Energy Changes Matter

Track how thermal energy changes the phase of water.

5.7.c "energy has an effect on the phases of matter."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each sentence that tells what happens when thermal energy is added. Circle each sentence that tells what happens when thermal energy leaves matter, then number the four phase changes described in the passage.

Water on the Move

(1) An ice cube is water in its solid phase. Its particles are packed closely and vibrate in place. When the cube sits on a warm plate, thermal energy moves from the plate into the ice. The particles move faster and loosen their fixed positions. The ice melts, changing from a solid to liquid water. Matter is still water, but its phase has changed.

(2) Heating a pot of water adds thermal energy to the liquid. As the particles move faster, some can escape the attractions holding them together. At the boiling point, bubbles of water vapor form throughout the water. The liquid boils and becomes a gas. Water vapor particles move freely and spread into the nearby air above the pot.

(3) Energy can also leave matter. After a hot shower, water vapor in the air touches a cool mirror. Thermal energy moves from the vapor to the cooler mirror, so the particles slow down. The vapor condenses into liquid droplets. In a freezer, liquid water loses thermal energy and freezes into solid ice. Removing energy can change a gas to a liquid or a liquid to a solid.

2 ANSWER WITH EVIDENCE

Use the passage

1. When the ice cube melts, which way does thermal energy move?

2. What happens to water particles when thermal energy is added to liquid water?

3. What phase change happens when water in the pot reaches its boiling point?

4. Why do liquid droplets form on the cool mirror after a hot shower?

3 YOUR TURN

Your own words

In the three panels, draw water as ice, liquid water, and water vapor while it gains thermal energy. Write a caption for each panel that names the phase and tells how the particles move.

ANSWER KEY

Energy Changes Matter

GRADE 5 · 5.7.c

PART 1 · READ AND MARK

Underline each sentence that tells what happens when thermal energy is added. Circle each sentence that tells what happens when thermal energy leaves matter, then number the four phase changes described in the passage. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	When the ice cube melts, which way does thermal energy move?	**Thermal energy moves from the warm plate into the ice cube.**
2	What happens to water particles when thermal energy is added to liquid water?	**The particles move faster. Some can escape the attractions holding them together.**
3	What phase change happens when water in the pot reaches its boiling point?	**The liquid boils and becomes a gas, water vapor.**
4	Why do liquid droplets form on the cool mirror after a hot shower?	**Water vapor loses thermal energy to the cooler mirror. Its particles slow down, and the vapor condenses into liquid droplets.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Panel 1: Ice is a solid. Its particles are packed closely and vibrate in place. Panel 2: Liquid water has gained thermal energy. Its particles move faster and slide past one another. Panel 3: Water vapor is a gas. Its particles move freely and spread out.

Accept answers that explain that adding thermal energy can cause melting or boiling, while removing thermal energy can cause condensation or freezing. In Part 3, accept simple particle drawings if the captions accurately connect energy, particle motion, and phase.