

# LESSON CLUSTER 1

## States of Water

### Activity 1.1: Changing Solid Water to Liquid Water -- Fast

You will show that ice is really solid water by changing it into liquid water, as quickly as possible.

Get an ice cube and seal it in a plastic bag so that nothing can get in or out. Now see how quickly you can change the ice into liquid water. Time yourself.

Starting time \_\_\_\_\_ : \_\_\_\_\_ and \_\_\_\_\_ seconds

Ending time \_\_\_\_\_ : \_\_\_\_\_ and \_\_\_\_\_ seconds

Melting time \_\_\_\_\_ minutes and \_\_\_\_\_ seconds

1. How did you try to speed up the melting?

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2. How does this activity show that ice and water are really the same?

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3. How could you change the liquid water in your bag back into ice?

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4. Do you think you would have more, less or the same amount of ice as started out with?

\_\_\_\_\_ Explain your answer.

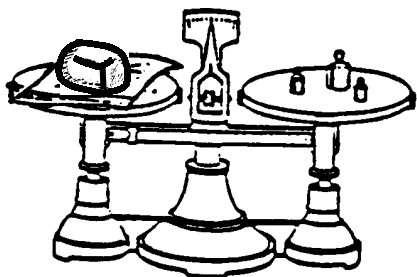
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5. My friend predicted that the liquid water from a melted ice cube would weigh less than the solid ice cube. My friend designed an experiment to find out whether her prediction was true. She placed an ice cube in a ziplock bag, weighed it, allowed the ice to melt, and weighed it again. Note the results:

**BEFORE**



**AFTER**



Notice that there was no change in weight. Explain the results of the experiment.

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Demonstration 1.2: Distilling Water

Answer the questions below after your teacher has demonstrated the distillation of water.

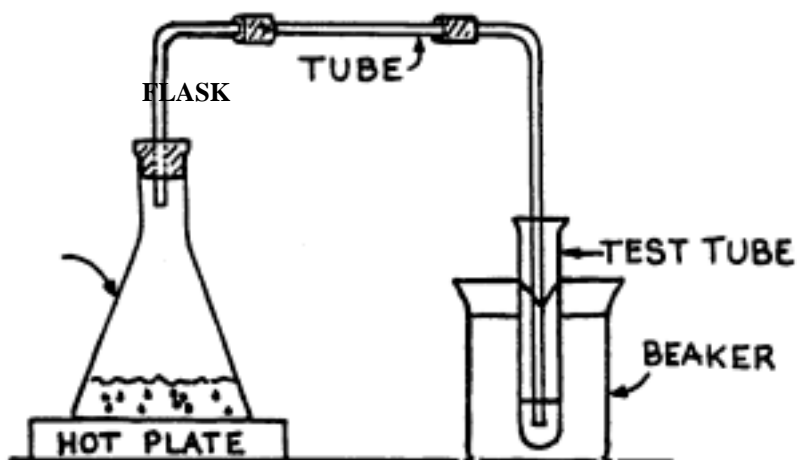
1. Would you expect the flask to have more water in it, the same amount, or less water at the end of the experiment? \_\_\_\_\_ Why?

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2. Draw arrows on the picture below to show how the water is moving through the distillation apparatus.



3. Complete the following sentences:

- a. Inside the flask, water is changing from \_\_\_\_\_ to \_\_\_\_\_.
- b. \_\_\_\_\_ is traveling through the tube.
- c. In the test tube, water is changing from \_\_\_\_\_ back into \_\_\_\_\_.
- d. The bubbles in the boiling water are made of \_\_\_\_\_.

4. My friend watched a pot of water boiling on the stove and said, “Oh, look at the air bubbles in the water.” Was what my friend said correct? \_\_\_\_\_

Explain.

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5. a. Look carefully at the tube. Can you see the water vapor inside the tube? \_\_\_\_\_

b. Can you see the water vapor inside the bubbles of boiling water? \_\_\_\_\_

c. What does this show you about water vapor?

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6. How does this experiment verify that liquid water and water vapor are two different states of the same substance?

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Question Set 1.3: The Smallest Pieces of Water

I. What are the smallest pieces of water called? \_\_\_\_\_  
What are these smallest pieces made of? \_\_\_\_\_

2. Draw a picture of a water molecule and label the atoms in it.

3. Suppose you saw a tiny speck of dust floating in a drop of water. Draw a picture to show how the size of the speck of dust compares to the size of water molecules.

4. Draw arrows in the picture you drew above to show how the water molecules are moving.

5. My friend said that if you froze some water into ice, then let the ice sit completely still in the freezer, the water molecules would eventually slow down and stop moving.

Was my friend right? \_\_\_\_\_

Explain your answer.

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Question Set 1.4: Molecules and the States of Water

1. How are ice, liquid water, and water vapor the same? (Talk about molecules in your answer).

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2. How are ice, liquid water, and water vapor different? (Talk about molecules in your answer. Draw pictures if it helps.)

3. My friend says that when water freezes the molecules get cold and turn hard. Do you agree? \_\_\_\_\_ Explain your answer.

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4. My friend says that there is water between the molecules of liquid water. Do you agree? \_\_\_\_\_ Explain your answer.

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5. My friend says that there is air inside the bubbles of boiling water. Do you agree? \_\_\_\_\_ Explain your answer.

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