Project period 1

Year	The BIG Question	National Curriculum coverage
3	***How do forces and metals affect our lives?***	*Forces and magnets:*
	Key Vocabulary: attract effort force meter forces friction fulcrum lever load magnet magnetic magnetic field Newton pivot pulley repel strength surface	• compare how things move on different surfaces • notice that some forces need contact between two objects, but magnetic forces can act at a distance • observe how magnets attract or repel each other and attract some materials and not others • compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials • describe magnets as having two poles • predict whether two magnets will attract or repel each other, depending on which poles are facing • report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions (WS) • make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers (WS) • set up simple practical enquiries, comparative and fair tests (WS) • gather, record, classify and present data in a variety of ways to help in answering questions (WS) • record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables (WS)
4	***Do all liquids have the same properties?***	*States of matter:*
	Key Vocabulary: boiling point condense degrees Celsius evaporate freezing point state of gas liquid matter melting point solid solidify temperature water thermometer vapour	• 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) • ask relevant questions and using different types of scientific enquiries to answer them (WS) • set up simple practical enquiries, comparative and fair tests (WS) • make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers (WS) • report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions (WS) • use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions (WS) • use straightforward scientific evidence to answer questions or to support their findings • identify differences, similarities or changes related to simple scientific ideas and processes (WS)

5	***Why would you choose to live on Earth?*** **Key Vocabulary:** asteroid astronaut astronomer atmosphere axis comet crater dwarf planet geocentric model heliocentric model lunar meteoroid orbit planets rotate satellite solar system spherical body universe	*Earth and space:* • describe the movement of the Earth, and other planets, relative to the Sun in the solar system (LTI) • 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 • use test results to make predictions to set up further comparative and fair tests (WS) • report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations (WS) • identify scientific evidence that has been used to support or refute ideas or arguments (WS) • take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate (WS) • plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary (WS)
6	***What is essential for a human to stay alive?*** **Key Vocabulary:** alveoli antibody blood vessel circulatory system haemoglobin hormone immunity kidneys liver nutrients protein pulmonary pulmonary artery pulmonary vein villi virus	*Animals including humans (the circulatory system, lifestyle & nutrition):* • 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 • take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate (WS) • plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary (WS)

Project period 2

<table>
<tr>
<td>3</td>
<td>What's beneath my feet?

Key Vocabulary:
appearance
cast fossil
fossil fuels
fossilisation
igneous rock
impermeable
lava
liquid
magma
metamorphic rock
mould fossil
organic matter
permeable
sediment
sedimentary rock</td>
<td>Rocks:

• 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.

• set up simple practical enquiries, comparative and fair tests (WS)
• make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers (WS)
• gather, record, classify and present data in a variety of ways to help in answering questions (WS)
• record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables (WS)
• report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions (WS)
• use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions (WS)
• identify differences, similarities or changes related to simple scientific ideas and processes (WS)
• use straightforward scientific evidence to answer questions or to support their findings (WS)</td>
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<tr>
<td>4</td>
<td>Could you eat chalk?

Key Vocabulary:

absorb
bacteria
bolus
canine
carnivore
constipation
decay
digestion
digestive system
enzyme
faeces
herbivore
incisor
large intestine
micro-organism
molar
oesophagus
omnivore
predator
prey
premolar
rectum
saliva
small intestine</td>
<td>Animals including humans:

• 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

• report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions (WS)
• use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions (WS)
• use straightforward scientific evidence to answer questions or to support their findings
• gather, record, classify and present data in a variety of ways to help in answering questions (WS)
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• identify differences, similarities or changes related to simple scientific ideas and processes (WS)</td>
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5	***What would life be like without forces?*** **Key Vocabulary:** accelerate air resistance brake buoyancy decelerate forces friction gravity gravitational pull mass mechanism streamlined transfers water resistance weight	*Forces:* • recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect • identify the effects of air resistance, water resistance and friction, that act between moving surfaces?? • explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object	• plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary (WS) • take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate (WS) • record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs (WS) • use test results to make predictions to set up further comparative and fair tests (WS) • report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations (WS) • identify scientific evidence that has been used to support or refute ideas or arguments (WS)
6	***Which circuit is best to power a fire alarm?*** **Key Vocabulary:** brightness components electric current electrical conductivity loudness lux negative positive resistance voltage volume	*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 (LTIs) • use recognised symbols when representing a simple circuit in a diagram.	• plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary (WS) • take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate (WS) • record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs (WS) • use test results to make predictions to set up further comparative and fair tests (WS) • report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations (WS) • identify scientific evidence that has been used to support or refute ideas or arguments (WS)

Project period 3

3	***What is lurking under the skin's surface?***	*Animals including humans:*	
	Key Vocabulary: adaptation camouflage carnivore/carnivorous decomposer ectoparasite endoparasite herbivore host joints calorie carbohydrates energy fat fibre health mammal movement muscle nectar omnivore protection skeleton sockets tendons producer consumer (primary. Secondary and tertiary) apex predator parasitic plants	• 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	• 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 (WS) *LTI: What do owls eat?* • identify that humans and some other animals have skeletons and muscles for support, protection and movement. (WS) *LTI: What are our joints for?*
4	***How can we make electricity?***	*Electricity:*	
	Key Vocabulary: appliances battery bulb buzzer cell circuit closed switch components conductor connection crocodile clip device electrical electricity electrons generate insulator materials motor non-renewable open switch renewable solar switch symbol wire	• 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.	• report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions (WS) • use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions (WS) • use straightforward scientific evidence to answer questions or to support their findings (WS) • gather, record, classify and present data in a variety of ways to help in answering questions (WS) • record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables (WS)

<table>
<tr>
<td>5</td>
<td colspan="2">How would you survive on Alchemy Island?
Key Vocabulary:
alchemy
conductivity
dissolved
durable
electrical conduction
filter
hardness
irreversible change
magnetism
malleable
particle
property
reversible change
sieve
solubility
solute
solution
solvent
substance
thermal conduction
transparency</td>
<td colspan="2">Properties and changes of materials:
• 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
• use test results to make predictions to set up further comparative and fair tests (WS)
• report and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations (WS)
• identify scientific evidence that has been used to support or refute ideas or arguments. (WS)
• take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate (WS)
• plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary (WS)</td>
</tr>
<tr>
<td>6</td>
<td colspan="2">How do scientists classify living things?
Key Vocabulary:
amphibian
arachnid
anthropod
bird
characteristics
classification keys
crustacean
domain
environment
fungus
genus
invertebrate
kingdom
Linnaean
micro-organism
mollusc
phylum
reptile
species
vertebrate</td>
<td colspan="2">Living things and their habitats:
• describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals
• give reasons for classifying plants and animals based on specific characteristics.
• plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary (WS)</td>
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Project period 4

3	***Do plants and animals need the same things to survive?*** **Key Vocabulary:** blossom branch bud bulb carpel fertilisation flower flowering plants fruit leaf/ leaves petals pollen pollination roots seed sepal soil stamen stem transported trunk	*Plants* • identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers (LTI) • 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 (LTI) • explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. • make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers (WS) • set up simple practical enquiries, comparative and fair tests (WS) • gather, record, classify and present data in a variety of ways to help in answering questions (WS) • record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables (WS)
4	***How can we make different sounds?*** buzzer decibel soundproof sound source vibrate/vibration travel pitch volume fainter muffle tune insulation instrument *condensation* *evaporation* *precipitation* *producer* *water cycle* *water vapour*	*Sound + partial states of matter* • 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 • *identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. LTI: Where does water go?* • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers (WS) • identifying differences, similarities or changes related to simple scientific ideas and processes (WS) • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions (WS) • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables (WS)

5	***What would life be like without insects?***	*Living things and their habitats:*	
	Key Vocabulary: anther carpel climate female fertiliser filament gestation antennae asexual consumer exoskeleton germination life cycle mandible metamorphosis micro habitat mimicry moult male ovary ovule sepal stamen stigma stile organism plantlet pollen pollination reproduction runners seed dispersal segment sexual stamen stigma venom	• 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. • *develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics (Aims)* • *are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future (Aims)*	• plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary (WS) • record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs (WS) • use test results to make predictions to set up further comparative and fair tests (WS) • report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations (WS) • identify scientific evidence that has been used to support or refute ideas or arguments (WS)
6	***How does the eye see?***	*Light*	
	Key Vocabulary: angle concave convex filters incidence kaleidoscope periscope prism rainbow reflection refraction spectrum	• 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 eye (LTI) • use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them • *are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future (Aims)*	• plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary (WS) • take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate (WS) • record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs (WS) • use test results to make predictions to set up further comparative and fair tests (WS) • report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations (WS) • identify scientific evidence that has been used to support or refute ideas or arguments (WS)

Project period 5

<table>
<tr>
<td>3</td>
<td>How can something small cast a big shadow?
Key Vocabulary:
beam
bounce
iris
lens
nocturnal
opaque
pupil
ray
reflect
retina
shadow
source
translucent
transparent
visible</td>
<td>Light:
• 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
• ask relevant questions and using different types of scientific enquiries to answer them. (WS)
• report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. (WS)
• use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. (WS)
• identify differences, similarities or changes related to simple scientific ideas and processes. (WS)</td>
</tr>
<tr>
<td>4</td>
<td>How could a creature survive in the deep ocean?
Key Vocabulary:
abyss
adapt
bioluminescence
camouflage
climate
conservation
coral reef
diversity
environment
habitat
marine
oceanography
organism
pollution
pressure
species</td>
<td>Living things and their habitats:
• 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.
• ask relevant questions and using different types of scientific enquiries to answer them (WS)
• set up simple practical enquiries, comparative and fair tests (WS)
• make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers (WS)
• gather, record, classify and present data in a variety of ways to help in answering questions (WS)
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• use straightforward scientific evidence to answer questions or to support their findings (WS)</td>
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5	***How do life cycles differ?*** **Key Vocabulary:** adolescence adulthood childhood death eggs embryo fallopian tube female reproductive organs fertilise fetus life male reproductive organs ovaries pregnancy reproduction sperm womb	*Animals including humans:* • describe the changes as humans develop to old age. LTI: Do we slow down as we get older?	• record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs (WS) • plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary (WS) • use test results to make predictions to set up further comparative and fair tests (WS) • report and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms • identify scientific evidence that has been used to support or refute ideas or arguments. (WS)
6	***Could Marvel characters ever become a reality? Explain your answer*** **Key Vocabulary:** ancestry breeding evolution fossil inheritance naturalist offspring reproduction species variation	*Evolution and inheritance:* • 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. • recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago (LTI)	• plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary (WS) • record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs (WS) • use test results to make predictions to set up further comparative and fair tests (WS) • report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations (WS) • identify scientific evidence that has been used to support or refute ideas or arguments (WS)