INVESTIGATION
4-C

STRUCTURED INQUIRY

Skills and Strategies

- Planning and Conducting
- Processing and Analyzing
- Evaluating
- Communicating

Safety

- Be careful when handling the glassware and thermometers to avoid breakage.
- Be careful when working near the hot bulb of the lamp.

What You Need

- 2 plastic trays
- black plastic
- cold water
- ice cubes
- 2 heat lamps
- 2 thermometers
- 2 clamps
- 2 retort stands with clamped thermometers
- masking tape
- waterproof marker
- timer

How Does Melting Sea Ice Affect Global Temperature?

Find out how changes in the hydrosphere affect temperatures around the world in this activity.

Question

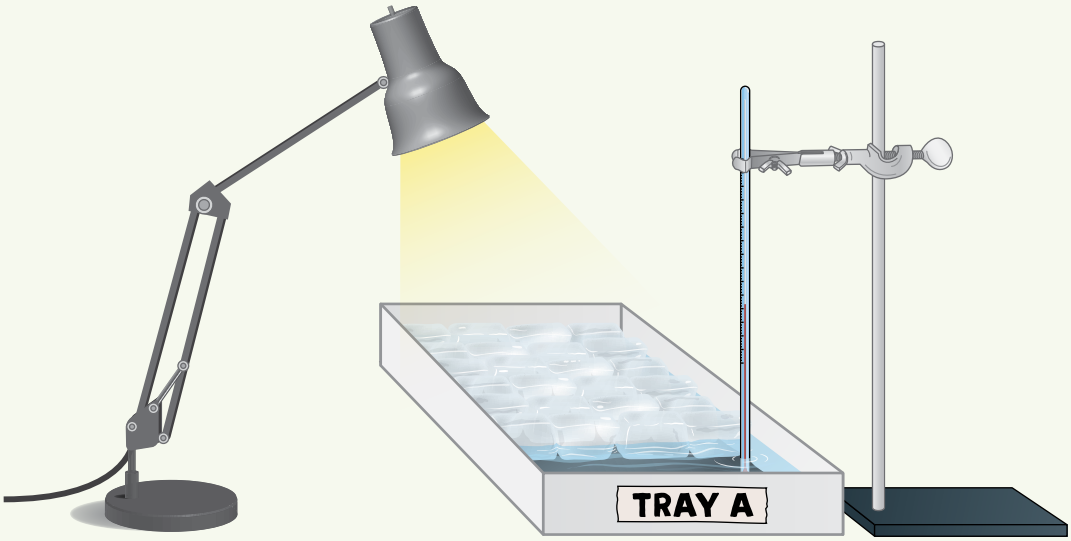
How can changes in the hydrosphere affect temperatures worldwide?

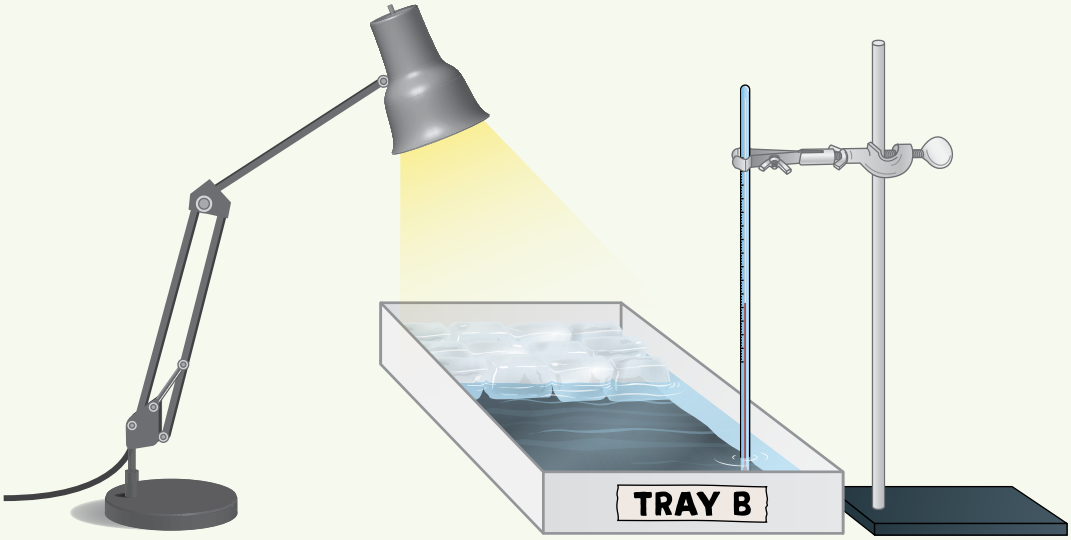
Procedure

1. Read all the steps, and create a data table to record your observations.
2. Line each tray with black plastic.
3. Label the trays A and B with the marker and masking tape. Cover three quarters of Tray A with ice. Cover one quarter of Tray B with ice.
4. Pour water in both trays to fill half the depth of the trays.
5. Set up two 150 W heat lamps about 20 cm from each tray.
6. Position thermometers in each tray to measure the temperature of the water.
7. Turn on the lamps, and make sure that the light shines over the entire tray.
8. Record the temperature of the water in each tray every 30 s for 10 min.

Analyze and Interpret

1. Create a line graph to represent your data.
2. In which tray did the water temperature warm the most? Why do you think this was the case?
   a) What did the black plastic represent in this activity? Hint: After sea ice melts, what lies beneath it?
   b) Why was this lining an important part of the experiment?
3. Use what you have learned in this activity to predict the effect of melting sea ice on average global temperature.





Conclude and Communicate

4. How do you think melting sea ice could affect Earth's other spheres? As you answer, think about how the atmosphere would be affected if areas of Earth's oceans normally covered by ice can now absorb more heat. Also consider how organisms in the biosphere may be affected by the loss of sea ice, and how the hydrosphere and the geosphere interact.