GRAYS TUITION CENTRE – Online Tutoring

WEEK: 3

Week Beginning: (04/01/2021)

Subject: SCIENCE

Year: 8

Lesson Objective:

- Teach Topic 1: Particle Theory
- Topic 2: More on particle theory

Keywords/ Concepts

- Particle arrangements
- Diffusion and Gas pressure

Class Questions

1. What does particle theory mean?
2. How are the particles in a gas arranged
3. Which state hols the particles close together and tightly packed?
4. Which state has the highest density?
5. Which state can flow and take the shape of the container?
6. Which state has weak attraction between particles?
7. Which state allows its particles to move in all directions
8. What causes gas pressure?
9. What things decrease gas pressure?
10. What is diffusion?
11. Is diffusion fast or slow? Explain why 12. What does density mean?

Homework

- 4x Worksheets attached

Additional Notes

All lessons is split into 3 sections:

a. Topic 1 + questions
b. Topic 2 + questions
c. Quiz + Recap

Make sure students mark their homework with the answers provided

Pages 67-68 — Extinction and Preserving Species

Q1 a) Gorillas **survive** in rainforests because they are well adapted to **compete** for food in that environment. When the trees in the rainforest are cut down to make room for fields, there is less **food** for the gorillas to eat. Those gorillas that are less able to compete successfully for food will **struggle** to survive and **reproduce**.

b) i) Extinct — None of that species are left.

ii) Endangered — At risk of becoming extinct.

Q2 a) Accept any two things humans use that we obtain from plants or animals.
For example: clothing/fabric/wool, medicine (or an example of a named medicine), fuel/wood, building materials/wood.

b) You must give two examples that match your answers from part a). For example:
Item 1 (wool): Organism — sheep. Effect on humans — if sheep became extinct, we would need to find other materials to make warm clothes from.
Item 2 (wood): Organism — pine tree. Effect on humans — if pine trees became extinct, we would have to use more man-made building materials/cut down more of other types of tree.

Q3 a) genes
b) biodiversity

Q4 a) sperm, eggs
b) They must be frozen.
c) E.g. use the stored egg and sperm cells to create new animal embryos.
d) Stop species becoming extinct in the first place, by e.g. preventing the destruction of habitats.

Q5 E.g. the organisms could be sources of useful products which humans cannot make use of if the species becomes extinct. / Because the rainforest is a complex ecosystem, the loss of some species could have knock-on effects for other species, including humans.

Answers for Week 5 Pg 69

Page 69 — Solids, Liquids and Gases

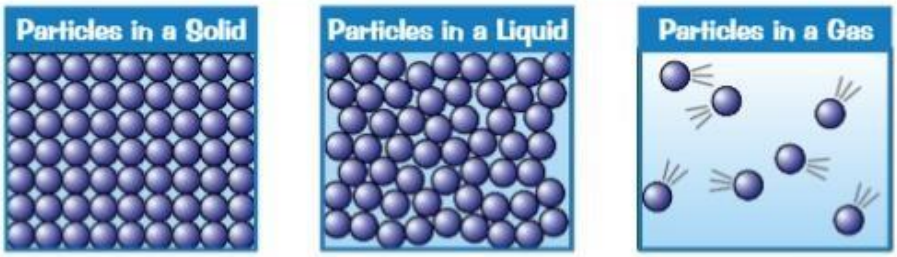
Q1
1. Particles
2. Compressing
3. Properties
4. Solid
5. Three
6. Volume
7. Liquids
8. Gas

Q2 a) Solid
b) Gas
c) Liquid

Particle Theory

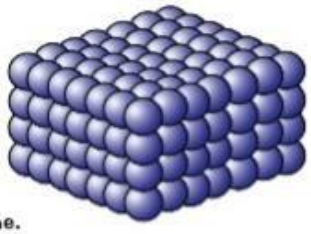
Particle theory — sounds pretty fancy. But actually it's pretty straightforward.

1) The particles in a substance stay the same whether it's a solid, a liquid or a gas.
2) What changes is the arrangement of the particles and their energy.



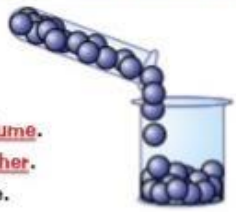
3) This particle theory explains all the different properties of solids, liquids and gases...

Solids — Particles are Held Very Tightly Together



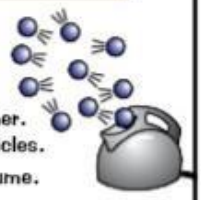
1) There are strong forces of attraction between particles.
2) The particles are held closely in fixed positions in a very regular arrangement. But they do vibrate to and fro.
3) The particles don't move from their positions, so all solids keep a definite shape and volume, and can't flow like liquids.
4) Solids can't easily be compressed because the particles are already packed very closely together.
5) Solids are usually dense, as there are lots of particles in a small volume.

Liquids — Particles are Close Together But They Can Move



1) There are some forces of attraction between the particles.
2) The particles are close, but free to move past each other — and they do stick together. The particles are constantly moving in all directions.
3) Liquids don't keep a definite shape and can form puddles. They flow and fill the bottom of a container. But they do keep the same volume.
4) Liquids won't compress easily because the particles are packed closely together.
5) Liquids are quite dense, as there are quite a lot of particles in a small volume.

Gases — Particles are Far Apart and Whizz About a Lot



1) There are very weak forces of attraction between the particles.
2) The particles are far apart and free to move quickly in all directions.
3) The particles move fast, and so collide with each other and the container.
4) Gases don't keep a definite shape or volume and will always expand to fill any container. Gases can be compressed easily because there's a lot of free space between the particles.
5) Gases all have very low densities, because there are not many particles in a large volume.

Phew, Particle Theory — particle-ularly gripping stuff...

It's pretty clever the way you can explain all the differences between solids, liquids and gases with a page full of snooker balls. Anyway, that's the easy bit. The not-so-easy bit is making sure you understand it.

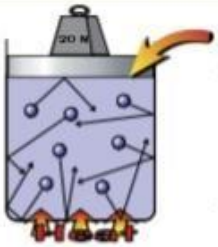
Classwork for week 6

More Particle Theory

Particle theory can be used to explain all sorts of exciting things, like, erm, gas pressure and diffusion. I say exciting. I may be exaggerating just a teensy tiny bit...

Gas Pressure is Due to Particles Hitting a Surface

Increasing the Temperature Increases Pressure

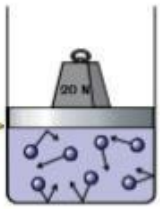


1) When you increase the temperature, it makes the particles move faster.
2) This has two effects:
   a) They hit the walls harder.
   b) They hit more often.
3) Both these things increase the pressure.

Increasing the temperature will only increase the pressure if the volume stays the same.

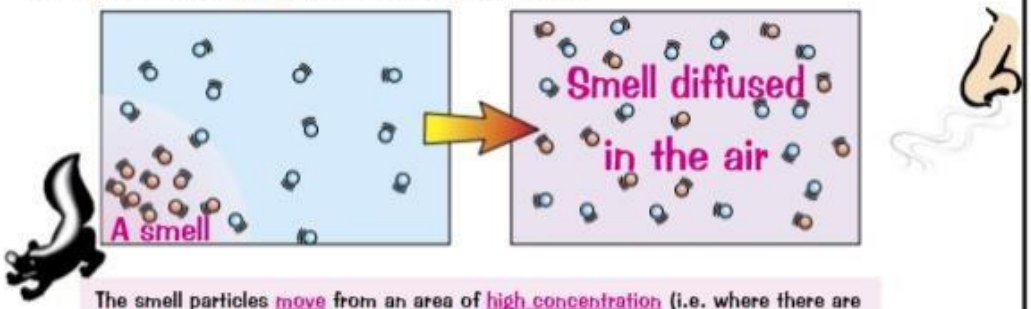
Reducing the Volume Increases Pressure

1) If you reduce the volume it makes the pressure increase.
2) This is because when the particles are squashed up into a smaller space they'll hit the walls more often.



Diffusion is Just Particles Spreading Out

1) Particles "want" to spread out — this is called diffusion.
   An example is when a smell spreads slowly through a room.



The smell particles move from an area of high concentration (i.e. where there are lots of them) to an area of low concentration (where there's only a few of them).

2) Diffusion is slow because the smell particles keep bumping into air particles, which stops them making forward progress and often sends them off in a completely different direction — it's a bit like trying to run blindfold through a herd of frisky bullocks. As you do.

Let the information on this page diffuse into your mind...

...you know — move from where there's a high concentration of information (this page) to where there's a low concentration (err... your mind). To be honest though, you're going to need to be a bit more active when it comes to learning this page. You know the drill by now. Look, cover and scribble it all down.

Worksheets for Homework Week 6:

70

Particle Theory

Q1 Write true or false next to each sentence to show whether it is correct or not.

a) There are strong forces of attraction between particles in a solid. .....

b) Particles in a gas are close together. .....

c) Liquids are easy to compress. .....

d) Liquids are usually quite dense — they have quite a lot of particles in a small volume. .....

e) The forces of attraction between the particles in a gas are very weak. .....

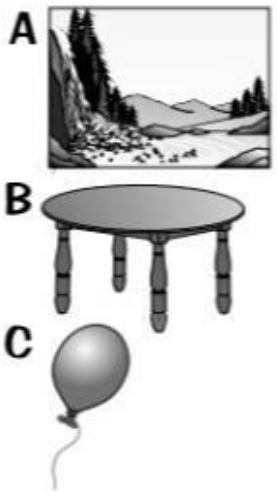
f) Gases can be compressed easily as there's lots of free space between the particles. .....

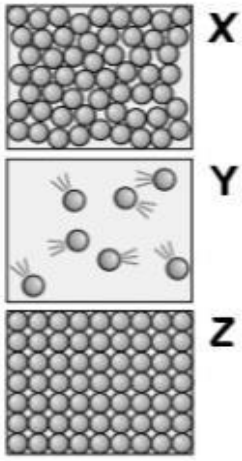
g) The particles in a gas are free to move quickly in all directions. .....

Q2 In the following chart, tick (✔) the relevant boxes about particles in solids, liquids or gases.

	Particles are close together	Particles are held in fixed positions	Particles are moving or vibrating
Solid			
Liquid			
Gas			

Q3 Match each of the pictures on the left (A, B and C) with the correct arrangement of particles on the right (X, Y and Z) by drawing a line between them.





Worksheets for Week 5

Particle Theory

Q4 Use the key words below to write a few sentences about how the forces between the particles affect the arrangement of particles in solids, liquids and gases.

KEY WORDS: forces particles strong weak

Q5 A liquid is poured into the first container, and then into each of the others, one at a time.

a) Does the liquid's volume remain the same each time? .....

b) Does the height of the liquid remain the same each time? .....

Q6 This question is all about liquids.

a) Describe the **arrangement** and **movement** of particles in a liquid.

b) List some **properties** of a liquid.

You should be able to think of two things about the particles, and at least three properties of liquids.

72

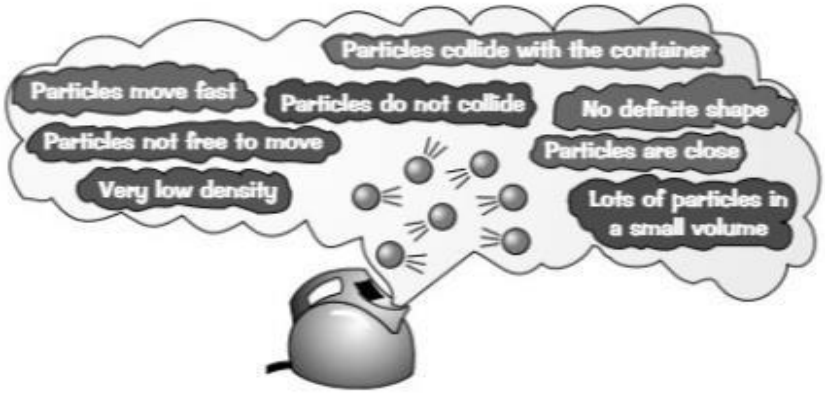
Particle Theory

Q7 Fill in the missing words about particles in a solid.
Words may be used once, more than once, or not at all.

fixed	closely	compact	dense	air	fast	move
compressed		vibrate	volume		flow	small

In a solid, the particles are held very ..... together in ..... positions, although they do ..... to and fro a little. The particles don't ..... from their positions, so all solids keep a ..... shape and ..... and can't ..... like liquids. Solids can't easily be ..... because the particles are already packed very ..... together. Solids are usually ..... , as there are lots of particles in a ..... volume.

Q8 This question is about a gas, such as steam. Look at the picture below and put a tick next to the phrases relevant to steam.



Q9 What will happen to the pressure of a gas in a container if the temperature is increased? Explain what is happening to the gas particles in the container.

.....

.....

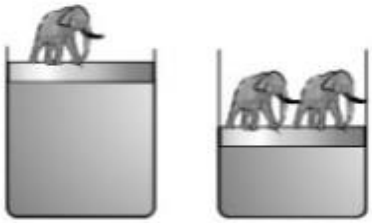
.....

.....

Section 5 — Classifying Materials

Particle Theory

Q10 The diagrams below show a gas being compressed.
Describe why decreasing the volume makes the pressure increase.



.....

.....

.....

.....

Q11 Andy has left a bucket of smelly cheese porridge to cool down in the kitchen.

a) Claire and Dagmar are sitting in the next room. Explain how the smell spreads to Claire's nose by **diffusion**.

.....

.....

.....

.....

.....

b) Dagmar says that diffusion happens **really quickly**. Is he right or wrong? Explain your answer.

.....

.....

.....

.....

.....