



Title: Solar Sweet Tea

Grade: PreK-2

Subjects: Science, Language Arts

Time: 50 minutes

Objectives: Students will be able to...

- Identify the sun as a source of heat energy.
- Record information using their own words and drawings.

Standards: Students will...

Science Standard 9: Understand the sources and properties of energy.

- **Benchmark # 1:** Know that the Sun supplies heat and light to the Earth.

Science Standard 12: Understand the nature of scientific inquiry.

- **Benchmark # 1:** Know learning can come from careful observation and simple experiments.

Materials:

- One liter jars
- Tea bags
- Water
- Sugar
- Spoon
- Cups

Overview:

The sun releases heat and light that reach us here on Earth and provides us with an abundance of energy. This solar energy is what makes life on Earth possible. It is a renewable resource, available in inexhaustible amounts, and it has many applications.

Solar energy can be converted into other types of energy. Solar energy converted to thermal energy can be used to heat substances, such as water. Thermal energy increases the speed at which molecules move. When molecules in a substance move faster, they heat up and the temperature of the substance rises. Therefore, temperature is the measure of how much thermal energy a substance actually has. Thermal energy is an effective, efficient and economical way to heat.

Thermal energy is often used to heat water. Solar tea is one example of this process. A container filled with cold water and left exposed to the sun will increase in temperature to approximately 130° Fahrenheit. Tea that has been added to the water darkens as the tea brews. Since dark colors absorb light and convert it into heat, as the tea brews in the sunlight it absorbs more energy to heat the water. As a result the tea is brewed by heating the water slowly rather than boiling it, as is the more traditional method for making tea. This results in the tea retaining its natural flavors and it is typically less bitter.

Kid's Speak:

The sun releases heat and light that reach us here on Earth. This heat and light from the sun is called solar energy. It has many uses. Solar energy can be changed into other types of energy, such as thermal energy. We use thermal energy to heat water. We can use solar energy to make solar sweet tea.

Eco-Fact:

According to the US Department of Energy, appliances, home electronics, and artificial lights are responsible for about 35% of home energy bills.

Procedures:

Before Making Solar Sweet Tea:



- Discuss how parents make tea at home on a stove. Tell students that they are going to experiment with the sun's energy by using it to make sweet tea.

Making Solar Sweet Tea:

- Begin the experiment by filling each jar with one liter of water and a tea bag.
- Place jars in sun for one to three hours.

While Solar Sweet Tea Is Brewing:

- Explain to students how the sun is heating the water. Students will draw a diagram of the tea brewing using arrows to indicate how the tea is being heated by the sun.
- When tea is a dark color, take the tea bags out of jars. Add ½ cup of sugar to each jar and stir. Let cool. Ice can be used to help speed up the cooling process.

After Solar Sweet Tea Is Brewed:

- Have a tea party! After tea is cooled pour each student a cup and have students share their diagrams with the class.

Adaptations:

Celebrate harnessing the energy of the sun. Perhaps invite parents to share your solar sweet tea. It might be a way to celebrate Earth Day.

Extensions: Check out other solar lessons on the GEF site!