**Ice Cube Experiment**
Written by GEF Staff

**Grades**: PreK-2
**Subject**: Science
**Time**: 40- 50 minutes

*** Standards:** Students will...
**Science Standard 8:** Understand the property and structure of matter.
**Benchmark # 2:** Know that things can be done to objects (e.g., freezing, heating) to change some of their properties, but not all objects respond the same way to what is done to them.

**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.

**Objectives:** Students will be able to:
- Explain why some of the ice cubes melt faster than others and relate the effect to color.
- Make predictions about questions asked.
- Collect, organize and record data from simple experiments.

Please click here to view both the creative artwork for this great lesson and the downloadable PDF.

**Materials:**
- Colored 3 inch x 3 inch cardboard or paper square cards (black and white are essential and any other four colors will do; the three primary colors red, blue and yellow, as well as green are good choices).
- 6 ice cubes (The same shape and size.)
- Watch or stop-watch
- Worksheet for data (included below)

**Overview**: The color of an object depends on the wavelengths of colors reflected by that object. When a black object is illuminated by white light all wavelengths are absorbed. Dark objects appear dark because they absorb light instead of reflecting it. The light absorbed by dark objects does not disappear. The absorbed light energy is transformed into heat energy. Since darker colors absorb light better they also emit heat better. Wearing a white T-shirt rather than wearing a black T-shirt on a hot day keeps you cooler. A white t-shirt reflects more sunlight and so absorbs less heat.

Green building programs recommend the use of cool roofing. Light colored roofs reflect sunlight minimizing temperature rise and reducing smog formation. This is important in urban areas with asphalt parking lots, paved roads, black roofs, and little vegetation.




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**Kid's Speak**: The darker color absorbs the most light, gains the most energy, and heats up more.

**Eco-Facts**: In one hour more sunlight falls on the earth than what is used by the entire population in one year.

**Procedure**:
**Before Beginning Ice Cube Experiment:**
- Explain to the class that solar thermal energy is produced by the sun's heat.
- Explain to students, when an ice cube is placed in direct sun light, the sun's solar thermal energy will melt the ice.
- Have students predict which ice cube will melt first and which will melt last. Tally predictions on board or make a bar graph using sticky note paper.

**Instructions for Ice Cube Experiment:**
**1.** Put one ice cube on each card and place them in the sun.
**2.** Make sure all the ice cubes are exposed to full sunlight.
**3.** Time how long it takes each ice cube to melt.
**4.** Observe which ice cube melts the fastest and which melts the slowest. Students can record observations on the included worksheet.
**5.** In the first column of the worksheet student can record the time each color took to melt. In the second column students can write the numbers 1-6 to show the order of melting.

**After Completing the Experiment:**
- Discuss the results of the experiment and offer scientific reason.
- Discuss the implications of the results as solar energy becomes more widely implemented in the future.

**Adaptations**: Students can also make colored ice using food dyes. For the white block, students can add milk to the water and for the black one mix up all the other color food dyes; it won't be quite black but it will be close enough. Other options for the black block could be cola. This variant will have a lot more interest for children as they also get to prepare the ice. For this variation, use white paper or card as the substrate.

**Extensions:**
- Students can try the experiment at different times during the day.
- Students can take a field trip to a solar power plant to learn more about solar energy.

**GEF Community:** Students can share their experiment results with the GEF Community. Also, students can share their opinions about what they have learned about solar energy with the GEF Community.




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1. Click on the image above
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