

**GRAYS TUITION CENTRE – Online Tutoring**

**WEEK: 3**

**Week Beginning: (04/01/2021)**

**Subject: SCIENCE**

**Year: 7**

**Lesson Objective:**

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

**Keywords/ Concepts**

- Particle arrangements
- Diffusion and melting, condensing and evaporation

**Class Questions**

1. What does particle theory mean?
2. How are the particles in a gas arranged?
3. Which state holds 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 forces between particles?
7. Which state allows its particles to move in all directions?
8. When a material changes state what happens to the arrangement and energy of the particles?
9. When a solid turns to a gas is heat supplied or not?
10. What happens to the particles when a liquid turns to a gas?
11. What is diffusion?

**Homework**

- 2x Worksheets attached

**Additional Notes**

### 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.
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- 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.
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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

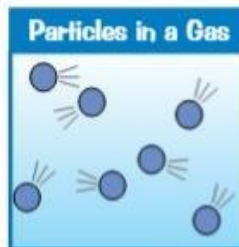
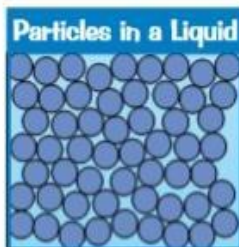
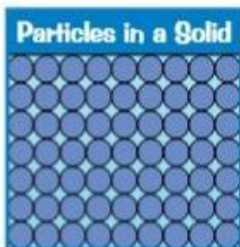
### Page 69 — Solids, Liquids and Gases

- Q1
- |                |            |
|----------------|------------|
| 1. Particles   | 5. Three   |
| 2. Compressing | 6. Volume  |
| 3. Properties  | 7. Liquids |
| 4. Solid       | 8. Gas     |
- Q2 a) Solid  
b) Gas  
c) Liquid

## Particle Theory

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

- 1) All materials are made up of **tiny particles** — you can just think of them as tiny balls.
- 2) The way the particles are **arranged** is **different** in **solids**, **liquids** and **gases**. Look:



- 3) **Particle Theory** explains how the arrangement of particles affects a material's **properties**.

### Solids — Particles are Held Very Tightly Together

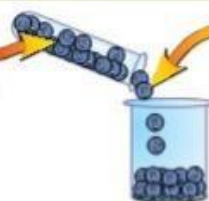
- 1) **Strong forces** hold the particles **very close together**.
- 2) This makes solids **dense** and **hard to squash**.



- 3) The particles **can't move** very much. They do **vibrate** (jiggle) a bit.
- 4) This means solids **keep** the **same shape** and **volume**.

### Liquids — Particles are Close but They Can Move

- 1) **Weak forces** hold the particles **quite close together**.
- 2) This makes liquids **quite dense** and **hard to squash**.
- 3) The particles are also free to **move** past each other.



- 4) This means liquids can **flow**.
- 5) It also means liquids **don't** always keep the **same shape**. They can form **puddles**.
- 6) Liquids **do** keep the **same volume**.

### Gases — Particles are Far Apart and Whizz About a Lot

- 1) The particles in a gas are **far apart**. There are **very weak forces** between the particles.
- 2) There's **lots of space** between the particles, so gases are **easy to squash**.
- 3) Gases are **not dense**.



- 4) In gases, the particles **move quickly** in **all directions**.
- 5) This means gases **don't** keep the **same shape** or **volume**. They always **spread out** to **fill a container**.

### Phew Particle Theory — it's gripping stuff...

It's **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.



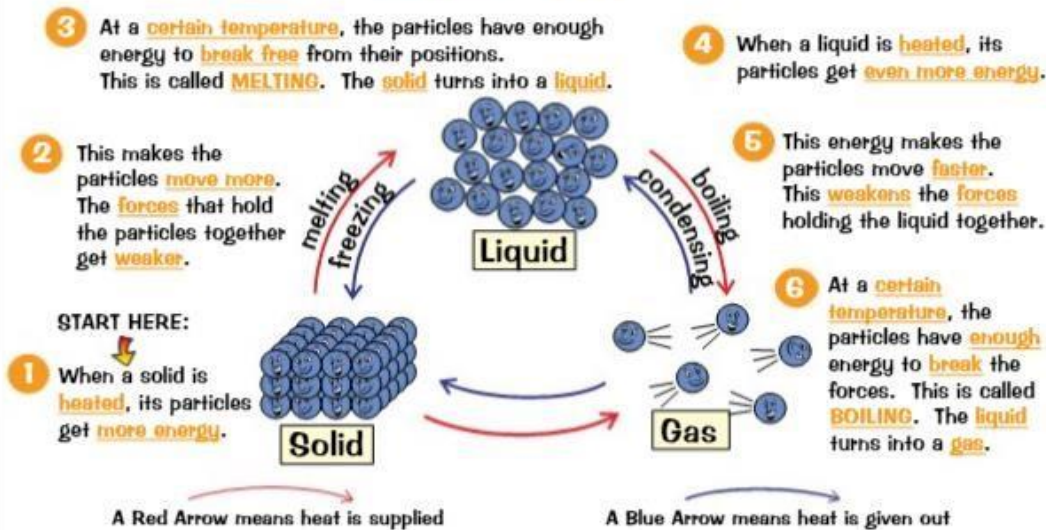
## More Particle Theory

More particles I'm afraid. They do get everywhere, don't they. A bit like dog hair.

### Changes of State

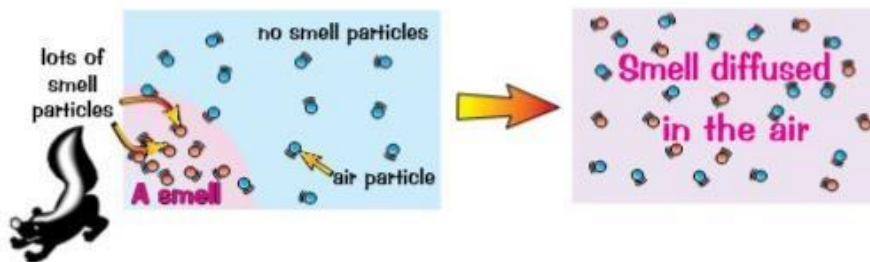
- 1) Materials can **change** from **one state of matter** to **another**. For example, **water** changes from a **LIQUID** to a **SOLID** when it **freezes**.
- 2) Materials **change state** when the **arrangement** and **energy** of the particles changes.

There's loads more on physical changes on p. 72.



### 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.
- 2) The smell particles **move** from where there are **lots of them** to where there **aren't as many**.



### Phew — another page of jostling snooker balls...

So the reason your **ice cream melts** is because the little **snooker balls** of ice cream **take in energy**, which means they can **break free** from their positions and become a **liquid**. Not that my ice creams last that long.

## 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.


**A**



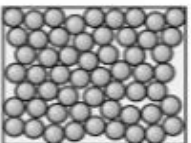
**B**




**C**



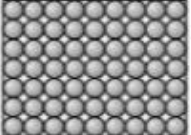
**X**



**Y**



**Z**



## 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.