



Curiosity Guide #706

Solar Energy

Accompanies Curious Crew, Season 7, Episode 6 (#706)

Solar Energy Balloon

Investigation #4

Description

Heat up that balloon!

Materials

- Solar balloon
- String
- Scissors
- Friends
- Adult supervision
- Large field
- Sunny day

Procedure

- 1) Take the balloon outside in the field.
- 2) Securely tie off one end of the balloon in a knot or twist the end before tying off with string.
- 3) Open the other end of the balloon and carefully catch enough air to work the air down to the tied-off end.
- 4) Continue to inflate the balloon completely before twisting and tying off the open end.
- 5) Have friends hold the balloon while you measure and cut two lengths of string about 12 feet long.
- 6) Tie each length of string to the ends of the balloon and don't let go.
- 7) Let the balloon rest and observe. What do you notice?

Results

Explanation

The solar balloon is made of a very dark thin plastic, so the balloon is very lightweight that rips easily. Once the balloon is inflated and tied shut, the gas particles cannot get out. As the sun shines on the black plastic, the plastic absorbs all the wavelengths of light and reflects little, so the plastic appears black. The light energy that does get absorbed is converted mostly into heat that gets emitted into the balloon and heats up the gas particles inside. The heated gas particles begin to move more rapidly and collide more frequently, making the balloon inflate a bit more. This changes the density of the balloon particles compared to the air outside of the balloon, and make the balloon more buoyant, causing the balloon to lift.

Solar Power! Have you ever gotten in a closed car on a sunny day and discovered that the car was really hot inside? This is an example of a solar collector. The windows let the sunlight in, and that energy gets absorbed by the dark inside surfaces, the dashboard, floor, steering wheel, and seats. Those surfaces absorb that light and give off a lot of heat, and the heat can't get out. Some people use solar collectors to use the sun's energy to heat water for their homes or even heat their homes themselves. Pretty cool! Or should I say, warm?

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