

# Heene Church of England (Aided) Primary School

*'Learning together, loving others, guided by God'*



## SCIENCE

### National Curriculum Requirement

#### Early Years

##### Birth to three

- Explore materials with different properties.
- Explore natural materials, indoors and outside.
- Explore and respond to different natural phenomena in their setting and on trips.

##### 3 and 4-year olds

- Use all their senses in hands-on exploration of natural materials.
- Explore collections of materials with similar and/or different properties.
- Talk about what they see, using a wide vocabulary
- Plant seeds and care for growing plants.
- Understand the key features of the life cycle of a plant and an animal.
- Begin to understand the need to respect and care for the natural environment and all living things.
- Explore and talk about different forces they can feel.
- Talk about the differences between materials and changes they notice.

##### Reception

- Explore the natural world around them.
- Describe what they see, hear and feel whilst outside.
- Recognise some environments that are different to the one in which they live.
- Understand the effect of changing seasons on the natural world around them.

#### ELG:

##### The Natural World

Children at the expected level of development will:

- Explore the natural world around them, making observations and drawing pictures of animals and plants
- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

#### Key Stage 1

##### Working Scientifically

- asking simple questions and recognising that they can be answered in different ways
- observing closely, using simple equipment
- performing simple tests
- identifying and classifying
- using their observations and ideas to suggest answers to questions
- gathering and recording data to help in answering questions

#### Lower Key Stage 2

##### Working Scientifically

- asking relevant questions and using different types of scientific enquiries to answer them
- setting up simple practical enquiries, comparative and fair tests
- making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings.

#### Upper Key Stage 2

##### Working Scientifically

- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- using test results to make predictions to set up further comparative and fair tests
- reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations
- identifying scientific evidence that has been used to support or refute ideas or arguments

**PROGRESSION**

**Key Questions underlined in bold**

	EFYS	Year One	Year Two	Year Three	Year Four	Year Five	Year Six
Autumn Term 2021 Science Links	Due to the structure of the EFYS curriculum, the following objectives are covered throughout the course of the year.	1) Seasonal Changes (Continues throughout the year) <u>Why does the weather change?</u>  Build on Geography unit Spring EFYS	1) Living Organisms <u>How do living things survive?</u>  2) Materials <u>Are all materials useful?</u>	1) Forces - Magnets and springs  <u>What do forces do?</u>	1) Living things and their habitats <u>Can all living things be classified?</u>  2) Animals Inc. Humans <u>What does your body do with food?</u>	1) Properties and changes of materials <u>Can the properties of all materials change?</u>  2) Forces <u>What if forces did not exist?</u>	1) Evolution and Inheritance <u>What makes us different?</u>
NC Refs	1) Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.  2) Understand some important processes and changes in the natural world around them, including the seasons and states of matter.	1) observe changes across the 4 seasons 1) observe and describe weather associated with the seasons and how day length varies	1) explore and compare the differences between things that are living, dead, and things that have never been alive 1) 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 1) identify and name a variety of plants and animals in their habitats, including microhabitats 1) describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food  2) identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses 2) find out how the shapes of solid objects made from	1) compare how things move on different surfaces 1) notice that some forces need contact between 2 objects, but magnetic forces can act at a distance 1) observe how magnets attract or repel each other and attract some materials and not others 1) 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 1) describe magnets as having 2 poles 1) predict whether 2 magnets will attract or repel each other, depending on which poles are facing	1) recognise that living things can be grouped in a variety of ways 1) explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment 1) recognise that environments can change and that this can sometimes pose dangers to living things 2) describe the simple functions of the basic parts of the digestive system in humans 2) identify the different types of teeth in humans and their simple functions 2) construct and interpret a variety of food chains, identifying producers, predators and prey	1) 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 1) know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution 1) use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating 1) give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic 1) demonstrate that dissolving, mixing and changes of state are reversible changes 1) explain that some changes result in the	1) recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago 1) recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents  1) identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution

			some materials can be changed by squashing, bending, twisting and stretching			<p>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</p> <p>2) explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</p> <p>2) identify the effects of air resistance, water resistance and friction, that act between moving surfaces</p> <p>2) recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect</p>	
Spring Term 2022 Science Links	Due to the structure of the EYFS curriculum, the following objectives are covered throughout the course of the year.	<p>1) <i>Our Bodies What makes us human?</i></p> <p>2) <i>Materials What could this be used for?</i></p>	1) Plants <u>What is happening to this plant?</u>	<p>1) Plants <u>Is there more to a plant than we can see?</u></p> <p>2) Rocks and Solids <u>How can rocks be different to one another?</u></p>	<p>1) States of Matter Inc. Water Cycle <u>What's happened to my drink!?</u></p> <p><u>Link to prior learning of water cycle in Year 3 Geography. Ensure progression is evident.</u></p>	<p>1) Earth and Space <u>Are we ever truly 'still'?</u></p>	<p>1) Animals Inc. Humans <u>What makes my body work?</u></p> <p>2) <u>Living things and their habitats</u> <u>Why would you need to guess?</u></p>
NC Refs	<p>1) Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.</p> <p>2) Understand some important processes and changes in the natural world around them, including the</p>	<p>1) <i>Pupils should have plenty of opportunities to learn the names of the main body parts (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth) through games, actions, songs and rhymes.</i></p> <p><i>(Non-statutory)</i></p> <p>2) <u>distinguish between an object and the</u></p>	<p>1) observe and describe how seeds and bulbs grow into mature plants</p> <p>1) find out and describe how plants need water, light and a suitable temperature to grow and stay healthy</p>	<p>1) identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</p> <p>1) 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</p> <p>1) investigate the way in which water is</p>	<p>1) compare and group materials together, according to whether they are solids, liquids or gases</p> <p>1) 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)</p> <p>1) identify the part played by evaporation and condensation in the water cycle and associate the</p>	<p>1) describe the movement of the Earth and other planets relative to the sun in the solar system</p> <p>1) describe the movement of the moon relative to the Earth</p> <p>1) describe the sun, Earth and moon as approximately spherical bodies</p> <p>1) use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky</p>	<p>1) identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood</p> <p>1) recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</p> <p>1) describe the ways in which nutrients and water are transported within animals, including humans</p> <p>2) <u>describe how living things are classified into broad groups according to common observable</u></p>

	seasons and states of matter.	material from which it is made 2) identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock 2) describe the simple physical properties of a variety of everyday materials 2) compare and group together a variety of everyday materials on the basis of their simple physical properties		transported within plants 1) explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal  2) compare and group together different kinds of rocks on the basis of their appearance and simple physical properties 2) describe in simple terms how fossils are formed when things that have lived are trapped within rock 2) recognise that soils are made from rocks and organic matter	rate of evaporation with temperature		characteristics and based on similarities and differences, including micro-organisms, plants and animals 2) give reasons for classifying plants and animals based on specific characteristics
Summer Term 2022 Science Links	1) The Natural World – focus on plants and mini-beasts	1) Animals <u>What is this animal?</u> 2) Plants and Growth <u>Are all plants the same?</u>	1) Animals Inc. Humans <u>What do we need to do to stay alive?</u>	1) Light and Shadow <u>What is darkness?</u> 2) Animals Inc. Humans <u>What's happening inside my body?</u>	1) Sound <u>What on earth is that noise?</u> 2) Electricity <u>How does this work?</u>	1) Animals Inc. Humans <u>Do we ever stop changing?</u> 2) Living things and their habitats <u>How is 'that' still here?</u>	1) Light <u>How can we 'use' light?</u> 2) Electricity <u>How can I turn this off!?</u>
NC Refs	1) explore the natural world around them, making observations and drawing pictures of animals and plants.	1) identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals 1) identify and name a variety of common animals that are carnivores, herbivores and omnivores 1) describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) 1) identify, name, draw and label the basic	1) notice that animals, including humans, have offspring which grow into adults 1) find out about and describe the basic needs of animals, including humans, for survival (water, food and air) 1) describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene	1) recognise that they need light in order to see things and that dark is the absence of light 1) notice that light is reflected from surfaces 1) recognise that light from the sun can be dangerous and that there are ways to protect their eyes 1) recognise that shadows are formed when the light from a light source is blocked by an opaque object	1) identify how sounds are made, associating some of them with something vibrating 1) recognise that vibrations from sounds travel through a medium to the ear 1) find patterns between the pitch of a sound and features of the object that produced it 1) find patterns between the volume of a sound and the strength of the vibrations that produced it 1) recognise that sounds get fainter as the distance	1) describe the changes as humans develop to old age  1) Pupils should draw a timeline to indicate stages in the growth and development of humans. They should learn about the changes experienced in puberty.  1) Pupils could work scientifically by researching the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows.	1) recognise that light appears to travel in straight lines 1) 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 1) 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 1) use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them  2) associate the brightness of a lamp or the volume of a buzzer

		<p>parts of the human body and say which part of the body is associated with each sense</p> <p>2) identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</p> <p>2) identify and describe the basic structure of a variety of common flowering plants, including trees</p>		<p>1) find patterns in the way that the size of shadows change</p> <p>2) 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</p> <p>2) identify that humans and some other animals have skeletons and muscles for support, protection and movement</p>	<p>from the sound source increases</p> <p>2) identify common appliances that run on electricity</p> <p>2) construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers</p> <p>2) 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</p> <p>2) recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</p> <p>2) recognise some common conductors and insulators, and associate metals with being good conductors</p>	<p>(Non-statutory)</p> <p>2) describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</p> <p>2) describe the life process of reproduction in some plants and animals</p>	<p>with the number and voltage of cells used in the circuit</p> <p>2) 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</p> <p>2) use recognised symbols when representing a simple circuit in a diagram</p>
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## VOCABULARY

**Bold – Previously used vocabulary.**

**Green - New vocabulary.**

	EYFS	Year One	Year Two	Year Three	Year Four	Year Five	Year Six
Autumn	<p><b>Autumn</b></p> <p><b>burst</b></p> <p><b>butterflies</b></p> <p><b>desert</b></p> <p><b>different</b></p> <p><b>drifts</b></p> <p><b>drowns</b></p> <p><b>freeze</b></p> <p><b>hot</b></p> <p><b>life-cycle</b></p> <p><b>melting</b></p>	<p><b>Seasons</b></p> <p>Autumn</p> <p>Chilly</p> <p>Cold</p> <p>Conkers</p> <p>Day length</p> <p>Day light</p> <p>Deciduous</p> <p>Freeze</p> <p>Frost</p> <p>Hibernate</p> <p>Ice</p> <p>Migrate</p> <p>Months</p>	<p><b>Living Organisms</b></p> <p>Biomes</p> <p>Carnivore</p> <p>Depend</p> <p>Food chain</p> <p>Habitat</p> <p>Herbivore</p> <p>Invertebrate</p> <p>Microhabitat</p> <p>Minibeast</p> <p>Offspring</p> <p>Omnivore</p> <p>Plant</p> <p>Source</p>	<p><b>Forces and Magnets</b></p> <p>Attract</p> <p>Bendy</p> <p>Friction</p> <p>Force</p> <p>Gravity</p> <p>Magnet</p> <p>Magnetic Field</p> <p><b>Metal</b></p> <p>Motion</p> <p>Non-Magnetic</p> <p>Opposite</p> <p>Position</p>	<p><b>Animals Inc.</b></p> <p><b>Humans</b></p> <p><b>Absorb</b></p> <p>Canine</p> <p><b>Carnivore</b></p> <p>Decay</p> <p>Digestion</p> <p>Enamel</p> <p>Excretion</p> <p>Faeces</p> <p><b>Herbivore</b></p> <p>Incisor</p> <p>Ingested</p>	<p><b>Properties and changes of materials</b></p> <p><b>Circuit</b></p> <p><b>Condensation</b></p> <p>Conductor</p> <p>Dissolves</p> <p><b>Electricity</b></p> <p><b>Evaporation</b></p> <p>Filtering</p> <p>Flexible</p> <p><b>Gas</b></p> <p>Insoluble</p>	<p><b>Evolution and Inheritance</b></p> <p>Adaptation</p> <p>Ancestor</p> <p>Biodiversity</p> <p><b>Biome</b></p> <p>Breeding</p> <p>Characteristics</p> <p><b>Environment</b></p> <p>Evolution</p> <p>Extinct</p> <p>Fossil</p> <p>Generation</p> <p>Inherit</p>

	<p>mini-beasts ocean rain sails same snow soil Spring sun sways warm Winter</p>	<p>Nature Rain Season Slightly Snow Spring Summer Sunny Temperature Warm Weather Windy Winter</p>	<p>Tree Vegetation Vertebrate</p> <p><u>Materials</u> Absorbent Bendy Dull Elastic Fabrics Foil Glass Man-made Metal Natural Opaque Plastic Process Properties Purpose Recyclable Rock Rough Shiny Smooth Soft Squash Stiff Stretchy Suitable Transparent Twist Unsuitable Waterproof Wood</p>	<p>Pull Push Repel Resistance Squash Stretchy Surface Twist</p>	<p>Intestines Molar Muscles Nutrition Oesophagus Omnivore Organ Plaque Premolar Process Saliva Stomach</p> <p><u>Living things and their habitats</u> Biomes Carnivore Classification key Criteria Deciduous Environment Evergreen Excretion Food chain Habitat Herbivore Invertebrate Life processes Microhabitat Minibeast Nutrition Omnivore Organism Predator Prey Producers Reproduction Respiration Sensitivity Urban Vegetation Vertebrate</p>	<p>Insulator Irreversible Liquid Magnetic Melting Particles Permeable Process Properties Rate Resistance Reversible Solid Soluble Solution State Temperature Thermal Transparent Variable Water cycle</p> <p><u>Forces</u> Attract Friction Force Gear Gravity Lever Motion Opposite Pulley Repel Resistance Spring Streamlined Surface</p>	<p>Maladaptation Mutation Natural selection Offspring Palaeontology Reproduction Species Survive Theory Variation</p>
Spring	<p>Autumn burst butterflies</p>	<p><u>Material</u> Absorbent Bendy</p>	<p><u>Plants</u> Branches Bulb</p>	<p><u>Plants</u> Absorb Anther</p>	<p><u>States of Matter</u> Condensation Cooling</p>	<p><u>Earth and Space</u> Asteroid</p>	<p><u>Animals Inc. Humans</u> Aorta Arteries</p>

	<p>desert different drifts drowns</p> <p>freeze hot life-cycle melting mini-beasts ocean rain sails same snow soil Spring sun sways warm Winter</p>	<p>Brick Dull Elastic Foil Glass Man-made Metal Natural Opaque Plastic Rock Rough Shiny Smooth Soft Stiff Stretchy Transparent Waterproof Wood</p>	<p>Common Crop Deciduous Evergreen Flower Flowering Fruit Garden Herb Leaf/Leaves Nutrients Petal Plant Reproduce Roots Seed Stem Tree Trunk Vegetable Vegetation Weed Wild</p>	<p>Branches Bulb Carbon Dioxide Climate zone Common Deciduous Dispersed Dissect Evergreen Fertilisation Fertiliser Flower Flowering Fruit Function Garden Germination Healthy Leaf/Leaves Life cycle Mature Nutrients Ovule Petal Plant Pollen Pollination Roots Seed Stem Stigma Structure Temperature Transported Tree Trunk Vegetation Wild</p> <p><u>Rocks</u> Absorb Bedrock Decaying Grain Igneous Imprint Leaf litter Magma Man-made Metamorphic</p>	<p>Evaporation Freezing Freezing point Gas Heating Liquid Melting Melting point Particles Precipitation Process Properties Solid Temperature Vibrations Water cycle Water vapour</p>	<p>Axis Comet Galaxy Leap year Meteorite Orbit Planet Shadow Solar System Sphere Spin Star Time zones Universe</p>	<p>Blood vessels Capillaries Carbon dioxide Circulatory System Deoxygenated Heart Lungs Nutrients Organ Oxygen Oxygenated Pulse Respiration Vein Vena Cava Ventilation Via</p> <p><u>Living things and their habitats</u> Adaptation Carnivore Characteristics Classification key Criteria Energy Environment Evolution Food chain Habitat Herbivore Invertebrate Microhabitat Microorganism Minibeast Omnivore Organism Predator Prey Species Vertebrate</p>
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				Mineral Molten <b>Natural</b> <b>Nutrients</b> Palaeontology Permeable Porous Prehistoric Preserve Pressure <b>Properties</b> <b>Rock</b> Sediment Soil Surface Surrounding Volcano Weathered			
Summer	<u>Natural World</u>  bud rays roots stems weed Summer petals pod water soil light grow	<u>Animals Inc.</u> <u>Humans</u> Backbone Carnivores Cold-blooded Environment Farm Gills Herbivore Invertebrate Omnivore Pet Temperature Vertebrate Warm-blooded Wild  <u>Plants</u> Branches Bulb Common Deciduous Evergreen Flower Flowering Fruit Garden Herb	<u>Animals Inc.</u> <u>Humans</u> <b>Backbone</b> Balanced diet Bar chart Bones Disease Exercise <b>Farm</b> Healthy Hygiene Life cycle Medicine Muscles Offspring <b>Pet</b> Pictogram Skeleton Survive	<u>Animals Inc.</u> <u>Humans</u> <b>Backbone</b> <b>Bones</b> Contract Elbow Endoskeleton Exoskeleton Joints <b>Muscles</b> Organs Protect Relax <b>Skeleton</b> Support Vertebrate  <u>Animals Inc.</u> <u>Human (Diet)</u> <b>Balanced diet</b> Diet Disease Energy Healthy Hygiene <b>Nutrients</b> Nutrition	<u>Sound</u> Amplitude Decibel Electricity <b>Energy</b> Frequency Medium Pitch Power Sound waves Source Transmit Travel Vibrations Volume  <u>Electricity</u> Appliances Battery Bulb Buzzer Cell Circuit Component Conductor Current Device	<u>Animals Inc.</u> <u>Humans</u> Adolescence Adulthood Development Foetus Genitals Gestation Growth Hormones Independent Infancy <b>Life cycle</b> <b>Life processes</b> Mature Menopause Menstruation Offspring Organ Puberty Rapid <b>Reproduction</b> Toddler <b>Vertebrate</b>	<u>Light</u> Angle Dark Dim Electricity Emits Light Mirror Opaque Reflects Shadows Source Surface Torches Translucent Transparent  <u>Electricity</u> Ammeter Appliances Battery Bulb Buzzer Cell Circuit Component Conductor Current





### Science units will include

- **Prior Learning** Children will be given the opportunity to review prior learning, this could be from a previous unit or lesson.
- **Working Scientifically** will be embedded in every lesson and will be clearly identified on MTP's.
- **Bright Ideas** will be used regularly and recorded at least twice per unit.

#### MODIFICATION

- Provide children which structured STEM sentences.  
To make this even more accessible for certain children, teachers can give children the vocabulary needed to fill in the missing gaps. Children can choose from these.
- Ensure that children have access to diagrams/visual aids related to their topic.
- TAs and teachers can scribe the response of children and stick labels in their books. Often, children find writing and remembering sentences a large barrier to science.
- Begin each lesson by reviewing previous learning and previous vocabulary. In addition to this, ensure that the key vocabulary for each topic is displayed on the working wall and referred to regularly.
- Peer support in science can be very effective. Working alongside a confident child can improve the confidence and independence of another.

#### CHALLENGE

- Ensure that every/most lessons have an accessible exceeding question for the children.  
Can they find any link to the real world? Who/How might this finding help?
- Pace – limit the time taken to do something
- Off you go... – limit the number of instructions before an open task is set. It is best if the outcome is focused so students know when they have succeeded. This gives them immediate feedback.
- Replacing the surplus materials with alternative, suitably challenging, materials.