

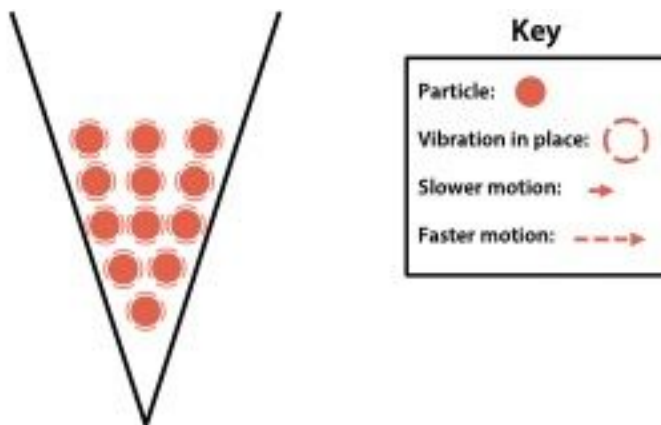
Assessment Items for Physical Science 1-4

Item 1

Marcus found a small icicle outside and brought it inside to show his sister. Marcus put the icicle in a bowl and left it on the table in the warm kitchen. After a while, the icicle melted. Marcus was surprised the next morning when he found that the melted icicle had completely evaporated away. He wondered what caused these changes. He also wondered what was different about the water when it was an icicle compared to when it was liquid water and when it evaporated to become water vapor. Complete the model below to help explain to Marcus how changes to the water particles caused the changes he observed.



Below is a particle model that shows the particles in the icicle when Marcus first brought it inside and a brief caption that explains the model. The symbols in the key represent particles and their motion. Note that the particle sizes and distances between particles are not to scale.



The water is frozen solid. The particles vibrate in place but do not move around.

a. First, the icicle melted. As a first step toward answering Marcus' questions, use symbols from the key to draw a particle model of the water in the bowl just after the icicle melted. Be sure your model includes each of the following:

- The spacing and location of the particles.
- The motion of the particles.
- A caption that describes what happened to the state of the water and how the particle motion has changed.



Caption:

b. Eventually, the water in the bowl evaporated. Use symbols from the key to draw a particle model to show what happened as the water evaporated from the liquid water in the bowl. Use symbols from the key and labels or captions to explain why the water evaporated. Be sure your model includes each of the following:

- The spacing and location of the particles.
- The motion of the particles.
- Labeled arrows identifying thermal energy transfer.
- A caption that describes changes in the motion of the particles and what caused the water to evaporate.



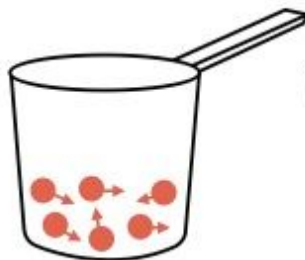
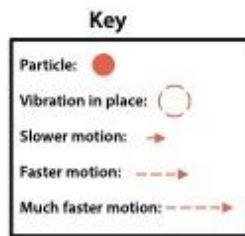
Caption:

Item 2

Josie needed to boil some water to cook pasta. She put a pot of room temperature (20°C) water on the stove and turned the burner on. After 5 minutes, the water had not boiled yet. Josie got a phone call and stopped checking the water. When she returned to check the water 15 minutes after she turned on the stove, it was boiling rapidly and half of the water was gone. She started to wonder: *What happened to the water from the time I put it in the pot until it boiled? Why is some of the water no longer in the pot?*

Complete the model below and use it to explain to Josie what happened. The model shows the same pot before the stove was turned on, after 5 minutes, and when Josie returned after 15 minutes. The model for the room temperature water is provided. Use symbols from the key to complete the model. Then, fill in the box below each pot with a caption to explain how your model shows what was happening at each stage to:

- the temperature change of the water.
- the state(s) of the water (solid, liquid, or gas).
- spacing between particles.
- particle motion.
- what causes an changes in the water.



Start



5 minutes



15 minutes

The water is at room temperature (20°C) and it is a liquid. The particles are close together, but as the short arrows show, they are able to move.