

St Mark's All-Through Curriculum Map for Science (KS1 – 3)

	Autumn	Spring		Summer
EYFS	Content <ul style="list-style-type: none"> • Expanding science capital: Children are exposed to scientists through stories and play e.g. what's it like to be an astronaut? • Children talk about some of the things they have observed in their environment such as plants, animals, natural and found objects. <ul style="list-style-type: none"> • Children talk about why things happen and how things work in the context of practical activities. • Children observe things closely through a variety of means, including magnifiers and photographs. • Children examine change over time, for example, growing plants and animals, and changes that may be reversed, e.g. melting ice. <ul style="list-style-type: none"> • Children can look closely at similarities, differences, patterns and change in the context of practical activities. 			
	Progression in Working Scientifically at a Year R level: <p>Planning</p> <ul style="list-style-type: none"> -Being curious and start to ask questions <p>Enquiring and Testing</p> <ul style="list-style-type: none"> -Performing simple tests and using equipment -sorting and matching things <p>Observing and recording</p> <ul style="list-style-type: none"> -using senses to observe and look closely -looking closely at things and noticing changes -making simple records of what I have done and noticed <p>Evaluating and communicating</p> <ul style="list-style-type: none"> -talking about what I have done and noticed -finding things that are similar and different 			
	Understanding the World: The Natural World <p>The science curriculum for Year R at St Mark's is one part of the ongoing curriculum for Understanding the World (UW).</p> <p>Early Learning Goal: Explore the natural world around them, making observations and drawing pictures of animals and plants.</p> <p>Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.</p> <p>Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</p>			
	Autumn 1 Show care and concern for living things and the environment.	Autumn 2 Can describe the similarities and differences between materials.	Spring 1 Can describe the similarities and differences between materials	Spring 2 Has Developed an understanding of growth and change through animal life cycles, and plant growth.

	<p>Children can use all 5 senses to explore a range of natural materials. Children can identify and observe the weather for autumn.</p> <p>Living Things - lifecycle of a butterfly - Exploring natural materials</p> <p>Seasonal Changes - Using our 5 senses to explore - Autumn Study - record and observe</p>	<p>Children can explore and talk about the different forces they feel (floating and sinking). Children can identify and observe the weather for winter and explain how it has changed.</p> <p>States of Matter - save the penguin from the ice.</p> <p>Forces - Floating and Sinking</p> <p>Seasonal Changes - Using our 5 senses to explore - Winter Study - record and observe</p>	<p>and changes they notice (Natural and man-made).</p> <p>Materials - Den for a bear that stays dark (light and shadows)</p> <p>Living Things - bear poo observations - herbivore and carnivore</p>	<p>Understands the need to respect and care for the natural environment and all living things. Children can identify and observe the weather for spring and explain how it has changed.</p> <p>Living Things - animals and what they need to grow - life cycles of a chick, sheep etc. - Life cycle of a plant e.g. growing crops on the farm e.g. cress, bean sprouts etc.</p>	<p>Seasonal Changes - Using our 5 senses to explore - Summer Study - record and observe</p> <p>Materials - materials: best material for boat building, does it float or sink.</p> <p>Living Things - How do humans grow?</p>
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Year 1

Curriculum Content (Core Knowledge and Vocabulary outlined on the Knowledge Organiser).

Progression in Working Scientifically at a Year 1 level:

Planning

- Explore the world around them and start to ask simple questions and recognising different ways they may be answered

Enquiring and Testing

- carry out simple tests

- use simple features to compare objects, materials and living things and **with support** decide how to sort and group (identify and classify)

- ask people questions and use secondary sources to find answers

Observing and recording

- **with support**, observe closely, using simple equipment (include observing changes over time).

- Use simple measurements and equipment to gather data (non standard measurements such as multilink, body parts), rulers, magnifying glasses and pipettes

- Record simple data (Venn diagrams, tally charts and observational drawings)

Evaluating and communicating

- Use their observations and ideas to suggest answers to questions
- Talk about what they have found out and how they found it out.
- With help, record and communicate their findings in a range of ways, beginning to use scientific language (using given stem sentences)

Core Disciplinary Vocabulary

Observe, changes, patterns, grouping, sorting, compare, same, different, bigger, smaller, tallest, largest, identify (name), ask questions, explore, equipment, magnifying glass, pipette, ruler, answer questions, measure, drawing, picture, prediction, conclusion..

**Year
1**

NB. To be taught throughout the year and bridged between science and geography learning.

Living Things and their habitats (1.1)

Seasonal Changes

- observe changes across the 4 seasons
- observe and describe weather associated with the seasons and how day length varies
- Consider and review how plants change over time and link this to seasonality

Working Scientifically:

Observing over Time:

- making displays of what happens in the world around them, including day length, as the seasons change

Survey/Pattern seeking:

- Can collect information to classify weather and day length in different seasons and present the information in tables or charts to compare the seasons.

Link to prior learning EYFS observations of environments. Future learning 1.4, 1.5

Autumn Year 1

Spring Year 1

Summer Year 1

Autumn 1: Animals including Humans (animals focus) (1.1)

- identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals
- identify and name a variety of common animals that are carnivores, herbivores and omnivores

Spring 1: Animals including Humans (humans focus) (1.3)

- identify, name, draw and label the basic parts of the human body (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth) and say which part of the body is associated with each sense

Working Scientifically:

Summer 1: Plants (1.5)

- identify and name a variety of common wild and garden plants, including deciduous and evergreen trees
- identify and describe the basic structure of a variety of common flowering plants, including trees (leaves, flowers, petals, fruit, roots, bulb, seed, trunk, branches, stem)

	<p>-describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets)</p> <p>Working Scientifically:</p> <p>Classifying and Grouping:</p> <p>How can we group different animals?</p> <p>-using their observations to compare and contrast animals at first hand or through videos and photographs, describing how they identify and group them; -grouping animals according to what they eat;</p> <p>Link to prior learning EYFS observations of natural environments.</p> <p>Future Learning: 2.1, 4.1, 4.3</p>	<p>What are bodies and what can they do?</p> <p>-using their senses to compare different textures, sounds and smells.</p> <p>Future Learning: 2.1, 3.2, 4.1, 7.9</p> <p>Enquiry questions:</p> <p>Who has the biggest feet in our class?</p>	<p>Working Scientifically:</p> <p>Observing over Time:</p> <p>-Observe the growth of flowers/vegetables they have planted and Record how plants change over time (beans linking to Jack and the Beanstalk)</p> <p>Survey/Pattern seeking:</p> <p>-collect information and identify plants in open space (simple charts).</p> <p>Enquiry questions:</p> <p>How will the plant change over time?</p> <p>Link to prior Autumn/Spring/Summer work outdoors and observations. Opportunity to consolidate seasonal learning.</p> <p>Future Learning: 2.4, 3.3, 4.3</p>
	<p><u>Autumn 2: Materials Everyday Materials (1.2)</u></p> <p>-distinguish between an object and the material from which it is made</p> <p>-identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, rock, brick, paper, fabrics, elastic, foil</p> <p>-describe the simple physical properties of a variety of everyday materials hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent</p> <p>-compare and group together a variety of everyday materials on the basis of their simple physical properties</p> <p>Working Scientifically:</p> <p>What are things made of and why?</p>	<p><u>Spring 2: Living Things and their habitats (Spring) (1.4)</u></p> <p>Seasonal Changes</p> <p>-observe changes across the 4 seasons</p> <p>-observe and describe weather associated with the seasons and how day length varies</p> <p>-Consider and review how plants change over time and link this to seasonality</p> <p>Working Scientifically:</p> <p>Observing over Time:</p> <p>- making displays of what happens in the world around them, including day length, as the seasons change</p> <p>Survey/Pattern seeking:</p> <p>-Can collect information to classify weather and day length in different seasons and present the information in tables or charts to compare the seasons.</p>	

	<p>Classifying and Grouping: -compare and group materials based on their simple properties</p> <p>Comparative Testing: -Which is the best material for a boat?</p> <p>Enquiry questions: Which material will protect my picture? Which material is the best to build a boat with?</p> <p>Link to prior learning EYFS observations of materials in natural environments, floating and sinking.</p> <p>Future Learning 2.2, 5.3</p>	<p>Enquiry questions: What is the weather like in Autumn/Winter/Spring and Summer?</p> <p>Link to prior learning EYFS observations of environments.</p> <p>Future learning (1.5)</p>	
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Year 2

Curriculum Content (Core Knowledge and Vocabulary outlined on the Knowledge Organiser).

Progression in Working Scientifically at a Year 2 Level

Planning

-Explore the world around them and start to ask simple questions and recognising different ways they may be answered

Enquiring and Testing

-carry out simple tests

-use simple features to compare objects, materials and living things and **decide how to sort and group** (identify and classify)

-ask people questions and use secondary sources to find answers

Observing and recording

- **observe** closely, using simple equipment (such as pipettes, beakers, stopwatches, rulers, choice chamber).

-Use simple measurements and equipment to gather data (pipette drops, seconds, standard measurements, cm)

-Record simple data (venn diagrams, tally charts, tables, bar charts)

Evaluating and communicating

-Use their observations and ideas to suggest answers to questions

-Talk about what they have found out and how they found it out.

- **record and communicate** their findings in a range of ways, beginning to use scientific language - form a written conclusion. 'I think this happened because...' **Start to form very simple evaluations 'I was surprised/amazed because...'**

Core Disciplinary Vocabulary



ST. MARK'S CE SCHOOL

ONE SCHOOL - SERVING ALL - THROUGH EXCELLENCE

Data, record results, table, tally chart, pictogram, bar chart, Venn diagram, test, investigate, interpret results, pipette, beaker, stopwatch, choice chamber, ruler, heart rate, prediction, conclusion

Autumn Year 2

Spring Year 2

Summer Year 2

<p>Year 2</p>	<p>Autumn 1: Animals including Humans (2.1)</p> <ul style="list-style-type: none"> -Recap and review year 1 knowledge of basic parts of the human body including senses (Year 1 KO – 1.3) -notice that animals, including humans, have offspring which grow into adults e.g. recognition of growth in egg-chick, spawn-tadpole, baby, toddler, child, teenager, adult. -find out about and describe the basic needs of animals (review year 1 vocabulary), including humans, for survival (water, food and air) -describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene <p style="text-align: center;">Working Scientifically:</p> <p>Classifying and Grouping:</p> <ul style="list-style-type: none"> -Classifying foods as healthy and unhealthy <p>Survey and Pattern Seeking:</p> <ul style="list-style-type: none"> -Exploration of what humans need to stay healthy (exercise) <p>Secondary Sources: VISIT</p> <ul style="list-style-type: none"> -Choice of question to research: How to look after a _____ <p>children pose questions to a visitor who has recently had a baby/has a pet etc that can be brought in to school</p> <ul style="list-style-type: none"> - suggesting ways to find answers to their questions <p>Enquiry questions:</p> <p>Which activities make our heart rates increase the most?</p> <p>Future Learning – In preparation for key stage 2: 3.2, 4.1</p>	<p>Spring 1: Scientists Inventors (2.3)</p> <ul style="list-style-type: none"> Review Materials knowledge from autumn KO (2.2), and Year 1 KO (1.2) -Find out about people who have developed useful new materials, for example John Dunlop, Charles Macintosh or John McAdam. - Explore how materials have changed over time e.g. sheep wool and fleece <p>Working Scientifically:</p> <p>Comparative Testing:</p> <ul style="list-style-type: none"> -best material for a waterproof coat - best material for a teabag investigation <p>Enquiry questions:</p> <p>Which material is the most suitable for a waterproof coat? Which material is the most suitable for a teabag?</p> <p>Links forward to grow students’ science capital across the school and tackle pre-conceived perceptions of who can be a scientist. This unit focuses on the application of working scientifically skills to enable the children to see themselves as scientists ready for key stage 2.</p>	<p>Summer 1:</p>
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<p>Autumn 2: Use of Everyday Materials (2.2)</p> <p>Recap year 1 knowledge of identifying everyday materials (Year 1 KO – 1.2)</p> <ul style="list-style-type: none"> - identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. - some materials are used for more than one thing - different materials can be used to make the same thing - suitability of materials based on their properties <p>-find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</p> <p>Working Scientifically:</p> <p>Classifying and Grouping:</p> <p>-observing closely, identifying and classifying the uses of different materials, and recording their observations.</p> <p>Survey/Pattern Seeking:</p> <p>-investigating how materials can be shaped</p> <p>Enquiry questions:</p> <p>Which material is the most absorbent?</p> <p>Future Learning – In preparation for key stage 2 5.3</p>	<p>Spring 2: Plants 2.4</p> <p>Recap year 1 knowledge of plant structure (1.5): (leaves, flowers, petals, fruit, roots, bulb, seed, trunk, branches, stem) (Check Year 1 KO)</p> <ul style="list-style-type: none"> -observe and describe how seeds and bulbs grow into mature plants (seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them). -find out and describe how plants need water, light and a suitable temperature to grow and stay healthy <p>Working Scientifically:</p> <p>Observing over Time:</p> <p>-observe and record, with some accuracy, the growth of broad beans as they change over time from a seed</p> <p>Comparative Testing:</p> <p>-comparative test to show that plants need light and water to stay healthy.</p> <p>Enquiry questions:</p> <p>Which environment is the best for a plant to grow healthily?</p> <p>Future Learning – In preparation for key stage 2: 3.3, 4.3</p>	<p>Summer 2: Living Things and their habitats (2.5)</p> <p>Recap year 1 knowledge of carnivores, herbivores and omnivores (Year 1 - 1.1 KO) and plant knowledge (2.4) from previous unit.</p> <ul style="list-style-type: none"> -explore and compare the differences between things that are living, dead, and things that have never been alive -identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other -identify and name a variety of plants and animals in their habitats, including microhabitats - Compare familiar habitats with non-familiar habitats -describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food <p>Working Scientifically:</p> <p>Classifying and Grouping:</p> <p>-sorting and classifying things according to whether they are living, dead or things that were never alive, and recording their findings</p> <p>Survey/Pattern Seeking:</p> <p>- Exploring two contrasting habitats. Describe the conditions in different habitats and microhabitats (under log, on stony path, under bushes); and find out how the conditions affect the number and type(s) of plants and animals that live there.</p> <p>Using Secondary Sources:</p> <p>-Research creatures that live in certain habitats and design own creature that would be suitable.</p> <p>Enquiry questions:</p> <p>Which environment is the most suitable for a woodlouse?</p> <p>Future Learning – In preparation for key stage 2</p>
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Year 3

Curriculum Content (Core Knowledge and Vocabulary outlined on the Knowledge Organiser).

Progression in Working Scientifically at a Year 3 Level

Planning

- Raise their own relevant questions about the world around them.
- Start to make their own decisions about appropriate scientific enquiry
- Talk about criteria for grouping, sorting and classifying.

Enquiring and Testing

- set up practical, comparative and fair tests (fair testing new from key stage 1).

Observing and recording

- Make systematic and careful observations, making decisions about what to look for, for how long, and the equipment that might be used (torches, rock samples, pipettes, data logger, petri dishes, goggles, magnets, Newton metres, magnifying glasses).
- Take accurate measurements using standard units and new equipment (cm with a ruler, ml, cm and m with trundle wheels, newton metres)
- Collect and record data in a variety of ways (venn diagrams, tables, observational drawings)

Evaluating and communicating

- With help look for changes, patterns, similarities and differences in their data to draw simple conclusions and answer questions (start to form simple comparative statements 'The ___er the ___ the ___er the ___')
- Use relevant scientific language to discuss their ideas and communicate findings in appropriate ways
- With support, identify new questions arising from the data, making predictions within or beyond

Core vocabulary

fair testing, relationships, accurate, data logger, stopwatch, timer, estimate, data, diagram, prediction, similarity, difference, evidence, prediction, conclusion, evaluation, sample, pipettes, petri dishes, goggles, magnifying glasses, newton metres, torches, magnets, data loggers.

Year 3	<p><u>Autumn 1: Light (3.1)</u></p> <ul style="list-style-type: none"> - recognise that they need light in order to see things and that dark is the absence of light -notice that light is reflected from surfaces -recognise that light from the sun can be dangerous and that there are ways to protect their eyes -recognise that shadows are formed when the light from a light source is blocked by an opaque object 	<p><u>Spring 1: Plants 3.2</u></p> <ul style="list-style-type: none"> Recall parts of plants from year 1 and 2 (1.5 and 2.4) KOs ready to make the link between structure and function -identify and describe the functions of different parts of flowering plants: roots, stem/trunk (nutrition and support), leaves (nutrition) and flowers (reproduction) 	<p><u>Summer 1: Rocks 3.4</u></p> <ul style="list-style-type: none"> Recall Year 2 knowledge of everyday materials and their uses such as wood, metal, plastic, glass, brick, rock, paper and cardboard (Year 2 – 2.2 KO) -compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
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	<p>-find patterns in the way that the size of shadows change</p> <p>Working Scientifically: Pattern Seeking/Survey: -look for and measure shadows to find out how they are formed and why they might change when the light source moves/distance between light source changes.</p> <p>Comparative and fair Testing -investigate transparent/opaque materials</p> <p>Enquiry questions: How does the type of material affect the amount of light let through? How does the distance from a light source to an object affect the size of the shadow?</p> <p>Future Learning: Forward Links to 6.3, 7.8</p>	<p>-explore the requirements of plants for life and growth (air, light, water YEAR 2 KO, nutrients from soil, and room to grow) and how they vary from plant to plant</p> <p>-investigate the way in which water is transported within plants</p> <p>-explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal</p> <p>Working Scientifically: Comparative and Fair Testing & Observation over time: - compare the effect of different factors on plant growth, for example, the amount of light, the amount of fertiliser.</p> <p>Observation over time: - observing how water travels up the stem to the flowers (celery investigation).</p> <p>Secondary Sources: -research how requirement vary from plant to plant</p> <p>Enquiry questions: Which conditions do plants need to grow healthily?</p> <p>Future Learning: Forward links to 4.3, 7.3</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> <p>Working Scientifically: Observing over time: -observing rocks, including those used in buildings and gravestones, and exploring how and why they might have changed over time</p> <p>Classifying and Grouping: -observe, classify and group rocks in a variety of different ways (grains, crystals or fossils)</p> <p>Secondary Sources: -explore how fossils are formed.</p> <p>Comparative Testing – How are soils formed? - Pupils could explore different soils and identify similarities and differences between them</p> <p>Enquiry questions: Which soil will be the best at absorbing water?</p> <p>Bridging between learning in science and geography (extreme earth). Future Learning: Forward Links to 6.5</p>
		<p>Spring 2: Animals Including Humans 3.3</p> <p>-identify that animals, including humans, need the right type of foods (review from year 2 2.1 KO) and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat</p> <p>-identify that humans and some other animals have skeletons and muscles for support, protection and movement</p> <p>Working Scientifically: Classifying and Grouping: -identifying and grouping animals with and without skeletons</p>	<p>Summer 2: Forces and Magnets 3.5</p> <p>-compare how things move on different surfaces</p> <p>-notice that some forces need contact between 2 objects, but magnetic forces can act at a distance</p> <p>-observe how magnets attract or repel each other and attract some materials and not others (example, bar, ring, button and horseshoe)</p>

		<p>Survey/Pattern seeking: -Investigating body proportions</p> <p>Classifying and Grouping: -compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat.</p> <p>Secondary Sources: -Research nutrition of restaurant/takeaway meals and design meals based on what they find out.</p> <p>Enquiry questions: Does the length of your arm affect how far you can throw something?</p> <p>Future Learning: Forward Links to 4.1, 4.3, 6.4, 7.9</p>	<p>-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</p> <p>-describe magnets as having 2 poles</p> <p>-predict whether 2 magnets will attract or repel each other, depending on which poles are facing</p> <p>Working Scientifically: Comparative and Fair Testing: - raising questions and carrying out tests to find out how far things move on different surfaces, and gathering and recording data to find answers to their questions;</p> <p>-exploring the strengths of different magnets and finding a fair way to compare them;</p> <p>Classifying and Grouping: -sorting materials into those that are magnetic and those that are not;</p> <p>Enquiry questions: Which surface needs the most force to move an object across it? Future Learning: 5.2, 5.3</p>
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Year 4

Curriculum Content (Core Knowledge and Vocabulary outlined on the Knowledge Organiser).

Progression in Working Scientifically at a Year 4 Level

Planning

- Raise their own relevant questions about the world around them.
- Make their own decisions about appropriate scientific enquiry
- Talk about criteria for grouping, sorting and classifying using simple keys

Enquiring and Testing

- set up practical, comparative and fair tests. Recognising when a fair test is necessary.
- Recognise when and how secondary sources might answer their questions where practical investigations cannot.

Observing and recording

- Make systematic and careful observations, making decisions about what to look for, for how long, and the equipment that might be used (beakers, bunsen burner, metal mesh, dish, wires, battery, crocodiles clip, motors, buzzers, bulbs, propellers, tuning forks).
- Take accurate measurements using standard units and new equipment (cm with a ruler, seconds with a stopwatch, watts)

Evaluating and communicating

- Look for changes, patterns, similarities and differences in their data to draw simple conclusions and answer questions
- Use relevant scientific language to discuss their ideas and communicate findings in appropriate ways (venn diagrams).
- Identify new questions arising from the data, making predictions within or beyond

Core disciplinary vocabulary in Year 3

Findings, properties, characteristics, Venn diagrams, Bunsen burner, battery, motors, buzzers, bulbs, propellers, wattage, tuning forks, classification keys, chart, criteria, evidence, prediction, conclusion, evaluation, explanation, reason, improve.

<p>Year 4</p>	<p>Autumn 1: Animals including Humans (4.1)</p> <p>Review and recap year 3 knowledge of the human body (skeletons and muscles for support, protection and movement) Year 3 – 3.2 – KO</p> <ul style="list-style-type: none"> -describe the simple functions of the basic parts of the digestive system in humans (mouth, tongue, teeth, oesophagus, stomach, and small and large intestine and their functions) -identify the different types of teeth in humans and their simple functions -construct and interpret a variety of food chains – year 1 knowledge of carnivore, omnivore and herbivore, identifying producers, predators and prey <p>Working Scientifically:</p> <p>Comparative and fair Testing:</p> <ul style="list-style-type: none"> - finding out what damages teeth and how to look after them – tooth decay experiment <p>Secondary Sources:</p> <ul style="list-style-type: none"> -raising and answering questions based on the diets of different animals. 	<p>Spring 1: Living things and their habitats (4.3)</p> <p>Review Year 2 (2.5) knowledge of habitats and micro-habitats and Year 3 knowledge of skeletal classification (3.2).</p> <ul style="list-style-type: none"> -recognise that living things can be grouped in a variety of ways -explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment (animals, flowering plants and non-flowering plants) e.g. vertebrate and invertebrates -recognise that environments can change (habitats across the year) and that this can sometimes pose dangers to living things <p>Review knowledge on climate change topic here to explore examples of human impact (both positive and negative) on environments.</p> <p>Working Scientifically:</p> <p>Classifying and Grouping:</p> <ul style="list-style-type: none"> -using and making simple guides or keys to explore and identify local plants and animals; <p>Future Learning: Forward Links to 6.1, 6.4</p>	
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	<p>Enquiry questions: How do different liquids affect the rate at which an egg decay? Future Learning: Forward Links to 7.9</p>		
	<p>Autumn 2: States of Matter (4.2)</p> <ul style="list-style-type: none"> -compare and group materials together, according to whether they are solids(hold their shape), liquids (form a pool not a pile) or gases (escape from an unsealed container) -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) Avoid chemical changes e.g. baking or burning. -identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature <p>Working scientifically:</p> <p>Classifying and Grouping: -grouping and classifying a variety of different materials as solids, liquids or gases</p> <p>Observation over time: -chocolate melting -ice melting</p> <p>Comparative and fair Testing: -evaporation washing experiment</p> <p>Enquiry questions: Does the size of a chocolate button affect the speed at which it melts?</p>	<p>Spring 2: Electricity (4.4)</p> <ul style="list-style-type: none"> -identify common appliances that run on electricity -construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers (Draw as a pictorial representation) -identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery -recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit -recognise some common conductors and insulators, and associate metals with being good conductors -Explore the work of a famous scientist (Thomas Edison) <p>Working Scientifically:</p> <p>Classifying and Grouping: -Electrical appliances vs non-electrical appliances</p> <p>Comparative and fair Testing: -that metals tend to be conductors of electricity, some materials can and some cannot be used to connect across a gap in a circuit.</p> <p>Enquiry questions: How does the conductivity of an item affect the function of a circuit? Bridging between learning in science and DT (motorised)</p>	<p>Summer 2: Sound (4.5)</p> <ul style="list-style-type: none"> -identify how sounds are made, associating some of them with something vibrating -recognise that vibrations from sounds travel through a medium to the ear -find patterns between the pitch of a sound and features of the object that produced it -find patterns between the volume of a sound and the strength of the vibrations that produced it -Find out how pitch and volume of sounds can be changed in a variety of ways -recognise that sounds get fainter as the distance from the sound source increases <p>Working Scientifically:</p> <p>Survey/Pattern seeking: -finding patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses or length.</p> <p>Survey/Pattern seeking: -changing sounds with distance</p> <p>Enquiry questions: How does the position affect the pitch of the sound?</p>

<p>Will damp items that are larger, dry at a different rate from smaller items?</p> <p>Bridging between learning in science and geography (climate change). Future Learning: 5.3, 7.2, 7.4</p>	<p>buggies).</p> <p>Future Learning: 5.3, 6.2, 7.4</p>	<p>How does the distance of a sound source affect the volume of sound?</p> <p>How does the amount of force applied to an object affect the vibration?</p> <p>Future Learning: Forward Links to 7.8</p>
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Year 5

Curriculum Content (Core Knowledge and Vocabulary outlined on the Knowledge Organiser).

Progression in Working Scientifically at a Year 5 Level

Planning

-Use their science experiences and knowledge to explore ideas and raise different kinds of questions.

-Talk about how scientific ideas have developed over time

- Select and plan the most appropriate type of scientific enquiry and use to answer scientific questions

Enquiring and Testing

- Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why

Observing and recording

-Make own decisions about what observations to make, what measurements to use and how long to make them for. (mins/secs, newtons, cm/mm, km, mass, ml, days/months/years.)

-Choose the most appropriate equipment to make measurements with increasing precision and explain how to use it accurately. Take repeat measurements where appropriate. (solar system model, newton metres, measuring cylinders, stopwatches, beakers, pipettes)

-Decide how to record data and results of increasing complexity from a choice of familiar approaches: scientific diagrams, classification keys, tables, bar and line graphs - (line graph, bar graph, tables, venn diagrams)

Evaluating and communicating

-Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas

-report conclusions, causal relationships and explanations of degree of trust in results

-Use results to make predictions and identify when further observations, comparative and fair tests might be needed

Core Disciplinary vocabulary

Variables, independent variable, dependent variable, control variable, evidence, justify, argument, , causal relationship, accuracy, precision, bar graphs, line graphs, newton meter, beaker, pipette, measuring cylinder, classification keys)

<p>Year 5</p>	<p>Autumn 1: Earth and Space (5.1)</p> <ul style="list-style-type: none"> -describe the movement of the Earth and other planets relative to the sun in the solar system to help them explain day and night <p>KNOW that the sun is a star at the centre of our solar system and that it has 8 planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006)</p> <ul style="list-style-type: none"> -describe the movement of the moon relative to the Earth. KNOW that a moon is a celestial body that orbits a planet (Earth has 1 moon; Jupiter has 4 large moons and numerous smaller ones). -describe the sun, Earth and moon as approximately spherical bodies use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky -consider the work of scientists such as Ptolemy, Alhazen and Copernicus. How have ideas of the solar system developed from geocentric to heliocentric? <p>Working Scientifically:</p> <p>Secondary Sources:</p> <ul style="list-style-type: none"> -creating simple models of the solar system; - consider work of scientists such as Ptolemy, Alhazen and Copernicus 	<p>Spring Term: Properties and Changes of Materials (5.3)</p> <ul style="list-style-type: none"> -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 (review year 3 magnet knowledge - 3.5) (review year 4 electricity knowledge (4.4) -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 (check year 4 – 4.2 KO) 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 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 (vinegar) on bicarbonate of soda -Explore how chemists create new materials e.g. Spencer Silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton. <p>Working scientifically:</p> <p>Classifying and Grouping:</p> <ul style="list-style-type: none"> -compare and group materials based on their properties <p>Comparative and fair Testing:</p> <ul style="list-style-type: none"> -dissolving investigation <p>Observation over time:</p> <ul style="list-style-type: none"> -demonstrate that changes of state are reversible changes. <p>Enquiry questions:</p>	<p>Summer 1: Living Things and Their Habitats (5.4)</p> <ul style="list-style-type: none"> -describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird (classes reviewed from year 1 – 1.1). -They should find out about the work of naturalists and animal behaviourists, for example, David Attenborough and Jane Goodal -describe the life process of reproduction in some plants and animals. Pupils should find out about different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals. <p>Working Scientifically:</p> <p>Secondary Sources:</p> <ul style="list-style-type: none"> -research and compare the life cycles of different animals <p>Survey/Pattern seeking:</p> <ul style="list-style-type: none"> -Look for patterns in given data about gestation periods of animals – see ASE materials. <p>Observation over time:</p> <ul style="list-style-type: none"> - try to grow new plants from different parts of the parent plant (root cuttings) <p>Enquiry questions:</p> <p>How does the size of the animal affect the duration of gestation?</p> <p>Future Learning: Forward Links to 7.7</p>
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		<p>If we change the material, what happens to the time taken for the ice capsule to melt? If we change the material, what happens to the amount of water absorbed? Which materials do you think would dissolve in water?</p> <p>Shorter term and a more detailed topic content. Spread over two terms to provide opportunities for further Working Scientifically.</p> <p>Future Learning: Forward Links to 7.2, 1.10</p>	
	<p>Autumn 2: Forces (5.2)</p> <p>Review Year 3 forces and magnets knowledge – 3.5 KO.</p> <p>-explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. Study the work of Gallileo and Newton to develop the theory of gravitation</p> <p>-identify the effects of air resistance, water resistance and friction (Year 3 KO), that act between moving surfaces</p> <p>-recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect</p> <p>Working Scientifically:</p> <p>Comparative and fair Testing:</p> <p>- Friction – cars and movement investigation – need to check progression from year 3</p> <p>-Air Resistance (parachutes)</p> <p>-Water resistance (plasticine)</p> <p>Enquiry questions:</p> <p>If we change the material, what happens to the amount of friction?</p> <p>If we change the size of the parachute, what happens to the time it takes to fall?</p>	<p>Spring Term: Properties and Changes of Materials continued (5.3)</p>	<p>Summer 2: Animals including Humans (5.5)</p> <p>-describe the changes as humans develop to old age.</p> <p>-Timeline growth and development in humans</p> <p>-Learn about the changes experienced in puberty</p> <p>Working Scientifically: -</p> <p>Secondary Sources:</p> <p>-researching the gestation periods of other animals and compare them with humans- follow up from summer 1 unit</p> <p>Bridging between learning in science and PSHRE - statutory yet sensitive content.</p> <p>Future Learning: Forward Links to 7.7</p>

Bridging between learning in science and DT (fairground mechanisms). Review Year 4 electricity prior to the DT unit – check the KO – 4.4)

Future Learning: Forward Links to: 7.4

Year 6

Curriculum Content (Core Knowledge and Vocabulary outlined on the Knowledge Organiser).

Progression in Working Scientifically at a Year 6 Level

Planning

- Use their science experiences and knowledge to explore ideas and raise different kinds of questions.
 - Talk about how scientific ideas have developed over time
- Select and plan the most appropriate type of scientific enquiry and use to answer scientific questions
- Use and develop keys and other information records to identify, classify and describe living things, identifying patterns that may be found in the natural environment.

Enquiring and Testing

- Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why
- Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact.

Observing and recording

- Make own decisions about what observations to make, what measurements to use and how long to make them for. (volume, cm , minutes and seconds , heart rate)
- Choose the most appropriate equipment to make measurements with increasing precision and explain how to use it accurately. Take repeat measurements where appropriate. (funnel, circuits (batteries, wires, buzzers, bulbs, switches), torches, refraction machine, stopwatches)
- Decide how to record data and results of increasing complexity from a choice of familiar approaches: scientific diagrams, classification keys, tables

Evaluating and communicating

- Identify scientific evidence that has been used to support or refute ideas or arguments.
- Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas
 - report conclusions, causal relationships and explanations of degree of trust in results
- Use results to make predictions and identify when further observations, comparative and fair tests might be needed.

Core Disciplinary vocabulary (build on competence of year 5 vocabulary)

Variables, independent variable, dependent variable, control variable, evidence, justify, argument (science), causal relationship, accuracy, precision, heart rate, wattage,

<p>Year 6</p>	<p>Autumn 1: Living Things and Their Habitats (6.1)</p> <p>Review and re-visit Year 4 grouping and classification KO (4.3).</p> <ul style="list-style-type: none"> -Look at the classification system in more detail: describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. Look at how these broad groups can then be sub-divided. -give reasons for classifying plants and animals based on specific characteristics -Find out about the work of Carl Linnaeus, a pioneer of classification. <p>Working Scientifically: Classifying and Grouping:</p> <ul style="list-style-type: none"> -use classification systems and keys to identify some animals and plants in the immediate environment. <p>Secondary Sources:</p> <ul style="list-style-type: none"> -Find out about the work of Carl Linnaeus, a pioneer of classification. (separate opinion from fact) <p>Enquiry questions: Is yeast a living thing?</p>	<p>Spring 1: Light (6.3)</p> <p>Review and revisit light source knowledge from Year 3 (3.1).</p> <ul style="list-style-type: none"> -recognise that light appears to travel in straight lines -use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye -explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes <p>Review and re-visit shadow knowledge from Year 3 (3.1).</p> <ul style="list-style-type: none"> -use the idea that light travels in straight lines to explain why do shadows have the same shape as the objects that cast them <p>Working Scientifically: Comparative and fair testing:</p> <ul style="list-style-type: none"> -investigating how shadow size can be changed. <p>Enquiry questions: What happens when light travels through different objects? How does the position of the object affect the size of the shadow?</p> <p>Future Learning: Forward Links to 7.8</p>	
	<p>Autumn 2: Electricity (6.2)</p> <p>Review and re-visit electricity knowledge from Year 4 (4.4) and DT in Year 5.</p> <ul style="list-style-type: none"> -associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit -compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches -use recognised symbols when representing a simple circuit in a diagram <p>Working Scientifically: Comparative and fair testing:</p> <ul style="list-style-type: none"> -systematically identifying the effect of changing one component at a time in a circuit. 	<p>Spring 2: Animals Including Humans (6.4)</p> <p>Review and re-visit Year 3 (3.2) and Year 4 (4.1) knowledge on body parts and internal organs (skeletal, muscular and digestive system).</p> <ul style="list-style-type: none"> -identify and name the main parts of the human circulatory system, and -describe the functions of the heart, blood vessels and blood <p>Review and re-visit Year 3 nutrition (3.2).</p> <ul style="list-style-type: none"> -recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function -describe the ways in which nutrients and water are transported within animals, including humans <p>Working Scientifically: Survey/Pattern Seeking:</p> <ul style="list-style-type: none"> -explore the impact of exercise on pulse rate <p>Enquiry questions:</p>	<p>Summer 2: Evolution and Inheritance (6.5)</p> <p>Review and Re-visit Year 3 fossil knowledge (3.4).</p> <ul style="list-style-type: none"> -recognise that living things have changed over time and that fossils (3.4) provide information about living things that inhabited the Earth millions of years ago -recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents e.g. cross breeds of dogs - explore the idea that variation in offspring over time can make animals more or less able to survive in particular environments -Explore the work of palaeontologists such as Mary Anning, Charles Darwin and Alfred Wallace. -identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to



	<p>Enquiry questions: If we add more cells/buzzers to our circuit, what happens to the brightness of the bulb/voltage/volume? Future Learning: Forward Links to: 7.4</p>	<p>What is the function of the human heart? How does exercise impact our heart rate? Future Learning: Forward Links to 7.9</p>	<p>evolution</p> <p>Working Scientifically:</p> <p>Secondary Sources: -observing and raising questions about animals and how they are adapted to their environment; - comparing and analysing how some living things are adapted to survive in extreme conditions (separate opinion from fact)</p> <p>Survey/Pattern Seeking: -birds beaks (ASE)</p> <p>Enquiry questions: How does the size of a bird's beak affect the ability to gather seeds</p>
Year 7			

<p>Year 7</p>	<p>Year 7 Autumn</p> <p>7.1 How do you work in a lab? (Introduction)</p> <p>The initial unit is focuses on how to work safely in a lab, perform a risk assessment and reviews the following elements of working scientifically at KS2:</p> <ul style="list-style-type: none"> -Working scientifically, -Independent and dependent variables - factors that make a fair test -Examples of scientists and inventors <p>The unit introduces the skills necessary for KS3 and 4 and by the end of the unit, the students would be able to identify:</p> <ul style="list-style-type: none"> - key pieces of equipment in the science lab - how to use a Bunsen burner safely -how to make measurements and pack equipment away safely. – how to present their results as bar graphs or scatter graphs. The initial investigation will focus on data collection and measurement, but the process will be expanded upon in future topics. <p>Future Learning: Forward Links to all KS3 Science units.</p> <p>7.2 What are particles? (Chemistry)</p> <p>This unit allows students to start thinking of matter as being made up of particles. We use the particle model to describe changes of state changes first, then more complex ideas such as density, diffusion, convection and conduction.</p> <p>We start by reviewing and re-visit states of matter, includes changes of state and using degrees Celsius as units of temperature (4.2). As well as re-visit properties and changes to materials, included conduction and solubility (5.3).</p> <p>By the end of the unit the students will be able to:</p> <ul style="list-style-type: none"> -Describe phase changes in terms of particle theory. 	<p>Year 7 Spring</p> <p>7.5 What is a chemical reaction? (Chemistry)</p> <p>Students will learn to classify atoms, elements and compounds as well as the fundamental terminology used in chemistry.</p> <p>By the end of the unit, the students will be able to:</p> <ul style="list-style-type: none"> ● Explain the differences between element, compound and mixtures ● Describe methods of separating mixtures of solids and liquids. These include filtration, distillation and chromatography. ● Explain what an acid is and give examples of acids and alkalis. ● Use chemical equations and symbols to describe reactions. ● Draw dot/cross atomic structure diagrams <p>There is no direct link to a KS1/2 topic. But students may already have knowledge of some different elements such as gold, silver, oxygen. The initial lessons will focus on misconceptions students may have. For example, carbon dioxide and steel are not elements.</p> <p>Future Learning in KS3: Using chemical symbols and equations will be revisited in topics 7.10, 8.2, 9.2 and 9.5.</p> <p>7.6 What are forces? (Physics)</p> <p>This topic focuses on forces and their effect on an object when they are unbalanced. They will then learn about the differences between speed and acceleration.</p> <p>This links to the forces topic in Year R, Year 3 (3.5) and Year 5 (5.2). From these students should already be familiar with the concepts of gravity, air resistance, water resistance and gravity.</p> <p>By the end of the unit the students will be able to:</p> <ul style="list-style-type: none"> -Identify different forces that can act upon an object -Calculate resultant forces. -Describe the difference between mass and weight 	<p>Year 7 Summer</p> <p>7.8 What are waves? (Physics)</p> <p>In this topic students will learn about different types of waves and their properties.</p> <p>This topic links back to the properties of sound (4.5) and the properties of light (3.1, 6.3)</p> <p>By the end of the unit the students will be able to:</p> <ul style="list-style-type: none"> -Describe the different types of wave -Describe the different properties of sound -Explain how reflection works -Describe how light changes direction when passing through a lens -Describe how refraction can create a rainbow <p>Future Learning in KS3: Electromagnetic radiation will be reviewed and expanded upon when considering light in the context of space in year 8 (8.6).</p> <p>7.9 How does our body work? (Biology)</p> <p>In this topic students will cover the functions of the main body systems and how they work. They will learn about the nervous, circulatory, digestive and respiratory systems. As well as how our muscles, joints, skeleton and bones allow for support and movement.</p> <p>This topic draws from a board range of prior learning, such as basic parts of the body (1.3) as well as knowledge of the skeletal and digestive system (3.2, 4.1, 6.4).</p> <p>By the end of the unit the students will be able to:</p> <ul style="list-style-type: none"> -Identify key parts of the nervous, circulatory, digestive and respiratory systems. -Describe risk factors of diseases of the circulatory and respiratory systems, including the effect of smoking on the body.
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<p>-Describe the differences in conduction, convection and diffusion in terms of particle theory.</p> <p>Future Learning in KS3: Diffusion is an important concept that is essential to understanding transport in cells (7.3) and gas exchange in the lung (7.7). Convection will be important when we consider weather in (9.4) as well as in Geography. Thermal conduction will be revisited when considering energy changes in 7.4 and materials in 7.10.</p> <p style="text-align: center;">7.3 What is life? (Biology)</p> <p>After thinking about particles as the smallest unit of matter we begin biology by looking at the factors that qualify an organism as being alive. the students will learn how to use microscopes. We will also use this topic to introduce ethics, by discussing the use of stem cells as therapeutics.</p> <p>The unit will explore the differences between plant and animal cells in terms of their structure and function. To do this, students will need to understand that plants require light from the Sun (3.3)</p> <p>By the end of the unit the students will be able to:</p> <ul style="list-style-type: none"> -Describe the structure of cells and the functions of major organelles. -Describe the differences between plant cells, animal cells and bacteria. -Describe the differences between different types of microscopy -Be able to prepare samples for microscopy and describe how to operate a microscope. <p>Future Learning in KS3: The structure and function of the cell will be important when considering the needs of the organism. We revisit the concept of cells when considering body processes such as the nervous system (7.9), sex cells and cell division (7.7), photosynthesis and respiration (8.4) as well as DNA (9.1). Knowledge of</p>	<ul style="list-style-type: none"> -Calculate speed of an object -Draw distance-time graphs -Substitute values into a given scientific equation and solve it. Some students may be able to rearrange the equation. <p>Future Learning in KS3: These ideas will be revisited and expanded upon in the second forces topic in year 8 (8.3). Gravity will be used to help explain the motion of celestial bodies (8.6) and friction will be used to explain why earthquakes occur (8.5). There will be a brief review of forces in Year 9 when considering magnetism as part of the electricity topic (9.3).</p> <p style="text-align: center;">7.7 How does life reproduce? (Biology)</p> <p>In this topic students will cover both mammal and plant reproduction. They will learn about the different sex cells, the menstrual cycle and pregnancy. They will cover plant reproduction, including dissection of a plant and learn about different methods of seed dispersal.</p> <p>This topic links back to the asexual and sexual reproduction in plants (5.5) and growth and development in humans (5.6).</p> <p>By the end of the unit the students will be able to:</p> <ul style="list-style-type: none"> -Describe the different stages of human development. -Describe what sex cells are -Describe the stages of the menstrual cycle. -Describe the different stages of pregnancy -Identify the different parts of a plant -Identify plant sex organs -Describe different methods for seed dispersal <p>Future Learning in KS3: Plant reproduction will be reviewed in Year 8 (8.4) when considering what plants need to survive and in year 9 when considering how we get our food (9.6). Human reproduction and sex cells will be reviewed in Year 9 (9.1) when learning about</p>	<ul style="list-style-type: none"> -Name nutrients found in food and how they help keep us healthy. -Describe the role of homeostasis in keeping our body at a certain temperature. <p>Future Learning in KS3: The processes of human body systems will be reviewed when considering the effects of different diseases on them in Year 8 (8.1) and when considering inheritance in Year 9 (9.1).</p> <p style="text-align: center;">7.10 Why do we choose different materials for different jobs? (Chemistry)</p> <p>Students will cover examples of materials found in construction and why they are suited for that purpose. They will learn where crude oil comes from and how it can be used in many common products. They will look at different fuels and how cleaner fuels are being developed. They will also look at how plastics can be recycled.</p> <p>Students explored everyday materials in Year 2 (2.2) and looked at their properties in year 5 (5.3). From these topics, students would already be familiar with examples of materials as well as some keywords used to describe them.</p> <p>By the end of the unit the students will be able to:</p> <ul style="list-style-type: none"> -Use keywords such as malleable, brittle, flexible, strong and hard to describe different materials. -Explain how concrete is produced from limestone -Describe how crude oil can be refined into different fractions and what the uses of these fractions are. -Describe how fossil fuels combust and the pollution they cause. -Describe how some plastics can be recycled. <p>Future Learning in KS3: The properties of materials will be reviewed again when looking at how planes fly and boats sink in Year 8 (8.3) and when looking at where metals come from in Year 9 (9.5). The effects of fossil fuels and pollution will be expanded upon in Year 9 (9.4)</p>
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	<p>bacteria will also be important when we cover health and disease (8.1) as students will be distinguishing between bacteria and viruses. Ethics will be discussed again when considering DNA technology (9.1), refining non-renewable resources (7.10), development of medicines (8.1) and how we get our food (9.6).</p> <p>7.4 What is energy? (Physics)</p> <p>In this topic students will learn the different forms energy can take as well as how energy is transferred from one form to another.</p> <p>Students will be familiar with the different forms of energy such as light (3.1 & 6.3), heat (4.2) electricity (4.4, 5.2 & 6.2) and sound (4.5). They may not consider all of these as being energy, or how energy can transfer from one form to another so this will be the focus for the first part of the topic.</p> <p>By the end of the unit the students will be able to:</p> <ul style="list-style-type: none"> -Identify different forms of energy. -Describe energy transfers. -Calculate energy efficiency of transfers. -Describe how objects can be designed to make energy transfers more efficient <p>Future Learning in KS3: Energy transfers are revisited in several places across KS3. For example, the use of electromagnetic waves (7.8), process in the body (7.9), friction (8.3), processes in the Earth (8.5), energy released by chemical reactions (9.2) and electricity (9.3).</p>	<p>DNA and inheritance.</p>	
Year 8			
	<p>Year 8 - Autumn</p> <p>Year 8 - Autumn 1 - Why do we get sick? (Biology)</p>	<p>Year 8 - Spring 1 How is life connected? (Biology)</p> <p>Students will cover how plants and animals are adapted to their environment, as well as classification and interdependence.</p>	<p>Year 8 - Summer 1 - Why is the periodic table useful? (Chemistry)</p>

<p>In this topic students will learn about pathogens, and the different types of diseases and how we treat them.</p> <p>By the end of the topic, students will be able to: -Give examples of diseases caused by viruses, bacteria and parasites and explain the rationale behind different drug treatments.</p> <p>Prior knowledge Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function - Year 6 - Spring 2 Bacteria - Year 7-Topic 3 Organ systems from Year 7-Topic 9.</p> <p>Future Learning In Year 9 students will extend their knowledge by learning about different medicines and how they can be used to treat the diseases covered in this topic.</p>	<p>By the end of the topic the students will be able to: -Classify organisms -Describe and give examples of adaptations of animals -Describe how animals compete with each other -Describe how organisms live in an ecosystem and are dependent on each other for their own survival.</p> <p>Prior learning: From year 6 Autumn 1 - students will be able to Discuss classification, including the work of Carl Linneas From Year 6 - Summer 2 - students will be able to Give examples of adaptations of animals to help them survive in their environment.</p> <p>Future Learning All of the content in this topic is applicable to KS4 The work on adaptation will be recapped in YEar 9-Topic 1 on DNA and inheritance</p>	<p>In this topic students will learn about the development of the periodic table as well as how the elements are arranged to show trends in reactivity. Students will review acids and alkalis from Year 7 and learn about neutralisation. They will also cover combustion</p> <p>By the end of the topic the students will be able to: -Give examples of some trends in reactivity in group 1 and 7 -Calculate relative molecular mass and do basic mol calculations -Describe and give examples of salts formed through neutralisation reactions</p> <p>Prior learning from Year 7-Topic 5 and Year 8 Topic 2 students should be able to</p> <ul style="list-style-type: none"> - Explain the differences between element, compound and mixtures - Explain what an acid is and give examples of acids and alkalis. - Use chemical equations and symbols to describe reactions. - Draw dot/cross atomic structure diagrams <p>Future learning Students will need to review many of these topics in Year 9- Autumn 3 when they look at rates of reactions and Year 9 Summer 1 when they look at metals and their reactions. All of the content discovered again in KS4</p>
<p>Year 8 - Autumn 2- How do atoms bond together? (Chemistry)</p> <p>In this topic students will learn about the different types of bonding between atoms, such as ionic, covalent and metallic. They have already covered what the periodic table is, this topic will expand on</p>	<p>Year 8 - Spring 2- Why is the Earth always changing? (Chemistry)</p> <p>In this topic students will learn about the structure of the Earth, as well as different types of rock and their formation</p> <p>By the end of the topic students will be able to:</p>	<p>Year 8 - Summer 2-What is electricity? (Physics)</p> <p>In this topic students will learn about what electricity is and how to construct simple circuits</p> <p>By the end of the topic the students will be able to: -Describe how static electricity is generated</p>

	<p>that to explain how it was developed. They will then look at how bonds break and reform during a chemical reaction. Students will be introduced to exothermic and endothermic reactions.</p> <p>By the end of the topic the students will be able to:</p> <ul style="list-style-type: none"> -Describe the difference between atoms, molecules and ions. -Describe the differences between ionic, metallic and covalent bonding -Describe that combustion -Describe the differences between exothermic and endothermic reactions <p>Prior learning from Year 7-Topic 5 students should be able to</p> <ul style="list-style-type: none"> - Explain the differences between element, compound and mixtures - Use chemical equations and symbols to describe reactions. - Draw dot/cross atomic structure diagrams <p>Future learning Students will need to review many of these topics in Year 9-Autumn 2 when they look at rates of reactions and Year 9 Summer 1 when they look at metals and their reactions. All of the content discovered again in KS4</p>	<ul style="list-style-type: none"> -Describe the composition of the Earth -Describe the structure of the Earth -Describe the rock cycle and the formation of igneous, sedimentary and metamorphic rocks -Describe the causes of Earthquakes and why volcanoes erupt -Describe the process of weathering and erosion <p>Prior learning: Year 7 - Topic 2 - Planet Earth topic in geography Students will have covered the structure of the Earth and its formation</p> <p>Future Learning Plate tectonics and the structure of the Earth will be covered in Year 9 Geography</p>	<ul style="list-style-type: none"> -Describe electricity as the movement of charge -Deibe the differences between series and parallel circuits -Construct simple circuits -Perform calculations relating to potential difference, current, resistance and power. <p>Prior learning: Year 4 & 6 -Students will have constructed simple series circuits and be familiar with the concept of conductors and insulators</p> <p>Future Learning All of the content in this topic is applicable to KS4 The work on adaptation will be recapped in YEar 9-Topic 4 when students look at magnetism, electromagnets and how electricity is generated</p>
	<p>Year 8-Autumn 3-Why does a balloon pop? (Physics)</p> <p>In this topic students will review forces from year 7 and develop them. They will also cover buoyancy, pressure and moments.</p>	<p>Year 8 -Spring 3- What is in the universe? (Physics)</p> <p>In this topic students will learn about our solar system, why we have day and night as well as why we have different seasons of the year. They will learn about some of the major developments in the space race and where the future of space travel lies.</p>	<p>Year 8 - Summer 3-Why are plants important? (Biology)</p> <p>In this topic students will learn about life processes such as respiration, osmosis, transpiration and photosynthesis</p> <p>By the end of the topic the students will be able to:</p>

<p>By the end of the topic the students will be able to:</p> <ul style="list-style-type: none"> -Describe atmospheric pressure -Describe pressure in liquids, such as pressure increasing with depth; upthrust effects, floating and sinking -Calculate pressure measured by ratio of force over area -Calculate moments as an effect of a turning force -Calculate work done and energy changes on deformation <p>Prior learning:</p> <p>From Year 7-Topic 4 students should be able to:</p> <ul style="list-style-type: none"> -Identify different forces that can act upon an object -Calculate resultant forces. -Describe the difference between mass and weight -Substitute values into a given scientific equation and solve it. Some students may be able to rearrange the equation. <p>From topics on forces topic in Year R, Year 3 (3.5) and Year 5 (5.2) students should already be familiar with the concepts of gravity, air resistance, water resistance and gravity.</p> <p>Future learning</p> <p>All of these topics are part of the KS4 Physics curriculum</p>	<p>By the end the topic the students will be able to:</p> <ul style="list-style-type: none"> -Calculate the force of gravity on different planets -Describe the key features of our solar system -Use the movement of the sun, Earth and Moon to describe day/night cycles, seasons, eclipses and tides. -Describe the life cycle of stars -Describe some of the key history of the Space Race. -Use the light year as a unit of distance <p>Prior Learning:</p> <p>Year 5 - Autumn 1 - Students will be able to describe the movement of the Sun, Earth and Moon and name the different planets in the solar system.</p> <p>Year 7 - Topic 4- Describe the concept of gravity</p> <p>Year 7 - Topic 8 - Electromagnetic waves</p> <p>Future Learning</p> <p>Space is a topic in GCSE Physics (not the Double Science GCSE)</p>	<ul style="list-style-type: none"> -Describe how oxygen and water (transpiration) move through a plant. Including the role of the stomata -Describe photosynthesis and respiration as life processes -Describe the differences between aerobic and anaerobic respiration and how respiration can be used to produce alcohol or make bread. <p>Prior learning:</p> <p>From Year 6 - Summer 2 and Year 8 Spring 1 - students will be able to</p> <p>Give examples of adaptations of animals to help them survive in their environment.</p> <p>From Year 7 Topic 2 & 9 students will be able to</p> <p>Describe the process of diffusion (topic 2) and give examples of diffusion across a membrane (gas exchange in topic 9)</p> <p>From Year 7 topic 3 students will be able to:</p> <ul style="list-style-type: none"> -Describe the structure of cells and the functions of major organelles. -Describe the differences between plant cells, animal cells and bacteria. <p>From Year 7-Topic 5 students will be able to</p> <ul style="list-style-type: none"> -Identify the different parts of a plant <p>Future Learning</p> <p>All of the content in this topic is applicable to KS4</p> <p>The work on adaptation will be recapped in Year 9-Topic 1 on DNA and inheritance</p>
<p>Year 9</p>		
<p>Autumn term</p>		

	<p align="center">9.1 How do we fight disease? (Biology)</p> <p>In this topic students will review the different ways in which the body fights disease, vaccination how medicines are developed, what cancer is and the dangers of recreational drugs.</p> <p>By the end of the topic the students will be able to:</p> <ul style="list-style-type: none"> -Describe the main functions of the immune system. -Describe how vaccinations allow us to acquire immunity to disease -Describe the benefits of vaccination., -Describe different types of medication. -Describe the rise of MRSA -Explain the dangers of recreational drugs <p>Prior learning: From Year 8-Topic 1- different diseases -Year 6 - Spring 2 - The impact of drugs on the body</p> <p>Future learning All of these topics are part of the KS4 Physics curriculum</p>	<p align="center">9.2 Why do objects cool down? (Physics)</p> <p>In this topic, students will review energy transfers, but will then look at how thermal energy can be stored by objects and the factors that affect them cooling down. such as if they are light or dark, as well as specific heat capacity. This topic will also focus on improving investigation skills as there are several opportunities for practical work.</p> <p>By the end of the topic the students will be able to:</p> <ul style="list-style-type: none"> -Describe the effect of insulating materials. -Explain different materials have different specific heat capacities. -Explain different types of food contain different amounts of chemical energy. <p>Prior learning: Year 7-Topic 3- energy transfers Year 7-Topic 2 - States of matter Year 4&5 - properties of materials</p> <p>Future learning All of these topics are part of the KS4 Physics curriculum</p>	<p align="center">9.3 What are metals? (Chemistry)</p> <p>In this topic, students will review their chemistry knowledge from Years 7&8 and apply them to the chemistry of metals. They will learn some of the basic reactions of metals, the reactivity series and how metals are extracted from their ores.</p> <p>By the end of the topic the students will be able to:</p> <ul style="list-style-type: none"> -Describe how metals are extracted from their ores. -Describe what an alloy is and how it is useful. -Put the metals into a reactivity series. -Plan an experiment to extract copper from its ore. <p>Prior learning: Year 7-Topic 5 & Year 8 Topics 2 & 7 From these topics students will have a knowledge about the periodic table, atomic structure and some basic chemical reactions.</p> <p>Future learning All of these topics are part of the KS4 Physics curriculum</p>
Spring term			
	<p align="center">9.4 Why are magnets useful?</p> <p>In this topic students learn about magnetism and magnetic fields. They will learn how magnets are used in the generation of electricity and how a</p>	<p align="center">9.5 Why is carbon useful?</p> <p>In this topic students learn organic chemistry and how oil can be separated using fractional distillation into useful products.</p>	<p align="center">9.6 Why are we the same, but different?</p> <p>In this topic students will learn about inheritance and genetics. They will cover genetic illnesses and the differences between sexual and asexual reproduction.</p>

	<p>power station works. They will learn to calculate the cost of electricity and the advantages and disadvantages of different types of renewable energy.</p> <p>By the end of the topic the students will be able to:</p> <ul style="list-style-type: none"> -Describe how magnets produce a magnetic field -Describe how magnets are used to produce electricity using a turbine -Describe how a power station works -Describe the advantages and disadvantages of renewable and non-renewable energy <p>Describe the costs of electricity and how costs can be reduced</p> <p>Prior learning: From Year 8-Topic 8 - What is electricity Year 4 & 6 -Electricity Year R and Year 3 - Magnets</p> <p>Future learning All of these topics are part of the KS4 Physics curriculum</p>	<p>By the end of the topic the students will be able to:</p> <ul style="list-style-type: none"> -What is in oil and how it can be separated using fractional distillation -Describe some alternatives to using oil as a fuel -Describe ways in which we can recycle materials <p>Prior learning: From Years 7&8 - Chemistry topics Year 1&5 materials</p> <p>Future learning All of these topics are part of the KS4 Physics curriculum</p>	<p>By the end of the topic the students will be able to:</p> <ul style="list-style-type: none"> -Describe the differences between sexual and asexual reproduction -Give examples of how characteristics such as height, arm span, head circumference and shoe size vary across a population. -Construct Punnet squares to show genetic inheritance. -Describe the process of cloning and how it is different to selective breeding. -Give examples of genetic illnesses. <p>Prior learning: Prior learning: Year 8 - Topics 1&4 on biology where they would learn about disease as well as variation and natural selection. Year 7-Topic 7 where they would have covered reproduction. Year 7 Topic 9 where they covered different organ systems. Year 6-Where they covered evolution and inheritance.</p> <p>Future learning All of these topics are part of the KS4 Physics curriculum</p>
Summer term			
	<p>9.7 Why are some reactions faster than others?</p> <p>In this topic students will learn about rates of reaction, the factors that affect how fast a reaction proceeds and what a catalyst is.</p> <p>By the end of the topic the students will be able to:</p>	<p>9.8 - What is radiation?</p> <p>In this topic students will learn about what radiation is and how it can be used</p> <p>By the end of the topic the students will be able to:</p> <ul style="list-style-type: none"> -Explain the differences between the three forms of radiation. 	<p>9.9 How is our environment changing?</p> <p>In this topic students will review what they know about ecosystems and learn about the water, carbon and nitrogen cycles.</p> <p>By the end of the topic the students will be able to:</p> <ul style="list-style-type: none"> -Describe how water, carbon and nitrogen form cycles.

<p>-Explain different experimental methods for comparing the rate of reaction. -Explain why concentration, surface area and temperature all affect the rate of reaction -Explain what a catalyst is</p> <p>Prior learning: Prior learning: Year 7-What is a particle Year 7-What is energy Year 7, 8 & 9 chemistry topics From these topics students will be able to apply what they know about movement of particles and will be able to apply this to understanding chemical reactions</p> <p>Future learning All of these topics are part of the KS4 Physics curriculum</p>	<p>-Explain the dangers of radiation. -Give examples of sources of radiation. -Give examples of uses of radiation</p> <p>Prior learning: Prior learning: Year 7-What is energy and what is chemical reaction, students will understand different forms of energy and atomic structure.</p> <p>Future learning All of these topics are part of the KS4 Physics curriculum</p>	<p>-Describe how increasing the carbon in the atmosphere will lead to climate change. -Describe the effects of climate change on the planet and ecosystems.</p> <p>Prior learning: Prior learning: Year 8 - topics on biology they would learn about Ecosystems and adaptation. From KS3 geography they would know the water cycle. .</p> <p>Future learning All of these topics are part of the KS4 Physics curriculum</p>
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