



The Whinless Down Academy Trust
Progression in knowledge of Chemistry
(materials, rocks, states of matter and properties of materials)

Level Expected at the End of EYFS - We have selected the Early Learning Goals that link most closely to the Science National Curriculum

Early Learning Goal - Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes.

Knowledge - Objects are made from different **materials**. Materials are **wood, metal, glass, paper, brick, fabric, sand, plastic, rock**. Materials look and feel different (properties)

Vocabulary – Materials. **Types of materials:** wood, plastic, glass, metal, rock, brick, fabric, sand, paper.

Possible Misconceptions - Only fabrics are materials.

	National Curriculum	Knowledge	Vocabulary
Year 1	Children can distinguish between an object and the material from which it is made. Children can identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. Children can describe the simple physical properties of a variety of everyday materials. Children can compare and group together a variety of everyday materials on the basis of their simple physical properties.	Objects all around us are made out of something that has come from somewhere. Wood comes from trees. Paper and card come from trees. Trees are chopped down and turned into things. Metal comes from rocks from underground. Rocks are heated to get the metal out of them. Plastic is made from oil and other things. It can be made in lots of different colours. Glass is made from sand and other things. It can be made in different colours. Glass can be sharp if broken and could injure us. Not all objects feel the same or look the same. We can use shiny/dull, soft/hard, rough/smooth to describe how objects feel or look. Materials can be grouped.	Types of materials: wood, plastic, glass, metal, rock, brick, fabric, sand, paper, Properties of materials: hard/soft, stretchy/not stretchy, shiny/dull, rough/smooth, bendy/not bendy, Verbs associated with materials: bend, stretch, twist Senses: touch, see, hear, smell and taste
Possible misconceptions: Only fabrics are materials. Only building materials are materials. Only writing materials are materials. The word 'rock' describes an object rather than a material. Sand is small bits of glass.			
Year 2	Children can identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. Children can find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	The shapes of solid objects can be changed by squashing, bending, twisting and stretching . The feel of a material is its texture . People choose materials because of their properties . Wood is strong, stiff and hard . A plastic bag is bendy, smooth and stretchy Glass is transparent (clear), hard, smooth and waterproof . Brick is rough, strong, opaque and dull . Paper is translucent, flexible and not waterproof Cardboard is rough, dull, opaque and not waterproof . Tinfoil is shiny, bendy, waterproof and opaque .	Types of materials: wood, plastic, glass, metal, water, rock, brick, fabric, sand, paper, flour, butter, milk, Properties of materials: hard/soft, stretchy/not stretchy, shiny/dull, texture, rough/smooth, bendy/not bendy, transparent (clear)/not transparent, sticky/not sticky Verbs associated with materials: crumble, squash, bend, stretch, twist



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		Some materials can have their shape changed by bending, twisting, squashing and stretching . We call these materials flexible .	Senses: touch, see, hear, smell and taste
Possible misconceptions: 'Solid' is another word for hard. Only fabrics are materials. Only building materials are materials. Only writing materials are materials.			
Year 3	Children can compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. Children can describe in simple terms how fossils are formed when things that have lived are trapped within rock. Children can notice that some forces need contact between two objects, but magnetic forces can act at a distance.	Rocks are formed in 3 different ways. Igneous rocks are formed when molten magma from a volcano cools down. Igneous rocks are very hard, dark and heavy. They may contain crystals or holes . Sedimentary rocks are formed when small pieces of bones, shells of animals or other bits of rock are pressed into layers over many millions of years. They often contain fossils . Sedimentary rocks are light in weight and colour. They are crumbly with round grains and are formed in layers. A fossil is any preserved sign of past life more than 10,000 years old. Metamorphic rocks are formed when sedimentary rocks are changed by heat or pressure . Metamorphic rocks have light and dark bands. They may contain a few fossils. They have large grains. Fossils are often made when an animal or plant dies in watery environment and is buried in mud. The soft tissue rots away. Rocks break up over time and become soil . There are layers of soil . Hardness is the most important property for classifying rocks. Some materials are magnetic.	Names of rocks – Chalk, limestone, granite, basalt, sandstone, flint, slate, shale, marble Types of rock – Sedimentary, metamorphic, igneous Properties of rocks – Hard/soft , permeable/impermeable Processes – Heat, pressure, erosion, transportation, deposition, melt, solidify Size of rocks – Grain, pebbles Rock describing words – Crystals, layers Land formations – Plates, volcanoes, mountains, valleys
Possible misconceptions: Rocks are all hard in nature. Rock-like, man-made substances such as concrete or brick are rocks. Materials which have been polished or shaped for use, such as a granite worktop, are not rocks as they are no longer 'natural'. Certain found artefacts, like old bits of pottery or coins, are fossils. A fossil is an actual piece of the extinct animal or plant. Soil and compost are the same thing.			
Year 4	Children can compare and group materials together, according to whether they are solids, liquids or gases. Children 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). Children can identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	Materials can exist in different states: Solids - have a definite shape and a fixed volume. It remains the same unless a force is acting upon it. Liquids - have no fixed shape but a fixed volume and takes on the shape of its container. Gas - no fixed shape or volume and will always spread out to fill the container that it is in. Melting is a change of state from solid to liquid at a specific temperature.	States of matter - solid, liquid and gas, oxygen, helium, carbon dioxide, methane. Water , milk, juice, oil, wood, rocks, metal, plastic, glass , wool, leather, Processes – Melting , condenses, condensation, evaporates, evaporation, solidifying, freezing



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		<p>We use a thermometer to measure the temperature of materials. We measure the temperature in degrees Celsius (°C).</p> <p>Freezing is a state change from liquid to solid at a specific temperature.</p> <p>Boiling is a state change from liquid to gas at a specific temperature.</p> <p>Condensation is a state change from gas to liquid at a specific temperature.</p> <p>Evaporation is a state change from liquid to gas but happens over time.</p> <p>Water Cycle:</p> <p>Water is constantly moving on Earth. It is recycled over and over again. This process is called the water cycle.</p> <p>Water evaporates into the air. The sun heats up water on land, in rivers, lakes and seas and turns it into water vapour. The water vapour rises into the air. This is called evaporation. The hotter the temperature the quicker water will evaporate.</p> <p>Water vapour in the air cools down and changes back into tiny drops of liquid water, forming clouds. This is called condensation.</p> <p>The clouds get heavy and water falls back to the ground in the form of rain, sleet, hail or snow. This is called precipitation.</p> <p>Rain water runs over the land and collect in lakes or river, which take it back to the sea. The cycle starts all over again.</p>	<p>Water cycle -water vapour, steam, heating , cooling, precipitation</p>
<p>Possible misconceptions:</p> <p>'Solid' is another word for hard or opaque.</p> <p>Solids are hard and cannot break or change shape easily and are often in one piece.</p> <p>Substances made of very small particles like sugar or sand cannot be solids.</p> <p>Particles in liquids are further apart than in solids and they take up more space.</p> <p>When air is pumped into balloons, they become lighter.</p> <p>Water in different forms – steam, water, ice – are all different substances</p>			
Year 5	<p>Children 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.</p> <p>Children know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.</p> <p>Children can use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.</p> <p>Children can give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.</p> <p>Children can demonstrate that dissolving, mixing and changes of state are reversible changes.</p>	<p>Materials can be compared by properties such as their:</p> <ul style="list-style-type: none"> • Hardness • Solubility • Transparency • Electrical conductivity • Thermal conductivity • Response to magnets <p>The properties of materials makes them suitable for different purposes.</p> <p>Transparency - how much you can see through a material. Electrical conductivity - how much electricity can pass through a material.</p> <p>Thermal conductivity - how much heat can pass through a material. Materials that transfer heat easily are called thermal conductors. Materials that do not transfer heat easily are called thermal insulators.</p> <p>Magnetism is whether an object is attracted to magnets or not. Hardness is how hard or soft a material is.</p> <p>Absorbency is how much liquid a solid material can hold.</p>	<p>Thermal conductivity – thermal conductor, thermal insulator</p> <p>Electrical conductivity – electrical conductor, electrical insulator</p> <p>Dissolving – Solvent, mixture, solution, solute, soluble, insoluble, solid, liquid, particles, suspensions</p> <p>Separating materials – Sieve, filter, evaporate, condense</p>



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		<p>Materials that can be used in a working electrical circuit are known as electrical conductors. All metals can conduct electricity. Electrical insulators do not conduct electricity.</p> <p>Some materials dissolve in liquids to create a mixture. We call these soluble materials. The liquid is called a solvent, the material is called a solute and the new mixture is called a solution.</p> <p>A mixture is created when two or more materials are combined.</p> <p>Mixtures can be separated by filtering, sieving or evaporation.</p> <p>A mixture of different solid particles can be separated using a sieve. An insoluble solid can be separated from a liquid when passed through a filter. The liquid can pass through the filter whilst the solid particles are trapped in the filter.</p> <p>A reversible change is a change that can be changed back again. Melting and heating are examples of reversible changes. An irreversible change is a change that cannot be changed back again.</p>	
<p>Possible misconceptions:</p> <p>Thermal insulators keep cold in or out.</p> <p>Thermal insulators warm things up.</p> <p>Solids dissolved in liquids have vanished and so you cannot get them back.</p> <p>Lit candles only melt, which is a reversible change.</p>			
Year 6	<p>Evolution and Inheritance</p> <p>Children can recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.</p>	<p>Living things have changed over time. Our evidence for this comes from fossils.</p>	<p>fossils</p>
<p>Possible misconceptions:</p>			

Previously taught – Remains Key Vocabulary, Revisit

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