Subject Information:

How we teach Science

in our

Heritage Coast Federation

Heritage Coast Federation Science Progression

Inquisitive, independent Investigators

Intent

At the Heritage Coast Federation, it is our intention to offer a high quality science education that provides children with the foundations they need in order to recognise the importance of Science in every aspect of daily life, develop a lifelong curiosity and interest in the sciences. Teachers will ensure that all children are exposed to high quality teaching and learning experiences. These will hook the children's interest, enabling them to develop a sense of excitement and curiosity about natural phenomena. They will be encouraged to ask questions about the world around them and work increasingly scientifically to further their conceptual understanding and scientific knowledge.

We give the teaching and learning of Science high prominence. Children have regular lessons in Science throughout Key Stage 1 and 2. In the Early years, science is taught through play and exploration and pupils are supported by the class teacher to extend and develop their scientific knowledge and develop the foundations of science enquiry skills. Opportunities for the children to learn science in the early years, is carefully planned and provided for.

When planning for the science curriculum, we intend for children to have the opportunity, wherever possible, to learn through varied systematic investigations. As children progress through the year groups, they build on their skills in working scientifically, as well as on their scientific knowledge, as they develop greater independence in planning and carrying out fair and comparative tests to answer a range of scientific questions. At the Heritage Coast Federation, in conjunction with the aims of the National Curriculum, our Science teaching offers opportunities for children to:

- encourage respect for living organisms and the physical environment.
- 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;
- be equipped with the scientific knowledge required to understand the uses and implications of Science, today and for the future.
- develop the essential scientific enquiry skills to deepen their scientific knowledge and find the answers to their own scientific questions with increasing independence.
- Use a range of methods to communicate their scientific information and present it in a systematic, scientific manner, including I.C.T., diagrams, graphs and charts and provide opportunities for critical evaluation of evidence.
- Develop a respect for the materials and equipment they handle with regard to their own, and other children's safety.
- Develop an enthusiasm and enjoyment of scientific learning and discovery.

Additional opportunities are provided in Science, such as celebrating British Science week, taking part in Stem challenges and competitions, frequently using our unique local environment and working with the National Parks, Trust and other local science based organisations, as well as further educational visits linked to the science curriculum.

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Implementation

Teachers create a positive attitude to science learning within their classrooms and reinforce an expectation that all children are capable of achieving high standards in science. Our whole school approach to the teaching and learning of science involves the following;

- Science will be taught in planned and arranged topic blocks and wherever possible, links are made to the class topic. This is a strategy to enable the achievement of a greater depth of knowledge.
- Each lesson has a clear focus. We are currently using the two year Hamilton Trust Mixed age Scheme of work to ensure the Working Scientifically Skills are taught at an appropriately challenging level and all learning is differentiated for each year group so that all children have an appropriate level of support and challenge. Working Scientifically skills are embedded into lessons to ensure these skills are being developed throughout the children's school career and new vocabulary and challenging concepts are introduced through direct teaching. This is developed through the years, in-keeping with the topics. The Hamilton plans are adjusted to allow opportunity for regular revision of previously taught topics.
- For each Science topic, teachers use the PLAN knowledge matrices to better understand the key learning and vocabulary that pupils need to acquire; pupils prior and future learning; common misconceptions that pupils may have; and possible evidence that would indicate pupils are secure in the learning and vocabulary. These matrices also help ensure that teachers are equipped with secure scientific subject knowledge, enabling them to deliver high-quality teaching and learning opportunities that ensure the full coverage of all five types of scientific enquiry.
- Through using the Hamilton Trust planning, we involve problem solving opportunities that allow children to find out for themselves. Children are encouraged to ask their own questions and are given opportunities to use their scientific skills and research to discover the answers. This curiosity is celebrated within the classroom. Planning involves teachers creating engaging lessons, often involving high-quality resources to aid understanding of conceptual knowledge. Teachers use precise questioning, supported by the North Yorkshire science resources, in class to test conceptual knowledge and skills, and assess children regularly to identify those children with gaps in learning, so that all children keep up.
- We build upon the learning and skill development of the previous years. As the children's knowledge and understanding increases, and they become more proficient in selecting, using scientific equipment, collating and interpreting results, they become increasingly confident in their growing ability to come to conclusions based on real evidence. We are developing science topic knowledge organisers, to support pupil's revision, retention and recall of new/previous science knowledge.
- Teachers demonstrate how to use scientific equipment, and the various Working Scientifically skills in order to embed scientific understanding.

Impact

Progress is measured through a child's ability to know more, remember more and explain more. This is measured in different ways across our topic units. The use of key questions in the Hamilton Planning and assessment questions from the North Yorkshire Science Resources, ensures opportunities are built into the lesson for ongoing assessment. Teaching and Assessment of Primary Science (TAPS) assessment materials are used to support assessment and the moderation of science. Attainment and progress can be measured across the school using Target Tracker.

- The impact of using the full range of resources included in the science unit, will also be seen across the school with an increase in the profile of science. The learning environment across the school will be more consistent with science technical vocabulary displayed, spoken and used by all learners. Children who feel confident in

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their science knowledge and enquiry skills will be excited about science, show that they are actively curious to learn more and will see the relevance of what they learn in science lessons to real-life situations and also the importance of science in the real world.

- Most children **will** achieve age related expectations in Science at the end of their cohort year.
- Children will retain knowledge that is pertinent to Science with a real life context.
- Children will be able to question ideas and reflect on knowledge.
- Children will work collaboratively and practically to investigate and experiment.
- Children will be able to explain the process they have taken and be able to reason scientifically.

By the end of KS2, our expectation is that children will be able to develop their own questions, plan different types of enquiries to answer those questions and communicate their findings in a variety of ways. Children will understand that part of science is failing and that problem solving helps us to overcome these failures. Children will have a clear understanding of how scientists both past and present have contributed to society's understanding of the world around them. They will understand the role that science and other STEM subjects play in solving some of the key problems facing the world, such as climate change.

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Learners in EYFS

This document demonstrates which statements from the 2020 Development Matters are prerequisite skills for science within the national curriculum. The table below outlines the most relevant statements taken from the Early Learning Goals in the EYFS statutory framework and the Development Matters age ranges for Three and Four-Year-Olds and Reception to match the programme of study for science.

The most relevant statements for science are taken from the following areas of learning:

- Communication and Language
- Personal, Social and Emotional Development
- Understanding the World

Science		
Reception	Communication and Language	• Learn new vocabulary. • Ask questions to find out more and to check what has been said to them. • Articulate their ideas and thoughts in well-formed sentences. • Describe events in some detail. • Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. • Use new vocabulary in different contexts.
Reception Continued	Personal, Social and Emotional Development	• Know and talk about the different factors that support their overall health and wellbeing: -regular physical activity -healthy eating -toothbrushing -sensible amounts of 'screen time' -having a good sleep routine -being a safe pedestrian

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	Understanding the World		• Explore the natural world around them. • Describe what they see, hear and feel while they are outside. • Recognise some environments that are different to the one in which they live. • Understand the effect of changing seasons on the natural world around them.
ELG	Communication and Language	Listening, Attention and Understanding	• Make comments about what they have heard and ask questions to clarify their understanding.
	Personal, Social and Emotional Development	Managing Self	• Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.
	Understanding the World	The Natural World	• 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.

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Working Scientifically Progression

Key Vocabulary

EYFS	KS1	LKS2	UKS2
Science Experiment Fair Find out Explain Reason Why Change	question, answer, observe, observing, equipment, identify, sort, group, compare, differences, similarities, describe, measurements, test, results, secondary sources record – diagram, chart	oral and written explanations, conclusion, predictions, criteria, classify, changes, data, contrast, evidence, improve, secondary sources, guides, keys, construct, interpret research – relevant question equipment – thermometer, data – gather, standard units, record, classify, present record – drawings, labelled diagrams, keys, bar charts, tables	plan, variables, measurements, accuracy, precision, repeat readings, predictions, further comparative and fair test, identify, classify and describe, patterns, systematic, quantitative measurements report data – scientific diagrams, labels, classification keys, tables, scatter graphs, bar graph and line graphs report and present – conclusions, casual relationships, explanations, degree of trust, oral and written display and presentation evidence – support, refute, ideas or arguments biology, physics, chemistry

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Skill	EYFS	KS1	LKS2	UKS2
Asking Questions and Carrying Out Fair and Comparative Tests	**(ELG) Communication and language** **Make comments about what they have heard and ask questions to clarify their understanding.** *Communication and language* -Ask questions to find out more and to check what has been said to them -Articulate their ideas and thoughts in well-formed sentences.	Ask simple questions and recognise that they can be answered in different ways *Children can:* *-ask simple questions that begin with why, what if, how or when with help and encouragement.* - develop their ability to ask questions (such as what something is, how things are similar and different, the ways things work, which alternative is better, how things change and how they happen) while exploring the world, Where appropriate, they answer these questions. -answer questions developed with the teacher often through a scenario. • be involved in planning how to use resources provided to answer the questions using different types of enquiry, helping them to recognise that there are different ways in which questions can be answered.	Ask relevant questions linked to a topic/ theme and begin to recognise which type of enquiry they could use to answer a question. Children can: - consider their prior knowledge when asking questions. - independently use a range of question stems and where appropriate, they answer these questions. -answer questions posed by the teacher. -given a range of resources, the children decide for themselves how to gather evidence to answer the question. - recognise when secondary sources can be used to answer questions that cannot be answered through practical work. They identify the type of enquiry that they have chosen to answer their question. Set up simple practical enquiries, comparative and fair tests Children can: -select from a range of practical resources to gather evidence to answer questions generated by themselves or the teacher. -follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking. ***Explanatory note*** *A comparative test is performed by changing a variable that is qualitative e.g. the type of material, shape of the parachute. This leads to a ranked outcome.* *A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.*	Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary Children can: -independently ask scientific questions. This may be stimulated by a scientific experience or involve asking further questions based on their developed understanding following an enquiry. -given a wide range of resources the children decide for themselves how to gather evidence to answer a scientific question. - choose a type of enquiry to carry out and justify their choice. - recognise how secondary sources can be used to answer questions that cannot be answered through practical work. -select from a range of practical resources to gather evidence to answer their questions. - carry out fair tests, recognising and controlling variables. -decide what observations or measurements to make over time and for how long. -look for patterns and relationships using a suitable sample.

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Skill	EYFS	KS1	LKS2	KS2
Observing and Measuring Changes	**ELG-Understanding the World** 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. (ELG: Managing Self) Be confident to try new activities and show independence, resilience and perseverance in the face of challenge *Understanding the world* -Explore the natural world around them. -Describe what they see, hear and feel while they are outside *Personal, Social and Emotional Development* Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.	Observing closely, using simple equipment Children can: - explore the world around them. -make careful observations to support identification, comparison and noticing change. -use appropriate senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations. -begin to take measurements, initially by comparisons, then using non-standard units Performing simple tests Children can: -use practical resources provided to gather evidence to answer questions generated by themselves or the teacher. - carry out: tests to classify; comparative tests; pattern seeking enquiries; and make observations over time.	Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers Children can: -make systematic and careful observations. -use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements.	Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate Children can: - select measuring equipment to give the most precise results e.g. ruler, tape measure or trundle wheel, force meter with a suitable scale. -During an enquiry, they make decisions e.g. whether they need to: take repeat readings (fair testing); increase the sample size (pattern seeking); adjust the observation period and frequency (observing over time); or check further secondary sources (researching); in order to get accurate data (closer to the true value).

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Skill	EYFS	KS1	LKS2	KS2
Identifying, Classifying, Recording and Presenting Data	Describe events in some detail. Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. Use new vocabulary in different contexts.	Identifying and classifying Children can: -use their observations and testing to compare objects, materials and living things. - sort and group these things, identifying their own criteria for sorting. -use simple secondary sources (such as identification sheets) to name living things. -describe the characteristics they used to identify a living thing. Gathering and recording data to help in answering questions Children can: - record their observations e.g. using photographs, videos, drawings, labelled diagrams or in writing. -record their measurements e.g. using prepared tables, pictograms, tally charts and block graphs. -classify using simple prepared tables and sorting rings	Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, pictures, labelled diagrams or writing. Children can: -record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add headings). - record classifications e.g. using tables, Venn diagrams, Carroll diagrams. -present the same data in different ways in order to help with answering the questions with support	Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs Children can: -decide how to record and present evidence. They record observations e.g. using annotated photographs, videos, labelled diagrams, observational drawings, labelled scientific diagrams or writing. - record measurements e.g. using tables, tally charts, bar charts, line graphs and scatter graphs. - record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys. -present the same data in different ways in order to help with answering the question.

Skill	EYFS	KS1	LKS2	KS2
Drawing Conclusions, Noticing Patterns , Presenting Findings and Evaluating	**ELG-Understanding the World** **Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.** **ELG Communication and language** **Make comments about what they have heard and ask questions to clarify their understanding.** *Communication and language* Describe events in some detail.	Using their observations and ideas to suggest answers to questions Children can -use their experiences of the world around them to suggest appropriate answers to questions. They are supported to relate these to their evidence e.g. observations they have made, measurements they have taken or information they have gained from secondary sources. - recognise 'biggest and smallest', 'best and worst' etc. from their data.	Using straightforward scientific evidence to answer questions or to support their findings Children can: - answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. The answers are consistent with the evidence.	Identifying scientific evidence that has been used to support or refute ideas or arguments Children can: -answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. When doing this, they discuss whether other evidence e.g. from other groups, secondary sources and their scientific understanding, supports or refutes their answer.

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	Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. *Personal, social and Emotional development* -Know and talk about the different factors that support their overall health and wellbeing: • regular physical activity • healthy eating • toothbrushing • sensible amounts of 'screen time' • having a good sleep routine • being a safe pedestrian *Understanding the world* Recognise some environments that are different to the one in which they live. Understand the effect of changing seasons on the natural world around them.		Identifying differences, similarities or changes related to simple scientific ideas and processes Children can: - interpret their data to generate simple comparative statements based on their evidence. They begin to identify naturally occurring patterns and causal relationships. Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions Children can: - draw conclusions based on their evidence and current subject knowledge.	- talk about how their scientific ideas change due to new evidence that they have gathered. -talk about how new discoveries change scientific understanding. Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations Children can: -in their conclusions, children: identify causal relationships and patterns in the natural world from

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Skill	EYFS	KS1	LKS2	KS2
Drawing Conclusions, Noticing Patterns , Presenting Findings and Evaluating			-identify ways in which they adapted their method as they progressed or how they would do it differently if they repeated the enquiry.-use their evidence to suggest values for different items tested using the same method e.g. the distance travelled by a car on an additional surface. -following a scientific experience, the children ask further questions which can be answered by extending the same enquiry. Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions Children can: communicate their findings to an audience both orally and in writing, using appropriate scientific vocabulary.	their evidence; identify results that do not fit the overall pattern; and explain their findings using their subject knowledge. - evaluate, for example, the choice of method used, the control of variables, the precision and accuracy of measurements and the credibility of secondary sources used. -identify any limitations that reduce the trust they have in their data. - communicate their findings to an audience using relevant scientific language and illustrations. Using test results to make predictions to set up further comparative and fair tests Children can: -use the scientific knowledge gained from enquiry work to make predictions they can investigate using comparative and fair tests.

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Progression in the Knowledge and Understanding of Science

(red statements are from linked topics/Blue vocabulary from linked PSHE/RHSE)

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	EYFS	Year 1 and 2	Year 3 and 4	Year 5 and 6
BIOLOGY Plants	• Plant seeds and care for growing plants. Understand the key features of the life cycle of a plant and an animal (butterfly and sunflower). Begin to understand the need to respect and care for the natural environment and all living things. Draw information from a simple map. (Reception – Living things and their habitats) Explore the natural world around them. (Reception – Living things and their habitats) Describe what they see, hear and feel whilst outside. (Reception – Living things and their habitats) Recognise some environments that are different to the one in which they live. (Reception – Living things and their habitats) Understand the effect of changing seasons on the natural world around them. (Reception – Seasonal changes)	Identify and name a variety of common wild and garden plants. Identify and describe the basic structure of a variety of common flowering plants, including trees. Observe how seeds and bulbs grow into mature plants. Describe how seeds and bulbs grow into mature plants. Find out how plants need water, light and a suitable temperature to grow and stay healthy Identify and name a variety of plants and animals in their habitats, including microhabitats. (Y2 - Living things and their habitats)	Identify and describe the functions of different parts of flowering plants: roots; stem/trunk; 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 way in which water is transported within plants. Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. Recognise that living things can be grouped in a variety of ways. (Y4 - Living things and their habitats) Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. (Y4 - Living things and their habitats) Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 - Living things and their habitats)	Describe the life process of reproduction in some plants and animals. (Living things and their habitats) 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. (Living things and their habitats) • Give reasons for classifying plants and animals based on specific characteristics. (Y6 - Living things and their habitats)
Vocabulary	• Tree, petals, trunk, fruit, branch, roots, leaves, flowers, seed	Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud, germinate, root hairs, bulb Names of trees in the school woodland area/grounds: silver birch, Monkey puzzle, apple, holly, oak, Names of garden and wild flowering plants in the local area: heather, fern, nettle, dock, dandelion, bluebell R Y2 Revise Year 1 plus deciduous, evergreen, light, shade, sun, warm, cool, water, grow, healthy, root hairs, nutrients, produce, seedlings, shoot, seed coat, evaporation, damp, cool, wither, limp,	Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal, function, mature, (wind dispersal, animal dispersal, water dispersal)	Stigma, style, ovary, Stamen, anther, filament, carpel, sepal, fertilistation, pollination, respiration, pollinator, carbon dioxide, asexual reproduction, sexual reproduction

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Skill	EYFS	Year 1 and 2	Year 3 and 4	Year 5 and 6
BIOLOGY & PHYSICS Living things and their habitat This topic is taught every year. In KS1, the objectives are differentiated. In Key stage 2, there are 4 topic areas-2 at LKS2 and 2 at UKS2	Begin to understand the need to respect and care for the natural environment and all living things. • • Explore the natural world around them. • Recognise some environments that are different to the one in which they live • Draw information from a simple map. Explore the natural world around them. Describe what they see, hear and feel whilst outside. Recognise some environments that are different to the one in which they live.	Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. (Plants) Identify and describe the basic structure of a variety of common flowering plants, including trees. (Plants) Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. (Animals including humans) Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Animals including humans) Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). (Animals, including humans) Observe changes across the four seasons. (Seasonal change) 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 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 Notice that animals, including humans, have offspring which grow into adults. (Animals including humans)	Identify and describe the functions of different parts of flowering plants: roots; stem/trunk; 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 way in which water is transported within plants. Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. 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	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.
Key Vocabulary	Names of local habitats e.g. pond, woodland etc. Names of micro-habitats e.g. under logs, in bushes etc.	Energy suited, suitable, basic needs, , food chain, shelter, move, feed, healthy, conditions, shelter, leaf litter, predator, prey, Living, dead, never been alive, suited, suitable, basic needs Names of micro-habitats e.g. under logs, in bushes,	Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate	Botanical illustration, ***Carl Linnaeus***, linnaen zoological illustration, Gamete, stamen, stigma, carpel, pistil, pollination, germination, flowering, sexual reproduction, life cycle, seed, pollen, anther, filament, style, ovary, botanical illustration, dissection

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Skill	EYFS	Year 1 and 2	Year 3 and 4	Year 5 and 6
BIOLOGY & CHEMISTRY Animals including Humans	Talk about members of their immediate family and community. Name and describe people who are familiar to them. Recognise some environments that are different to the one in which they live	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. Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. Notice that animals, including humans, have offspring which grow into adults. Find out about and describe the basic needs of animals, 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. 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. (Living things and their habitats)	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. Identify that humans and some other animals have skeletons and muscles for support, protection and movement 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.	Describe the changes as humans develop to old age. Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. (Living things and their habitats) Describe the life process of reproduction in some plants and animals. (Living things and their habitats) Identify and name the main parts of the human circulatory system, and describe 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. 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. (Living things and their habitats) Give reasons for classifying plants and animals based on specific characteristics. (Living things and their habitats)
Key Vocabulary	• body parts e.g. hands, head, teeth penis testicles vulva/ vagina bottom	Offspring, reproduction, growth, child, young/old stages (examples - chick/hen, baby/child/adult, caterpillar/butterfly), exercise, heartbeat, breathing, hygiene, germs, disease, food types (examples – meat, fish, vegetables, bread, rice, pasta) birth death range of more specific external body parts e.g. stomach, chest	Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine breast nipple anus scrotum toiletries bacteria infection hygiene	Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs, lifestyle Puberty Period Menstruation Cervix Labia fallopian tube clitoris ovary/ ovum vulva/ vagina uterus/womb sperm/sperm duct urethra pubic hair voice breaking arousal erection sexual intercourse sex ejaculate conception pregnancy ovulation

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Skill	EYFS	Year 1 and 2	Year 3 and 4	Year 5 and 6
CHEMISTRY & BIOLOGY Evolution and Inheritance	Recognise some environments that are different to the one in which they live. (Living things and their habitats)	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. (Living things and their habitats) Notice that animals, including humans, have offspring which grow into adults. (Animals, including humans)	Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Rocks) Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Plants) Recognise that environments can change and that this can sometimes pose dangers to living things. (Living things and their habitats)	Describe the life process of reproduction in some plants and animals. (Living things and their habitats) 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.
Key Vocabulary	Rock, stone, pebble, soil, mud, Names of local habitats e.g. pond, woodland etc. Names of micro-habitats e.g. under logs, in bushes etc.	Crystals Offspring, reproduction, growth, child, young/old stages (examples - chick/hen, baby/child/adult, caterpillar/butterfly), exercise, heartbeat, breathing, hygiene, germs, disease, food types (examples – meat, fish, vegetables, bread, rice, pasta) birth death range of more specific external body parts e.g. stomach, chest	boulder, grain, , layers, hard, soft, texture, absorb water, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy/chalk/clay soil	offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils

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Skill	EYFS	Year 1 and 2	Year 3 and 4	Year 5 and 6
PHYSICS Seasonal Changes	Explore the natural world around them. Describe what they see, hear and feel whilst outside. Understand the effect of changing seasons on the natural world around them	Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies.	Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. (Light)	Use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky. (Earth and space)
Key Vocabulary	Weather (sunny, rainy, windy, snowy etc.) • Seasons (winter, summer, spring, autumn)	•Sun, sunrise, sunset, day length	Natural, light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous protect,	straight lines, light rays, rotate, orbit, Earth's axis, compass points, tilited

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Skill	EYFS	Year 1 and 2	Year 3 and 4	Year 5 and 6
PHYSICS, CHEMISTRY & BIOLOGY Materials	Explore the natural world around them. Describe what they see, hear and feel whilst outside.	Distinguish between an object and the material from which it is made. Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. Describe the simple physical properties of a variety of everyday materials. Compare and group together a variety of everyday materials on the basis of their simple physical properties. Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. (Rocks) Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Rocks) 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. (Forces and magnets) 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. Recognise some common conductors and insulators, and associate metals with being good conductors. (Electricity)	Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. Give reasons, based on evidence from 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.
Key Vocabulary	Names of materials: wood, metal, paper, plastic, glass, wool,	Names of materials – wood, metal, plastic, glass, brick, rock, paper, cardboard, rubber, clay, wool, fabric, elastic, foil, Properties of materials: hard, soft, stretchy, stiff, floppy, waterproof, absorbent, breaks/tears, opaque,	solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, condensation, temperature, water cycle, rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water,	thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material

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	Hard, soft, rough, smooth, bendy, shiny, dull, see through, not see through	transparent and translucent, reflective, non-reflective, flexible, rigid Shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching	soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy/chalk/clay soil	

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Skill	EYFS	Year 1 and 2	Year 3 and 4	Year 5 and 6
PHYSICS & CHEMISTRY Rocks	Explore the natural world around them. Describe what they see, hear and feel whilst outside.	Distinguish between an object and the material from which it is made. (Everyday materials) Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (Everyday materials) Describe the simple physical properties of a variety of everyday materials. (- Everyday materials) Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Everyday materials) Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Uses of everyday materials)	Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. Describe in simple terms how fossils are formed when things that have lived are trapped within rock. Recognise that soils are made from rocks and organic matter.	Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. (Evolution and inheritance)
Key Vocabulary	Rock, stone, pebble, soil, mud,	crystal	rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy/chalk/clay soil, erosion, erode	Fossils, sedimentary, igneous, metamorphic rock, weathering, precipitation

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Skill	EYFS	Year 1 and 2	Year 3 and 4	Year 5 and 6
PHYSICS, CHEMISTRY & BIOLOGY Light	Describe what they see, hear and feel whilst outside.	Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Animals, including humans) Describe the simple physical properties of a variety of everyday materials. (Materials)	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. Find patterns in the way that the size of shadows change.	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. (Properties and changes of materials) 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.
Key Vocabulary	Eye, senses, light, see, dark, sun, moon,	Surface, star,	light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous, protect, natural, artificial	straight lines, light rays

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Skill	EYFS	Year 1 and 2	Year 3 and 4	Year 5 and 6
PHYSICS & CHEMISTRY Forces	Explore the natural world around them. Describe what they see, hear and feel whilst outside.	Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Uses of everyday materials)	Compare how things 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.	Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. 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.
Key Vocabulary	push/pushing, pull/pulling,	twist/twisting, squash/squashing, bend/bending, stretch/stretching	Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole	Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears

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Skill	EYFS	Year 1 and 2	Year 3 and 4	Year 5 and 6
Sound PHYSICS, CHEMISTRY & BIOLOGY	Describe what they see, hear and feel whilst outside.	Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Animals, including humans)	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. Recognise that sounds get fainter as the distance from the sound source increases.	Describe the auditory range in some animals and understand how/why this has evolved.
Key Vocabulary	Ears, sound, loud, quiet,	Volume, high, low	source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation	Range, echolocation, adaptation, evolution, survival, communication, infrasound

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Skill	EYFS	Year 1 and 2	Year 3 and 4	Year 5 and 6
PHYSICS & CHEMISTRY Electricity	Explore how things work.	Identify electrical devices in the classroom Understand how to save electricity in the classroom and home	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. 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.	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
Key Vocabulary	Electric, electricity, plug, socket, wire, safety, battery, Remote control	Computer, screen, keyboard, i pad, reduce, reuse, recycle	electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol	circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage

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Skill	EYFS	Year 1 and 2	Year 3 and 4	Year 5 and 6
PHYSICS Earth and Space	Explore the natural world around them. Describe what they see, hear and feel whilst outside.	Observe changes across the four seasons. (Seasonal changes) Observe and describe weather associated with the seasons and how day length varies. (Seasonal changes)	*Observe how the Sun appears to move across the sky from East to West* *Observe how the apparent movement of the Sun across the sky causes shadows to change* *Describe how we can see the Moon because the Sun's light reflects off it* *Describe how the Earth and Moon go around the Sun in one year* *Recognise that humans have been to the Moon*	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. •
Key Vocabulary	See seasonal changes	See seasonal changes	surface, shadow, reflect, mirror, sunlight, dangerous, natural, rotate, orbit	Earth, Sun, Moon, (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, solar system, rotates, star, orbit, planets