

Solar Power Challenge Student Sheet

Name _____

The mayor of a small town is in need of your help. The town will be growing quickly in the next few years. The city council would like to see this growing city use renewable energy as an energy source. Your job is to create a prototype using the sun as energy to generate electricity. The mayor has assigned you and your partners to find the best way to generate the most electricity from one panel efficiently.

Together with your group, discuss what three main questions you will need to research before you can start building.

- 1.
- 2.
- 3.

Research: Research is important to the engineering process. Watch the following videos and summarize what you learned in them.

What is Solar Energy? (5:07) - <https://www.nrel.gov/research/re-solar.html>

Summarize this video.

Solar Energy 101 (1:58) - <https://www.energy.gov/eere/videos/energy-101-solar-pv>

Summarize this video.

Engineering projects have criteria and constraints. In this activity they are:

Criteria: Develop a prototype of a house that can gather 1.0 volts of solar energy as shown on a voltmeter.

Constraints: Limited supplies – one sheet of cardboard or very stiff paper, solar panel, voltmeter and sun.

Time: You will have one hour to complete your prototype.

Design: Draw your house design and show where the solar panel will be located and the angle at which it will be placed. Show where the sunlight will be coming from.

Testing: Take your prototype outside at least three times throughout the day to gather data. You must place it in the same location each time. Once outside, give your solar panel time to gather the sun's energy. Then take a measurement of the amount of energy the sun generated by using the voltmeter.

Record your observations:

Day 1 Weather

Angle of solar panel:

Time:

Volts:

Observation:

Time:

Volts:

Observation:

Time:

Volts:

Observation:

Analysis: Answer the following questions.

1) How did your solar panel perform? Give some details from your observations.

2) What changes do you need to make with the solar panel to make it more efficient or fix issues during testing?

Redesign: Redesign your house by making changes to improve or reach the criteria. Is there a new angle? What adjustments did the group make? Redraw your prototype showing the changes made.

Retest your design and record the results in the table below:

Day 2 Weather

Angle of solar panel:

Time:

Volts:

Observation:

Time:

Volts:

Observation:

Time:

Volts:

Observation:

Analysis: Answer the questions below.

1) Did your redesign help meet the criteria? Why or why not? Describe your observations.

2) What other changes do you need to make to the prototype to make it more efficient or fix issues during testing? Use the space below to show any redesigns.

Adapted from: <https://energy.utah.gov/energy-education/curriculum/>.