



CLASSROOM ACTIVITY

Amazing Albedo

How does the color of a surface influence its ability to reflect or absorb heat? Focus your investigation on the questions below. After you and your team have completed the activity, respond to these questions directly in your journal.

- ▶ How does the color of a surface impact how it responds to incoming solar radiation?
- ▶ How might this factor influence temperatures in Antarctica?

Gather with your team and choose a captain and a note taker for today, as well as an artist to illustrate the group's findings. Before you begin your investigation, consider what you already know about albedo, the ability of a surface to reflect or absorb heat. Use the questions below to structure your discussion.

- ▶ What colors do you tend to wear in the winter? In the summer? Why?
- ▶ Which would you rather walk on with bare feet—black asphalt or white concrete? Would your answer be different for summer and winter? Explain.
- ▶ What are some of the reasons that temperature varies around the globe?

The captain appoints group members to collect the required materials while the rest of the group reviews today's procedure. Before beginning, the captain makes sure that the group has all required materials, and that everyone knows the day's procedure.

The note taker takes notes on the group's findings for your team. Remember to record your observations and explanations in your journal for your own research notes. Include drawings to illustrate your findings.

**CLASSROOM
ACTIVITY****Amazing Albedo****MATERIALS**

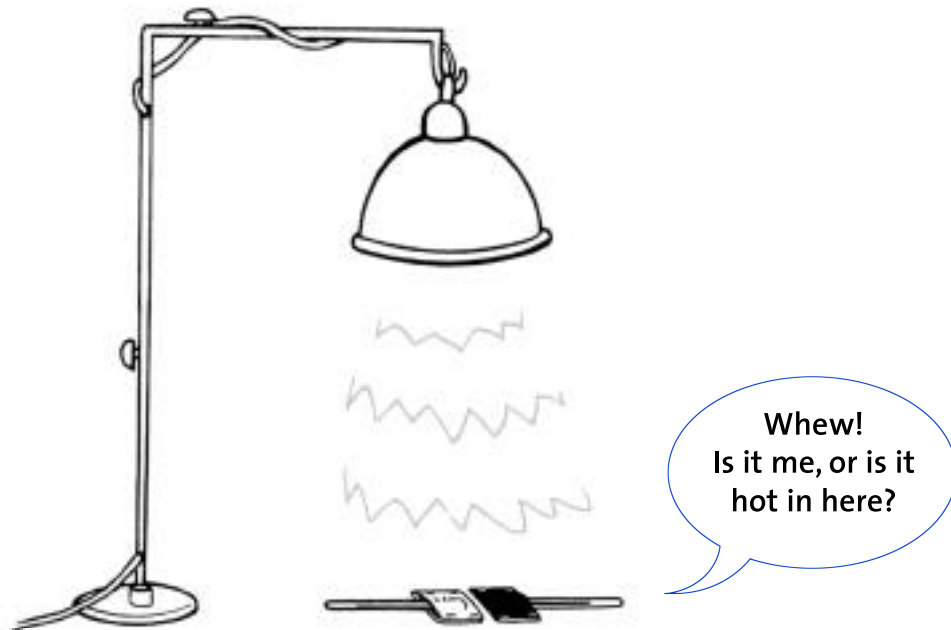
- ▶ 1 sheet of black construction paper
- ▶ scissors
- ▶ stopwatch
- ▶ 1 sheet of white construction paper
- ▶ heat lamp (or natural sunlight)
- ▶ 2 thermometers
- ▶ stapler
- ▶ graph paper
- ▶ ruler

PROCEDURE

1. Cut two rectangles, one from the black paper and one from the white paper. The rectangles should measure 8 cm x 4 cm.
2. Fold the rectangles in half to form squares. Staple the squares to make pockets that can fit around the bulbs of the two thermometers. Slip the paper pockets over the bulbs. Using the worksheet, record the initial temperature reading for each thermometer.

The envelopes must be placed over the bulb end of the thermometers. And the thermometers must be equidistant from your heat source. Why?



**CLASSROOM
ACTIVITY****Amazing Albedo**

3. Position the heat lamp about two feet above the surface of the table.
4. Make predictions with your team about how temperatures will (or will not) change over time. Record your predictions on your worksheet.
5. Turn on the lamp. Be careful—the bulb and the shade can get hot enough to burn! Every two minutes, record the temperature of each thermometer on your worksheet. Continue taking readings for ten minutes.
6. Make a graph of the temperatures you recorded on the two thermometers over time. Use scrap paper to lay out your graph intervals and draw a rough sketch before creating a final graph on the worksheet.
7. Analyze the data with your team. Use the questions on your worksheet to guide your analysis. As your group draws conclusion, remember to take notes in your own journal. Include illustrations to represent your ideas.



GROUP MEMBERS _____

CAPTAIN _____ **NOTE TAKER** _____

1. Record starting temperatures for each of the two thermometers in the first column of the chart below.

	ORIG TEMP	2 MIN	4 MIN	6 MIN	8 MIN	10 MIN
WHITE						
BLACK						

2. Make a prediction: What do you think will happen to the temperatures of the two thermometers over time? Which temperature will rise faster? Which will get hotter? Why do you think so?

3. Which thermometer registered the fastest rise in temperature? Which one registered the slowest rise? Why do you think this happened?



4. Look at a map or a globe. Considering what you have discovered about how surfaces interact with heat depending on color. Which areas of the globe would reflect more solar radiation: the ocean or the continent of Antarctica? Explain.

5. Compare Antarctica with North America. Which continent would reflect more solar radiation? Why?

6. Using all the discoveries you made about how albedo affects temperature, finalize your hypotheses about temperatures in Antarctica. Include the affect of angle in your explanation, if you have studied that as well. Using today's experiment offer a hypothesis to explain temperatures in Antarctica.

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ILLUSTRATIONS

- ▶ In the space below, illustrate your conclusions about how surfaces interact with solar radiation. Include the Earth and the Sun in your drawings, and indicate how the color of a surface affects its ability to reflect/absorb heat. Highlight Antarctica!

GROUP DYNAMICS

Comment on how each group member participated in today's discussion.