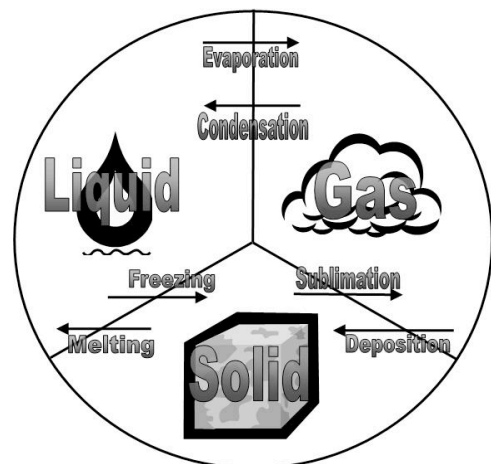
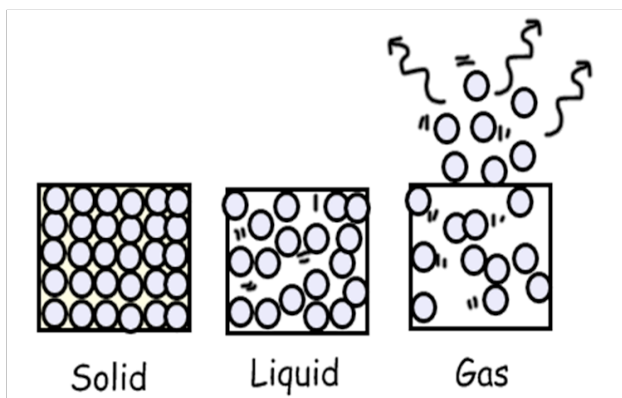


The AWESOME Y7

Particles & Reactions

Workbook of **SCIENCE**

I am owned by:



Particles and Reactions Vocabulary

	Vocabulary	Definition
1	Particle theory	
2	Particles	
3	State of matter	
4	Solid	
5	Liquid	
6	Gas	
7	Compress	
8	Density	
9	Change of state	
10	Evaporation	
11	Condensation	
12	Freezing	
13	Melting	
14	Sublimation	
15	Deposition	
16	Reversible change	
17	Irreversible change	
18	Physical change	
19	Chemical change	
20	Chemical reaction	
21	Reactants	
22	Products	
23	Mass	
24	Weight	
25	Effervescence	
26		
27		

Particles and Reactions Checklist

TOPIC	TARGET	GOT IT! ☺	NOT QUITE.	I DON'T KNOW ☹	PLAN OF ACTION
Vocabulary	I have completed the vocabulary list.				
	I understand the definition of each vocabulary word.				
Particle Theory	I know that everything is made up of particles				
	I know the states of matter.				
	I know the properties and characteristics of the states of matter.				
	I can explain the way particles behave.				
	I can describe changes of state.				
	I can define changes of state.				
	I can explain the link between energy and changes in state.				
Changes	I know the difference between physical and chemical changes.				
	I know the signs of chemical changes.				
	I can describe the changes that I see.				
	I know what reactants and products are.				

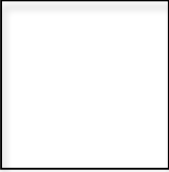


PARTICLE THEORY : States of Matter : Think Sheet #1

30

Q#1: (L3-4)

Complete the table.

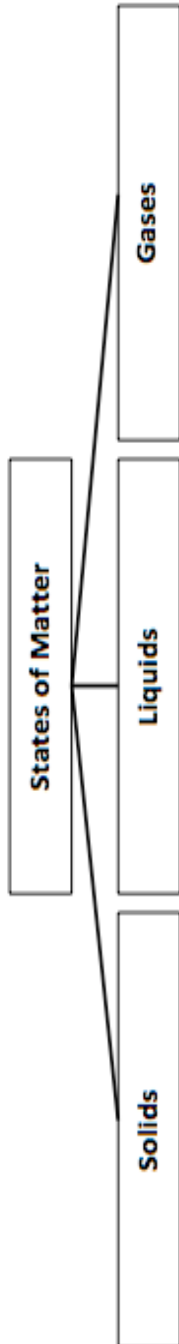
[24 marks]

PROPERTY	SOLIDS	LIQUIDS	GASES
Shape			
Closeness of particles			
Density:			
Can flow?			
Can be squashed?			
Movement of particles			
Draw a diagram			
Examples			

Q#2: (L3-4)

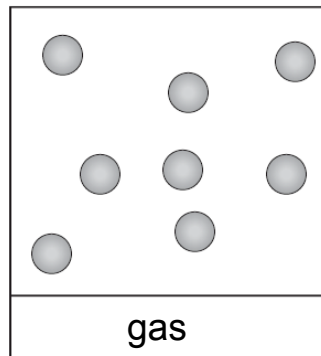
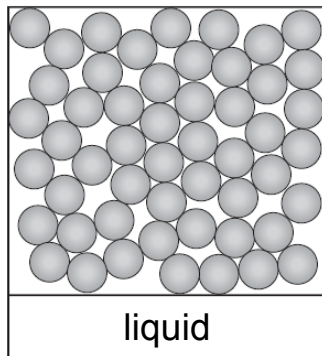
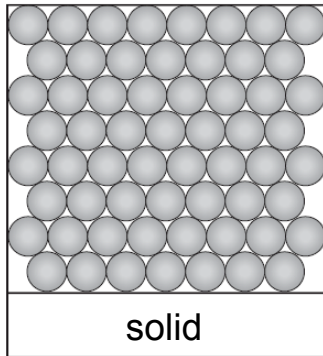
Complete the mind map.

[6 marks]



Q#1: (L3)

These drawings show the particles in a solid, a liquid, and a gas. Match them to their descriptions. [3 marks]



The particles are far apart, not in any pattern.

The particles are packed closely together in neat rows.

The particles are touching. They are not in a regular pattern.

Q#2: (L3)

The particles in solids, liquids, and gases are moving all the time.

Use these words to fill in the gaps.

[8 marks]

liquid	can't	quickly	can
solid	vibrate	gas	slide

- a) The particles in a solid can only _____ in place.
They _____ move around.
- b) The particles in a _____ vibrate more than in a _____.
They _____ move around.
They _____ over each other.
- c) The particles in a _____ are moving _____ in all directions.

Q#3: (L3-4)

Anita makes some observations about solids. Tick (✓) the facts about particles that explain Anita's observations. You may tick more than one fact! [5 marks]

Anita's observations	Facts		
	Particles are close together	Particles are stuck together	Particles can't move around
You can't stir a solid.			
You can't squash a solid.			
You can't pour a solid.			
A solid keeps its shape.			
A solid always takes up the same volume.			

Q#4: (L3-4)

Write *TRUE* or *FALSE* for each sentence. [3 marks]

- a) You can squash a liquid because the particles are not touching. _____
- b) You can pour a liquid because the particles can slide over each other. _____
- c) A liquid keeps its volume but not its shape. _____

Q#5: (L3-4)

Use these words to fill the gaps. [5 marks]

squashed shape particles pushed volume vibrate

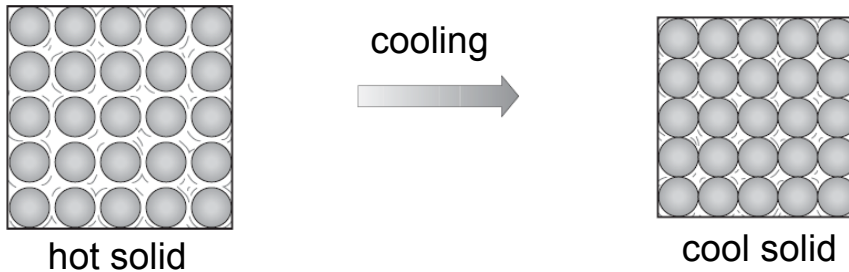
- a) The _____ and _____ of a gas can change because the _____ are further apart.
- b) A gas can be _____ into a smaller volume because its particles can be _____ closer together.

Q#6: (L3-4)

In a solid, the particles vibrate on the spot. As they get hotter, they vibrate more and take up more space. The solid gets bigger.

When a hot solid cools, the particles vibrate less.

Look at these diagrams of particles in a solid as it cools down.



Write *TRUE* or *FALSE* for each sentence.

[4 marks]

- a) A hot solid has a smaller volume than a cold solid.
- b) The particles in a hot solid vibrate more.
- c) The particles in hot and cold solids are touching.
- d) As a solid cools, it gets smaller because the particles take up less space.

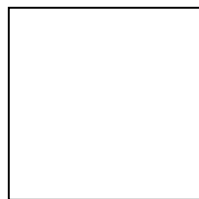
Q#7: (L3-4)

This drawing shows a kettle boiling.

Hot, gassy water called steam is coming out of the spout.



- a) Draw a diagram of the particles in hot steam.
[1 mark]



- b) Steam is a gas. Tick the word(s) that describe how the particles move. [1 mark, all or nothing]

- vibrating not stuck together
- far apart sliding quickly over each other
- stuck together moving quickly in all directions
- touching

- c) As the steam cools down, it will change into:

[1 mark]

- solid ice liquid water gassy steam

Q#1: L(4-5)

Materials have all sorts of different properties. Here are some of the reasons for this.

- | |
|---|
| A The particles in a liquid are not joined together as strongly as particles in a solid. |
| B Particles can slide over each other. |
| C Particles that are very close together cannot be pushed any closer. |
| D Particles that are far apart can be pushed closer together. |
| E Particles in a gas move quickly from one place to another. |

Explain the observations below by choosing the correct reason A to E.

You may not need all of the reasons.

[5 marks]

Statements	Reason(s)
You cannot squash a piece of steel.	
A liquid will flow through a tube.	
When the wind blows you can feel the air on your face.	
A gas is easy to compress (squash).	
Iron is usually a solid and water is usually a liquid.	

Q#2: L(4-5)

Use your knowledge of the particle theory to explain why the following observations happen in the way they do.

[6 marks]

- a) It is easier to walk upright in the air than to walk upright, up to your neck in water, in a swimming pool.

- b) A syringe full of air can be compressed but a syringe full of water cannot.

- c) You can pour liquid drink from a container but, if it is frozen, it falls out in one piece.

PARTICLE THEORY : Changes in State : Think Sheet #4

17

Q#1: (L4)

Fill in the gaps.

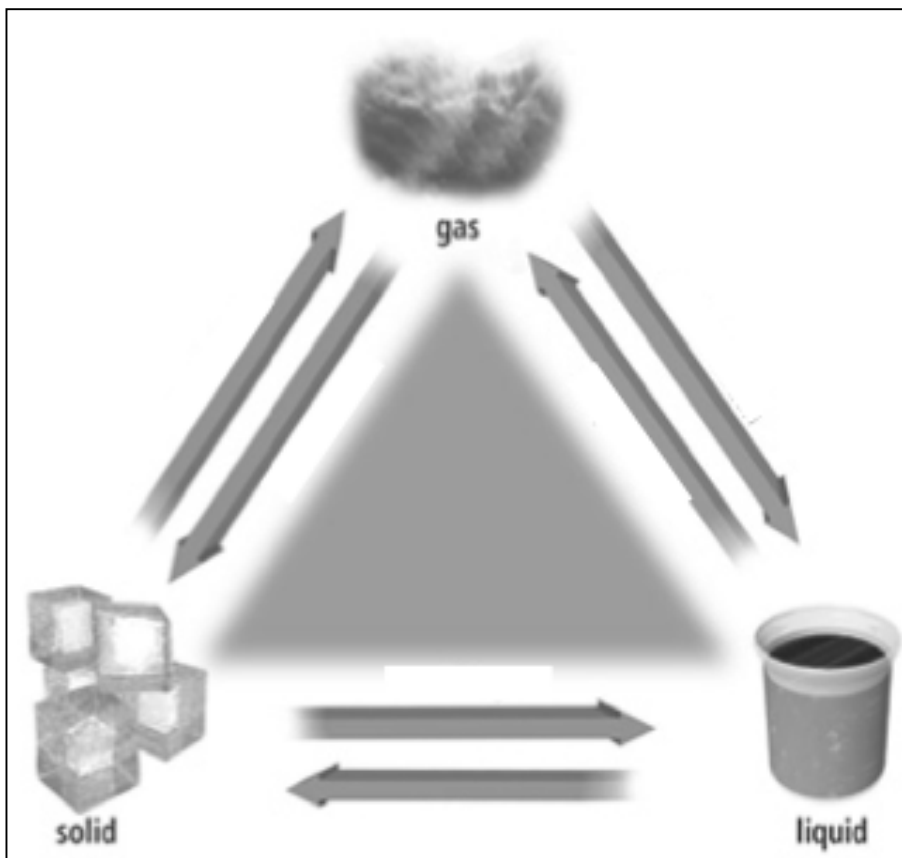
[7 marks]

The process wherein liquid turns into gas is called _____. When you breath on a cold mirror, you see water particles. This is because of _____. The change from liquid to solid is called _____, while the reverse of this is called _____. When a solid immediately changes into gas without passing the liquid state, it undergoes _____. When a gas immediately turns into a solid without passing the liquid state, it undergoes _____. Leaving dry ice out in room temperature is an example of _____.

Q#2: (L4)

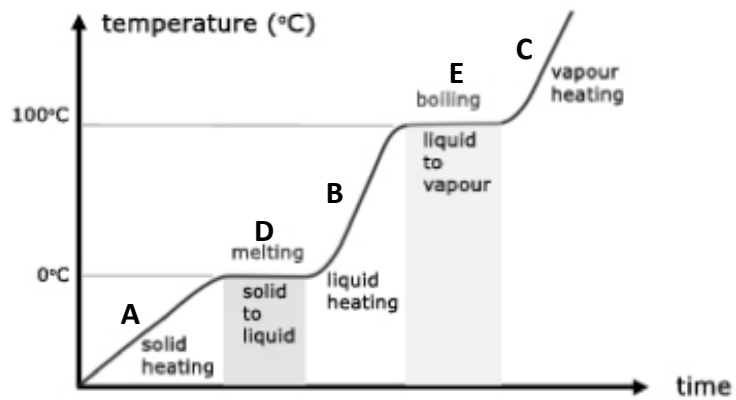
Complete the diagram.

[6 marks]



Q#3: (L5-6)

Examine the diagram.



a) Explain why the temperature rises in A, B and C.

[2 marks]

b) Explain why the temperature remains the same in D and E.

[2 marks]

PARTICLES AND REACTIONS : Think Sheet #5 : CHALLENGE!!!

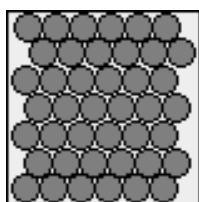
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To answer this, you must know the following:

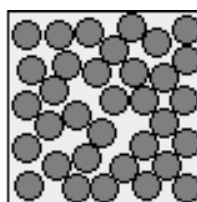
- ✓ States of matter
- ✓ The relationship between **density** and the different states of matter
- ✓ Changes of state
- ✓ How heat affects change of state

What is **density**?

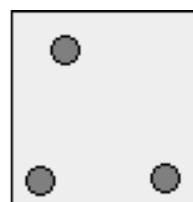
Density is the amount of particles in a given area.



solid



liquid



gas

Q#1: (L5-6)

Look at the data in the table.

Substance	Density in g/cm ³	Melting point in °C
water	1.0	0
magnesium	1.7	650
X	3.5	3550
Y	7.0	420
Z	0.0008	-248

- a) What must be true about the forces between the particles in substance X and the particles in substance Z? How do you know? [3 marks]

- b) Magnesium and substance Y were both heated from 400 °C to 500 °C. In what way would the arrangement of their particles now be different? Why would they be different? [3 marks]

- c) A sample of water has a mass of 10 g. What would be the mass of a sample of substance Y that had exactly the same volume as the water? Explain your answer. [3 marks]

- d) Is substance Z most likely to be a solid, a liquid or a gas at room temperature? How do you know? [3 marks]

- e) Look at the data of substance Z. How does the arrangement of the particles and the forces between them explain its very low melting point? [3 marks]

PHYSICAL AND CHEMICAL CHANGES : Think Sheet #6

	17	17

Q#1: (L4)

[6 marks]

_____ changes are reversible. _____ changes, on the other hand, are _____. In a _____ change, two or more _____ react to create _____.

Q#2: (L4)

Identify whether the changes are physical or chemical.

[10 marks]

A lump of wax melting on a hotplate	
Steam condensing on a cold glass	
An ice cube melting	
Crumpling paper	
Frying an egg	
Burning magnesium	
Bending a piece of wire	

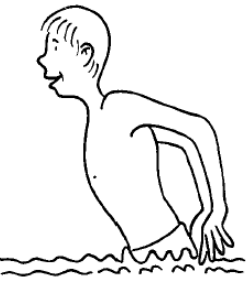
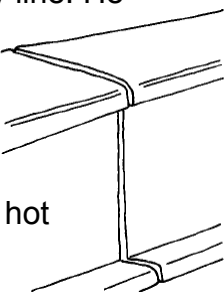

Q#3: (L5-6)

Burning hydrogen gas in the air produces steam which turns into water drops and then into ice on a very cold surface. [4 marks]



Complete the table.

PHYSICAL CHANGES	CHEMICAL CHANGES

<p>Swimming pool</p> <p>Joe and Eve run to the swimming pool. They then have races by running through the water. However hard they try, they run much slower through the water than through the air.</p>  <p>WHY? [3 marks]</p>	
<p>Rail tracks</p> <p>David's dad is laying new steel tracks along a railway line. He leaves gaps between each length of track. He says that these are to stop the track bending or bulging in hot weather.</p>  <p>WHY? [3 marks]</p>	
<p>Water bed</p> <p>Jack has a water bed. The bed has a big plastic bag filled with water instead of a mattress. He says it is really comfortable because it fits around the shape of his body when he lies down.</p>  <p>WHY? [3 marks]</p>	

Y7 Particles and Reactions : INVESTIGATION : Burning a Candle

Name: _____ Y7D Date: _____

Objective: To understand the changes that occur when a candle burns

Testable Question: Does the mass of a candle increase or decrease as it burns?

Vocabulary:

MASS: _____

HYDROCARBON:

Candle wax is a **HYDROCARBON**.

It contains two elements, which are _____ and _____.

REACTANTS: _____

PRODUCTS: _____

Background Information:

(What do you know about particle theory and changes in state? Write down the key points.)

Class Expanded Hypothesis: *(expanded – includes reasoning backed by prior knowledge)*

The mass of the candle will _____ because _____

Materials and apparatus:

Materials	Apparatus
Candle	Electronic balance
	Lighter
	Stopwatch

Procedure:

1. Place the candle on top of an electronic balance. Record the initial mass of the candle.
2. Light the candle. Start the stopwatch.
3. Record the mass of the candle every minute for a total of five (5) minutes.

Variables:

Does this investigation have variables? Explain.

Observation/results table:

Time (minutes)	Mass of candle
0 (initial mass)	
1	
2	
3	
4	
5	

Data Analysis:

Did the mass of the candle increase or decrease? Explain.

THINK!

REACTANTS				PRODUCT
carbon	+		→	
hydrogen	+		→	

If all the products of this chemical reaction were collected, would the mass of the candle increase or decrease? Explain.

Reflection:

1. On a scale of 1 to 5, 5 being the best, rate your participation in the investigation and explain why.

2. On a scale of 1 to 5, 5 being the best, rate your partner's participation in the investigation and explain why.

3. How can you improve this experiment?

Y7 Particles and Reactions : Investigation : “Copper Sulphate Dehydration And Rehydration”

Name: _____ Partner: _____

Objective:

To determine if the dehydration and rehydration of copper sulphate (CuSO_4) is an example of a physical or chemical change

Testable Question: Is the dehydration and rehydration of CuSO_4 an example of a physical or chemical change?

Vocabulary:

PHYSICAL CHANGE: _____

CHEMICAL CHANGE: _____

DEHYDRATION: _____

REHYDRATION: _____

Background Information:

(What do you know about physical and chemical changes? Write down the key points.)

Physical Change	Chemical Change

Class Expanded Hypothesis: (expanded – includes reasoning backed by prior knowledge)

The dehydration and rehydration of CuSO_4 is a _____ change because _____

Materials and Apparatus:

MATERIALS	APPARATUS
Copper sulphate crystals	Spirit burner
	Test tube
	Distilled water
	Test tube holder
	Safety goggles

Variables:

Does this investigation have variables? Explain.

Procedure:

1. Set up the Bunsen burner.
2. Using a spatula, put some copper sulphate crystals into the test tube. Describe how the crystals look like. Record your observations.
3. Ignite the spirit burner. Gently heat the copper sulphate crystals by moving the test up and down into the flame.
4. Observe what is happening to the copper sulphate crystals and record your observations.
5. When you see a change, extinguish the spirit burner flame. Describe the crystals and record your observations.
6. Slowly add water to the material in the test tube. Record your observations.

Observation/Results Table:

Observations of CuSO_4 crystals before heating	
Observations of CuSO_4 crystals while heating	
Observations of CuSO_4 crystals after heating	
Observations of CuSO_4 crystals after adding a few drops of water	

Data Analysis:

1. How many color changes occurred during the investigation? Explain.

2. What do you think caused the color changes? Explain.

Conclusion:

3. Did your results support your hypothesis? Explain.

Reflection:

4. On a scale of 1 to 5, 5 being the best, rate your participation in the investigation and explain why.

5. On a scale of 1 to 5, 5 being the best, rate your partner's participation in the investigation and explain why.

6. How can you improve this investigation?
