# Solar Cooker

Design and conduct an experiment to investigate one factor that contributes to the effectiveness of a solar cooker.

**Introduction**

Most people in the United States use an electric stove or a natural gas stove to cook their food. This is not the case in much of the world. Approximately 50% of the people on Earth cook using fire from burning wood. However, due to overuse, wood is becoming a scarce commodity in many countries. In addition, burning wood is a major source of air pollution.

One alternative to cooking with wood is using solar cookers. These devices use energy from the sun to cook food without producing any pollution. While there are many designs for solar cookers, a simple solar cooker can be made from everyday materials. There are many factors that can influence the effectiveness of a solar cooker including the size of the collector, the orientation of the panel and the color of the container.

**Your Task**

You and your lab partner will design and conduct an experiment to investigate one factor that contributes to the effectiveness of a solar cooker in heating water. Factors you may want to investigate include: the shape of the collector, the shape of the water container, orientation of the collector, surface area or color of the container.

You have been provided with the following materials and equipment. It may not be necessary to use all of the equipment that has been provided.

**Materials**

- heat lamps or sunlight
- cardboard
- aluminum foil
- container for water
- safety goggles
- tape
- thermometer
- water
- colored paper or paint

In the space below sketch a few design ideas for your solar cooker. Your cooker must be easily moved, able to be aimed or adjusted to face the sun, and able to hold or support your food item

Name: _____ Period: _____

1. State the problem you are going to investigate.

2. Write a hypothesis using an "If a solar cooker is … then … because …" statement that describes what you expect to find and why.

3. Identify the independent variable: _____

4. Identify the dependent variable: _____

5. Design an experiment to test the problem. Your experimental design should match the statement of the problem and should be clearly described so that someone else could easily replicate your experiment. Include a control if appropriate and state which variables need to be held constant.

3. Review your design with your teacher before you begin your experiment.

4. Create a data table where you will record data during the experiment

6. Conduct your experiment. While conducting your experiment, take notes on your observations and record your data in your table.

Name: _____ Period: _____

| Category | Objective | Points Possible | Student Score | Teacher Score |
|---|---|---|---|---|
| **Statement of Problem and Hypothesis**<br><br>**8 points** | The problem is stated clearly and completely | 2 | | |
| | The hypothesis is stated clearly and completely | 2 | | |
| | Clear identification of independent variable | 2 | | |
| | Clear identification of dependent variable | 2 | | |
| | | | | |
| **Experimental Design**<br><br>**10 points** | The experimental design matches the stated problem. | 2 | | |
| | Variables are held constant. | 2 | | |
| | A control is included when appropriate. | 2 | | |
| | The procedures are clear, complete and replicable. | 4 | | |
| | | | | |
| **Data Presentation**<br>**8 points** | Data table is well organized and presented in an appropriate manner. | 4 | | |
| | Observations are presented in an appropriate manner. | 4 | | |
| | | | | |
| **Conclusions**<br>**8 points** | Conclusions are fully supported by data and address the hypothesis. | 4 | | |
| | Reliability of data and validity of conclusions are thoroughly discussed. | 4 | | |
| | **Total** | 34 | | |