects, including a concentration of math ideas.

High Tech High School: Selection of PBL projects from High Tech High in San Diego, California.

Envision Schools: Collection of projects from Envision Schools.

Emergent Math: A blog dedicated to brainstorming interesting and dynamic math problems that could be part of a PBL.

The Learning Network: This amazing site from the New York Times provides ideas to start or scaffold a PBL unit.

Virtual Schoolhouse: Online and blended PBL ideas for projects.

Edutopia: Article pointing to ideas for high school with regard to PBL.

Global Schoolhouse: Whether you're just starting out or ready for advanced levels, this tutorial will help you implement collaborative, project-based learning on the Internet.

Real World Math: Provides some interesting ideas for some great math PBL.

Mathalicious: Although this is primarily a fee-based site, there are some great ideas (even some free). For those willing to put up some funds, the price is very reasonable!

Cases Online: A collection of great activities related to science, technology, engineering, and math (STEM) subjects that will satisfy students at all levels.

CIESE: The Center for Innovation in Engineering and Science Education (CIESE) has some wonderful PBL-based units.

Siemens—We Can Change the World Challenge: Great site loaded with resources, standards, and ideas. Enter the competition, or just use the resources that are provided. Applicable to all levels of K-12 education.

Kids Science Challenge: Awesome and inspiring challenges involving bio-designed scientific inventions, sports on Mars, and detective science. Be sure to check out the great podcasts listed in “Pulse of the Planet.”

Young Scientists Challenge: Great resource for students in K-8. Lessons, multimedia, and other materials that can be incorporated into PBL units.

National Engineer Week: Future City: Great project-based learning activity incorporating STEM along with language arts and social studies. Engage students with Sim City software, model building, and a new curriculum designed to integrate disciplines.

Google Science Fair: The Google Science Fair challenges students ages 13 to 18 to carry out a scientific investigation on a real-world problem or issue that interests them. The competition asks them to carry the investigation forward through rigorous experimentation, recording, and conclusions. Students compete with peers in their age group from all over the world to win scholarships, internships, and once-in-a-lifetime experiences.

National STEM Video Game Challenge: Inspired by the Educate to Innovate Campaign, President Obama's initiative to promote a renewed focus on STEM education, the National STEM Video Game Challenge is a multi-year competition whose goal is to motivate interest in STEM learning among America's youth by tapping into students' natural passion for playing and making video games.

CyberPatriots: Great PBL program based on code and cybersecurity from the U.S. Air Force Association.

Imagine Cup: A wonderful Microsoft competition designed to push STEM and imagination.

Dupont Challenge: A STEM program promoting “What Is Your Challenge?”

Moody's Mega Math Challenge: This program is designed to go beyond the content and allow for math connections to the real world.

Who Wants to Be a Mathematician?: Great opportunity to explore mathematical knowledge.

Science Talent Search: A great program that allows talented science students to express and demonstrate their talent.

Science and Engineering Fair: Intel brings this amazing competition to the STEM field.

APP Challenge: Do your students have an idea for an app? Then look at this competition from Verizon.

Biomimicry Challenge: What can living organisms contribute to STEM and engineering? Check it out.

Got Game: A challenge devoted to students wanting to create “that” game.

National Science Bowl: The national Department of Energy offers this unique experience.

Be the Change: Wonderful idea for social studies and any class promoting positive change.

CSPAN Video: Use CSPAN resources to create a documentary. Fits any curriculum.

Global Cardboard Challenge: An awesome opportunity to engage any class in innovation with free and inexpensive resources.



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