

# Activity Sheet Answers

## Chapter 2, Lesson 3

### Changing State—Condensation

#### DEMONSTRATION



1. Why do you think the cup that is exposed to more air has water on the outside of it?

The cup that was exposed to more air has more water on it because the air contains water vapor (a gas). When the water vapor touches the cold glass it condenses to become liquid water. So the more air that can hit the cold cup, the more water will form on it by condensation.

2. List two common examples of condensation.

Two common examples of condensation are water forming on the outside of a cold cup and dew forming overnight on grass or on a car.

#### ACTIVITY

##### WHAT DID YOU OBSERVE?

3. After a couple of minutes, what did you observe on the inside of the top cup?

After putting the cup on top of the cup of hot water, the inside of the top cup gets a little cloudy-looking. It looks like tiny drops of water on the inside of the top cup.

4. How could the tiny drops of water get to the inside of the top cup? Use ideas about evaporation and condensation in your explanation.

Tiny drops of water formed on the inside of the top cup because water evaporated from the hot water in the bottom cup and then condensed on the inside of the top cup.

#### ACTIVITY

##### WHAT DID YOU OBSERVE?

5. Does cooling water vapor increase the rate of condensation?

Cooling water vapor does increase the rate of condensation.

What evidence do you have from the activity to support your answer?

In the experiment, the cup with the ice on top had more water on the inside than the cup without the ice. The only difference between the cups was the temperature that the water vapor was exposed to. Since there was more water on the cup in which the water vapor was cooled, cooling water vapor must increase the rate of condensation.

## **EXPLAIN IT WITH ATOMS & MOLECULES**

6. The animation showed water molecules as a gas condensing to form liquid water on the inside of the top cup. Since the water molecules were all separated as a gas, why did they come together to form a liquid?

The molecules of water vapor contacted the sides of the cooler cup and transferred some of their energy to the cup. The molecules slowed down and their attractions were able to hold them together as liquid water.

7. Why do you think the cup with the ice has bigger drops of water on the inside than the cup without ice?

The cup with ice on top has bigger drops of water because the colder temperature caused more water vapor to condense to liquid water. The greater amount of liquid water formed bigger drops.

## **TAKE IT FURTHER**

### **Fogging up a cold window**

8. When you breathe on a cold window in the winter, the window gets tiny droplets of moisture on it or “fogs up.” Using what you know about condensation, explain why you think the cold window gets foggy. (**Hint:** There is water vapor in your breath.)

Water vapor that is in your breath condenses on the cold window and forms tiny drops of liquid water. These droplets make the window look foggy.

### **Warm breath in cold air**

9. When you breathe out in the winter, you see “smoke,” which is really tiny droplets of liquid water. Using what you know about condensation, explain why you think this happens.

These tiny droplets of water form in the air when water vapor from your breath condenses into liquid water.

10. Using what you know about evaporation and condensation, explain what causes rain.

Rain is caused by water evaporating from lakes, rivers, and oceans. This water vapor cools in the upper atmosphere and condenses into tiny droplets which form clouds. These tiny droplets come together and form raindrops which are heavy enough to fall as rain.

11. Why does moving air over a wet surface make it dry more quickly?

The air over a wet surface that is evaporating has some extra water vapor in it that condenses back onto the surface. If you blow away that air, there is less condensation back onto the surface and it dries out faster.

12. Is there any color in the water that forms on the inside of the top cup?

When the colored water evaporates and condenses on the inside of the top cup, there is no color in the water on the inside surface of the cup.

13. If you were stranded on an island and only had saltwater, how could you make water to drink?

If you were stranded on an island and only had salt water, you could put the saltwater in a bowl or other container. Then you stand a glass or cup in the middle of the saltwater and cover the whole bowl. At night, if it got cold enough, evaporated water vapor from the saltwater would condense and drip into the cup.