

Solar Energy Experiment

Grade Level: K-6

Overview The sun is believed to have a series of energy, which it gives out in different forms. We are all quite familiar with the light energy from the sun. It is possible to collect the energy from the sun and convert it to various other forms of energy. The energy from the sun can be converted to heat energy and to electrical energy.

Our sun is an average sized star and it has been burning for about 4.5 billion years. Few people think of the sun as a nuclear furnace and fewer realize that the sun is a source of nuclear energy that does not pollute. About four million tons of the sun's matter turns into energy every second and only one-billionth of the sun's light ever strikes the earth. In some parts of the world including Africa, solar energy is converted and stored for general use in the form of heat energy and electrical energy. Research is still going on to convert solar energy into electrical energy for the purpose of driving our cars.

Purpose The purpose of this activity is to demonstrate that energy from the sun can be collected and stored for use in the form of heat. Also, this activity shows that black objects collect and store heat energy from the sun better than white objects.

Objectives Students will be able to:

- i. Identify the sun
- ii. Discuss what they observe on a sunny day
- iii. Explain why the balloon on the black bottle expanded.

Resources/Materials

Two plastic bottles
One bottle painted white
The other bottle painted black
Several balloons.

Activities and Procedures

- i. Let the students discuss and distinguish between the sun, the moon and the stars. Do the children know that the moon does not have light of its own? Show them the poem on the moon and let them learn the poem.
- ii. The children should be asked to discuss their experiences and what they do on a sunny day. Let the children have the opportunity to relate their own experiences.
- iii. The White and Black Bottle Experiment This activity is carried out with the two plastic bottles, one painted white and the other painted black. Fix a balloon on each of the bottle by placing the open end of the balloon on the mouth of the bottles. Make

sure the balloons form an airtight seal on each bottle. Ask the children why there should be an airtight seal with the bottles. Ask the children to observe the two balloons and make a drawing of what they observe.

Now place both bottles in bright sunlight. Let the children observe the balloons in the sunlight for about ten minutes. Let them touch the two bottles and record what they observe. Help the children to time when the balloon on the black bottle gets inflated. While the balloon on the black bottle expands, the balloon on the bottle painted white remains limp. Let the children draw what they observe. Challenge them to explain what they think is the explanation for what has happened to the balloons.

Tying it all together

Explanation The black bottle will absorb the sun's heat energy better than the bottle painted white. The white bottle reflects away most of the sun's heat energy. The air inside the black bottle warms up and expands making the balloon to inflate and full of air. Hot air expands.

Poem on the Moon

Title: The moon has no light of its own.

Round bright moon
How beautiful you are
Come give us your glow
For children to learn
Some interesting moonlight stories.
Poor me poor me
I have no light of my own
For when you see me
In the sky,
It is the sun
That shines on me.

ELSSA, 1997

Assessment Let the children try to answer the following questions through class discussion or in writing.

- i. Why do people sweat more on a sunny day than on a cloudy day?
- ii. If the moon does not have light of its own, why does it give us moonlight?
- iii. What would be a good color to paint a car if the owner wants to stay cool during the sunny days?
- iv. Which color of uniform would you recommend for police men -white -black - White on black -black on white. State your reasons.
- v. What would be the advantages of driving cars powered by solar energy?
- vi. Let the children find out the local folk tales about the moon and the sun.

Suggestions/Modifications:

- Students may draw the sun or the moon and make a diagram tracking the

different positions the sun and moon take in the sky at different times.

- Students may work in groups to write their own poems about the sun, moon, or stars.
- Students may create their own solar energy experiments or create a proposal to their Energy Minister about the importance of energy conservation.

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References

1. Asun et al. (1998) Longman Primary Science. Book Longman Nig. Plc
2. Bajah, Tunde and Anthony Youdeowei. (1997) Primary Science for Nigerian Schools Book Heinemann Nig. Ltd.