St. Martin's Science Curriculum Map

Intent

At St. Martin's it is our intent to give all children a strong understanding of the world around them whilst equipping them with the skills and knowledge to help them think scientifically. We encourage children to be inquisitive and we strive to foster a healthy curiosity about our universe, whilst ensuring children gain an understanding of scientific processes. We strive to ensure children are equipped with an understanding of the use and implications of Science, today and for the future. Children will be exposed to a number of scientists and their research and be able to appreciate advances that have been made in science throughout history.

We aim to equip pupils with the skills to work scientifically, asking and answering their own questions through using a range different enquiry types. Children will be scientifically literate and have a strong understanding of scientific vocabulary in the curriculum. From Nursery to Year 6 our pupils will build up a knowledge, through revisiting key areas and building upon previous learning- embedding procedural knowledge into the long term memory.

Through these things and the national curriculum we endeavour to distil a lifelong love for science within our pupils through both the curriculum and extra-curricular activities.

Implementation

Science lessons at St. Martin's have a clear learning objective, which subsequently lead to the acquisition of key scientific knowledge. Each lesson has a clear focus with scientific knowledge and enquiry skills being developed with increasing depth and challenge as children move through the year groups. This is mapped on our long term plan.

Carefully sequenced lessons help to embed scientific knowledge and skills, with each lesson building on previous learning. Activities are effectively differentiated so that all children have an appropriate level of support and challenge. Through ongoing assessment of both skills and knowledge teaching staff are aware of the next steps.
Topic overviews give teaching staff guidance to ensure that they are equipped with secure scientific subject knowledge and a chronological understanding of previous learning.

Children have access to outdoor environments around school which are utilised fully. Where possible, teaching staff will use visits and visitors to enhance their curriculum delivery. Cross curricular links are made in order to help children consolidate knowledge and embed skills.

Impact

Children understand the importance of caring for the environment and how they can be socially responsible. They are aspirational learners and having an understanding of science in the wider world gives them the impetus to continue their science learning journey at high school.

The learning environment across the school is consistent with current learning in science and the associated technical vocabulary displayed, spoken and used by all learners. Children feel confident in their science knowledge and enquiry skills and are excited about science. The learning that takes place in science empowers children to meet life's challenges, makes them curious to learn more and see the importance of science in the future of the real world.

Teaching staff are confident in delivering an engaging science programme. Progress is measured through a child's ability to know more, remember more and explain more. Attainment and progress is measured across the school using the end of unit quizzes and related assessment proformas. Monitoring of science skills across all year groups gives an accurate overview and as a result, the effectiveness of the curriculum is evaluated and any CPD needs can be addressed.

The National Curriculum

Purpose of Study

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

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

Scientific Knowledge and Conceptual Understanding

The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression: pupils may struggle at key points of transition (such as between primary and secondary school), build up serious misconceptions, and/or have significant difficulties in understanding higher-order content.

Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. The social and economic implications of science are important but, generally, they are taught most appropriately within the wider school curriculum: teachers will wish to use different contexts to maximise their pupils' engagement with and motivation to study science.

The nature, processes and methods of Science

'Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group. It should not be taught as a separate strand. The notes and guidance give examples of how 'working scientifically' might be embedded within the content of biology, chemistry and physics, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data.

'Working scientifically' will be developed further at key stages 3 and 4, once pupils have built up sufficient understanding of science to engage meaningfully in more sophisticated discussion of experimental design and control.

Spoken Language

The national curriculum for science reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely.

They must be assisted in making their thinking clear, both to themselves and others, and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

Key Stage 1 – Years 1 and 2

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.

'Working scientifically' is described separately in the programme of study, but must always be taught through and clearly related to the teaching of substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read and spell scientific vocabulary at a level consistent with their increasing word-reading and spelling knowledge at key stage 1

Lower Key Stage 2 – Years 3 and 4

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

'Working scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word-reading and spelling knowledge.

Upper Key Stage 2 – Years 5 and 6

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

'Working and thinking scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read, spell and pronounce scientific vocabulary correctly.

Knowledge and Skills Progression from Nursery to Year 6

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1	Pets and Gardens	My Body	Seasonal Changes	Everyday Materials	Identifying Animals	Identifying Plants
Year 2	Growth and Survival	Exploring Everyday Materials	Living in Habitats	Growing Plants	Super Scientists	Ocean Animals
Year 3	Health and Movement	Forces and Magnets	Rocks, Fossils and Soils	Desert Life	How Plants Grow	Light and Shadow
Year 4	What do Scientists do?	Eating and Digestion	States of Matter	Circuits and Conductors	Living in Environments	Changing Sound
Year 5	Life Cycles	Changes and Reproduction	Properties and Changes of Materials	Earth and Space	Forces in Action	Famous British Scientists
Year 6	Healthy Bodies	Classifying Organisms	Changing Circuits	Seeing Light	Evolution and Inheritence	

BIOLOGY

Year	Term	Scheme of work	Plants	Working Scientifically	Key Vocabulary
Nursery			• I can comment on and ask questions about the natural world. • I am beginning to understand growth, decay and changes over time. • I can show care and concern for living things and the environment.	• I can talk about what I see, using a wide vocabulary.	plant, leaf, stem, branch, root, bark, flower, petal, seed, berry, fruit, vegetable, bulb, plant, hole, dig, water, weed, grow, shoot, die, dead, soil, names of plants they grow
Reception			• I know some similarities and differences between living things. • I can talk about the environment around me and about how environments can be different from one another. • I can make observations of animals and plants and explain why some things occur.	• I can explore the natural world around me, making observations about similarities, differences, patterns and change.	tree, bush, herb, names of plants they see
1	Summer	Identifying Plants	• I know that a plant is a living thing that grows. • I know that plants need sunlight, air and water. • I know that plants have seeds that grow into new plants. • I can recognise where the seeds are in a variety of plants. • I can plant a seed and describe what I expect it to look like in a few weeks time. • I can identify and describe a variety of garden plants. • I can identify the difference between a flower and a tree. • I can identify a variety of wild plants. • I can identify and describe a variety of trees. • I know the difference between an evergreen and a deciduous tree. • I can identify the roots, stem, leaves, flower and petals of a flower. • I know what roots are and why they are important. • I can describe the changes a seed goes through as it becomes a plant.	• I can observe plants closely and draw my findings. • I can use a simple classification key to identify wild flowers. • I can use close observation to explain how a seed changes to a plant.	leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud, names of trees in the local area, names of garden and wild flowering plants in the local area
2	Spring	Growing Plants	• I know that different seeds grow into different plants. • I can use information on a seed packet to tell me when a seed should be planted, how to plant it and how to care for the seed as it grows into a plant. • I can follow the instructions on a seed packet to plant a seed. • I know that seeds can be eaten by humans and animals. • I know that some plants grow from bulbs. • I can explain the life cycle of a plant grown from a bulb, such as a tulip. • I know that the bulb provides a store of food for the plant while it is in the ground during the winter months. • I know that the fruit of the plant is the part that carries the seeds. • I can explain why most plants grow lots of seeds instead of just one. • I can explain some of the ways in which seeds are dispersed. • I know that not all seeds will grow into a new plant and can explain reasons for this. • I know that the term 'germination' refers to the process when a seed starts to grow and produce shoots.	• I can carry out an experiment to observe how the roots of a bulb grow. • I can use close observation to examine different fruits to see how many seeds they have, making predictions beforehand. • I can plan and set up an experiment to find out which conditions are best for seed germination. • I can suggest how to make an experiment a fair test. • I can use the results of my experiment to draw a diagram explaining the best conditions for seed germination. • I can use observation to explain how a seed changes over time.	light, shade, Sun, warm, cool, water, space, grow, healthy, bulb, germinate, shoot, seedling names of plants in local habitats and micro-habitats
3	Summer	How Plants Grow	• I can identify and describe the functions of the roots, stem, leaf and flower of flowering plants. • I know that the root is the first part of the plant to grow from the seed and that the young root absorbs water and minerals from the soil to help the seed sprout. • I can describe each step in the growth of roots. • I can describe the process of water transportation in plants. • I can explain what the process of photosynthesis is. • I know that the plant uses minerals from the soil to make chlorophyll in its leaves. • I can explain what the process of pollination is. • I can explain some of the ways pollen grains get from the male stamen to the female part of the plant. • I can order the stages in the life cycle of flowering plants. • I can identify the ways in which a variety of different plants disperse their seeds. • I know that seeds have an outer coat to protect them that starts to absorb water and soften when it lands in soil. • I know that seeds can have one, two or three seed leaves that store food. • I know that seeds are an important source of food for animals.	• I can observe root growth over a period of time and record my observations in a table. • I can generate ideas for an experiment to test water transportation in plants. • I can plan, set up and carry out an experiment to show how water is transported in plants, making a prediction and recording my observations. • I can make a comic strip to explain the process of pollination, using vocabulary such as stamen, stigma, ovary, nectar and petals. • I can classify plants according to their seed dispersal method. • I can taste test a variety of different seeds. • I can gather data about our class's favourite seeds in a chart. • I can ask and answer questions about the seed data I have gathered.	photosynthesis, pollen, insect/wind pollination, male, female, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal), air, nutrients, minerals, soil, absorb, transport
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Year	Term	Scheme of work	Animals, including Humans	Working Scientifically	Key Vocabulary
Nursery			• I can comment on and ask questions about the natural world. • I am beginning to understand growth, decay and changes over time. • I can show care and concern for living things and the environment.	• I can talk about what I see, using a wide vocabulary.	•
Reception			• I know some similarities and differences between living things. • I can talk about the environment around me and about how environments can be different from one another. • I can make observations of animals and plants and explain why some things occur.	• I can explore the natural world around me, making observations about similarities, differences, patterns and change.	•
1	Summer	Identifying Animals	• I can identify and name a variety of common UK pets. • I can identify a variety of UK mammals, birds, reptiles, fish and amphibians. • I know that mammals have backbones, feed their young with milk and have fur. • I can find a similarity or difference between pairs of mammals. • I know that birds have feathers, wings and a beak. • I know that lizards are cold-blooded vertebrates that lay eggs. • I can identify differences in the features of birds and lizards. • I know that fish and amphibians lay eggs. • I know the steps in the life cycles of amphibians and fish, and spot similarities and differences. • I know what a herbivore, carnivore and omnivore are. • I can identify common animals that are herbivores, carnivores and omnivores. • I can explain some of the ways in which people need to look after pets.	• I can use a Venn diagram to sort animals to show which are herbivores, carnivores and omnivores. • I can use a tally chart to gather data about ou class's favourite pet. • I can use a tally chart to gather information about minibeasts I spot. • I can use information I have gathered in tally charts to answer simple questions.	•
1	Autumn	My Body	• I can name the different parts of my body, such as arms, legs, head, wrist, fingernails, etc. • I can describe which parts of my body I use for different activities. • I can name the five senses. • I can describe why each of the five senses is important, and how we use each one. • I know that the senses of smell and taste are very closely linked.	• I can carry out a blind test to identify familiar smells. • I can gather facts about the sense of smell to answer questions. • I can taste different fruits and use appropriate vocabulary to describe them.	•
2	Autumn	Growth and Survival	• I know that all species of animals have babies, including humans, and that if they didn't the species would become extinct. • I can match a variety of baby animals to their parents. • I know that some baby animals look very similar to their parents and some look very different. • I know that mammals give birth to live young and birds, reptiles and fish lay eggs. • I know that different animals are pregnant for different lengths of time, and that this is often dependent on the size of the animal. • I know that the eggs animals lay are vulnerable to predators and other dangers, which is why the parent animal often builds a nest to keep them safe and lays several eggs at once. • I know that some eggs have hard shells and some eggs have soft shells. • I can identify a variety of animals that give birth to live young and those that lay eggs. • I can explain the stages a human goes through to grow from a baby to an adult. • I know that all animals need food, water and air to stay alive, and that some animals breathe oxygen with their lungs while fish that live under water take in oxygen through their gills. • I know that animals need to live in different environments to get the food, water and oxygen they need. • I know that it is important to eat a healthy balance of foods because different foods are useful to our bodies for different things. • I can use the food pyramid and balanced plate model to find out how much carbohydrate, fruits and vegetables, protein, dairy, fats and sugars I should eat. • I can plan a healthy, balanced meal. • I know that exercise is important to keep our heart and lungs healthy, and that it keeps our muscles strong and flexible. • I know that exercise is important to keep us from getting overweight. • I can design an exercise to work my whole body using different apparatus.	• I can carry out my own research using simple sources to find out what a particular animal needs in order to survive.	
2	Summer	Super Scientists	• I can explain the contributions Florence Nightingale, Joseph Lister and Alexander Fleming made to knowing what makes us ill and how to stop the prevention of germs and diseases.	• I know that scientists discover new things and make advances because they ask questions and work out how to find the answers. • I can carry out simple tests to test my reflexes, recording the results systematically in a table. • I can carry out an experiment to see how many germs are on our hands before and after we wash them. • I can make predictions about what will happen in an experiment.	•

3	Autumn	Health and Movement	• I know that animals, including humans, get the nutrition they need from what they eat. • I know that the two main reasons humans need food is for growth and energy. • I know that we need proteins for growth and to help repair our bodies when we are ill or injured. • I know that starches, fats and sugars are good foods for energy. • I can explain how to eat a healthy, balanced diet. • I can design healthy, balanced meals for people who have dietary restrictions, e.g. vegetarians or people with wheat/dairy allergies. • I know that we have skeletons to support our bodies, protect our internal organs and to help us move. • I can name and locate some of the major bones in the human body. • I can describe similarities and differences between human and animal skeletons. • I know that all vertebrates have a backbone. • I can explain how invertebrates without an internal skeleton protect themselves. • I know that we need muscles to help us move. • I can explain the difference between smooth muscles, cardiac muscles and skeletal muscles. • I can explain the role of flexors and extensors in making our bones move.	• I can classify a variety of foods into different food groups. • I can carry out my own research to find out what foods different animals eat, and record my findings. • I can generate questions to investigate to find out what pets eat. • I can gather data in a tally chart and convert the results into a pictogram. • I can use data to draw conclusions and find the answer to my question. • I can label a diagram of the human skeleton. • I can use a variety of sources of information to find out how invertebrates protect themselves and report my findings. • I can ask and answer questions about muscles. • I can make different movements with my body and explain which muscles I am using.	•
4	Autumn	Eating and Digestion	• I can suggest similarities and differences in the diets of a variety of different animals. • I can identify herbivores, carnivores and omnivores in a variety of different habitats. • I can interpret and construct a variety of food chains with both producers and consumers. • I can suggest what might happen if one or more organisms was taken out of a food chain. • I can identify where canines, incisors and molars are in the human mouth. • I can explain the function of canines, incisors and molars. • I know that teeth have roots that hold the teeth in place in the gums. • I can suggest why different animals have different types of teeth. • I know that young children have 20 milk teeth that start growing through when they are around six months old. • I know that milk teeth fall out and are replaced by 32 adult teeth, which are permanent. • I know that tooth decay can cause teeth to rot and fall out. • I can suggest some ways of making sure my teeth stay healthy. • I can name the organs associated with the digestive system. • I can describe the functions of the basic parts of the digestive system.	• I can classify a wide variety of animals to show whether they are herbivores, carnivores or omnivores. • I can present information about how to keep teeth healthy. • I can draw a diagram to show what I think the digestive system looks like and how it works. • I can ask a variety of questions about the digestive system and use different sources to find out the answers. • I can label a diagram of the digestive system and describe how it works. • I can plan and carry out an experiment (making sure it is a fair test) to explore how acid affects the food in our stomachs.	•
5	Autumn	Changes and Reproduction	• I can describe some of the ways our bodies change as we grow. • I know that our rate of growth is dependent on many different factors. • I can name the different stages in the human life cycle and put them in order. • I can describe the stages in the gestation period of humans and compare this to other animals. • I can describe the growth and development of children from age 0 to 11. • I understand the role of hormones in puberty. • I can describe the changes that occur to both boys and girls during puberty. • I can describe some of the ways teenagers can keep fit and healthy during all the changes that take place during puberty. • I know that a human is fully grown by the time they reach the age of around 20. • I know that the human body starts to deteriorate as it enters old age. • I can describe some of the ways in which humans can make sure they stay fit and healthy as they get older.	• I can create a bar chart to show the gestation period of a range of animals, and use this to answer questions. • I can compare gestation periods in animals with the female animal's weight, and use this to draw conclusions. • I can write a report about the development of children from age 0 to 11. • I can label diagrams of boys and girls to show the changes that take place during puberty.	•

6	Autumn	Healthy Bodies	• I know that people have not always known that disease and illnesses were often related to diet, such as scurvy. • I know that James Lind is credited as being the scientist who conducted the world's first clinical trial to explore the effects of diet on scurvy. • I know that there are two groups of carbohydrates: sugars and starches. • I can describe the importance of the different food groups and why each one is important for keeping our bodies healthy. • I can name some different minerals and why they are important for our bodies. • I can use food labels to match foods to their nutritional values. • I can use food labels to assess how healthy a food is, explaining reasons for my choices. • I know that it is our circulatory system that transports nutrients around our bodies, and that the two organs associated with the circulatory system are the heart and lungs. • I can describe the functions of the heart and lungs. • I can describe how the circulatory system works. • I know that it is important to keep our hearts healthy and that exercise is a crucial part of this. • I know that it is the muscles in our bodies that allow us to move. • I can explain the difference between smooth muscles, cardiac muscles and skeletal muscles. • I can name some of the different muscle groups in the human body. • I can explain which muscles we use for a variety of different physical activities. • I can explain what happens to our muscles and the rest of our body when we exercise. • I can define what a drug is. • I know that some drugs are very beneficial and others are very harmful, and that some drugs are legal and some are illegal. • I can describe the short-term and long-term effects of drugs such as tobacco and alcohol. • I can make suggestions about the ways in which given characters can change their lifestyles to make them healthier.	• I can plan an experiment, as James Lind, to see whether eating different foods can cure scurvy. • I can suggest ways in which James Lind could have expanded his clinical trial. • I can plan a clinical trial to explore the effects of different foods on our bodies, explaining how I will make it a fair test and what I expect the results to show. • I can allocate a variety of foods to their correct food group. • I can assess a variety of food labels to assess which of a group of foods has e.g. the most and least fat, or the most and least carbohydrate. • I can use a diagram of the human heart to suggest how it works. • I can write a detailed report about how the circulatory system works. • I can dissect a heart to explore the heart's chambers, veins and arteries, writing a recount of my findings. • I can take my own pulse before and after exercise, recording the differences. • I can design an investigation to explore how exercise affects our heart rate and draw conclusions from my results. • I can label muscle groups on a diagram of the human body. • I can suggest some exercise that would train different muscle groups. • I can create a presentation to answer a particular question about drugs, using my own research to find answers.	•

Year	Term	Scheme of work	Living Things and their Habitats	Working Scientifically	Key Vocabulary
Nursery			•	•	•
Reception			• I know some similarities and differences between living things. • I can talk about the environment around me and about how environments can be different from one another. • I can make observations of animals and plants and explain why some things occur.	• I can explore the natural world around me, making observations about similarities, differences, patterns and change.	•
1			•	•	•
2	Spring	Living in Habitats	• I know the difference between things that are living, things that are dead and things that have never been alive. • I can name the seven life processes that all living things need to be able to do to stay alive. • I know that all living things will eventually die. • I know what a habitat is. • I know that all living things need to live in a habitat that can provide them with the things they need to stay alive. • I can suggest what type of animals might live in a variety of different habitats. • I can match animals to their correct habitat. • I can identify and name some of the plants and animals that live in a seaside habitat. • I know that the plants and animals in a habitat are all dependent on each other for survival. • I can describe some habitats and their features in other parts of the world, such as rainforest, desert and Arctic habitats. • I can describe why some animals are well suited to their rainforest, desert or Arctic habitats. • I can describe what a microhabitat is. • I can identify some of the minibeasts that live in microhabitats. • I know that plants and animals in a habitat are linked to each other through food chains. • I know that plants get their energy from the sun. • I can construct some simple food chains for a variety of habitats.	• I can classify things that are living, things that are dead and things that have never been alive. • I can explore and observe microhabitats in the local environment. • I can experiment with ways of separating a variety of materials from water, choosing suitable equipment for the task.	•
2	Summer	Ocean Animals	• I can identify and describe a variety of ocean animals. • I can identify and describe the structure of a variety of ocean animals. • I can consider how ocean animals are suited to the environment in which they live. • I can construct some simple food chains for an ocean habitat.	• I can classify animals by those that live in the ocean and those that do not. • I can classify a variety of ocean animals by different criteria. • I can use Venn diagram to show similarities and differences between ocean animals.	•
3			•	•	•

4	Summer	Living in Environments	• I can give a definition for the term 'habitat'. • I can suggest in which habitat you would find a variety of animals. • I can explain why it is important to be able to classify organisms. • I can identify animals that are vertebrates, invertebrates, mammals, birds, insects, fish, reptiles, amphibians, insects, annelids, crustaceans, arachnids, echinoderms and molluscs. • I can identify and classify a variety of British plants. • I know that changing just one thing in a habitat can have a big impact on all the organisms living there. • I can describe what deforestation is and why it is causing a big problem around the world. • I can describe some of the ways in which humans can both help sustain environments and ways in which they harm environments. • I can explain the negative impact draining a pond would have on the local environment, stating my case through a letter.	• I can explore my local area to see how many different habitats there are. • I can use a variety of clues in riddles to help me identify different animals. • I can classify a variety of organisms using my own and given criteria, sorting the results into tables and Carroll diagrams. • I can use a classification key to identify which group an animal belongs to. • I can use a classification key to identify unfamiliar organisms.	•
5	Autumn	Life Cycles	• I can describe the process of sexual reproduction in flowering plants, using each of these terms: petal, anther, carpel, filament, ovary, stamen, stigma, sepal and style. • I can describe the process of asexual reproduction in plants, giving some examples of plants that reproduce asexually. • I can describe how and why humans clone plants. • I can describe the process of sexual reproduction in animals. • I know that some animals reproduce externally and others reproduce internally, giving examples for each. • I can describe how the environment in which an animal lives affects the way it reproduces. • I know that hermaphrodites are animals that have both male and female reproductive organs, such as snails. • I can identify animals that live in a British woodland environment. • I can compare different habitats around the world with a British woodland environment and suggest ways in which the living conditions may be more or less challenging for the organisms living there. • I can suggest ways in which the life cycles of different animals might vary in different environments around the world. • I can describe and compare the life cycles of a variety of mammals, reptiles, fish and other animals. • I can describe what a naturalist does. • I can explain the contribution of some famous naturalists to our understanding of nature and the importance of humans looking after the environment.	• I can label the parts of a flowering plant correctly using their scientific names. • I can dissect a flower to explore the male and female parts of the plant. • I can write scientifically accurate descriptions of asexual reproductions in plants using 100 words or less. • I can follow instructions to grow a new plant from cuttings. • I can classify a variety of animals according to how they reproduce. • I can create a scatter graph to show animal gestation and incubation periods, using the information to generate statements and answer questions. • I can research and present data and information about the organisms living in a variety of environments around the world. • I can compare the life cycles of a variety of animals. • I can carry out independent research to find out about the life and achievements of a famous naturalist.	•
6	Autumn	Classifying Organisms	• I can match organisms to their correct group (plant, mammal, amphibian, reptile, bird, fish, insect, crustacean, arachnid or mollusc, as well as echinoderm, myriapod and annelid) using what I know about the features of each group. • I can explain why it is important to be able to classify organisms. • I know the difference between vascular and non-vascular plants. • I can describe the difference between flowering and non-flowering plants. • I know that Carl Linnaeus is known as the Father of Taxonomy because of the system he developed to help classify organisms. • I know that the Linnaeus system uses Latin names for organisms so that there was a globally recognised naming system. • I can describe what each of the seven levels on the classification system are: kingdom, phylum, class, order, family, genus and species. • I can describe what a micro-organism is. • I know that micro-organisms can be classified into the kingdoms of protists, bacteria and fungi. • I can describe some examples of micro-organisms, such as in food production and illnesses.	• I can classify a variety of organisms into groups according to their features. • I can use a classification key to help me identify which group unfamiliar animals belong to. • I can create a presentation with labelled diagrams to show the features of each group of animal. • I can use a variety of criteria to classify animals that belong to the same group, e.g. mammals. • I can create a classification key to help identify a variety of flowering and nonflowering plants. • I can gather plant samples (or photographs of plants) from the local area, then create a classification key to identify them. • I can find a variety of different ways to classify different plants. • I can use the Linnaeus classification system to identify the kingdom, phylum, class, order, family, genus and species of a variety of organisms. • I can use the Linnaeus classification system to answer questions about different organisms. • I can carry out my own research to create a report about a particular family of animals, including pictures, diagrams and information. • I can ask questions about micro-organisms and use my own research to answer them. • I can carry out a fair test to explore which foods yeast most likes to eat, recording the results and drawing conclusions. • I can gather samples of organisms in the local area (or take photos) to identify and classify organisms found in the local area. • I can carry out my own research to find out about different groups of organisms in a different part of the world, presenting my findings appropriately.	•

6	Summer	Evolution and Inheritance	• I know that living things produce offspring of the same kind, but that normally offspring vary and are not identical to their parents. • I can suggest some common inherited characteristics, e.g. hair colour, eye colour, height, etc. • I know that 'variation' occurs from generation to generation in a species. • I can identify examples of variation in animals that are cross-bred. • I can identify the features of the environment an animal lives in and can explain some of the ways in which the animal has adapted to suit its environment. • I know that some inherited features are advantageous and some are not. • I know that, over many generations, advantageous features may be spread across a whole species, making them better adapted to their environment. • I understand how the adaptation of plants and animals to suit their environment may lead to evolution. • I can explain Darwin's theory of evolution and the process of natural selection. • I know that Darwin explained each step in the Linnaeus classification system to show where part of a population developed a new variation and eventually formed a new species. • I know that some variations are caused by mutations, and that some of these are harmless, some are advantageous and some are disadvantageous. • I know that changes to an environment can affect the evolutionary process. • I know that palaeontologists study fossils to explore how species have evolved over time. • I understand how humans have evolved over time, and how human behaviour can affect changes in other species over time.	• I can identify features I have inherited from my parents and note variations. • As a class, we can arrange ourselves in different ways according to our inherited characteristics. • I can carry out my own research to find animals that live in a particular environment around the world, recording the features that make it advantageous for its habitat. • I can compare and contrast the features of two animals living in the same environment, explaining why each of their features are advantageous for that particular species. • I understand that scientists are always refining, changing and developing the ideas of other scientists, and that ideas can be refuted when further evidence is uncovered. • I can ask questions about evolution and use my own research to find the answers, presenting my findings. • I can create a fact file about Charles Darwin, using known facts and my own research. • I can read statements and write persuasive arguments to show whether I agree or disagree, drawing on my knowledge of evolution and inheritance.	•

CHEMISTRY

Year	Term	Scheme of work	Materials and States of Matter	Working Scientifically	Key Vocabulary
Nursery				• I can use all my senses in hands-on exploration of natural materials. • I can explore collections of materials with similar and/or different properties. • I can talk about what I see, using a wide vocabulary.	•
Reception			• I know about similarities and differences in relation to objects and materials.	• I can explore similarities and differences between materials.	•
1	Spring	Everyday Materials	• I know what a material is. • I know the difference between a material and an object. • I can name a variety of materials. • I can describe a material's properties using adjectives. • I can explain why some materials are better suited for different purposes than others.	• I can follow instructions to perform a simple test to see whether a material is waterproof or not. • I can use my observations to suggest which materials would be best for an umbrella.	•
2	Autumn	Exploring Everyday Materials	• I can use a range of appropriate vocabulary to describe the properties of different materials. • I know the difference between a natural and a man-made material. • I know that the same product, e.g. a table, can be made from a variety of different materials, and can suggest suitable materials for each object. • I can explain how glass, pottery and paper are made. • I know that some materials can change shape permanently, some can change shape and go back to their original shape, and some can't change shape. • I can name a variety of materials that can change shape, can change shape temporarily and cannot change shape. • I know that there are lots of different types of plastic that can be used for different purposes. • I can explore the suitability of plastic and metal for different purposes, and explain why each material has been chosen for each different purpose. • I know that paper and cardboard are made from wood and can describe the benefits of using paper and cardboard over wood for different purposes. • I can name some objects that can all be made from wood, plastic and metal, e.g. chairs. • I can suggest appropriate materials for an object to be made from, based on what the object will be used for and who will use it.	• I can suggest different ways of sorting materials based on their properties and characteristics. • I can sort materials into those that are natural and those that are man-made. • I can experiment with what happens to different materials when you bend, twist, stretch and squash them, recording my observations. • I can make predictions about how materials will behave. • I can experiment with ways of making a paper bridge that is strong enough to hold a toy car.	•

3	Spring	Rocks, Fossils and Soils	• I know that most of our planet is made up of rock and that rocks are made up of a mixture of minerals that are pressed tightly together. • I can distinguish between rocks that are naturally occurring and those that are not. • I know that erosion is the process when something is worn away by water, wind or other natural materials over time. • I know that a pedologist is a scientist that studies soil. • I can explain why soil is so important to our planet. • I know that there are different layers of soil and that each layer is known as a horizon. • I can describe the features of each different soil horizon. • I know that the three main types of soil are clay, sand and silt. • I know that scientists split rocks into three main groups: igneous rock, sedimentary rock and metamorphic rock. • I know that igneous, sedimentary and metamorphic rock can change over millions of years in a process known as the rock cycle. • I know that a fossil is the petrified remains of plants and animals from more than 10,000 years ago. • I can explain how fossils are formed. • I know that a palaeontologist is a scientist who studies fossils. • I know that some fossils are common and some fossils are very rare. • I can identify some organisms from their fossils.	• I can classify rocks that are natural and those that are man-made. • I can identify a variety of natural and manmade rocks in my local environment. • I can suggest which criterion has been used to sort rocks into two groups. • I can sort rocks into Venn diagrams and Carroll diagrams based on specific criteria. • I can use my own criteria for sorting rocks into a Carroll diagram. • I can generate ideas for an experiment to test different rocks to see how much they erode. • I can carry out an experiment to test the erosion rate of different rocks, making predictions and recording my findings appropriately. • I can use a variety of sources of information to help me find out about specific rocks and their uses. • I can use observation to explore different soil samples and rank them according to different criteria. • I can classify fossil samples according to various criteria.	•
4	Spring	States of Matter	• I know the difference between a liquid and a solid. • I know how to tell if a material is a liquid or a solid. • I know that gases have mass. • I can describe the properties of a solid, liquid and gas. • I can explain what would happen if a solid, liquid and gas were poured into a container. • I know that solids, liquids and gases behave differently because the particles of each behave differently. • I know that water turns from a liquid to a solid at 0°C and from a liquid to a gas at 100°C. • I know that metals all have different melting points and that these are usually very high temperatures. • I know that the process of a liquid turning into a gas is called evaporation. • I know that the process of a gas cooling and turning into a liquid is called condensation. • I can explain how evaporation and condensation are part of the water cycle.	• I can compare and classify materials according to whether they are solids or liquids. • I can carry out an investigation to see if air weighs anything and report on my findings. • I can draw diagrams to show how the particles in solids, liquids and gases behave differently. • I can experiment with pneumatics and make observations about what I'm doing. • I can research the melting points of a variety of materials. • I can plan and carry out an experiment to see the different melting points of chocolate and evaluate the fairness of my experiment. • I can give different everyday processes which involve melting and freezing. • I can draw diagrams and use written examples to show the processes of evaporation and condensation. • I can label a diagram of the water cycle to show what is happening.	•
5	Spring	Properties and Changes of Materials	• I know that some materials will dissolve in water to form a solution. • I know that not all materials react the same way when mixed with water; some will float, sink, dissolve or react. • I know that dissolving is a reversible change. • I know that soluble materials, such as sugar, are able to be separated from water through evaporation. • I know that filtering is a good way to separate water from insoluble materials, such as sand. • I can identify a range of mixing processes, dissolving processes or changes of state that are reversible. • I know that an irreversible change occurs when two materials react with each other to form a new substance. • I can explain what would happen to a variety of materials when they were heated and cooled, and explain whether these are reversible or irreversible changes. • I know that some materials change state when they are heated or cooled. • I know that when a material is burned, it produces a new product (e.g. gas or ash), which makes burning an irreversible change. • I can identify the properties of a variety of everyday materials, such as whether it is magnetic, conductive, soluble, flexible, etc.	• I can mix a variety of materials with water to see whether they will dissolve, float, sink or react, recording the results in a table. • I can classify materials depending on whether they dissolve, float, sink or react when mixed with water. • I can investigate different irreversible changes by mixing different materials together, observing the results and explaining what has happened. • I can compare and classify a variety of everyday materials based on their properties. • I can carry out a variety of investigations to explore the properties of materials to see if they e.g. conduct electricity, are magnetic, are soluble, etc. • I can give reasons, based on evidence from comparative and fair tests, for uses of everyday materials. • I can plan, set up and carry out a fair test, drawing conclusions and presenting the results.	•
6			•	•	•

Year	Term	Scheme of work	Forces	Working Scientifically	Key Vocabulary
Nursery			•	•	•
Reception			•	•	•
1			•	•	•
2	Summer	Super Scientists	• I know that Isaac Newton was the first person to identify gravity as a force. • I know that gravity is a force that makes things fall to the ground and stops things from floating around in the air.	• I can carry out an investigation to explore the effect adding paper clips to a spinner has on the length of time it takes the spinner to reach the ground. • I can design a marble run with the intention of it taking the longest possible time for the marble to reach the ground.	•
3	Autumn	Forces and Magnets	• I know that a force is a push or a pull on an object, and that a force needs two objects where one pushes or pulls the other to make it move. • I can describe whether a push or a pull is being used to move an object, and describe which direction the forces are acting in. • I know what a forcemeter is and can use one to measure forces in newtons. • I know that some forces, like gravity and magnetism, do not need contact between two objects to make things move. • I know that magnets have a north pole and a south pole. • I can describe lots of different uses for magnets.	• I can carry out a fair test to explore whether objects need the same force to move them across different surfaces. • I can make predictions about the results of my investigation. • I can use my results to draw conclusions. • I can explore whether magnets attract or repel when north poles and south poles are put together. • I can draw diagrams to show the results of my findings. • I can predict which materials will be magnetic and which will not, then test my hypothesis. • I can carry out my own research to find out about uses for magnets and report my findings.	•
4			•	•	•
5	Summer	Forces in Action	• I know that the Earth's gravitational force causes objects to have weight, and that gravity pulls objects towards the centre of the Earth. • I know that friction is the force that acts as resistance between two objects when moving over one another. • I can explain examples of friction using photographs. • I know that air resistance is the force that occurs when air pushes against a moving object, making it slow down. • I can explain examples of how air resistance is used. • I know that water resistance is the force that pushes against objects as they pass through the water. • I know that the shape of an object dictates how much water resistance it will meet as it moves through the water. • I know that pulleys and levers make heavy objects easier to lift and can explain why. • I know that gears allow a smaller force to have a greater effect. • I know that two or more gears working together are called a transmission. • I can explain which direction a follower gear will turn based on the movement of the driver gear when two or more gears are used in a transmission. • I know that the force transmitted by gears in a transmission is called torque. • I can give some examples of how gears and transmissions are used in everyday life. • I can recognise some different types of gears, such as worm gears, rack gears and bevel gears.	• I can carry out an investigation to explore the effect of gravity on falling objects, taking careful measurements and observations to draw conclusions. • I can carry out independent research to find out about the roles Newton and Galileo played in helping our understanding of gravity, presenting my findings appropriately. • I can suggest ways to plan an experiment to find out which surface has the most friction when an object is moved across it. • I can carry out a fair test to explore the friction of different surfaces, recording my results accurately and using them to draw conclusions. • I can analyse a variety of statements, explaining which I agree with and why. • I can plan, set up and carry out an investigation to explore how the size of a parachute affects the speed at which it falls to the ground, recording my results appropriately and using them to draw conclusions. • I can make predictions about which shape of plasticine would fall quickest in a pot of water, giving scientific explanations for my choices. • I can carry out an experiment to test my predictions, recording my results using a stopwatch and using evidence to draw conclusions. • I can create some simple pulleys, exploring the different forces needed to pull the same object and drawing conclusions from my findings. • I can use card or construction toys to create different transmissions, exploring the movement and torque of the driver and follower gears.	•
6			•	•	•

Year	Term	Scheme of work	Light and Sound	
1			•	•
2	Summer	Super Scientists	• I know that Isaac Newton worked out that the light from the sun is made up of lots of different colours mixed together, and that we see this as white light. • I know that you can reverse the process of splitting light with a prism by passing the light through a lens to turn it back into white light. • I can use what I know about light to explain why we have rainbows.	•
3	Summer	Light and Shadow	• I know that we need light in order to see. • I can name a variety of natural and man-made light sources. • I know that the Sun is the most powerful light source. • I know that we have night and day because the Earth rotates on its axis once every 24 hours. • I can describe the difference between dawn and dusk. • I know that shadows are formed when light is blocked by an object. • I know that we have more shadows on a sunny day than on a cloudy day and can explain why. • I know the difference between transparent, translucent and opaque objects. • I know that opaque objects will cast a shadow, translucent objects will cast a faint shadow, and transparent objects will not cast a shadow. • I know that we can see objects because light is reflected from their surfaces; light travels in a straight line from the source to the objects, then bounces off the object to our eyes. • I know that some objects reflect more light than others. • I know that when a surface is very smooth, like a mirror, it reflects a lot of light which is why we can see a reflection.	•
4	Summer	Changing Sound	• I know that sound travels through the air in waves and that sound waves are caused by vibrations in the air. • I know that sound waves pass through some materials more easily than others. • I know that sometimes sound needs to be muffled for safety or convenience. • I can name a variety of musical instruments, describe what they sound like and explain how the sound is made. • I know what the terms 'pitch' and 'volume' mean. • I can identify when the pitch and volume of a sound changes, and explain what has happened. • I can explain how the length, thickness and tightness of a string affects its pitch. • I can explain how the length of the air column in wind instruments changes the pitch.	•
5			•	•

6	Spring	Seeing Light	• I can name the different parts of the eye and describe their function. • I know that light can only travel in a straight line. • I can explain how mirrors can be used to reflect light. • I can explain how objects such as periscopes and rear-view mirrors work and why they are useful. • I know that the angle the light lands on the mirror will affect which angle the light changes direction to, and I know that this is called the angle of reflection. • I know that some surfaces reflect more light than others. • I can explain the difference between a shadow and a reflection. • I can explain how a mirror could make a shadow and a reflection at the same time.	•

Year	Term	Scheme of work	Electricity
Nursery			•
Reception			•
1			•
2	Summer	Super Scientists	• I know that Edison invented the first light bulb that could last for more than 12 hours. • I know that a circuit needs a bulb, battery and wire to work. • I know that a circuit needs to be complete for it to work. • I know the symbols for wire, bulb and battery. • I can create a simple working circuit.
3			•
4	Spring	Circuits and Conductors	• I know that atoms generate electricity when they are rubbed together. • I can explain the difference between static electricity and current electricity. • I know that current electricity needs a complete circuit in order to work properly. • I can use diagrams to explain which circuits will and won't work. • I can explain the difference between mains and battery powered electricity. • I can describe some of the ways in which people can stay safe when using mains electricity. • I can distinguish between objects that use mains electricity and those that use battery-powered electricity. • I can write a definition for the words 'conductor' and 'insulator'. • I can explain why some appliances are made with conductors on the inside and insulators on the outside. • I can explain how switches work to complete a circuit.
5			•

6	Spring	Changing Circuits	• I can define each of these terms: circuit, current, conductor, insulator, volt, component, battery, motor. • I know the difference between a series circuit and a parallel circuit. • I know that if there are too many volts running through a circuit, it will blow the component. • I can recognise and use conventional symbols used in circuit diagrams.

Year	Term	Scheme of work	Physics Earth and Space	Working Scientifically
Nursery				• I can talk about what I see, using a wide vocabulary.
Reception			• I can talk about the environment around me and about how environments can be different from one another.	• I can explore the natural world around me, making observations about similarities, differences, patterns and change.
1	Spring	Seasonal Changes	• I know that the weather is always changing and that we have many different types of weather. • I know that there are four seasons in the UK. • I can name the months each season occurs in. • I can identify the main features of each of the different seasons. • I can describe different clothing that is appropriate to wear during each season. • I can identify differences between each of the four seasons. • I can describe how animals are affected by each of the four seasons, and how their behaviour changes during each one. • I can describe some of the ways humans adapt to the different seasons, e.g. by what we wear, eat and do. • I know that some foods are seasonal. • I know that the number of hours of daylight changes throughout each of the four seasons. • I know that there are more hours of sunlight during the summer than during the winter.	• I can transfer data from a tally chart into a pictogram to show what seasonal clothing was worn. • I can use collected data to answer questions.
2			•	•
3			•	•
4			•	•
5	Spring	Earth and Space	• I know that the Sun, Earth and Moon are roughly spherical in shape. • I can describe what the Sun, Earth and Moon are using appropriate vocabulary. • I know that Earth orbits the Sun and the Moon orbits the Earth. • I can describe how the rotation of the Earth creates night and day. • I know that as well as orbiting the Sun, the Earth rotates on its axis, and that it takes one full day (24 hours) for a complete rotation. • I understand why there are different time zones in the world. • I can describe why the length of daylight changes throughout the year. • I know that the tilt of the Earth's axis is what causes the four seasons of the year. • I know that the Northern and Southern Hemispheres experience seasons at different times of year and can explain the reason for this. • I can describe why the Moon appears to change shape throughout a lunar month. • I can describe the different phases of the Moon using appropriate vocabulary. • I can describe what a solar eclipse is and why it occurs. • I can describe how theories about our solar system have changed over time, explaining the difference between geocentric and heliocentric models. • I know that we are in a galaxy called the Milky Way. • I know that there are three main types of planets in our solar system and can describe the difference between terrestrial, gas giant and ice giant planets. • I can name the planets in our solar system and order them by their distance from the Sun. • I know that the length of a year is different on each planet because of the time it takes each one to orbit the Sun.	• I can draw a labelled diagram of the Sun, Earth and Moon to show how they are related to one another. • I can create a moving model of the Sun, Earth and Moon, and write a description to describe what is happening. • I can make a simple sundial and set it up to observe how shadows change throughout the day. • I can record my observations and use these to draw conclusions. • I can use the internet to research which time zones different cities around the world are in. • I can label diagrams to show which season both the Northern and Southern Hemispheres will be experiencing depending on the Earth's position and tilt. • I can create a graph to show the average day length by month, and use the data to answer questions. • I can create a labelled diagram of the phases of the moon. • I can sort fact cards to show which apply to the geocentric and which apply to the heliocentric explanations of the solar system. • I can use the internet to explore the night sky, stating which planets and constellations will be visible on a given day. • I can carry out my own research to find out key facts about each planet in the solar system. • I can create a 3D model of the solar system.
6			•	•