

Hot Dogs and Sun Tea

Sixth Grade

Activity: 6

Time: 2-3 Class Periods

General Description

Students will investigate the use of solar energy as heat to prepare food and drinks. They will build a solar cooker for hot dogs and make sun tea.

Objectives

Students will construct a solar cooker to help reduce the use of electricity.

Arizona State Standards

SC06 S3C2 PO3 Design and construct a solution to an identified need or problem using simple classroom materials.

SC06 S2C2 PO2 Describe how scientific knowledge is subject to change as new information and or technology challenges prevailing theories.

Teacher Information

When parallel light rays, as seen from the sun, fall on a concave mirror, foil on the inside of an oatmeal box, the reflected light rays come together at a place called the focal point. The focal point is a concentrated point of the sun's thermal, heat, energy. A foil-lined oatmeal box does not make just one focal point but a line of focal points. In order for the hot dog to cook, it must lie along this line. The students should be shown how the focal point is determined. Use half of an oatmeal box to determine this. Point out that the focal point is not a spot on the box. Even though they cannot see this line of points, they can feel the heat generated by the focal line with their hands. See Activity Card 6-6a.

Safety Note: Make sure the students use unpainted coat hangers as some paints could be poisonous. Caution students not to look directly into the solar cooker as the intense sun could damage their eyes.

Materials

Activity Card 6-6b

Round oatmeal box

Cardboard card (no longer than the oatmeal box)

Aluminum foil

Tape

Unpainted coat hangers

Nuts and bolts

Hot dogs

Sun tea

Water

Tea bags

Glass jar with lid

Sun

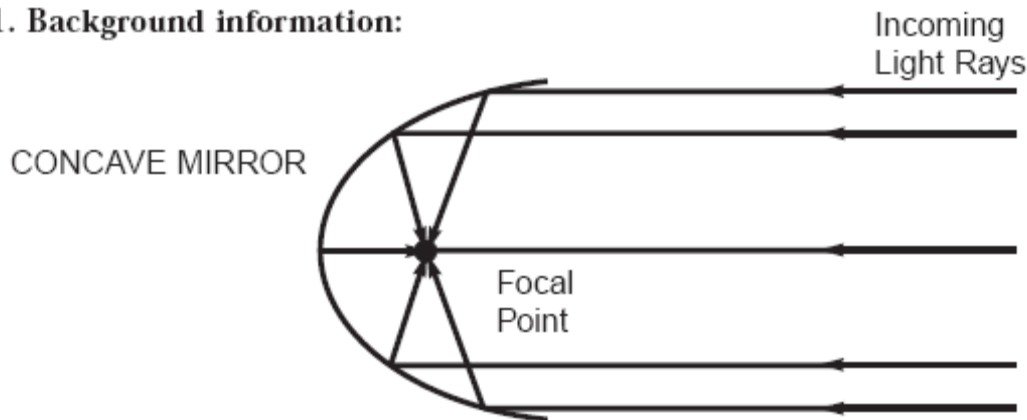
Procedures/Exploration

1. Discuss and model the steps for building the solar cooker as shown on Activity Card 6-6b before beginning project.
2. Discuss the steps for making sun tea as described on Activity Card 6-6b.
3. Allow students time to construct the solar cookers.
4. Pick a sunny day and cook the hot dogs and make the sun tea.
5. Discuss other ways to use the heat generated by solar energy. Students could research current uses of solar energy and give reports to the class.

Teacher Information

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Activity: 6
Activity Card: 6-6a

1. Background information:



When parallel light rays (as from the sun) fall on a concave mirror (foil on the inside of an oatmeal box), the reflected light rays come together at a place called the focal point. A foil-lined oatmeal box does not make just one focal point but a line of focal points. In order for the hot dog to cook, it must lie along this line.

2. Directions:

The children must be shown how the focal point is determined. Use half of an oatmeal box to demonstrate this. Point out that the focal point is not a spot on the box. Even though they can not see this line of point, they can feel the heat generated by the focal line with their hands.

After the children have located their focal line, have them make their hole in their boxes and run the coat hanger through this line using the diagram as a guide.

Nuts and bolts are not necessary to hold the coat hanger in place.

3. Safety note:

Make sure the students use unpainted coat hangers because paint can poison.
Do not look directly into your solar cooker. If you do, it may damage your eyes.

Glossary

Focal point: the point to which light is focused by using a concave mirror or convex lens.

Parallel: side-by-side but the same distance apart.

Concave mirror: mirror which curves inward at its center.

Hot Dogs and Sun Tea

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Activity: 6
Activity Card 6-6b



Materials

For solar cooker:

Round oatmeal box
Cardboard box that is longer than the oatmeal box
Unpainted coat hanger
Foil
Tape
Nuts and bolts
Hot dogs

For sun tea:

Water
Tea bags
Glass jar with lid
Sun

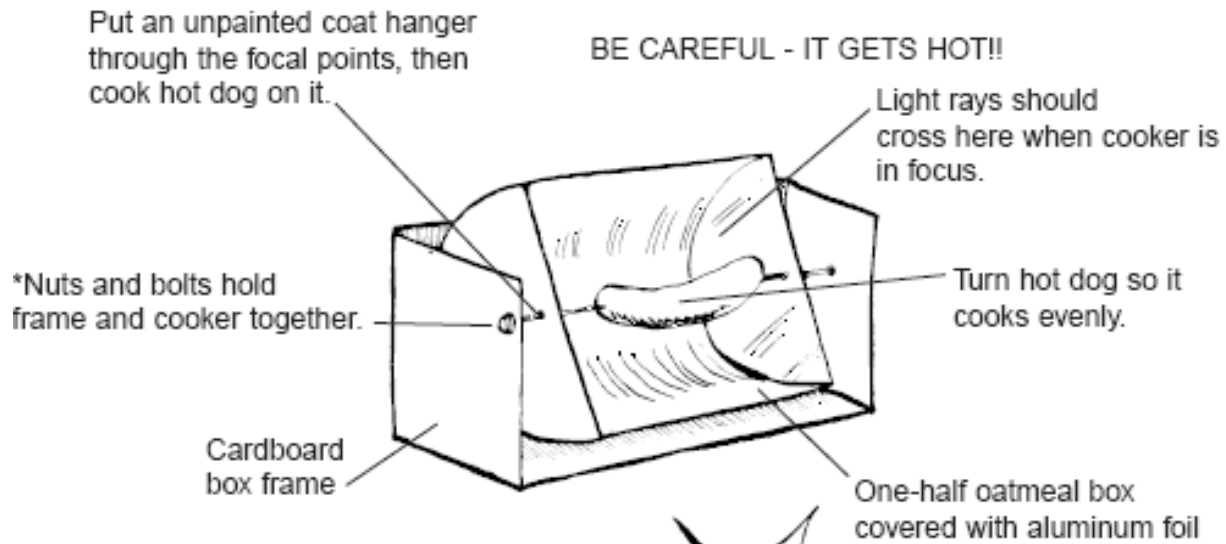
Directions

For solar cooker:

1. Cut the oatmeal box in half lengthwise and line the inside with foil. This means both the curved surface and the ends will be lined.
2. Cut off one side of the cardboard box (as shown in the picture) so the oatmeal box will turn freely.
3. Straighten your coat hanger and bend a handle in one end.
4. To find the focal point, hold the oatmeal box so the sun shines into it. Give it a minute to warm up. Using your hand, (DON'T TOUCH THE FOIL) find the warmest spot in front of the foil. Mark this spot with your pencil on the side of the oatmeal box. This is the focal point. Your coat hanger must run along the focal points. See the picture and wait for the teacher's help before going on.

For sun tea:

1. Fill the glass container with water.
2. Put the tea bags in the water (leave the tags on the bags hanging outside the jar).
3. Put the lid on the container and place the container in the sun where it will not be knocked over. Leave the jar in the sun for two to six hours, depending on how strong you prefer your tea.



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