



Solar Ovens

Solar Ovens Lesson 6: Solar vs. Battery Circuits

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DESCRIPTION: In this lesson, students will explore and do small experiments with mini solar panels and circuit boards. The class will discuss the advantages and disadvantages of solar energy. Students will continue to work in their Solar Energy Student Notebooks to record their observations and discussion.

GRADE LEVEL(S): 4 and 5

SUBJECT AREA(S): Science, solar energy, photovoltaics, electricity, renewable energy

ACTIVITY LENGTH: 00 hours, 45 minutes

LEARNING GOAL(S): Students will do experiments that reinforce the idea that the sun's energy can be transferred into electrical energy. Students will also explore and discuss the advantages and disadvantages of solar energy. Students will discuss how solar energy compares to other forms of energy generation.

STANDARDS MET:

Next Generation Science Standards:

4-PS3-2. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

4-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

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Student Background:

Nothing aside from previous lessons in this unit.

Educator Background:

None.

Materials List:

- 6 mini solar panels
- 6 mini circuit boards or Kidwind Sound and Light Boards
- 1 small DC motor
- Motor from Lego Simple and Motorized Mechanisms Base Set
- Battery pack from Lego Simple and Motorized Mechanisms Base Set
- 6 AA batteries
- Sunlight

Materials note: If you do not have access to a Lego set, you can use a second small DC motor and a battery pack with two AA batteries instead.

Vocabulary:

No new vocabulary.

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Lesson Details:

Question of the Day/Exit Slip: What are the advantages and disadvantages of solar energy where you live?

- STEP 1: Break students into 6 equal groups. Give each group a mini solar panel and a mini circuit board. Let them take turns exploring.
- STEP 2: Connect the DC motor to one of the mini solar panels. Connect the Lego Motor to the Lego battery pack. Discuss the pros and cons of both energy sources. (Examples: Batteries do not turn off in the shade. Batteries create waste because they will die and need to be disposed of but the solar panels do not.)
- STEP 3: Have a whole group discussion about the advantages and disadvantages of using solar energy.
- STEP 4: Have students fill out page 11, Solar Energy, in their Solar Energy Student Workbooks.

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