Properties of Materials

Science Capital:

Become a chemist or geologist, research into ways of using magnets to create perpetual motion generator, use magnets to improve green technologies such as harnessing solar power, recharging batteries, soldering toys together etc, research into sustainable materials,

National Curriculum Objectives:

Foundation 1	Foundation 2	Year 1 and 2	Year 3 and 4	Year 5 and 6
		Year 1: • distinguish between an object and the material from which it is made • identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock • describe the simple physical properties of a variety of everyday materials • compare and group together a variety of everyday materials on the basis of their simple physical properties. **Year 2:** • identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock,	**Year 3:** (Rocks) • compare and group together different kinds of rocks on the basis of their appearance and simple physical properties • describe in simple terms how fossils are formed when things that have lived are trapped within rock • recognise that soils are made from rocks and organic matter (Magnets) • notice that some forces need contact between two objects, but magnetic forces can act at a distance • observe how magnets attract or repel each	**Year 5** • 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 • 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

		paper and cardboard for particular uses • find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching	other and attract some materials and not others • compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic material • describe magnets as having two poles • predict whether two magnets will attract or repel each other, depending on which poles are facing **Year 4:** • 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	comparative and fair tests, for the particular uses of everyday 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

	**Year 1 – properties of everyday objects and materials** SC1.1 know the difference between an object and the material from which it is made SC1.2 know and name a variety of everyday materials, including wood, plastic, glass, metal, water, rock and more SC1.3 know the simple properties (e.g. hard, soft, stretchy, stiff, waterproof, not waterproof, opaque, transparent) of a variety of everyday materials SC1.4 know a variety of everyday materials and compare and group them together on the basis of their simple physical properties	**Key scientist** **Coming soon…**

Prior Learning	**Future learning**
• Use all their senses in hands-on exploration of natural materials. (Nursery - Materials, including changing materials) • Explore collections of materials with similar and/or different properties. (Nursery - Materials, including changing materials) • Talk about the differences between materials and changes they notice. (Nursery - Materials, including changing materials)	• Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Y2 – Properties of materials) • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 - Properties of materials)

Linked texts

Coming soon…

What pupils need to know or do to be secure

Show understanding of a concept using scientific vocabulary correctly

Key Learning

All objects are made of one or more materials. Some objects can be made from different materials e.g. plastic, metal or wooden spoons. Explore different everyday objects and name the materials that they are made from. See vocabulary for a list of materials.

Materials can be described by their properties e.g. shiny, stretchy, rough etc. Some materials e.g. plastic can be in different forms with very different properties. Learn to describe different every day materials using their simple properties. See vocabulary for a list of adjectives.

Possible Evidence to support teacher assessment

- Can label a picture or diagram of an object made from different materials
- Can describe the properties of different materials

Key Vocabulary

Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see-through, not see-through

Common misconceptions

Some children may think:

- only fabrics are materials
- only building or writing materials are materials
- the word 'rock' describes an object rather than a material
- 'solid' is another word for hard.

Apply knowledge in familiar related contexts

Line of Enquiry - Classification

- Classify objects made of one material in different ways e.g. a group of objects made of metal.
- Classify in different ways one type of object made from a range of materials e.g. a collection of spoons made of different materials.
- Classify materials based on their properties.
- Fair test the properties of objects e.g. absorbency of cloths, strength of party hats made of different papers, stiffness of paper plates, waterproofness of shelters.

Possible Evidence to support teacher assessment

- Can sort objects and materials using a range of properties
- Can choose an appropriate method for testing an object for a particular property
- Can use their test evidence to answer the questions about properties e.g. "Which cloth is the most absorbent?"

Equipment

Coming soon…

	**Year 2 – uses of everyday materials** SC2.1 know how materials can be changed by squashing, bending, twisting and stretching SC2.2 know and compare the suitability of a variety of everyday materials including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses	**Key scientist** **Coming soon…**

Prior Learning	**Future learning**
• Distinguish between an object and the material from which it is made. (Y1 – Properties of materials) • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (Y1 - Properties of materials) • Describe the simple physical properties of a variety of everyday materials. (Y1 - Properties of materials) • Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y1 - Properties of materials)	• Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. (Y3 – Properties of materials) • Notice that some forces need contact between two objects, but magnetic forces can act at a distance. (Y3 – Properties of materials) • 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. (Y5 - Properties of materials) • Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. (Y5 - Properties of materials)

Linked texts

Coming soon…

What pupils need to know or do to be secure

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Key Learning

All objects are made of one or more materials that are chosen specifically because they have suitable properties for the task. For example, a water bottle is made of plastic because it is transparent allowing you to see the drink inside and waterproof so that it holds the water.

When choosing what to make an object from, the properties needed are compared with the properties of the possible materials, identified through simple tests and classifying activities.

A material can be suitable for different purposes and an object can be made of different materials.

Objects made of some materials can be changed in shape by bending, stretching, squashing and twisting. For example, clay can be shaped by squashing, stretching, rolling, pressing etc. This can be a property of the material or depend on how the material has been processed e.g. thickness.

Possible Evidence to support teacher assessment

Can name an object, say what material it is made from, identify its properties and make a link between the properties and a particular use

Can label a picture or diagram of an object made from different materials

For a given object can identify what properties a suitable material needs to have

Key Vocabulary

Names of materials – wood, metal, plastic, glass, brick, rock, paper, cardboard
Properties of materials – as for Year 1 plus opaque, transparent and translucent, reflective, non-reflective, flexible, rigid
Shape - push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching

Common misconceptions

Some children may think:
- only fabrics are materials
- only building and writing materials are materials
- the word rock describes an object rather than a material
- solid is another word for hard.

Apply knowledge in familiar related contexts

Line of Enquiry - Classification

- Classify materials.
- Make suggestions about alternative materials for a purpose that are both suitable and unsuitable
- Test the properties of materials for particular uses e.g. compare the stretchiness of fabrics to select the most appropriate for Elastigirl's

Possible Evidence to support teacher assessment

- Can sort materials using a range of properties
- Can explain using the key properties why a material is suitable or not suitable for a purpose
- Can begin to choose an appropriate method for testing a material for a particular property

costume, test materials for waterproofness to select the most appropriate for a rain hat	• Can use their test evidence to select appropriate material for a purpose e.g. Which material is the best for a rain hat?
Equipment **Coming soon…**	



Year 3 - Rocks

SC3.1 know how to compare and group rocks based on their appearance and physical properties
SC3.2 know in simple terms how fossils are formed when things that have lived are trapped within rocks
SC3.3 know that soils are made from rocks and organic matter

Key scientist

Coming soon…

Prior Learning	Future learning
• Distinguish between an object and the material from which it is made. (Y1 – Properties of materials) • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (Y1 - Properties of materials) • Describe the simple physical properties of a variety of everyday materials. (Y1 - Properties of materials) • Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y1 - Properties of materials) • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Y2 - Properties of materials)	• Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. (Y6 - Evolution and inheritance) • The composition of the Earth. (KS3) • The structure of the Earth. (KS3) • The rock cycle and the formation of igneous, sedimentary and metamorphic rocks. (KS3)

Linked texts

Coming soon…

What pupils need to know or do to be secure

Show understanding of a concept using scientific vocabulary correctly

Key Learning

Rock is a naturally occurring material. There are different types of rock e.g. sandstone, limestone, slate, marble, granite, chalk which have different properties.

Rocks can be hard (durable) or soft. They have different sizes of grain or crystal. They may absorb water(permeable). Rocks can be different shapes and sizes (stones, pebbles, boulders). Rocks can be dense and sink or not dense and float.

Soils are made up of pieces of ground down rock which may be mixed with plant and animal material (organic matter). The type of rock, size of rock pieces and the amount of organic matter affect the property of the soil.

Some rocks contain fossils. Fossils were formed millions of years ago. When plants and animals died, they fell to the seabed. They became covered and squashed by other material. Over time the dissolving animal and plant matter is replaced by minerals from the water.

Possible Evidence to support teacher assessment

- Can name some types of rock and give physical features of each
- Can explain how a fossil is formed
- Can explain that soils are made from rocks and also contain living/dead matter

Key Vocabulary

rock, stone, pebble, boulder, grain, crystals, layers, hard, durable, soft, texture, absorb water, permeable, fossil, bone, flesh, minerals, marble, chalk, granite, sandstone, slate, limestone, soil, types of soil (e.g. peaty, sandy, chalk, clay), organic material

Common misconceptions

Some children may think:

- 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.

Apply knowledge in familiar related contexts	
Line of Enquiry – Classification • Observe rocks closely. • Classify rocks in a range of ways, based on their appearance. • Devise a test to investigate the hardness of a range of rocks. • Devise a test to investigate how much water different rocks absorb. • Observe how rocks change over time e.g. gravestones or old building. • Research using secondary sources how fossils are formed. • Observe soils closely. • Classify soils in a range of ways based on their appearance. • Devise a test to investigate the water retention of soils. • Observe how soil can be separated through sedimentation. • Research the work of Mary Anning.	**Possible Evidence to support teacher assessment** • Can classify rocks in a range of different ways, using appropriate vocabulary • Can devise tests to explore the properties of rocks and use data to rank the rocks • Can link rocks changing over time with their properties e.g. soft rocks get worn away more easily • Can present in different ways their understanding of how fossils are formed e.g. in role play, comic strip, chronological report, stop-go animation etc. • Can identify plant/animal matter and rocks in samples of soil • Can devise a test to explore the water retention of soils
Equipment **Coming soon…**	

	**Year 3 - Magnets** SP3.2 know that some forces need contact between two objects, but magnetic forces can act at a distance SP3.3 know that magnets attract and repel each other and attract some materials and not others SP3.4 know how to compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials SP3.5 know that magnets have two poles SP3.6 know how to predict whether two magnets will attract or repel each other, depending on which poles are facing	**Key scientist** **Coming soon…**

Prior Learning	Future learning
• Explore how things work. (Nursery – Forces) • Explore and talk about different forces they can feel. (Nursery – Forces) • Talk about the differences between materials and changes they notice. (Nursery – Forces) • Explore the natural world around them. (Reception – Forces) • Describe what they see, hear and feel whilst outside. (Reception – Forces) • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 - Uses of everyday materials)	• Magnetic fields by plotting with compass, representation by field lines. (KS3) • Earth's magnetism, compass and navigation. (KS3)

Linked texts

Coming soon…

What pupils need to know or do to be secure

Show understanding of a concept using scientific vocabulary correctly

Key Learning

A magnet attracts magnetic material. Iron and nickel and other materials containing these, e.g. stainless steel, are magnetic.

The strongest parts of a magnet are the poles. Magnets have two poles – a north pole and a south pole. If two like poles, e.g. two north poles, are brought together they will push away from each other – repel. If two unlike poles, e.g. a north and south, are brought together they will pull together – attract.

For some forces to act, there must be contact e.g. a hand opening a door, the wind pushing the trees. Some forces can act at a distance e.g. magnetism. The magnet does not need to touch the object that it attracts.

Possible Evidence to support teacher assessment

- Can name a range of types of magnets and show how the poles attract and repel
- Can draw diagrams using arrows to show the attraction and repulsion between the poles of magnets

Key Vocabulary

non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole

Common misconceptions

Some children may think:
- the bigger the magnet the stronger it is
- all metals are magnetic.

Apply knowledge in familiar related contexts

Line of Enquiry – Classification

- Explore what materials are attracted to a magnet.
- Classify materials according to whether they are magnetic.
- Explore the way that magnets behave in relation to each other.
- Use a marked magnet to find the unmarked poles on other types of magnets.
- Explore how magnets work at a distance e.g. through the table, in water, jumping paper clips up off the table.
- Devise an investigation to test the strength of magnets.

Possible Evidence to support teacher assessment

- Can use classification evidence to identify that some metals, but not all, are magnetic
- Through their exploration, they can show how like poles repel and unlike poles attract, and name unmarked poles
- Can use test data to rank magnets

Equipment **Coming soon…**	



Year 4 – States of Matter

SC4.1 know how to compare and group materials together according to whether they are solids, liquids or gases
SC4.2 know that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens (°C)
SC4.3 know the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature

Key scientist

Coming soon…

Prior Learning	Future learning
• Distinguish between an object and the material from which it is made. (Y1 – Properties of materials) • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (Y1 - Properties of materials) • Describe the simple physical properties of a variety of everyday materials. (Y1 - Properties of materials) • Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y1 - Properties of materials) • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Y2 - Properties of materials) • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 - Properties of materials)	• 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. (Y5 - Properties of materials) • Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. (Y5 - Properties of materials) • Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. (Y5 - Properties of materials) • Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. (Y5 - Properties of materials) • Demonstrate that dissolving, mixing and changes of state are reversible changes. (Y5 - Properties of materials) • 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. (Y5 - Properties of materials)

Linked texts

Coming soon…

What pupils need to know or do to be secure

Show understanding of a concept using scientific vocabulary correctly

Key Learning

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, but when poured they form a heap and they do not keep a level surface when tipped. 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 0oC. 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 100oC. 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.

Possible Evidence to support teacher assessment

- Can create a concept map, including arrows linking the key vocabulary
- Can name properties of solids, liquids and gases
- Can give everyday examples of melting and freezing
- Can give everyday examples of evaporation and condensation
- Can describe the water cycle

Key Vocabulary

Common misconceptions

solid, liquid, gas, heating, cooling, state change, melting, freezing, melting point, boiling, boiling point, evaporation, condensation, temperature, water cycle	• 'solid' is another word for hard or opaque • solids are hard and cannot break or change shape easily and are often in one piece • substances made of very small particles like sugar or sand cannot be solids • particles in liquids are further apart than in solids and they take up more space • when air is pumped into balloons, they become lighter • water in different forms – steam, water, ice – are all different substances • all liquids boil at the same temperature as water (100 degrees) • melting, as a change of state, is the same as dissolving • steam is visible water vapour (only the condensing water droplets can be seen) • clouds are made of water vapour or steam • the substance on windows etc. is condensation rather than water • the changing states of water (illustrated by the water cycle) are irreversible • evaporating or boiling water makes it vanish • evaporation is when the Sun sucks up the water, or when water is absorbed into a surface/material.
Apply knowledge in familiar related contexts	
Line of Enquiry – Observe over time	**Possible Evidence to support teacher assessment**
• Observe closely and classify a range of solids. Observe closely and classify a range of liquids. • Explore making gases visible e.g. squeezing sponges under water to see bubbles, and showing their effect e.g. using straws to blow objects, trees moving in the wind. • Classify materials according to whether they are solids, liquids and gases. • Observe a range of materials melting e.g. ice, chocolate, butter. • Investigate how to melt ice more quickly. • Observe the changes when making rocky road cakes or ice-cream.	Can give reasons to justify why something is a solid liquid or gas • Can give examples of things that melt/freeze and how their melting points vary • From their observations, can give the melting points of some materials • Using their data, can explain what affects how quickly a solid melts • Can measure temperatures using a thermometer • Can explain why there is condensation on the inside the hot water cup but on the outside of the icy water cup

• Investigate the melting point of different materials e.g. ice, margarine, butter and chocolate. • Explore freezing different liquids e.g. tomato ketchup, oil, shampoo. • Use a thermometer to measure temperatures e.g. icy water (melting), tap water, hot water, boiling water (demonstration). • Observe water evaporating and condensing e.g. on cups of icy water and hot water. • Set up investigations to explore changing the rate of evaporation e.g. washing, puddles, handprints on paper towels, liquids in containers. • Use secondary sources to find out about the water cycle.	• From their data, can explain how to speed up or slow down evaporation • Can present their learning about the water cycle in a range of ways e.g. diagrams, explanation text, story of a water droplet
Equipment **Coming soon…**	



Year 5 – Properties of Materials

SC5.1 know how to compare and group together everyday materials on the basis of their properties (e.g. hardness, solubility, transparency, conductivity, [electrical & thermal], and response to magnets)
SC5.2 know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
SC5.3 know how mixtures might be separated using knowledge of solids, liquids and gas, including through filtering, sieving and evaporating
SC5.4 know the particular uses of everyday materials including metal, wood and plastic, based on evidence from comparative and fair tests
SC5.5 know that dissolving, mixing and changes of state are reversible changes through investigation
SC5.6 know 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 soda

Key scientist

Coming soon…

Prior Learning	Future learning
• Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Y2 – Properties of materials) • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 - Properties of materials) • Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. (Y3 - Properties of materials) • Compare and group materials together, according to whether they are solids, liquids or gases. (Y4 - Properties of materials) • 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). (Y4 - Properties of materials)	• Chemical reactions as the rearrangement of atoms. (KS3) • Representing chemical reactions using formulae and using equations. (KS3) • Combustion, thermal decomposition, oxidation and displacement reactions. (KS3) • Defining acids and alkalis in terms of neutralisation reactions. (KS3) • The pH scale for measuring acidity/alkalinity; and indicators. (KS3)

• Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. (Y4 - States of matter)	

Linked texts

Coming soon…

What pupils need to know or do to be secure

Show understanding of a concept using scientific vocabulary correctly

Key Learning	Possible Evidence to support teacher assessment
Materials have different uses depending on their properties and state (liquid, solid, gas). Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets. Some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment. Mixtures can be separated by filtering, sieving and evaporation. Some changes to materials such as dissolving, mixing and changes of state are reversible, but some changes such as burning wood, rusting and mixing vinegar with bicarbonate of soda result in the formation of new materials and these are not reversible.	• Can use understanding of properties to explain everyday uses of materials, for example, how bricks, wood, glass and metals are used in buildings • Can explain what dissolving means, giving examples • Can name equipment used for filtering and sieving • Can use knowledge of liquids, gases and solids to suggest how materials can be recovered from solutions or mixtures by evaporation, filtering or sieving • Can describe some simple reversible and non-reversible changes to materials, giving examples
Key Vocabulary	**Common misconceptions**
Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material	Lots of misconceptions exist around reversible and irreversible changes, including around the permanence or impermanence of the change. There is confusion between physical/chemical changes and

	reversible and irreversible changes. They do not correlate simply. Chemical changes result in a new material being formed. These are mostly irreversible. Physical changes are often reversible but may be permanent. These do not result in new materials e.g. cutting a loaf of bread. It is still bread, but it is no longer a loaf. The shape, but not the material, has been changed. Some children may think: • thermal insulators keep cold in or out • thermal insulators warm things up • solids dissolved in liquids have vanished and so you cannot get them back • lit candles only melt, which is a reversible change.
Apply knowledge in familiar related contexts	
Line of Enquiry – Fair test • Investigate the properties of different materials in order to recommend materials for particular functions depending on these properties e.g. test waterproofness and thermal insulation to identify a suitable fabric for a coat. • Explore adding a range of solids to water and other liquids e.g. cooking oil, as appropriate. • Investigate rates of dissolving by carrying out comparative and fair test. • Separate mixtures by sieving, filtering and evaporation, choosing the most suitable method and equipment for each mixture. • Explore a range of non-reversible changes e.g. rusting, adding fizzy tablets to water, burning. • Carry out comparative and fair tests involving non-reversible changes e.g. What affects the rate of rusting? What affects the amount of gas produced? • Research new materials produced by chemists e.g. Spencer Silver (glue of sticky notes) and Ruth Benerito (wrinkle free cotton).	**Possible Evidence to support teacher assessment** • Can create a chart or table grouping/comparing everyday materials by different properties • Can use test evidence gathered about different properties to suggest an appropriate material for a particular purpose • Can group solids based on their observations when mixing them with water • Can give reasons for choice of equipment and methods to separate a given solution or mixture such as salt or sand in water • Can explain the results from their investigations

Equipment **Coming soon…**	