

Brough Primary School – Curriculum Intention Plan 2024 - 2025



Subject: Science Year Group: Year 5/6		Area of learning: Properties and Changes of Materials
Links to previous work/Remember when	<ul style="list-style-type: none"> • Year 3&4 – Knowing some electrical conductors and insulators and that metals are generally good conductors. • Year 3&4 - Knowledge of being able to group common solids, liquids and gases. • Year 3&4 – Knowing that some materials change state when they are heated or cooled. • Year 3&4 – Knowing the part played by evaporation and condensation in the water cycle. • Year 1&2 – Work on comparing uses of everyday materials. • • <u>Working Scientifically</u> • being able to ask and investigate relevant scientific questions; • setting up simple scientific enquiries; • making systematic and careful observations; • gathering, recording and presenting data; • reporting on findings both oral and written; • using results to draw simple conclusions • using straight forward scientific evidence to support what they have found out. 	
Term	Year 5/6	Key Skills to be taught
Spring 2025 What the children should know at the end of this series of lessons		<ul style="list-style-type: none"> • Compare and group together every day materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal) and response to magnets • Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. • Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. • Give reasons, based on evidence from comparative and fair tests, for the particular uses of every day materials, including metals, wood and plastic. • Demonstrate that dissolving, mixing and changes of state are reversible changes. • 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. • • <u>Working Scientifically</u> • Develop their knowledge of planning different scientific investigations to answer questions, including recognising and controlling variables. • Continue to use scientific equipment to measure but with increasing accuracy.

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	<ul style="list-style-type: none"> • How to record data in increasing complexity through diagrams, labels, tables, bar and line graphs. • Using test results to make predictions and set up comparative and fair tests. • Reporting and presenting findings from investigations in oral and written forms for display and other presentations. • Identify how scientific evidence has been used to support or discount ideas and arguments.
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Vocabulary

Solid, liquid, gas, compress, rigid, heat, cool, evaporation, condensation, melting, freezing, state of matter, particles, flow, do not flow, spread out, volume, property, characteristic, hardness, solubility, transparency, electric conductivity, thermal conductivity, durable, flexible, absorbent, waterproof, magnetic, permeable, transparent, stretchy, thermal insulator, properties, fair test, variables (independent, dependent, control), prediction, thermometer, degrees Celsius, soluble, insoluble, dissolve, material, saturated, solution, suspension, evaporation, agitation, separate/separation, materials, soluble/insoluble, magnetic, filter/filtering, sieve/sieving, evaporation, solids/liquids/gases, reversible/irreversible, separate/separation, chemical change, reversible, irreversible, heating/cooling, mixture.

Sequence of learning	Learning Objectives/Outcomes	Suggested lesson outline
1	<p>Learning Objective: I can compare and group materials together according to whether they are solids, liquids or gasses and name their properties.</p> <p>Key knowledge: Solids, liquids and gases are the three known states of matter. Many materials readily change between the three different states of matter.</p>	<p>Recap – Start this unit of work with the slightly more detailed pre-learning assessment task provided by the subject leader which allows for RAG rating of retention of knowledge about materials from the Year 2 units on types, properties and uses of materials.</p> <p>Solids, Liquids and Gases Solids stay in one place, keep their shape (rigid), do not flow and always take up the same amount of space. They can be cut or shaped. Liquids can flow or be poured easily, they are not easy to hold, they change their shape depending on the container but always take up the same amount of space (volume). Gases are often invisible, do not keep their and don't always take up the same amount of space. They spread out and fill up whatever container they are in. Gases can be squashed.</p> <p><i>Children record the names of the given solids, liquids and gases on a table to correctly identify which is which. Discussion can be had around unfamiliar materials. Secondly, in books, children</i></p>

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		<i>write a description for the three states of matter using the target vocabulary.</i>
2	<p>Learning Objective: 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.</p> <p>Key knowledge: Materials are grouped on the basis of well known properties which help us know how best to use them. These properties include hardness, solubility, transparency, and conductivity (electrical and thermal)</p>	<p>Recap - Explain to a partner what the words, solid, liquid and gas mean, then recap as a class. Focus on particles and how the particles interact with each other, to extend knowledge.</p> <p>Comparing and Grouping Refer to the pre-learning task from the start of the previous lesson. Start by naming as many materials as possible and link them to at least one accepted use. Consider a list of words (durable, flexible, absorbent, waterproof, magnetic, permeable, conductive, transparent, stretchy) that can be used to describe materials. Write a definition for each word. Once completed, children should have time to marry a material name and a use for that material to each word. This should lead the children to a better understanding of how materials compare with each other and how they can be grouped.</p> <p><i>Children record the names of as many materials as possible in their book and then link those materials to the descriptive words given. Children need to understand for example, we use bricks to build houses because they are strong, hard, , durable, impermeable and opaque. (Listing a number of properties which make things suitable)</i></p>
3	<p>Learning Objective: I can investigate the thermal insulation of different materials.</p> <p>Give reasons, based on evidence from comparative and fair tests, for the particular uses of every day materials, including metals, wood and plastic.</p> <p>Key knowledge: Thermal insulation is about either keeping things warm or keeping them cool – slowing down the transfer of heat energy. In investigation, we use</p>	<p>Recap - What properties can you think of to describe a metal like steel or iron?</p> <p>Thermal investigation Children select a question and then set about detailing how they will carry out the investigation in simple terms – using the correct terminology. (This could be teacher led if required). In a separate lesson if necessary, children carry out the investigation, recording their results in an appropriate way. A conclusion should be drawn based on the evidence and recorded in simple terms.</p> <p><i>Children write a plan, record their results and write a draw a conclusion based on the evidence.</i></p>

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	<p>the terms dependent, independent and control variables, and we talk about how the test is fair.</p>	
4	<p>Learning Objective: I can compare and group materials based on their response to magnets.</p> <p>Key knowledge: Magnetic forces act at a distance. Magnets are usually made from iron and have a north and south pole. Magnets can attract and repel. They can be different sizes, shapes and colours – it doesn't always follow that the largest magnet is the strongest.</p>	<p>Recap - What must a scientist know about the independent variable – it is the one thing we can change to keep a test fair.</p> <p>Magnets and magnetism Magnets are mostly made from iron or steel but can also be made from aluminium, copper, nickel and cobalt. Explore some magnet facts together – the Earth's magnetic field, bar magnets and compasses. Predict and then check which of a range of materials are magnetic – think back to forces in Y4. Use what you have learnt to help you design a game for Y1 which uses magnets. Discuss as a class which metals are magnetic and which are not.</p> <p><i>Children record their predictions and then actual results for checking if materials are magnetic or not. Children use this to design a game for Y1, listing suitable magnetic objects.</i></p>
5	<p>Learning Objective: I know that some materials will dissolve in liquid to form a solution, and I can describe how to recover a substance from a solution.</p> <p>Key knowledge: Some materials dissolve when you mix them with a liquid. When a material dissolves in water, it may look like it has disappeared, but it has just mixed to make a transparent liquid called a solution. When no more material can be dissolved into a liquid, we say it is saturated.</p>	<p>Recap - What magnetic materials can you remember? Can you name a material which would be good to insulate a hot drink?</p> <p>Dissolving and solutions When you add sugar to tea, the sugar does not disappear, we can taste it in the tea. The sugar has dissolved. Discuss how we can test if a range of materials dissolve in water (salt, sand, flour, sugar) Carry out a brief test to check the predictions we have made. Some dissolve and some are suspended (form a cloud in the water). Take a sugar and water mix. Ask how we could get the sugar back? Let the children discuss but lead them to evaporating the water if necessary. Saturate some water with sugar and set up a test to prove this works.</p> <p><i>Children record a range of materials and the time taken for it to dissolve in water. (Some will dissolve, and some will not). Children complete a matching activity for key vocabulary. Children make key definitions such as solution – soluble, insoluble, solution, suspension.</i></p>

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6	<p>Learning Objective: Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.</p> <p>Key Knowledge We can separate different materials in a variety of ways – filtering, sieving, evaporating, magnets. It depends on the what the mixed materials are as to which separation technique would be best?</p>	<p>Recap - What do these words mean? Dissolve, soluble, insoluble, solution and saturated.</p> <p>Separating materials Use ppt and or you tube to take the children through the various separation techniques shown to the left. Once they understand what these techniques would be used for provide them with small amounts of mixtures on tables, and ask them to indicate which separation technique they would use for each material mix or solution.</p> <p><i>Children record how each of the mixtures should be separated – whether by sieving, evaporating, filtering or magnets. Children record that many (but not all) changes made when materials are combined are reversible.</i></p>
7	<p>Learning Objective: 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.</p> <p>Key Knowledge: Some changes are not reversible, because new material has been formed which cannot be changed back.</p>	<p>Recap - Which method would be best to separate salt and water, paper clips and sugar, chocolate chips and flour, sand and water?</p> <p>Irreversible changes Work through some examples of cooking and mixing things like vinegar and bicarbonate of soda and show how these are irreversible – essentially, this is because something new is being created. Add burning to the list and demonstrate using safe techniques - stand and sand box - how a few different items burn, producing new materials.</p> <p><i>Children record their observations of the different mixtures of materials – so what happens when bicarb and vinegar are mixed, when an egg is cooked (could be poached in hot water) and when selected materials are burnt.</i></p>
8	<p>Learning objective: To demonstrate what has been learnt about materials and their properties.</p>	<p>ASSESSMENT LESSON</p> <p>Children will complete an assessment task, which could be summative, or it could be a quiz style assessment or written task which draws on the knowledge learnt.</p>

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Learning Outcome/product
During this unit of work, children will consolidate previous learning by revisiting the properties of solids, liquids and gases; learn to describe the properties of materials using scientific language; investigate which materials make the best thermal insulators; and which materials are magnetic. Children will be introduced to key scientific vocabulary to describe the properties of materials (e.g. soluble and insoluble) and investigate how to separate materials using these properties. They will be able to name separation methods (filtering, sieving, evaporation, magnets) and decide on the most efficient method for separating a mixture of materials. They will be able to describe change as reversible or irreversible.

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