

Feb 4-12:39 PM

What you'll understand after this unit ...

Even if the water is the same temperature as the air, why are you cold when you get out of a pool?

Boiling really has nothing to do with temperature! In fact, boiling is a COOLING process.

Why does 90 F feel so much more miserable in St. Louis than in Phoenix?

Why does boiling water stay at 100°C, no matter how much heat you apply?

How does an odor move from one place to another?

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Feb 12-9:51 AM

Kinetic Theory

Feb 19-8:34 AM

Kinetic Theory

"Kinetic" refers to \_\_\_\_\_

Feb 19-8:34 AM

Kinetic Theory

"Kinetic" refers to movement

A **theory** is a unifying idea that is useful for understanding a wide variety of observations

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### Kinetic Theory

"Kinetic" refers to movement

A theory is a unifying idea that is useful for understanding a wide variety of observations

The **Kinetic Theory** is a unifying concept that uses the idea of **moving particles** to explain gases, liquids, solids, phase changes and the effects of temperature and pressure on them.

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### Kinetic Theory

Three assumptions necessary to use the theory:

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- All matter is made of particles (atoms, ions or molecules)

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Three assumptions necessary to use the theory:

- All matter is made of particles (atoms, ions or molecules)
- The particles of matter are in constant motion

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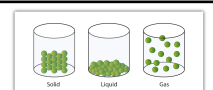
### Kinetic Theory

Three assumptions necessary to use the theory:

- All matter is made of particles (atoms, ions or molecules)
- The particles of matter are in constant motion
- All collisions are perfectly elastic (no energy is lost)

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### Solids



Feb 19-8:34 AM

## Solids

The particles in a solid do not have enough energy to flow past one another (but do vibrate from their fixed positions), thus:

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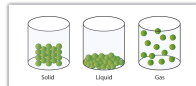
## Solids

The particles in a solid do not have enough energy to flow past one another (but do vibrate from their fixed positions), thus:

Solids have their own shape and volume regardless of their containers

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## Liquids



Feb 19-8:34 AM

## Liquids

The particles in a liquid have enough energy to move past one another but not enough to break free of attractive forces among them, thus:

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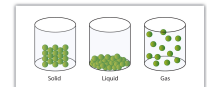
## Liquids

The particles in a liquid have enough energy to move past one another but not enough to break free of attractive forces among them, thus:

Liquids take the shape of their container but have their own volume.

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## Gases



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### Gases

The particles in a gas have enough energy to overwhelm any attractive forces. They move rapidly and randomly and thus:

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### Gases

The particles in a gas have enough energy to overwhelm any attractive forces. They move rapidly and randomly and thus:

Gases take the shape and volume of their container.

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### Plasmas

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### Plasmas

The particles in a plasma have so much energy that the electrons are stripped from the nuclei.

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### Plasmas

The particles in a plasma have so much energy that the electrons are stripped from the nuclei.

Plasmas are rare on Earth, but are the most common form of matter in the universe. They are found in inflorescent light bulbs and in great quantities on the sun.

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### Solids

If a solid is heated and its particles get enough energy, they will start flowing around each other, becoming a \_\_\_\_\_.

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## Solids

If a solid is heated and its particles get enough energy, they will start flowing around each other, becoming a liquid.

This process is called \_\_\_\_\_.

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## Solids

If a solid is heated and its particles get enough energy, they will start flowing around each other, becoming a liquid.

This process is called melting.

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## Liquids

If a liquid is heated until its particles have enough energy to overwhelm attractive forces and escape, it will then be a \_\_\_\_\_.

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## Liquids

If a liquid is heated until its particles have enough energy to overwhelm attractive forces and escape, it will then be a gas.

This process is called \_\_\_\_\_.

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## Liquids

If a liquid is heated until its particles have enough energy to overwhelm attractive forces and escape, it will then be a gas.

This process is called evaporation.

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## Gases

If a gas is cooled to the point that the attractive forces among them cause them to clump, it will then be a \_\_\_\_\_.

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Gases

If a gas is cooled to the point that the attractive forces among them cause them to clump, it will then be a liquid.

This process is called \_\_\_\_\_.

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Gases

If a gas is cooled to the point that the attractive forces among them cause them to clump, it will then be a liquid.

This process is called condensation.

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Liquids

If a liquid is cooled to the point that the particles don't have enough energy to flow, it will be a \_\_\_\_\_.

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Liquids

If a liquid is cooled to the point that the particles don't have enough energy to flow, it will be a solid.

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Liquids

If a liquid is cooled to the point that the particles don't have enough energy to flow, it will be a solid.

This process is called \_\_\_\_\_.

Feb 19-8:34 AM

Liquids

If a liquid is cooled to the point that the particles don't have enough energy to flow, it will be a solid.

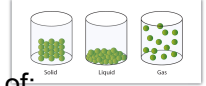
This process is called freezing.

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## Kinetic Theory Worksheet

Feb 19-8:34 AM

## States of Matter

Describe the shape and volume of:

- a gas
- a liquid
- a solid

Feb 5-7:27 AM

**Kinetic Theory:** uses the idea of moving particles to explain many properties of matter.

Feb 7-10:51 AM

Simulation



Feb 6-7:52 AM

**TEMPERATURE**

Slow moving particles have little kinetic energy, corresponding to a low temperature.

If they are heated, they'll have higher kinetic energy, corresponding to a higher temperature.

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Our new definition of **TEMPERATURE:**

**Temperature is a measure of the average kinetic energy of a substance.**

Feb 7-10:54 AM

**Absolute Zero**

- Theoretically the coldest possible temperature.

Feb 17-7:33 AM

Feb 17-7:33 AM

**Absolute Zero**

- Theoretically the coldest possible temperature.
- The temperature at which there is no molecular motion.

Feb 17-7:33 AM

**Absolute Zero**

- Theoretically the coldest possible temperature.
- The temperature at which there is no molecular motion.
- 0 Kelvin; -273 degrees Celsius

Feb 17-7:33 AM

Converting to and from Kelvin and Celsius

$$C + 273 = K$$

Feb 17-7:34 AM

**PRESSURE**

Feb 7-10:57 AM



PRESSURE

Pressure is defined as the force applied to a unit area of a surface. Gas pressure is the force of gas particles hitting a surface.

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- Vapor pressure: the pressure resulting from escaping gas particles.

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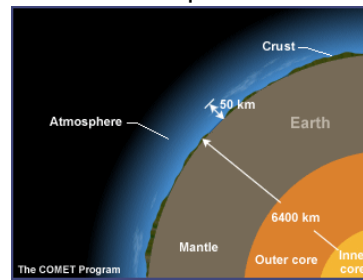
PRESSURE

Pressure is defined as the force applied to a unit area of a surface. Gas pressure is the force of gas particles hitting a surface.

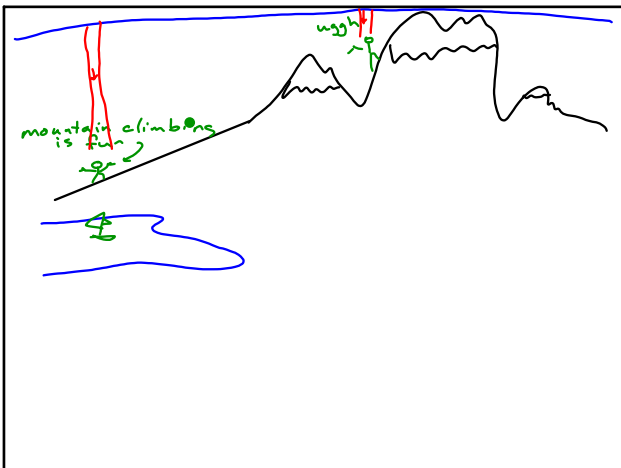
- Vapor pressure: the pressure resulting from gas particles escaping from a liquid.
- Atmospheric pressure: the pressure resulting from gravity pulling air down.

Feb 7-10:57 AM

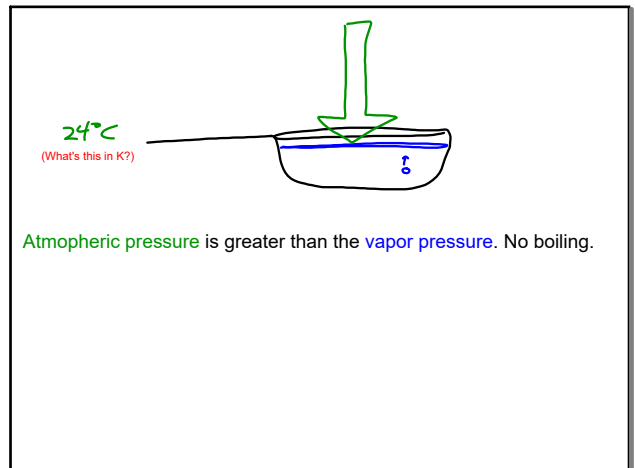
The Atmosphere



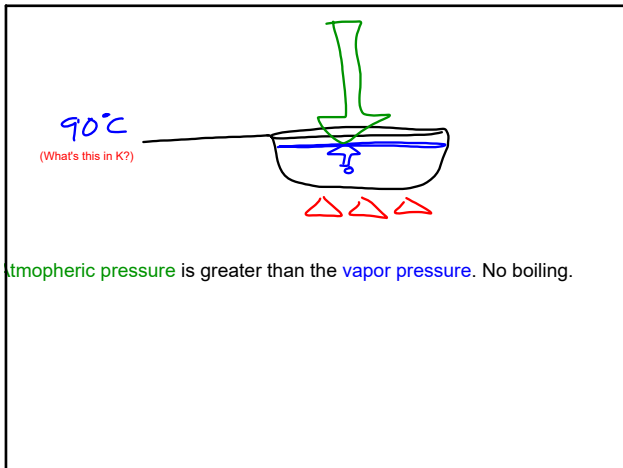
Feb 7-11:01 AM



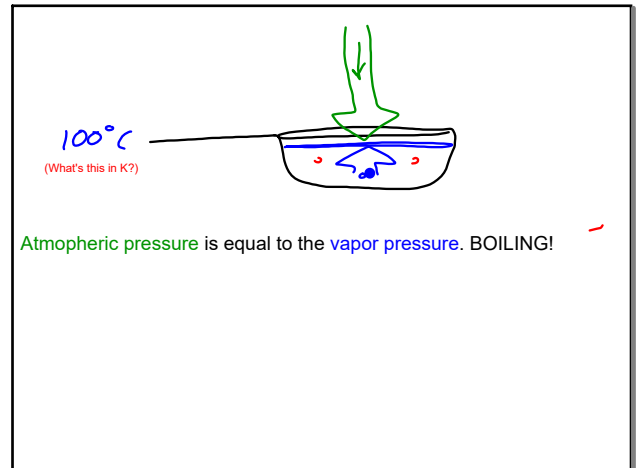
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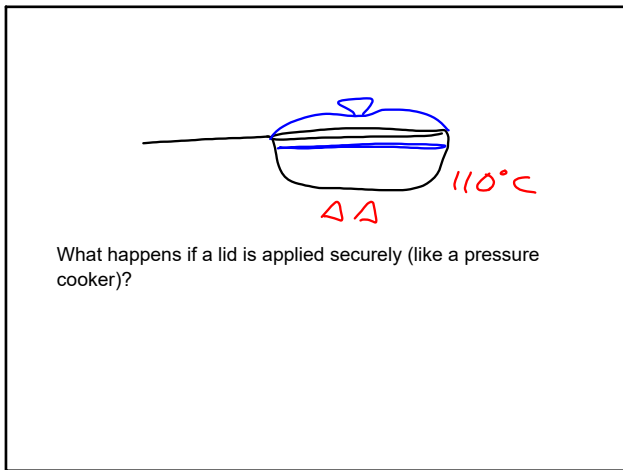
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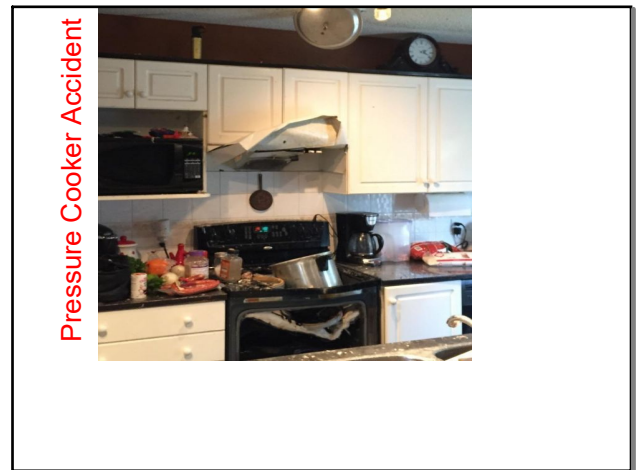
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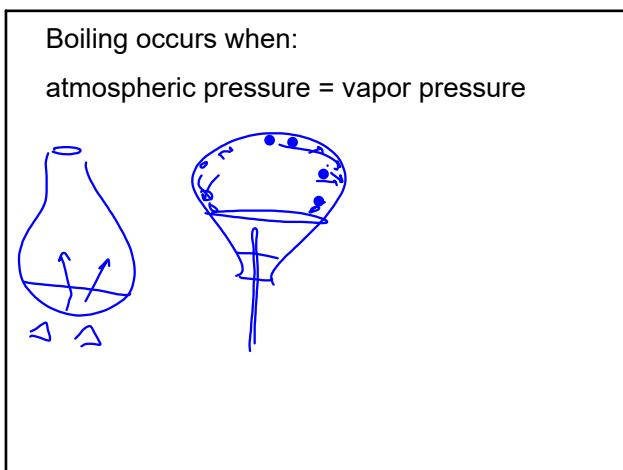
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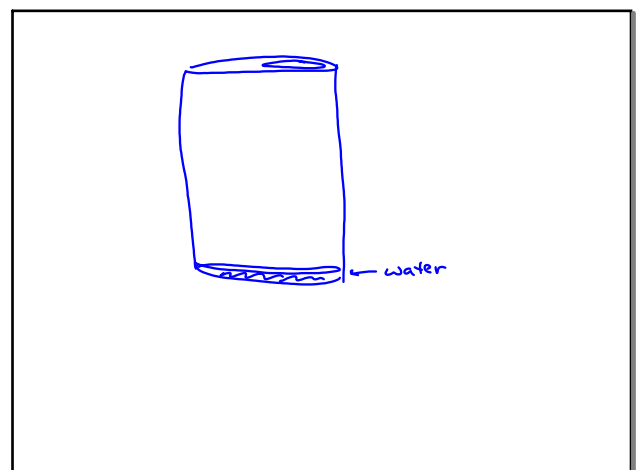
Feb 7-11:23 AM



Feb 8-11:25 AM

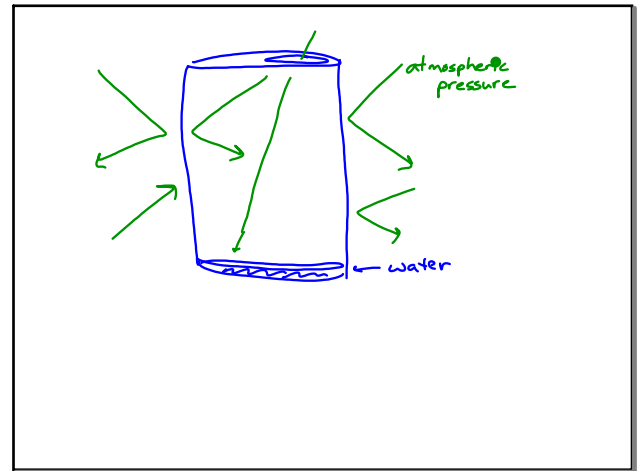


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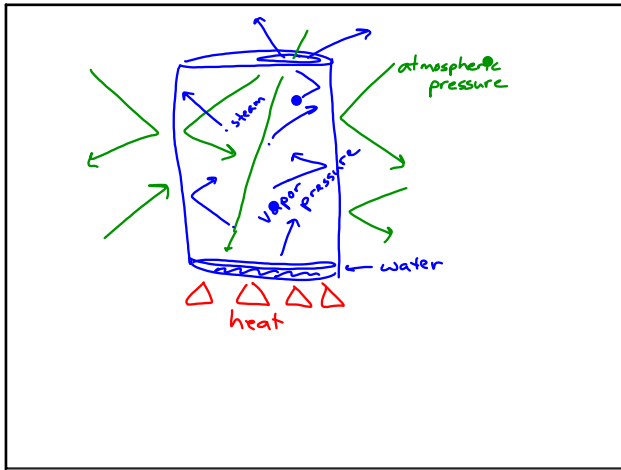
Feb 12-7:29 AM

Work on States of Matter sheet  
Use essentials, or  
Ask Mr. W.

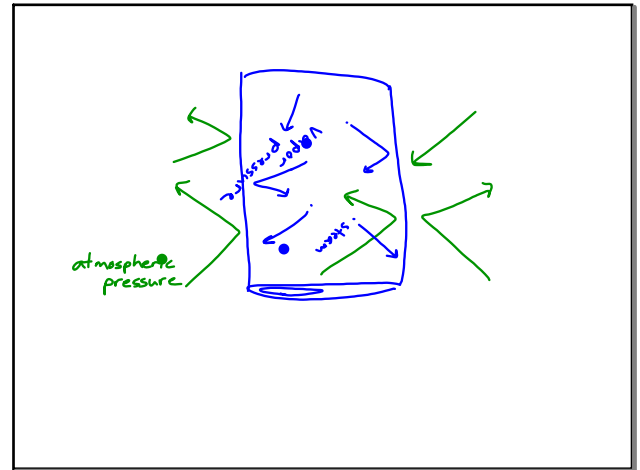


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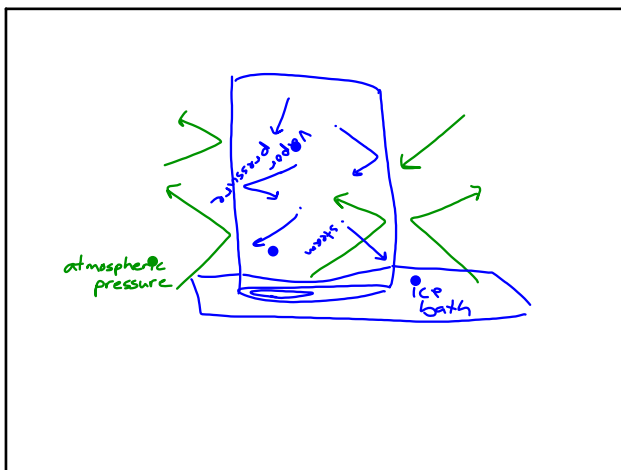
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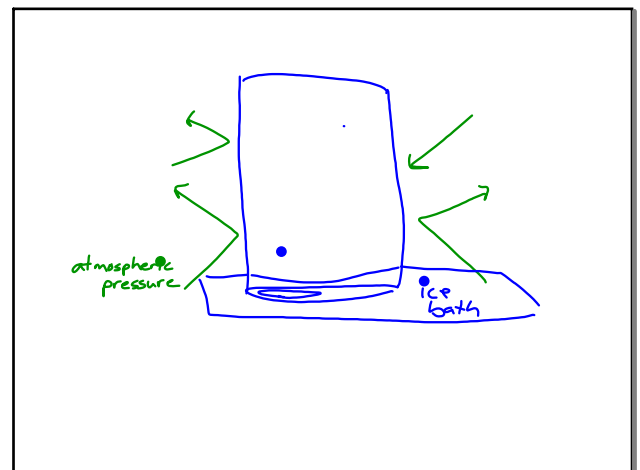
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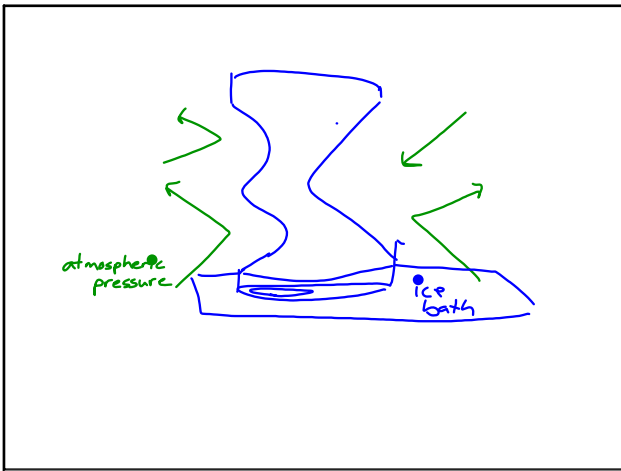
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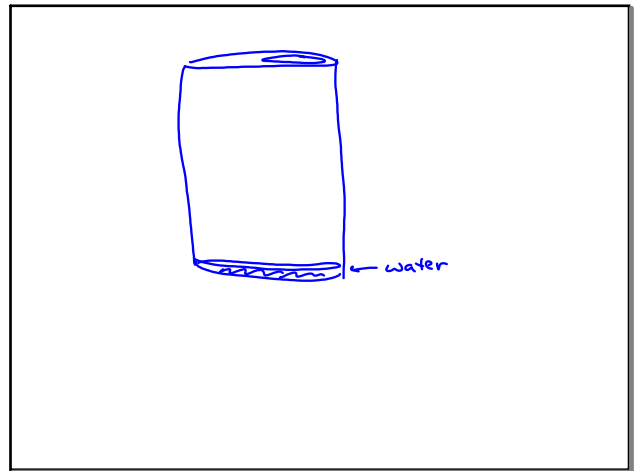
Feb 12-7:29 AM



Feb 12-7:29 AM



Feb 12-7:29 AM



Feb 12-7:29 AM

### What to know for "tomorrow's" quiz

- What is absolute zero, and its values in C and K.
- Properties of solids, liquids and gases (shape and volume)
- What the Kinetic Theory involves.
- The assumptions of the kinetic theory.
- The definition of temperature, according to the KT.
- Where plasma is found.
- The difference between evaporation and boiling.
- The conditions necessary for boiling.
- The freezing and boiling points of water.

C K

boiling	100°	373
freezing	0°	273
abs zero	-273°	0

Feb 18-7:23 AM

### States of Matter Worksheet

1. see obj 6
2. see obj 6 & 7
3. you should know C, see obj 7 for K
4. you should know C, see obj 7 for K
5. see obj 9
6. see obj 5
7. see obj 5
8. see obj 8
9. see obj 9
10. see obj 1
11. see obj 1
12. see obj 2
13. see obj 3
14. "the sun"
15. "fluorescent light bulbs"

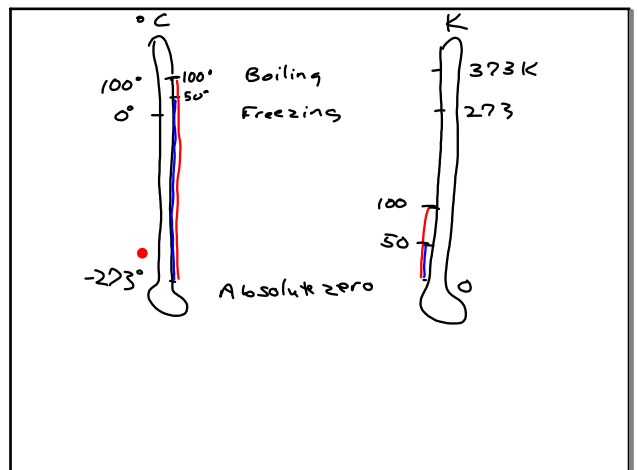
C K

boiling	100°	373
freezing	0°	273
abs zero	-273°	0

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Feb 12-9:51 AM



Feb 7-11:50 AM

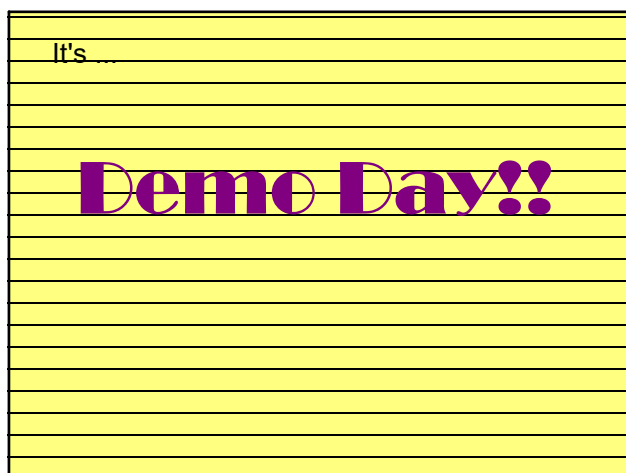
	Water	Alcohol	Acetone
0.0 min	_____	_____	_____
0.5 min	_____	_____	_____
1.0 min	_____	_____	_____
1.5 min	_____	_____	_____
2.0 min	_____	_____	_____
2.5 min	_____	_____	_____
3.0 min	_____	_____	_____
3.5 min	_____	_____	_____
4.0 min	_____	_____	_____
4.5 min	_____	_____	_____
5.0 min	_____	_____	_____

Feb 11-9:49 AM

Please. . . .

- complete Review Sheet
- (use "Essentials" to help)
- or ask Mr. W

Feb 16-12:58 PM



Feb 11-9:47 AM

Temperature =

Atmospheric pressure =

Vapor pressure =

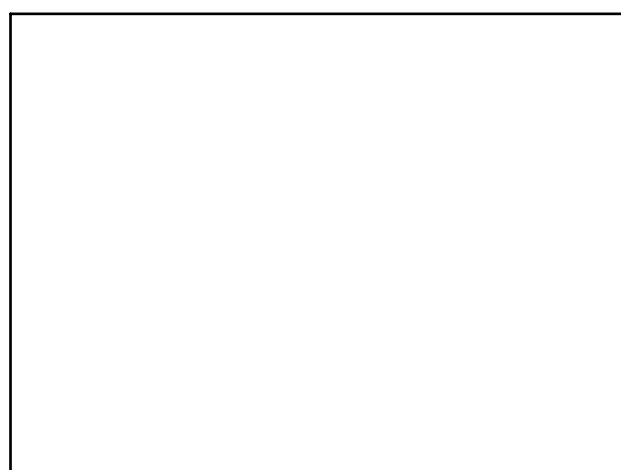
Boiling point =

Feb 11-9:55 AM

**Reaction Rate Pre-lab Questions**

1. Why does tea dissolve faster in hot water?
2. Why do we refrigerate left-overs?
3. Which will dissolve faster, a sugar cube or a teaspoon of granulated sugar? Why?
4. If you're in a hurry to get something to react or mix, what do you usually do? Why?

Feb 11-10:49 AM



Feb 4-12:50 PM

## Attachments

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Kinetic Theory Powerpoint.pptx

Kinetic Theory Worksheet.pptx