Science Knowledge Progression

Key Stage One – Biology Knowledge

Animals Including Humans

- Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals including pets, and describe and compare their structures.
- Identify and name a variety of common animals that are carnivores, herbivores and omnivores.
- Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.
- Notice that animals, including humans, have offspring which grow into adults.
- Find out about and describe the basic needs of animals, including humans for survival (water, food, air)
- Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.

Living Things and Their Habitats

- 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 identify and name different sources of food.

Plants

- Know and be able to describe how plants need water, light and a suitable temperature to grow and stay healthy.
- Know and describe how seeds and bulbs grow into mature plants s

Year One				Year Two				
Animals Inc Humans • Identify, name, draw and label the basic parts of the human body. • Say which part of the body is associated with each sense.	**Animals including humans** • Group and sort the key animal groups • Know the common features of each animal group • Learn about animal diets (carnivores, omnivores, herbivores)	**Animals inc Humans** • To name and identify the key animal groups (fish, birds, amphibians and reptiles) **and to describe and compare their structures.** • Learn about animal diets (carnivores, omnivores, herbivores) an group and sort animals by this criteria	**Living Things: Plants** • Identify and name a variety of common wild and garden plants. • Identify and name some deciduous and evergreen trees. • Identify and describe the basic structure of a variety of common flowering plant. • Plant beans and make and record observations over time in growth and development. • Take part in nature walks on and off site. • Observe, gather and record data in relation to wild flowers and trees in the local area. • Draw conclusions from findings.	**Living Things and Their Habitats** • Observe a range of micro-habitats - children to find and observe the range of micro-habitats and discuss what they can do to further protect them. • Identify a range of macro-habitats and their differing features. • The children will understand how animals are adapted to their own habitats. • Children to begin to understand that some animals are in danger of their habitats being in danger. • Design and make their own habitat for an animal which is suitably adapted. • Children to look at simple food chains and know animals obtain their plants from plants and other animals. Children to consider what would happen when one part of that simple food chain is not there - what would happen? • Children to create their own micro-habitats for our school ground to attract a range of biodiversity. Why did God design the Earth's biodiversity the way he did?	• Know and understand how animals are adapted to extremely hot and cold habitats. • Children to know the impact the human population is having on our world. • Know the basic causes and effects of climate change. • Perform simple tests that demonstrate global warming. • Know that the ice caps are melting, sea levels and rising and animals are in danger of losing their natural habitats. • Discover climate change heroes: David Attenborough and Greta Thunberg • Explore Laudato Si and understand how they can be heroes and care for our common home	**Animals including humans** • Understand that animals including humans have offspring that grow into adults • Understand how humans grow up and the differences in the stages of life. • Know and understand and describe the basic needs of animals including humans for survival • Know and understand the importance of exercise • Know and understand the importance of a healthy, balanced diet • Know and understand the importance of hygiene and keeping clean		**Living Things: Plants** Children will use the local environment throughout the year to observe how different plants grow. Children will be introduced to the requirements of plants for germination, growth and survival, as well as to the processes of reproduction and growth in plants.
human **cleanliness** **aroma** **healthy** **exercise** **require** **texture** **sound** **label** **identify** **facial features**	**identify** **predator** **grouping** **legs** **ears** **fur** **feathers** **wings** **beak** **scales** **gills**	**identify** **predator** **grouping** **legs** **ears** **fur** **feathers** **wings** **beak** **scales** **gills**	**deciduous** **evergreen** **blossom** **crown** **trunk** **branch** **roots** **petals** **leaves** **bud** **stem** **weed**	**habitat** **dead** **alive** **living** **non-living** **food chain** **predator** **prey** **source** **environment** **suitable** **shelter** **global warming** **climate** **climate change** **adapt**	**habitat** **food chain** **predator** **prey** **source** **environment** **suitable** **shelter** **global warming** **climate** **climate change** **adapt**	**reproduce** **life cycle** **develop** **offspring** **young** **live young** **generation** **hatchling** **larva** **caterpillar** **chrysalis** **frogspawn** **tadpole**	**exercise** **heart rate** **pulse** **perspire** **hygiene** **germs** **spread** **diet** **dehydrate** **shelter**	**seed** **bulb** **plant** **temperature** **light** **water** **germination** **survival** **reproduction** **stunted** **moist** **shade** **dormant**

Key Stage One - Chemistry Knowledge

Everyday Materials – Properties, changes and uses

- 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.
- 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.

Year One

Everyday materials - Properties

What is the best material to build a castle?

- Identify and name everyday materials
- Describe simple properties of everyday materials
- Distinguish between an object in the material it is made from
- Make a prediction and perform a simple test
- Use observations to answer simple questions
- To observe closely and sort objects according to simple criteria

opposites
object
material
property
group
compare
waterproof
absorbent
transparent
opaque
flexible
rigid
fragile
dull
recycle

Year Two

Everyday Materials – Uses and Changes

What is the best material to wrap a Christmas present?'

- Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard.
- Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.
- Identify natural and man-made materials.
- Describe how we can preserve materials.
- Children to research and discover which materials from earth are running out.

Materials – Uses and Changes

'What is the best material to build a bridge?'

- Children will 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.
- Work scientifically to observe and identify the uses of everyday materials around school and the local environment and reasons for their uses.
- Perform simple tests on materials to develop an understanding of their properties.
- Children will find out about people who have developed new materials.

materials
properties
suitability
stretch
transparent
opaque
absorbent
waterproof
raw material
manufactured
metal
magnetic materials

Key Stage One - Physics Knowledge

Seasonal Changes

- Observe changes across the four seasons.
- Observe and describe weather associated with the seasons and how day length varies

Year One	Year Two
Observe changes across the four seasons. • Observe and describe weather associated with the seasons and how day length varies	There are no physics programmes of study in Year 2. Children draw on previous physics knowledge during their work on plants and materials. Plants - Through their work on how observing how different plants grow throughout the year children will re-visit how the weather and day length changes across the seasons. Materials – Through their work exploring the properties of materials children will experience forces.
seasons **a day** **day time** **daylight** **cloudy** **dry day** **humidity** **unpredictable** **pouring** **clear** **shiver** **blizzard** **observe** **varies**	

Key Stage One - Working Scientifically Skills

Children will be taught to use the following practical scientific methods, processes and skills:

- 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.

Key Stage One – Working Scientifically Vocabulary

Investigation
Prediction
Explanation
Secondary Source
Classify
Comparative test
Standard units
Chart
Key

Year One

Observation Over Time	Pattern seeking	Identifying, Classifying and Grouping	Comparative and Fair Testing	Research Using Secondary Sources
•Runner beans- planting an observing over a few weeks (Summer 1) •What are fruits and seeds (Autumn) •What plants need to grow (Spring) •Structure of a flower (Summer) •Observe KS1 area tree with sketches	•Do trees with bigger leaves lose their leaves first in autumn? (Autumn) •Is there a pattern in the types of materials that are used to make objects in a school? •Can I wear the same clothes in every season? (Sort clothes for the seasons activity)	•Wildflower walk and local area walk identifying trees. •Nurse visit- healthy eating through tasting and categorising. •Classifying animals (Animals Takeover workshop) •Material hunt •Feely bag- group the materials	•Five senses experiments •Waterproof umbrella experiment	•Quality information books •Websites

Year Two

Observation Over Time	Pattern seeking	Identifying, Classifying and Grouping	Comparative and Fair Testing	Research Using Secondary Sources
Observe what conditions woodlice prefer to live in Observe what happens to plants when you change what you give them/where they are – e.g. no sunlight, no water, temperature Observe what happens to beans when they grow Observe germ growth on bread over time after hand	Discover which habitats worms prefer Plant seeds to see if larger seeds grow into larger plants Identify places where plants grow well/don't grow well – what do they notice?	Identify and group things that are alive, dead or have never been alive Identify micro-habitats within the children's homes and local area Identify the structure of a flower by dissecting the head Identify the structure of a seed through dissecting	Compare the structure of seeds. Hand washing experiment – what is the best way to wash your hands? Compare materials – waterproof/not waterproof absorbent/non-absorbent transparent/opaque magnetic/non-magnetic	Research the habitats to which animals are suited Research how animals are adapted to their habitat Research Charles Mackintosh and John McAdam How plastics are made and recycled

•Photos of children as babies, toddlers and now (comparing how we are different as we grow up.) •Daily calendar and weather chart discussion •Looking at Autumn •Looking at Winter •Looking at Spring •Looking at Summer					washing in a variety of ways Observe how their bodies change when they exercise Life cycles – tadpoles and chicks How does a tadpole change over time? How does a chick change over time? Would a paper boat float forever?		Identify the life cycle of a flowering plant Identify, group and sort foods from the different food groups Identify what a human needs to survive Sort which offspring belongs to which animal Identify and group live young/animals that hatch from an egg Sorting and identifying the properties of everyday materials Identify the uses of everyday materials in class and in the local area Identify what happens to materials when they are stretched, squashed, etc	Which material would be best to build a bridge	

Lower Key Stage Two - Biology Knowledge

Animals Including Humans

- 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.
- 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.

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.

Plants

- Identify and describe the functions of different parts of flowering plants – roots, stem/trunk, leaves & flowers.
- Know that plants need air, light, water, nutrients from the soil and room to grow and how these can vary from plant to plant.
- To investigate the way in which water is transported within plants.
- To explore the role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

Year Three		Year Four	
Animals including humans **We Are Companions on A Journey** • Know that Humans and some other animals have skeletons and muscles for support, protection and movement. • Learn about the importance of nutrition and the five different food groups. • Learn how to care for our bones. • Compare strengths of muscles. • Examine how skeletons vary between animals- carnivores and herbivores.	**Plants** **How did that blossom become an apple?** • To identify and describe the functions of different parts of a flower including: roots, leaves, stem/ trunk and flowers. • To know that plants need air, light, water, nutrients from the soil and room and to grow and how they vary from plant to plant.	**Animals including humans**	**Animals including humans**

skeleton	**flowers**	**digestion**	**food chain**
bone	**leaves**	**mouth**	**producer**
protection	**stem/trunk**	**saliva**	**consumer**
joint	**roots**	**oesophagus**	**predator**
movement	**vascular**	**stomach**	**prey**
function	**xylem**	**small**	**carnivore**
muscles	**phloem**	**intestine**	**herbivore**
tendon	**sucrose**	**liver**	**omnivore**
contract	**starch**	**large**	**organism**
relax	**transpiration**	**intestine**	
voluntary	**germination**	**anus**	
involuntary	**pollen**	**decay**	
exoskeleton	**petal**	**enamel**	
diet	**stamen**	**plaque**	
healthy	**pistil**		
unhealthy	**sepal**		
nutrients	**pollinators**		
energy	**formation**		
exercise	**fertilisation**		
hygiene	**pollination**		
digest	**dispersal**		

Lower Key Stage Two - Chemistry Knowledge

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 a rock.
- Recognise that soils are made from rocks and organic matter.

States of Matter

- 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
- Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

Year Three

Rocks

'What do rocks tell us about the way the Earth was formed?'

- What are fossils and why are they so fascinating?
- What can you find out about sedimentary and igneous rocks?
- Why is a diamond a girl's best friend?
- The mystery of Stonehenge.

fossil
palaeontology
sediment
erosion
decay
organic matter
exposed
permeable
volcano
molten
magma
lava
compacting/compressing

Year Four

States of Matter

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
Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

solid
liquid
gas
heated
cooled
freezing
melting
evaporate
condensation
temperature
thermometer
Celsius

Lower Key Stage Two - Physics Knowledge

Forces

- 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.

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 source is blocked by an opaque object.

Sound

- 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 produce 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.

Electricity

- 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.

Year Three

Magnets
Are you attractive enough?

- What is a magnet and what is its relationship to the North Pole?
- What do we mean by attract and repel?
- How can we use magnets to make an exciting game?
- What other forces do we know and how can we classify forces?

force
contact
force
non-contact force
surfaces
friction
energy
attract/attraction
repel/repulsion
poles
magnet
magnetic field
magnetism

Light

reflect
transparent
translucent
opaque
shadow
mirror
absorption
emit
proximity
radiation

Year Four

Sound
What creates sound?

- Children will investigate how sound is made.
- We will undertake practical experiments connected with how sounds are made.
- We will learn all about how our ear functions

Sound wave
Vibration
Volume
Amplitude
Pitch
Frequency
Source
Insulation
Outer ear
Inner ear
Eardrum

Electricity
How did the Romans survive without electricity?

- 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

Circuit
Series circuit
Open switch
Closed switch
Voltage
Current
Conductors
Insulators
Component
Mains
Battery
Appliances
Bulb
Motor
Switch
Wire
Buzzer
Cell/battery

Lower Key Stage Two - Working Scientifically Skills

Children will be taught to use the following practical scientific methods, processes:

- 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.

Lower Key Stage Two – Working Scientifically Vocabulary

Investigation
Prediction
Explanation
Secondary Source
Classify
Comparative test
Standard units
Chart
Key

Year Three

Observation Over Time	Pattern seeking	Identifying, Classifying and Grouping	Comparative and Fair Testing	Research Using Secondary Sources
To examine how light changes in our classroom over time? Are our shadows the same at different times of the day? How does the distance between the shadow puppet and the screen affect the size of the shadow produced? Plant own seed and position somewhere where they think it will grow. Observe over time and record results What happens to celery when it is left in a glass of coloured water? If we magnetise a pin, how long does it stay magnetised for?	Reaction tests. Look at the muscles that we choose to use and when and how. Pupil dilation observation. How the muscle around the eye reacts to light. Look what makes a surface reflective, how the shape of that surface influences the image produce and where different mirrors can be used. Does the size and shape of a magnet affect how strong it is?	Examine the structures of different types of skeletons. Sort and classify rocks into given criteria: colour, texture, sedimentary etc Look at different types of soil, identify similarities and differenced between them. Which materials are magnetic?	Jump tests to test the strength of leg muscles. Look at how light does, or does not transmit through different material. Put the planted seed into different locations and discuss growth results give predictions and reasons for change Which magnet is the strongest?	Name the key bones of a human skeleton and research what their function is. Use the internet to find out about the food groups, nutrition and the diet that we need to look after our bones. Decide how we can protect our bones in other ways. Look for a variety of natural and man made sources of light. Watching "Espresso" "BBC" video clips on germination, seed dispersal, pollination and germination. Discuss their findings with peers. Who was Mary Anning and what did she discover?

Year Four

Observation Over Time	Pattern seeking	Identifying, Classifying and Grouping	Comparative and Fair Testing	Research Using Secondary Sources
Children put food and liquid through a model digestive system. Place egg in different liquids. Observe decay over time.	Local habitat surveys. Sound walk - Consider which areas of the school will be quiet, which will be loud and which will have no sound at all. Pupils investigate how different pitches are made with the instruments. Make careful observations using different materials to show the presence of gas. Investigate how to construct a simple circuit in order to make a bulb light up. Investigate whether bulbs get brighter if more cells are added.	Identify and label the organs that make up the human digestion system. Identify and label different types of human teeth and describe their functions. Compare animal skulls/photographs. Describe similarities/differences. Grouping living things. Classifying vertebrates. Invertebrate hunt. Classification keys. Classifying a range of different materials. Children sort objects and pictures into groups eg. do/don't run on electricity, run on mains electricity/batteries.	Place egg in different liquids. Observe decay over time. Investigate sound-proofing materials by planning and conducting a fair test, considering all the variables and how to record the results. Carry out an ice cube observation, match the temperatures and measure the temperature in different parts of the room. Plan and set up an enquiry into the factors that speed up evaporation, Investigate which material is the best insulator/ conductor of electricity by connecting different materials into a circuit.	Children use the internet to research information about food chains and construct their own. Research how environmental changes have impacted on endangered species.

Upper Key Stage Two - Biology Knowledge

Animals Including Humans

- Describe the changes as humans develop to old age.
- Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood (including the pulse and clotting)
- 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.

Living Things and Their Habitats

- Describe the difference in the life cycle of a mammal, an amphibian an insect and a bird.
- Describe the life process of reproduction in some plants and animals.
- 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 plant and animals based on specific characteristics.

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.
- 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 may lead to evolution.

Year Five

Animals including humans

• The stages of human development, growth of babies, puberty, changes in old age, gestation periods and life expectancy.
• The children will draw graphs to display a variety of data and look at spreadsheet software to present their data in different ways.

puberty
lifecycle
gestation
growth
reproduce
foetus
life
expectancy
fertilisation
embryo

Living Things and Their Habitats

- Describe the difference in the life cycle of a mammal, an amphibian an insect and a bird.
- Describe the life process of reproduction in some plants and animals.

life cycle
reproduction
asexual reproduction
sexual reproduction
genes
offspring
inherit
amphibian
bird
insect
mammal
fertilise
gestation
metamorphosis
pollination

Year Six

What is the Theory of Evolution?

How do fossils provide evidence for evolution? What are the different animal kingdoms? What impact have humans had on plants and animals?

evolution
adaptation
inherited traits
inheritance
adaptive traits
natural selection
DNA
genes
variation
offspring
fossil
environment
habitat
fossilisation

Animals including humans

• Identifying the main parts of the circulatory system.
• Explaining the main functions of the heart, lungs and blood vessels in the circulatory system.
• Able to describe how the digestive system breaks down nutrients.
• Able to outline what constitutes a healthy lifestyle.
• Taking accurate measures of the pulse rate.

circulatory system
heart
blood vessels
blood
artery
lungs
vein
pulmonary
alveoli
capillary
digestion
transport
gas exchange
villi
nutrients
oxygen
organ

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 micro-organisms, plants and animals.
Give reasons for classifying plant and animals based on specific characteristics.

classify
compare
classification
characteristics
vertebrates
invertebrates
microorganism
organism
micro-organism
flowering
non flowering
kingdom
class
order
family
genus
species

Upper Key Stage Two - Chemistry Knowledge

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.

Year Five	Year Six
Properties and changes to materials **Could you be the next CSI investigator?** • Properties of materials, keeping cool (thermal insulators and conductors), brighter bulbs (electrical insulators and conductors), dissolving, separating mixtures and irreversible changes.	There are no Chemistry programmes of study in Year 6. Children are expected to draw on their prior knowledge of materials when exploring light and electricity.
material **dissolving** **insoluble** **suspensions** **solution** **soluble** **mixture** **separate** **permeable** **particle** **filtration** **sieving** **evaporation** **condensation** **irreversible** **reversible** **insulator** **conductivity** **circuit** **magnetism** **transparency**	

Upper Key Stage Two - Physics Knowledge

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 switches.
- Use recognised symbols when representing a simple circuit in a diagram.

Year Five

Earth and Space

Will we ever send another human to the moon?

- 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

geocentric
heliocentric
spherical
axis
orbit
eclipse
sundial
night
day
rotate
solar
system
star
planets
moon
sun
Earth

Forces

Can you feel the force?

- To identify forces acting upon an object.
- Explore the effect that gravity has on objects and how the first theory of gravity was developed.
- Investigate the effects of air resistance, explore the effects of water resistance.
- Investigate the effects of friction and to explore and design mechanisms.

force
push
pull
opposing
forces
gravity
air
resistance
water
resistance
friction
streamlining
brake
lever
gear
cog
pulley

Year Six

Light

The pupils will be learning everything they need to know about light and how it behaves. Covering all of the objectives from the Light Year 6 Science strand, these lessons explore shadows and how they behave, how our eyes see, reflections and much more!

shadow
light
filter
colour
reflect
absorb
refract
visible
angle
incidence
ray
energy
source
tilt
rainbow
periscope

Electricity

Changing Circuits

Year 6 will consolidate their class knowledge of circuits and how they work, before challenging themselves to extend their knowledge of electrical circuits through a variety of fun, practical and informative activities. They will have the chance to explore how to change the brightness of a bulb in a circuit, how different wires affect a circuit, circuit symbols and lots more as they carry out electricity investigations and other activities independently.

Electric current
Alternating current
Direct current
Open circuit
Closed circuit
Battery (cell)
Bulb
Wire
Motor
Buzzer
Circuit
Voltage
Electron
Static electricity
Electromagnet

Upper Key Stage Two - Working Scientifically Skills

Children will be taught to use the following practical scientific methods, processes and skills:

- 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 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.

Upper Key Stage Two - Working Scientifically Vocabulary

Scientific Enquiry
Scientific Conclusion
Variable
Fair Test
Comparative test
Repeated Measurements/Reading
Precision
Systematic
Accuracy
Classification Key
Predicted value

Year Five					Year Six				
Observation Over Time	**Pattern seeking**	**Identifying, Classifying and Grouping**	**Comparative and Fair Testing**	**Research Using Secondary Sources**	**Observation Over Time**	**Pattern seeking**	**Identifying, Classifying and Grouping**	**Comparative and Fair Testing**	**Research Using Secondary Sources**
Test different materials and see if they dissolve in water. Test if a soluble material dissolves quicker in cold or hot water. Observing the life cycle of a caterpillar How does the level of salt affect how quickly brine shrimp hatch? How does shadow length change over different times of the day?	Measuring the height of children in different year groups to see if they are the tallest? Is there a pattern between the size of a planet and the time it takes to travel around the sun? To design boats using different materials and time how long is takes to cross the water tray.	Can you identify all the stages in the human life cycle? Children use a camera to photograph flowers around school or the local area. Sort them into wind or insect pollinated, based on the features they see. Can you observe and identify all the phases in the cycle of the moon? Can you label and name all the forces acting on the objects in certain situations?	Will a snowman melt faster with or without a coat on? Use what you know about thermal conductors and insulators to make a prediction, then test it by wrapping ice cubes in 'coats' made of different materials. To investigate the conductivity of different materials. To carry out an experiment to measure the force of gravity To create different types of parachutes and measure how they affect the time to reach the floor. Investigate how different surfaces affect the speed of a toy car.	Research gestation periods of different animals and create a table to show this. Children write a diary entry in role as Jane Goodall, describing the chimpanzee behaviour she observed. To research Jocelyn bell Burnel and find out what she discovered.	What happens to a piece of bread if left on a windowsill for two weeks? Which is the most common invertebrate on the park? How does my heart rate change over the day? Can exercising regularly affect your lung capacity? Evolution of species Is there a pattern to how bright it is in different parts of the school over the day? Which make of battery lasts the longest?	What type of exercise has the greatest effect on our heart rate? Compare beaks of finches and relate to food types. Changing the size of shadows Which material is most reflective? Is there a pattern to how bright it is in different parts of the school over the day?	Classify living things into animal groups Using keys Which organs of the body make up the circulatory system? Fossils Identify all the colours of light that make up white light. What colours do you get if you mix different colours of light together?	What type of exercise has the greatest effect on our heart rate? Compare the skeletons of apes and each stage of human evolution. Which material is most reflective? How does the angle that a ray hits a plain mirror affect the angle at which it reflects off the surface? Investigate parallel and series circuits on brightness of bulbs Which type of fruit makes the best battery?	What do microbes do? Are they always harmful? What happened when Charles Darwin visited the Galapagos? Mary Anning Related scientists – How had our understanding of electricity changed over time?