

AJS Science Overview - Spring

| Key Stage | Year Group | Topic Name | Key Questions | Sticky Knowledge | Key investigations/ activities | Where does this fit into the National Curriculum? |
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| Lower KS2 | Year 3 | Rocks | <p>What are rocks and where are they found?</p> <p>How can rocks be grouped?</p> <p>What is a fossil?</p> <p>How is soil formed?</p> <p>What is soil made up of?</p> <p>Why do you think worms are important to the creation of soil?</p> | <p>Rocks can be natural/ human made.</p> <p>There are different types of rock. There are different types of soil.</p> <p>There are three types of naturally occurring rocks: Igneous, sedimentary and metamorphic.</p> <p>Rocks have different properties: hard, soft, permeable, impermeable, durable (meaning resistant to weathering), high density, low density. Density measures how 'bulky' the rock is (how tightly packed the molecules are).</p> <p>Fossils tell us and provide evidence for what has happened before.</p> <p>Soil is the uppermost layer of the Earth. It is a mixture of different things: minerals; air; water; organic matter (including living and dead plants and animals).</p> | <p>Name different types of rock Sort rocks into natural and man-made Observe and describe properties of rocks.</p> <p>Make scientific observations and drawings using magnifying glass</p> <p>Test the hardness of rocks.</p> <p>Look at ways of sorting rocks.</p> <p>Observe and sketch variety of fossils</p> <p>Describe in simple terms how fossils are formed.</p> <p>Observe and describe properties of soil.</p> <p>Observe the effect of mixing soil with water and how it separates.</p> <p>Explain how soil is formed from rock and organic matter</p> | <p>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.</p> <p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock.</p> <p>Recognise that soils are made from rocks and organic matter</p> |

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| | | <p>States of Matter</p> | <p>Can you group these materials and objects into solids, liquids, and gases?</p> | <p>Materials can be divided into solids, liquids and gases.</p> <p>Solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container</p> <p>When water and other liquids reach a certain temperature, they change state into a solid or a gas.</p> <p>Evaporation occurs when water turns into water vapour</p> <p>Condensation is when water vapour is cooled down and turns into water.</p> <p>Condensation and evaporation occur within the water cycle.</p> <p>If a solid is heated to its melting point, it melts and changes to a liquid.</p> <p>When freezing occurs, the particles in the liquid begin to slow down as they get colder and colder. They can then only move gently on the spot, giving them a solid structure.</p> <p>Changing state is a reversible change.</p> | <p>Observe water as a solid, a liquid and a gas</p> <p>Explore a variety of everyday materials and develop simple descriptions of the states of matter</p> <p>Understand particles in a Solid, liquid and gas (practically using bodies as particles in classroom/hall and diagrams)</p> <p>Observe and record evaporation over time.</p> <p>Draw the Water Cycle and use the following words to label it; evaporation, precipitation, condensation, transpiration.</p> <p>Observe and describe the effect of heating and cooling (temperature) water, chocolate, butter, cream etc.</p> | <p>Compare and group materials together, according to whether they are solids, liquids or gases</p> <p>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)</p> <p>identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</p> |
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| Lower KS2 | Year 4 | Rocks | <p>How are igneous and sedimentary rocks formed?</p> <p>Why are certain rocks used for certain purposes?</p> <p>How are fossils formed?</p> <p>Why are fossils often found near the sea?</p> <p>Are all soils the same?</p> <p>How does the composition of soil affect how quickly water drains through it?</p> <p>How are the soils different? Which do you think has best drainage? Which is more likely to lead to flooding?</p> | <p>Igneous rock is formed from magma or lava.</p> <p>Sedimentary rock is formed by layers of sediment being pressed down.</p> <p>Metamorphic rock started out as igneous or sedimentary rock but changed due to being exposed to extreme heat or pressure.</p> <p>Palaeontologists use Fossils to find out about the past.</p> <p>Fossils provide evidence that living things have changed over time.</p> <p>Soils are made from rocks and organic matter.</p> <p>Soils change over time.</p> <p>Different plants grow in different soils.</p> | <p>Observe and describe the properties of igneous, sedimentary and metamorphic rocks.</p> <p>Illustrate/ understand how igneous/ sedimentary rocks are formed</p> <p>Explain the main differences.</p> <p>Compare and contrast properties of different rocks (acid test, density, changes in water)</p> <p>Group rocks based on results from investigations</p> <p>Describe/illustrate/model how a fossil is formed.</p> <p>Observe and describe a variety of different soils.</p> <p>Investigate the drainage of soil. (How does adding different amounts of sand to soil affect how quickly water drains through it? Which soil absorbs the most water?)</p> | <p>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.</p> <p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock.</p> <p>Recognise that soils are made from rocks and organic matter</p> |
| | | States of matter | <p>Sand can be poured so is it a liquid?</p> <p>How does the surface area of water affect how long it takes to evaporate?</p> | <p>Solids, liquids and gases are described by observable properties.</p> <p>Solids keep their shape unless a force is applied to them. They can be hard, soft or even squashy.</p> <p>Solids take up the same amount</p> | <p>Group materials into solids, liquids and gases (Extension from Year 3- include more challenging materials/ discussion e.g. sand, flour, set jelly, shaving foam)</p> <p>Research the temperature at which materials change state, for example,</p> | <p>Compare and group materials together, according to whether they are solids, liquids or gases</p> <p>Observe that some materials change state when they are heated or</p> |

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| | | | <p>Does seawater evaporate faster than fresh water?</p> <p>How does the mass of a block of ice affect how long it takes to melt?</p> | <p>of space no matter what has happened to them.</p> <p>Liquids take the shape of their container. They can change shape but do not change the amount of space they take.</p> <p>Gases can spread out to completely fill the container or room they are in. They do not have any fixed shape but they do have a mass.</p> <p>Heating causes solids to melt into liquids and liquids evaporate into gases. Cooling causes gases to condense into liquids and liquids to freeze into solids.</p> <p>Some materials can change from one state to another and back again. Changing state is a reversible change.</p> <p>The temperature at which given substances change state are always the same.</p> | <p>when iron melts or when oxygen condenses into a liquid.</p> <p>Investigate the rate of evaporation (temperature, surface area, salt content)</p> <p>Graph the relationship between temperature and evaporation</p> <p>Suggest practical uses for relationship between temperature and evaporation.</p> <p>Investigate the effect temperature/ size/ adding material (salt) has on ice (snowman) melting.</p> | <p>cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</p> |
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| Upper KS2 | Year 5 | Properties of materials | <p>How can materials be grouped?</p> <p>What is a conductor/ insulator?</p> <p>What is the best material for insulating a hot/cold drink?</p> | <p>Different materials are used for particular jobs based on their properties: electrical conductivity, flexibility, hardness, insulators, magnetism, solubility, thermal conductivity, transparency</p> <p>A transparent object lets light through so the object can be looked through, for example glass or some plastics.</p> <p>A conductor is a material that heat can easily travel through. Most metals are both thermal conductors.</p> <p>An insulator is a material that does not let heat travel through them. Wood and plastic are both thermal insulators.</p> | <p>Observe and describe materials on the basis of hardness, response to magnets, thermal insulation, and transparency.</p> <p>Identify the materials that different objects are made from and explain why they have been chosen with reference to their physical properties.</p> <p>Investigate variety of materials on insulation properties (thermal) e.g. best material for keeping hot chocolate warm/ lunch cool.</p> <p>Investigate the uses of plastic and why objects are made from plastic</p> <p>Investigate environmental impact of single use plastics.</p> | <p>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>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</p> |
| | | Changes of Materials | <p>What is dissolving?</p> <p>How does the amount of water used affect how much sugar will dissolve in it?</p> <p>How do chemical changes have an impact on our lives?</p> | <p>Dissolving is solution is made when solid particles are mixed with liquid particles.</p> <p>When two or more substances are mixed and remain present the mixture can be separated.</p> | <p>Investigate/ observe soluble/ insoluble materials</p> <p><i>Does 'x' dissolve when I mix it with water?</i></p> <p>Draw diagrams of particles in a solution</p> <p>How does the amount of water used affect how much sugar will dissolve in it?</p> | <p>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</p> <p>Use knowledge of solids, liquids and gases to decide how mixtures might be</p> |

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| | | | <p>Have we made a new substance?</p> | <p>Sieving- Smaller materials are able to fall through the holes in the sieve, separating them from larger particles.</p> <p>Filtering- The solid particles will get caught in the filter paper but the liquid will be able to get through</p> <p>Evaporation- The liquid changes into a gas, leaving the solid particles behind.</p> <p>Materials change state by heating and cooling</p> <p>Reversible (physical) changes do not produce a new substance or change the amount of substance.</p> <p>The differences between heating, melting and burning, including: Melting is a change in state and is usually reversible. Burning is a chemical change and is not usually reversible. Heating is a change in temperature and is usually reversible.</p> | <p>Observe a solution that is saturated.</p> <p>Observe and describe how items may be separated through filtering, sieving and evaporation.</p> <p>Observe and describe a variety of irreversible changes.</p> <p>Describe changes as reversible/irreversible.</p> <p>How does the amount of bicarbonate of soda, washing up liquid and vinegar affect the reaction?</p> <p>Observe and compare the changes that take place when burning different materials.</p> <p>Investigate 'Does a candle burn longer in a bigger beaker?'</p> <p>Find out about how chemists create new materials, for example, Spencer Silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton.</p> | <p>separated, including through filtering, sieving and evaporating</p> <p>Demonstrate that dissolving, mixing and changes of state are reversible changes</p> <p>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> |
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| Upper KS2 | Year 6 | Properties of materials | <p>Why is ____ the best material for ____?</p> <p>What are smart materials and how can they help us?</p> | <p>Different materials are used for particular jobs based on their properties: electrical conductivity, flexibility, hardness, insulators, magnetism, solubility, thermal conductivity, transparency</p> <p>A conductor is a material that heat or electricity can easily travel through. Most metals are both thermal conductors (they conduct heat) and electrical conductors (they conduct electricity).</p> <p>An insulator is a material that does not let heat or electricity travel through them. Wood and plastic are both thermal and electrical insulators.</p> | <p>Label materials, including insulators and conductors using a range of scientific vocabulary.</p> <p>Observe that some conductors will produce a brighter bulb in a circuit than others and that some materials will feel hotter than others when a heat source is placed against them.</p> <p>Apply understanding of the properties of materials to explain why a range of everyday items have been made from a particular material.</p> <p>Investigate and explore the different single use plastics and their impact of the environment.</p> | <p>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>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</p> |
| | | Changes of Materials | <p>What is a soluble/ insoluble material?</p> <p>How does temperature affect dissolving?</p> <p>How can we separate a mixture of water, iron filings, salt and sand?</p> | <p>Solvent + solute = solution</p> <p>Materials that will dissolve are known as soluble. Materials that won't dissolve are known as insoluble. A suspension is when the particles don't dissolve.</p> <p>When a solute dissolves in a solvent to create a solution, its</p> | <p>Describe materials as soluble/ insoluble.</p> <p>Investigate the effect temperature has on dissolving.</p> <p>Investigate the rate in which different sugars dissolve.</p> | <p>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</p> <p>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through</p> |

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| | | | <p>Why do and what types of materials rust?</p> <p>Have we made a new substance?</p> | <p>particles spread out so that they can no longer be seen or retrieved by filtering.</p> <p>Dissolving, mixing and changes of state are reversible changes. They can be reversed by: sieving, filtering and evaporation.</p> <p>Some changes result in the formation of new materials, a that this kind of change is not usually reversible.</p> | <p>Explain why certain methods of separation will work.</p> <p>Investigate how to separate a mixture of water, iron filings, salt and sand.</p> <p>Describe how to recover a substance from a solution</p> <p>Identify and classify reactions and changes into reversible and irreversible</p> <p>Investigate irreversible changes (yeast, sugar and water)- How does the amount of yeast/ sugar affect the reaction?</p> <p>Observe and describe how oxidising a material creates a new material and is not reversible.</p> <p>Investigate how different substances affect the rate of oxidisation.</p> <p>Research new materials, when and by whom they were invented, their advantages and disadvantages, and common applications.</p> <p>Discuss the creative use of new materials such as polymers, super-sticky and super-thin materials</p> | <p>filtering, sieving and evaporating</p> <p>Demonstrate that dissolving, mixing and changes of state are reversible changes</p> <p>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> |
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