

WORDS TO KNOW

physical property

physical change

boil

conservation

phase change

freeze

Lesson 2

WHAT HAPPENS TO MATTER
WHEN IT TRANSFORMS?

THE BIG IDEA

- Matter stays the same weight when it changes form, whether it becomes a solid, liquid, or gas.

WHAT I NEED TO KNOW

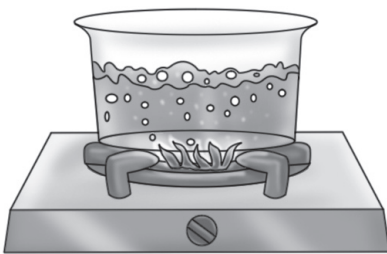
▶ TURN AND TALK

What is matter? Brainstorm some examples of matter that you commonly see in a solid form, in a liquid form, and in a gas form.

What happens if your ice cream melts? Do you still have the same amount of ice cream? Yes, all the ice cream is still there, but it changed shape or form. If you weigh the ice cream before and after it melts, it weighs the same.

You can observe that some of the ice cream's **physical properties** changed. You can observe that the ice cream's temperature became warmer, and it had a **physical change** from solid to liquid. The contents of the ice cream did not change. It still has all of its ingredients, just in a stickier, liquid form. The ice cream's property of weight, or amount of matter, did not change.

What happens when water boils in a pot? There is less and less water in the pot. Where does the water go? Heating water to a boil makes it turn from a liquid to a gas. The gas mixes with the air, so you cannot see it. Even though it is invisible and seems to disappear, it is still there!



Just like the ice cream, water is made of matter. Matter can change forms, but it never just goes away. The same amount of matter is there, no matter what form it takes. When matter keeps a physical property such as weight while it changes from one form to another, it is called **conservation**. You can test conservation of matter by weighing objects before and after a **phase change**, or a change between solid, liquid, or gas.

Water changes from one phase to another based on the temperature of the water. Water freezes at 32°F or 0°C. Water boils at 212°F or 100°C. Freezing is when water goes from liquid form to solid form. Water boils when it goes from liquid form to gas form.

◀ THINK ABOUT IT

Think about the weight data collected for the container holding water in solid, liquid, and gas forms. What would the graph of the weights look like?

WHAT I HAVE LEARNED

1. Which statement below is true?

- Ⓐ Matter cannot change form.
- Ⓑ Matter does not change its physical properties.
- Ⓒ Matter is conserved during changes in form.
- Ⓓ Matter changes weight when it changes form.

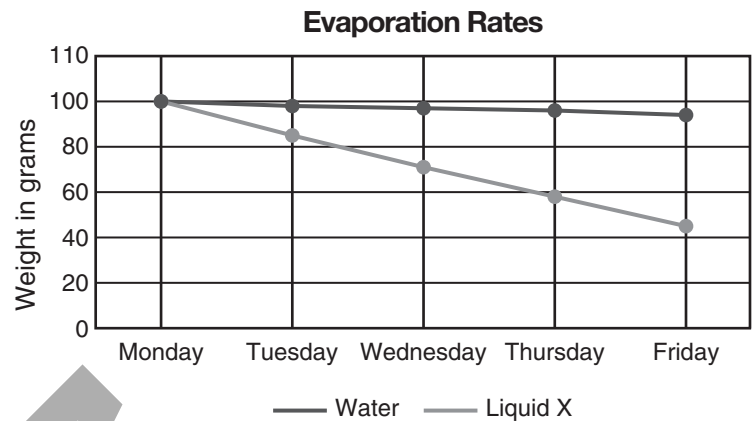
2. In a classroom experiment, 100 grams of water were placed in a beaker and left uncovered. Three days later, the teacher weighed the beaker again, and the class observed that there were only 96 grams of water. What is the most reasonable conclusion for this experiment?

- Ⓐ The scale is not working because the water should weigh the same.
- Ⓑ Some water was spilled.
- Ⓒ There were 4 grams of water that evaporated as a gas.
- Ⓓ There were 6 grams of water that evaporated as a gas.

◀ HINT, HINT

Remember that evaporation is when a liquid turns into a gas. You do not need to boil a liquid to see this happen! Puddles dry up, and clothes dry when hung outside. Evaporation is part of the water cycle, but all liquids can evaporate.

3. In another classroom experiment, students placed 100 grams of water in one beaker and 100 grams of an unknown liquid called Liquid X in another beaker. They left both on a table and weighed them every day. This is their graphed data.



What conclusion can they make from this graph?

- (A) Water turned into a gas more quickly than Liquid X.
 (B) Both water and Liquid X turned into a gas at the same rate.
 (C) Water did not turn into a gas, but Liquid X did.
 (D) Water turned into a gas more slowly than Liquid X.
4. A student watches her uncle heat chocolate in a pot so they can dip in bananas and cake for dessert. The uncle is using a candy thermometer that shows degrees Fahrenheit ($^{\circ}\text{F}$). The student makes the following observations.

At 75°F the chocolate is shaped into small, solid, “chip” shapes.

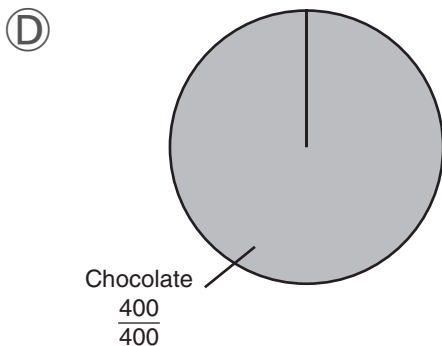
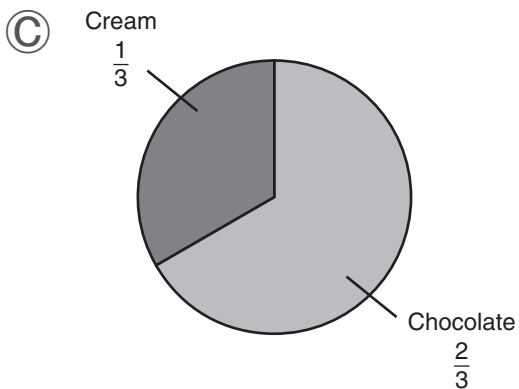
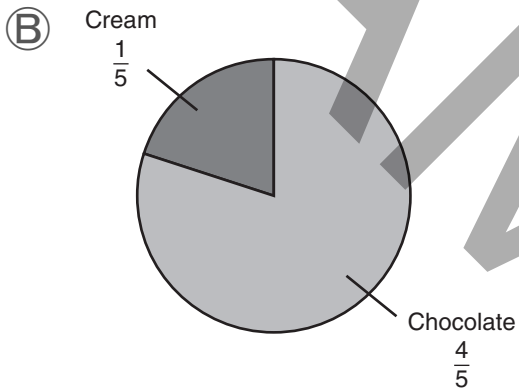
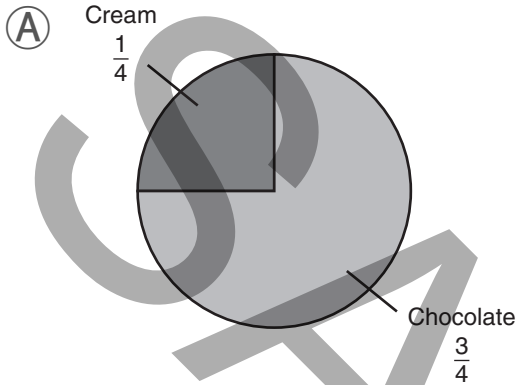
At 86°F the chocolate chips are losing their hard edges.

At 90°F they can stir the chocolate with a spoon.

What happened to the chocolate chips?

- (A) The chocolate chips changed in some physical properties.
 (B) The chocolate chips became a solution.
 (C) The chocolate chips became a mixture.
 (D) The chocolate chips weighed less after 90°F .

5. A student decides to add 100 grams of cream into 300 grams of melted chocolate. He mixes it in until he cannot see the cream. Which graph shows the correct proportion of ingredients by weight?



◀ HINT, HINT

Remember that a pie chart, or circle chart, shows the whole, and the “pie pieces” show the parts that make up that whole. In a fraction, that same whole is the number in the denominator, and the part is the number in the numerator. What is the whole weight of the mixture when the cream is added to the chocolate? What part of that whole is cream or chocolate? Remember to simplify your fractions.