

One Powerful Project-Based Assignment

Here's a sample assignment in a career-pathway class that would advance students' postsecondary and career readiness (from a 9th-grade course in SREB's AC Clean Energy Curriculum).

Project Title: Solar Hot Water Heater

Essential Question: How efficiently can we collect and store radiant energy from the sun to heat water in our homes?

Engagement Scenario: A local public utility company and homebuilders are looking for affordable solar collectors to offset the cost of heating water. They are sponsoring a competition to develop new passive solar designs.

Design Criteria: The overall heat gain (amount of heat transferred to the water) and cost reduction compares with what is currently on the market.

Student Role: Students take the role of an engineer to help them learn engineers' way of thinking.

Skills, Understanding, and Tasks Required

Heat transfer: Students must understand physical science concepts on how heat is transferred via radiation, conduction, and convection processes.

Read informational text: Students research technical texts on heat transfer methods in designing, building, and testing a working passive device that circulates water using a thermal convector.

Prepare design brief: Students research the types of materials used in solar collectors, review the background of these materials, and prepare a design brief for construction of a solar collector.

Management plan: Teams develop a management plan for creating a working prototype of a passive solar hot water heater.

Build initial prototype: Students build a prototype, collect data on solar efficiency of the prototype, and develop a mathematical explanation of their system's performance.

Present results: Students teams prepare and present initial results of their work to solar experts from the public utility and receive feedback.

Refine prototype: Students make improvements in their prototype and prepare a final written engineering report detailing their results and conclusions.

Final evaluation: Judges from the utility and homebuilders review the accuracy of their theory, the quality of drawings, the construction of the prototype, and comparative cost to current units on the market.