Lesson A: **Particle Model of Solids, Liquids and Gases (4.1)**

Date: _____

Objectives:

- Understand that substances can be gaseous and know the common gases at room temperature.

-Use the particle model to describe solid, liquids (including solutions) and gases.

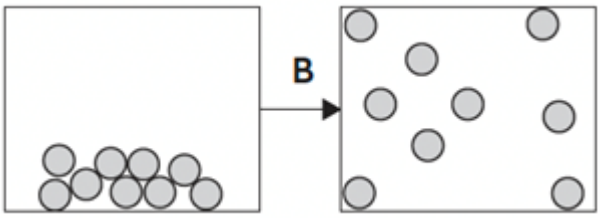
1. Solids, liquids and gases have different properties.

   The particles differ in the way they are arranged and how they move about.

   Tick (√) the box beside the correct statement.

Particles in a gas move quickly in all directions.	
Particles in a liquid can be compressed as they are not packed tightly together.	
Particles in a solid are very far apart.	

2. Look at the diagram below.



What does arrow B represent? Circle the correct answer.

a gas changing into a solid

a liquid changing into a gas

a solid changing into a liquid

3. Oxygen exists as a gas at room temperature.

What is 'room temperature'? Circle the correct answer.

the temperature of a place

the temperature of our surroundings

4. A liquid takes the shape of its container but a solid does not.

   Use the particle model to explain why.

   Liquid particles have a random arrangement and they move around each other. The particles of solids have a regular pattern and they vibrate in a fixed position.

5. Write the state of matter that corresponds to the description given.

   1. It fills a container in all directions. _____gas_____
   2. It can be cut and shaped. _____solid_____
   3. It can be compressed. _____gas_____
   4. Its volume doesn't change but it can flow. _____liquid_____
   5. It doesn't flow and cannot be compressed. _____solid_____

6. Why can we compress gases but not liquids? Use the particle model to explain.

Liquid particles are tightly packed and cannot be compressed while gas particles are far apart and can be compressed.

Refer to LMS notes or the book

7. Particles behave differently in a solid, liquid and gas.

Complete the table to describe the arrangement and movement of particles in a solid, liquid and gas.

	solid	liquid	gas
Arrangement of particles			
Movement of particles			

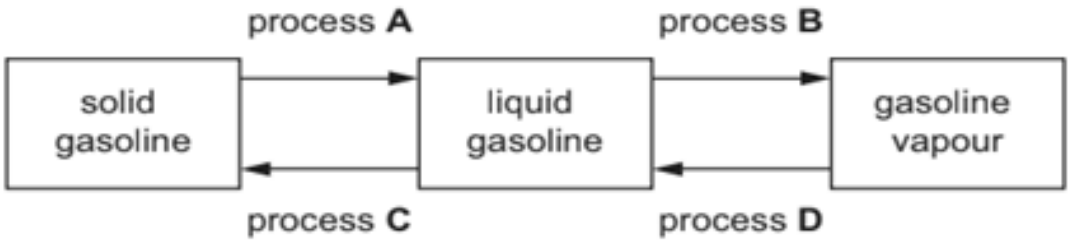
Lesson B: **Evaporation and Condensation (4.2)**

Date: _____

Objectives:

-Describe the processes of evaporation and condensation, using the particle model and relating the processes to changes in temperature.

1. Gasoline can exist as solid, liquid and gas.



a. What is the name of **process A** in the diagram? melting

b. What is the name of **process B** in the diagram? evaporation

c. What is the name of **process C** in the diagram? Freezing

d. What is the name of **process D** in the diagram? condensation

2. Explain this statement.

Sandra says: "When we sweat, our body cools down."

Sweat is a liquid that will evaporate. It gains heat from our body this means that our body will lose heat and cool down.

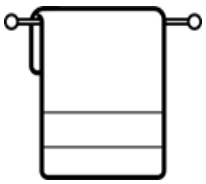
3. John carries out an investigation on the rate of evaporation.

He prepares two set-ups as shown.

The two towels have the same amount of water.

John leaves both set-ups in a room.

He measures the amount of water left in the towel after two hours.

Towel X 

Towel O 

A. Identify the following:

a. the control variables (what is kept the same)

1. The same amount of water in the towels
2. The material of the towel
3. Same surrounding temperature

b. the independent variable (the variable that we change)

Surface area of the towel

c. the dependent variable (the variable that we measure)

The rate of evaporation

B. Towel __x__ will dry faster. Explain.

Towel X has a larger surface area, the larger the surface area

the faster the rate of evaporation.

4. What are the three factors that affect the rate of evaporation?

a. amount of water

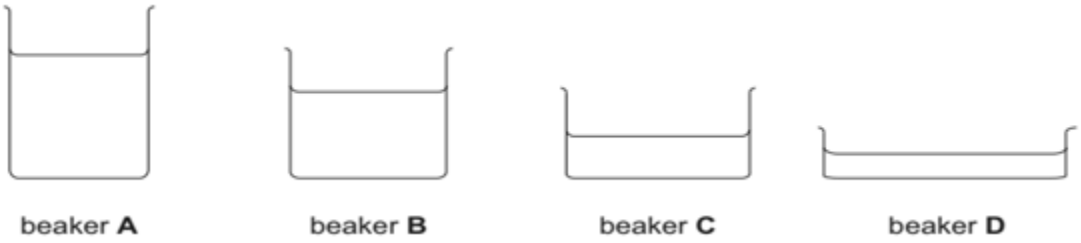
b. Temperature

c. surface area

d. wind spead

5. Gabriella investigates the evaporation of water.

- She measures 100 cm^3 of water and puts this into a beaker.
- She measures the time for all the water to evaporate.
- Gabriella repeats the experiment three more times. Each time she uses a different beaker.
- The surface area of the water increases from beaker A to beaker D.



A. Which of these sentences is a **prediction?** Tick the correct box.

All four beakers start with the same volume of water.	
Beaker D will take the shortest time for all the water to evaporate.	
The water in the four beakers must be at the same temperature.	
How many days will it take for all the water to evaporate from each beaker?	

B. Which two of these sentences will make the investigation a **fair test**?

All four beakers start with the same volume of water.(Control Variable)	
Beaker D will take the shortest time for all the water to evaporate.(prediction)	
Evaporation is the process by which a liquid changes into a gas. (FACT)	
How many days will it take for all the water to evaporate from each beaker? (inquiry question)	
The water in the four beakers must be at the same temperature. (control variable)	

6. Fill in the blanks.

a. Dependent variable: a factor that is measured in an experiment

b. evaporation: the process by a liquid gains heat and changes into gas. (did not reach the boiling point)

c. condensation: the process by which a gas loses heat and changes into a liquid

d. gaseous: the state of matter in which particles are further apart and move more freely than in solid and liquid states.

e. Independent variable: a factor that is investigated in an experiment.

f. Room temperature: the temperature of the surroundings (in science, it is around 20-25 degrees Celsius)

g. Control variable: a factor that is kept the same to ensure that an experiment is fair.