TMS Science Launchpad - Year 2023/2024 Year 4 - Chemistry: Materials (solids, liquids & gases)

Substantive knowledge:

Solids, liquids and gases are described by observable properties.

<u>Solids</u>

- stay in one place and can be held.
- keep their shape. They do not flow like liquids.
- always take up the same amount of space. They do not spread out like gases.
- can be cut or shaped.

Even though they can be poured, sugar, salt and flour are all solids. Each particle of salt, for example, keeps the same shape and volume.

Liquids

- can flow or be poured easily. They are not easy to hold.
- change their shape depending on the container they are in.

Even when liquids change their shape, they always take up the same amount of space. Their volume stays the same.

Gases

- are often invisible.
- do not have a fixed shape. They spread out and change their shape and volume to fill up whatever container they are in.
- can be squashed.

Materials can be divided into solids (flour, ice, wood), liquids (honey, water, milk) and gases (steam, oxygen, carbon dioxide, helium)

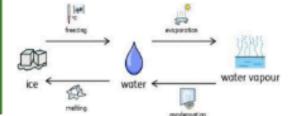
Heating causes solids to melt into liquids and liquids evaporate into gases.

Cooling causes gases to condense into liquids and liquids to freeze into solids.

The temperature at which given substances change state are always the same.







The water cycle is the continuous journey of water from the land to the sky and back to the land again. This constant movement of water is happening all the time and is vital to supporting life on earth.

There are four main stages in the water cycle:

Evaporation happens when warmth from the sun causes water (liquid) from the sea, lakes and rivers to rise into the air and turn to vapour (gas).

Condensation happens when the water vapour cools and turns back into drops of water which form clouds in the sky. Precipitation is when the clouds get too heavy and water falls from the clouds in the form of rain, snow, sleet or hail.

Run off happens when the majority of this water runs over the land and flows back into lakes and rivers or gets carried back to the sea.

Vocabulary:

solid, liquid, gas, particles, state change, materials, properties, matter, melt, freeze, water, ice, temperature, process, condensation, evaporation, water vapour, energy, precipitation, collection, water cycle

Disciplinary knowledge

Identify and classify



Observation over time



How does the level of water in a glass change windowsill? (to gather/record

interpret results)

Identify and classify



How does the surface area of water affect how long it takes to

Comparative



How does the mass of a block melt? (to draw

Comparative Comparative





Pattern seeking

Can you group How would you these materials sort these and objects into when left on the objects/material solids, liquids, s based on their and gases? temperature? (to ask scientific (to observe questions) results) (to closely)

of ice affect how long it takes to conclusions)

Does sea-water evaporate faster than fresh-water? (to make a prediction)

Is there a pattern in how long it takes different sized ice lollies to melt? How does evaporation rate change as you add more salt to your water?

Research

evaporate?

(to plan an

enquiry)



What are hurricanes, and why do they happen? What temperature do different materials (iron/oxygen/sand) change state at and what happens?