

The school follows the Kent Science Scheme of work, specifically designed to address the Primary National Curriculum. During each key stage, pupils complete projects focused on an area of science as part of their curriculum. The projects are organised into a two-year rolling programme. Pupils learn specific knowledge in each project and deepen their understanding across each year and across each key stage, including the use of key concepts and the development of key vocabulary.

In accordance with the guidance in the new National Curriculum, this scheme has clearly indicated a progression in the key scientific knowledge and concepts, from Year 1 to Year 6. Each of the 28 units of study clearly indicates the aspects of knowledge to be developed. Where appropriate, the unit will indicate the 'learning journey'; i.e. where the knowledge and concepts of that particular unit fit within the learning for that particular aspect of science as the child progresses through the primary phase.

National Curriculum Aims

The national curriculum for science aims to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

Throughout the years of compulsory schooling, schools should, through their science education programmes, aim systematically to develop and sustain learners' curiosity about the world, enjoyment of scientific activity and understanding of how natural phenomena can be explained. Science education should provide every student equally with opportunities that enable them to take an informed part in decisions, and to take appropriate actions, that affect their own wellbeing and the wellbeing of others and the environment. It should aim to develop:

- ☐ understanding of a set of big ideas in science which include ideas of science and ideas about science and its applications
- ☐ scientific capabilities concerned with gathering and using evidence
- ☐ scientific attitudes and dispositions.

Working with Big Ideas of Science Education, 2015, Edited by Wynne Harlen

Key Concepts

Knowledge has been organised around important concepts which support children in building their knowledge and enable them to better predict and explain a large number of phenomena. Having an understanding of these concepts helps children to have a better understanding of science, as well as the elements of scientific inquiry. By knowing core scientific concepts, children develop a better and more accurate perception of how the world works.

Scientific Process

Organisation and Systems

Variation, Change and Diversity

Scale

Deepening Knowledge and Understanding

Children learn and gain knowledge with observations and experiments. They demonstrate knowledge of, and skill in using appropriate scientific disciplines to explore questions and gather evidence to support answers. For example, children pose a scientific question, develop a hypothesis and make educated predictions. They gather evidence, take measurements and evaluate data, present and explain results, report cause and effect and draw conclusions which support or refute a theory.

Children organise and classify objects and phenomena into a logical order which helps understand a subject's complexity or place in a list of hierarchies. For example, plants and animals are organized by kingdom, phylum, class, order, family, genus and species. They also organise various components into systems eg the solar system.

Through observing and exploring variation in elements, children understand and know about the distinctive properties found in objects. By understanding these differences or how elements change, individuals can better predict the outcome of modifications. Children know about diversity in the natural world and gain insight into how ecosystems work and depend on different elements to carry out their intended functions. For example, water in an ecosystem provides a natural habitat for aquatic animals, acts as a source of hydration for others and provides nutrients to plants.

Children build their knowledge and skill in the use of a range of scales to quantify measureable items, including relative scale. For example, the use of a large beach ball to represent the sun and several balls of various sizes for planets. Placing the smaller balls around the beach ball, teacher and children can demonstrate the size of the planets in relation to the sun and indicates their positions in the solar system.

Rationale

Learning is defined as an alteration in long-term memory. If nothing has altered in long-term memory then nothing has been learned.

Sweller

Over the course of study, teaching is designed to help learners to remember in the long term the content they have been taught and to integrate new knowledge into larger concepts.

Ofsted Framework 2019

When students' brains link background knowledge with new text, they are better at making inferences and retain information more effectively.

Vacca and Vacca (2002)

Retrieval is built into the teaching cycle in order to ensure that children activate what they already know and can then build on their existing knowledge, making connections, securing key concepts and deepening learning. Retrieval practice will help teachers to remind pupils of their previous learning and what they know from other subjects, as well as identifying what personal knowledge they bring to the new learning.

These key concepts allow us to encourage our core learning attitudes with different types of enquiry and questioning. They allow for children to develop our schools' core attitudes, including being inquisitive, creative, eager, aspirational, collaborative, confident, adaptable and independent. They promote asking questions about the world and how things work, and also explore and investigate in order to find things out.

They allow children to use scientific enquiry skills across the science curriculum and to deepen their knowledge of enquiry in many varying contexts, including applying skills learned in other areas of the curriculum.

Reception

Learning within our reception year provides the knowledge, skills and understanding bedrock for future learning. Pupils;

- investigate and experience things, and 'have a go'
- concentrate and keep on trying if they encounter difficulties, and enjoy achievements
- have and develop their own ideas, make links between ideas, and develop strategies for doing things

ELG: The Natural World

Children at the expected level of development will:

- explore the natural world around them, making observations and drawing pictures of animals and plants
- 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
- understand some important processes and changes in the natural world around them, including the seasons and changing states of matter

Adapting Teaching for SEND

The Code of Practice says that every teacher is a teacher of SEND. The teachers have overall responsibility for those children and must ensure that they make appropriate progress. Children with identified SEND will have adjustments made in QFT in line with the Mainstream Core Standards. In addition, when planning and teaching the teaching sequence for each project, teachers will consider what adaptations can be made in order for all children to access teaching and learning. Where this is an adaptation beyond the MSC's, teachers will consider, in particular, how specific skills are being developed. Adaptive teaching will be considered and identified by teachers in the medium-term plan for each project. Subject leaders, alongside the SENDCo, will monitor the effectiveness of these adaptations.

Aycliffe Community Primary School – Long Term Science Plan – 2022

Year Group	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
A 1/2	Biology Seasonal Changes - <i>Seasons- observe weather</i>	Biology Animals including humans 1 – Humans/my body <i>Seasons- observe weather</i>		Biology Plants <i>Seasons- observe weather</i>	Chemistry Everyday Materials/explore what toys are made from <i>Seasons- observe weather</i>	Biology Animals including humans 2 – animals- identify and compare <i>Seasons- observe weather</i>
B 1/2	Biology Animals including humans 2 – human health	Chemistry Uses of everyday materials		Biology Plants	Biology Animals including humans 1 – survival and growth	Biology All living things and their habitats
A 3/4	Animals including humans	Electricity		Living things and their habitats	Sound	States of matter
B 3/4	Forces and magnets	Light		Rocks	Plants	Animals including humans
A 4/5	Animals including humans	Electricity		States of matter	Sound	Living things and their habitats
B 4/5	Animals including humans	Properties and changes of materials		Forces	Earth and Space	Living things and their habitats

Year 6	All living things	Electricity		Light	Evolution and Inheritance	Animals including humans
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Federation of Nonington and Goodnestone – Long Term Science Plan – 2022

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B 1/2	Biology Animals including humans 2 – human health	Chemistry Uses of everyday materials		Biology Plants	Biology Animals including humans 1 – survival and growth	Biology All living things and their habitats
A 3/4	Biology Animals including humans	Physics Light		Physics Forces and magnets	Chemistry Rocks	Biology Plants
B 3/4	Biology	Physics		Chemistry	Physics	Biology

	Animals including humans	Sound		States of Matter	Electricity	Living things in their habitats
A 5/6	Biology Animals including humans	Physics Earth and Space		Chemistry Properties and changes in materials	Physics Forces	Biology Living things and their habitats
B 5/6	Biology Evolution and inheritance	Physics Light		Biology Animals including humans	Biology Living things and their habitats	Physics Electricity

Cycle A

YEAR GROUP	Biology Seasonal Changes - <i>Seasons- observe weather</i>	Biology Animals including humans 1 – Humans/my body <i>Seasons- observe weather</i>	Biology Plants <i>Seasons- observe weather</i>	Chemistry Everyday Materials/explore what toys are made from <i>Seasons- observe weather</i>	Biology Animals including humans 2 – animals- identify and compare <i>Seasons- observe weather</i>
Reception	In EYFS have named the four seasons as they experience them They may have knowledge of months of the year linked to their birthdays	In EYFS children have been taught nursery rhymes to include parts of the body, e.g. head, shoulders, knees and toes	In EYFS children have grown plants from seeds They will have observed plants and will know names such as leaf, flower, petal, etc.	Pupils in EYFS have explored a variety of resources that are made of different materials Most will be familiar with the name of the material, i.e. wood, glass, metal, etc.	They know that they come from a family and can identify mother, father and siblings, grandparents as part of their family

	They will almost certainly know that summer is a hot period and winter is generally cold	They will know how to use their senses to explore and observe.	They have walked in a woodland area or noticed trees in the woodland area		Children have discussed pets at home and what they eat They have learnt about animals that can be found in the school woodland area, and have learnt about what they eat They will have come across a variety of animals have grouped them in simple ways
Year 1 / 2	Observe changes across the four seasons Observe and describe weather associated with the seasons and how day length varies (group/classify by association). Observe changes in nature over the different seasons Record the direction of the wind and observe how it may change over time Set up rain gauges to measure rainfall Make an anemometer to measure wind direction Use thermometers to measure temperature in different seasons	Identify, name draw and label the basic parts of the human body and say which parts of the body is associated with each sense. Discipline skills: <i>Observations. Observe closely, using simple equipment.</i> <i>Simple tests</i> <i>Identifying and classifying</i> <i>Secondary sources.</i> <i>Measure using non-standard and standard units. They should use simple secondary sources to find answers.</i>	Observe, identify and name a variety of common plants, including garden plants, wild plants and trees, and classify as deciduous and evergreen Identify and describe the basic structure of a variety of common plants including roots, stem/trunk, leaves and flowers. Discipline skills: <i>Observations. Observe closely, using simple equipment.</i> <i>Simple tests</i> <i>Identifying and classifying</i>	Distinguish between an object and the material from which it is made. Identify and name a variety of everyday materials, including wood, plastic, glass, water and rock. Describe the simple physical properties of a variety of everyday materials. Compare and group together a variety of everyday materials on the basis of their physical properties. Discipline skills:	Identify/name a variety of common animals that are birds, fish, amphibians, reptiles, mammals and invertebrates. Identify/name a variety of common animals that are carnivores, herbivores and omnivores. Describe/compare/classify the structure of a variety of common animals (birds, fish, amphibians, reptiles and mammals, and including pets). Discipline skills: <i>Observations. Observe closely, using simple equipment.</i> <i>Simple tests</i>

	(Continue to observe across the school year – use of floor book) Discipline skills: Observations. Observe closely, using simple equipment. Simple tests Identifying and classifying Secondary sources. Measure using non-standard and standard units. They should use simple secondary sources to find answers. Recording. Gather and record data to suggest answers to their questions. With help, they should record in a range of ways and begin to use simple scientific language. Analysing observations. Use observations and ideas to suggest answers to questions. Notice patterns and relationships in their observations. Talk about what they have found out and how they found out.	Recording. Gather and record data to suggest answers to their questions. With help, they should record in a range of ways and begin to use simple scientific language. Analysing observations. Use observations and ideas to suggest answers to questions. Notice patterns and relationships in their observations. Talk about what they have found out and how they found out.	Secondary sources. Measure using non-standard and standard units. They should use simple secondary sources to find answers. Recording. Gather and record data to suggest answers to their questions. With help, they should record in a range of ways and begin to use simple scientific language. Analysing observations. Use observations and ideas to suggest answers to questions. Notice patterns and relationships in their observations. Talk about what they have found out and how they found out.	Observations. Observe closely, using simple equipment. Simple tests Identifying and classifying Secondary sources. Measure using non-standard and standard units. They should use simple secondary sources to find answers. Recording. Gather and record data to suggest answers to their questions. With help, they should record in a range of ways and begin to use simple scientific language. Analysing observations. Use observations and ideas to suggest answers to questions. Notice patterns and relationships in their observations. Talk about what they have found out and how they found out.	Identifying and classifying Secondary sources. Measure using non-standard and standard units. They should use simple secondary sources to find answers. Recording. Gather and record data to suggest answers to their questions. With help, they should record in a range of ways and begin to use simple scientific language. Analysing observations. Use observations and ideas to suggest answers to questions. Notice patterns and relationships in their observations. Talk about what they have found out and how they found out.
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	Biology	Physics	Physics	Chemistry	Biology
	Animals including humans	Light	Forces and magnets	Rocks	Plants
Year 3 / 4	Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat. Know that humans and some animals have skeletons and muscles for support, protection and movement. Classify animal skeletons into different groups, showing similarities and differences between animals. Record and use drawings. Discipline skills: - Raising Questions. They should be given a range of scientific experiences to enable them to raise their own questions about the world around them. - Choosing a suitable scientific enquiry.	Know that light is needed in order to see things and that dark is the absence of light. Notice that light is reflected from surfaces. Know 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 a solid object. Find patterns in the way that the sizes of shadows change. Discipline skills: - Raising Questions. They should be given a range of scientific experiences to enable them to raise their own questions about the world around them. - Choosing a suitable scientific enquiry. They should start to make their own decisions about	Observe and compare how different objects move on different surfaces. Notice that some forces need contact between two objects, but magnetic forces can act at a distance. Observe how magnets attract or repel each other and attract some materials and not others. Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. Describe magnets as having two poles. Predict whether two magnets will attract or repel each other, depending on which poles are facing.	Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. Describe in simple terms how fossils are formed when things that have lived are trapped within rock and change over time. Recognise that soils are made from rocks and organic matter. Discipline skills: - Raising Questions. They should be given a range of scientific experiences to enable them to raise their own questions about the world around them. - Choosing a suitable scientific enquiry. They should start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions	Identify and describe the functions of different parts of plants; roots, stem, leaves and flowers. Explore the requirements of plants for life and growth (air, light, water, nutrients from soil and room to grow) and how they vary from plant to plant. Investigate the ways in which water is transported within plants. Explore the role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. Discipline skills: - Raising Questions. They should be given a range of scientific experiences to enable them to raise their own questions about the world around them. - Choosing a suitable scientific enquiry. They should start to make their own decisions about the most

They should start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions • Observations. They should help to make decisions about what observations to make, how long to make them for. They should make systematic and careful observations. • Fair testing. Recognise when a simple fair test is necessary. • Sorting and classifying. Talk about the criteria for grouping, sorting and classifying and use simple keys. • Secondary sources. They should recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations. • Choosing equipment. They should help to make decisions about the type of simple equipment that might be used. They should learn how to use new equipment, such as a data loggers and thermometers, appropriately. • Collecting data. They should collect data from their own	the most appropriate type of scientific enquiry they might use to answer questions • Observations. They should help to make decisions about what observations to make, how long to make them for. They should make systematic and careful observations. • Fair testing. Recognise when a simple fair test is necessary. • Sorting and classifying. Talk about the criteria for grouping, sorting and classifying and use simple keys. • Secondary sources. They should recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations. • Choosing equipment. They should help to make decisions about the type of simple equipment that might be used. They should learn how to use new equipment, such as a data loggers and thermometers, appropriately. • Collecting data. They should collect data from their own observations and measurements.	Discipline skills: • Raising Questions. They should be given a range of scientific experiences to enable them to raise their own questions about the world around them. • Choosing a suitable scientific enquiry. They should start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions • Observations. They should help to make decisions about what observations to make, how long to make them for. They should make systematic and careful observations. • Fair testing. Recognise when a simple fair test is necessary. • Sorting and classifying. Talk about the criteria for grouping, sorting and classifying and use simple keys. • Secondary sources. They should recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations. • Choosing equipment. They should help to make decisions about the type of simple equipment that might be used. They should learn how to use new equipment, such as a data loggers and thermometers, appropriately. • Collecting data. They should collect data from their own observations and measurements.	• Observations. They should help to make decisions about what observations to make, how long to make them for. They should make systematic and careful observations. • Fair testing. Recognise when a simple fair test is necessary. • Sorting and classifying. Talk about the criteria for grouping, sorting and classifying and use simple keys. • Secondary sources. They should recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations. • Choosing equipment. They should help to make decisions about the type of simple equipment that might be used. They should learn how to use new equipment, such as a data loggers and thermometers, appropriately. • Collecting data. They should collect data from their own observations and measurements. • Measuring. They should use standard units. • Recording. They should make decisions as to how to record. They should record in notes, drawings,	appropriate type of scientific enquiry they might use to answer questions • Observations. They should help to make decisions about what observations to make, how long to make them for. They should make systematic and careful observations. • Fair testing. Recognise when a simple fair test is necessary. • Sorting and classifying. Talk about the criteria for grouping, sorting and classifying and use simple keys. • Secondary sources. They should recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations. • Choosing equipment. They should help to make decisions about the type of simple equipment that might be used. They should learn how to use new equipment, such as a data loggers and thermometers, appropriately. • Collecting data. They should collect data from their own observations and measurements. • Measuring. They should use standard units. • Recording. They should make decisions as to how to record. They should record in notes, drawings,
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	Biology	Physics	Chemistry	Physics	Biology
	Animals including humans	Earth and Space	Properties and changes in materials	Forces	Living things and their habitats
Year 5 / 6	Describe the changes as humans develop from birth to old age. Comparing gestation periods of different animals compared to humans. Human body during puberty. Parts of the body that change as you get older. Discipline skills: <i>Planning enquires. Children should plan different types of enquiry to answer questions. Identifying variables. Children should recognise and control variables where necessary. Secondary sources. Children should recognize</i>	Explore and describe the movement of the Earth, and other planets, relative to the Sun in the solar system Describe the movement of the Moon relative to the Earth. 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. Discipline skills:	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 Observe and understand that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution Use knowledge of solids, liquids and gases to decide how mixtures might be	Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object (relative scale possibilities) Identify the effects of air resistance, water resistance and friction, that act between moving surfaces Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. Identify scientific evidence that has	Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird Describe the life process of reproduction in some plants and animals. Recognise which secondary sources will be most useful to their research. (non-statutory) Use scientific diagrams and labels. Discipline skills: <i>Planning enquires. Children should plan different types of enquiry to answer questions. Identifying variables. Children should recognise and control variables where necessary. Secondary sources. Children should recognize when secondary sources will be most</i>

when secondary sources will be most useful to research their ideas and begin to separate opinion from fact. Using equipment. They should choose the most appropriate equipment. Children should take measurements, using a range of scientific equipment with increasing accuracy and precision. Collecting data. They should make their own decisions about what observations to make, what measurements to use, and how long make them for. Recording. They should choose how to record data. Children should record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables and bar and line graphs. They should report and present findings from enquires, including conclusions, causal relationships and explanations of results (in oral and written forms). Analysing data. Children should use test results to make predictions to set up further comparative and fair test. They should use simple models to describe scientific ideas. 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They should report and present findings from enquires, including conclusions, causal relationships and	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 on bicarbonate of soda. Discipline skills: Planning enquires. Children should plan different types of enquiry to answer questions. Identifying variables. Children should recognise and control variables where necessary.	been used to support or refute ideas or arguments. Discipline skills: Planning enquires. Children should plan different types of enquiry to answer questions. Identifying variables. 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Key Component Knowledge– Cycle A
For discipline knowledge see steps

Year 1	Biology Seasonal Changes - Name the 4 seasons: spring, summer, autumn and winter Name different types of weather: snow, rain, sun, fog, wind Know the weather in each season: spring – rain getting warmer, summer- hotter and dry, autumn -more rain getting colder and winter - cold snow How the amount of daylight changes in each season. The days are short in the	Biology Animals including humans 1 – Humans/my body Name the main parts of the human body: facial features, knees, elbows, shoulder etc. Able to label the main parts of the human Body	Biology Plants Name & identify some common garden plants and trees Know I the basic parts of a plant – roots, stem, flower Know the role of the basic parts of a plant – roots take in water and food, stem hold the flower, flower produces pollen Sequence the seasonal cycle of trees	Chemistry Everyday Materials Identify key materials. wood, plastic, metal, fabric Identify materials by their properties. Eg – smooth, soft Know that materials are what something is made out of and objects are what materials are made into Know that natural materials are not made by man; they are found in	Biology Animals including humans 2 Know that there are 6 main groups of animals - mammals, birds, fish, reptiles, amphibians and insects Identify some characteristics of the 5 groups Know that an herbivore only eats plants. A carnivore only eats meat & an omnivore eats both
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	winter and long in the summer		buds and blossom, leaves, turn brown and fall off A plant needs light, water and warmth to Grow	our land. Man-made objects are made by humans	
Year 2	As above and in addition: Know that in spring the weather becomes warmer – leaves begin to grow on the trees and some trees blossom (have flowers) – plants begin to grow and baby animals such as lambs may be seen. In the summer, the weather is generally warmer and the days are longer and nights shorter The trees are full of leaves and there are lots of flowers, bees, butterflies and other insects The weather includes the temperature, wind	As above and in addition: Know the five senses Know a wider range of human body parts, to include: chest, stomach, forehead, eyebrow Know that the human body is made up of many different parts. Each part of the body has a specific job to do. Each part works together so we can eat, live, breathe, eat, dance and so much more Know that their bones make up the skeleton in their bodies. The smallest bone is the ear	As above and in addition: Know that there are different types of plants: trees, moss, bushes and shrubs, and fruit and vegetables Know that plants grow from seeds and seeds come in lots of different shapes and sizes Know that we eat some plants – fruits and vegetables, and that these plants grow in the same way as other plants	As above and in addition: Know a wider range of materials: rubber, rock, glass, water, sand, flour, milk, soil Know the meaning of absorbent, transparent and opaque, and identify and classify material into these categories Confidently use verbs to describe properties of materials: crumble, squash, bend, stretch, twist	As above and in addition: Know and accurately use the terms: feathers, scales, gills, fins, hair, land, water, backbone, skeleton Identify a wider range of animals confidently: amphibians, reptiles, mammals and invertebrates Use the terms herbivore, carnivore and omnivore accurately

	direction and strength, cloud, rain, snow and sun				
Year 3	Biology Animals including humans We need food in order to grow, be strong & be healthy The 5 food groups are fruit and vegetables, carbohydrates, dairy, protein, fats Fruit and vegetables give us fibre and vitamins, carbohydrates give us energy, dairy is important for teeth and bones, protein helps grow and build muscles, fats are only needed in small amounts for energy The skeleton is there to support, protect	Physics Light A source of light makes light Dark is the absence of light A reflection is when a light bounces off a surface Materials are opaque (no light will pass through), translucent (small amounts of light can pass through) or transparent (see through) Shadows are formed when the light source is blocked by an object. Demonstrate how a shadow is formed	Physics Forces and magnets A force is a push or pull action on an object Friction occurs between two surfaces that slide against each other Two different ends of a magnet are the north and the south pole Opposite poles attract and the same poles repel Some types of metal attract magnets (magnetic) - all other materials do not attract magnets	Chemistry Rocks When a volcano erupts lava it cools to become igneous rock Sedimentary rocks are formed when sediment is squashed under the pressure of layers of more sediment above Metamorphic (morph means change) rocks are made when rocks are under pressure or heated or cooled Fossils are formed when skeletons are buried, worn away and then replaced by rock within the mould	Biology Plants Identify and explain the reproductive parts of a plant Understand how a plant Reproduces Understand seed dispersal Understand how water is transported through a plant Sequence the life cycle of a flowering plant

	internal organs and move Muscles move the skeleton				
Year 4	As above and in addition: Know how nutrients, water and oxygen are transported within animals and humans Know about the skeletal and muscular system of a human and some other animals	As above and in addition: Seeing an object – Know that when light reaches an object, it can be absorbed, or it can pass through the object or it can be reflected. Light colours reflect more light than darker colours. White objects reflect nearly all light. Black reflects very little light. Explain how a shadow changes shape Explain how light can be reflected using clear diagrams to support ideas	As above and in addition: Explain how properties of any given material affects the motion of two touching surfaces Explain how magnets attract and repel Predict whether magnets will attract or repel and give a reason based on scientific knowledge and understanding	As above and in addition: Name and categorise a wider range of different types of rock: granite, basalt, obsidian, slate, marble, sandstone, limestone, flint, chalk, shale Explain the layers of soil: Half of soil is air and water. In soil you can find sand, small stones, bits of leaves and roots. There are also millions of micro-organisms in the soil which help break down the matter and make the soil healthy and full of life	As above and in addition: Clearly explain the function of a wider range of plant parts, to include: Ovary Ovule Filament Anther Style Sepal Explain the different ways in which seeds are dispersed, giving examples

Year 5	Biology Animals including humans	Physics Earth and Space	Chemistry Properties and changes in materials	Physics Forces	Biology Living things and their habitats
	Know that Reproduction is the process by which new living things are made Sequence the growth of a fetus Sequence the stages of a human Record the changes that happen from children to puberty Record the changes that happen from puberty to adulthood	Identify and label the planets in the milky way Understand how the planets move around the sun including the time of earth's rotation/ leap year Understand what an eclipse is Understand how we see the moon as it travels around the earth Label the phases of a moon	Group materials according to their properties Use tools to separate materials- e.g. through filtering, sieving and evaporating Dissolving is when disappears in a liquid to make a transparent liquid called a solution A reversible change is when a material can be changed back to its original state Give examples of irreversible change	Gravity is a pulling force that works across space Newton discovered gravity The weight of an object is caused by gravity pulling it down and Mass is a measure of the amount of 'stuff'/matter inside an object Mechanisms allow forces to become greater Air resistance, water resistance and friction effect an object by pushing against it	Draw and label life cycles of a mammal, an amphibian, an insect and a bird Asexual reproduction needs only one parent, which creates offspring that are exact copies of the parent Sexual reproduction requires two parents to make one offspring Plants reproduce when pollen from the male anther enters the female ovule Mammals reproduce when a male sperm fertilises a female ovum

Year 6	As above and in addition:	As above and in addition:	As above and in addition:	As above and in addition:	As above and in addition:
	Know the life cycle of different living things e.g. mammal, amphibian, insect and bird Know the differences between different life cycles	Know how gravitational forces cause the orbits of the planets and their moons Know how the tilt of the Earth causes the seasons	Know and explain how a material dissolves to form a solution Know how the properties of the different components of a mixture lead to different methods of separating them Explain how some changes result in the formation of a new material and that this is usually irreversible	Know what gravity is and its impact on our lives Explain the effect of air and water resistance Explain how levers, pulleys and gears allow a smaller force to have a greater effect	Create a detailed flow-chart and explanations to demonstrate knowledge of reproduction in animals Explain the differences between sexual and asexual reproduction

Cycle B					
YEAR GROUP	Biology	Chemistry	Biology	Biology	Biology
	Animals including humans 2 – human health	Uses of everyday materials	Plants	Animals including humans 1 – survival and growth	All living things and their habitats
Reception	Pupils know the importance of handwashing in relation to stopping	Pupils can describe how different objects feel using vocabulary-	Children will have grown plants from seeds	Children have explored the basic stages of growth and compared their height	Pupils have discussed pets at home and know what some pets eat

	the spreading of bad germs They know that moving and stretching helps to make the body strong Pupils know that vegetables and fruit are good for the body and foods high in sugar are not Pupils know that it is important to brush their teeth Pupils know that apples, oranges, carrots, peas are good for you. They know that lots of sweets are bad for you In PE children know the importance of exercise on a healthy body They have made a healthy sandwich in food technology	hard, soft, rough, bendy They know that plastic is a material that some objects are made from They know that wood can be made into objects by man	They have observed plants and will know names such as leaf, flower, petal, etc. They have walked in a woodland area and explored different types of trees and plants, identifying their parts, including a flowering plant	with other pupils in their class Children know that they need air to breathe and food and water to live	They will have come across a variety of animals Pupils have explored the woodland regularly and identified a variety of living things such as minibeasts and birds- worms, slugs, centipedes, butterflies, woodlice, ants
Year 1 / 2	Describe the importance for humans of exercise,	Identify and compare the suitability of a variety of everyday	Observe and describe how seeds and bulbs	Notice that animals, including humans,	Explore and compare the differences between things that

	eating the right amounts of different types of food, and importance of hygiene. Investigate the affects of exercise on the human body. Discipline Skills: See cycle A (use of different scales)	materials, including wood, metal, plastic, glass, brick, fabric, rock, paper and cardboard for particular uses. Discipline Skills: See cycle A (use of different scales)	grow into mature plants Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy (opportunity to compare differences) Discipline Skills: See cycle A (use of different scales)	have offspring which grow into adults Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) Discipline Skills: See cycle A (use of different scales)	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 micro-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. Discipline Skills: See cycle A (use of different scales)
	Biology	Physics Sound	Chemistry States of Matter	Physics Electricity	Biology

	Animals including humans				Living things in their habitats
Year 3 / 4	Describe the simple functions of the basic parts of the digestive system in humans Identify the different types of teeth in humans and their simple functions Construct and interpret a variety of food chains, identifying producers, predators and prey. Discipline Skills: See cycle A (use of different scales)	Know how different sounds are made, associating some of them with something vibrating Know that vibrations from a sound 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. Know that sounds get fainter as the distance from the sound source increases. Discipline Skills: See cycle A (use of different scales)	Compare and group materials together, according to whether they are solids, liquids or gases Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. Discipline Skills: See cycle A (use of different scales)	Identify and compare 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 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 Know that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit Know some common conductors and insulators, and associate metals with being good conductors. Discipline Skills: See cycle A (use of different scales)	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 Recognise that environments can change and that this can sometimes pose dangers to living things. Discipline Skills: See cycle A (use of different scales)

	Biology	Physics	Biology	Biology	Physics
	Evolution and inheritance	Light	Animals including humans	Living things and their habitats	Electricity
Year 5 / 6	Recognise that living things have changed over time and that fossils 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. Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. Identify scientific evidence that has been used to support or refute ideas or arguments. Discipline Skills: See cycle A (use of different scales)	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. Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them- classification/grouping of materials that reflect and those that do not). Use scientific evidence to support or refute an idea. Discipline Skills:	Identify and name the main parts of the human circulatory system, and explain the functions of the heart, blood vessels and blood. 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. Discipline Skills: See cycle A (use of different scales)	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. Give reasons for classifying plants and animals based on specific characteristics. Discipline Skills: See cycle A (use of different scales)	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. Discipline Skills: See cycle A (use of different scales)

		See cycle A (use of different scales)			
Key Component Knowledge Cycle B For discipline knowledge see steps					
Year 1	Biology Animals including humans 2 – human health Name some healthy foods: apples, oranges, bananas, broccoli, carrots, porridge oats, fish Know that fruit and vegetables should be eaten daily because they contain lots of vitamins Know why some food when eaten in too large amounts is bad for our health – e.g. sugar Know why exercise is good for our health	Chemistry Uses of everyday materials Know how materials can be changed by squashing, bending, twisting and stretching Identify what materials can be used for/ what can they be made into-make furniture/ build houses/ mould into toys Know why a material might or might not be used for a specific job-that it has useful properties such as: hard, soft, light, heavy	Biology Plants Knows the four main parts of a plant - leaves, flower, stem and roots. A plant needs light, warmth, water, soil and air to grow Can describe, with the help of pictures/experiments over time / working wall, how seeds grow into plants – the four main stages	Biology Animals including humans 1 – survival and growth Identify an animals young - cow/ calf, cat/ kitten, tadpole/ frog, horse/foal Know the basic stages in a life cycle for animals, (including humans) The basic needs of humans are food, oxygen, water Basic changes from birth to old age in humans Grow, walk, talk, brain develops, stop growing, age	Biology All living things and their habitats Classify things by living, dead or never lived Identify some main habitats: woodland, pond and sea, bush, trees, Identify some living things that live in above habitats

Year 2	Biology	Chemistry	Biology	Biology	Biology
	Animals including humans 2 – human health As above and in addition: Name some healthy food groups: Fruits and vegetables, pastas and rice Know why some food when eaten in too large amounts is bad for our health – e.g. sugar, salts and fats Can explain that vitamins are nutrients that the body needs to stay healthy Know why exercise, a balanced diet and good hygiene are important for humans Exercise develops our muscles, especially our heart	Uses of everyday materials As above and in addition: Know how materials can be changed by squashing, bending, twisting and stretching Identify what materials can be used for/ what can they be made into-make furniture/ build houses/ mould into toys Know why a material might or might not be used for a specific job-that it has useful properties such as: waterproof, flexible, rigid Biodegradable means it can be broken down naturally and return to nature	Plants As above and in addition: A plant also needs nutrients to grow Explain how seeds grow into mature plants- A plant begins as a seed, then germinates, grows roots, grows a stem with leaves, grows a flower, produces seeds or spreads its pollen Knows that the leaves of the plant help the plant to make its own food through photosynthesis. Know that plants need water, light and a suitable temperature to grow and stay healthy.	Animals including humans 1 – survival and growth As above and in addition: Name some life processes: growth, nutrition (feeding), respiration (breathing is part of this) and reproduction Can describe the meaning of: offspring / reproduction / growth / breathing	All living things and their habitats As above and in addition: Know that a living thing feeds, breaths, moves, grows, reproduces and gets rid of waste Identify some main habitats: as above and bush, trees, cliffs, scrubland, ocean, desert Identify some living things that live in above habitats Within each habitat, plants are always at the start of a food chain. This gives energy to the animal that eats it. This animal (prey) is then eaten by another animal (a predator) and they, in turn, get energy

	Can describe the meaning of: hygiene/exercise/ Germs / disease	without having a harmful impact on the environment			A food chain consists of a producer, a primary consumer and a secondary consumer
Year 3	Biology Animals including humans Name the parts of the human digestive system Know the functions of the organs in the human digestive system Label the types of teeth Sequence a simple food chain	Physics Sound Sound is made when something vibrates Sound travels in straight lines The further the distance the lower the volume	Chemistry States of Matter Group materials based on their state of matter (solid, liquid, gas) Know the temperature at which materials change state Know about how some materials can change state Know the part played by evaporation and condensation in the water cycle	Physics Electricity Appliances run on electricity Label electrical symbols A circuit will work when it is complete, closed and has a power Source An insulator will not allow electricity to pass through it and a conductor allows electricity to pass through it	Biology Living things in their habitats Use classification keys to group, identify and name living things Plastic pollution, deforestation, volcanoes & urbanisation changes and effects the habitats where animals live

Year 4	Biology	Physics	Chemistry	Physics	Biology
	Animals including humans As above and in addition: Know the different types of human teeth Sequence the functions of the organs in the human digestive system Know the functions of different human teeth A food chain contains the sun, producers, primary consumer, secondary consumer, tertiary consumer, decompose	Sound As above and in addition: Know how sound is made, associating some of them with vibrating Know how sound travels from a source to our ears Know the correlation between pitch and the object producing a sound Know the correlation between the volume of a sound and the strength of the vibrations that produced it Sound is measured in pitch (how high or low a sound is) and amplitude (the volume)	States of Matter As above and in addition: A solid is rigid with a fixed shape and volume. Its molecules are tightly packed A liquid is not rigid with no fixed shape and volume. Its molecules are many but can move about A gas is not rigid with no fixed shape and volume. Its molecules are spaced far apart and can move freely Materials such as water can change between a solid, liquid and gas Label and explain the water cycle – collection, evaporation, condensation, precipitation	Electricity As above and in addition: Name appliances that require electricity to function Name the components in a series circuit (including cells, wires, bulbs, switches and buzzers) Know the function of a switch Know the difference between a conductor and an insulator; giving examples of each	Living things in their habitats As above and in addition: Explain how living things can be grouped in order to identify and name them Know how changes to an environment could endanger living things

Year 5	Biology	Physics	Biology	Biology	Physics
	Evolution and inheritance As above and in addition: The shape of teeth is a consequence of an animal's diet Fossils tell us information about how that living thing lived Offspring have some of their parents characteristics Animals and plants adapt to suit their environment Know who Darwin was and give a simple explanation of his theory of evolution	Light As above and in addition: Light travels in a straight line to the eye We see objects when light is reflected on an object The size of a shadow changes as the light source moves. Know how simple optical instruments work mirror	Animals including humans As above and in addition: Know that exercise increases the heart rate Give examples of how exercise and a healthy diet have a positive impact on the body Describe the negative impact on the body eg, smoking, alcohol Describe how water is transported around the body - circulatory system	Living things and their habitats As above and in addition: Name the five kingdoms of organisms Give examples organisms in the five kingdoms Know how to classify living things into broad groups according to observable characteristics and based on similarities and differences	Electricity As above and in addition: Give reasons for why components work and do not work in a circuit Know how to draw circuit diagrams using correct symbols The higher the voltage from the cells the brighter the light The higher the voltage from the cells the higher the volume of a buzzer

Year 6	Biology	Physics	Biology	Biology	Physics
	Evolution and inheritance As above and in addition: Explain how living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago Know that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents Explain how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution	Light As above and in addition: Describe and explain using specific scientific vocabulary accurately (emits, opaque, source, surface, translucent, transparent) the relationship between a blocking object and its shadow, and why objects look bent in water (reference to speed and direction and angle of entry and exit) Know how simple optical instruments work - periscope, magnifying glass	Animals including humans As above and in addition: Know the impact of diet, exercise, drugs and lifestyle on health, making connections between Name the seven main components of the heart (four chambers: two upper chambers known as the left atrium and right atrium and two lower chambers called the left and right ventricles) and explain their function Know the ways in which nutrients and water are transported in animals, including humans	Living things and their habitats As above and in addition: Give reasons for classifying plants and animals in a specific way Know how to classify species into the five kingdoms and other groupings (Amphibians, Reptiles, Mammals, Fish Insects, Birds, animal plant single celled life form) Explain how fungi is formed using scientific vocabulary precisely (microscopic, decompose, spores, mold, yeast)	Electricity As above and in addition: Give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches Explain why the arrangement of components in a circuit can affect how they function Know that the length of wires in a circuit can affect how the components function

Year Group Learning Expectations

Year 1	Plants • Know the names of a variety of common wild and garden plants, including deciduous and evergreen tree • Know and describe the basic structure of a variety of common flowering plants, including trees Animals including humans • Know the names a variety of common animals including fish, amphibians, reptiles, birds and mammals • Know the names of a variety of common animals that are carnivores, herbivores and omnivores • Know and describe the differences between the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) • Know the basic parts of the human body and say which part of the body is associated with each sense Everyday Materials • Know the difference between an object and the material from which it is made • Know the names of a variety of everyday materials, including wood, plastic, glass, metal, water, and rock • Know and can describe the simple physical properties of a variety of everyday materials • Know how to compare and group together a variety of everyday materials on the basis of their simple physical properties. Seasonal Changes • Know about changes across the four seasons • Know about and describe weather associated with the seasons and how day length varies.
Year 2	Living things and their habitats • Know the differences between things that are living, dead, and things that have never been alive • Know 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 • Know the names of a variety of plants and animals in their habitats, including micro-habitats • Know and 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. Plants • Know and describe how seeds and bulbs grow into mature plants • Know and describe how plants need water, light and a suitable temperature to grow and stay healthy Animals, including humans • Know that animals, including humans, have offspring which grow into adults • Know and describe the basic needs of animals, including humans, for survival (water, food and air) • Know and describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene Uses of everyday materials • Know about the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses

	Know that the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching
Year 3	Plants - Know and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers - Know the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant - Know the way in which water is transported within plants - Know the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal Animals, including humans - Know that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat - Know that humans and some other animals have skeletons and muscles for support, protection and movement. Rocks - Know about the differences between different kinds of rocks on the basis of their appearance and simple physical properties - Know in simple terms how fossils are formed when things that have lived are trapped within rock - Know that soils are made from rocks and organic matter Light - Know that we need light in order to see things and that dark is the absence of light - Know that light is reflected from surfaces - know that light from the sun can be dangerous and that there are ways to protect their eyes - Know that shadows are formed when the light from a light source is blocked by a solid object - Know the way that the size of shadows change and can find patterns Forces and magnets - Know and can compare how things move on different surfaces - Know that some forces need contact between two objects, but magnetic forces can act at a distance - Know how magnets attract or repel each other and attract some materials and not others and can describe magnets as having two poles - Know whether two magnets will attract or repel each other, depending on which poles are facing. - Know how to compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials
Year 4	Living things and their habitats - Know that living things can be grouped in a variety of ways - Know how to use classification keys to help group, identify and name a variety of living things in their local and wider environment - Know that environments can change and that this can sometimes pose dangers to living things Animals, including humans - Know and describe the simple functions of the basic parts of the digestive system in humans - Know the different types of teeth in humans and their simple functions - Know how to construct and interpret a variety of food chains, identifying producers, predators and prey States of matter - Know how to compare and group materials together, according to whether they are solids, liquids or gases - Know that some materials change state when they are heated or cooled, and can measure or research the temperature at which this happens in degrees Celsius (°C) - Know the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. Sound

	• Know how sounds are made, associating some of them with something vibrating • Know that vibrations from sounds travel through a medium to the ear • Know about the relationship between the pitch of a sound and features of the object that produced it • Know about the relationship between the volume of a sound and the strength of the vibrations that produced it • Know that sounds get fainter as the distance from the sound source increases. Electricity • Know common appliances that run on electricity • Know how to construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • Know 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 • Know that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit • Know some common conductors and insulators, and associate metals with being good conductors.
Year 5	Living things and their habitats • Know and describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird • Know and describe the life process of reproduction in some plants and animals. Animals, including humans • Know and describe the changes as humans develop to old age. Properties and changes of materials • Know, compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets • Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution • Know how mixtures might be separated, including through filtering, sieving and evaporating using my knowledge of solids, liquids and gases • Know the reasons for the particular uses of everyday materials, including metals, wood and plastic, based on evidence from comparative and fair tests • Know and can demonstrate that dissolving, mixing and changes of state are reversible changes • Know and can 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 Earth and Space • Know and describe the movement of the Earth, and other planets, relative to the Sun in the solar system • Know and describe the movement of the Moon relative to the Earth • Know and can describe the Sun, Earth and Moon as approximately spherical bodies • Know and can explain day and night and the apparent movement of the sun across the sky using the idea of the Earth's rotation Forces • Know and can explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • Know the effects of air resistance, water resistance and friction, that act between moving surfaces • Know that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect
Year 6	Living things and their habitats • Know and can 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 • Know and can give reasons for classifying plants and animals based on specific characteristics Animals, including humans • Know the names of the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood • Know the impact of diet, exercise, drugs and lifestyle on the way their bodies function • Know and can describe the ways in which nutrients and water are transported within animals, including humans

	Evolution and inheritance • Know that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago • Know that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents • Know how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution Light • Know and can explain that objects are seen because they give out or reflect light into the eye using the idea that light travels in straight lines • Know and can 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 • Know and can explain why shadows have the same shape as the objects that cast them using the idea that light travels in straight lines Electricity • Know the association between the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit • Know and can 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 • Know how to use recognised symbols when representing a simple circuit in a diagram.
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Two-year Rolling Programme

Additional Key Vocabulary which compliments key vocabulary lists included in Kent Primary Science Scheme of Work
(Andrew Berry)

Topic	Year 1/2	Year 3/4	Year 5/6
Animals including humans	Reptiles, Mammals, Amphibians (+ examples of each) Herbivore, Omnivore, Carnivore, Survival, Offspring, Calf, Exercise, Hygiene	Muscles, Contract, Relax, Joints, Nutrition, Nutrients, Carbohydrates, Protein, Fats, Fibre, Vitamins, Minerals, Invertebrates, Vertebrates, Digestive system, Small Intestine, Large Intestine,	Foetus, Embryo, Womb, Gestation, Development, Puberty, Life Cycle, Fertilisation, Reproduce, Life Expectancy, Skeletal, Muscle, Digest , Circulatory system, Blood vessels, Lifestyle, Nutrients,

		Colon, Saliva, Canine, Incisor, Molar Producers	Substances
Plants	Deciduous, Evergreen, Blossom, Petals, Roots, Bulb, Stem, Temperature, Growth	Nutrients, Reproduction, Transportation, Transpiration, Dispersal, Pollination	
Living Things in their Habitats	Living, Habitat, Energy, Food chain, Predator, Prey, Woodland, Desert, Source, Adapt	Vertebrates, Invertebrates, Environment, Human impact	Life Cycle, Mammal, Reproduction, Amphibian, Offspring Classify Classification Domain kingdom phylum, Class, Family Genus, Species, Characteristics, Micro-organisms, Organism,

			Flowering, Non-flowering,
Evolution and Inheritance			Evolution, Adaption, Inherited Traits, Adaptive Traits, Natural Selection, Inheritance, Charles Darwin, Alfred Wallace, DNA, Variation, Offspring, Fossil
Everyday Materials including Rocks	Rough, Smooth, Stretchy, Stiff, Bending, Twisting, Stretching, Elastic, Foil Dull, Waterproof, Absorbent, Fabrics	Fossils, Sandstone, Granite, Marble, Rock Pumice, Crystals, Absorbent, Sedimentary, Organic matter, Grains Solid, Liquid, Gas, Evaporation, Condensation, Particles,	Properties, Solubility, Transparency, Electrical Conductor, Thermal Conductor, Magnets, Dissolve, Solution, Separate, Separating, Reversible Changes, Dissolving, Evaporation, Filtering, Sieving, Melting, Irreversible,

		Freezing, Solidify Changing State, Degrees Celsius, Water Cycle, Water Vapour	Quantitative, Measurements, Conductivity, Insulation, Chemical
Forces and Magnets		Magnetic, Force, Attract, Repel, Friction, Poles, Magnetic Poles	Gravity, Air Resistance, Water Resistance, Friction, Surface, Force, Effect, Accelerate, Decelerate, Mechanism, Pulley, Gear, Spring, Theory of gravitation Galileo Galilei, Isaac Newton
Light		Reflective, Reflection, Natural, Artificial	Refraction, Reflection, Spectrum, Rainbow, Travels, Straight, Reflect, Light Source, Object,

			Shadows, Mirrors, Periscope, Filters SEE ALSO YEAR FIVE EARTH AND SPACE
Seasonal Changes	Seasons Weather, Summer, Spring, Autumn, Winter		
Electricity		Cells, Switches, Buzzers, Motor, Circuit, Series, Conductors, Insulators, Complete Circuit	Amps, Volts, Voltage, Cell, Circuit Diagram, Symbols
Sound		Vibration, Wave, Pitch, Tone, Percussion, Wood wind, Brass, Insulate	
Earth and Space			Earth, Sun,

			Moon, Orbit, Axis, Rotation, Spherical, Day, Night, Hemisphere, Season, Tilt, Phases of the Moon, Star, Constellation, Solar system , Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto
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Appendix i

The “Big Ideas” content for teachers

Through observing and exploring variation in elements, children understand and know about the distinctive properties found in objects. By understanding these differences or how elements change, individuals can better predict the outcome of modifications. Children know about diversity in the natural world

and gain insight into how ecosystems work and depend on different elements to carry out their intended functions. For example, water in an ecosystem provides a natural habitat for aquatic animals, acts as a source of hydration for others and provides nutrients to plants.

When learning during the science projects pupils will deepen their knowledge of the following 'Big Ideas', the learning from which will contribute towards children's understanding of objects, phenomena and relationships in the natural world.

All matter in the Universe is made of very small particles-Chemistry

5-7

All the 'stuff' encountered in everyday life, including air, water and different kinds of solid substances, is called matter because it has mass, and therefore weight on Earth, and takes up space. Different materials are recognisable by their properties, some of which are used to classify them as being in the solid, liquid or gas state, and to identify their suitability for different purposes.

7-11

When some substances are combined they form a new substance (or substances) with properties that are different from the original ones. Other substance simply mix without changing permanently and can often be separated again. At room temperature, some substances are in the solid state, some in the liquid state and some in the gas state. The state of many substances can be changed by heating or cooling them. The amount of matter does not change when a solid melts or a liquid evaporates.

Changing the movement of an object requires a net force to be acting on it- Physics

5-7

Forces can push, pull or twist objects, making them change their motion or shape. Forces act in particular directions. Equal forces acting in opposite directions in the same line cancel each other and are described as being in balance. The movement of objects is changed if the forces acting on them are not in balance.

7-11

The speed of a moving object is a measure of how far it would travel in a certain time. How quickly an object's motion is changed depends on the force acting and the object's mass. The greater the mass of an object, the longer it takes to speed it up or slow it down, a property of mass described as inertia.

The total amount of energy in the Universe is always the same but can be transferred from one energy store to another during an event- Chemistry / Physics

5-7

There are various ways of causing an event or bringing about change in objects or materials. Objects can be made to change their movement by pushing or pulling. Heating can cause change, as in cooking, melting solids or changing water to vapour.

7-11

Electricity can make light bulbs glow. Wind can rotate the blades of wind turbines. In all these changes, energy is transferred from one object, which is an energy source or resource, to another. Fuels such as oil, gas, coal and wood are energy resources. Some energy resources are renewable, such as those produced by wind, waves, sunlight and tides, others are non-renewable such as from burning fossil fuels with oxygen.

Organisms are organised on a cellular basis and have a finite life span- Biology

5-7

There is a wide variety of living things (organisms), including plants and animals. They are distinguished from non-living things by their ability to move, reproduce and react to certain stimuli. To survive they need water, air, food, a way of getting rid of waste and an environment which stays within a particular range of temperature.

7-11

Although some do not appear to be active, all will at some stage carry out the life processes of respiration, reproduction, feeding, excretion, growth and developments and all will eventually die.

Organisms require a supply of energy and materials for which they often depend on, or compete with, other organisms- Biology

5-7

All living things need food as their source of energy as well as air, water and certain temperature conditions. Plants containing chlorophyll can use sunlight to make the food they need and can store food that they do not immediately use. Animals need food that they can break down, which comes either directly by eating plants (herbivores) or by eating animals (carnivores) which have eaten plants or other animals.

7-11

Animals are ultimately dependent on plants for their survival. The relationships among organisms can be represented as food chains and food webs. Some animals are dependent on plants in other ways as well as for food, for example for shelter and, in the case of human beings, for clothing and fuel. Plants also depend on animals in various ways. For example, many flowering plants depend on insects for pollination and on other animals for dispersing their seeds.