

Tundra

Investigation Data Sheet



Why Are Many Tundra Plants Dark in Color?

The tundra biome is a cold, harsh, treeless land, but it does contain a variety of plants and animals. Plants in the tundra biome have many adaptations to survive the freezing temperatures. Many are small and able to grow close to the ground for protection. Their dark-colored leaves also help them survive by trapping heat energy from sunlight.

Objective

Explore how the color of a material affects its ability to absorb heat from the sun.

Materials

- a sunny area and a shaded area (When doing this investigation indoors, a lamp and a dark closet can be used.)
- two liters of water at room temperature
- a measuring cup
- a thermometer
- two sheets of white plastic
- two sheets of black plastic
- four shallow containers (i.e., aluminum pie pans)

Safety Notice: All applicable laboratory safety rules must be followed. Students should not perform any experimental activity without the teacher's supervision and express permission. Students must follow safety guidelines and wear appropriate protective gear.

Procedure

1. Take the temperature of the water and record the reading in the data table.
2. Line two shallow pans with white plastic.
3. Line two shallow pans with black plastic.
4. Fill each with 500 mL of water.
5. Place one white pan and one black pan in the "sunny" area (under the lamp if indoors).
6. Place one white pan and one black pan in the "shady" area (dark closet if indoors).

Data Table	Sunlight		Shade	
	white pan	black pan	white pan	black pan
Starting temp.	°C	°C	°C	°C
after 5 min.				
after 10 min.				
after 15 min.				
after 20 min.				
after 25 min.				
after 30 min.				
after 40 min.				
after 50 min.				
after 60 min.				

7. Make a prediction about the temperature changes in each pan.

8. After five minutes, observe the temperature of the water in each pan. Record your findings in the data table.

9. Over the next hour, observe and record the temperature of the water in each pan periodically.

Conclusions

Using the data you collected, plot a line graph to show the changes in temperature over time for each pan. Be sure to give the graph a title and label the x and y axes. Represent each pan with a different line.

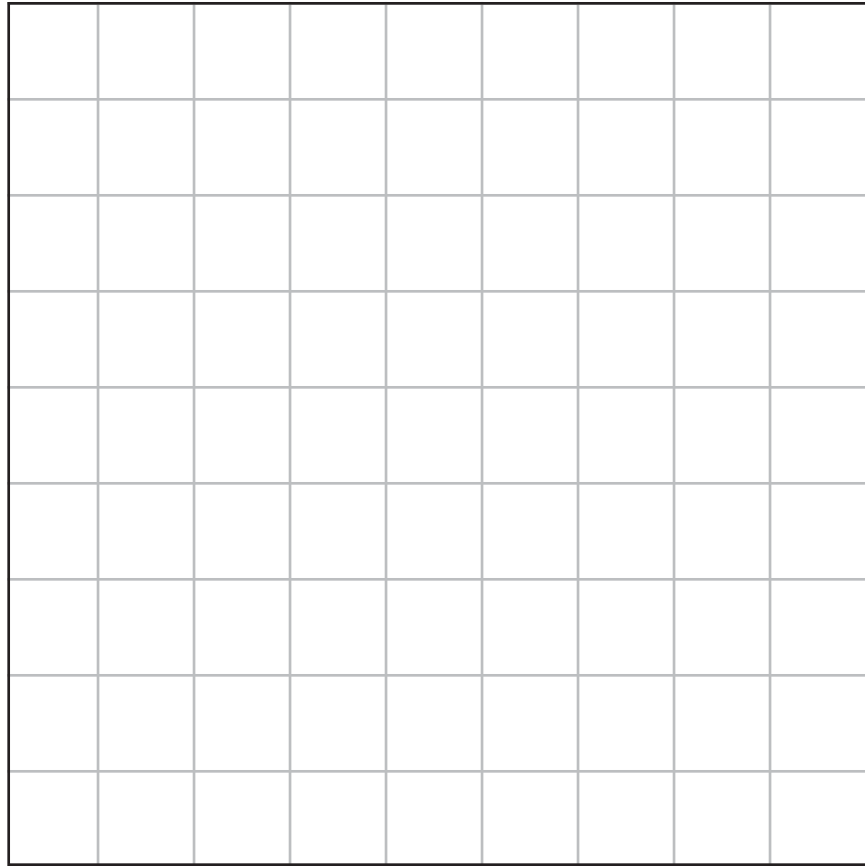
Which pan showed the greatest increase in temperature over time? Why?

Which pan showed the least increase in temperature? Why?

Based on what you found, how do you think the black skin of the polar bear protects it from the cold?

Line Graph

Time



Temperature °C