

Brough Primary School – Curriculum Intention Plan 2023 - 2024



Subject: Science Year Group: Year 3/4		Area of learning: States of Matter (Year B)
Links to previous work/Remember when	<ul style="list-style-type: none"> • Children will have learnt to compare and group materials on the basis of their simple properties. They will have explored how to change the shape of solids by bending, twisting, squashing and stretching. • Children will have spent time observing the changes to the seasons in KS1 and will be familiar with water freezing in the cold winter months. • Future learning UKS2 – Children will use their knowledge of solids, liquids and gases by deciding how materials might be separated, including filtering, sieving and evaporation. They will extend their knowledge and learn about dissolving and mixing and consider if these changes of state are reversible or irreversible. <p><u>Working Scientifically</u></p> <ul style="list-style-type: none"> • Asking more relevant questions and used different scientific enquiries to answer them. • Set up some comparative and fair tests. • Made careful observations, and where appropriate taken measurements. • Identify and classify (KS1) • Using their observations to suggest answers to questions. 	
	Year 3/4	Key Skills to be taught
Summer 1 2024 What the children should know at the end of this series of lessons	<ul style="list-style-type: none"> • 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. • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. <p><u>Working Scientifically</u></p> <ul style="list-style-type: none"> • Set up simple practical enquiries, comparative and fair tests. • Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. • Gather, record, classify and present data in a variety of ways to help answer questions. • Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. • Report on findings from enquiries, including oral. 	

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Vocabulary

Change, collection, condensation, evaporation, freeze, gas, heat, liquid, precipitation, property, solid, temperature, thermometer, characteristics, properties, volume, particles, viscosity, plan, fair test, variables, conclusion, heating, cooling, change states, melt, evaporate, condense, water cycle, collection (run-off), precipitation, reuse, body of water, water vapour.

Sequence of learning	Learning Objectives/Outcomes	Suggested lesson outline
<p>1 Explorify could be used at the start of the unit as a stimulus.</p>	<p>Learning Objective: I can compare and group materials together, according to whether they are solids, liquids or gases.</p> <p>Key Knowledge: Children know the characteristics of solids, liquids and gases. They are able to say that a liquid can be poured and a solid can too,,, as long as the particles are small enough and behave almost like a liquid. They are able to describe solids, liquids and gases in terms of the location and motion of particles. Children can name some common examples.</p> <p>Enquiry Type: Ask simple questions and recognising that they can be answered in different ways.</p>	<p>Recap – How did you group materials in the Y1/2 unit on materials and their properties? What are the properties of solids? Liquids? gases? What do you know about water through the seasons? Winter? Summer, when there is a shower followed by warm sun?</p> <p>Properties of solids, liquids and gases Everything in the world can exist in one of three states: as a solid, as a liquid, or as a gas. These are the three states of matter.</p> <p>What is matter? Matter is everything that you can see or feel or touch around you. It includes things like the air we breathe and the items we use in everyday life.</p> <p>Solids can have a whole range of different physical characteristics. They can be soft like fur or silk, or they can be rock hard like... well, a rock!</p> <p>There's no limit to their size, either. Consider that the smallest grain of sand or rice is a solid, but so is a massive asteroid hurtling through space.</p> <p>So what do all these different things have in common? They all hold their shape because the invisible molecules that they're made up of are tightly packed together.</p>

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		<p>Liquids are another form of matter. Before a solid turns into a gas by changing states, it will become a liquid at some point in the process.</p> <p>Liquids are made up of very small particles which are packed close together, but not as tightly as solids. These molecules are not arranged in any specific pattern, so they can move around and slide past each other. That's how a liquid changes its shape.</p> <p>Gases are one of the three states of matter. Like solids and liquids, they are everywhere. Common gases include oxygen and carbon dioxide – you can't see them because they're colourless, but they are there in the air we breathe.</p> <p>They're made up of very small molecules which are really spread out. These molecules have so much energy that they're constantly moving around in different directions.</p> <p><i>Children complete a sorting activity recapping earlier learning. Children write a description of solids, liquids and gases, in terms of their properties and the movement of their articles.</i></p>
2	<p>Learning Objective: I can make careful observations. I can communicate my results.</p> <p>Key Knowledge: Liquids can flow or be poured easily. They are not easy to hold. Liquids change their shape depending on the container they are in. Even when liquids change their shape, they always take up the same amount</p>	<p>Recap – What do the words solid, liquid and gas mean?</p> <p>Investigation planning and presentation of results. In this lesson the children will plan to investigate three characteristics of tomato ketchup - how it sits on a hot dog, how runny it is and how it tastes. Children discuss in pairs or small groups. Equipment? How will it be recorded? Discuss variables etc.</p> <p><i>Children record investigation plans under given headings. Children record findings in a table form and then contribute to a</i></p>

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	<p>of space. Their volume stays the same.</p> <p>Enquiry Type: Observing closely, using simple equipment. Reporting on findings from enquiries, including oral and written explanations.</p>	<p><i>modelled email replying to the hotdog stand owner.</i></p>
<p>3 LESSON REQUIRES THE FOOD TECHNOL OGY AREA</p>	<p>Learning Objective: I can observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens.</p> <p>Key Knowledge: Materials can change state when they are heated or cooled. For example, water can be changed into a solid by cooling it. This happens at 0°C. Water can be changed into a gas by heating it. This happens at 100°C.</p> <p>Enquiry Type: Observing closely, using simple equipment. Performing simple tests.</p>	<p>Recap – Can you think of an example of each state of matter? Can you think of an example which changes state quite easily?</p> <p>Changing State In this lesson the children will explore the concept of changing state. They will decide how changes to state happen (heating and cooling). They will then carry out the Wonka investigation, to answer an enquiry question.</p> <p><i>Children record their observations of the different ways to heat chocolate and the temperature of the chocolate after 1 minute, identifying the best option for Wonka. If time, children complete the challenge, showing their understanding that the process is reversible.</i></p>
<p>4 Use Explorify - Where is the Water?</p>	<p>Learning Objective: I can identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p> <p>Key Knowledge: Water changes state when it is heated (evaporation/boiling) and when it is cooled</p>	<p>Recap – What is the name for water when it is a solid? What are the two names we call water when it is a gas?</p> <p>The Water Cycle All water moves continually and is recycled over and over again. This is vital in supporting all life on earth. The stages are evaporation, condensation, precipitation and collection. In this lesson children will match the correct picture to the correct stage of the water cycle.</p>

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	<p>(freezing). Water vapour also changes state when it is cooled and this is called condensing. Precipitation includes rain, snow, sleet and hail stones. Water run-off is the water which is the water that is collected in rivers, creeks or ponds because the land cannot absorb anymore.</p> <p>Enquiry Type: Make systematic and careful observations - linked to video description of water cycle.</p>	<p><i>Children carry out a partner activity matching the stages of the water cycle, and then create a comic strip for Walter the Water Droplet. Children complete a table regarding the states of matter for the different precipitation before completing a final ordering task for Ahmed.</i></p>
<p>5a Investigation will require a second time to record findings and draw conclusions.</p>	<p>Learning Objective: I can plan and carry out a fair test, considering the necessary variables.</p> <p>Key Knowledge: An enquiry is fair when only the independent variable is changed and all of the others, the control variables are kept the same.</p> <p>Enquiry Type: Plan enquiries; set up simple practical enquiries, comparative and fair tests.</p>	<p>Recap – How do we ensure a scientific enquiry is fair? What are variables? Which variables should be kept the same and which will change? Why?</p> <p>Fair Testing (Part 1) In this lesson the children will investigate if all liquids evaporate. They will be given a selection of liquids and will have to plan a fair test to see if they evaporate. Identify the control variable and the independent variable. Make sure this is clear for the children and that they know how this ensures the test is fair.</p> <p><i>Children draft a plan to ensure the test is fair. This could be independent or with some guidance. Children set up the investigation to run over the next few days.</i></p>
<p>5b</p>	<p>Learning Objective: I can record my results and draw conclusions from those results.</p> <p>Key Knowledge: It turns out that all liquids can evaporate at room temperature and normal</p>	<p>Recap – What were we hoping to find out from our investigation? How will we record our results?</p> <p>Fair Testing (Part 2) In this lesson the children will make final observations of their test specimens before drawing relevant conclusions about how and which liquids evaporate.</p>

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	<p>air pressure. Evaporation happens when atoms or molecules escape from the liquid and turn into a vapour. Not all of the molecules in a liquid have the same energy, so evaporation takes place at different speeds for different liquids.</p> <p>Enquiry Type: Make systematic and careful observations; gather, record and present findings;</p>	<p><i>Children record their observations and then write a conclusion which answers the question, 'Do all liquids evaporate?'</i></p>
6	<p>Learning Objective: To demonstrate what has been learnt about states of matter</p>	<p>ASSESSMENT LESSON</p> <p><i>Children complete short formative assessment.</i></p>

Learning Outcome/product

Children will be able to compare and group materials according to whether they are solids, liquids or gases. They will learn that some materials change state when they are heated or cooled and be able to identify and name these processes as melting, freezing, evaporating or condensing. They will learn about the water cycle and be able to identify the part played by evaporation and condensation in the water cycle. Children will work scientifically to plan and conduct investigations involving melting and evaporation. They will learn to associate the rate of evaporation with temperature.

Assessment records	List only those children who have not achieved the expected outcomes.