

## **\*\*Chapter 1 – States of Matter\*\***

### **\*\*Lesson 1.1 – Everything is Made of Particles – Slide Set\*\***

#### **\*\*Chapter 1 – Lesson 1.1 – Slide 1\*\***

Slide Title: Everything is Made of Particles!

Bullet Points:

- \* Everything around us is made of tiny pieces too small to see.
- \* We call these tiny pieces particles.
- \* Particles are always moving, even if we can't see it.

Suggested Visual: A picture of a magnified view of sand, showing individual grains of sand representing particles.

Optional Think Prompt: Can you think of other things that are made of tiny particles?

#### **\*\*Chapter 1 – Lesson 1.1 – Slide 2\*\***

Slide Title: Particles in Motion

Bullet Points:

- \* In solids, particles are close together and don't move around much.
- \* In liquids, particles are close but can move and slide past each other.
- \* In gases, particles are far apart and move very quickly and randomly.

Suggested Visual: Three diagrams showing the arrangement of particles in a solid, liquid, and gas. Use different colours for the particles and show their movement with arrows.

Optional Think Prompt: How does the movement of particles explain why liquids flow but solids don't?

**\*\*Chapter 1 – Lesson 1.1 – Slide 3\*\***

Slide Title: Evidence of Particles

Bullet Points:

- \* Smells spread out because gas particles move and mix with air.
- \* Dust dances in sunlight because air particles bump into the dust.
- \* The spreading of color in water shows particles mixing.

Suggested Visual: Images showing: a person smelling perfume, dust motes in a sunbeam, and potassium permanganate dissolving in water.

Optional Think Prompt: How can you prove that the particles in air are moving?

**\*\*Chapter 1 – Lesson 1.1 – Slide 4\*\***

Slide Title: Diffusion

Bullet Points:

- \* Diffusion is the mixing of particles.
- \* Particles move from areas where they are crowded to areas with more space.
- \* This continues until the particles are evenly spread.

Suggested Visual: A diagram showing the diffusion of bromine gas into air. Show bromine particles in red and air particles in blue, initially separated, then gradually mixing.

Optional Think Prompt: Why does it take longer to smell perfume in a large room than a small room?

**\*\*Chapter 1 – Lesson 1.1 – Slide 5\*\***

Slide Title: Atoms and Molecules

### Bullet Points:

- \* Atoms are the smallest particles that can't be broken down chemically.
- \* Some substances are made of single atoms (e.g., Argon).
- \* Molecules are groups of atoms joined together (e.g., Water).

Suggested Visual: Diagrams showing single argon atoms and a water molecule (H<sub>2</sub>O).

Optional Think Prompt: What is the difference between an atom and a molecule?

### **\*\*Chapter 1 – Lesson 1.1 – Slide 6\*\***

#### Slide Title: Ions

#### Bullet Points:

- \* Ions are atoms or groups of atoms with an electric charge.
- \* Ions are formed when atoms lose or gain electrons.
- \* Many substances are made of ions (e.g., salt).

Suggested Visual: Diagram showing a simple ion, such as Na<sup>+</sup> or Cl<sup>-</sup>. Explain what the "+" or "-" means.

Optional Think Prompt: How might an atom become an ion?

### **\*\*Chapter 1 – Lesson 1.1 – Slide 7\*\***

#### Slide Title: Seeing Particles

#### Bullet Points:

- \* Scientists can now "see" atoms using powerful microscopes.
- \* These images show atoms are incredibly small.

Suggested Visual: A scanning tunneling microscope image of atoms (like the one in the text).

Optional Think Prompt: How do you think scientists can "see" something so small?

**\*\*Lesson 1.2 – Solids, Liquids, and Gases – Slide Set\*\***

**\*\*Chapter 1 – Lesson 1.2 – Slide 1\*\***

Slide Title: States of Matter

Bullet Points:

- \* Solids have a fixed shape and volume.
- \* Liquids have a fixed volume but take the shape of their container.
- \* Gases have no fixed shape or volume; they fill their container.

Suggested Visual: Three images: a block of wood (solid), water in a glass (liquid), and air filling a balloon (gas).

Optional Think Prompt: Which state of matter is the most compressible? Why?

**\*\*Chapter 1 – Lesson 1.2 – Slide 2\*\***

Slide Title: Changes of State

Bullet Points:

- \* Melting: solid to liquid (e.g., ice to water)
- \* Freezing: liquid to solid (e.g., water to ice)
- \* Boiling/Evaporation: liquid to gas (e.g., water to steam)
- \* Condensation: gas to liquid (e.g., steam to water)

Suggested Visual: A diagram showing the water cycle illustrating all four changes of state.

Optional Think Prompt: What causes these changes of state?

**\*\*Chapter 1 – Lesson 1.2 – Slide 3\*\***

Slide Title: Melting and Boiling Points

Bullet Points:

- \* Melting point: the temperature at which a solid melts.
- \* Boiling point: the temperature at which a liquid boils.
- \* These points are specific for each substance.

Suggested Visual: A heating curve graph for water, clearly showing the flat sections representing melting and boiling.

Optional Think Prompt: Why are the melting and boiling points constant during those changes?

**\*\*Chapter 1 – Lesson 1.2 – Slide 4\*\***

Slide Title: Melting and Boiling Points of Different Substances

Bullet Points:

- \* Different substances have different melting and boiling points.
- \* Some substances melt and boil at very high temperatures (e.g., iron).
- \* Some substances melt and boil at very low temperatures (e.g., oxygen).

Suggested Visual: A table showing the melting and boiling points of various substances (water, oxygen, iron, etc.).

Optional Think Prompt: Can you think of why some substances have very high boiling points?

