

# HEATING AND COOLING WATER A

## Materials for each pair

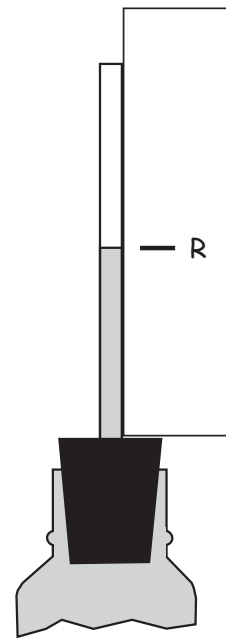
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|----------------------------------|--------------------------------------|
| 1 Glass bottle                   | • Tape                               |
| 1 Rubber stopper with clear pipe | • Blue water                         |
| 1 Syringe, 35-mL                 | 1 Large cup (500 mL) with cold water |
| 1 Squeeze pipette                | 1 Large cup (500 mL) with hot water  |
| 1 Card, 1" × 3"                  | 1 Glass thermometer                  |

## Procedure

- Push the clear plastic pipe a short distance into the rubber stopper.
- Use a syringe to put 35 mL of blue water into the glass bottle.
- Push the stopper into the bottle as far as it will go. Use the pipette to fine-tune the water level so it is halfway up the pipe.
- Tape a 1" × 3" card to the clear tube. Label the water level "R."
- Record the starting temperatures of the cold and hot water.

Cold water \_\_\_\_\_ Hot water \_\_\_\_\_

- Place the bottle in cold water. After 3 minutes, label the water level "C."
- Move the bottle to hot water. In 5 minutes, label the water level "H."



## Think about the bottle system.

- What happened when you placed your bottle system in cold water? Draw and explain.

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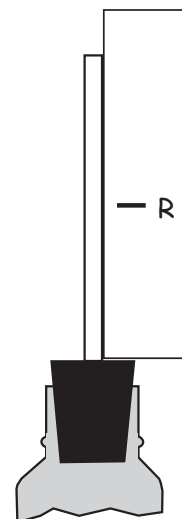
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## HEATING AND COOLING WATER B

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2. What happened when you placed your bottle system in hot water? Draw and explain.

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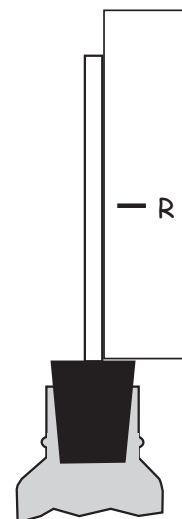
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3. What caused the water to go up in the pipe when you put the bottle in hot water?

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4. What caused the water to go down in the pipe when you put the bottle in cold water?

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5. Describe what you think happened to the water particles in the bottle system when it was placed in hot water. Discuss kinetic energy and expansion.

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