

## Exploring moisture on the outside of a cold cup

### What causes moisture to form on the outside of a cold cup?

You may have seen tiny drops of water on the outside of a cold drink or a ring of moisture on a napkin or table beneath a cold drink. This activity explores what causes this moisture to form by considering both the *temperature* of the drink and the amount of *water vapor* in the air.

#### Does the temperature of a cup affect how much moisture forms on it?

##### Procedure

1. Fill 1 cup with ice. Add room-temperature water until the cup is about  $\frac{3}{4}$  filled.
2. Add room-temperature water to another cup until it is about  $\frac{3}{4}$  filled.
3. Wipe the outside of both cups with a paper towel to be sure they are dry.
4. Allow the cups to sit for about 1–3 minutes. Look at the outside of each cup. Use your finger to test for any liquid on the outside of the cups.



1. Which cup had more moisture on the outside of it?

---

---

2. Condensation is the process where a gas changes to a liquid. Explain how condensation might be the cause of the moisture on the outside one of the cups.  
**Hint:** Remember that cooling water vapor increases the rate of condensation.

---

---

## **Exploring moisture on the outside of a cold cup** *(continued)*

### **Does water vapor from the air cause moisture to form on the outside of a cold cup?**

If you've ever let your cold drink sit out for a while, you've probably noticed that water forms on the outside of the cup. In this activity, you will explore what causes this moisture to form.

To find out if water vapor from the air causes condensation, you could expose one cold cup to air and keep air away from another. This activity is one way of doing this.

#### ***Procedure***

1. Fill 2 cups with ice. Then add room-temperature water until each cup is about  $\frac{3}{4}$  filled. Wipe the outside of both cups with a paper towel to be sure they are dry.
2. Carefully place 1 cup in a zip-closing plastic bag. Get as much air out of the bag as possible and then seal the bag tightly.
3. After about 1–3 minutes, observe both cups.



3. Which cup has more moisture on the outside?

---

---

4. What is the purpose of the bag in this experiment?

---

---

5. If you see a cup with moisture on the outside of it, what can you say about the temperature of the cup and the amount of water vapor in the air?

---

---

6. If you see a cup that is completely dry on the outside, what can you say about the temperature of the cup or the amount of water vapor in the air?

---

---

## **Exploring moisture on the outside of a cold cup** *(continued)*

### **Try this activity at home**

Conduct an at-home activity to find out whether moisture will develop on the outside of an *empty* cold cup.

7. Make a prediction. Do you think moisture will form on the outside of an *empty* cold cup? \_\_\_\_\_

Why?

---

---

---

### ***Procedure***

1. Place 1 clear plastic cup in a freezer while keeping another identical cup out. This identical cup will serve as a control.
  2. Leave the cup in the freezer for at least 5 minutes.
  3. Remove the cup from the freezer and place it near the control cup.
  4. Look at the cups and feel the outside of each.
8. Some people might think that the moisture that forms on the outside of a cold drink somehow leaks through the cup. Explain how this experiment could change their minds.

---

---

---

---

---

---

---