



Investigation 3.3

Investigating the Temperature of Air

Materials

For you

- Science notebook
- Student Sheet 3.3: *Investigating the Temperature of Air*

For your group

- 2 Convection Tubes™
- 2 Pieces of plastic wrap
- 2 Rubber bands
- 1 Digital thermometer
- 1 Metric ruler
- 1 Plastic container of crushed ice, 120 mL (with screw-top lid)
- 1 Plastic container of hot water, 120 mL (with screw-top lid)
- 1 Stopwatch
- Paper towels
- Scissors

Procedure

1. Look over Student Sheet 3.3: *Investigating the Temperature of Air* as your teacher discusses it. Read the question at the top of the student sheet. You will complete the student sheet as you conduct this Investigation.
2. Observe as your teacher demonstrates the setup and Steps 5–12 of the procedure. Review Figures 4 and 5 with your teacher at this time.
3. How would you make this investigation a fair test? List your ideas under Step 1 on Student Sheet 3.3.

4. Make a prediction of the temperature of the air in the tube above different surfaces, and then record it under Step 4 on the student sheet. Discuss your prediction with your class.
5. Collect your materials. With your group, practice reading the thermometers inside the cylinders. The number on the thermometer highlighted with green is the correct temperature. If two numbers that are not green are highlighted, you can average them. Also practice reading the time on the stopwatch and starting and stopping it until you feel comfortable using it.
6. If it has not been done for you, fill one plastic container with hot water and one with crushed ice.
7. Use the digital thermometer to measure the temperature of the hot water. Also measure the temperature of the crushed ice. Write the temperatures for the ice and hot water in the second row of Table 1 on the student sheet.
8. Before you place each container of water (without its lid) under a Convection Tube™, record the starting temperatures of both thermometers in both cylinders on Table 1 of the student sheet. Write them across from Time 0:00. (Thermometer A is the top thermometer.)
9. Set your stopwatch at zero. Place the container of hot water under one Convection Tube™. Place the container of crushed ice under the other Convection Tube™, as shown in Figure 3.4. Then start the stopwatch.

Notes on left side

10. Record the changes in temperature in each Convection Tube™ every minute for three minutes. If the temperature goes higher than the thermometer's highest temperature, you can record 30+°C on your data table. (Do not touch the outside of the cylinder. Your hand may affect the temperature readings.)
11. If it gets difficult to see inside the Convection Tube™, use a paper towel to remove moisture from the base. Attach a paper towel to a ruler with a rubber band and use this device to clear

the cylinder and base, as shown in Figure 3.5. After clearing the Convection Tube™, you can cover your containers of water or ice with plastic wrap and secure the wrap with a rubber band.

12. When you have completed the investigation, clean up your work area.

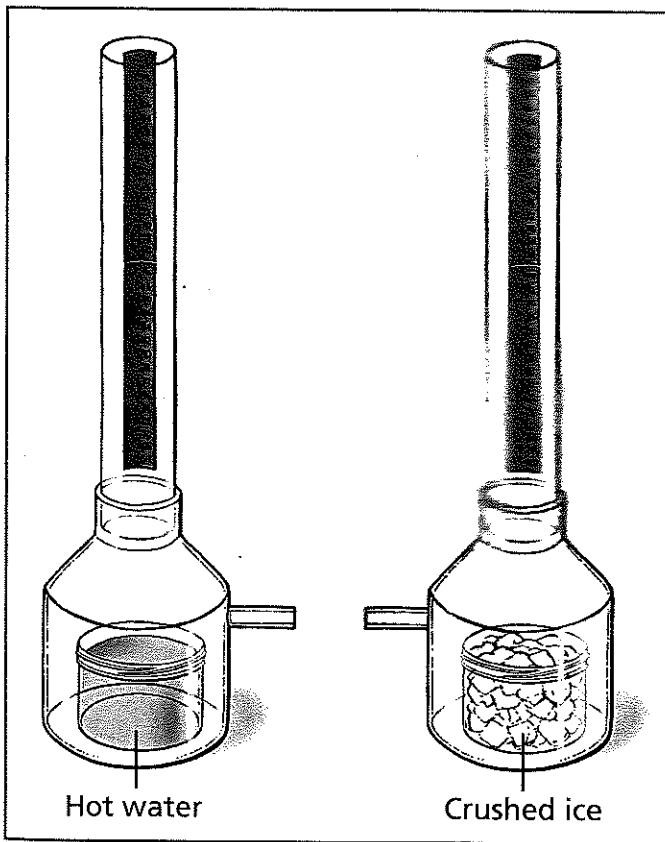


Figure 3.4
Place the hot water and crushed ice underneath the Convection Tubes™.

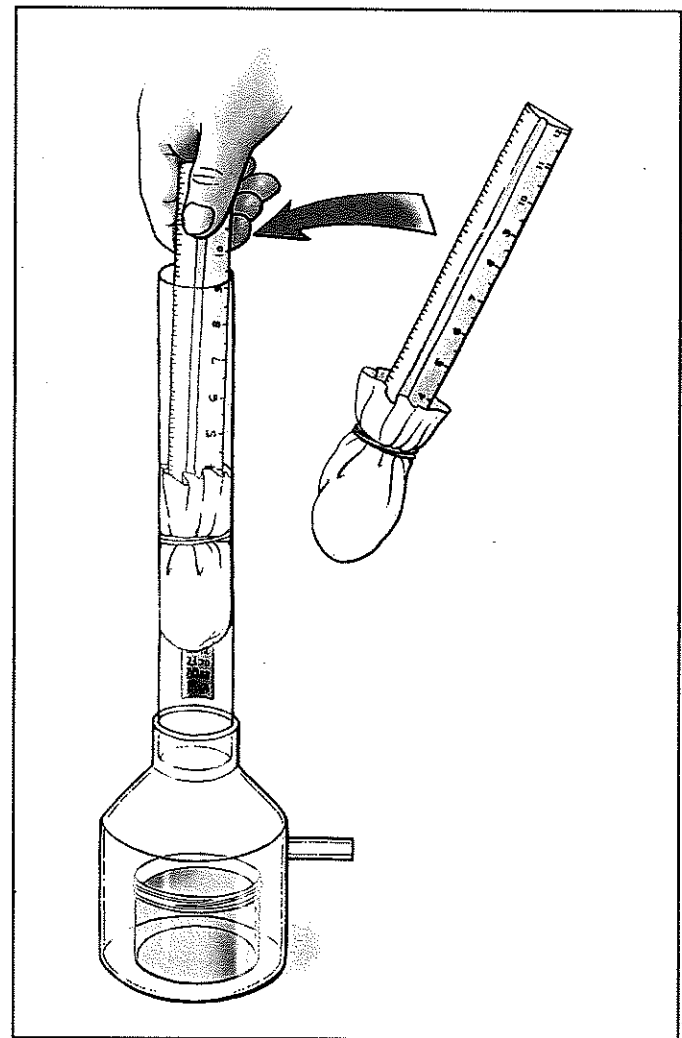


Figure 3.5
Clearing the Convection Tube™