6th Grade Science 2/04/19

EQ: Does Menthol have to melt before I smell it?

CW: Investigation 15.3

HW: Reading 15.4 pgs. 150-152 Write in margins and answer questions

Agenda

1. Reading 15.2
2. Investigation 15.3 Does Menthol have to melt before I smell it?

End of IC1 test on Wednesday

Reading 15.2 pg. 142

📖 Reading 15.1 – What Happens to Molecules When a Substance Melts?

Getting Ready

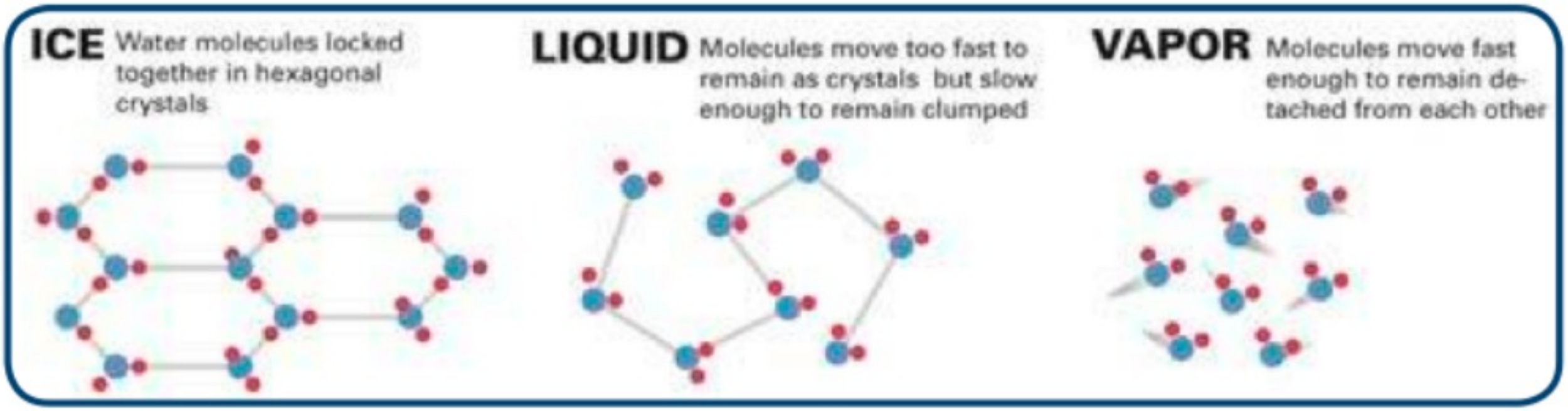
Ice cream melts. Butter melts. You have probably observed both of these. You probably have not seen a glacier melting. Glaciers are like big rivers of ice. They are found on every continent except Australia. The glacier in this picture is the white part that curves around the land.

Maybe you have heard that the world's glaciers are getting smaller. It is probably easier to think about a glacier getting smaller if you think about watching an ice cube melt. As you read about the molecules in an ice cube, think about how what you are reading might apply to glaciers too.

What Happens When I Put Ice in a Glass of Soda Pop?

Many people like their drinks cold. One way to make a drink cold is to put ice cubes in it. When you put ice in a warm drink, the ice melts and the drink gets colder.

The following diagram can help you think about what happens to the molecules when ice sits in a glass of warm liquid. At first, the molecules that make up ice are in a specific arrangement.



They are in the solid state, so they only move back and forth and cannot move past other molecules. The warm liquid molecules surrounding the ice collide with and bounce off of the ice molecules. When the faster-moving molecules in the liquid state (the beverage) collide with the molecules in the solid state, the molecules in the solid state move a little faster, and those in the liquid state move a slower. Some of the ice molecules start to move so fast that they start moving past each other. The solid water begins to change into liquid water when the ice molecules start to move past each other. Another way to say that a substance changes from the solid state to the liquid state is to say it melts. The ice continues to melt as more ice molecules move fast enough to slide past each other. This continues until all of the solid water changes to liquid water. When ice melts, the molecules do not change, they just move faster.

Why Does a Drink Get Cold When the Ice Cubes Melt?

In class you saw that when you heated candle wax, the wax changed from the solid state to the liquid state. Wax is a solid at room temperature. It needs to be heated to become a liquid. When wax is heated, the wax molecules move faster. When they move fast enough so that they can slide past each other, the wax melts into a liquid.

Ice cubes also need to be heated to melt. An ice cube is heated by a warm drink. The warm beverage particles can move past each other and collide with the molecules that make up the ice cube. Those collisions can make the ice cube molecules move faster. The collisions can also make the warm drink particles move slower. As the drink particles continue to collide into the ice cube molecules, they move slower and the liquid cools down. When you put ice in a warm glass of soda pop, as the ice melts it also cools your soda pop. Your particle model can explain how liquids cool.

How Is Melting a Property of a Substance?

Have you ever melted butter in a frying pan or spread butter on hot corn on the cob? Butter starts to melt when it reaches a temperature of 32.3°C or 90.1°F. This temperature is called the melting point of butter. Melting point is the temperature at which a solid substance starts to become a liquid. Once a solid reaches its melting point, it stays at the same temperature until it is completely melted. Solid butter stays at 90.1°F until it is completely melted. During that time, the energy used to melt the butter is breaking attractions between the molecules, not heating the substance even more. The temperature stays the same until all the attractions between molecules are broken, which means the substance is completely melted. Then the substance can get hotter.

The melting point of a substance is a property of that substance. Remember that a property of a substance is characteristic of that substance. That means that the melting point is the same no matter how much of the substance is in your sample. A spoonful of butter melts faster than a whole stick of butter. However, both of them start to melt at the same melting point.

What Happens to Molecules as Something Freezes?

If you live in the northern part of the United States, you have felt how cold winters can be. Often people say, "It's freezing!" outside when it really is not freezing, it is just very cold. When it is actually "freezing cold," interesting things happen to the moisture in the air. For example, if the air is cold enough, rain can become freezing rain. Liquid water freezes at 32°F. When liquid water freezes, it changes into a solid. The molecules that make up liquid water do not move fast enough to slide past each other. Instead, the molecules slow down to the point that they stay in a fixed place. They vibrate instead of moving fast enough to move past each other. That is what happens to liquid rain if it is cold enough. At about 32°F it freezes and becomes "freezing rain" or sleet.

In a previous lesson, your class created a human model of states of matter. You changed a liquid to a gas. This is called boiling. Describe how people could move their bodies to show what happens to water molecules when liquid water freezes and changes to ice.

Answer Question pg. 144

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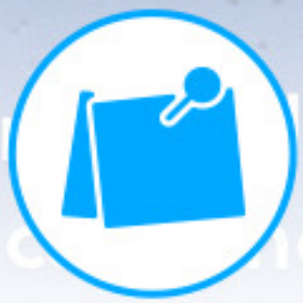
How Do Melting and Freezing Explain Why Glaciers Are Getting Smaller?

Glaciers can shrink and grow depending on the climate of an area. Temperature is important in determining whether glaciers will grow or shrink. In fact, scientists have shown that Earth's surface temperature has risen by about 1°F in the past 100 years. Some scientists believe that the increase in temperature may be causing glaciers to get smaller each year.

Explain why scientists would think an increase in temperature would cause glaciers to get smaller. Remember that glaciers are huge pieces of ice. Use ideas you learned in this lesson, including melting, freezing, and water molecules.



Collaborate!

What needs to happen to odor molecules so that we can smell

Investigation 15.3 pg. 146

Title/Question:	**Investigation 15.3 - Does menthol have to melt before I smell it?**
Summary: *What will we do?*	We will develop models and use them to explain what happens to molecules during a phase change.
Prediction:	What do you expect solid dry ice to do at room temperature?

Materials:	Dry ice Menthol crystals
Safety/ Responsibility:	Do not touch the dry ice or menthol crystals with your bare hands
Procedure:	☐ Your teacher will break solid carbon dioxide (dry ice) into pieces. ☐ Clear your desk and place a paper towel in the center of the table. Raise your hand for a sample to observe. ☐ Observe what happens to the dry ice. Record your observations of the dry ice in the data table

Investigation 15.3 - Does menthol have to melt before I smell it?

Data:
Qualitative or quantitative?

Title: _____

	Observations
Dry ice on paper towel	
Dry ice in water	

Answer Analysis and Interpretation questions, then begin HW

Analysis and Interpretation:	1. Use your particle model to explain what happened to the dry ice. 2. Use your observations and your particle model to explain why you can smell a solid like menthol crystals.

https://www.youtube.com/embed/6JzQ08AGuhI

What did you see happen to the dry ice?

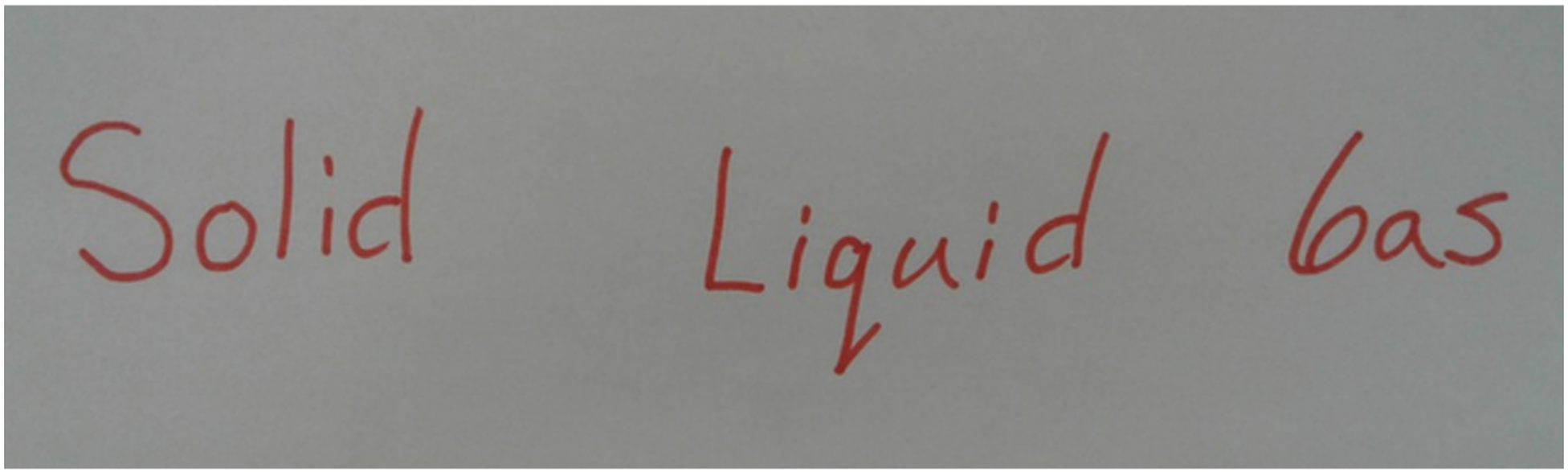
Collaborate!

What did you see happen to the dry ice?

Sublimation

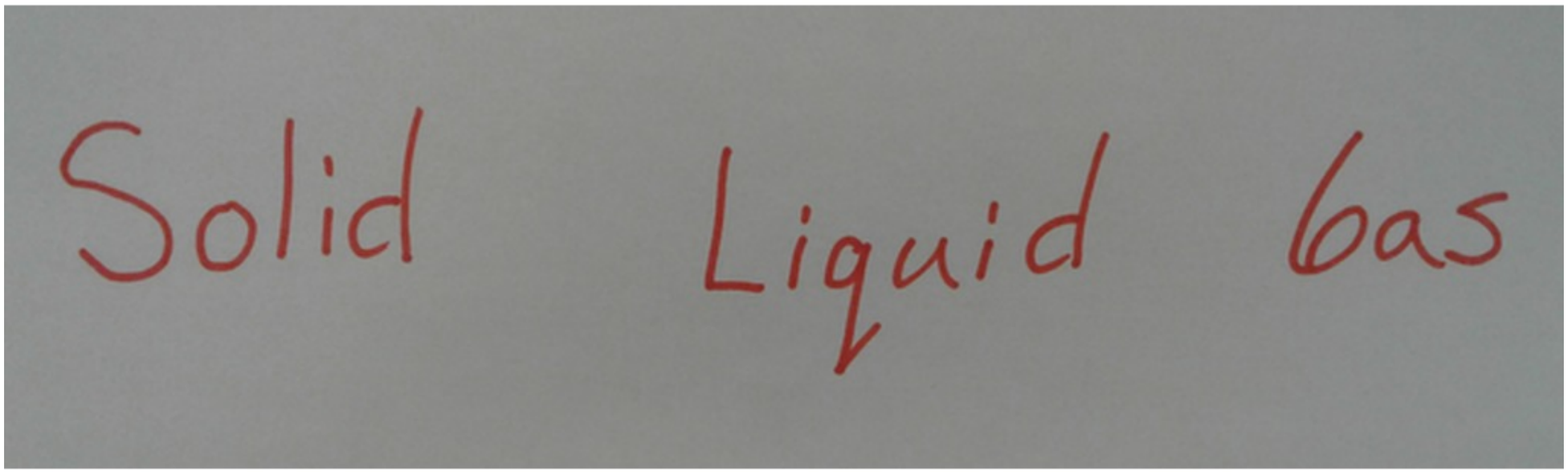
Draw It

Draw arrows to represent the phase changes of water



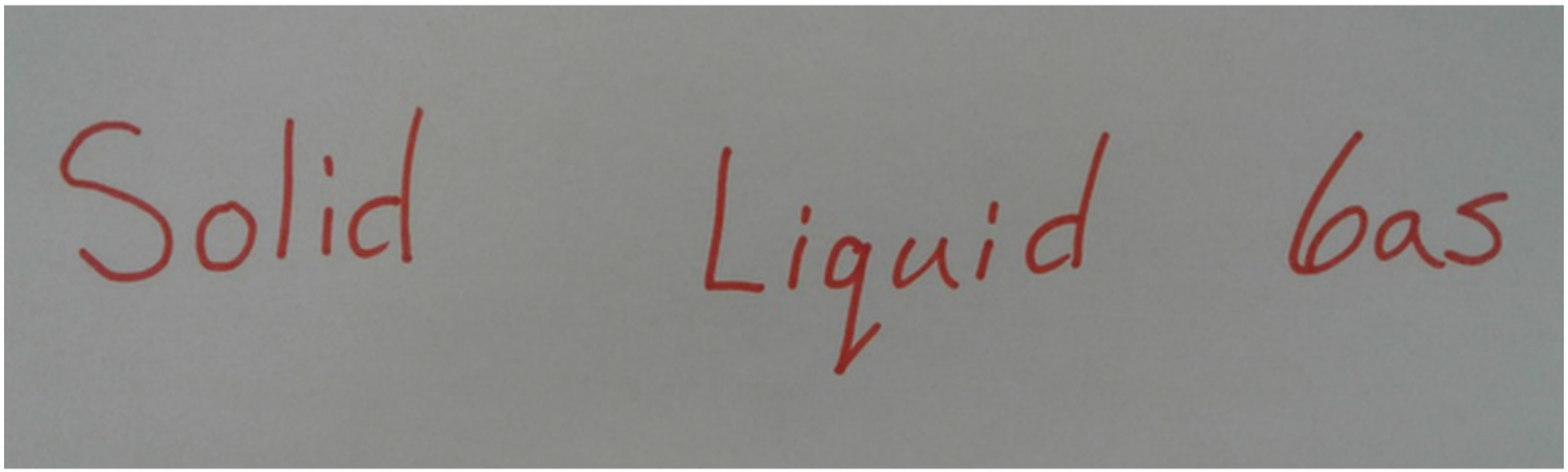
Draw It

Draw arrows to represent the phase changes of menthol



Draw It

Draw arrows to represent the phase changes of candle wax



Poll

Do you think all substance have three states? (Solid, Liquid, Gas)

- Yes
- No

Open Ended Question

What happens to the molecules of all substances when they are heated?

Please enter your answer here.