Warm Up: William's Quote

On the 3rd page of your notebook, in complete sentences, explain what you think this quote means:

"Before I discovered the miracles of science, magic ruled the world."

-William Kamkwamba

What does a windmill do?

The Question

What should we figure out first?

Start from the beginning

Activity 1: How Small?

Look closely at the sugar cube.

1. Draw a picture of what it looks like very very close up.
2. Use words to describe what you are seeing and drawing.

3. Draw this table.

Substance	Color?	Reflects Light?
Sugar Cube		
Grains of Sugar		
Powdered Sugar		

Activity 1: How Small?

4. Do you see evidence that grains of sugar and powdered sugar are made of the same substance as the sugar cube? Or do they look like different substances? Explain the evidence.

What will we try to figure out?

Warm Up: Girl's Claim 8/18/2017

Watch the video.

1. What is the girl's claim?
2. List two pieces of evidence she uses to support her claim.

Activity 2: Swab the Deck

When I say go:

1. Pull out the swab. Do NOT unfold the swab.
2. Drag the swab across the table to make a wet streak about one foot long.
3. Watch the streak for a minute or two.
4. Describe what you see and smell. Use words and pictures. (Do NOT try to explain what happens; just describe what happens.)

Analysis: Swab the Deck

1. Explain what happened to the alcohol streak. Give your best guess:
    a. Where do you think the alcohol went?
    b. Why did it do this?
    c. Use words and pictures.

2. In question 1, you came up with an explanation. Now think of a different way to explain where the alcohol went.

(Think of how someone else might try to explain it.)

Use words and pictures.

3. In questions 1 and 2, you came up with two ways to explain what happened.

   Now you want to test these two ideas to see which explanation is better.

   Think of a simple experiment you can do with an alcohol swab, ruler, and a pen to test these two explanations.

Activity 3: Swab Balance

1. Lay the marker pen on its side on the table top and tape the pen onto the table so that it cannot roll.
2. Lay the ruler across the pen so the ruler balances horizontally on top of the pen.
3. Open the alcohol swab packet, pull out the prep swab – DO NOT unfold the swab – and lay the wet swab on the right end of the ruler.
4. QUICKLY but carefully move the ruler so that the ruler is balanced. As soon as the ruler is perfectly balanced, do not touch it.
5. Watch the balance for a few minutes. What happens?
   Describe; don't explain.

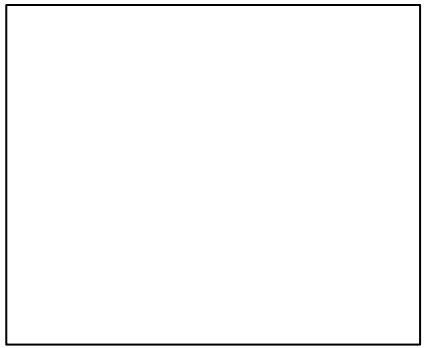
Analysis: Swab Balance

1. Suppose Johnny says, “I think matter is made of tiny particles.”

Do your observations agree with Johnny? Why or why not?

Analysis: Swab Balance

2. Draw the alcohol swab at the beginning and after a minute. Use circles to show particles.



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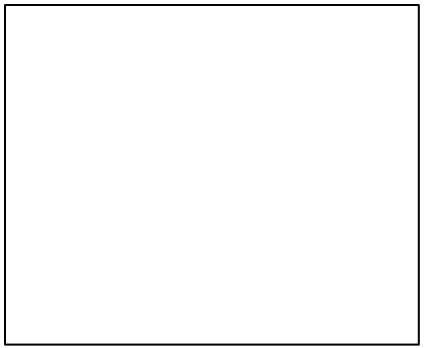


After 1 minute

Pull out a half sheet of paper and your notebook

Notebook Quiz 8/21/2017

1. Write your answer to question 1 from the warm up on 8/18/2017
2. Write your answer to question 1 from Swab the Deck

Warm Up: Leftover Salt 8/22/17

Johnny left a cup of salt water on a table for three hours. After three hours, he made the following observations:

- All the water was gone.
- The bottom of the cup was white.

Explain what you think happened to the particles in that cup. Where did the water go? Why was the bottom white?

Safety

- No horseplay, running, etc.
- Do not squirt alcohol or water at yourself or anybody else.
- If a glass slide breaks, raise your hand and I will come clean it.
- No flames.

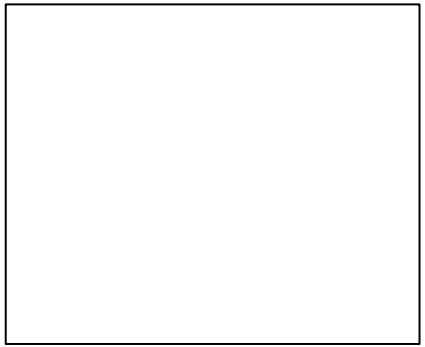
Activity 4: Drops 8/22/17

1. Write down what the liquids are:
    - liquid A: alcohol
    - liquid B: water
2. Use the straw to put ONE DROP of each liquid onto the glass (so that the drops do not touch each other).
3. ***Draw and describe* the shape of each drop.**
4. ***Describe* how quickly they evaporate.**

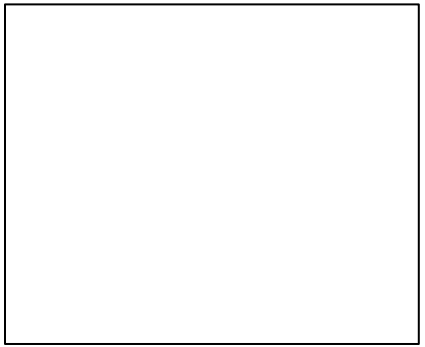
Analysis: Drops

Some drops are more round (like a ball) and other drops are more flat (like a pancake).

1. Draw the particles of glass, alcohol, and water. *Label each one.* **Use circles to show ALL particles.**



Alcohol on glass



Water on glass

The shape of the drop tells you something about the particles of the liquid and the particles of glass.

2. Why do you think some drops are more round and other drops are more flat?

3. Why do you think the drops evaporated at different rates?

Explain with words, and draw a picture of the particles.

Warm Up:

Evidence-Explain

Warm Up: Waterproof 8/23/17

Johnny sprayed his shoes with Scotchgard Outdoor Water Shield: America's #1 Waterproof Shoe Spray.

He timed how long it took his shoes to dry before and after using the spray. His data is in the table below:

	Time to Dry
Before Using the Spray	2,700 seconds
After Using the Spray	3 seconds

Using what you know about particles, explain how Scotchgard Outdoor Water Shield works.

Pull out a half sheet of paper and your notebook

Participation Quiz 2 8/23/17

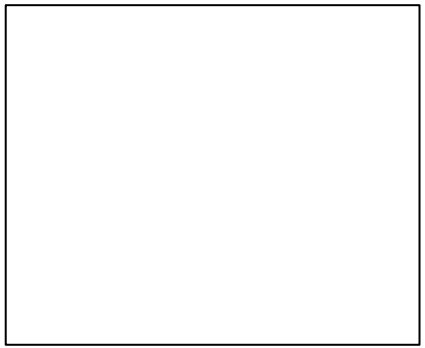
1. Write your answer to question 2 from Activity 4: Drops.
2. Write your answer to question 3 from Activity 4: Drops.

Activity 5: Drops on a Candle

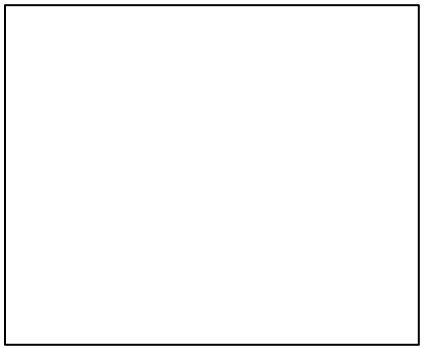
- Use the droppers to put a single drop of water and a single drop of oil onto the top of the candle. Try to get the drops to stay on top of the candle.
- *Don’t pick up the candle yet. Leave it on the table.*
- **Describe the shape of each drop as it sits on the candle.** (Don’t explain why it makes this shape yet.)

Analysis: Drops on a Candle

1. Draw the particles of wax, oil and water. Label each one. Use circles for particles.



Oil on wax



Water on wax

Analysis: Drops on a Candle

2. Now try to explain the shape of the drops:
    a. Why do you think the drop of water looks like that?
    b. Why does the oil drop look like that?

Think about the candle’s particles.

3. Do you think a candle particle prefers to stick to a water particle or to an oil particle? What evidence did you see today that helps you decide?

Tilt the candle just enough so that the water drop and the oil drop run slowly to the edge of the candle.

4. Describe what you see.
    - Does either drop hang on to the candle?
    - Does either drop leave “residue” on the candle when it comes off?

If water, oil, and candle wax are all made of tiny particles.

5. What evidence have you seen today that these particles can have some stickiness?

Evidence-Explain

Pull out ***two*** half sheets of paper and your notebook.

Notebook Quiz 3

1. Write your answer to question 1 from Activity 5: Drops on a Candle.

Look at activities Swab the Deck, Swab Balance, Drops, and Drops on a Candle.

What do they have in common?

Particle Model Map

Exit Ticket 8/24/17

Trisha puts a drop of liquid X on the table, and at the same time she puts a drop of liquid Y on the table. The drops are the same size. After 5 minutes, she notices this:

- Drop X is smaller, but it is not gone yet.
- Drop Y is completely gone.

Explain why drop X acted differently than drop Y. How are the particles in liquid X different than the particles in liquid Y?

DO NOT USE THE WORD EVAPORATE/EVAPORATION

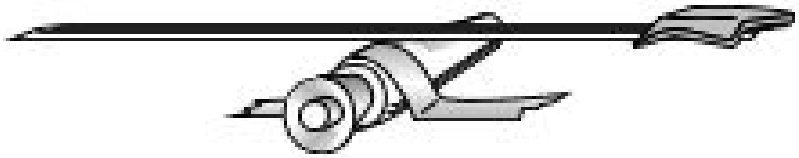
The particles in drop X act differently than the particles in drop Y because _____.

Warm Up: Drying Water

8/21/17

Johnny soaked a piece of cotton *in water* and set up the ruler experiment we did last Friday.

1. In what ways will his results be similar to the alcohol?
2. In what ways will his results be different than the alcohol? Explain why you think they'd act different.



Hint: Which dries up faster: alcohol or water?

Activity 6: Balloons

Smell the balloons. The new empty balloon is what a normal balloon should smell like.

In your notebook, describe the smell or aroma as best as you can.

new empty balloon:

_____

yellow balloon:

_____

red balloon: _____

Analysis: Balloons

1. Does your nose need to touch the balloon to smell it? Describe how far away from the blown-up balloons you can be and still recognize the smell.

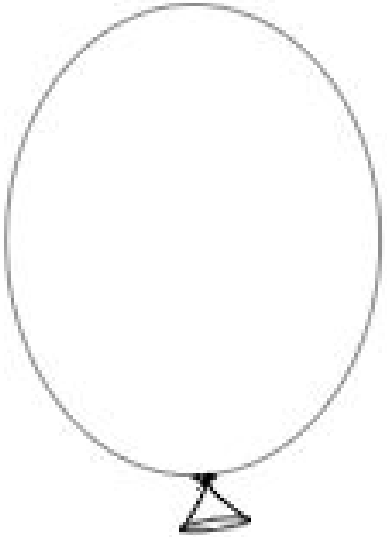
2. Why do you think the two blown-up balloons have the scent or aroma that you smell? What do you think Mr. Serrato did to prepare these balloons and give them a scent?

3. Traci says, “The smell traveled to my nose from inside the balloon.”

Do you agree with Traci? Use evidence to justify your answer.

4. Draw what must have happened to the smell inside the balloon so that the nose could detect it.

Draw *all* the particles to explain how the smell got to the nose.



Evidence-Explain

Warm Up: Balloon Claim 8/25/17

In Balloons, you could smell the balloons, even from a short distance away.

- Sofia says, “I can explain this by thinking that smell is made of tiny particles.”
- Bart says, “I can explain this by thinking that the balloon fabric is made of tiny particles.”

Do you agree with Sofia? Bart? Or both? Use evidence.

Trisha puts a drop of liquid X on the table, and at the same time she puts a drop of liquid Y on the table. The drops are the same size. After 5 minutes, she notices this:

- Drop X is smaller, but it is not gone yet.
- Drop Y is completely gone.

Explain why drop X acted differently than drop Y. How are the particles in liquid X different than the particles in liquid Y?

DO NOT USE THE WORD EVAPORATE/EVAPORATION

The particles in drop X act differently than the particles in drop Y because _____.

Stickiness Quiz

- Do not write on the Stickiness Quiz.
- Write on the answer sheet.
- *Only use pencil.*
- **Multiple answers on Stickiness Quiz**

Measurement Assessment

1. Measure the line on the paper in inches and centimeters.
2. I will call one table at a time to measure the tennis ball mass.
3. Use the picture to answer the question.

Warm Up: Deflating 8/28/17

Johnny filled two balloons: one was made of rubber and the other was made of thin plastic. He set them on a table for a week.

After one week, the rubber balloon was completely deflated while the plastic balloon was half its original size.

1. Explain why both balloons lost air.
2. Explain why you think they lost air at different rates.

The balloons lost air because _____.

Air left the balloons at different rates because _____.

- There are tiny, empty spaces between particles.
- Particles may be different sizes.
- Spaces between balloon particles might be different sizes.

Notebook Quiz 4 8/28/17

1. Copy your answer to question 3 from Activity 6: Balloons.
2. Copy your answer to question 4 from Activity 6: Balloons.
3. What was the title of the warm up on 8/25/17?

Go over quiz

Graduated Cylinder Practice

A and B - 43 mL

C and D - 52 mL

Activity 7: Mixing Liquids

How much volume?	**Predict**	**Actual**
63 ml water + 37 ml water		
50 ml water + 50 ml alcohol		
50 ml water + 10 ml salt		

Activity 7: Mixing Liquids

1. Measure 63 mL of water in one of the graduated cylinders.
2. Measure 37 mL of water in the other graduated cylinder.

Analysis: Mixing Liquid

1. What did you notice about the total volume of the water + water mixture?

After the Demo

2. What happened to the total volume of the water + alcohol mixture?

After the Demo

3. What happened to the total volume of the water + salt mixture?

4. Try to come up with two possible explanations for your observations of the *water + alcohol* mixture and the *water + salt* mixture.

(Think of two different ways to explain what happened to the volume. You don’t have to believe both explanations; just think of ideas other people might come up with.)

Pull out ***two*** half sheets of paper

Notebook Quiz 5 8/29/17

1. Write your answer to question 1 from Warm Up: Deflating on 8/28/17.
2. Write your answer to question 2 from Warm Up: Deflating on 8/28/17.

Rice and Ping Pong Balls Demo

Use the Rice and Ping Pong Balls Demo to help.

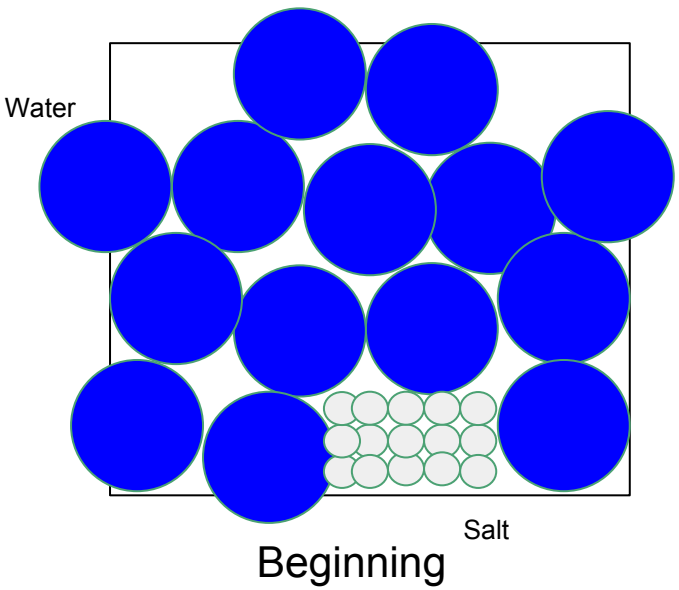
5. Johnny poured 5 mL of salt into 50 mL of water. He expected to get 55 mL of total volume.

    - After a minute he only had about 52 mL of mixture.

    Explain where the lost volume may have went.

Use the Rice and Ping Pong Balls Demo to help.

6. In each box, draw the particles of water and particles of salt. Label the water and salt



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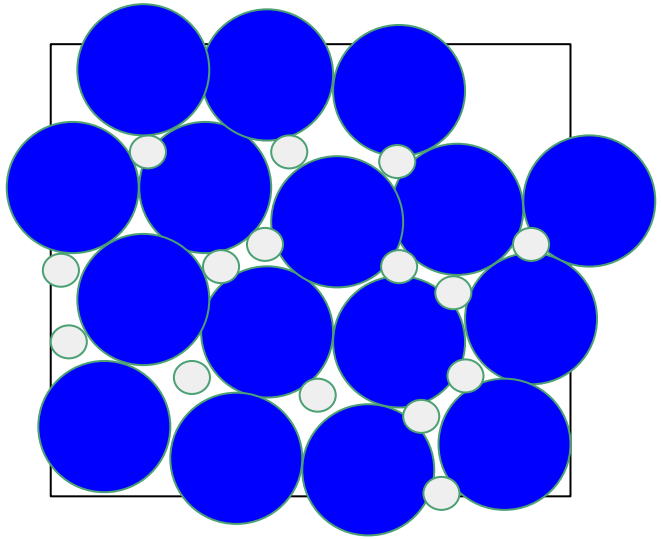


5 minutes

7. Why do you think the particles in the grains of salt break apart? Explain using ideas we've already learned in class.

Evidence-Explain

Exit Ticket

8/29/17

Using stickiness and space between particles, explain what happens to a grain of salt when it *dissolves*.

Warm Up: Dissolving Process 8/30/17

We learned yesterday that particles dissolve when they are stickier to other particles than themselves.

For example, salt dissolves in water because it is stickier to water than itself.

For a particle of salt to break apart from other salt particles, what has to happen between the particle of salt and a particle of water?

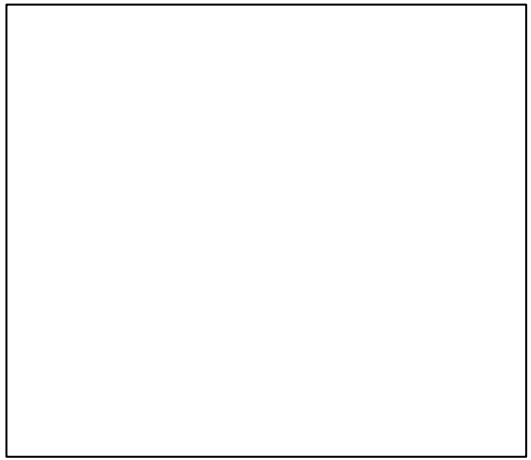
Pull out one half sheet of paper

Notebook Quiz 6 8/30/17

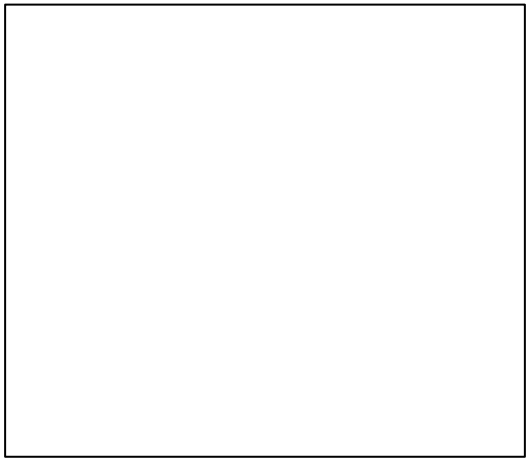
1. Write your answer to question 7 from Activity 7: Mixing Liquids

Activity 8: States of Matter

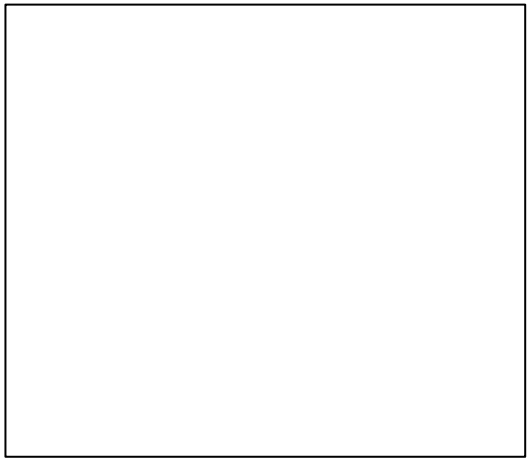
8/29/17



Solid



Liquid



Gas

Draw the particles for solid ice, liquid water, and gaseous steam

Activity 8: States of Matter

Property	Gas	Liquid	Solid
Shape			
Fluidity			
Squishability			

Analysis: States of Matter

Shape

1. Based on shape, which state of matter do you think has the most stickiness between its own particles? Which has the least? Explain your reasoning.

Fluidity

2. Which state of matter do you think has the most stickiness between its particles? Which has the least? Explain how you know.

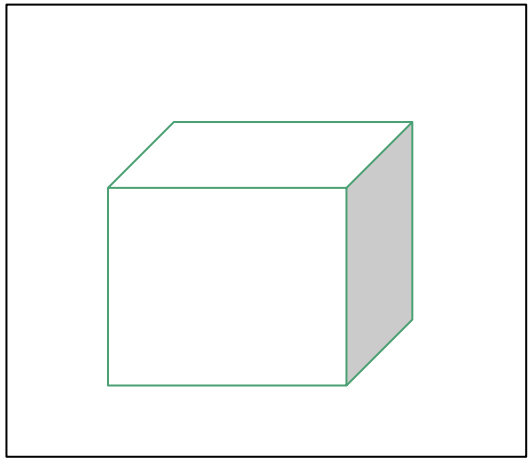
Squishability

3. Explain how particles might be spaced if they *can* be squished together.
4. Explain how particles might be spaced if they *can't* be squished together.

Warm Up: Matter 8/31/17

1. Summarize the difference in stickiness between solids, liquids, and gases.
2. We learned in the Balloons activity that solid particles have tiny spaces between them. We learned in the Mixing Liquids activity that liquids can have tiny spaces between them. Knowing this, why couldn't the solid and liquid be squished in yesterday's activity?

5.



Solid

Liquid

Gas

Using what we learned yesterday, redraw the particles for solid ice, liquid water, and gaseous steam

Evidence-Explain

Particle Model Map

Safety

- Do not eat or drink anything from the lab.
- Do not squirt water, food coloring, or anything else.
- Be careful with the food coloring and clothes.

Activity 9: Watercolors 8/31/17

1. Fill a beaker with room temperature water.
2. Let the beakers sit still for a minute so that air bubbles can rise and the water can stop moving/swirling.
3. Gently put one drop of food coloring into the water. DO NOT SHAKE OR STIR.
4. Watch what the food coloring does over the next 3 minutes.

Analysis: Watercolors

1. Describe what the food coloring did over time.

2. Explain why the food coloring behaves that way when placed in water. What are the particles doing?

Pull out one half sheet of paper

Notebook Quiz 6

1. Draw the liquid box from question 5 in Activity 8: States of Matter.
2. Write your answer to question 2 from Activity 9: Watercolors.

Safety

- Do not eat or drink anything from the lab.
- Do not squirt water, food coloring, or anything else.
- Be careful with the food coloring and clothes.
- Do not touch, play with, etc. with hot water. It can burn you.
- No horseplay, running, etc.

1. Fill one beaker with COLD water (but no ice) and the other beaker with an equal amount of WARM water.
2. Let both beakers sit for a minute so that air bubbles can rise and the water can stop moving/swirling.
3. Gently and **at the same time**, put one drop of food coloring into the cold water and one drop of food coloring into the the warm water. DO NOT SHAKE OR STIR.

Describe what you see.

Analysis: Watercolors

3. Did the food coloring in the hot water behave differently than the food coloring in the cold water? Describe the difference.

4. Explain why the food coloring acts different in the hot water than the cold water.

5. Explain what temperature seems to measure.

Evidence - Explain

Warm Up: Particle Motion Experiment 9/5/17

Claim: *Temperature is a measure of particle motion. Higher temperature means more particle motion.*

Using the following materials, create an experiment procedure that can test our claim. You also need a data table.

- Two beakers
- Cold water
- Hot water
- Two sugar cubes
- Timer

When your whole table is finished, I will check your procedure. You may need to revise before getting started. If complete, you will get materials.

Procedure

- Numbered
- Detailed
- Each sentence should start with a verb (*measure* 100mL of water, *pour* water into beaker, ...)

Data Table

- Labels

Example: Drops

1. Write down what the liquids are:
    - liquid A: alcohol
    - liquid B: water
2. Use the straw to put ONE DROP of each liquid onto the glass (so that the drops do not touch each other).
3. ***Draw and describe*** **the shape of each drop.**
4. ***Describe*** **how quickly they evaporate.**

Activity 10: Rates of Dissolving

1. Fill one beaker with COLD water (but no ice) and the other beaker with an equal amount of WARM water.
2. Let both beakers sit for a minute so that air bubbles can rise and the water can stop moving/swirling.
3. Gently and **at the same time**, drop one sugar cube into the cold water and drop the other sugar cube into the warm water. DO NOT SHAKE OR STIR.

Describe what you see.

Activity 10: Rates of Dissolving

1. Describe the evidence. What did you see? What did you measure?
2. Explain why the sugar cubes began to break apart. (talk about particles of sugar and particles of water).
3. Why do you think the sugar cubes behaved differently in *cold* water than they did in *warm* water.
4. Does your evidence (the stuff you saw today) support the claim that temperature is a measure of particle motion? Explain your reasoning.
5. In your groups, come up with a way to diagram the motion of water particles when hot and when cold.

Study for the ‘space between particles’ quiz

Activity 10: Rates of Dissolving

1. Describe the evidence. What did you see? What did you measure?
2. Explain why the sugar cubes began to break apart. (talk about particles of sugar and particles of water).
3. Why do you think the sugar cubes behaved differently in *cold* water than they did in *warm* water.
4. Does your evidence (the stuff you saw today) support the claim that temperature is a measure of particle motion? Explain your reasoning.
5. In your groups, come up with a way to diagram the motion of water particles when hot and when cold.

Evidence-Explain

Activity 11: Solid Expansion

https://www.youtube.com/watch?v=3pnj4ytORQw

With your partner:

Why did the solid expand?

Evidence-Explain

Particle Model Map

Pass Back Papers

Warm Up: Bringing It All Together 9/7/17

1. Compare the temperatures of solid ice, liquid water, and gaseous steam.
2. Compare the stickiness of water particles in solid ice, liquid water, and gaseous steam.
3. Compare the motion of water particles in solid ice, liquid water, and gaseous steam.
4. What do you notice happens to temperature, stickiness, and motion as water changes from ice to steam?

Activity 11: Solid Expansion

https://www.youtube.com/watch?v=3pnj4ytORQw

Pull out a half sheet of paper

(No charging anymore)

Notebook Quiz 7

1. Write your answer to question 2 from the Rates of Dissolving activity.
2. Write your answer to question 3 from the Rates of Dissolving activity.

Change of State **of Water** 9/7/17

Copy this table. Fill in the boxes with High, Medium, Low.

	Solid	**Liquid**	**Gas**
Stickiness			
Temperature			
Particle Motion	Low		High

Change of State ***of Water*** 9/7/17

Copy this table. Fill in the boxes with High, Medium, Low.

	Solid	**Liquid**	**Gas**
Stickiness	High	Medium	Low
Temperature	Low	Medium	High
Particle Motion	Low	Medium	High

1. What do you notice happens to particle motion as matter changes from solid to gas?
2. What do you notice happens to stickiness as matter changes from solid to gas?

As matter goes from a solid to liquid to gas:

- Particle motion *increases*
- Stickiness *decreases*

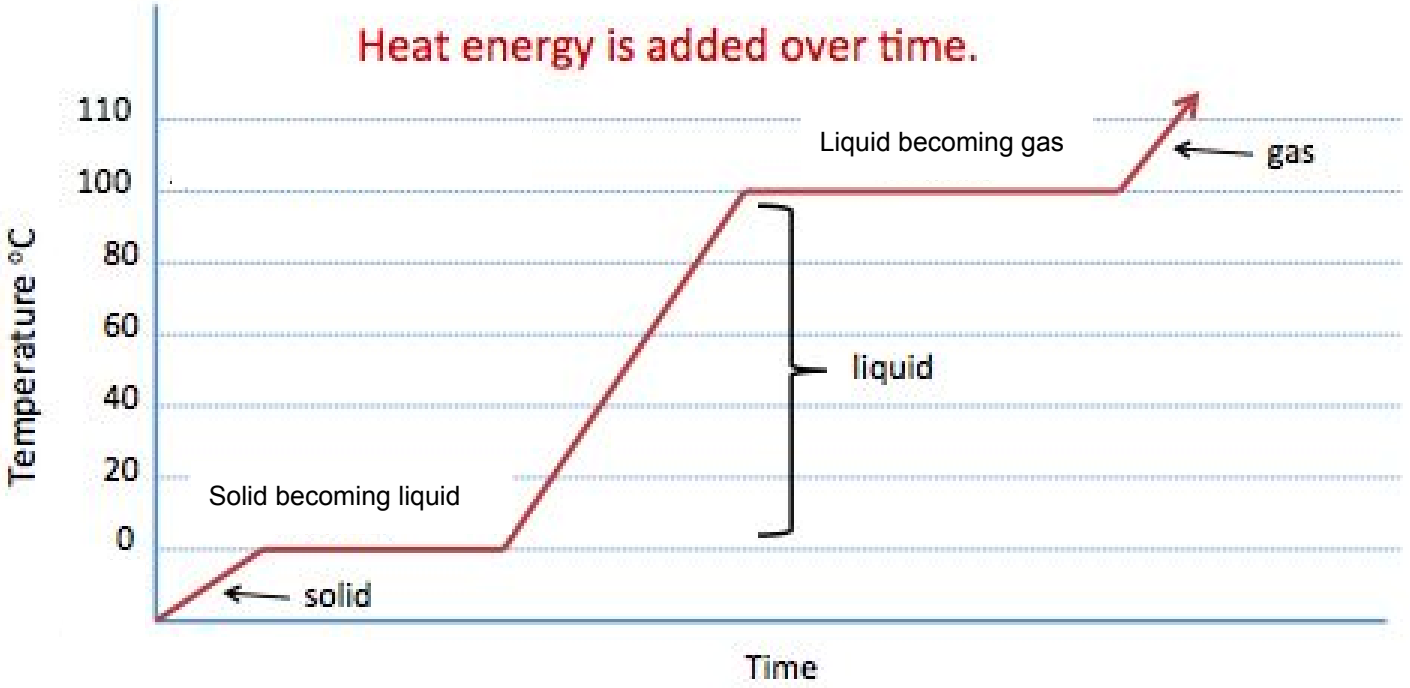
We need to figure out *when* this happens

Graph the points as I call them out.

Label:

1. When all of the water is solid.
2. When solid is becoming liquid.
3. When all of the water is liquid.
4. When liquid is becoming gas.

Changes in State: Water



- Particle motion increases when _____ rises and the state of matter is/is not changing.

- Stickiness decreases when _____ and the state of matter *is/is not* changing.

3. When temperature is going up, what is happening to the particles? Does the state of matter change when temperature goes up?

Label these spots on your graph

4. Explain what the heat making the particles do when the water is *not* changing its state.

5. When temperature is *not* changing, is particle motion changing? Is the state of matter changing?

6. When particle motion and temperature aren’t changing , explain what the heat is being used for when the water is changing state.

Pull out a ***full*** sheet of lined paper

Phase Change Graph Labels

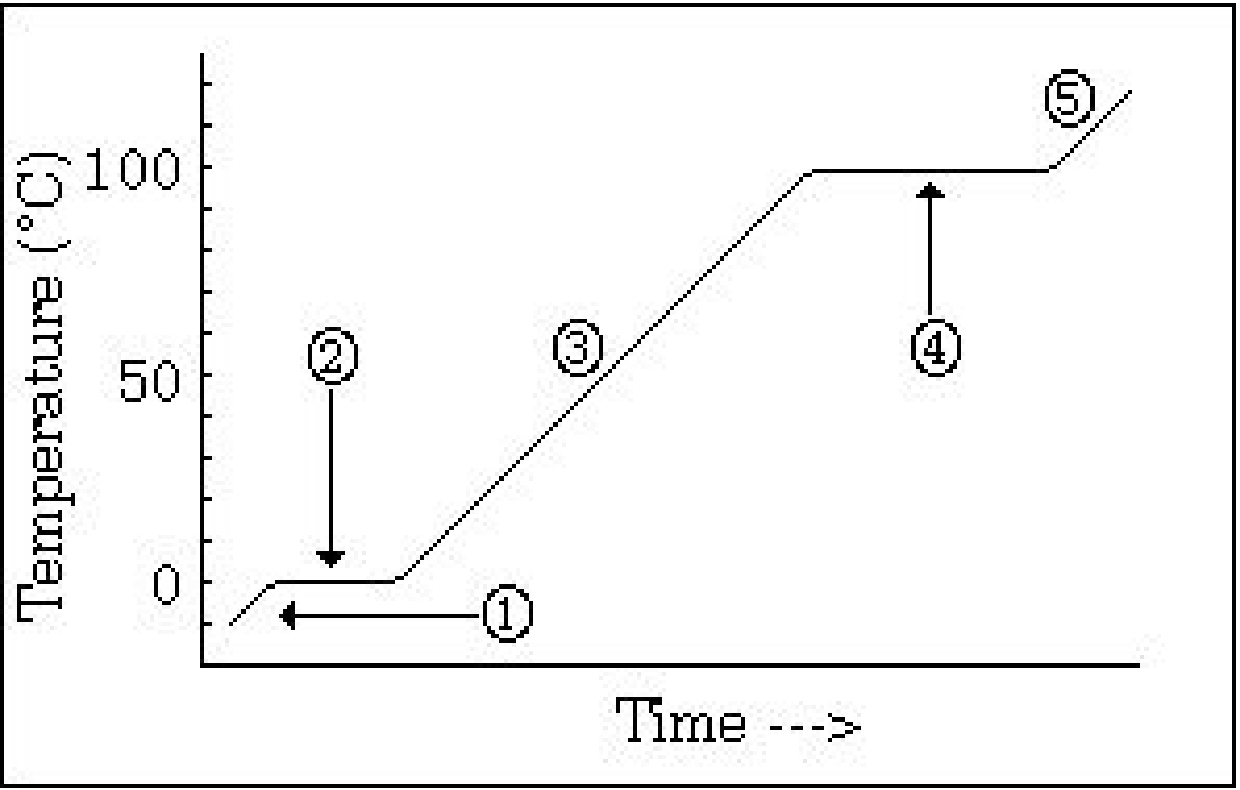
Solid	Temp up
Liquid	Particle motion up
Gas	Particle motion same
Solid to Liquid	Stickiness down
Liquid to Gas	Temp same

Phase Change WordBank

Solid	High
Liquid	Medium
Gas	Low
Move faster	Particle motion
Heat	Temperature

Warm Up: Heating Water

9/11/17



Draw the graph

1. Explain what's happening to particles of water at 1, 3, and 5.
2. Describe what's happening to particles of water at 2 and 4.

Pull out a full sheet of paper

Exit Ticket: Particle Motion

Using what you know about particles, explain what happened.

Wordbank

Temperature

Particle Motion

Space

Write 5 things you see in the video that we have already learned.

Pull out your study guide and the answers you have so far

Pull out your study guide and Phase Change homework.
We’re going to collect in a few minutes.

Test

- First and last name, TEST ID, period, date
- Fill in the bubbles fully. Erase all the way. There may be multiple answers.
- No phones.
- No communicating in any way.

When finished:

- Raise your hand. I will collect test.
- Work on homework from any class, read, or sleep.
- DO NOT PULL YOUR PHONE OUT OR TALK. Put in your headphones and ignore everybody to avoid getting a zero.