Warm Sun

Grade 1 – Understanding Matter and Energy

Lesson Plan

Cross Curricular	N/A
Safety Notes	N/A

Big Ideas

The sun is the principal source of energy for the earth

Specific Expectations

- 2.2 investigate how the sun affects the air, land, and/or water, using a variety of methods
- 2.6 investigate how the sun's energy allows humans to meet their basic needs, including the need for food
- 3.2 demonstrate an understanding that the sun, as the earth's principal source of energy, warms the air, land, and water; is a source of light for the earth; and makes it possible to grow food

Description

We explore how the Sun warms the air, soil and water. To look at heating of air we build a simple little greenhouse, for soil we place a rock inside the greenhouse, and for water we compare how a container of it warms up in the sun compared to shade. Needless to say that this is a lesson for a sunny day only!

Materials

For each student (or group):

- Plastic cup or clear Tupperware like container
- Optional: aluminum foil and/or black paper
- A small, preferably dark, stone
- Thermometer – if possible.

- Two bottles full of water – either one set or a set for each student

Accommodations/Modifications

N/A

Introduction

Prep:

- A couple of hours before doing this lesson find a sunny spot to place a full water bottle (or one water bottle for each student).
- Either place a second bottle in a shady spot OR measure the temperature of the water before placing it in the Sun.

Introductory discussion:
Today we will learn about staying warm!

- Who can tell me a way of staying warm?
- Can you warm up by standing in the Sun? (yes)
- Are there other living things that use the Sun to warm up? (Yes – e.g. cats taking a nap, plants, etc. etc.)
- So – the Sun is very important for us on Earth to stay warm!

We will do some experiments today to see how the Sun can warm up different things.

Action

We already have a water bottle sitting in the Sun there. In a bit we will look at it. But first:

Small Greenhouse

- Does anyone have a garden at home? How about a greenhouse? What does a greenhouse help you do? (Grow plants better, keep them warm, etc.)
- We are going to make our own little greenhouse here!
- We will also put something in it – a little rock.

Everyone grab a plastic cup and a stone.

- Hold the cup in your hand. Does it feel warm? (no)
- What about the stone? (should not feel warm either)

Let's find a sunny spot for our little greenhouse!

OPTIONALLY:
We can place a piece of aluminum foil on the outside of half of the cup. Tape it on. Place the cup so that the aluminum foil is on the far side from where the sunlight comes from. We can also put a black piece of paper under the cup. You may want to have some students do it this way and some without. Then you can compare results after.

While we wait for our little greenhouses to hopefully warm up let's have a look at the water that's been in the Sun for a while. Have students grab the bottles and feel them.

- If you have two sets of bottles have them compare them to each other.
- Do the bottles feel warmer? (Yes – hopefully easy to tell.)
- What happened? (The sunlight warmed up the water. The water absorbed the heat of the Sun. This is the energy of the Sun.)
- The Sun can heat up the water! Have any of you gone swimming in a lake before? When did you go? (in summer) Could you go in winter? (No – because the water has cooled down when there isn't as much sun. Even in summer you can feel how the water deeper down is colder than the layer right at the surface).
- OPTIONAL: Use a thermometer to measure the water temperature in each bottle. This is also a good option if the temperature difference isn't very large.

Now let's go back to our greenhouses.

- Do they feel warm to the touch? (If so, why? – The air inside has warmed up. If not, give it a bit more time.)
- Pull out the stone and feel it. Is it warmer? (yes) Compare to a stone that's been left in the shade.
- Both the air inside the greenhouse and the stone have warmed in the sunlight.

Consolidation/Extension

- Compare the greenhouses with and without the aluminum foil and black floor surface. If they are warmer we can explain that the black surface gets warmer than a lighter surface. Students may have experienced before how the Sun warms them up more when wearing a black shirt. The aluminum foil reflects light back into the greenhouse also warming it more.
- Review how we have seen that air, water, and a rock can be warmed up by the sun.
- It's very important for us on Earth to be warmed up by the Sun. Without that warmth the Earth's air, water, and soil would be too cold for us to live.
- The Sun doesn't just give us light. It also gives us the warmth on Earth that we need to survive!