

Name \_\_\_\_\_

Date \_\_\_\_\_

## Condensation Lab: Dew or Frost?

**Question to investigate:** What is the source of water that condenses on the outside of cold cups?

### Materials for Each Group

- 2 Clear Plastic Cups
- Ice Cubes and Liquid Water
- Thermometers
- Gallon Sized Ziplock Plastic Bags



### Procedure

1. Place water and ice cubes into two identical plastic cups.
2. Immediately place one of the plastic cups into a gallon sized Ziplock bag and get as much air out of the bag as possible. Close the bag securely.
3. Allow the cups to sit undisturbed for about 10 minutes.
4. Remove the plastic cup from the bag and examine both cups.
5. Use a thermometer to measure and record the temperature of the water in each cup.

### Analysis?

1. Which cup had the most moisture on the outside of it?
2. Why do you think one cup had more moisture on it than the other cup?
3. Some people think that the moisture that appears on the outside of a cold cup is water that has leaked through the cup. How does this demonstration prove that this idea is not true?
4. Condensation happens when water molecules in the air slow down so much that their attractions overcome their speed. This makes them join to form liquid water.

List four common examples of condensation.

5. What temperature was the liquid in each cup?
6. 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.
7. When you breathe out in the winter, you see “smoke or fog,” which are really tiny droplets of liquid water. Using what you know about condensation, explain why you think this happens.
8. Does it have to rain in order for dew to develop on grass in the morning? Explain:

**Question to Investigate:** How can you cause water vapor to change to frost?

**Materials for Each Group**

- Empty Metal Can
- Ice
- Paper Towel
- Salt
- Metal Spoon
- Thermometer



**Procedure**

1. Dry the outside of a can with a paper towel.
2. Place 2 heaping spoons of salt in the bottom of the can.
3. Fill the can about halfway with ice.
4. Add another 2 heaping spoons of salt.
5. Add more ice until the can is almost filled and add another 2 spoons of salt.
6. Hold the can securely and mix the ice-salt mixture with a metal spoon for about 1 minute.
7. Remove the spoon and observe the outside of the can. Do not touch it yet.
8. Wait 3–5 minutes.
9. Use a thermometer to measure the temperature of the ice inside the can.

**Analysis**

1. Look at and touch the outside of the can. What do you observe?
2. Frost is white and forms through deposition, which occurs when water vapor turns directly to a solid. Ice is clear and forms through freezing which occurs when liquid water turns into a solid. Which process occurred on the outside of the can?
3. Describe what happened to the water vapor in the air when it came in contact with the cold surface of the can. Be sure to mention how the molecules change speed and how they are attracted to each other.
4. Your can might have some water and some frost on the outside of it. Explain how this can be possible.
5. Where and when do you often see frost occur?
6. What was the temperature of the ice inside the can?
7. In what temperature range, would dew form and in what temperature range would frost form?