

Changing State - Freezing Activity Sheet

Objectives: _____

DEMONSTRATION

1. In the video, you saw a round metal container filled with water and placed in a very cold liquid mixed with dry ice. What happened when the water inside the container froze?

What caused this to happen?

2. Use the example of what happens to the metal container to explain why roads are likely to develop potholes during cold winters?
- 3.

ACTIVITY

Question to investigate

How can you make the water vapor in air condense and then freeze?

Materials for each group

- Empty clean metal can
- Salt
- Ice
- Metal spoon or study stick
- Teaspoon
- Paper towel



Procedure

1. Dry the outside of a can with a paper towel.
2. Place 3 heaping teaspoons of salt in the bottom of the can. Fill the can about halfway with ice.
3. Add another 3 heaping teaspoons of salt.

4. Add more ice until the can is almost filled and add another 3 teaspoons of salt.
5. Hold the can securely and mix the ice-salt mixture with a metal spoon or study stick for about 1 minute. Remove the spoon, and observe the outside of the can. Do not touch it yet.
6. Wait 3 -5 minutes. Watch the animations while you wait.

EXPLAIN IT WITH ATOMS & MOLECULES

Look at and touch the can. What do you observe?

Describe what happens to the water 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.

Your can might have some water and some ice on the outside of it. Explain how this can be possible.

Conclusions:

1. The temperature at which a substance freezes is called the freezing point. Different liquids have different freezing points. Here are a few examples:

Water	0°C
Corn Oil	About - 20°C
Isopropyl Alcohol	-88.5°C

Why do you think different liquids have different freezing points?

2. Nitrogen is a gas at room temperature. It needs to be cooled to -196°C to condense to a liquid and it freezes at -210°C. Do you think the attractions between nitrogen molecules are strong or weak? Why?