Unit: Cooking with the Sun and Solar Ovens

Lesson #5: Understanding Light

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DESCRIPTION: Students will observe and articulate their observations of the way that different materials reflect and absorb sunlight, transforming it into heat to varying degrees.

GRADE LEVEL(S): 4-5

ACTIVITY LENGTH: 30 minutes

LEARNING GOAL(S): Students will conduct simple experiments to learn what kind of materials absorb heat from the sun, what kind of materials reflect light from the sun and what color of materials do not get hot in the sun. This lesson gives students experience in beginning to learn about why certain materials and colors are used in solar ovens.

STANDARDS MET:
Common Core:

- W.4.7. Conduct short research projects that build knowledge through investigation of different aspects of a topic.
- W.4.8. Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.
- W.5.7. Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.
- W.5.8. Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.

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-PS4-2. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.

- 5-ESS1-2. Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.
- 5-PS1-3. Make observations and measurements to identify materials based on their properties.

Student Background:

- Basic experience in anticipating what will happens to shiny, transparent, dark and white items when placed in the sun.

Educator Background:

- Basic experience in anticipating what happens to shiny, transparent, dark and white items when placed in the sun.

Other Materials List:

- A sunny day
- A sunny wall
- Black or dark-colored cloth
- White or light colored cloth

One or more items that are:
- Transparent -- clear plastic bag, glass, etc.
- Metallic shiny -- metal pot, mirror, etc.
- Black metal

Vocabulary:

- Reflection
- Absorption
- Transparent
- Metallic

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Lesson Details:

Activity:

1. Have the students hold the items near the sunny wall.

Discuss which items let light through (transparent items) and which items block the light and make shadows on the wall.

2. Have students hold the items in the sunlight and move the items to try and shine a bright spot somewhere on the ground.

   Discuss which materials reflect light (shiny and light colored) and which ones absorb light (dark materials).