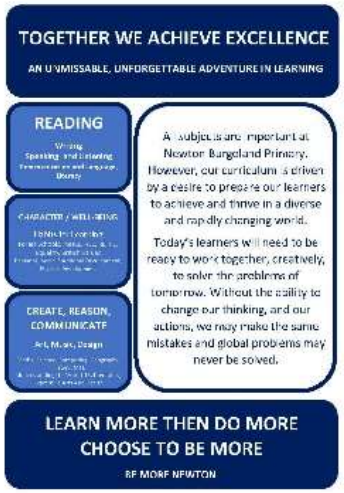
Learn more. Do more. Choose to be more.

This scheme of work has been devised by the teachers at Newton Burgoland Primary School

Preamble

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

INTENT



We want all learners to reach at least the expected National Curriculum standard by the end of year 6 and to be keen to continue their studies in key stage 3 and beyond. We want learners to be able to see themselves as Scientists and open to pursuing a career in STEM subjects.

The science lesson should be one our learners look forward to and greet with enthusiasm. They should leave lessons wanting to find out more.

When studying science, learners will draw on their developing learning habits, making progress in their ability to persevere, work effectively as a team, respect and celebrate difference, ask questions and create. We want learners to be interested in the application of science to life today and for tomorrow.

We want our children to understand that not all people were treated equally in the history of science that people of all colour and background have contributed to scientific discovery; that careers in science should not be seen as gender specific.

Our curriculum ensures that pupils understand that:

- Science is about finding the cause or causes of phenomena in the natural world
- Scientific explanations, theories and models are those that best fit the evidence available at a particular time
- The knowledge produced by science is used in engineering and technologies to create products to serve human ends
- Applications of science often have ethical, social, economic and political implications

In addition that there are 3 big ideas in science (Harlen, W., 2010) which can connect all learning:

- All matter in the Universe is made of very small particles
- Objects can affect other objects at a distance
- Organisms are organised on a cellular basis and have a finite life span

IMPLEMENTATION

We want our learners to enjoy science, to be curious about scientific phenomena- routinely, asking why and what if…



In EYFS learners talk about the world around them. They observe the seasons, collect natural materials, grow plants, push and pull in play. Build structures and engage with teacher initiated learning to find out more about scientific phenomena. They use scientific language, share non-fiction books and ask questions to further their interests and understanding.

In key stage 1 pupils follow the national curriculum ensuring that they are prepared for further study and enquiry in key stage 2.
In key stage 2 pupils, again, follow the national curriculum.

Pupils find out about how science has contributed, about scientists and about the importance of science to averting climate change.

Science is generally taught as a stand-alone subject, but where possible cross-curricular links are made to enhance and reinforce learning. In each class, elements of knowledge, within areas of study, are explored and revisited to ensure that misconceptions are addressed and knowledge and understanding are secured. Learners are encouraged to communicate their thinking clearly using subject specific vocabulary to support the securing of knowledge and to enable teachers to identify and address misconceptions.
Learners work scientifically in both key stages within units of study, developing understanding, skills and techniques.
Science learning includes, finding out about famous scientists; learning and using key vocabulary and concepts, and refining and developing key investigational skills.
Visits to enhance learning include: the botanical gardens and arboretum, The Magna centre in Sheffield and Space centre in Leicester. Cross-curricular work – The Tudors and the 'king in the car park' give an insight into how science can unlock the secrets of the past.

Wherever possible, we draw on stem ambassadors and parents or governors working in scientific fields to inspire learners and signpost career paths. Regular Forest school sessions enhance and reinforce learning in a practical setting.

Approximately, 60 hours is allocated to learning in science, in both keystages, of which at least half is allocated for working scientifically. Practical work is highly valued and supports learning in mathematics, English communication and computing.
A range of non-fiction texts on aspects of scientific knowledge and understanding, suitable for young and early readers, are available within our reading scheme.

Key vocabulary has been identified, alongside enrichment opportunities including trips and visitors.

- The reading scheme includes high quality non-fiction to support learning in science
- Themes are revisited, and teaching makes links to what has already been learnt and what will be learnt next.
- Continuous provision and direct teaching in EYFS is carefully planned to prepare pupils for the national curriculum.
- A progression document is in place to support the assess, plan, do review cycle
- Teachers are careful to avoid cognitive overload by planning learning in small steps with time to develop understanding and spaced retrieval to aid long term memory

Assessment, Recording and Reporting

In all subjects there are three broad areas for assessment:

- Children's knowledge and understanding
- How well children can use and apply their knowledge, understanding and skills at the end of a unit of work to complete an independent (of an adult) task or challenge.
- How well learners are developing habits for learning and character

Teachers assess learner's work, their attitudes, increasing skills, knowledge and understanding, by making informal judgements as they observe them during lessons. This assessment enables planning to be tailored to meet learners needs. Assessment encompasses teacher, peer and self-assessment. In all subjects, opportunities for both Assessment for Learning and Assessment of Learning are built into provision. Learners are supported to reflect on their own learning and, age appropriately, to make judgements about their strengths and needs, beginning to plan how to make progress and set personal targets.

Baseline assessment, in order to understand pupils' prior learning, is an essential part of planning to ensure new learning is relevant and progress can be assessed.
The learners work, in particular baseline assessments and end of unit assessments, which are recorded within learners' workbooks are used to make decisions at the end of each unit, and at the end of each year, as to next learning steps and whether or not learners are making strong progress and are on track for end of key stage expectation.

Progress is recorded and reported to parents as part of the child's annual school report.

Special Educational Needs
Science is taught to all children, whatever their ability, in accordance with the school curriculum policy of providing a broad and balanced education to all children. Teachers provide learning opportunities matched to the needs of children with learning difficulties.

IMPACT

Prior to the pandemic:

- Pupils made good progress in science to achieve at least ARE by the end of year 6.
- Continuous provision and direct teaching in EYFS prepared pupils well for the national curriculum.
- All children used scientific vocabulary accurately
- Children could speak confidently about their learning in science
- Those working at greater depth were able to make connections between units of study. They went beyond the knowledge studied and asked questions to further their understanding.
- A number of pupils studied science beyond school at university in the areas of veterinary science, psychology and environmental science.

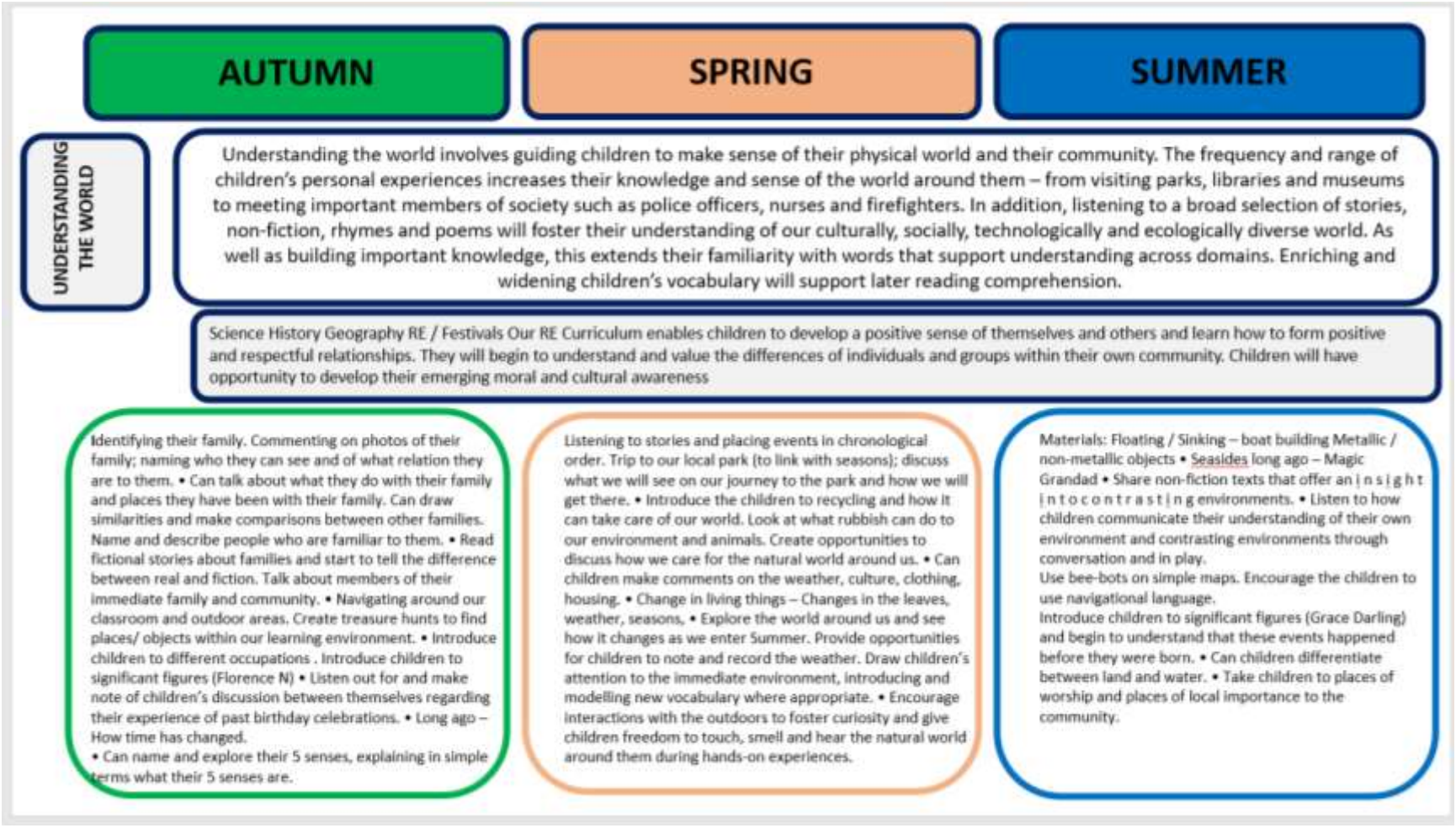
As a result of the pandemic pupils have:

- had fewer opportunities to explore concepts and address misconceptions through talking and questioning – not all learning is secure.
- had a variety of experiences when home learning and accessed set learning differently.
- had fewer opportunities for collaboration and enrichment through visits and visitors
- Had fewer opportunities to work scientifically and make connections to the big ideas of Science.

By following the assess, plan, do, review cycle teachers will identify areas which need more or less focus over the next 2 years and support all pupils to make strong progress from starting points. An engineering club is in place to enrich learning for pupils in KS2 alongside a sound engineering club (2021/22).
In 2022/23 our focus is on diversity.

Foundation stage

Learners in foundation stage are taught within a mixed age class. They actively engage with the science curriculum through play.



	AUTUMN	SPRING	SUMMER
CHARACTERISTICS OF EFFECTIVE LEARNING	**Playing and exploring:** Children investigate and experience things, and 'have a go'. Children who actively participate in their own play develop a larger store of information and experiences to draw on which positively supports their learning. **Active learning:** Children concentrate and keep on trying if they encounter difficulties. They are proud of their own achievements. For children to develop into self-regulating, lifelong learners they are required to take ownership, accept challenges and learn persistence. **Creating and thinking critically:** Children develop their own ideas and make links between these ideas. They think flexibly and rationally, drawing on previous experiences which help them to solve problems and reach conclusions.		
OVER ARCHING PRINCIPLES	**Unique Child** Every child is unique and has the potential to be resilient, capable, confident and self-assured. **Positive Relationships** Children flourish with warm, strong & positive partnerships between all staff and parents/carers. This promotes independence across the EYFS curriculum. Children and practitioners are NOT alone – embrace each community. **Enabling environments** Children learn and develop well in safe and secure environments where routines are established and where adults respond to their individual needs and passions and help them to build upon their learning over time. **Learning and Development:** Children develop and learn at different rates (not in different ways as it stated 2017). We must be aware of children who need greater support than others.		

Newton Burgoland Primary School 2022 Progression in Science - Knowledge

Units of learning	Autumn A	Spring A	Summer A	Autumn B	Spring B	Summer B
Foundation and Year 1	*Animals including Humans (and our senses) Seasonal Changes*	*Materials Seasonal Changes*	*Animals (sea creatures) Seasonal Changes*	*Animals Seasonal Changes*	*Materials Humans & Senses*	*Plants Animals (mini beasts)*
Year 2	Animals including Humans – Habitats, needs of living things and life cycles.	Materials – Changing materials	Animals including humans – Healthy Humans	Animals including Humans – Habitats, needs of living things and life cycles.	Materials – Changing materials	Animals including humans – Healthy Humans
Year 3 and 4	Animals and habitats Materials and states of matter	Forces and magnets Digestive system and teeth	Plants	Animals and humans: nutrition and the skeleton	Rocks and soils	Electricity Light
Year 5 and 6	*Forces*	*Living Things and Habitats*	Properties and Changes of Materials *Electricity*	*Animals, humans and life cycles Evolution*	*Earth in Space Light*	*The Circulatory System*

Organisation of learning

Units of learning in foundation and Year1 are organised so that pupils can meet learning objectives in both year 1 and foundation – securing and deepening knowledge This knowledge and understanding is further secured and extended in year 2. Some early scientific knowledge, which is further developed in KS2, is explored through cross-curricular themes in key stage 1: Sound, Earth in space and forces. music, history, design technology respectively)
Knowledge about humans , plants and animals develops and deepens from foundation to year 6 connections are made between different units of study and learning in geography (biomes and climate)

F / Y1 Plants

F1 Grow and observe plant growth

F2 Explore the plants in the surrounding natural environment

F3 Explore plants and animals in a contrasting natural environment

1. identify and name a variety of common wild and garden plants, including deciduous and evergreen trees
2. identify and describe the basic structure of a variety of common flowering plants, including trees

Assessment		Key learning	Evidence of learning	Working Scientifically
SECURE	Shows understanding of a concept using scientific vocabulary correctly	Growing locally there will be a vast array of plants which all have specific names. These can be identified by looking at the key characteristics of the plant. Plants have common parts but they vary between the different types of plants. Some trees keep their leaves all year whilst other trees drop their leaves during autumn and grow them again during spring. **Key vocabulary** Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud Names of trees in the local area Names of garden and wild flowering plants in the local area	Can name trees and other plants that they see regularly Can describe some of the key features of these trees and plants e.g. the shape of the leaves, the colour of the flower/blossom Can point out trees which lost their leaves and those that kept them the whole year Can point to and name the parts of a plant, recognising that they are not always the same e.g. leaves and stems may not be green	I can observe plants/leaves closely and describe them. I can observe the change and growth in a plant over time. I can use my senses to describe plants. I can make observations of how a tree changes over the course of a year. **Celebrating diversity** Wangari Maathai
	Applying knowledge in familiar related contexts, including a range of enquiries	Make close observations of leaves, seeds, flowers etc. Compare two leaves, seeds, flowers etc. Classify leaves, seeds, flowers etc. using a range of characteristics Identify plants by matching them to named images Make observations of how plants change over a period of time When further afield, spot plants that are the same as those in the local area studied regularly, describing the key features that helped them	Can sort and group parts of plants using similarities and differences Can use simple charts etc. to identify plants Can collect information on features that change during the year Can use photographs to talk about how plants change over time	

F/Y1 Animals – see next sheet for human statement

F1 Name and describe animals that live in different habitats.
F2 Describe different habitats
F 3 Learn about the life cycles of animals
F 4 Compare adult animals to their babies
F 5 Observe how baby animals change over time
F6 Explore the animals in the surrounding natural environment

1. identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals
2. identify and name a variety of common animals that are carnivores, herbivores and omnivores
3. describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)

	Assessment guidance	Key learning	Possible Evidence	Working scientifically
SECURE	Shows understanding of a concept using scientific vocabulary correctly	Animals vary in many ways having different structures e.g. wings, tails, ears etc. They also have different skin coverings e.g. scales, feathers, hair. These key features can be used to identify them. Animals eat certain things - some eat other animals, some eat plants, some eat both plants and animals. **Key vocabulary** Head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves Names of animals experienced first-hand from each vertebrate group N.B. The children need to be able to name and identify a range of animals in each group e.g. name specific birds and fish. They do not need to use the terms mammal, reptiles etc. or know the key characteristics of each, although they will probably be able to identify birds and fish, based on their characteristics. The children also do not need to use the words carnivore, herbivore and omnivore. If they do, ensure that they understand that carnivores eat other animals not just meat.	Can name a range of animals which includes animals from each of the vertebrate groups Can describe the key features of these named animals Can label key features on a picture/diagram Can write descriptively about an animal Can write a What am I? riddle about an animal Can describe what a range of animals eat	I can identify a range of animals and sort them in different ways. I can show my sorting in different ways. **Celebrating diversity** Eugenie Clarke Evelyn Cheesman,
	Applying knowledge in familiar related contexts, including a range of enquiries	Make first hand close observations of animals from each of the groups Compare two animals from the same or different group Classify animals using a range of features Identify animals by matching them to named images Classify animals according to what they eat	Can sort and group animals using similarities and differences Can use simple charts etc. to identify unknown animals Can create a drawing of an imaginary animal labelling its key features Can use secondary resources to find out what animals eat, including talking to experts e.g. pet owners, zoo keepers etc.	

F/Y1 Humans – see previous sheet for animal statements

F1 Describe people who are familiar to them
F2 Learn about how to take care of themselves
F 3 Learn about the life cycles of humans
F 4 Learn about their senses

4. identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense

Assessment		Key learning	Possible Evidence	Working scientifically
SECURE	Shows understanding of a concept using scientific vocabulary correctly	Humans have keys parts in common, but these vary from person to person. Humans (and other animals) find out about the world using their senses. Humans have five senses – sight, touch, taste, hearing and smelling. These senses are linked to particular parts of the body. **Key vocabulary** Parts of the body including those linked to PSHE teaching (see joint document produced by the ASE and PSHE association) Senses, touch, see, smell, taste, hear, fingers (skin), eyes, nose, ear and tongue NB. Although we often use our fingers and hands to feel objects the children should understand that we can feel with many parts of our body	Can play and lead 'Simon says'. During PE lessons, can follow instructions involving parts of the body Can label parts of the body on pictures and diagrams Can explore objects using different senses	• I can take part in a simple investigation and record my findings. • I can make close observations of faces. • I can record my observations in a table. • I can use a simple labelled diagram. **Possible enquiry questions** Will the oldest child in the class always have the biggest feet? **Celebrating diversity** Dr Julia Bath,
	Applying knowledge in familiar related contexts, including a range of enquiries	Make first hand close observations of parts of the body e.g. hands, eyes Compare two people Take measurements of parts of their body Compare parts of their own body Look for patterns between people e.g. Do people with big hands have big feet? Classify people according to their features Investigate human senses e.g. Which part of my body is good for feeling, which is not? Which food/flavours can I identify by taste? Which smells can I match?	Can use first-hand close observations to make detailed drawings Can name body parts correctly when talking about measurements and comparisons 'My arm is x straws long.' 'My arm is x straws long and my leg is y straws long. My leg is longer than my arm.' 'We both have hands, but his are bigger than mine.' 'These people have brown eyes and these have blue.' Can talk about their findings from investigations using appropriate vocabulary 'My fingers are much better at feeling than my toes' 'We found that the crisps all taste the same.'	

F/ Y1 Everyday materials

F 1 Explore a range of materials
F 2 Shape and join materials
F 3 Combine and mix ingredients
F 4 Change materials by heating and cooling, including cooking
F 5 Explore a range of materials, including natural materials
F6 Make objects from different materials, including natural materials
F 7Observe, measure and record how materials change when heated and cooled
F 8 Compare how materials change over time and in different conditions

1. distinguish between an object and the material from which it is made
2. identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock
3. describe the simple physical properties of a variety of everyday materials
4. compare and group together a variety of everyday materials on the basis of their simple physical properties

Assessment		Key learning	Possible Evidence	Working scientifically
SECURE	Shows understanding of a concept using scientific vocabulary correctly	All objects are made of one or more materials. Some objects can be made from different materials e.g. plastic, metal or wooden spoons. Materials can be described by their properties e.g. shiny, stretchy, rough etc. Some materials e.g. plastic can be in different forms with very different properties. **Key vocabulary** Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see through, not see through	Can label a picture or diagram of an object made from different materials Can describe the properties of different materials	I can sort objects according to the material they are made from. I can make predictions about the properties of materials. I can carry out a simple test to classify materials e.g. absorbent or not absorbent. I can show my results in a table. I can use my test to answer the enquiry question. **Possible enquiry questions** • Which material will make the best bedding for a dog? • Which material is most absorbent? **Celebrating diversity**
	Applying knowledge in familiar related contexts, including a range of enquiries	Classify objects made of one material in different ways e.g. a group of object made of metal Classify in different ways one type of object made from a range of materials e.g. a collection of spoons made of different materials Classify materials based on their properties Test the properties of objects e.g. absorbency of cloths, strength of party hats made of different papers, stiffness of paper plates, waterproofness of shelters	Can sort objects and materials using a range of properties Can choose an appropriate method for testing an object for a particular property Can use their test evidence to answer the questions about properties e.g. Which cloth is the most absorbent?	

F/Y1 Seasonal Change

F 1 Play and explore outside in all seasons and in different weather
F 2 Observe living things throughout the year
F 3 Explore shadows
F 4 Explore rainbows

1. observe changes across the four seasons
2. observe and describe weather associated with the seasons and how day length varies

Assessment g		Key learning	Possible Evidence	Working Scientifically
SECURE	Shows understanding of a concept using scientific vocabulary correctly	In the UK, the day length is longest at mid-summer (about 16 hours) and gets shorter each day until mid-winter (about 8 hours) before getting longer again. The weather also changes with the seasons. In the UK, it is usually colder and rainier in Winter and hotter and dryer in the Summer. The change in weather causes many other changes; some examples are numbers of minibeasts found outside, seed and plant growth, leaves on trees and type of clothes worn by people. **Key vocabulary** Weather (sunny, rainy, windy, snowy etc.), seasons (Winter, Summer, Spring, Autumn), sun, sunrise, sunset, day length	Can name the four seasons and identify when in the year they occur. Can describe weather in different seasons over a year. Can describe days as being longer (in time) in the summer and shorter in the winter. Can describe other features that change through the year	• I can observe and record weekly weather in a chart. • I can discuss and make comparisons about the data collected. • I can create a simple pictogram to show the weather over a week. • I can record the class's favourite types of weather in a tally chart. **Possible enquiry questions** • How does the weather change through the week? • How does the weather change throughout the year? **Celebrating diversity**
	Applying knowledge in familiar related contexts, including a range of enquiries	Collect information about the weather regularly throughout the year Present this information in table and charts to compare the weather across the seasons Collect information, regularly throughout the year, of features that change with the seasons e.g. plants, animals, humans Present this information in different ways to compare the seasons Gather data about day length regularly throughout the year and present this to compare the seasons	Use their evidence gathered to describe the general types of weather and changes in day length over the seasons. Use their evidence to describe some other features of their surroundings, themselves, animals, plants that change over the seasons Demonstrate their knowledge in different ways e.g. making a weather forecast video, writing seasonal poetry, creating seasonal artwork	

Y2 Living things and their habitat

1. explore and compare the differences between things that are living, dead, and things that have never been alive
2. 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
3. identify and name a variety of plants and animals in their habitats, including micro-habitats
4. 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

Assessment guidance		Key learning	Possible Evidence	Working scientifically
SECURE	Shows understanding of a concept using scientific vocabulary correctly	All objects are either living, dead or have never been alive. Living things are plants (including seeds) and animals. Dead things include dead animals and plants and parts of plants and animals that are no longer attached e.g. leaves and twigs, shells, fur, hair and feathers (this is a simplification but appropriate for year 2 children). An object made of wood is classed as dead. Objects made of rock, metal and plastic have never been alive (again ignoring that plastics are made of fossil fuels). Animals and plants live in a habitat to which they are suited which means that animals have suitable features that help them move and find food and plants have suitable features that help them to grow well. The habitat provides the basic needs of the animals and plants – shelter, food and water. Within a habitat there are different micro-habitats e.g. in a woodland – in the leaf litter, on the bark of trees, on the leaves. These micro-habitats have different conditions e.g. light or dark, damp or dry. These conditions affect what plants and animals live there. The plants and animals in a habitat depend on each other for food and shelter etc. The way that animals obtain their food from plants and other animals can be shown in a food chain. **Key vocabulary:** Living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed, names of local habitats e.g. pond, woodland etc., names of micro-habitats e.g. under logs, in bushes etc.	Can find a range of items outside that are living, dead and never lived Can name a range of animals and plants that live in a habitat and micro-habitats that they have studied Can talk about how the features of these animals and plants make them suitable to the habitat Can talk about what the animals eat in a habitat and how the plants provide shelter for them Can construct a food chain that starts with a plant and has the arrows pointing in the correct direction	• Sort objects according to criteria and record findings e.g. living, never been alive, dead. • Sort objects according to own criteria. • Make observations of a habitat and record findings e.g. which minibeasts did you find under the log? • Make comparisons about different habitats e.g. how was what you found in the woodland different to the pond? • Present data in different ways e.g. pictogram, table, bar chart. • Make prediction about animals using knowledge e.g. where do you think this animal would like to live? • Make careful observations using magnifying glasses, sketches, diagrams etc. **Possible enquiry questions** Which would make the best habitat for a _____? How did what you found in the _____ differ from what you found in the _____. **Celebrating diversity** **Joan Proctor**
	Applying knowledge in familiar related contexts, including a range of enquiries	Explore the outside environment regularly to find objects that are living, dead and have never lived Classify objects found in the local environment Observe animals and plants carefully, drawing and labelling diagrams Create simple food chains for a familiar local habitat from first hand observation and research Create simple food chains from information given e.g. in picture books (Gruffalo etc.)	Can sort into living, dead and never lived Can give key features that mean the animal or plant is suited to its micro-habitat Using a food chain can explain what animals eat Can explain in simple terms why an animal or plant is suited to a habitat e.g. the caterpillar cannot live under the soil like a worm as it needs fresh leaves to eat; the seaweed we found on the beach cannot live in our pond because it is not salty	

Y2 Plants

1. observe and describe how seeds and bulbs grow into mature plants
2. find out and describe how plants need water, light and a suitable temperature to grow and stay healthy

Assessment guidance		Key learning	Possible Evidence	Working scientifically
SECURE	Shows understanding of a concept using scientific vocabulary correctly	Plants may grow from either seeds or bulbs. These then germinate and grow into seedlings which then continue to grow into mature plants. These mature plants may have flowers which then develop into seeds, berries, fruits etc. Seeds and bulbs need to be planted outside at particular times of the year and they will germinate and grow at different rates. Some plants are better suited to growing in full sun and some grow better in partial or full shade. Plants also need different amounts of water and space to grow well and stay healthy. **Key vocabulary** As for year 1 plus - light, shade, sun, warm, cool, water, grow, healthy	Can describe how plants that they have grown from seeds and bulbs have developed over time Can identify plants that grew well in different conditions	• Sort seeds and bulbs in a range of ways e.g. put them in order of shape/size. • Ask own questions linked to the topic. • Make close observations and record findings e.g. using a magnifying glass to look closely at a plant and sketch/label what they see. • Record data showing change e.g. measuring the height of a sunflower over time. • Investigate the best conditions for plant growth. Record observations and data over time. Make comparisons between plants grown in different conditions from observations and data. • Make predictions about what they think will happen. • Use results of investigations to answer enquiry questions e.g. What are the best conditions for plant growth? • Make labelled diagrams from close observation. **Possible enquiry questions** What are the best conditions for plant growth? How does a sunflower change over time? **Celebrating diversity**
	Applying knowledge in familiar related contexts, including a range of enquiries	Make close observations of seeds and bulbs Classify seeds and bulbs Research and plan when and how to plant a range of seeds and bulbs Look after the plants as they grow – weeding, thinning, watering etc. Make close observations and measurements of their plants growing from seeds and bulbs Make comparisons between plants as they grow	Can spot similarities and difference between bulbs and seeds Can nurture seeds and bulbs into mature plants identifying the different requirements of different plants	

Y2 Animals including humans

1. notice that animals, including humans, have offspring which grow into adults
2. find out about and describe the basic needs of animals, including humans, for survival (water, food and air)
3. describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene

Assessment guidance		Key learning	Possible Evidence	Working scientifically
SECURE	Shows understanding of a concept using scientific vocabulary correctly	Animals including humans have offspring which grow into adults. In humans and some animals these offspring will be young, such as babies or kittens, that grow into adults. In other animals, such as chickens or insects, there may be eggs laid that hatch to young or other stages which then grow to adults. The young of some animals do not look like their parents e.g. tadpoles. All animals including humans have basic needs of feeding, drinking and breathing that must be satisfied in order to survive, and to grow into healthy adults they also need the right amounts and types of food and exercise. Good hygiene is also important in preventing infections and illnesses. **Key vocabulary:** Offspring, reproduction, growth, child, young/old stages (examples - chick/hen, baby/child/adult, caterpillar/butterfly), exercise, heartbeat, breathing, hygiene, germs, disease, food types (examples – meat, fish, vegetables, bread, rice, pasta)	Can describe how animals including humans have offspring which grow into adults, using the appropriate names for the stages Can state the basic needs of animals, including humans, for survival. Can state the importance for humans of exercise, eating the right amounts of different types of food and hygiene. Can name foods in each section of the Eatwell guide	• Ask a range of questions relevant to the topic. • Sort types of food in different ways. • Carry out a simple investigation and record evidence e.g. what is the impact of different types of exercise on our bodies? • Recording data – e.g. recording a baby's growth on a height/weight chart. • Use books, the internet and other sources to gather knowledge e.g. about how to take care of a pet. **Possible enquiry questions** What is the impact of exercise on our bodies? Do older children always run faster? **Celebrating diversity**
	Applying knowledge in familiar related contexts, including a range of enquiries	Ask people questions and use secondary sources to find out about the life cycles of some animals Observe animals growing over a period of time e.g. chicks, caterpillars, a baby Ask questions of a parent about how they look after their baby Ask pet owners questions about how they look after their pet Explore the effect of exercise on their bodies Classify food in a range of ways, including using the Eatwell guide Investigate washing hands, using glitter gel	Can describe, including using diagrams, the life cycle of some animals, including humans, and their growth to adults e.g. by creating a life cycle book for a younger child Can measure/observe how animals, including humans, grow. Show what they know about looking after a baby/animal by creating a parenting/pet owners' guide Explain how development and health might be affected by differing conditions and needs being met/not met.	

Y2 Uses of everyday materials

1. 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 some materials can be changed by squashing, bending, twisting and stretching

	Assessment guidance	Key learning	Possible Evidence	Working scientifically
SECURE	Shows understanding of a concept using scientific vocabulary correctly	All objects are made of one or more materials that are chosen specifically because they have suitable properties for the task. For example, a water bottle is made of plastic because it is transparent allowing you to see the drink inside and waterproof so that it holds the water. When choosing what to make an object from, the properties needed are compared with the properties of the possible materials, identified through simple tests and classifying activities. A material can be suitable for different purposes and an object can be made of different materials. Objects made of some materials can be changed in shape by bending, stretching, squashing and twisting. For example, clay can be shaped by squashing, stretching, rolling, pressing etc. This can be a property of the material or depend on how the material has been processed e.g. thickness. **Key vocabulary** Names of materials – increased range from year 1 Properties of materials - as for year 1 plus opaque, transparent and translucent, reflective, non-reflective, flexible, rigid Shape, push/pushing, pull/puling, twist/twisting, squash/squashing. Bend/bending, stretch/stretching	Can name an object, say what material it is made from, identify its properties and make a link between the properties and a particular use Can label a picture or diagram of an object made from different materials For a given object can identify what properties a suitable material needs to have Whilst changing the shape of an object can describe the action used Can use the words flexible and/or stretchy to describe materials that can be changed in shape and stiff and/or rigid for those that cannot Can recognise that a material may come in different forms which have different properties	• Use knowledge and observation to identify what material an object is made from. • Investigate and observe how materials can be changed. • Carry out a simple test and record data. Use this to answer enquiry question. E.g. what is the best material for a rain coat? • Investigate the properties of materials and record data and findings. • Sort materials in a range of ways e.g. which material is most stretchy? **Possible enquiry questions** • Which is the best material for a rain coat? • How can the shape of these materials be changed? • Which material will be best for making a tyre/dog lead? Etc. **Celebrating diversity**
	Applying knowledge in familiar related contexts, including a range of enquiries	Classify materials Make suggestions about alternative materials for a purpose that are both suitable and unsuitable Test the properties of materials for particular uses e.g. compare the stretchiness of fabrics to select the most appropriate for Elastigirl's costume, test materials for waterproofness to select the most appropriate for a rain hat	Can sort materials using a range of properties Can explain using the key properties why a material is suitable or not suitable for a purpose Can begin to choose an appropriate method for testing a material for a particular property Can use their test evidence to select appropriate material for a purpose e.g. Which material is the best for a rain hat?	

Y3/4 Plants

1. identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
2. 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
3. investigate the way in which water is transported within plants
4. explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal

Assessment guidance		Key learning	Possible Evidence	Working scientifically
SECURE	Shows understanding of a concept using scientific vocabulary correctly	Many plants, but not all, have roots, stems/trunks, leaves and flowers/blossom. The roots absorb water and nutrients from the soil and anchor the plant in place. The stem transports water and nutrients/minerals around the plant and holds the leaves and flowers up in the air to enhance photosynthesis, pollination and seed dispersal. The leaves use sunlight and water to produce the plant's food. Some plants produce flowers which enable the plant to reproduce. Pollen, which is produced by the male part of the flower, is transferred to the female part of other flowers (pollination). This forms seeds, sometimes contained in berries or fruits which are then dispersed in different ways. Different plants require different conditions for germination and growth **Key vocabulary** Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal – wind dispersal, animal dispersal, water dispersal	Can explain the function of the parts of a flowering plant Can describe the life cycle of flowering plants, including pollination, seed formation, seed dispersal, and germination Can give different methods of pollination and seed dispersal, including examples	• I can carry out research using secondary sources e.g. finding out about the functions of different parts of plants from books. • I can use my knowledge of plants to make a prediction. • I can carry out a simple investigation taking the variables into account. • I can record my observations/measurements in a table. • I can use the information recorded to make comparisons about different growing conditions. • I can draw conclusions from my investigation using the data. **Possible enquiry questions** • What are the best conditions for plant growth? • Which soil we be the best for this plant to grow? • How is water transported through a plant? **Celebrating diversity**
	Applying knowledge in familiar related contexts, including a range of enquiries	Observe what happens to plants over time when the leaves or roots are removed Observe the effect of putting cut white carnations or celery in coloured water Investigate what happens to plants when they are put in different conditions e.g. in darkness, in the cold, deprived of air, different types of soil, different fertilisers, varying amount of space Spot flowers, seeds, berries and fruits outside throughout the year Observe flowers carefully to identify the pollen Observe flowers being visited by pollinators e.g. bees and butterflies in the summer Observe seeds being blown from the trees e.g. sycamore seeds Research different types of seed dispersal Classify seeds in a range of ways including by how they are dispersed Create a new species of flowering plant	Can explain observations made during investigations Can look at the features of seeds to decide on their method of dispersal Can draw and label a diagram of their created flowering plant to show its parts, their role and the method of pollination and seed dispersal	

Y3/4 Animals including humans

1. 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
2. identify that humans and some other animals have skeletons and muscles for support, protection and movement

Assessment guidance		Key learning	Possible Evidence	Working scientifically
SECURE	Shows understanding of a concept using scientific vocabulary correctly	Animals, unlike plants which can make their own food, need to eat in order to get the nutrients they need. Food contains a range of different nutrients that are needed by the body to stay healthy – carbohydrates including sugars, protein, vitamins, minerals, fibre, fat, sugars, water. A piece of food will often provide a range of nutrients. Humans and some other animals have skeletons and muscles which help them move and provide protection and support **Key vocabulary:** Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, support, protect, move, skull, ribs, spine, muscles, joints	Can name the nutrients found in food Can state that to be healthy we need to eat the right types of food to give us the correct amount of these nutrients Can name some bones that make up their skeleton giving examples that support, help them move or provide protection Can describe how muscles and joints help them to move	I can ask relevant questions about the topic. I can interpret data e.g. looking at how much fat/sugar is in different types of food. **Celebrating diversity**
	Applying knowledge in familiar related contexts, including a range of enquiries	Classify food in a range of ways Use food labels to explore the nutritional content of a range of food items Use secondary sources to find out they types of food that contain the different nutrients Use food labels to answer enquiry questions e.g. How much fat do different types of pizza contain? How much sugar is in soft drinks? Plan a daily diet contain a good balance of nutrients Explore the nutrients contained in fast food Use secondary sources to research the parts and functions of the skeleton Investigate pattern seeking questions such as • Can people with longer legs run faster? • Can people with bigger hands catch a ball better? Compare, contrast and classify skeletons of different animals	Can classify food into those that are high or low in particular nutrients Can answer their questions about nutrients in food based on their gathered evidence Can talk about the nutrient content of their daily plan Use their data to look for patterns (or lack of) when answering their enquiry question Can give similarities e.g. they all have joints to help the animal move, and differences between skeletons	

Y3/4 Rocks

1. 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
3. recognise that soils are made from rocks and organic matter

Assessment guidance		Key learning	Possible Evidence	Working scientifically
SECURE	Shows understanding of a concept using scientific vocabulary correctly	Rock is a naturally occurring material. There are different types of rock e.g. sandstone, limestone, slate etc. which have different properties. Rocks can be hard or soft. They have different sizes of grain or crystal. They may absorb water. Rocks can be different shapes and sizes (stones, pebbles, boulders). Soils are made up of pieces of ground down rock which may be mixed with plant and animal material (organic matter). The type of rock, size of rock piece and the amount of organic matter affect the property of the soil. Some rocks contain fossils. Fossils were formed millions of years ago. When plants and animals died, they fell to the seabed. They became covered and squashed by other material. Over time the dissolving animal and plant matter is replaced by minerals from the water. **Key vocabulary:** Rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy/chalk/clay soil	Can name some types of rock and give physical features of each Can explain how a fossil is formed Can explain that soils are made from rocks and also contain living/dead matter	• I can make simple observations and record as labelled diagrams. • I can classify rocks by their properties. • I can carry out a simple test and record my data in a table e.g. porous, density, durability. • I can sort/order according to my own criteria e.g. most crumbly – least crumbly. **Celebrating diversity** Mary Anning,
	Applying knowledge in familiar related contexts, including a range of enquiries	Observe rocks closely Classify rocks in a range of ways based on their appearance Devise a test to investigate the hardness of a range of rocks Devise a test to investigate how much water different rocks absorb Observe how rocks change over time e.g. gravestones or old building Research using secondary sources how fossils are formed Observe soils closely Classify soils in a range of ways based on their appearance Devise a test to investigate the water retention of soils Observe how soil can be separated through sedimentation Research the work of Mary Anning	Can classify rocks in a range of different ways using appropriate vocabulary Can devise tests to explore the properties of rocks and use data to rank the rocks Can link rocks changing over time with their properties e.g. soft rocks get worn away more easily Can present in different ways their understanding of how fossils are formed e.g. in role play, comic strip, chronological report, stop-go animation etc. Can identify plant/animal matter and rocks in samples of soil Can devise a test to explore the water retention of soils	

Y3/4 Light

1. recognise that they need light in order to see things and that dark is the absence of light
2. notice that light is reflected from surfaces
3. recognise that light from the sun can be dangerous and that there are ways to protect their eyes
4. 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

Assessment guidance		**Key learning**	**Possible Evidence**	**Working scientifically**
SECURE	Shows understanding of a concept using scientific vocabulary correctly	We see objects because our eyes can sense light. Dark is the absence of light. We cannot see anything in complete darkness. Some objects, for example the sun, light bulbs and candles are sources of light. Objects are easier to see if there is more light. Some surfaces reflect light. Objects are easier to see when there is less light if they are reflective. The light from the sun can damage our eyes and therefore we should not look directly at the Sun and can protect our eyes by wearing sunglasses or sunhats in bright light. Shadows are formed on a surface when an opaque or translucent object is between a light source and the surface and blocks some of the light. The size of the shadow depends on the position of the source, object and surface. **Key vocabulary:** Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous	Can describe how we see objects in light and can describe dark as the absence of light Can state that it is dangerous to view the sun directly and state precautions used to view the sun, for example in eclipses Can define transparent, translucent and opaque Can describe how shadows are formed by objects blocking light.	I can set up a simple comparative test. I can record my findings in a table. I can sort materials according to whether they are opaque, transparent or translucent and present my findings e.g. Venn diagram. I can use my knowledge to answer enquiry questions. **<u>Possible enquiry questions</u>** Which material is the most reflective? Which material would be best for making a pair of sunglasses? **Celebrating diversity**
	Applying knowledge in familiar related contexts, including a range of enquiries	Explore how different objects are more or less visible in different levels of lighting Explore how objects with different surfaces e.g. shiny vs matt are more or less visible Explore how shadows vary as the distance between a light source, an object or surface is changed Explore shadows which are connected to and disconnected from the object e.g. shadows of clouds and children in the playground Choose suitable materials to make shadow puppets Create artwork using shadows	Can describe patterns in visibility of different objects in different lighting conditions and predict which will be more or less visible as conditions change Can clearly explain, giving examples, that objects are not visible in complete darkness Can describe and demonstrate how shadows are formed by blocking light Can describe, demonstrate and make predictions about patterns in how shadows vary	

Y3/4 Forces and magnets

1. compare how things move on different surfaces
2. notice that some forces need contact between two objects, but magnetic forces can act at a distance
3. observe how magnets attract or repel each other and attract some materials and not others
4. 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
5. describe magnets as having two poles
6. predict whether two magnets will attract or repel each other, depending on which poles are facing

Assessment guidance		Key learning	Possible Evidence	Working scientifically
SECURE	Shows understanding of a concept using scientific vocabulary correctly	A force is a push or a pull. When an object moves on a surface, the texture of the surface and the object affect how it moves. It may help the object to move better or it may hinder its movement e.g. ice skater compared to walking on ice in normal shoes. A magnet attracts magnetic material. Iron and nickel and other materials containing these e.g. stainless steel, are magnetic. The strongest parts of a magnet are the poles. Magnets have two poles – a north pole and a south pole. If two like poles e.g. two north poles, are brought together they will push away from each other – repel. If two unlike poles e.g. a north and south, are brought together they will pull together – attract. For some forces to act there must be contact e.g. a hand opening a door, the wind pushing the trees. Some forces can act at a distance e.g. magnetism. The magnet does not need to touch the object that it attracts. **Key vocabulary:** Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole	Can give examples of forces in everyday life Can give examples of objects moving differently on different surfaces Can name a range of types of magnets and show how the poles attract and repel Can draw diagrams using arrows to show the attraction and repulsion between the poles of magnets	• I can use a Venn diagram to sort e.g. push and pull forces. • I can sort according to whether a material is magnetic or non-magnetic e.g. coins. • I can make a prediction using my knowledge. • I can carry out a test thinking about how to make it fair. • I can record my results in a table and bar chart. **Possible enquiry questions** • Which surface will the toy car travel fastest on? • Which magnet is the strongest? • How does the surface affect the strength of the magnet? (When trying to move a paper clip across the surface) **Celebrating diversity**
	Applying knowledge in familiar related contexts, including a range of enquiries	Carry out investigations to explore how objects move on different surfaces e.g. spinning tops/coins, rolling balls/cars, clockwork toys, soles of shoes etc. Explore what materials are attracted to a magnet Classify materials according to whether they are magnetic Explore the way that magnets behave in relation to each other Use a marked magnet to find the unmarked poles on other types of magnets Explore how magnets work at a distance e.g. through the table, in water, jumping paper clip up off the table Devise an investigation to test the strength of magnets	Can use their results to describe how objects move on different surfaces Can use their results to make predictions for further tests e.g. it will spin for longer on this surface than that, but not as long as it spun on that surface Can use classification evidence to identify that some metals but not all are magnetic Through their exploration they can show how like poles repel and unlike poles attract and name unmarked poles Can use test data to rank magnets	

Y3/4 Living things and their habitats

1. recognise that living things can be grouped in a variety of ways
2. explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
3. recognise that environments can change and that this can sometimes pose dangers to living things

	Assessment guidance	**Key learning**	**Possible Evidence**	**Working scientifically**
SECURE	Shows understanding of a concept using scientific vocabulary correctly	Living things can be grouped (classified) in different ways according to their features. Classification keys can be used to identify and name living things. Living things live in a habitat which provides an environment to which they are suited (year 2 learning). These environments may change naturally e.g. through flooding, fire, earthquakes etc. Humans also cause the environment to change. This can be in a good way i.e. positive human impact, such as setting up nature reserves or in a bad way i.e. negative human impact, such as littering. These environments also change with the seasons; different living things can be found in a habitat at different times of the year **Key vocabulary** Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate	Can name living things living in a range of habitats, giving the key features that helped them to identify them Can give examples of how an environment may change both naturally and due to human impact	I can ask questions to identify an animal e.g. using a classification key. I can record information using a classification key. I can research and present causes, impact and possible solutions for deforestation. **Celebrating diversity** Jane Goodall Evelyn Cheesman
	Applying knowledge in familiar related contexts, including a range of enquiries	Observe plants and animals in different habitats throughout the year Compare and contrast the living things observed Use classification keys to name unknown living things Classify living things found in different habitats based on their features Create a simple identification key based on observable features Use fieldwork to explore human impact on the local environment e.g. litter, tree planting Use secondary sources to find out about how environments may naturally change Use secondary sources to find out about human impact, both positive and negative, on environments	Can keep a careful record of living things found in different habitats throughout the year (diagrams, tally charts etc.) Can use classification keys to identify unknown plants and animals Can present their learning about changes to the environment in different ways e.g. campaign video, persuasive letter	

Y3/4 Animals including humans

1. 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
3. construct and interpret a variety of food chains, identifying producers, predators and prey

	Assessment guidance	Key learning	Possible Evidence	Working scientifically
SECURE	Shows understanding of a concept using scientific vocabulary correctly	Food enters the body through the mouth. Digestion starts when the teeth start to break the food down. Saliva is added and the tongue rolls the food into a ball. The food is swallowed and passes down the oesophagus to the stomach. Here the food is broken down further by being churned around and other chemicals are added. The food passes into the small intestine. Here nutrients are removed from the food and leave the digestive system to be used elsewhere in the body. The rest of the food then passes into the large intestine. Here the water is removed for use elsewhere in the body. What is left is then stored in the rectum until it leaves the body through the anus when you go to the toilet. Humans have four types of teeth - incisors for cutting, canines for tearing, molars and premolars for grinding (chewing). Living things can be classified as producers, predators and prey according to their place in the food chain. **Key vocabulary** Digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars, herbivore, carnivore, omnivore, producer, predator, prey, food chain	Can sequence the main parts of the digestive system Can draw the main parts of the digestive system onto a human outline Can describe what happens in each part of the digestive system Can point to the three different types of teeth in their mouth and talk about their shape and what they are used for Can name producers, predators and prey within a habitat Can construct food chains	I can use my knowledge to make a prediction. I can carry out a simple test. I can make careful observations. I can record my findings in a table. I can use data and observations to answer my enquiry question. **Possible enquiry questions** Which toothpaste is best for preventing tooth decay? **Celebrating diversity** Evelyn Cheesman
	Applying knowledge in familiar related contexts, including a range of enquiries	Research the function of the parts of the digestive system Create a model of the digestive system using household objects Explore eating different types of food, to identify which teeth are being used for cutting, tearing and grinding (chewing) Classify animals as herbivores, carnivores or omnivores according to the type of teeth they have in their skulls Use food chains to identify producers, predators and prey within a habitat Use secondary sources to identify animals in a habitat and find out what they eat	Can use diagrams or a model to describe the journey of food through the body explaining what happens in each part. Can record the teeth in their mouth (make a dental record) Can explain the role of the different types of teeth Can explain how the teeth in animal skulls show they are carnivores, herbivores or omnivores. Can create food chains based on research	

Y3/4 States of matter

1. compare and group materials together, according to whether they are solids, liquids or gases
2. 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)
3. identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature

	Assessment guidance	Key learning	Possible Evidence	Working scientifically
SECURE	Shows understanding of a concept using scientific vocabulary correctly	A solid keeps its shape and has a fixed volume. A liquid has a fixed volume but changes in shape to fit the container. A liquid can be poured and keeps a level, horizontal surface. A gas fills all available space; it has no fixed shape or volume. Granular and powdery solids like sand can be confused with liquids because they can be poured, but when poured they form a heap and they do not keep a level surface when tipped. Each individual grain demonstrates the properties of a solid. Melting is a state change from solid to liquid. Freezing is a state change from liquid to solid. The freezing point of water is 0°C. Boiling is a change of state from liquid to gas that happens when a liquid is heated to a specific temperature and bubbles of the gas can be seen in the liquid. Water boils when it is heated to 100°C. Evaporation is the same state change as boiling (liquid to gas) but it happens slowly at lower temperatures and only at the surface of the liquid. Evaporation happens more quickly if the temperature is higher, the liquid is spread out or it is windy. Condensation is the change back from a gas to a liquid caused by cooling. Water at the surface of seas, rivers etc. evaporates into water vapour (a gas). This rises, cools and condenses back into a liquid forming clouds. When too much water has condensed the water droplets in the cloud get too heavy and fall back down as rain, snow, sleet etc. and drain back into rivers etc. This is known as precipitation. This is the water cycle. **Key vocabulary** Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, temperature, water cycle	Can create a concept map, including arrows linking the key vocabulary Can name properties of solids, liquids and gases Can give everyday examples of melting and freezing Can give everyday examples of evaporation and condensation Can describe the water cycle	I can sort into solids, liquids and gases. I can make observations about similarities and differences. E.g. between chocolate buttons. I can plan and carry out a simple test, thinking about making it fair. I can record my observations. I can make conclusions based on what I have observed. I can evaluate my test, thinking about how it could be improved. **Possible enquiry questions** Which button will melt the fastest? What will happen to these liquids when they are put in the freezer? What will happen to a water handprint on paper towel over time? What is the best way to dry a pair of socks? **Celebrating diversity** Marie Curie
	Applying knowledge in familiar related contexts, including a range of enquiries	Observe closely and classify a range of solids Observe closely and classify a range of liquids Explore making gases visible e.g. squeezing sponges under water to see bubbles, and showing their effect e.g. using straws to blow objects, trees moving in the wind Classify materials according to whether they are solids, liquids and gases Observe a range of materials melting e.g. ice, chocolate, butter Investigate how to melt ice more quickly Observe the changes when making rocky road cakes or ice-cream Investigating melting point of different materials e.g. ice, margarine, butter and chocolate Explore freezing different liquids e.g. tomato ketchup, oil, shampoo Use a thermometer to measure temperatures e.g. icy water (melting), tap water, hot water, boiling water (demonstration) Observe water evaporating and condensing e.g. on cups of icy water and hot water Set up investigations to explore changing the rate of evaporation e.g. washing, puddles, handprints on paper towels, liquids in containers Use secondary sources to find out about the water cycle	Can give reasons to justify why something is a solid liquid or gas Can give examples of things that melt/freeze and how their melting points vary From their observations, can give the melting points of some materials Using their data, can explain what affects how quickly a solid melts Can measure temperatures using a thermometer Can explain why there is condensation on the inside the hot water cup but on the outside of the icy water cup From their data, can explain how to speed up or slow down evaporation Can present their learning about the water cycle in a range of ways e.g. diagrams, explanation text, story of a water droplet	

Y3/4 Sound

1. identify how sounds are made, associating some of them with something vibrating
2. recognise that vibrations from sounds travel through a medium to the ear
3. find patterns between the pitch of a sound and features of the object that produced it
4. find patterns between the volume of a sound and the strength of the vibrations that produced it
5. recognise that sounds get fainter as the distance from the sound source increases

Assessment guidance		**Key learning**	**Possible evidence**	**Working scientifically**
SECURE	Shows understanding of a concept using scientific vocabulary correctly	A sound source produces vibrations which travel through a medium from the source to our ears. Different mediums such as solids, liquids and gases can carry sound but sound cannot travel through a vacuum (an area empty of matter). The vibrations cause parts of our body inside our ears to vibrate, allowing us to hear (sense) the sound. The loudness (volume) of the sound depends on the strength (size) of vibrations which decreases as they travel through the medium. Therefore, sounds decrease in volume as you move away from the source. A sound insulator is a material which blocks sound effectively. Pitch is the highness or lowness of a sound and is affected by features of objects producing the sounds. For example, smaller objects usually produce higher pitched sounds. **Key Vocabulary** Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation	Can name sound sources and state that sounds are produced by the vibration of the object. Can state that sounds travel through different mediums such as air, water, metal Can give examples to demonstrate how the pitch of a sound are linked to the features of the object that produced it Can give examples of how to change the volume of a sound e.g. increase the size of vibrations by hitting or blowing harder Can give examples to demonstrate that sounds get fainter as the distance from the sound source increases	• I can ask questions relevant to the topic and think of ways to answer my own questions. • I can make a prediction. • I can carry out a fair test. • I can record my data. • I can use comparative language. • I can use my data to draw conclusions. **Possible enquiry questions** • Which material will make the loudest sound when hit? • How can the pitch/volume of an instrument be changed? • Which is the best material for muffling loud sounds? • What happens to sounds as they get further away? **Celebrating diversity**
	Applying knowledge in familiar related contexts, including a range of enquiries	Classify sound sources Explore making sounds with a range of objects such as musical instruments and other household objects Explore how string telephones or ear gongs work Explore using objects that change in feature to change pitch and volume such as length of guitar string, bottles of water or tuning forks Measure sounds over different distances Measure sounds through different insulation materials	Can explain what happens when you strike a drum or pluck a string and use a diagram to show how sounds travel from an object to the ear Can demonstrate how to increase or decrease pitch and volume using musical instruments or other objects Can use data to identify patterns in pitch and volume Can explain how loudness can be reduced by moving further from the sound source or by using a sound insulating medium	

Y3/4 Electricity

1. identify common appliances that run on electricity
2. construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers
3. 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
4. recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit
5. recognise some common conductors and insulators, and associate metals with being good conductors

<table>
<tr><th colspan="2">Assessment guidance</th><th>Key learning</th><th>Possible Evidence</th><th>Working scientifically</th></tr>
<tr><td rowspan="2">SECURE</td><td>Shows understanding of a concept using scientific vocabulary correctly</td><td>Many household devices and appliances run on electricity. Some plug in to the mains and others run on batteries. An electrical circuit consists of a cell or battery connected to a component using wires. If there is a break in the circuit, a loose connection or a short circuit the component will not work. A switch can be added to the circuit to turn the component on and off.
Metals are good conductors so they can be used as wires in a circuit. Non-metallic solids are insulators except for graphite (pencil lead). Water, if not completely pure, also conducts electricity
Key Vocabulary
Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol N.B. Children in year 4 do not ned to use standard symbols as this is taught in year 6</td><td>Can name the components in a circuit
Can make electric circuits
Can control a circuit using a switch
Can name some metals that are conductors
Can name materials that are insulators</td><td rowspan="2">• I can sort objects in an intersecting Venn diagram e.g. uses batteries, plugs in.
• I can draw and label a diagram of a circuit.
• I can make predictions.
• I can carry out a test.
• I can record my results.
• I can use the data to make conclusions.

Possible enquiry questions
• Which materials will complete the circuit? (Good conductors)
• How can we make the light bulb work without any wires?
•
Celebrating diversity</td></tr>
<tr><td>Applying knowledge in familiar related contexts, including a range of enquiries</td><td>Construct a range of circuits
Explore which materials can be used instead of wires to make a circuit
Classify the materials that were suitable/not suitable for wires
Explore how to connect a range of different switches and investigate how they function in different ways
Choose switches to add to circuits to solve particular problems such as a pressure switch for a burglar alarm
Apply their knowledge of conductors and insulators to design and make different types of switch
Make circuits that can be controlled as part of a D&T project

N.B. Children should be given one component at a time to add to circuits.</td><td>Can communicate structures of circuits using drawings which show how the components are connected
Use classification evidence to identify that metals are good conductors and non-metals are insulators
Can incorporate a switch into a circuit to turn it on and off
Can connect a range of different switches identifying the parts that are insulators and conductors
Can add a circuit with a switch to a DT project and can demonstrate how it works
Can give reasons for choice of materials for making different parts of a switch
Can describe how their switch works</td></tr>
</table>

Y5/6 Living things and their habitats

1. describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
2. describe the life process of reproduction in some plants and animals

Assessment guidance		Key learning	Possible evidence	Working scientifically
SECURE	Shows understanding of a concept using scientific vocabulary correctly	As part of their life cycle plants and animals reproduce. Most animals reproduce sexually. This involves two parents where the sperm from the male fertilises the female egg. Animals including humans have offspring which grow into adults. In humans and some animals these offspring will be born live, such as babies or kittens, and then grow into adults. In other animals, such as chickens or snakes, there may be eggs laid that hatch to young which then grow to adults. Some young undergo a further change before becoming adults e.g. caterpillars to butterflies. This is called a metamorphosis. Plants reproduce both sexually and asexually. Bulbs, tubers, runners and plantlets are examples of asexual plant reproduction which involves only one parent. Gardeners may force plants to reproduce asexually by taking cuttings. Sexual reproduction occurs through pollination, usually involving wind or insects. **Key vocabulary** Life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings	Can draw the life cycle of a range of animals identifying similarities and differences between the life cycles Can explain the difference between sexual and asexual reproduction and give examples of how plants reproduce in both ways	• I can carry out research and present my findings e.g. about the life cycle of a bird. • I can make careful observations over time and record them e.g. in a diary. E.g. Hatching eggs. • I can make comparisons between life cycles e.g. using intersecting Venn diagrams. • I can interpret data, noticing patterns e.g. looking at gestation periods of different animals. • Use graphs and tables to present data. **Possible enquiry questions** • Which animal has the longest gestation period? • Which animal has the longest life span? **Celebrating diversity** Jane Goodall
	Applying knowledge in familiar related contexts, including a range of enquiries	Use secondary sources and, where possible, first hand observations to find out about the life cycle of a range of animals Compare the gestation times for mammals and look for patterns e.g. in relation to size of animal or length of dependency after birth Look for patterns between the size of an animal and its expected life span Grow and observe plants that reproduce asexually e.g. strawberries, spider plant, potatoes Take cuttings from a range of plants e.g. African violet, mint Plant bulbs and then harvest to see how they multiply Use secondary sources to find out about pollination	Can present their understanding of the life cycle of a range of animals in different ways e.g. drama, pictorially, chronological reports, creating a game Can identify patterns in life cycles Can compare two or more animal life cycles studied Can explain how a range of plants reproduce asexually	

Y5/6 Animals, including humans (this builds on the learning in Living things and their habitat)

1. describe the changes as humans develop to old age

Assessment guidance		Key learning	Possible evidence	Working scientifically
SECURE	Shows understanding of a concept using scientific vocabulary correctly	When babies are young they grow rapidly. They are very dependent on their parents. As they develop they learn many skills. At puberty, a child's body changes and develops primary and secondary sexual characteristics. This enables the adult to reproduce. This needs to be taught alongside PSHE Useful guidance can be obtained at: http://www.ase.org.uk/news/aseviews/teaching-about-puberty/ http://www.ase.org.uk/documents/2016-joint-statement-on-reproduction/ **Key vocabulary** Puberty: the vocabulary to describe sexual characteristics	Can explain the changes that takes place in boys and girls during puberty Can explain how a baby changes physically as it grows and also what it is able to do	I can research using second hand sources. E.g. finding out about human growth from a book. **Celebrating diversity**
	Applying knowledge in familiar related contexts, including a range of enquiries	This unit is likely to be taught through direct instruction due to its sensitive nature		

Y5/6 Properties and changes of materials

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
2. know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
3. use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
4. give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
5. demonstrate that dissolving, mixing and changes of state are reversible changes
6. 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

Assessment guidance		**Key learning**	**Possible evidence**	**Working scientifically**
SECURE	Shows understanding of a concept using scientific vocabulary correctly	Materials have different uses depending on their properties and state (liquid, solid, gas). Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets. Some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment. Mixtures can be separated by filtering, sieving and evaporation. Some changes to materials such as dissolving, mixing and changes of state are reversible, but some changes such as burning wood, rusting and mixing vinegar with bicarbonate of soda result in the formation of new materials and these are not reversible. **Key vocabulary** Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve reversible/non-reversible change, burning, rusting, new material	Can use understanding of properties to explain everyday uses of materials. For example, how bricks, wood, glass and metals are used in buildings Can explain what dissolving means, giving examples Can name equipment used for filtering and sieving Can use knowledge of liquids, gases and solids to suggest how materials can be recovered from solutions or mixtures by evaporation, filtering or sieving Can describe some simple reversible and non-reversible changes to materials, giving examples	• I can make careful observations. • I can use scientific knowledge to explain what I can see. • I can choose my own sorting criteria to sort materials. • I can show my sorting in a Carroll or Venn diagram. • I can make a prediction. • I can plan and carry out a fair test. I can talk about controlling the variables. • I can record and present my results. • I can make conclusions based on my findings. I can use these to make further predictions. • I can use a classification key to identify materials. **Possible enquiry questions** • What will happen to raisins when placed in lemonade? • How can I make sugar dissolve more quickly? • How can we separate sand and water? • What affects the rate of evaporation of water and salt? • How could this mixture be separated? • Which cup is best for keeping my drink warm? **Celebrating diversity**
	Applying knowledge in familiar related contexts, including a range of enquiries	Investigate the properties of different materials in order to recommend materials for particular functions depending on these properties e.g. test waterproofness and thermal insulation to identify a suitable fabric for a coat Explore adding a range of solids to water and other liquids e.g. cooking oil, as appropriate Investigate rates of dissolving by carrying out comparative and fair test Separate mixtures by sieving, filtering and evaporation, choosing the most suitable method and equipment for each mixture Explore a range of non-reversible changes e.g. rusting, adding fizzy tablets to water, burning Carry out comparative and fair tests involving non-reversible changes e.g. What affects the rate of rusting? What affects the amount of gas produced? Research new materials produced by chemists e.g. Spencer Silver (glue of sticky notes) and Ruth Benerito (wrinkle free cotton)	Can create a chart or table grouping/comparing everyday materials by different properties Can use test evidence gathered about different properties to suggest an appropriate material for a particular purpose Can group solids based on their observations when mixing them with water Can give reasons for choice of equipment and methods to separate a given solution or mixture such as salt or sand in water Can explain the results from their investigations involving dissolving and non-reversible change	

Y5/6 Earth and space

1. describe the movement of the Earth, and other planets, relative to the Sun in the solar system
2. describe the movement of the Moon relative to the Earth
3. describe the Sun, Earth and Moon as approximately spherical bodies
4. use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky

Assessment guidance		Key learning	Possible evidence	Working scientifically
SECURE	Shows understanding of a concept using scientific vocabulary correctly	The Sun is a star. It is at the centre of our solar system. There are 8 planets (can choose to name them, but not essential). These travel around the Sun in fixed orbits. Earth takes 365¼ days to complete its orbit around the Sun. The Earth rotates (spins) on its axis every 24 hours. As Earth rotates half faces the Sun (here it is day) and half is facing away from the Sun (night). As the Earth rotates the Sun appears to move across the sky. The Moon orbits the Earth. It takes about 28 days to complete its orbit. The Sun, Earth and Moon are approximately spherical. **Key vocabulary** Earth, Sun, Moon, (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune) spherical, solar system, rotates, star, orbit, planets	Can create a voice over for a video clip or animation Can show using diagrams the movement of the Earth and Moon Can explain the movement of the Earth and Moon Can show using diagrams the rotation of the Earth and how this causes day and night Can explain what causes day and night	I can make observations about how the appearance of shadows change throughout the day. I can show my understanding in a diagram. I can use second hand sources to conduct research. **Celebrating diversity** Maria Mitchell
	Applying knowledge in familiar related contexts, including a range of enquiries	Use secondary sources to help create a model e.g. role play or using balls, to show the movement of the Earth around the Sun and the Moon around the Earth. Use secondary sources to help make a model to show why day and night occur Make first-hand observations of how shadows caused by the Sun change through the day Make a sundial Research time zones Consider the views of scientists in the past and evidence used to deduce shapes and movements of the Earth, Moon and planets before space travel	Can use the model to explain how the Earth moves in relation to the Sun and the moon moves in relation to the Earth Can demonstrate and explain verbally how day and night occur Can explain evidence gathered about the position of shadows in term of the movement of the Earth. Can show this using a model Can explain how a sundial works Can explain verbally using a model why we have time zones Can describe the arguments and evidence used by scientists in the past	

Y5/6 Forces

1. explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
2. identify the effects of air resistance, water resistance and friction, that act between moving surfaces
3. recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect

<table>
<tr><th colspan="2">Assessment guidance</th><th>Key learning</th><th>Possible evidence</th><th>Working Scientifically</th></tr>
<tr><td rowspan="2">SECURE</td><td>Shows understanding of a concept using scientific vocabulary correctly</td><td>A force causes an object to start moving, stop moving, speed up, slow down or change direction. Gravity is a force that acts at a distance. Everything is pulled to the Earth by gravity. This causes unsupported objects to fall.
Air resistance, water resistance and friction are contact forces that act between moving surfaces. The object may be moving through the air or water or the air and water may be moving over a stationary object.
A mechanism is a device that allows a small force to be increased to a larger force. The pay back is that it requires a greater movement. The small force moves a long distance and the resulting large force moves a small distance, e.g. a crowbar or bottle top remover. Pulleys, levers and gears are all mechanisms, also known as simple machines.
Key vocabulary
Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears</td><td>Can demonstrate the effect of gravity acting on an unsupported object
Can give examples of friction, water resistance and air resistance
Can give examples of when it is beneficial to have high or low friction, water resistance and air resistance
Can demonstrate how pulleys, levers and gears work</td><td rowspan="2">• I can measure using a force meter and take careful readings.
• I can use subject knowledge to make a prediction.
• I can plan and carry a test thinking about how to control the variables.
• I can record and present my data and observations.
• I can draw conclusions using my findings.
• I can evaluate my test, thinking about how it could be improved.
• I can plan my own investigation from given resources. E.g. design your own investigation using a car and a ramp.
Possible enquiry questions

Why is the boy finding it difficult to pull the girl and the dog? How could it be made easier?

• Which surface is best for pulling the trainer along?
• How could we make a paper spinner fall more quickly?
• Which liquid is harder to stir? Why?
Celebrating diversity
Emma Lillian Todd</td></tr>
<tr><td>Applying knowledge in familiar related contexts, including a range of enquiries</td><td>Investigate the effect of friction in a range of contexts e.g. trainers, bath mats, mats for a helter-skelter
Investigate the effects of water resistance in a range of contexts e.g. dropping shapes through water, pulling shapes e.g. boats along the surface of water
Investigate the effects of air resistance in a range of contexts e.g. parachutes, spinners, sails on boats
Explore how levers, pulleys and gears work
Make a product that involves a lever, pulley or gear
Create a timer that uses gravity to move a ball
Research how the work of scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation</td><td>Can explain the results of their investigations in terms of the force, showing a good understanding that as the object tries to move through the water or air or across the surface, the particles in the water, air or on the surface slow it down
Can demonstrate clearly the effects of using levers, pulleys and gears</td></tr>
</table>

Y5/6 Living things and their habitats

1. 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
2. give reasons for classifying plants and animals based on specific characteristics

Assessment guidance		**Key learning**	**Possible Evidence**	**Working scientifically**
SECURE	Shows understanding of a concept using scientific vocabulary correctly	Living things can be formally grouped according to characteristics. Plants and animals are two main groups but there are other livings things that do not fit into these groups e.g. micro-organisms such as bacteria and yeast, and toadstools and mushrooms. Plants can make their own food whereas animals cannot. Animals can be divided into two main groups – those that have backbones (vertebrates) and those that do not (invertebrates). Vertebrates can be divided into five small groups – fish, amphibians, reptiles, birds and mammals. Each group has common characteristics. Invertebrates can be divided into a number of groups including insects, spiders, snails and worms. Plants can be divided broadly into two main groups – flowering plants and non-flowering plants. **Key vocabulary:** Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering and non-flowering	Can give examples of animals in the five vertebrate groups and some of the invertebrate groups Can give the key characteristics of the five vertebrate groups and some invertebrate groups Can compare the characteristics of animals in different groups Can give examples of flowering and non-flowering plants	I can classify plants and animals according to my own criteria. I can use and create classification keys. I can research plants and animals using secondary sources and present my findings. I can draw accurate, labelled diagrams to show my observations. **Celebrating diversity**
	Applying knowledge in familiar related contexts, including a range of enquiries	Use secondary sources to learn about the formal classification system devised by Carl Linnaeus and why it is important Use first hand observation to identify characteristics shared by the animals in a group Use secondary sources to research the characteristics of animals that belong to a group Use information about the characteristics of an unknown animal or plant to assign it to a group Classify plants and animals presenting this in a range of ways – Venn diagrams, Carroll diagrams and keys Create an imaginary animal which has features from one or more groups	Can use classification materials to identify unknown plants and animals Can create classification keys for plants and animals Can give a number of characteristics that explain why an animal belongs to a particular group	

Y5/6 Animals including humans

1. identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood
2. recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function
3. describe the ways in which nutrients and water are transported within animals, including humans

<table>
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<tr><td rowspan="2">SECURE</td><td>Shows understanding of a concept using scientific vocabulary correctly</td><td>The heart pumps blood in the blood vessels around to the lungs. Oxygen goes into the blood and carbon dioxide is removed. The blood goes back to the heart and is then pumped around the body. Nutrients, water and oxygen are transported in the blood to the muscles and other parts of the body where they are needed. As they are used they produce carbon dioxide and other waste products. Carbon dioxide is carried by the blood back to the heart and then the cycle starts again as it is transported back to the lungs to be removed from the body. This is the human circulatory system.
Diet, exercise, drugs and lifestyle have an impact on the way our bodies function. They can affect how well out heart and lungs work, how likely we are to suffer from conditions such as diabetes, how clearly we think, and generally how fit and well we feel. Some conditions are caused by deficiencies in our diet e.g. lack of vitamins.
Key vocabulary
Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs and lifestyle</td><td>Can draw a diagram of the circulatory system and label the parts and annotate it to show what the parts do
Produces a piece of writing that demonstrates the key knowledge e.g. explanation text, job description of the heart</td><td rowspan="2">• I can use subject knowledge to make a prediction.
• I can plan and carry a test thinking about how to control the variables.
• I can record and present my data and observations. (bar chart, line graphs etc)
• I can identify patterns in my data.
• I can draw conclusions using my findings.
• I can evaluate my test, thinking about how it could be improved.
• I can research using secondary sources e.g. finding out about the circulatory system.

Possible Enquiry Questions

Are our resting pulse rates all the same?

What happens to our pulse rate after exercise?
Celebrating diversity
Dr Mary Temple Grandin</td></tr>
<tr><td>Applying knowledge in familiar related contexts, including a range of enquiries</td><td>Create a role play model for the circulatory system
Carry out a range of pulse rate investigations
• Fair test – effect of different activities on my pulse rate
• Pattern seeking – exploring which groups of people may have higher or lower resting pulse rates
• Observation over time - how long does it take my pulse rate to return to my resting pulse rate (recovery rate)
• Pattern seeking – exploring recovery rate for different groups of people
Learn about the impact of exercise, diet, drugs and lifestyle on the body. This is likely to be taught through direct instruction due to its sensitive nature</td><td>Use the role play model to explain the main parts of the circulatory system and their role
Can use subject knowledge about the heart whilst writing conclusions for investigations
Can explain both the positive and negative effects of diet, exercise, drugs and lifestyle on the body
Present information e.g. in a health leaflet describing impact of drugs and lifestyle on the body</td></tr>
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Y5/6 Evolution and inheritance

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
2. recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
3. identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution

Assessment guidance		**Key learning**	**Possible Evidence**	**Working scientifically**
SECURE	Shows understanding of a concept using scientific vocabulary correctly	All living things have offspring of the same kind, as features in the offspring are inherited from the parents. Due to sexual reproduction, the offspring are not identical to their parents and vary from each other. Plants and animals have characteristics that make them suited (adapted) to their environment. If the environment changes rapidly some variations of a species may not suit the new environment and will die. If the environment changes slowly, animals and plants with variations that are best suited survive in greater numbers to reproduce and pass their characteristics on to their young. Over time these inherited characteristics become more dominant within the population. Over a very long period of time these characteristics may be so different to how they were originally that a new species is created. This is evolution. Fossils give us evidence of what lived on the Earth millions of year ago and provide evidence to support the theory of evolution. More recently scientists such as Darwin and Wallace observed how living things adapt to different environments to become distinct varieties with their own characteristics. **Key vocabulary** Offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils	Can explain the process of evolution Can give examples of how plants and animals are suited to an environment Can give examples of how an animal or plant has evolved over time e.g. penguin, peppered moth Give examples of living things that lived millions of years ago and the fossil evidence we have to support this Can give examples of fossil evidence that can be used to support the theory of evolution	I can research and present my findings. I can use subject knowledge to make a prediction. I can plan and carry a test thinking about how to control the variables. I can record and present my data and observations. (bar chart, line graphs etc) I can identify patterns in my data. I can draw conclusions using my findings. I can evaluate my test, thinking about how it could be improved. **Possible enquiry questions** Which food is most suitable for which bird? (Based on Darwin's research and beak size). **Celebrating diversity**
	Applying knowledge in familiar related contexts, including a range of enquiries	Design a new plant or animal to live in a particular habitat Use models to demonstrate evolution e.g. Darwin's finches bird beak activity Use secondary sources to find out about how the population of peppered moths changed during the industrial revolution Make observations of fossils to identify living things that lived on Earth millions of years ago Identify features in animals and plants that are passed on to offspring Explore this process by considering the artificial breeding of animals or plants e.g. dogs Compare the ideas of Charles Darwin and Alfred Wallace on evolution Research the work of Mary Anning and how this provided evidence of evolution	Can identify characteristics that will make a plant or animal suited or not suited to a particular habitat Can link the patterns seen in the model to the real examples Can explain why the dominant colour of the peppered moth changed over a very short period of time	

Y5/6 Light

1. recognise that light appears to travel in straight lines
2. 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
3. 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
4. use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them

Assessment guidance		Key learning	Possible Evidence	Working scientifically
SECURE	Shows understanding of a concept using scientific vocabulary correctly	Light appears to travel in straight lines and we see objects when light from them goes into our eyes. The light may come directly from light sources but for other objects some light must be reflected from the object into our eyes for the object to be seen. Objects that block light (are not fully transparent) will cause shadows. Because light travels in straight lines the shape of the shadow will be the same as the outline shape of the object. **Key vocabulary:** As for year 3 plus straight lines, light rays.	Can describe with diagrams or models as appropriate how light travels in straight lines either from sources or reflected from other objects into our eyes. Can describe with diagrams or models as appropriate how light travels in straight lines past translucent or opaque objects to form a shadow of the same shape.	• I can record my observations using diagrams. • I can use subject knowledge to make a prediction. • I can plan and carry a test thinking about how to control the variables. • I can record and present my data and observations. (bar chart, line graphs etc) • I can identify patterns in my data. • I can draw conclusions using my findings. • I can evaluate my test, thinking about how it could be improved. **Possible enquiry questions** How can a hose pipe and torch be used to show that light travels in a straight line? How can lasers and mirrors be used to show that light travels in straight lines? 
	Applying knowledge in familiar related contexts, including a range of enquiries	Explore different ways to demonstrate that light travels in straight lines e.g. shining a torch down a bent and straight hose pipe, shining a torch through different shaped holes in card Explore the uses of the behaviour of light, reflection and shadows such as in periscope design, rear view mirrors and shadow puppets.	Can explain how evidence from enquiries shows that light travels in straight lines Can predict and explain with diagrams or models as appropriate how the path of light rays can be directed by reflection to be seen, for example reflection in car rear view mirrors or in a periscope. Can predict and explain with diagrams or models as appropriate how the shape of shadows can be varied.	

Y5/6 Electricity

1. associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
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
3. use recognised symbols when representing a simple circuit in a diagram

<table>
<tr><th colspan="2">Assessment guidance</th><th>Key learning</th><th>Possible Evidence</th><th>Working scientifically</th></tr>
<tr><td rowspan="2">SECURE</td><td>Shows understanding of a concept using scientific vocabulary correctly</td><td>Adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer make a louder sound. If you use a battery with a higher voltage, the same thing happens. Adding more bulbs to a circuit will make each bulb less bright. Using more motors or buzzers, each motor will spin more slowly and each buzzer will be quieter. Turning a switch off (open) breaks a circuit so the circuit is not complete and electricity cannot flow. Any bulbs, motors or buzzers will then turn off as well.
You can use recognised circuit symbols to draw simple circuit diagrams.
Key Vocabulary
Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage
NB Children do not need to understand what voltage is but will use volts and voltage to describe different batteries. The words cells and batteries are now used interchangeably</td><td>Can make electric circuits and demonstrate how variation in the working of particular components, such as the brightness of bulbs can be changed by increasing or decreasing the number of cells or using cells of different voltages

Can draw circuit diagrams of a range of simple series circuits using recognised symbols</td><td rowspan="2">• I can use subject knowledge to make a prediction.
• I can plan and carry a test thinking about how to control the variables.
• I can record and present my data and observations. (bar chart, line graphs etc)
• I can identify patterns in my data.
• I can draw conclusions using my findings.
• I can evaluate my test, thinking about how it could be improved.
<u>Possible enquiry questions</u>

How can we make the lamp brighter?
How does the size of the cell effect the brightness of a bulb?
How does a motor perform when extra cells are added to a circuit?
Celebrating diversity</td></tr>
<tr><td>Applying knowledge in familiar related contexts, including a range of enquiries</td><td>Explain how a circuit operates to achieve particular operations, such as control the light for a torch with different brightness’s or make a motor go faster or slower
Make circuits to solve particular problems such as a quiet and a loud burglar alarm
Carry out fair tests exploring changes in circuits
Make circuits that can be controlled as part of a D&T project</td><td>Can incorporate a switch into a circuit to turn it on and off
Can change cells and components in a circuit to achieve a specific effect
Can communicate structures of circuits using circuit diagrams with recognised symbols
Can devise ways to measure brightness of bulbs, speed of motors, volume of a buzzer during a fair test
Can predict results and answer questions by drawing on evidence gathered</td></tr>
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