Year 4 States of matter
(Chemistry)

Prior and future learning

Prior Knowledge	What's next?
• I can identify the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. • I can compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. • I can find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (YR 2 -Materials) **Link to YR 3 Rocks and Fossils**	• I can compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. • I know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution. • I use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating • I can give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic • I can demonstrate that dissolving, mixing and changes of state are reversible changes. • I can explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.

Track your learning

How I will show what I have learned	☹	😐	☺
I can compare and group materials together, according to whether they are solids, liquids or gases.			
I can observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C).			
I can identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.			

Key knowledge I need to understand

- A solid keeps its shape and has a fixed volume. A liquid has a fixed volume but changes in shape to fit the container. A liquid can be poured and keeps a level, horizontal surface. A gas fills all available space; it has no fixed shape or volume.
- Granular and powdery solids like sand can be confused with liquids because they can be poured. Each individual grain demonstrates the properties of a solid. Melting is a state change from solid to liquid.
- Freezing is a state change from liquid to solid. The freezing point of water is 0°C.
- Boiling is a change of state from liquid to gas that happens when a liquid is heated to a specific temperature and bubbles of the gas can be seen in the liquid. Water boils when it is heated to 100°C
- Evaporation is the same state change as boiling (liquid to gas), but it happens slowly at lower temperatures and only at the surface of the liquid. Evaporation happens more quickly if the temperature is higher, the liquid is spread out or it is windy.
- Condensation is the change back from a gas to a liquid caused by cooling.
- Water at the surface of seas, rivers etc. evaporates into water vapour (a gas). This rises, cools and condenses back into a liquid forming clouds. When too much water has condensed, the water droplets in the cloud get too heavy and fall back down as rain, snow, sleet etc. and drain back into rivers etc. This is known as precipitation. This is the water cycle.

Scientist: Anders Celsius

Possible texts to read:
Once Upon a Raindrop – *James Carter*
Sticks – *Diane Alber*

Working scientifically assessment: Measuring temperature, drying materials

Link to maths curriculum:
Measurement:

- Find the surface areas of containers when exploring the rate of evaporation and using this to make predictions for new values (*Find the area of rectilinear shapes by counting squares).*
- Presenting data gathered when exploring the melting point of different solids *(interpret and present discrete and continuous data using bar charts)*
- Presenting data gathered when exploring the circumference of an ice block over a period of time and using this to make predictions for new values. (*Interpret and present continuous data using time graphs*).

Key vocabulary I need to know	
absorbent	material that soaks up liquid easily
Viscosity	How fast or slow something will flow.
elastic	a rubber material that stretches when you pull it and returns to its original size and shape when you let it go
transparent	If an object is **transparent**, you can see through it
foil	sheets of metal as thin as paper
glass	a hard transparent material
man-made	things are created by people
metal	a hard substance such as iron, steel, gold, or lead
natural	things that exist in nature and are not made by people
opaque	if an object or substance is **opaque**, you cannot see through it
plastic	a material which is light in weight and does not break easily
stretchy	slightly elastic
rough	uneven and not smooth
shiny	things are bright and reflect light
smooth	no roughness, lumps, or holes
Molecular structure	The location of the atoms, groups or ions relative to one another in a molecule.
Molecule	a group of atoms bonded together.
Evaporation	the process of turning from liquid into vapour.
Condensation	water which collects as droplets on a cold surface when humid air is in contact with it.
Precipitation	Rainfall, snow, sleet or hail.