

Sample Project-Based Learning Lesson Plan

This project-based learning plan provides a comprehensive, hands-on approach to teaching high school students the principles of construction, with a focus on sustainability and real-world application.

Directions: Use this sample as an example, then use the blank template to design your own project-based lesson plan.

<p>Lesson Title: Design and Build a Sustainable Tiny-House</p>	<p>Grade Level: 10th-12th Duration: 8 weeks</p>
<p>Lesson Overview: Students will design and build a sustainable tiny-house, incorporating principles of green building and renewable energy. This project will cover various aspects of construction, including planning, budgeting, material selection, and construction techniques.</p>	
<p>Lesson Objectives:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Understand the principles of sustainable building. <input type="checkbox"/> Develop skills in project planning and management. <input type="checkbox"/> Gain hands-on experience with construction tools and techniques. <input type="checkbox"/> Collaborate effectively in teams to complete a complex project. <input type="checkbox"/> Apply knowledge of math, science, and technology in a real-world context. 	<p>Materials:</p> <ul style="list-style-type: none"> ● Design software (e.g., SketchUp, AutoCAD) ● Construction materials (wood, nails, screws, insulation, etc.) ● Renewable energy kits (solar panels, small wind turbines) ● Safety equipment (goggles, gloves, helmets) ● Measuring tools (tape measures, levels) ● Power tools (drills, saws) ● Budget planning tools (spreadsheets)
<p>Cross-Curricular Connections:</p> <ul style="list-style-type: none"> ● Math: Geometry, algebra, and measurement ● Science: Environmental science, physics (force, energy) ● Technology: Use of tools, software for design, and construction techniques ● Career and Technical Education: Building trades, architecture, engineering principles 	<p>Assessments:</p> <ul style="list-style-type: none"> ● Formative Assessments: <ul style="list-style-type: none"> ○ Daily logs and journals ○ Weekly progress checks and peer reviews ○ Instructor observations during hands-on sessions ● Summative Assessments: <ul style="list-style-type: none"> ○ Final project presentation ○ Completed tiny-house evaluation based on design, functionality, sustainability, and teamwork

Lesson Activities:

Week 1: Introduction and Planning

- Days 1-2: Introduction to Sustainable Building
 - Discuss the importance of sustainability in construction.
 - Explore different sustainable building materials and techniques.
 - Activity: Watch videos and have a guest speaker from the sustainable building industry.
- Days 3-5: Project Planning
 - Form project teams and assign roles (project manager, designer, materials manager, etc.).
 - Start brainstorming and sketching initial designs.
 - Activity: Use design software to create initial blueprints.

Week 2: Research and Design

- Days 1-3: Research Sustainable Materials and Energy
 - Research different materials and their environmental impact.
 - Investigate renewable energy options.
 - Activity: Create a materials list with justifications for choices.
- Days 4-5: Finalize Design
 - Teams finalize their blueprints and materials list.
 - Activity: Present design to the class for feedback.

Week 3: Budgeting and Sourcing Materials

- Days 1-2: Budget Planning
 - Learn how to create and manage a budget.
 - Activity: Create a detailed budget for the project using spreadsheet software.
- Days 3-5: Sourcing Materials
 - Research where to buy materials within the budget.
 - Activity: Contact suppliers and place orders.

Week 4-5: Construction Phase 1

- Daily Activities: Safety training and tool demonstrations
 - Begin construction with the foundation and framing.
 - Activity: Hands-on building sessions with instructor supervision.
 - Checkpoints: Daily progress reviews and problem-solving sessions

Week 6-7: Construction Phase 2

- Daily Activities: Continue with building walls, roofing, and installing windows and doors
 - Install renewable energy systems (solar panels, wind turbines).
 - Activity: Hands-on building sessions with instructor supervision
 - Checkpoints: Weekly progress presentations and peer reviews

Week 8: Finishing and Presentation

- Days 1-3: Finishing Touches
 - Complete any remaining construction work.
 - Add finishing touches such as paint, insulation, and interior design.
 - Activity: Final inspection and quality check
- Days 4-5: Presentation and Reflection
 - Teams prepare a presentation covering their design, construction process, challenges, and outcomes.
 - Activity: Present the tiny-houses to the class, school staff, and possibly local community members.
 - Reflection: Write a reflection paper on what they learned and how they overcame challenges.

Extension Activities:

- Community Involvement: Invite local builders or sustainability experts to give feedback.
- Field Trip: Visit a sustainable building site.
- Technology Integration: Use virtual reality to simulate the tiny-house in different environments.

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Lesson Activities:	

Lesson Activities (cont):

Extension Activities: