Science – Year 4

Materials- states of matter
Where does a puddle go?

NC objectives - **areas of study**	End point of area of study	Vocabulary		
		Basic	Adventurous	Technical
compare and group materials together, according to whether they are solids, liquids or gases 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) identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	Children are able to identify materials as solids, liquids and gases- this builds upon their prior knowledge of identifying materials and their properties. Children know that materials are made up of particles that are arranged in different ways for each of the states of matter and can talk about this. They know that materials can change state when things are cooled or heated and can talk about water in these different states confidently. They understand the water cycle and talk about the different processes involved.	Solid, liquid, gas, heating, cooling, particles, state, materials, properties, matter, melt, freeze, water, ice, temperature, state change, melting, freezing, melting point, boiling point, water cycle		process, condensation, evaporation, water vapour, energy, precipitation, collection,

Knowledge

Substantive Knowledge

- Retrieval- work in year 4 builds on the prior knowledge of pupils from KS1 where children name objects and the materials they are made from. They begin to choose materials for a particular purpose and know how some materials can be changed and recycled. They know who John Boyd Dunlop is.
- In Y3 they know the name of different types of rock and how they are formed, how soil and fossils are formed and the work of Mary Anning.

- Lesson 1
- LO To know objects are solids, liquids or gases.

Disciplinary Knowledge

Working as chemists, children explore the materials objects are made from and begin to understand the different states of matter through observation and investigation.

Similarities and differences

Children explore a range of everyday materials and can describe their state of matter, finding similarities and differences between them to aid them with classification and grouping. Children define each state of matter and how

- **Solid, liquid, gas,**
- Know that an object is made from/of a material
- Know that materials can be hard, soft, strong, weak, absorbent, heavy, light, solid and runny, smooth and rough; these descriptions denote the properties of a material
- Identify materials as solids, liquids or gases.

Verbalise their responses when exploring different materials and reactions to stimuli.

- Lesson 2
- LO To know materials are made of particles.
- **Solid, liquid, gas, particles, state,**
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- Know that matter (stuff) is made from tiny building blocks
- Know that things are composed of a matter commonly in one of three states of matter: solid, liquid or gas
- Lesson 3
- LO To know materials change state when cooled.
- **cooling, particles, state, materials, properties,**
- **state change, freezing,**
-
- Know that things are made of particles (tiny building blocks) and that these are organized differently in different states
- Know that materials can change state when temperature changes
- Lesson 4
- LO To know materials change state when heated.
- **Solid, liquid, gas, heating, particles, state, materials, properties, melt, temperature,**
- **state change, melting, melting point, boiling point,**
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- Know that there are bonds between the particles (building blocks) in a solid; as temperature increases, these bonds are somewhat overcome as the particles absorb energy and solids can change into liquids; with a further increase in temperature, the particles become even more energetic and the bonds are overcome entirely so the liquid changes into a gas

they are different from one another due to the make up of particles within them.

Evidence

Making observations of water in each of the three states, they can talk about when it is heated or cooled and what happens to the particles. Investigating the effect of temperature on substances for example chocolate, butter, cream to make chocolate crispy cakes and ice cream they can talk about the changes and how heating and cooling were involved. They suggest other relevant questions to answer and ways to set up an enquiry to answer them and draw simple conclusions.

Observing evaporation over time – a puddle on the playground or washing on a line, they can record results of washing drying or snowmen melting.

Using evidence to report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.

Children use dataloggers to explore temperature and its role in materials melting or freezing.

- Lesson 5
- LO To know what evaporation and condensation are.
- **melt, freeze, water, ice, temperature,**
- **state change, process, condensation, evaporation,**
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- Know that when solids turn into liquids, this is called melting and that the reverse process is called freezing- in water and solidifying in other materials.
- Know that when liquids turn into gases, this is called evaporation and that the reverse process is called condensation
- Know that the melting point of water is 0^{o} C and that the boiling point of water is 100^{o} C
- Lesson 6
- LO To know how the water cycle works.
- **water cycle, process, condensation, evaporation, water vapour, energy, precipitation, collection,**
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- Know that water flows around our world in a continuous process called the water cycle
- Know that, along with evaporation, water on the Earth's surface moves to the air in a process called transpiration in which water turns into water vapour (gas) on the surface of leaves on plants
- Know that rain condenses in clouds and falls to earth as rain, snow or hail in a process called precipitation
- Know that water flows across the land in rivers and streams in a process called surface run-off and under the ground as groundwater

How important is the water cycle?

Concepts

Biology	Chemistry	Physics	

SKILLS

1. Compare	2. Explore	3. Identify	4. describe	5. classify

6. Question	7. observe	8. test	9. record	10. research

ASSESSMENT

KNOW MORE, REMEMBER MORE, DO MORE...

In this unit of learning, progress has been made when a learner knows more. This 'distance travelled' from the starting point is evidenced through them remembering more and doing more: in books, low stakes quizzes, retrieval, use of mind maps, answering the big question and being able to feel more confident about this unit.