
SCIENCE
8


Latest
Update

Ofsted review of Science - April 2021

Schools should plan the science curriculum so that pupils build knowledge of key concepts and relationships between them over many years.

Pupils remembering long-term concepts that have been taught.

Explicitly teach pupils the concepts and procedures needed to work scientifically.

Starting the curriculum planning from early years by introducing pupils to a wide range of vocabulary to describe the natural world.

Make sure practical work has a clear purpose, forms part of a wider teaching sequence and takes place when pupils have enough prior knowledge to learn from the activity.

https://www.gov.uk/government/publications/national-curriculum-in-england-science-programmes-of-study/national-curriculum-in-england-science-programmes-of-study

Intent for Science at SEC

- Our intent is to give every child a broad and balanced Science curriculum which enables them to confidently explore and discover what is around them, so that they have a deeper understanding of the world we live in.
- To instil in our children a love of science. We want them to have no limits to what they can achieve and to fulfil their ambitions.
- To inspire children within their science lessons, to value these memories and embrace the scientific opportunities they are presented with which are exciting, practical hands on experiences that encourage curiosity and questioning.
- Stimulating and challenging experiences help every child secure and extend their scientific knowledge and vocabulary, as well as promoting a love and of learning.
- To equip our children with not only the minimum statutory requirements of the science National Curriculum but to prepare them for the opportunities, responsibilities and experiences for later life.

At SEC, in conjunction with the aims of the National Curriculum, our Science teaching offers opportunities for children to:

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;

Develop the essential scientific enquiry skills to deepen their scientific knowledge.

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.

Implementation for Science at SEC

- Children are provided with a coherently planned and sequenced curriculum which has been carefully designed and developed with the need of every child at the centre of what we do.
- Children receive highly focused lessons with sharp learning intentions.
- There is high pupil involvement and engagement in their learning.
- Highly skilled teaching, questioning, modelling and explaining enable retention, progression and life long learning.
- Children learn through dialogue with regular opportunities for them to talk both individually and in groups.
- We use outside experts for Biology, Physics and Chemistry teaching and explain how skills learnt could be transferred to future careers.
- Knowledge maps are used to guide each area which ensures children learn the correct skills and vocabulary .

Science

St Edmund Campion

Autumn 1

EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Understanding the world: - Working scientifically - Exploring animals	**Animals, including Humans** Know the name of parts of the human body that can be seen (including the 5 senses)		**Light** Know that dark is the absence of light Know that light is needed in order to see and is reflected from a surface Know and demonstrate how a shadow is formed and explain how a shadow changes shape Know about the danger of direct sunlight and describe how to keep protected	**All living things and their habitats** Use classification keys to group, identify and name living things Know how changes to an environment could endanger living things	**Properties & changes in materials** Compare and group materials based on their properties (e.g. hardness, solubility, transparency, conductivity, [electrical & thermal], and response to magnets Know and explain how a material dissolves to form a solution Know how to recover a substance from a solution	**All living things & their habitats** Classify living things into broad groups according to observable characteristics and based on similarities and differences Know how living things have been classified Give reasons for classifying plants and animals in a specific way

Autumn 2

EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Understanding the world: - Working scientifically - Recognise autumn - Understand the 5 senses - Explore water, floating and sinking - Talk about light and dark - Identify animals and sort them according to where they live - Recognise how animals behave as the seasons change.	**Everyday Materials** Know the name of the materials an object is made from Know about the properties of everyday materials	**Everyday Materials** Know how materials can be changed by squashing, bending, twisting and stretching Know why a material might or might not be used for a specific job (*Traction Man: Waterproof materials. Testing materials)	**Rocks** Compare and group rocks based on their appearance and physical properties, giving reasons Know how soil is made and how fossils are formed Know about and explain the difference between sedimentary, metamorphic and igneous rock	**Sound** Know how sound is made, Know how sound travels from a source to our ears Know the correlation between pitch and the object producing a sound Know the correlation between the volume of a sound and the strength of the vibrations that produced it Know what happens to a sound as it travels away from its source	**Properties & changes in materials** Know and demonstrate how some materials can be separated (e.g. through filtering, sieving and evaporating) Know and demonstrate that some changes are reversible and some are not Know how some changes result in the formation of a new material and that this is usually irreversible.	

Spring 1

EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Understanding the world: - Working scientifically - Recognise spring - Explore the force of magnetism - Name different materials and suggest some properties - Recognise changes in materials	**Seasonal Change** Name the seasons and know about the type of weather in each season (Facts about the seasons and using instruments to measure the weather)	**Animals, including Humans** Know the basic stages in a life cycle for animals, (including humans) Know why exercise, a balanced diet and good hygiene are important for humans	**Forces (and magnets)** Know about and describe how objects move on different surfaces Know how a simple pulley works and use to on to lift an object Know how some forces require contact and some do not, giving examples Know about and explain how magnets attract and repel Predict whether magnets will attract or repel and give a reason	**Electricity** Identify and name appliances that require electricity to function Construct a series circuit Identify and name the components in a series circuit (including cells, wires, bulbs, switches and buzzers) Predict and test whether a lamp will light within a circuit Know the function of a switch Know the difference between a conductor and an insulator; giving examples of each	**Earth and Space** Know about and explain the movement of the Earth and other planets relative to the Sun Know about and explain the movement of the Moon relative to the Earth Know and demonstrate how night and day are created Describe the Sun, Earth and Moon (using the term spherical)	**Electricity** Compare and give reasons for why components work and do not work in a circuit Draw circuit diagrams using correct symbols Know how the number and voltage of cells in a circuit links to the brightness of a lamp or the volume of a buzzer **Animals, Including humans** Identify and name the main parts of the human circulatory system Know the function of the heart, blood vessels and blood

Spring 2

EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Understanding the world: - Working scientifically - Talk about the life cycle of animals. - Talk about the life cycle of plants. - Understand what seeds need to grow and how to care for them.	**Animals, including Humans** Know how to classify a range of animals by amphibian, reptile, mammal, fish and birds Know and classify animals by what they eat (carnivore, herbivore and omnivore) Know how to sort by living and non-living things	**All living things and their habitats** Match living things to their habitat			**Forces** Know what gravity is and its impact on our lives Identify and know the effect of air and water resistance Identify and know the effect of friction Explain how levers, pulleys and gears allow a smaller force to have a greater effect	**Light** Know how light travels Know and demonstrate how we see objects Know why shadows have the same shape as the object that casts them Know how simple optical instruments work e.g. periscope, telescope, binoculars, mirror, magnifying glass etc.

Summer 1

EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Understanding the world: - Working scientifically - Recognise summer - Recognise familiar plants.	**Plants** Know and name a variety of common wild and garden plants Know and name the petals, stem, leaves and root of a plant Know and name the roots, trunk, branches and leaves of a tree	**Plants** Know and explain how seeds and bulbs grow into plants Know what plants need in order to grow and stay healthy (water, light & suitable temperature)	**Plants** Know the function of different parts of flowering plants and trees Know how water is transported within plants Know the plant life cycle, especially the importance of flowers.	**States of Matter** Know the temperature at which materials change state Know about and explore how some materials can change state Know the part played by evaporation and condensation in the water cycle Group materials based on their state of matter (solid, liquid, gas)	**All living things and their habitats** Know the life cycle of different living things e.g. mammal, amphibian, insect and bird Know the differences between different life cycles Know the process of reproduction in plants Know the process of reproduction in animals	**Animals, including humans** Know the impact of diet, exercise, drugs and lifestyle on health Know the ways in which nutrients and water are transported in animals, including humans

Summer 2

EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Understanding the world: - Working scientifically - Recognise summer - Recognise familiar plants.		**All living things and their habitats** Classify things by living, dead or never lived Know how a specific habitat provides for the basic needs of things living there (plants and animals) Name some different sources of food for animals Know about and explain a simple food chain	**Animals, including humans** Know about the importance of a nutritious, balanced diet (*Health Week) Know how nutrients, water and oxygen are transported within animals and humans Know about the skeletal and muscular system of a human	**Animals, including humans** Identify and name the parts of the human digestive system Know the functions of the organs in the human digestive system Identify and know the different types of human teeth Know the functions of different human teeth Use and construct food chains to identify producers, predators and prey	**Animals, including humans** Create a timeline to indicate stages of growth in humans	**Evolution & Inheritance** Know how the Earth and living things have changed over time Know how fossils can be used to find out about the past Know about reproduction and offspring (recognising that offspring normally vary and are not identical to their parents) Know how animals and plants are adapted to suit their environment Link adaptation over time to evolution Know about evolution and can explain what it is

MEDIUM TERM PLANS

SEC SCIENCE PLANNING

Year: 6

Prior learning:

- Know and classify animals by what they eat (carnivore, herbivore and omnivore) (Y1)
- Classify things by living, dead or never lived (Y2)
- Use classification keys to group, identify and name living things (Y4)

Autumn 1	Objective	Activities	Resources
1	Revisit lesson Know and classify animals by what they eat (carnivore, herbivore and omnivore) (Y1) Classify things by living, dead or never lived (Y2) Use classification keys to group, identify and name living things (Y4)	Watch video on omnivore, carnivore, herbivore. PP on 'Dead or alive?' Look at example of classification key.	https://www.youtube.com/watch?v=3yrikH2QEFA
2	Know how living things have been classified	Sorting activity: Different plants and animals into different groups. Find the classification group picture on the wall in the classroom that the plant/ animal belongs to.	https://www.youtube.com/watch?v=4VixROiu8Qg
3	Classify living things into broad groups according to observable characteristics and based on similarities and differences Give reasons for classifying plants and animals in a specific way	Begin to use classification keys to group, identify and name living things: Plan a sorting diagram for Reptiles, Amphibians, Fish, Bird, Mammal, Crustacean, Insect, Mollusc	

Science

St Edmund Campion

Working Scientifically

EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
• explore outside and make some observations about what I see around me • begin to ask questions and seek out information about things I observe • begin to think of questions based around a prompt and can then engage with research to find out more • make predictions about what I think might happen in a given situation and begin to give reasons for those predictions • use some basic scientific vocabulary • make observations	• ask simple questions recognising that they can be answered in different ways • observe closely, using simple equipment • perform simple tests • identify and classify • use observations and ideas to suggest answers to questions • gather and record data to help in answering questions	• ask simple questions recognising that they can be answered in different ways • observe closely, using simple equipment • perform simple tests • identify and classify • use observations and ideas to suggest answers to questions • gather and record data to help in answering questions	• ask relevant questions and using different types of scientific enquiries to answer them set up simple practical enquiries, comparative and fair tests • make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gather, record, classify and present data in a variety of ways to help in answering questions • record findings using simple scientific language,	• ask relevant questions and using different types of scientific enquiries to answer them set up simple practical enquiries, comparative and fair tests • make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gather, record, classify and present data in a variety of ways to help in answering questions • record findings using simple scientific language,	• plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • take measurements, using a range of scientific equipment, with increasing accuracy and precision • record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar and line graphs • use test results to make predictions to set up further comparative and fair tests • report and present findings from enquiries, including	• plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • take measurements, using a range of scientific equipment, with increasing accuracy and precision • record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar and line graphs • use test results to make predictions to set up further comparative and fair tests • report and present findings from enquiries, including

Working Scientifically

At SEC the children use a variety of approaches to answer scientific questions

- Observing over time
- Pattern seeking
- Identifying, classifying and grouping
- Comparative and fair testing (controlled investigations)
- Collecting, analyzing and presenting data.

Y6 – Light (Physics)

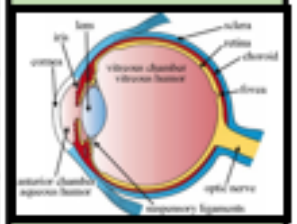
Prior Learning

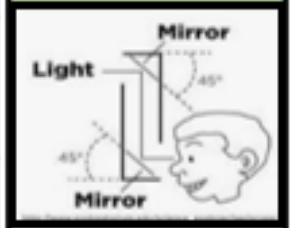
- Dark is the absence of light (Y3)
- Light is needed in order to see and is reflected from a surface (Y3)
- Know how a shadow is formed and explain how a shadow changes shape (Y3)
- Sunlight is dangerous and are able to describe how to keep protected (Y3)

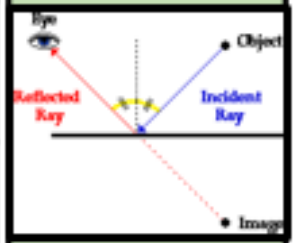
Things I need to know and Remember

- Know that light travels in a straight line
- We see because light reflects off an object and into our eye. The brain processes the image.
- The shape of a shadow will be the same as the object because. The closer the light is to an object the bigger the shadow.
- Optical instruments, such as periscopes, work by light reflecting at 90° through a series of mirrors
- When a ray of light hits a shiny surface it reflects off at the same degrees, known as the **line of incidence.**
- The eye is made up of many key parts: Iris, lens, pupil, retina, cornea, optic nerve, sclera

Interesting Images







Key Vocabulary

Light Source	Is a form of energy that travels in waves allowing us to see, e.g. sun
opaque	Something you are unable to see through. It blocks out the light.
transparent	Light passes straight through. Objects behind can be clearly seen. E.g. glass
translucent	Light passes through but objects behind cannot be clearly seen.
cornea	The transparent part of the eye that focuses light as it enters.
pupil	The black circle in the centre of the eye. It changes size to allow the right amount of light in
iris	The coloured tissue surrounding the pupil, controlling its size.
lens	Focusses light onto the retina. Similar to glasses and a camera.
retina	Receives images and sends them along the optic nerve
optic nerve	Carries messages from the retina to the brain

Impact:

Children at St Edmund Campion are provided with lots of opportunities to apply their science skills through cross curricular learning. The children are excited, enthused and active in their learning which results in them being confident and seeing a real purpose in the learning of science. Children learn key concepts and can explain what is occurring, predict how things will behave, and analyse causes. Children at St Edmund Campion make good progress in Science and are eager to become involved in outside science opportunities provided e.g.

Nottingham Night Light – Year 4
Neuroscience Students – Year 6
Science Photography Competition – Whole School
Nottingham Planetarium – Year 5
Astronomer – Roan Haggar – Year 2

Science and the wider Community at SEC


THANK YOU