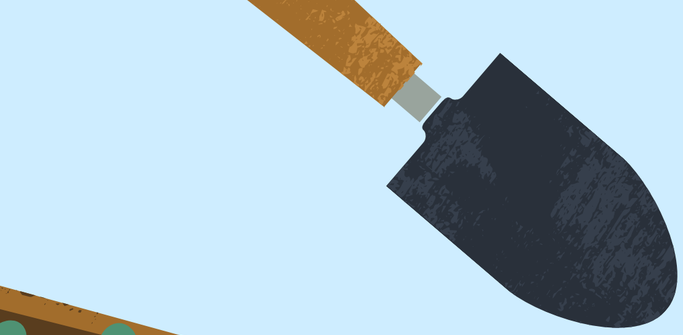
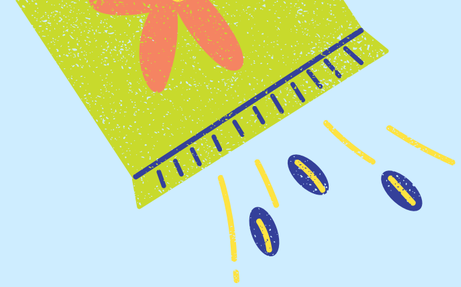
BYTE-SIZED EDTECH

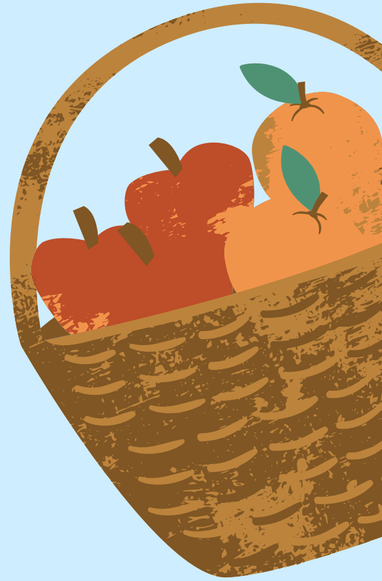
Presented by Technology Integration Specialist, Christine Danhoff, of North Point ESC and PBS Western Reserve

bit.ly/cultivatepbl

PBS WESTERN RESERVE





CULTIVATING PBL:
FROM SEEDS TO SYSTEMS

with Christine Danhoff

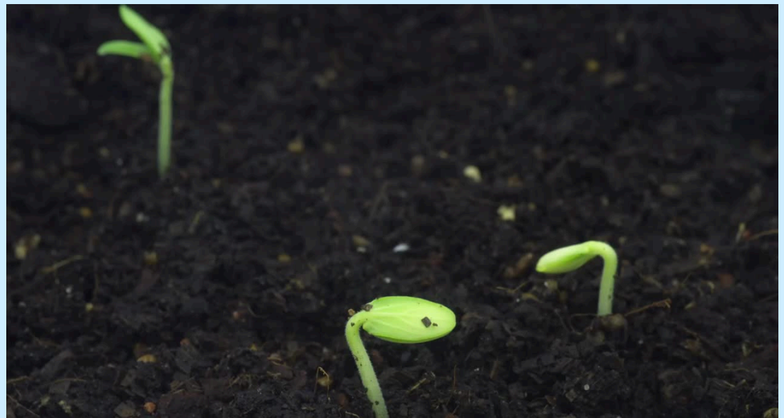
bit.ly/cultivatepbl



PBS WESTERN RESERVE

CULTIVATE THE SEEDS

- Design with Purpose: Real-World
- Plan for Growth: Next Steps
- Nurture with AI: Support Your Implementation



On a Scale of Starbucks

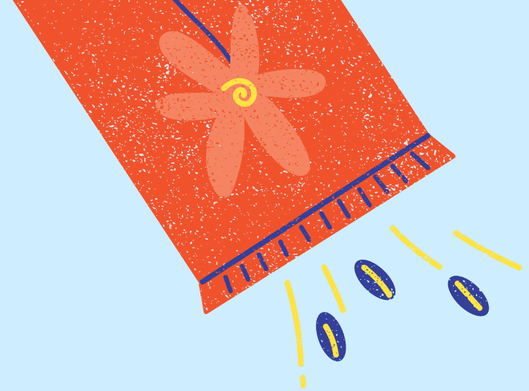
How are you feeling about PBL?

1

2

3

4



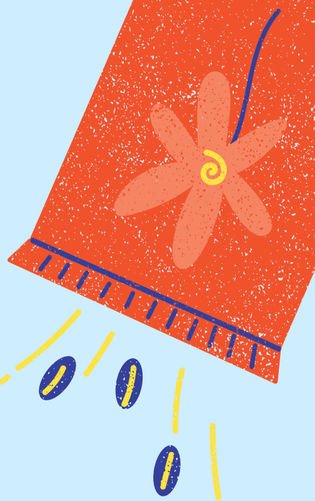
StartSOLE

DESIGN WITH PURPOSE

Project Path

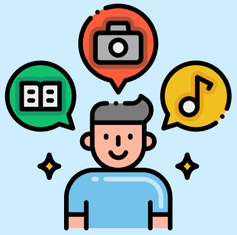
What Students Think About:	Project Phase:	How Teachers Support Inquiry:
• What is the project asking me to do? • What do I need to know? • Why is this important? • Who will I be sharing my work with?	Launch Project: Entry Event & Driving Question	• Conduct entry event and present/co-construct driving question • Facilitate process for generating student questions
• What resources can and should I use? • Can I trust the information I am finding? • What is my role in the process? • How can I apply what I have learned to the project?	Build Knowledge, Understanding & Skills to Answer Driving Question	• Facilitate use and evaluation of resources • Provide lessons, scaffolds, and guidance in response to student needs
• What new questions do I have? • Do I need more information? • Is my work on the right track?	Develop & Critique Products & Answers to the Driving Question	• Help students apply learning to project tasks • Provide additional experiences to generate new knowledge and questions • Facilitate processes for feedback
• What should I explain about my work? • How can I best share this with others? • What have I learned and what should I do in the next project?	Present Products & Answers to the Driving Question	• Help students evaluate their work • Facilitate student reflection on process and learning

Revision



AN EXEMPLAR DRIVING QUESTION IS...

- **ENGAGING FOR STUDENTS.** IT IS UNDERSTANDABLE AND INTERESTING TO STUDENTS, AND IT PROVOKES FURTHER QUESTIONS AND FOCUSES THEIR INQUIRY PROCESS.
- **OPEN-ENDED.** THERE ARE SEVERAL POSSIBLE ANSWERS, AND IT CANNOT SIMPLY BE GOOGLED.
- **ALIGNED WITH LEARNING GOALS.** TO ANSWER IT, STUDENTS WILL NEED TO LEARN THE TARGETED CONTENT AND SKILLS.

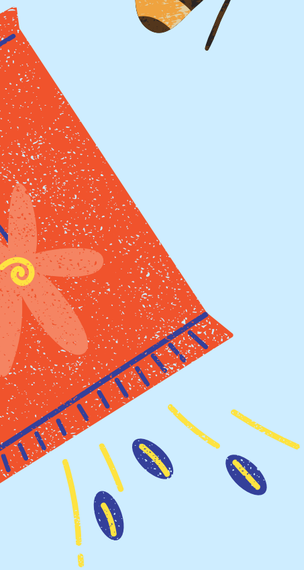


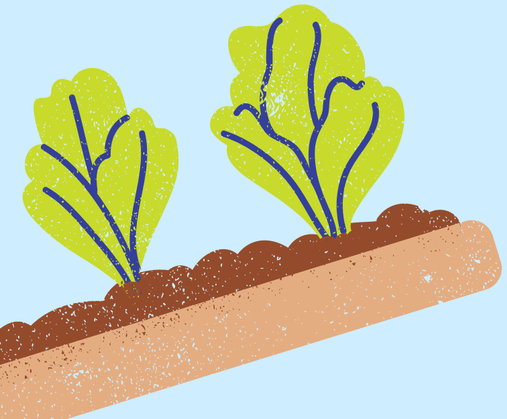
At-Risk Driving Questions	Proficient Driving Questions
Why do we need slope intercept formula?	How can we as economists help people understand the relationship between supply and demand so that they can create the best business possible?
What are the causes of the Civil War?	How do we as political advisors educate our community on how a divided country negatively or positively affects the future success of a nation so that citizens can take positive action?
Why is exercise important?	How do we as fitness experts create a customized training plan for busy professionals so they can achieve their best life?
What are some ways perimeter is important?	How can our third-grade nutritionists help provide better food options to the senior center so that senior citizens have an improved quality of life?

Gold Standard PBL

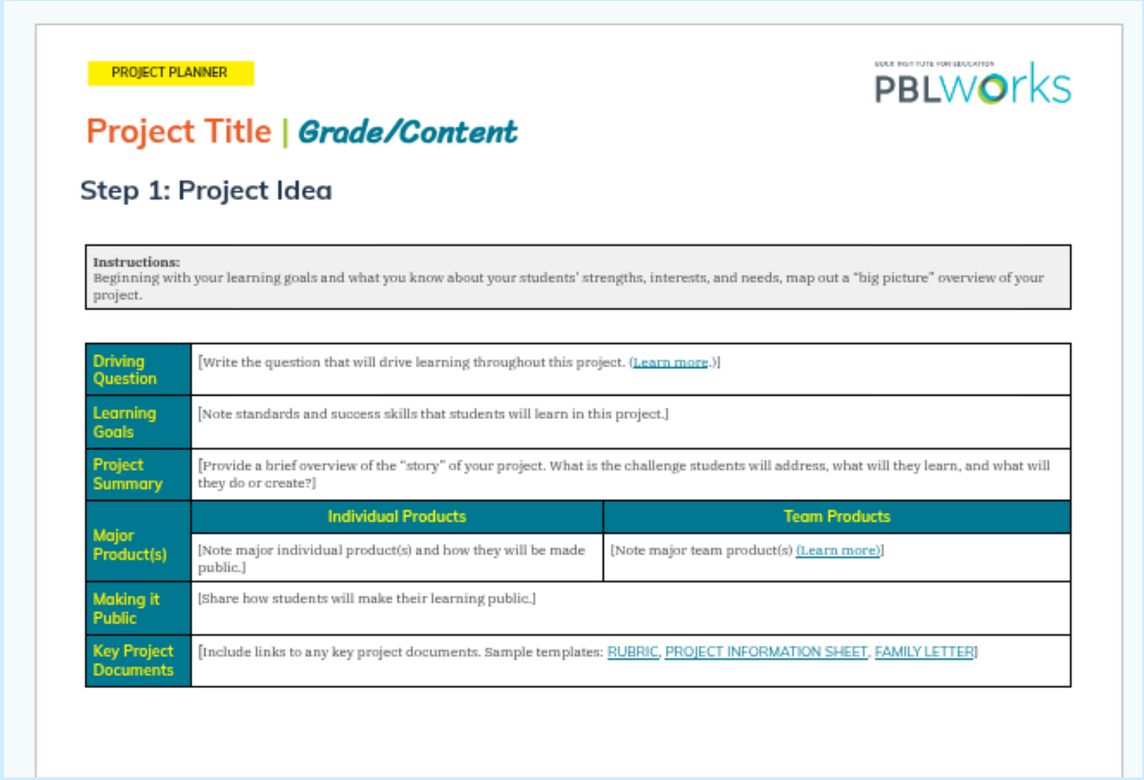
Seven Essential Project Design Elements

PLAN FOR GROWTH...





- CONSIDER YOUR CONTEXT
- GENERATE AN IDEA
- BUILD THE FRAMEWORK
- IMPLEMENT



PROJECT PLANNER

PBLWorks

Project Title | *Grade/Content*

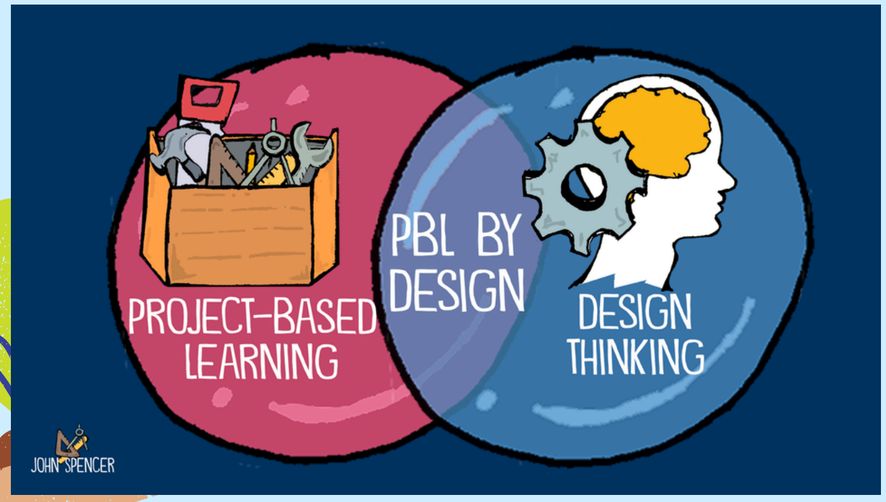
Step 1: Project Idea

Instructions:
Beginning with your learning goals and what you know about your students' strengths, interests, and needs, map out a "big picture" overview of your project.

Driving Question	[Write the question that will drive learning throughout this project. (Learn more.)]	
Learning Goals	[Note standards and success skills that students will learn in this project.]	
Project Summary	[Provide a brief overview of the "story" of your project. What is the challenge students will address, what will they learn, and what will they do or create?]	
Major Product(s)	Individual Products	Team Products
	[Note major individual product(s) and how they will be made public.]	[Note major team product(s) (Learn more)]
Making it Public	[Share how students will make their learning public.]	
Key Project Documents	[Include links to any key project documents. Sample templates: RUBRIC, PROJECT INFORMATION SHEET, FAMILY LETTER]	

PLAN FOR GROWTH...

StartSOLE



DESIGN THINKING...

stem-content

STEM Content Archive

NASA

Project Invent — Resource Library

Ready to inspire young inventors in your classroom? Below, find resources that can be used with or stand alone from our free invention curriculum.

Project Invent

Intel® Future Skills Projects + Materials

Every Intel® Future Skills project is designed to meet participants where they are in their learning journey.

Intel / Jun 8, 2023

Ignite STEM learning in K-12

Free, K-12, NGSS standards-aligned STEM lessons and hands-on activities for teaching elementary, middle and high school science, engineering design and math. Search by concepts or specific Next Generation Scien...

teachengineering.org

PBL SPROUTS...

Projects | MyPBLWorks

...our expanding library of project ideas that are standards-aligned, and cover a range of grade levels and subject areas.

pblworks.org

TITLE	LAST MODIFIED
20-Minute Peer Feedback	6/25/23
Boost PBL - 3-5	5/2/24
Boost PBL - K-3	5/2/24
Design Project - Create a Sport	6/25/23
PBL Assessment	6/25/23
PBL Coaching	5/16/23
PBL Feedback	6/25/23
PBL Management and Team Documents	6/25/23

PBL Project

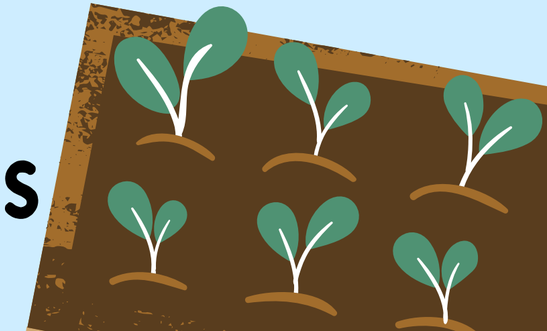
Explore Projects

Blue Apple PBL projects for elementary provide the supplies, real-world connections, cross-curricular content, collaboration options, and PD teachers...

Blue Apple Teacher /

USING AI TO NURTURE YOUR PBL

- ADAPT AN ALREADY CREATED PBL
- CREATE RUBRICS
- GENERATE DIFFERENTIATION IDEAS
- CREATE VOICE AND CHOICE IDEAS
- USE FOR RESEARCH AND SUPPORT FOR STUDENTS



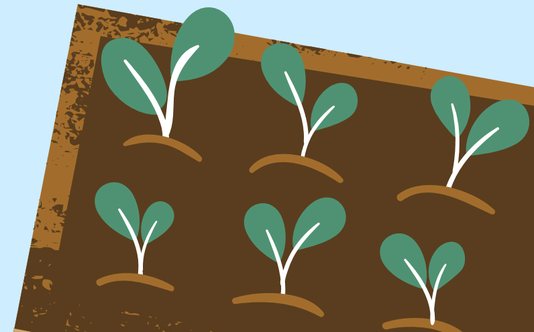
USING AI TO NURTURE YOUR PBL

MAGIC SCHOOL

ChatGPT

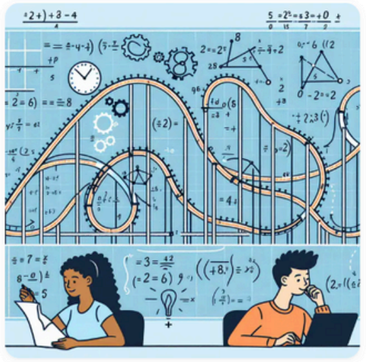
MasteryMate
By Alayna AI

TeachAid



MasteryMate
By Alayna AI

Project Recipe



Design a Roller Coaster with Systems of Equations

Actions

Grade 9 | Math | 1 days

Created by
Christine Danhoff

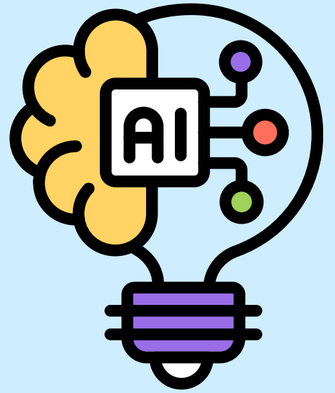
In this project-based learning experience, 9th-grade students apply systems of equations to design a roller coaster that balances thrill, safety, and functionality. Through inquiry-based activities, they learn to represent roller coaster components with mathematical equations and model them for optimization and safety analysis. The project incorporates hands-on experiences, such as graphing the coaster path and analyzing safety constraints, fostering mathematical reasoning and critical thinking. As a culmination, students present their optimized designs, demonstrating their understanding of real-world mathematical modeling and problem-solving skills.

Key Concepts

Systems of Equations | Roller Coaster Design | Mathematical Modeling | Safety Constraints | Optimization | Critical Thinking

📝 Inquiry Framework | 📚 Portfolio Activities | 🏆 Rubric & Reflection

TeachAid



Project-based assessment

Differentiate | Modify with AI | Download

Assessment Information

For the final project-based assessment, students will work in small teams to design and evaluate a plan for powering and lighting a “model tiny house” for a fictional student during a one-week science camping trip. Teams will receive a detailed scenario, including energy needs (lighting, charging devices), and will be provided with real-world constraints (such as maximum available battery energy, access to sunlight, etc.). Using provided data and requirements, students will (1) translate the scenario’s needs into algebraic and numerical expressions involving exponents and variables, (2) calculate and justify total energy use over the week, and (3) make recommendations for optimizing energy (e.g., using mathematical equivalence to compare alternative plans) presented through a multimedia report and visual displays.

- Students analyze a real-world scenario and translate requirements into algebraic/numerical expressions, including those with exponents and variables, explaining choices verbally and visually.
- Teams evaluate expressions with assigned values and justify calculations, explicitly applying order of operations, properties of operations, and relevant science formulas involving energy.
- Students generate equivalent expressions to propose and compare different energy use strategies, explaining equivalence and reasoning in context.
- Teams present findings in a multimedia presentation (slides, posters, or short video), clearly communicating methods and recommendations to both a peer and non-expert (parent/teacher) audience.

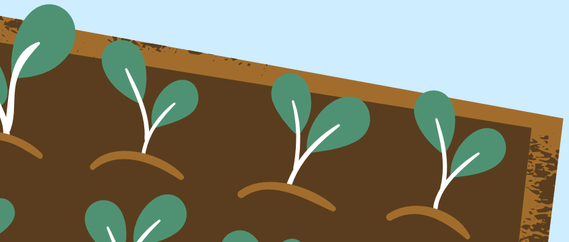
Assignment Instructions

Final Assessment Instructions: Powering and Lighting a Tiny House for a Science Camping Trip

This assessment is your chance to use math, science, and teamwork to solve a real-world problem! For the next 5 days, you and your team will plan how to power and light a “model tiny house” for a student during a one-week science camping trip. Follow these instructions step by step to complete your project and do your best work.

“EVERY PROJECT IS AN OPPORTUNITY TO LEARN, TO FIGURE OUT PROBLEMS AND CHALLENGES, TO INVENT AND REINVENT.”

David Rockwell



SAVE THE DATES! Technology/STEM PL

Blossoming with Innovation https://secure.smore.com/n/vzu5bd-blossoming-with-innovati

Smore / Aug 25, 2022

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Ohio Department of Education & Workforce

OHIO EdTechs

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THANK YOU!

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Book some time with me!