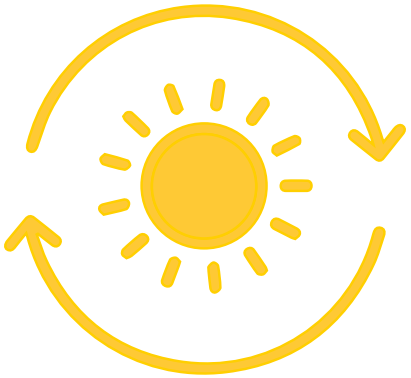
L1 Light Comes From the Sun

Lesson 1 of 3



Big Idea: We get light from the sun.

Big Question: Can we make light in the darkness using the sun?

Resources: The Sun Video : 3 minutes, 35 seconds

Activity:

- Cut out a hole in the ceiling of the box: it should be big enough so that the bottle can pass through it.
- Then cut a window-like opening on the side so that you can look into the box. Make that cut a 15x15cm square (or 5.9 inches) .
- Draw two concentric circles in the middle of the cardboard square the diameter of your liter bottle.
- Cut out the inner circle.
- Cut in intervals from the inner to the outer circle and bend these pieces upwards.
- Put the cardboard hole over the bottleneck and fill the bottle with water.
- Put your Solar Bottle Bulb in the ceiling's hole. Take the box outside in the sun or use a flash light to simulate the sun.
- Observe the solar bulb through the side opening. Modify your "light show" by adding food coloring.

Note to Parents:

1. The overall purpose of this lesson is to demonstrate the effects of the sun's rays on darkness. Kids are making light happen where darkness lives. For another resource that has images, go to Science in School.
2. Visit Project Learning Tree's 12 Nature Walk Activities for Earth Day (or Any Day!)

Materials:

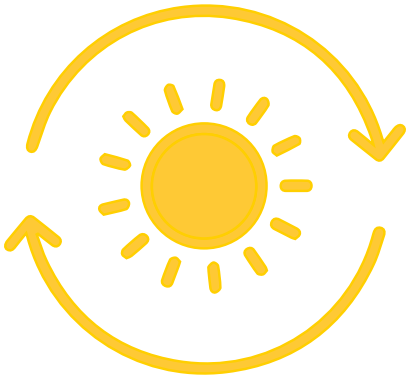
- Computer
- Internet connection
- Two or three 1-liter, clear soda bottles.
- Medium-size cardboard box
- Markers
- Scissors
- Masking tape
- Water
- Flashlight
- Food Coloring

Standards:

Standards addressed by this activity - BSB – The Do Place: NGSS MS-PS3.B.4 & NS 4E/E1; 4E/E2C; 4E/M3

L2 Solar Oven

Lesson 2 of 3



Who can tell us one thing they remember from the first lesson about the heat of the sun?

Big Question: How can we cook s'mores without a stove or campfire?

Set the Stage: Science U Cooking S'mores : 1 minute, 54 seconds (Science U video)

Activity:

Procedure: After the intro video – Engage
Use flashlights and mirrors/aluminum foil to focus as much light as possible on a target area/object (10min)

Observable Event:
Focus light using reflective materials.
Ask: How can we focus light? What does a reflective material look like?

Activity:
Students break into teams of 2-4. Teams are tasked with designing and building the best solar oven possible. Oven should be able to focus sunlight onto a small piece of chocolate. Give students ample time to experiment and design, ideally at least 20 minutes. Weather permitting, test these ovens immediately by having the students attempt to melt a small piece of chocolate. If weather is inclement, discuss limitations of solar power and what conditions are necessary for it to work and revisit solar cooker when weather permits.

Reflection:
How do solar ovens work? What are the good things and bad things about solar energy? What did you learn? What do you still have questions about?

Materials:

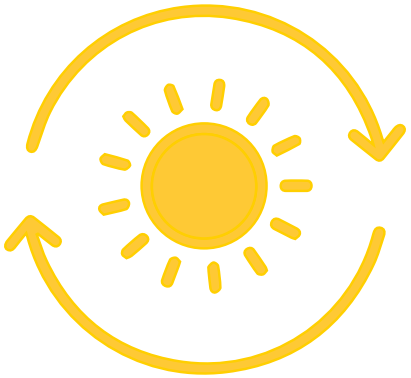
- Smores supplies: graham crackers, marshmallows, and chocolate
- Pizza box
- Tin foil
- Sheets of plastic or plastic page protectors
- Black construction paper
- Tape

Standards:

Standards addressed by this activity - BSB – The Do Place: NGSS MS-PS3.B.4; NS 4E/E1; 4E/E2C; 4E/M3; NE SC5.2.3.D; SC8.2.3.C; SC8.2.3.E; SC8.2.3.F

L3 Colors, Sunlight and Heat!

Lesson 3 of 3



Big Idea: Understanding the different heat absorbing capacities of different colored backgrounds and the effect of those on the melting rate of ice cubes.

Big Question: What could our future with solar energy look like?

Activity:

Procedure:

- Put one ice cube on each colored card and place them all in the sun. Make sure all the ice cubes are exposed to full sunlight. See which one melts the fastest, which melts the slowest.
- Note: The black card will melt fastest as it absorbs the most light; it is the most efficient Solar heat collector. The white will melt the slowest since it reflects most of the light.

Second Experiment:

Make colored ice using food dyes.

- For the white block, add milk to the water
- For the black one mix up all the other color food dyes; it won't be quite black but it will be close enough.
- Other options for the black block could be cola.
- Put colored ice cubes on white paper.

Note to Parents:

You can find more experiments at Red Tricycle and Solar Energy Education

Materials:

- 6 different colored square pieces of card or paper. Black and white are essential, and any other 4 colors will do (the three primary colors red, blue and yellow, as well as green are good choices for the other cards). Make the squares about 3 inches x 3 inches.
- 6 ice cubes of the same shape and size
- Food dyes
- Stopwatch

Standards:

Standards addressed by this activity - BSB – The Do Place: NGSS SEO.1B; NS P-SCI-5; NE S.01.1; S.02.1; S.02.2