

Science at Keelham Primary School

The Keelham Science *Adventure* starts with:

Exploring and Investigating



Discovering the Natural World



And *Pioneering* future Scientists



Science Curriculum

Intent

At Keelham Primary School, we recognise the importance of Science in every aspect of daily life. As one of the core subjects taught in Primary Schools, we give the teaching and learning of Science the prominence it requires.

The Scientific area of learning is concerned with increasing pupils' knowledge and understanding of our world, and with developing skills associated with Science as a process of enquiry. It will develop the natural curiosity of the child, encourage respect for living organisms and the physical environment and provide opportunities for critical evaluation of evidence.

In conjunction with the aims of the National Curriculum, our Science teaching offers opportunities for children to:

- develop scientific knowledge and conceptual understanding through the specific disciplines of Biology, Chemistry and Physics;
- develop understanding of the nature, processes and methods of Science through different types of science enquiries that help them to answer scientific questions about the world around them;
- be equipped with the scientific knowledge required to understand the uses and implications of Science, today and for the future.
- develop the essential scientific enquiry skills to deepen their scientific knowledge.
- Use a range of methods to communicate their scientific information and present it in a systematic, scientific manner, including I.C.T., diagrams, graphs and charts.
- Develop a respect for the materials and equipment they handle with regard to their own, and other children's safety.
- Develop an enthusiasm and enjoyment of scientific learning and discovery.

The National Curriculum will provide a structure and skill development for the science curriculum being taught throughout the school, which is now linked, where possible to the theme topics to provide a creative scheme of work, which reflects a balanced programme of study.

At Keelham, children have weekly lessons in Science throughout Key Stage 1 and 2, using various programmes of study and resources. In Early years, science is taught through the children learning about the world around them in their learning through play.

We endeavour to ensure that the Science curriculum we provide will give children the confidence and motivation to continue to further develop their skills into the next stage of their education and life experiences.

Implementation

Teachers create a positive attitude to science learning within their classrooms and reinforce an expectation that all children are capable of achieving high standards in science. Our whole school approach to the teaching and learning of science involves the following;

- Science will be taught in planned and arranged topic blocks by the class teacher. This is a strategy to enable the achievement of a greater depth of knowledge.
- Through our planning, we involve problem solving opportunities that allow children to find out for themselves. Children are encouraged to ask their own questions and be given opportunities to use their scientific skills and research to discover the answers. This curiosity is celebrated within the classroom. Planning involves teachers creating engaging lessons, often involving high-quality resources to aid understanding of conceptual knowledge. Teachers use precise questioning in class to test conceptual knowledge and skills, and assess children regularly to identify those children with gaps in learning, so that all children keep up.
- We build upon the learning and skill development of the previous years. As the children's knowledge and understanding increases, and they become more proficient in selecting, using scientific equipment, collating and interpreting results, they become increasingly confident in their growing ability to come to conclusions based on real evidence.
- Working Scientifically skills are embedded into lessons to ensure these skills are being developed throughout the children's school career and new vocabulary and challenging concepts are introduced through direct teaching. This is developed through the years, in-keeping with the topics.
- Teachers demonstrate how to use scientific equipment, and the various Working Scientifically skills in order to embed scientific understanding. Teachers find opportunities to develop children's understanding of their surroundings by accessing outdoor learning and workshops with experts.

EYFS Science Made Simple

The Natural World (Biology)

Area of Learning	By the end of Nursery children will be able to:	By the end of Reception children will be able to:	Books to read	By the end of Y1 children will be able to:
Seasons & Weather	<ul style="list-style-type: none"> • Begin to know 4 seasons • Can talk about the weather today • Can talk about what the weather might be like tomorrow 	<ul style="list-style-type: none"> • Name 4 seasons • Talk about the 4 seasons • Experience and observe the 4 seasons • Name different types of weather • Be familiar with weather reports e.g. BBC weather app 	When the wind blew Hurray for Hoppy Very helpful hedgehog A year with Kipper	<ul style="list-style-type: none"> • Name the seasons and the time of year associated with them. • Talk about and notice the seasons throughout the year. • Talk about and describe the seasons. • Talk about what we do to adapt to different seasons e.g. clothes, activities, physical environment, food • Talk about the plants and animals of different seasons and what they do. • Compare seasons.

Humans	<ul style="list-style-type: none"> • Begin to name parts of the body • Notice things about themselves and others • Experience and explore using their 5 senses • Begin to become aware of their senses • Begin to identify their needs e.g. food, water, play, toilet, cleaning up, washing hands etc. • Begin to dress themselves - link to body parts and materials 	<ul style="list-style-type: none"> • Name parts of the body • Describe themselves • Begin to compare themselves with others • Begin to use comparative language e.g. taller, shorter • Begin to measure themselves/their friends using non-standard units • Experience and explore using 5 senses • Name the 5 senses • Talk about how to keep healthy e.g. diet, exercise, hygiene, what clothes to wear/dressing 		<ul style="list-style-type: none"> • Talk about and describe their body. • Talk about how they are the same as and different from others e.g. physical appearance, things you like, things you believe, how we do things etc. • Talk about their senses and how they use them in everyday life. • Talk about how they've changed during year one • Measure themselves over the year and compare to others • Look after their own health e.g. handwashing, brushing teeth, choosing clothes
Animals	<ul style="list-style-type: none"> • Begin to name some animals from the key lists • Being to describe some animals from the key lists • Notice animals around them 	<ul style="list-style-type: none"> • Name some animals from the key lists • Describe some animals from the key lists 	<ul style="list-style-type: none"> • Dear Zoo • Owl Babies • Penguin and pinecone • Little Red Hen • Have you seen my cat? 	<ul style="list-style-type: none"> • Talk about animals that they are interested in. • Talk about and describe different animals. • Talk about what animals eat.

	<ul style="list-style-type: none"> • Have opportunities to observe/find animals in school grounds, local area and further afield • Begin to talk about what animals eat 	<ul style="list-style-type: none"> • Compare some animals from the key lists • Observe some animals from the key lists • Have opportunities to observe/find animals in the school grounds, local area and further afield • Talk about what animals eat • Have opportunities to talk to a vet, pet owner, farmer etc. 	<ul style="list-style-type: none"> • A roar for Stanley • Snail and the whale • Hungry caterpillar • Very busy spider • Iris and Isaac • Emperor's Egg • Walters Wonderful Web • Spyder • There's a tiger in the garden • Mixed up Chameleon • Alba the 100-year-old fish • Tiddler • Tiger who came to tea • Giraffes can't dance • Polar, bear, Polar bear • Brown Bear, brown bear • Actual Size • What the ladybird heard • Pig in the pond 	<ul style="list-style-type: none"> • Talk about where animals live • Talk about how to look after a pet • Compare animals • Measure animals • Talk about how they can look after animals/pets
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Plants	<ul style="list-style-type: none"> • Begin to name some plants from the key lists • Begin to describe some plants from the key lists • Notice plants around them • Have opportunities to observe/find plants in the school grounds, local area and beyond • Have opportunities to grow/taste/draw plants • Talk to a gardener 	<ul style="list-style-type: none"> • Name some plants from the key lists • Describe some plants from the key lists • Compare some plants from the key lists • Observe plants in the school grounds, local area and beyond • Name the basic parts of a plant • Have opportunities to grow/taste/draw/measure plants • Talk to a gardener 	<ul style="list-style-type: none"> • Stickman • Supertato • Colin and Lee, Carrot and Pea • Handa's surprise • Jasper's beanstalk • Jack the beanstalk • Enormous turnip • Winne's enormous pumpkin • Kitchen Disco • Florette 	<ul style="list-style-type: none"> • Talk about and notice plants throughout the year. • Talk about and describe different plants. • Talk about what plants we eat. • Talk about how to grow plants. • Compare plants. • Talk about how they can look after plants
Habitats	N/A	<ul style="list-style-type: none"> • Talk about the places where animals live • Talk about the animals they will find in the school grounds and local area 		

Year 1 Science Made Simple

By the end of Year 1 children will be able to...	NC PoS	Background information & Vocabulary
<p>Humans</p> <ul style="list-style-type: none"> • Talk about and describe their body. • Talk about how they are the same as and different from others e.g. physical appearance, things you like, things you believe, how we do things etc. • Talk about their senses and how they use them in everyday life. • Talk about how they've changed during year one • Measure themselves over the year and compare to others • Look after their own health e.g. handwashing, brushing teeth, choosing clothes 	<ul style="list-style-type: none"> • identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. 	<p>Background information</p> <p>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.</p> <p>Key Vocabulary</p> <p>Senses, touch, see, smell, taste, hear, fingers (skin), eyes, nose, ear and tongue</p>
<p>Scientific enquiries for humans</p> <ul style="list-style-type: none"> • Can the children with the biggest hands grab the most sweets? (Pattern seeking) • Observing changes in humans - e.g. photographing children when first coming into the year and then throughout the year. Look at changes to faces, hair, hobbies etc. Encourage children to collect some data e.g. height, weight, shoe size, number of teeth etc. Repeat at the beginning of each term and end the year with a piece of writing 'Look how much I've changed/grown!' (Observing over time) • Where does the food in my pack lunch come from? (Research) 		

Key Experiences

- Playing 'Simon Says'
- Referring to parts of the body and how children are feeling during PE sessions
- Drawing round each other and labelling as many parts of the body as they can

Animals

- Talk about animals that they are interested in.
- Talk about and describe different animals.
- Talk about what animals eat.
- Talk about where animals live.
- Talk about how to look after a pet.
- Compare animals
- Measure animals
- Talk about how they can look after animals/pets

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

Background information

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

Scientific enquiries for animals

- Which birds visit the school grounds? It's good to do this as part of the RSPB Big Garden Birdwatch in January. (Identifying and classifying)
- Spend all year identifying animals as you encounter them in stories, in the wild, in non-fiction books, through the news etc. (Identifying and classifying)

Key Experiences

- Go bird watching and on a bug hunt
- Bringing pets into school
- Making a home for animals (hedgehog, insects)
- Create bird feeders

- Look at different types of 'animal poo'

Materials

- Talk about and notice objects throughout the year.
- Talk about and describe different objects/materials.
- Talk about and describe objects that we use every day.
- Talk about how everyday objects are made (in a simple way).
- Compare objects.
- Talk about how we look after our objects or belongings.

- distinguish between an object and the material from which it is made
- identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock
- describe the simple physical properties of a variety of everyday materials
- compare and group together

Background information

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

Scientific enquiries for materials

- There's a hole in my bucket - what can I use to fix it? (Comparative/fair test)
- What is the best paper for wrapping a present? (Comparative/fair test)
- How can I make a paper fish go further? (Comparative/fair test)
- Floating and sinking - what happens to different objects when they are put into water? (Identifying and classifying)

Key Experiences

- Exploring different objects using the senses

- Talking about materials and properties of objects as children use them throughout the day/curriculum
- Playing 'Odd one out' with 3 objects regularly

Seasonal change

- Name the seasons and the time of year associated with them.
- Talk about and notice the seasons throughout the year.
- Talk about and describe the seasons.
- Talk about what we do to adapt to different seasons e.g. clothes, activities, physical environment, food
- Talk about the plants and animals of different seasons and what they do.
- Compare seasons.

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

Background information

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, temperature

Scientific enquiries for seasonal change

- Observing seasonal changes - monthly/seasonal stroll looking at school grounds. Noticing the changes in plants, animals, weather and what we are wearing. (Observing over time)
- Recording the weather daily as a class and discussing it (observing)

Key Experiences

- Going outside in the school grounds and experiencing different types of weather and looking at different types of plants/animals that are around in different seasons

Plants

- Talk about and notice plants throughout the year.
- Talk about and describe different plants.
- Talk about what plants we eat.
- Talk about how to grow plants.
- Compare plants.
- Talk about how they can look after plants

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

Background information

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

Scientific enquiries for plants

- What plants can I grow at home/school/in a particular object/indoors/outside? (Research)
- Do all apples have the same amount of seeds? (Pattern seeking)
- Do all flowers have the same number of petals? (Pattern seeking)

Key Experiences

- Collect autumn seeds from trees and flowers e.g. conkers, acorns, beech nuts, poppies
- Spot autumn berries on our trees
- Cook and eat some blackberry and apple crumble

- Observe, describe and compare leaves on the trees
- Make leaf rubbings

Working Scientifically

- Observe, describe and compare using simple science words
- Sort things
- Ask science questions
- Collect evidence to answer some questions
- Measure using non-standard units
- Test out ideas with help
- Talk about what might happen and what they found out
- Record on a simple table

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

observe
comparative language e.g. big, bigger, biggest, small, smaller, smallest, tall, taller, tallest, light, lighter, lightest, long, longer, longest
language of data e.g. table, pictogram, bar chart, tally

Year 2 Science

By the end of Year 2 children will be able to...	NC PoS	Background information & Vocabulary
Humans <ul style="list-style-type: none">Talk about and describe how to look after themselves - what foods are best to eat; why, we need to exercise; why and how to rest.Make comparisons between themselves and people that are older and younger than themLook after their own health e.g. brushing their teeth (the singing, dentist), washing hands, drinking water, choosing appropriate clothing, appropriate activities, bedtimes etc.	<ul style="list-style-type: none">notice that animals, including humans, have offspring which grow into adultsfind out about and describe the basic needs of animals, including humans, for survival (water, food and air)describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	Background information <p>Humans have offspring which grow into adults. In humans these offspring are babies that grow into adults.</p> <p>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.</p> Key Vocabulary <p>Offspring, growth, child, young/old stages exercise, heartbeat, breathing, hygiene, germs, disease, food types - meat, fish, vegetables, bread, rice, pasta. Comparative vocabulary - bigger, smaller-taller, shorter, longer, narrower, wider, healthy, unhealthy.</p>
Scientific enquiries for humans <ul style="list-style-type: none">Are the tallest children the oldest children? (Pattern seeking)How do athletes train? (Research)		
Key Experiences <ul style="list-style-type: none">Take part in different types of exercises and explore the changes in their body.Visits from different stages of life (baby, adult, elderly person)Being shown how to wash your hands and clean your teeth properly (visit from dentist and nurse)		

Animals <ul style="list-style-type: none">Talk about how to look after a pet.Describe how animals help humans.Talk about baby animals and their parents.Describe how baby animals change as they grow.Compare baby animals with their parents and other baby animals.	<ul style="list-style-type: none">notice that animals, including humans, have offspring which grow into adultsfind out about and describe the basic needs of animals, including humans, for survival (water, food and air) Key Vocabulary <p>Offspring, growth, young/old stages, breathing, survive, oxygen</p> <p>Comparative vocabulary - bigger, smaller-taller, shorter, longer, narrower, wider.</p> <p>Names of adult animal and baby animal e.g. cow and calf, horse and foal</p>	Background information <p>Animals have offspring which grow into adults. In 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.</p> <p>All animals 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.</p>
Scientific Enquiries for animals <ul style="list-style-type: none">Offspring - watching things grow e.g. how do animals change over time? (Hatching eggs, caterpillars, tadpoles etc.) Spring watch, BBC videos (Observing over time)Sorting animals by features, habitats etc. (Identifying & classifying)		
Key Experiences <ul style="list-style-type: none">Animal visit in or out of school (farm visits)Watch spring watchHatching eggs/frogspawn/ caterpillar-butterfly		

Living things and their habitats

- Talk about and describe different habitats.
- Explain how an animal is designed for its habitat.
- Describe how animals and plants get what they need to survive from their habitat.
- Order a simple food chain.
- Say if something is living, dead or never been alive.

- identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other
- identify and name a variety of plants and animals in their habitats, including micro-habitats
- 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.
- explore and compare the differences between things that are living, dead, and things that have never been alive

Background information
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

- Scientific Enquiries for living things & their habitats
- Where do we find the most snails/spiders/woodlice?
 - Which are the most endangered animals? (Research)
 - Do all sharks look like Bruce? (choose your own animal here if you wish) (Research)

- Key Experiences
- Explore the school grounds and the different types of habitats that can be found for animals including the plants which belong to these habitats
 - Talk regularly about things that are living, dead, and things that have never been alive in day to day

Uses of everyday materials

- Talk about and describe different objects/materials.
- Talk about the properties of everyday objects that we use.
- Talk about how they've made objects and things that went well or could be improved.
- Which object is the most suitable for a task. E.g. Which one of these bags is best for carrying my marking home in?
- Which material is the most suitable for an object. E.g. Which bag will protect my books from the rain?

- identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses
- find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

Background information
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
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, opaque, transparent and translucent, reflective, non-reflective, flexible, rigid, Shape, push/pushing, pull/puling, twist/twisting, squash/ squashing. Bend/bending, stretch/stretching

Scientific Enquiries for uses of everyday materials

- How many ways can you sort these vehicles/toys etc? (Identifying & classifying)
- What is the best way to mop up a puddle? (Comparative/fair test)
- How can we make a toy car go further? (Comparative/fair test)

Key Experiences

- Exploring a range of materials day to day and discussing their properties (what it is made out of and what it can do)

<p>Plants</p> <ul style="list-style-type: none">• Talk about how to grow a variety of plants.• Grow a variety of plants from seeds and bulbs• Care for a variety of houseplants/plants over the whole of Y2• Describe different seeds – what they look like, what they grow in to and how we use the plants.• Talk about how to grow a variety of bulbs.• Describe different bulbs – what they look like, what they grow in to and how we use the plants.• Talk about the parts of the plants we eat.	<ul style="list-style-type: none">• observe and describe how seeds and bulbs grow into mature plants• find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. <p>Key Vocabulary</p> <p>Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud, light, shade, sun, warm, cool, water, grow, healthy.</p> <p>Names of trees in the local area.</p> <p>Names of garden and wild flowering plants in the local area.</p>	<p>Background information</p> <p>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.</p>
<p>Scientific Enquiries for plants</p> <ul style="list-style-type: none">• What are the best seeds for growing a map of the world? (Comparative/fair testing)• The seeds have fallen out of their packet, how can we sort them? (Identifying & classifying)• Growing plants – all year round and watch them grow, including seeds, bulbs etc. (Observing over time)• What happens to our cut flowers over time? (Observing over time)		
<p>Key Experiences</p> <ul style="list-style-type: none">• Making a salad and tasting the different foods we can eat that grow from a plant• Grow and care for different plants• Exploring different types of seeds		
<p>Working Scientifically</p> <ul style="list-style-type: none">• Observe, describe and compare using science words• Sort and order observations• Ask scientific questions and use information to help answer them• Plan how to collect data to answer questions, with help• Measure using non-standard, then standard units• Talk about what might happen and compare it to what did happen• Plan a simple fair test, with help• Test out their own/someone else’s ideas• Explain why (in a simple way)• Record information on tables and bar charts	<ul style="list-style-type: none">• asking simple questions and recognising that they can be answered in different ways• observing closely, using simple equipment• performing simple tests• identifying and classifying• using their observations and ideas to suggest answers to questions• gathering and recording data to help in answering questions.	<p>Observe, Describe, Compare, Sort, Measure, Record, fair test, pattern</p> <p>comparative language e.g. big, bigger, biggest, small, smaller, smallest, tall, taller, tallest, light, lighter, lightest, long, longer, longest</p> <p>language of data e.g. table, pictogram, bar chart, tally,</p>

Year 3 Science		
By the end of Year 3 children will be able to...	NC PoS	Background Information & Vocabulary
<p>Humans</p> <ul style="list-style-type: none">• Talk about their skeleton and the job it does• Identify and name some bones in the human skeletal system• Talk about and identify the major muscles in the body, E.g. quads, hamstrings, calves, glutes, triceps, biceps• Talk about how the muscles work• Compare human and animal skeletons• Investigate the food we eat in a week, as a class• Explore how nutritious our current diet is and how we can improve it.	<ul style="list-style-type: none">• identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat• identify that humans and some other animals have skeletons and muscles for support, protection and movement.	<p>Background Information</p> <p>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.</p> <p>Humans and some other animals have skeletons and muscles which help them move and provide protection and support</p> <p>Key Vocabulary</p> <p>exercise, heartbeat, breathing, hygiene, germs, disease, quads, hamstrings, calves, glutes, triceps, biceps, skeleton, muscles, food types - meat, fish, vegetables, bread, rice, pasta, nutritious, Comparative vocabulary - bigger, smaller taller, shorter, longer, narrower, wider, healthy, unhealthy.</p>
<p>Scientific enquiries for humans</p> <ul style="list-style-type: none">• Are the children with the biggest feet the tallest? (Pattern seeking)• What food have I eaten this week? (Observing over time)• Do all animals have a skeleton? (Research)• How can you use exercise to keep our muscles strong and healthy? (Research)		
<p>Key experiences</p> <ul style="list-style-type: none">• Looking at real life x-rays of animals and humans• Look at models of bones in the human skeletal system• Make a healthy meal that will give them the correct and right amount of nutrition		
<p>Rocks</p> <ul style="list-style-type: none">• Talk about how the Earth is constantly moving and reshaping itself & how rock formation is dynamic• Name some famous rock formations, mountains and volcanoes around the world• Describe how rocks are formed in a simple way• Explore the environment and identify things made from rocks. E.g. stone• Observe, describe and compare rocks.• Group and order rocks (hardness, weight, length)• Explain why rocks have been used for a specific purpose. E.g. Marble for statues• Describe how fossils were formed.• Observe, describe and compare soils (When teaching plants talk about the correct soil type)• Talk about why Mary Anning is important to Paleontologists?	<ul style="list-style-type: none">• compare and group together different kinds of rocks on the basis of their appearance and simple physical properties• describe in simple terms how fossils are formed when things that have lived are trapped within rock• recognise that soils are made from rocks and organic matter.	<p>Background Information</p> <p>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.</p> <p>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.</p> <p>Key Vocabulary</p> <p>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</p>

<p>Scientific enquiries for rocks</p> <ul style="list-style-type: none"> How have the rocks/gravestones/buildings/cliffs around us changed over time? (Observing over time) The geology museum needs our help: how can we identify and sort the different types of rocks? (Identifying & classifying) What gifts do rocks, gems and minerals give us? (Research) 		
<p>Key experiences</p> <ul style="list-style-type: none"> Looking at a variety of different types of rocks, fossils and soils (4 senses) <p>H&S - Safe soil - compost from garden centres</p>		
<p>Forces and magnets</p> <ul style="list-style-type: none"> Explore forces in the environment E.g. playing with toys, kicking/throwing balls, opening doors, climbing. Make observations on how we use forces in everyday life. Describe forces and their effect on things Spot and talk about simple patterns in our observations E.g. the harder the kick the further the ball went. Measure forces using a force meter and record data in a table. Investigate how things move on different surfaces Observe and describe magnetic forces Test objects to see if they are magnetic 	<ul style="list-style-type: none"> compare how things move on different surfaces notice that some forces need contact between two objects, but magnetic forces can act at a distance observe how magnets attract or repel each other and attract some materials and not others compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials describe magnets as having two poles predict whether two magnets will attract or repel each other, depending on which poles are facing. 	<p>Background Information</p> <p>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.</p> <p>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.</p> <p>For some forces to act there must be contact e.g. a hand opening a door, the wind pushing the trees.</p> <p>Some forces can act at a distance e.g. magnetism. The magnet does not need to touch the object that it attracts.</p> <p>Key Vocabulary</p> <p>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</p>
<p>Scientific enquiries for forces & magnets</p> <ul style="list-style-type: none"> Which materials are magnetic? (Identifying & classifying) Which is the strongest magnet? (Comparative/fair testing) How are magnets used in everyday life? (Research) How do objects move across different surfaces? (Comparative/Fair Testing) 		
<p>Key experiences</p> <ul style="list-style-type: none"> Explore different types magnets and play around with what they can do. 		
<p>Plants</p> <ul style="list-style-type: none"> Talk about the things that plants give us Observe, describe and compare plants Measure plants Describe the functions of parts of a plant Describe how a variety of plants need different things to live Describe the life cycle of plants and the role of the flower 	<ul style="list-style-type: none"> identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant investigate the way in which water is transported within plants explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. 	<p>Background Information</p> <p>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</p> <p>Key Vocabulary</p> <p>pollen, insect/wind pollination, seed formation, seed dispersal - wind dispersal, animal dispersal, water dispersal</p>

Scientific enquiries for plants

- Do the biggest fruits have the most seeds? (Pattern seeking)
- How do our plants change over the year? (Observing over time)
- What effects how well our plants grow? (Comparative/fair test)
- How long does it take to change the colour of a carnation using food colouring? (Observing over time)
- Do all plants need the same things? (Research)

Key experiences

- Growing plants in different conditions
- Exploring the schools ground and observing different plants
- Looking at different fruits and their seeds

- Explore the school grounds at different types of rocks (buildings and on the ground)

Light

- Talk about how light helps us in everyday life
- Name some sources of light
- Talk about materials that reflect light and how this can be useful/not useful
- Talk about how dark is the absence of light
- Talk about how to protect our eyes from the sun and why this is important
- Explain how to make a variety of shadows e.g. vary size, clarity and shape

- recognise that they need light in order to see things and that dark is the absence of light
- notice that light is reflected from surfaces
- recognise that light from the sun can be dangerous and that there are ways to protect their eyes
- recognise that shadows are formed when the light from a light source is blocked by an opaque object
- find patterns in the way that the size of shadows change.

Background Information

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

Scientific enquiries for light

- Which is the best material for creating a cinema (dark) room? (Comparative/fair testing)
- Which things give us light? (Identifying & classifying)
- What makes a difference to a shadow? (Comparative/fair testing)
- The nearer to the torch, the bigger the shadow. True or false? (Pattern seeking)
- How do our shadows change over the day? (Observing over time)
- Why do we need to protect our eyes from the sun? (Research)

Key experiences

- Creating different shadows using different light sources
- Watch a shadow puppet show (BGT act - attraction) and create own puppet show
- Go outside and drawing around shadow across the day

Working scientifically

- Observe, describe and compare using Key Stage 2 scientific vocabulary
- Group and order observations giving scientific reasons
- Ask scientific questions and use information/collect data to answer them
- Predict what might happen and begin to explain why using everyday ideas
- Measure in standard units
- Test out their own/someone else's ideas
- Plan a fair test with help
- Explain observations using cause and effect
- Draw simple tables and bar charts to record their own observations/data
- Talk about observations/results and begin to use scientific facts to explain them
- Find and talk about simple patterns in results
- Communicate findings in a variety of ways
- Talk about how to improve their own work

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

Observe, describe, compare, fair test, variable, evidence, equipment, patterns, data, measurement (and all the units), predict, because, explain, table, bar chart

Year 4 Science made simple		
By the end of Year 4 children will be able to...	NC PoS	Background Information & Key Vocabulary
<p>Humans</p> <ul style="list-style-type: none">• Talk about their teeth and how to care for them• Describe the functions of the different types of teeth• Explain how food/drinks can affect teeth• Compare human teeth with those of other animals• Identify and name the main parts of the digestive system• Order the main parts of the digestive system• Describe what happens in each part of the digestive system• Explain how to keep their digestive system healthy	<ul style="list-style-type: none">• describe the simple functions of the basic parts of the digestive system in humans• identify the different types of teeth in humans and their simple functions	<p>Background Information</p> <p>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.</p> <p>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.</p> <p>Humans have four types of teeth - incisors for cutting, canines for tearing, molars and premolars for grinding (chewing).</p> <p>Key vocabulary</p> <p>Digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars, enzymes/acid.</p>
<p>Scientific enquiries for humans</p> <ul style="list-style-type: none">• Which drinks make teeth decay quickly? (comparative and fair testing)• How can I keep my digestive system healthy? (research)		
<p>Key experiences</p> <ul style="list-style-type: none">• Looking at our own teeth with mirrors• Using disclosing tablets to see how much decay is on their teeth and brushing it off• Create a model of the digestive system (tights and banana)		
<p>States of matter</p> <ul style="list-style-type: none">• Talk about solids, liquids and gases• Describe the properties of solids, liquids and gases• Describe what happens when objects melt, freeze or solidify• Give everyday examples of melting and freezing• Describe what happens when liquids evaporate and condenses• Give everyday examples of evaporation and condensation• Describe the water cycle• Talk about temperature being how hot or cold something is• Talk about how we measure temperature• Measure temperature using a variety of thermometers	<ul style="list-style-type: none">• compare and group materials together, according to whether they are solids, liquids or gases• observe that some materials change state• when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)• identify the part played by evaporation and• condensation in the water cycle and associate the rate of evaporation with temperature <p>Key vocabulary</p> <p>Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, temperature, water cycle, particles,</p>	<p>Background Information</p> <p>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.</p> <p>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.</p> <p>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.</p>

<p>Scientific enquiries for states of matter</p> <ul style="list-style-type: none"> Which bits on our ice hand will melt first? (observing over time) How does our iceberg change over the course of the day? (observing over time) What effects how quickly my chocolate will melt? (comparative and fair testing) What things will make water evaporate more quickly? (comparative and fair testing)
<p>Key experiences</p> <ul style="list-style-type: none"> Exploring different types of solids, liquids and gases and observing the differences

<p>Sound</p> <ul style="list-style-type: none"> Experience a variety of sounds around us, observe and describe them Order sounds in a variety of ways e.g. loudest to quietest, highest to lowest Compare sounds using words and decibels Explain how we use sounds in everyday life Consider how sounds help or hinder us Be able to explain how sounds travels Describe how volume and pitch are produced by a variety of simple instruments Describe how sounds get fainter as the distance from the sound source increases Explain how the ear works and how we can protect our hearing 	<ul style="list-style-type: none"> identify how sounds are made, associating some of them with something vibrating recognise that vibrations from sounds travel through a medium to the ear find patterns between the pitch of a sound and features of the object that produced it find patterns between the volume of a sound and the strength of the vibrations that produced it recognise that sounds get fainter as the distance from the sound source increases 	<p>Background Information</p> <p>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.</p> <p>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.</p> <p>Key Vocabulary</p> <p>Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation, vacuum.</p>
<p>Scientific enquiries for sound</p> <ul style="list-style-type: none"> Is there a link between the amount of noise in school and the time of the day? (pattern seeking) How do we use science in everyday life? (research) What is it like to be hearing impaired? (research) 		
<p>Key experiences</p> <ul style="list-style-type: none"> Frequency testing 		
<p>Electricity</p> <ul style="list-style-type: none"> Talk about objects that use electricity Talk about how electricity is used to produce heat, warmth, movement and light and give examples. Make an electrical circuit and name the components Control a circuit using a switch Identify and classify conductors and insulators Research how electricity is produced in a variety of ways The risks when using electricity 	<ul style="list-style-type: none"> identify common appliances that run on electricity construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit recognise some common conductors and insulators, and associate metals with being good conductors Understand how to be safe when using electricity 	<p>Background Information</p> <p>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.</p> <p>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</p> <p>Key Vocabulary</p> <p>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</p> <p>N.B. Children in year 4 do not need to use standard symbols as this is taught in year 6</p>
<p>Scientific enquiries for electricity</p> <ul style="list-style-type: none"> Which materials conduct electricity? (identifying and classifying) How can I keep myself safe around electrical appliances? (research) 		
<p>Key experiences</p> <ul style="list-style-type: none"> Exploring the different components to make a circuit. 		

<p>Living things and their habitats</p> <ul style="list-style-type: none">• Talk about and describe range of habitats and their plants & animals (building on from Y2 work)• Compare animals and plants• Ask and answer yes/no questions• Identify plants and animals using a classification key• Group animals & plants in a variety of ways and give reasons e.g. flowering/ non flowering• Construct classification keys to help others to identify animals & plants• construct and interpret a variety of food chains, identifying producers, predators and prey•• Give examples of how an environment has changed due to human impact or natural phenomena• Talk about actions they could take to protect our planet	<ul style="list-style-type: none">• recognise that living things can be grouped in a variety of ways• explore and use classification keys to help group, identify, and name a variety of living things in their local and wider environment• recognise that environments can change and that this can sometimes pose dangers to living things	<p>Background Information</p> <p>Living things can be grouped (classified) in different ways according to their features. Classification keys can be used to identify and name living things.</p> <p>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.</p> <p>Living things can be classified as producers, predators and prey according to their place in the food chain.</p> <p>Key Vocabulary</p> <p>Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate, herbivore, carnivore, omnivore, producer, predator, prey, food chain</p>
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<p>Scientific enquiries for living things & their habitats</p> <ul style="list-style-type: none">• Can you create a classification key to identify and name a variety of living things? (identifying and classifying)		
<p>Key experiences</p>		
<p>Working scientifically</p> <ul style="list-style-type: none">• Observe, describe and compare using Key Stage 2 scientific vocabulary• Group and order observations giving scientific reasons• Collect evidence/find information to test out an idea/prediction or answer a question• Predict what might happen and begin to explain why, using everyday ideas and scientific facts/ideas• Measure in standard units• Select equipment, with help• Plan ways to test out their own/someone else's ideas• Set up a fair test and explain why it is important to do so• Draw tables and bar charts to record observations/data• Explain observations/results using cause and effects and scientific facts and ideas• Explain what the evidence shows and whether it supports any predictions• Identify and explain simple trends and patterns in results• Communicate findings in a variety of ways• Talk about how to improve their own work	<ul style="list-style-type: none">• asking relevant questions and using different types of scientific enquiries to answer them• setting up simple practical enquiries, comparative and fair tests• making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers• gathering, recording, classifying, and presenting data in a variety of ways to help in answering questions• recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables• reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions• using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions• identifying differences, similarities or changes related to simple scientific ideas and processes• using straightforward scientific evidence to answer questions or to support their findings.	

Year 5 Science Made Simple		
By the end of Year 5 children will be able to...	NC PoS	Background Information & Key Vocabulary
Living Things and their habitats		
Living things and their habitats <ul style="list-style-type: none"> Describe the life cycles of a mammal Describe the life cycles of an amphibian Describe the life cycles of an insect Describe the life cycles of a bird Compare the life cycles of the above Review from year 3 parts of a plant, parts of a flower and the life cycle of a plant including pollination and seed dispersal Say that plants reproduce in 2 ways – asexual and sexual Give a simple explanation of sexual reproduction in plants and give examples of plants that reproduce this way. Talk about the two main groups of plants (flowering and non-flowering) and give examples of each Give a simple explanation of asexual reproduction in plants and give examples of plants that reproduce this way. 	<ul style="list-style-type: none"> describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird describe the life process of reproduction in some plants and animals 	Background Information 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
Scientific enquiries for living things & their habitats <ul style="list-style-type: none"> What is similar and what is different about the life cycles of different animals? (Research) Will seeds germinate in salty or oily water? (Comparative and fair testing) If we don't look after our plants properly they will die. How does changing the amount of water make a difference to how well they grow? What else can we change? (Comparative and fair testing) 		
Key experiences <ul style="list-style-type: none"> Planting seeds and observing their germination Observe and grow plants that reproduce asexually – grow strawberries and potatoes Take cuttings from a range of plants e.g. mint Plant bulbs and then harvest to see how they multiply Use secondary sources and first hand experiences to find out about life cycles of animals and plants 		
Animals including humans		
Humans <ul style="list-style-type: none"> Name and order the different stages of human life e.g. foetus, new born, child, adolescent, adult, old age Work as part of a group to describe in detail one stage of the five listed above. Compare two or more stages (E.g. new born and adolescent) Describe the changes of humans from birth to old age Explain strategies that people could use to support their mental wellbeing The following may be covered during RSE or PSHE Explain the changes during puberty for boys Explain the changes during puberty for girls 	<ul style="list-style-type: none"> describe the changes as humans develop to old age 	Background Information 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: https://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
Scientific enquiries for animals including humans <ul style="list-style-type: none"> If the animal is bigger, the gestation period longer? True or false? (Pattern seeking) The biggest man in the world has the biggest feet. Is there a pattern between height and foot size? (Pattern seeking) Do the tallest people have the strongest grip? (Pattern seeking) Are the oldest children in our class the tallest? Are the oldest adults the tallest? When does the pattern between height and age change? (Pattern seeking) Can the people with the biggest hands grab the most sweets? (Pattern seeking) Do we look different! How do we change as we get older? E.g. body proportions, hair, height, weight, skills. Do we only get older on our birthdays? (Observing over time) 		

- Key Experiences
- Looking at photographs of themselves over their lifetime
 - Looking at people at different stages of their life
 - Meeting people at different stages of their life – babies, child, old age
 - Watch time lapses of changing throughout lives

Properties and changes of materials

Properties and changes of materials

Carousel of activities to recap previous learning as follows:

- Describe the properties of objects
- Compare and group everyday objects based on their properties
- Group together materials that are magnetic & non-magnetic (recap Y3)
- Group together materials that are electrical conductors/insulators
- Order materials from transparent to opaque
- Order materials from softest to hardest
- Compare the same object made of different materials e.g. water bottle and say which one is best for a given user.
- Explain which material is most suitable for a given purpose drawing on wider knowledge (every day and scientific).
- Talk about the changes of state; solids, liquids, gases
- Explain how materials can be recovered through evaporation

New learning

- Explain what thermal conductivity is and which materials provide insulation
- Describe what a solution is
- Describe what a mixture is
- Explain the difference between soluble and insoluble.
- Explain what dissolving means and give examples of materials which dissolve
- Explain what filtering and sieving are and give examples
- Explain how materials can be recovered from solutions or mixtures through evaporation, filtering and sieving.
- Give examples of reversible and non-reversible changes

- compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets
- know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
- use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
- give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- demonstrate that dissolving, mixing and changes of state are reversible changes
- explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda

Background Information

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

Scientific enquiries for properties of materials

- I need to make a greenhouse. It is too dangerous to use glass due to the younger children. What material could I use? (Identifying and classifying)
- Which materials will slow how quickly our ice pop melts? (Comparative and fair testing)
- How can we sort packaging so we know which is best for wrapping different items to stop them getting wet or damaged? (Identifying and classifying)
- How can we clean dirty water? (Comparative and fair testing)
- Which factors affect how quickly my sugar dissolves? (Comparative and fair testing)

Key experiences

Earth and space

- Name and describe the sun and the planets
- Say that the earth, sun and moon are spherical bodies
- Use a model to explain day and night
- Say that the sun does not move and it doesn't rise or set. It is the earth's rotation that gives us the impression of a sunrise and sunset.
- Use a model to explain seasons
- Use a model to explain how the earth and moon orbit the sun
- Explain the phases of the moon
- Talk about weightlessness in space and the pull of gravity on earth
- Describe how scientist's thinking about space has changed over hundreds of years

- describe the movement of the Earth, and other planets, relative to the Sun in the solar system
- describe the movement of the Moon relative to the Earth
- describe the Sun, Earth and Moon as approximately spherical bodies
- use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky
- explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object

Background Information

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 365½ 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

<p>Scientific enquiries for Earth and space</p> <ul style="list-style-type: none">• How do our shadows change over the course of the day? (observation)• Which is the brightest/hottest part of the day? (observation)• What happens during a lunar eclipse? (research)• What do astronomers do? (research)• What would happen if the Earth started to rotate more slowly? (research)• What are the different phases of the moon? (observation)• How long does it take different planets to orbit the Sun? (pattern seeking)• Does the size of the planet effect the time it takes to orbit the Sun? (pattern seeking)
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Key experiences		
<p>Forces</p> <ul style="list-style-type: none">• Say that a force is a push or a pull (recap Y3)• Say that forces come in different sizes (recap Y3)• Say how forces affect an object (recap Y3)• Say what gravity is and how it affects things on earth• Measure forces using a force meter (recap Y3)• Plan fair tests that investigate water resistance, air resistance and friction• Use diagrams to explain water resistance• Use diagrams to explain air resistance• Use diagrams to explain friction• Give examples of when it is useful to when it is useful to have high water resistance, air resistance and friction• To explore how levers, pulleys and gears work• To say that levers, pulleys and gears are simple machines• To explain how each of these simple machines work by taking a force and making it bigger• Give examples of where these machines are used in everyday life	<ul style="list-style-type: none">• identify the effects of air resistance, water resistance and friction, that act between moving surfaces• recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect	<p>Background Information</p> <p>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.</p> <p>Everything is pulled to the Earth by gravity. This causes unsupported objects to fall.</p> <p>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.</p> <p>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.</p> <p>Key vocabulary Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears</p>
<p>Scientific enquiries for forces</p> <ul style="list-style-type: none">• What makes a difference of how far our balloon rocket can go? (Comparative and fair testing)• How does changing our parachute affect how our toy figure falls? (Comparative and fair testing)• Can you sort objects into those that fly, float or fall e.g. conkers, seeds, spinners? (Identification and classification)• Do all feathers fall in the same way? (pattern seeking)• Why don't cranes fall over? (Research)		
Key experiences		

<ul style="list-style-type: none">• Observe, describe and compare in careful detail• Sort and classify, with precise reasons• Make predictions and explain why• Plan how to collect evidence/information/data to test out an idea/prediction or answer a question• Measure precisely in standard units• Select the most suitable equipment for the task• Plan ways to test out their own/someone else's ideas• Set up and carry out fair tests• Repeat observations and measurements• Draw tables, bar charts and simple line graphs to record observations/data• Interpret and predict from bar charts and line graphs• Explain observations/results using cause and effects and scientific facts and ideas• Explain what the evidence show and whether it supports any predictions• Identify trends and patterns in data and explain using scientific facts and ideas• Begin to identify scientific evidence that has been used to support or refute ideas or arguments• Select the most appropriate way to communicate findings, evaluating the evidence as well as describing it• Talk about how to improve their own work giving reasons	<ul style="list-style-type: none">• asking relevant questions and using different types of scientific enquiries to answer them• setting up simple practical enquiries, comparative and fair tests• making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers• gathering, recording, classifying and presenting data in a variety of ways to help in answering questions• recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables• reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions• using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions• identifying differences, similarities or changes related to simple scientific ideas and processes• using straightforward scientific evidence to answer questions or to support their findings.	
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Year 6 Science Made Simple		
By the end of Year 6 children will be able to...	NC PoS	Background Information & Key Vocabulary
Living things and their habitats <ul style="list-style-type: none">Describe the characteristics of amphibians, reptiles, birds, fish and mammals (recap Y4)Compare the characteristics of animals in different groupsSay that plants are classified into two main groups and give examples of eachCreate classification keys for plants and animals and micro-organisms (partial recap Y4)Explain what micro-organisms are and how they help or hinder usSay what the 5 kingdoms of living things areTalk about the work of Carl Linnaeus and why his work was influentialUse classification materials to identify unknown plants, animals and microbesClassify living things according to Linnaean principles (Kingdom, Phylum, Class, Order, Family, Genus, Species)	<ul style="list-style-type: none">describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animalsgive reasons for classifying plants and animals based on specific characteristics	Background Information Living things can be formally grouped according to characteristics. Plants and animals are two main groups but there are other living 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
Scientific enquiries for living things & their habitats <ul style="list-style-type: none">Microbes are responsible for breaking down our food. Does the type of packaging effect how long food lasts? (observing over time)Are all microbes harmful? (research)Carl Linnaeus was a scientific pioneer. Why? (research)Can you create a key to classify plants, animals and micro-organisms? (identifying and classifying)		
Key experiences <ul style="list-style-type: none">Use a variety of keysLook at different plants, animals and microbes in books to extend their knowledge (DK animal book/DK trees, leaves, flowers and seeds book)Create an imaginary living thing (animal, plant or microbe) that has characteristics from more than one classification group and give its classification		
Animals including humans <ul style="list-style-type: none">Describe the digestive system and how diet and lifestyle impact our body (Recap Year 4)Identify and name the main parts of the circulatory systemDescribe the functions of the bloodDescribe the functions of the blood vesselsDescribe the functions of the heartExplain how diet, exercise, drugs and lifestyle affect the way our bodies functionDescribe how nutrients and water are moved in humansExplain how they can keep their heart healthy and why it is important to do so (Cardiovascular disease is the world's number one killer)Explain why blood donation is important	<ul style="list-style-type: none">identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and bloodrecognise the impact of diet, exercise, drugs and lifestyle on the way their bodies functiondescribe the ways in which nutrients and water are transported within animals, including humans	Background Information 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 our 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
Scientific enquiries for animals including humans <ul style="list-style-type: none">The further I run, the higher my heart rate? True or false? (pattern seeking)How can I keep my heart healthy? (research)		
Key experiences <ul style="list-style-type: none">Create a role play model for the circulatory systemCreate a tapestry of the inside of the bodyHeart Dissection		

<p>Evolution and inheritance</p> <ul style="list-style-type: none">• Explain how fossils are formed and how they provide scientists with a snapshot of the past• Give examples of living things that lived millions of years ago and the fossil evidence we have to support this• Give examples of fossil evidence that can be used to support the theory of evolution• Give examples of how plants and animals have adapted suit an environment E.g. Darwin's finches• Explain how an animal or plant has evolved over time E.g. penguin or peppered moth• Explain the process of evolution• Talk about the influence of Charles Darwin, Alfred Wallace and Mary Anning• Say that all living things have offspring of the same kind but the offspring are not identical to their parents and vary from each other• Talk about inherited and non-inherited characteristics of a family E.g. Beckhams, The Royal family	<ul style="list-style-type: none">• recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago• recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents• identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution	<p>Background Information</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>Key vocabulary</p> <p>Offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils</p>
<p>Scientific enquiries for evolution & inheritance</p> <ul style="list-style-type: none">• The longer the beak, the easier it is for a bird to pick up its food? True or false? Prove it (pattern seeking)		
<p>Key experiences</p> <ul style="list-style-type: none">• Darwin's Finches Tray experiment - different size/shape tongs/tweezers to replicate beaks. Tray full of different size/shape seeds, acorns, grass etc		
<p>Light</p> <ul style="list-style-type: none">• Identify light sources (recap Y3)• Use a diagram/model to explain how we see things which are a light source• Use a diagram/model to explain how we see things that reflect light• Explain how to make a variety of shadows (recap Y3)• Use a diagram/model to explain how shadows are formed• Describe how light (natural & man-made) can affect our mood/health	<ul style="list-style-type: none">• recognise that light appears to travel in straight lines• use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye• explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes• use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them	<p>Background Information</p> <p>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.</p> <p>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.</p> <p>Key vocabulary:</p> <p>As for year 3 plus straight lines, light rays.</p>
<p>Scientific enquiries for light</p> <ul style="list-style-type: none">• Light travels in straight lines. True or false? Prove it (pattern seeking)• How many different colours can white light be split in to? (research)		
<p>Key experiences</p> <ul style="list-style-type: none">• Create a shadow puppet show using own bodies (YouTube - 'Attraction' Theatre Group (Britain's Got Talent - dependent on Yr 3)• Observe their shadows at different times of the day		

Electricity

- Make an electric circuit, including a switch (recap Y4)
- Change the components in a circuit and explain what effect it has
- Explain which materials are conductors and insulators (recap Y5)
- Draw circuit diagrams using the correct symbols
- Explain how to keep safe around electricity
- Explore the use of electricity to power cars

- associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
- compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches
- use recognised symbols when representing a simple circuit in a diagram

Background Information

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

Scientific enquiries for electricity

- What effects the brightness of a bulb? (comparative and fair testing)

Key experiences

- Create various types of circuits
- Make a buzzer wire game

- Observe, describe and compare in careful detail
- Sort and classify, with precise reasons
- Make predictions and explain why
- Plan how to collect evidence/information/data to test out an idea/prediction or answer a question
- Measure precisely, in standard units
- Select the most suitable equipment for the task
- Plan ways to test out their own/someone else's ideas
- Set up and carry out fair tests
- Repeat observations and measurements
- Draw tables, bar charts and simple line graphs to record observations/data
- Interpret and predict from bar charts and line graphs
- Explain observations/results using cause and effects and scientific facts and ideas
- Explain what the evidence show and whether it supports any predictions
- Identify trends and patterns in data and explain using scientific facts and ideas
- Begin to identify scientific evidence that has been used to support or refute ideas or arguments
- Select the most appropriate way to communicate findings, evaluating the evidence as well as describing it
- Talk about how to improve their own work giving reasons

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