

Hook Junior School Whole School Science Curriculum Overview 2020-2021

Aims

- 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 pupils 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

Global Citizenship	Fair trade and deforestation (linking to Plants)	Plastic pollution (links to animals and habitats, but is also taught linked to geography in Spring term)	Sustainability of the Earth (Earth and space and ongoing)	Impact of electricity use on the environment – Earth Day (electricity unit)
AUTUMN TERM				
Year 3		Year 4		Year 5
Plants (15 sessions)		States of matter (16 sessions)		Earth and Space and Forces (16 sessions)
Prior Knowledge		Recap Year 2		Recap year 3 forces
Recap on learning from KS1 National Curriculum (Year 1) Pupils should be taught to: identify and name a variety of common wild and garden plants, including deciduous and evergreen trees identify and describe the basic structure of a variety of common flowering plants, including trees. observe and describe how seeds and bulbs grow into mature plants find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.		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.		Recap Year 3 objectives for light Recap Year 4 objectives for electricity
Light and electricity Light (6 sessions) Electricity (8 sessions)		Light and electricity Light (6 sessions) Electricity (8 sessions)		

- 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

- 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

Earth and Space

- 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

Forces

- 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

Light

- 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

Electricity

- 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

Skills	<ul style="list-style-type: none"> • I can ask questions linked to a wider topic • I can put appropriate headings onto intersecting Venn and Carroll diagrams • I can begin to decide what to change and what to measure/observe • I can decide how often to take a measurement • I can use my prior knowledge and experience to make a prediction. • I can explain my prediction using some scientific vocabulary • I can present what I've learnt verbally or using labelled diagrams. • I can use a table to record data. • I can make relevant observations linked to answering my question. • I can begin to spot patterns in the data up to two criterias. • I can draw simple conclusions from an investigation. • I can begin to suggest practical improvements to the investigation 	<ul style="list-style-type: none"> • I can ask a range of relevant questions linked to a topic • I can compare objects based on more sophisticated, observable features. • I can plan a fair enquiry with some support • I can explain my prediction using relevant vocabulary and experiences. • I can measure using standard units where not all the numbers are marked on the scale. • I can begin to decide when take repeat readings. • I can prepare own tables to record data. • I can begin to suggest how to organise data. • I can present data in bar charts. • I can begin to present data in time graphs. • I can use ICT to present data. • I can answer my questions using simple scientific language. • I can refer directly to some evidence when answering the question • I can draw simple conclusions when appropriate for patterns • I can suggest new questions linked to previous investigation. • I can suggest limitations of the investigation. 	<ul style="list-style-type: none"> • I can ask a range of questions and identify the type of enquiry that will help to answer the questions. • I can identify specific clear questions that will help to sort without ambiguity. • I can plan a fair enquiry , taking into account the variables. • I can make a prediction based on scientific knowledge and experiences. • I can measure using standard units using equipment that has intervals. • I can decide when to take repeat readings. • I can prepare own tables to record data, including columns for taking repeat readings • I can suggest how to organise data. • I can use a wide range of ways to present my data- verbally, graphic organisers or bar graphs. • I can answer my questions using appropriate scientific language. • I can suggest new questions arising from the investigation. 	<ul style="list-style-type: none"> • I can ask a range of questions recognising that some can be answered through research and others may not. • I can ask further questions based on results. • I can choose suitable sources to use when researching. • I can explain which variables to control to ensure a fair enquiry. • I can explain my prediction using experiences, knowledge and other investigations. • I can measure using equipment that has scales involving decimals. • I can select appropriate instruments to measure with to provide accurate results. • I can select and prepare tables and graphs appropriate to the data. • I can use a wide range of ways to present my data- verbally, graphic organisers, line graphs, scatter graphs etc. • I can answer my questions and draw conclusions using scientific evidence gained from a range of sources. • I can explain my degree of trust in my results -precision in taking measurements, variables that may not have been controlled and accuracy of results • I can evaluate the effectiveness of presenting my data and results.
--------	--	---	---	--

Understanding	<ul style="list-style-type: none"> • Plants make their own food to provide them with growth, energy, repair and reproduce. • Leaves absorb sunlight and carbon dioxide through leaves. • Plants have roots to provide support and to draw moisture from the soil. • The plants make food from water and carbon dioxide, using sunlight as energy. 	<ul style="list-style-type: none"> • Solids liquids and gases are described by observable properties • Materials can be divided into solids, liquids and gases. • Materials change state by heating and cooling. • Heating and cooling causes solids to melt and evaporate or condense and freeze. • The temperature at which given substances change state are always the same. • Some changes can be reversed some cant. 	<p>Earth and space</p> <ul style="list-style-type: none"> • The universe is vast and contains billions of stars • The solar system is a collection of planets and moons orbiting our nearest star, the sun. • All objects in the solar system are spinning as well as orbiting • The time it takes an object to spin once is called a day • The time it takes a planet to orbit the sun is called a year • Stars produce vast amounts of heat and light. All other objects are lumps of rock, metal or ice and can be seen because they reflect the light of stars • Gravity is a force of attraction between any two things that have mass and bigger masses exert bigger forces. <p>Forces</p> <ul style="list-style-type: none"> • When an object moves through the air and water they have to push it out the way. • Gases weigh less than liquids so water resistance is greater than air resistance • Friction is a force against motion causes by two surfaces rubbing against each other. 	<ul style="list-style-type: none"> • Animals see objects when light is reflected off that object and enters their eyes. • Animals see light sources when light travels from the source into their eyes.
----------------------	---	--	---	---

<p style="text-align: center;">Key Vocabulary</p>	<p>Plants, light, warmth, water, leaves, root, stem, growth, height</p>	<p>Solid, liquid, gas, melt, freeze, solidify, dissolve, solution, filter, undissolved, dissolved, separate, sieve, mix</p>	<p>Plant, orbit, sun, moon, gravity, star, force, Water resistance, air resistance, force, friction, push, pull</p>	<p>Light, beam, reflect, reflection, opaque, mirror, light revealing, source, reflected, travel. Block, shiny surface, Complete circuit, conductor, insulator, symbol, circuit diagram, electricity, component, voltage</p>
--	---	---	---	--

SPRING TERM					
Year 3		Year 4	Year 5	Year 6	
Rocks and light Light (6 sessions) (Rocks 8 sessions)		Electricity and sound Electricity (6 sessions) Sound (8 sessions)	Properties and changes of materials (8 sessions)	Evolution and inheritance (10 sessions)	
Prior Knowledge	No prior learning	No prior learning	Recap objectives from Year 1 NC 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.	No prior learning	

Knowledge	<p>Rocks</p> <ul style="list-style-type: none"> 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. <p>Light</p> <ul style="list-style-type: none"> recognise that they need light in order to see things and that dark is the absence of light notice that light is reflected from surfaces recognise that light from the sun can be dangerous and that there are ways to protect their eyes recognise that shadows are formed when the light from a light source is blocked by an opaque object find patterns in the way that the size of shadows change 	<p>Electricity</p> <ul style="list-style-type: none"> identify common appliances that run on electricity construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers 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. <p>Sound</p> <ul style="list-style-type: none"> identify how sounds are made, associating some of them with something vibrating recognise that vibrations from sounds travel through a medium to the ear find patterns between the pitch of a sound and features of the object that produced it find patterns between the volume of a sound and the strength of the vibrations that produced it recognise that sounds get fainter as the distance from the sound source increases Sounds are produced when an object vibrates. 	<ul style="list-style-type: none"> compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets 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 	<ul style="list-style-type: none"> 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
------------------	---	--	--	---

Skills	<i>Please refer to autumn skills section for working scientifically criteria.</i>	<i>Please refer to autumn skills section for working scientifically criteria.</i>	<i>Please refer to autumn skills section for working scientifically criteria.</i>	<i>Please refer to autumn skills section for working scientifically criteria.</i>
Understanding	<ul style="list-style-type: none"> • Light comes from a source. • Transparent items let light through and opaque items do not. • Beams of light bounce off some materials (reflection) • There must be light for us to see. Without light it is dark. 	<p>Electricity</p> <ul style="list-style-type: none"> • Source of electricity is needed for electrical devices to work. • A complete circuit is needed. • Electricity sources push electricity round a circuit. • More batteries will push the electricity further. • Devices work harder when more electricity goes through them. • Some materials allow electricity to flow easily and these are called conductors. Materials that don't allow electricity to flow are called insulators. <p>Sound</p> <ul style="list-style-type: none"> • Sound travels in all directions and we hear it when it travels to our ears. • Sound spreads out as it travels. • Sound moves through objects by making them vibrate. • Bigger vibrations produce louder sounds and smaller vibrations produce quieter sounds • Changing the way an object vibrates changes its sound. • Changing the shape, size of an object will change the sound it produces. 	<ul style="list-style-type: none"> • Sometimes mixed substances react to make a new substance. • Heating can sometimes cause materials to change permanently. When this happens, a new substance is made. These changes are not reversible. • When two or more substances are made. These substances are not reversible. 	<p>To know how things have changed over the last million years.</p> <p>To know how different organisms have become extinct and others have evolved into new organisms over many generations</p> <p>The fossil record provides evidence to work out how organisms evolve</p> <p>The way fossil is formed from and found in fossil records</p> <p>To understand the theory of Darwin and evolution</p> <p>To understand all living things have similar stages of life.</p>

<p style="text-align: center;">Key Vocabulary</p>	<p>Light, dark, shadow, transparent, opaque, translucent, direction, light travels, shortest, longest, highest, object, material, light source, sun, day, night</p> <p>Rocks, soils, slate, granite, sandstone, chalk, soil, clay, sand, limestone, quartz, marble, stone, pebble, texture, absorbent, characteristic, surface.</p>	<p>Electricity, electrical , circuit, battery, bulb, crocodile clip, buzzer, motor, conduct, conductor, insulate, switch, break, power, bright, brightness, dim, batteries,</p> <p>Sound, pitch, loudness, vibrate, vibration muffle, tuning, quiet, soft, noise, source, loud, high, low, vibrating, soundproof</p>	<p>Evaporate, evaporation, condense, condensation, change of state, state, solid, liquid, gas, melt, freeze, conditions, solidify, freezing, melting</p> <p>Evaporate, evaporation, condense, condensation, change of state, state, solid, liquid, gas, melt, freeze, conditions, solidify, freezing, melting</p>	<p>Growth, evolve, adapt, change, evolution, extinction, organisms, fossil, generations,</p>
--	---	--	---	--

SUMMER TERM				
Year 3		Year 4	Year 5	Year 6
Forces and magnets and animals Forces (6 sessions) Animals 7 sessions)		Living things and their habitats Animals including humans (13 sessions)	Animals including humans (7 sessions)	Animals including humans and living things and their habitats
Prior Knowledge	No prior learning for forces Animals - Year 1 and Year 2 curriculum objectives Pupils should be taught to: 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 explore and compare the differences between things that are living, dead, and things that have never been alive identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other identify and name a variety of plants and animals in their habitats, including microhabitats describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and	Recap objectives taught in KS1 and Year 3	Recap objectives taught in KS1 and Year 3 and 4	Recap objectives taught in KS1 and Year 3,4 and 5

	identify and name different sources of food.			
Knowledge	<ul style="list-style-type: none"> compare how things move on different surfaces notice that some forces need contact between 2 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 2 poles predict whether 2 magnets will attract or repel each other, depending on which poles are facing 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 	<p>Living things and their habitats</p> <ul style="list-style-type: none"> recognise that living things can be grouped in a variety of ways explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment recognise that environments can change and that this can sometimes pose dangers to living things 	<p>Animals including humans</p> <ul style="list-style-type: none"> describe the changes as humans develop to old age 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. <p>Living things and their habitats</p> <ul style="list-style-type: none"> 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 	<p>Living things and their habitats</p> <ul style="list-style-type: none"> describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals give reasons for classifying plants and animals based on specific characteristics <p>Animals including humans</p> <ul style="list-style-type: none"> identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood 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

Skills	<p>Apply the skills from Autumn and Spring term with a focus on any weaker areas or areas covered in less detail.</p>	<p>Apply the skills from Autumn and Spring term with a focus on any weaker areas or areas covered in less detail.</p>	<p>Apply the skills from Autumn and Spring term with a focus on any weaker areas or areas covered in less detail.</p>	<p>Apply the skills from Autumn and Spring term with a focus on any weaker areas or areas covered in less detail.</p>
Understanding	<ul style="list-style-type: none"> • Magnets exert attractive and repulsive forces on each other. • Magnets exert non-contact forces, which work through some materials. • Magnets exert attractive forces on some materials. • Magnet forces are affected by: magnet strength, object mass, distance from object and material • Different animals are adapted to eat different foods. • Animals have teeth to help them eat. Different types of teeth do different things. • Many animals have skeletons to support their bodies and vital organs. • Movable joints connect bones. 	<ul style="list-style-type: none"> • Living organisms can be divided into groups based upon their characteristics • Different food chains occur in different habitats • Human activity significantly affects the environment • Environmental changes affects different habitats differently • Nutrients produced by plants move to primary consumers then to secondary consumers through food chains. • Environmental change can affect how well an organism is suited to its environment. • Muscles are connected to bones and move them when they contract. 	<ul style="list-style-type: none"> • Food is broken down by the teeth and further in the stomach and intestines where nutrients go into the blood. The blood takes nutrients around the body. • The heart pumps blood around the body • Oxygen is breathed into the lungs where it is absorbed by the blood. • Different animals mature at different rates and live at different ages. • Muscles need Oxygen to release energy from food to do work. • Muscles are connected to bones and move them when they contract 	<p>Revision of Year 4 understanding but in greater depth.</p> <p>Organisms require a supply of energy and materials for which they are often dependent on or in competition with other organisms.</p> <ul style="list-style-type: none"> • Some organisms reproduce sexually where offspring inherit information from both parents. • Some organisms reproduce asexually by making a copy of a single parent. • Fossils provide evidence that Living things have changed over time. • Organisms best suited to their environment are more likely to survive long enough to reproduce. • Competition exists for resources and mates • Organisms best adapted to reproduced are more likely to do so. • Organisms reproduce and offspring have similar characteristics to parents. • Variation exists within a population (and between offspring of same parents). • Life cycles have evolved to help organisms survive to adulthood.

Key Vocabulary	<p>Magnets, spring, metal, iron, copper, aluminium, steel, brass, attract, repel, magnetic, non magnetic, attraction, repulsion, force, elastic, stretch, squash, compress</p> <ul style="list-style-type: none"> • 	<p>Skeleton, bone, bones, ribs, spine, skull, vertebrate, contract, relax, contraction, joint, move, muscle, muscles</p> <p>Habitat, nutrition, environment, keys, condition, consumer, producer, organism, predator, prey, food chain, similar ,different</p>	<p>Reproduce, reproduction, stamen, stigma, sepal, petal, ovary, pollen, style, germinate, germination, fertilise, fertilisation, pollinate, pollination, dispersion, life cycle, babyhood, childhood, adolescence, adulthood,</p>	<p>Plant growth fertiliser, nutrients, consumer, producer, predator, prey, food chain, key, suited, plant food, produces, identity, habitats, life processes.</p>