



## **Solar Energy**

**Objective:** Demonstrate that energy from the sun can be collected and stored in many ways.

### **Materials:**

- Plastic bottle painted white
- Plastic bottle painted black
- Several small balloons

### **Procedure:**

1. Place the open end of one small balloon on the mouth of the white bottle and do the same for the black bottle. Make sure the balloon forms an air tight seal.
2. Now place both bottles in bright sunlight. Within a few minutes the students will notice that the balloon on the black bottle will start to expand. The balloon on the white bottle will remain limp.
3. Have a student touch the black bottle to observe that it is warm. Then have the same student touch the white bottle to notice that it is much cooler than the black bottle.

### **What is going on?**

The black bottle will absorb the sun's energy much better. The white bottle reflects away most of the sun's energy. As the bottle absorbs energy, the air inside the bottle warms up and expands making the balloon fill with air.

### **Background:**

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 still realize this 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.

At the equator the Earth receives about one kilowatt per square meter of solar energy. A kilowatt is 1000 watts, or the amount of energy needed to light 10 one-hundred watt bulbs. If humans could take full advantage of solar energy, almost every house in the world could be energy

independent. Only a few households would have to be dependent on the electric company and this would reduce the pollution problem greatly. The consumption of gas, oil, or coal would be reduced and this would also help reduce the level of pollution. Automobiles could be powered by the sunlight during the day and use battery power at night. This would also reduce pollution and help prevent global warming.

Unfortunately, turning solar energy directly into electricity is not very efficient as of yet. Today solar energy can be best collected as heat.