Year Group: 9 Term:1 (Sept – Oct)

We are learning:

- **States of Matter** – Understanding solids, liquids, and gases in terms of particle arrangement and movement.
- **Changes of State** – Processes like melting, freezing, boiling, and condensing, including energy changes and conservation of mass.
- **Internal Energy** – How heating affects the internal energy of a substance, including kinetic and potential energy of particles.
- **Specific Heat Capacity & Latent Heat** – Calculations and concepts related to energy required to change temperature or state.
- **Gas Pressure & Temperature** – Relationship between pressure, volume, and temperature in gases (including the particle explanation and the use of the **pressure-volume** equation).
- **Density** – Definition, calculation, and practical methods for measuring the density of solids and liquids.

How can you support your child:

- Encourage them to make revision posters on each of the sub-topics within the topic.
- Encourage them to make cue cards with questions and answers on all the sub-topics.
- Encourage them to use the notes, videos, and quizzes, on BBC Bitesize.
- Encourage them to use Seneca Learning to supplement and secure their knowledge on the topic.

Try asking them:

- **"Can you describe how we behave when we're in a solid, liquid, and gas?"**
  Answer:
  - In a **solid**, we're tightly packed in a fixed arrangement and only vibrate in place.
  - In a **liquid**, we're still close together but can move around each other.
  - In a **gas**, we're far apart and move freely and quickly in all directions.
- **"What happens to us when we get warmer or cooler?"**
  Answer:
  - When we get **warmer**, our **kinetic energy increases**, so we move faster.
  - When we get **cooler**, our **kinetic energy decreases**, and we slow down.
- **"Do you remember what we need to change state — like when we melt or evaporate?"**
  Answer:
  - We need **energy** to overcome the forces holding us together.
  - For example, **melting** and **evaporation** require heat to increase our internal energy.
- **"How do we make pressure when we're bouncing around in a container?"**
  Answer:
  - We collide with the walls of the container.
  - More frequent and forceful collisions (due to higher temperature or more particles) increase the **pressure**.
- **"Why do some of our boxes in the shopping feel heavier than others, even if they're the same size?"**
  Answer:
  - That's because they have more **mass** packed into the same volume — they have a higher **density**.
  - **Density = mass ÷ volume**
- **"Can you help me calculate how much energy we need to heat up or change state?"**
  Answer:
  - To **heat up**, use:
    $$\text{Energy} = \text{mass} \times \text{specific heat capacity} \times \text{temperature}$$
  - To **change state**, use:
    $$\text{Energy} = \text{mass} \times \text{specific latent heat}$$

Useful Links:

Senecal Learning = https://senecalearning.com/en-GB/

BBC Bitesize = GCSE Physics (Single Science) - AQA - BBC Bitesize

Kerboodle = www.kerboodle.com