

Evaporation

Does adding heat to water increase the rate of evaporation?

In the last activity, you learned that heating molecules makes them move faster and cooling molecules makes them move slower. You observed this in a liquid (water) and a gas (air in a bottle). In this activity, you will compare the rate at which 2 drops of water dry up. When water “dries up”, it seems to disappear, but is still around—somewhere. The water, which was once a liquid, becomes the invisible gas *water vapor* and becomes part of the air.

1. List at least two examples of water “disappearing” as something wet becomes dry.

2. What do you think you could do to make the water “dry up” faster in one of your examples?

When water “dries up”, changing from a liquid to the gas *water vapor*, we say that it *evaporates*. Notice that the words *evaporate* and *water vapor* both contain the word “vapor”.

Plan your experiment

3. Develop an experiment that you could safely do in your classroom to find out if heating water increases the rate at which it evaporates. Answer the following questions as you think about how you will design your experiment.
 - a. How much water will you use? _____
 - b. How will you add heat to one sample of water?

 - c. How will you know when one sample has evaporated more than the other?

 - d. What are some things that will need to be kept the same so that the experiment is fair?

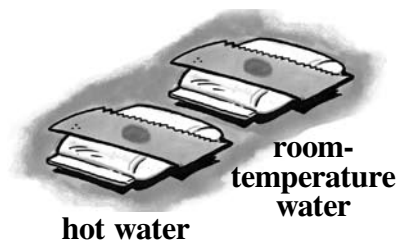
Activity 6.2

Evaporation (continued)

Does adding heat to water increase the rate of evaporation?

Procedure

1. Add about 1 cup of *room-temperature* water to a zip-closing plastic quart storage bag. Get as much air out as possible, and seal the bag securely. Lay the bag down flat.
2. Add about one cup of *hot* tap water to a zip-closing plastic bag. Get as much air out as possible, and seal the bag securely. Lay the bag down flat. This bag will serve as a heat source.
3. You and your partner should each use a dropper to place 1 drop of room-temperature water in the center of 2 separate pieces of brown paper towel at the same time.
4. Allow the drops to spread for about 10–20 seconds until they don't seem to be spreading any more.
5. At the same time, place 1 paper towel on each bag.
6. Observe every few minutes. Compare the amount of water on each paper towel.



Evaluate the design of this experiment

8. Why do you think you used the same amount of water on each paper towel?

9. Why do you think you used a bag of room-temperature water and a bag of hot water in this experiment?

Record your observations

10. Which sample of water evaporated faster?

11. Does adding heat energy to water increase the rate of evaporation? _____