Science

At Hollins Grundy, our science curriculum is based on each year groups' curriculum intention grid. The grid for Reception is based on The Early Years Curriculum and Development Matters document. For Years 1 to 6 these grids cover the National Curriculum requirements for science for each year group. Each grid is split into topics which cover the programmes of study specified in the national curriculum for each year group. The grid also contains the scientific enquiry objectives for each year group. Wherever possible, topics have been planned so they build on the learning from previous year groups and that there is progression.

Each unit is based on a question or learning challenge to stimulate the children's interest. This is broken down into a series of questions which the children work on over one or more lessons. In the majority of units this includes questions which relate directly to scientific enquiry. These may involve observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources, collecting, analysing and presenting data. The last question allows children to demonstrate their learning through an end of unit application activity. This provides the children with a purpose to their learning as well as providing assessment opportunities.

Science
Long term plans

Science

Reception

Reception currently follow the 2021 Early Years Curriculum and Development Matters document. The areas of learning that relate to science are PSED (ELG Understanding Self) and Understanding the World (ELG The Natural World) and Expressive Arts and Design (ELG Creating with Materials). These are taught through topics such as planting and growing, animals, seasons, space, healthy choices, life cycles. Topics are planned in consultation with the children and are in line with their interests so they can vary but they always focus on the Early Learning Goals.

Science in Reception is based on statements from our curriculum intent grid which links directly with the Early Years Curriculum and Development Matters.

Curriculum Intent Grid- Reception Science

Reception	
3 and 4 Year Olds	Understanding the World- The Natural World Use all their senses in hands-on exploration of natural materials. Explore collections of materials with similar and/or different properties. Talk about what they see, using a wide vocabulary Explore how things work Plant seeds and care for growing plants. Understand the key features of the life cycle of a plant and an animal. Begin to understand the need to respect and care for the natural environment and all living things. Explore and talk about different forces they can feel Talk about the differences between materials and changes they notice. PSED-Managing Self Make healthy choices about food, drink, activity and toothbrushing. Expressive Arts and Design Explore different materials freely, to develop their ideas about how to use them and what to make. Join different materials and explore different textures.
Children in Reception	Understanding the World- The Natural World Explore the natural world around them. Describe what they see, hear and feel whilst outside. Recognise some environments that are different from the one in which they live. Understand the effect of changing seasons on the natural world around them. PSED-Managing Self Know and talk about the different factors that support their overall health and wellbeing: -Regular physical activity - healthy eating -tooth brushing -sensible amounts of 'screen time' -having a good sleep routine -being a safe pedestrian
Early Learning Goal	Understanding the World- The Natural World -Explore the natural world around them, making observations and drawing pictures of animals and plants; - Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class; - Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. PSED-Managing Self -Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices. Expressive arts and design - Creating with Materials -Safely use and explore a variety of materials

Science

Long Term plans Year 1-6

HOLLINS GRUNDY PRIMARY SCHOOL

Happiness, Health and Respect for Confident, Creative Learners

Hollins Grundy Science Long Term Plan

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 1
Year 1	How could you become an animal expert? **NC Animals Including Humans**	Which materials should the little pigs have used to build their house? **NC Every Day Materials**	How could you become a weather reporter? **NC Seasonal Changes**	How could you become a weather reporter? **NC Seasonal Changes**	What plants grow in our nature reserve? **NC Plants**	What plants grow in our nature reserve? **NC Plants**
Year 2	Could you be the next sporting superstar? **NC Animals Including Humans.**	What happens as animals grow? **NC Animals Including Humans**	What materials are in our school? **NC Materials.**	How can we grow our own plants? **NC Plants**	How can we grow our own plants? **NC Plants**	Why can't a wood louse live at the sea shore? **NC Living Things and their Habitats.**
Year 3	How can Usain Bolt move so quickly? **NC Animals Including Humans.**	What can you find out about pushes, pulls and magnets? **NC Forces and Magnets**	What do rocks tell us about how the earth was formed? **NC Rocks**	How did that blossom become an apple? **NC Plants**	How did that blossom become an apple? **NC Plants**	What can you find out about shadows? **NC Light**
Year 4	What happens to the food we eat? **NC Animals Including Humans**.	What is sound and how do we make different sounds? **NC Sounds**	How could we cope without electricity for one day? **NC Electricity**	What are solids, liquids and gases? **NC States of Matter**	Which wild animals and plants thrive in your locality? **NC Living Things and their Habitats.**	Which wild animals and plants thrive in your locality? **NC Living Things and their Habitats.**
Year 5	How different will you be when you are as old as your grandparents? **NC Animals Including Humans**	How different will you be when you are as old as your grandparents? **NC Animals Including Humans** Could you be the next CSI investigator? **NC Properties and Changes of Matter**	Could you be the next CSI investigator? **NC Properties and Changes of Matter**	Will we ever send another human to the moon? **NC Earth and Space**	Can you feel the force? **NC Forces**	Do all animals and plants start of life as an egg? **NC Living Things and their Habitats**
Year 6	Could a spiderman really exist? **NC Living Things and their Habitats**	What would a journey through your body look like? **NC Animals Including Humans.**	Have we always looked like this? **NC Evolution and Inheritance**	Have we always looked like this? **NC Evolution and Inheritance**	Why is an electrical power source so important? **NC Electricity**	Why is light so important? **NC Light**

HOLLINS GRUNDY PRIMARY SCHOOL

Happiness, Health and Respect for Confident, Creative Learners

Hollins Grundy Science Long Term Plan Scientists and inventors.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 1	Other subjects
Year 1	How could you become an animal expert? Dr Mya-Rose Craig (ornithologist)	Which materials should the little pigs have used to build their house?	How could you become a weather reporter? June Bacon Bercey and Aisling Creevy (Meteorologists)	How could you become a weather reporter? June Bacon Bercey and Aisling Creevy (Meteorologists)	What plants grow in our nature reserve?	What plants grow in our nature reserve?	
Year 2	Could you be the next sporting superstar?	What happens as animals grow?	What materials are in our school? John Boyd Dunlop (inventor) or Charles MacIntosh (chemist and inventor)	How can we grow our own plants? Jeanne Baret (botanist)	How can we grow our own plants? Jeanne Baret (botanist)	Why can't a wood louse live at the sea shore?	Katherine Johnson (mathematician orbital mechanics) Mae Jemison and Neil Armstrong (astronauts) Explorers topic history
Year 3	How can Usain Bolt move so quickly?	What can you find out about pushes, pulls and magnets?	What do rocks tell us about how the earth was formed? Kulsala Rajerdan (seismologist / earth scientist)	How did that blossom become an apple? Edmond Albius (horticulturalist	How did that blossom become an apple? Edmond Albius (horticulturalist)	What can you find out about shadows? Ibn al-Shāṭir (astronomer inventor) Hippolyte Marie-Davey	
Year 4	What happens to the food we eat? William Beaumont (surgeon)	What is sound and how do we make different sounds?	How could we cope without electricity for one day? Lewis Latimer (inventor)	What are solids, liquids and gases?	Which wild animals and plants thrive in your locality? Charles Henry Turner (zoologist	Which wild animals and plants thrive in your locality? Charles Henry Turner (zoologist)	

HOLLINS GRUNDY PRIMARY SCHOOL

Happiness, Health and Respect for Confident, Creative Learners

Hollins Grundy Science Long Term Plan Scientists and inventors

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2	Other subjects
Year 5	How different will you be when you are as old as your grandparents?	How different will you be when you are as old as your grandparents? Could you be the next CSI investigator? Ruth Benerito or Spencer Silver (chemists)	Could you be the next CSI investigator? Ruth Benerito or Spencer Silver (chemists)	Will we ever send another human to the moon? Ptolemy or Copernicus Alhazen/Ibn Al Haytham (astronomers) and physicist) Ibn al Shatir (astronomer)	Can you feel the force? Galileo Galilei (physicist, engineer astronomer) and Isaac Newton (physicist and astronomer)	Do all animals and plants start of life as an egg? David Attenborough (naturalist) and Jane Goodall (ethologist)	Golden Age of Islam topic in history Range of Islamic scientist and inventors. Alhazen/Ibn Al Haytham (inventor and physicist, optics) Al Jazari (inventor and engineer) Abbas Ibn Firnas (inventor) Abdul Qassin Al Zahrwi (surgeon) Mariam Al Astrolabes (astronomer Ibn al Shatir (astronomer)
Year 6	Could a spiderman really exist? (Libby Hyman Zoologist)	What would a journey through your body look like? William Harvey (physician) Daniel Hale Williams (surgeon)	Have we always looked like this? Charles Darwin (naturalist, geologist and biologist)	Have we always looked like this? Charles Darwin (naturalist, geologist and biologist)	Why is an electrical power source so important?	Why is light so important?	

Science
Learning Challenges

Year 1

Year 1: How could you become an animal expert?

KS1 Science (Y1 Animals, including Humans)

- 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);
- Identify, name, draw and label the basic parts of the human body and say which part of the human body is associated with each sense.

WOW suggestion: *Read 'The Tiger who came to tea' and 'Zoo' or go to a zoo (if possible)*

LC1	What are the common animal groups and can you group animals into these groups?
LC2	Can you describe and compare the bodies of different animals and group them by common features?
LC3	Can you group animals by what they eat? (carnivore, herbivore, omnivore)
LC4	Why is Dr Mya Rose Craig know as "Bird Girl." and what are her important achievements?
LC5	What birds live in our schools grounds/nature reserve?(name, describe from pictures, identify in the local area)
LC6	What different body parts does a human have? ((head, neck, arms, elbows, legs, knees, face, ears eyes, hair, mouth and teeth) Learn rhymes and songs and label body diagrams.
LC7	What are our senses and what body parts are they linked to?
LC8	Can you use your senses to compare different sounds, textures and smells?
LC9	What mini-beasts live in our school habitat? Can you look closely at them and/or other minibeasts and describe them?
LC10	Reflection: Can you create your own class non fiction book about animals i.e 'Our Visit to the Zoo'?

Curriculum Intent Statements

NC Animals including humans
• **Identify and name a variety of common animals that are carnivores, herbivores and omnivores.**
• **Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. (This may include animals kept as pets).**
• **Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets.)**
• **Identify, name, draw and label the basic parts of the human body (head, neck, arms, elbows, legs, knees, face, ears eyes, hair, mouth and teeth) and say which part of the human body is associated with each sense.**
• **Compare and contrast animals first hand using lenses or through pictures and videos.**
• **Identify and group animals i.e by what they eat, common physical features, animal family/classification)**

Cross Curricular Links	
English	Read and write non-fiction text on animals
Maths	Measuring

Suggested Resources

Mini beasts, magnifying glasses, tanks, creature peepers, critter carriers, preserved mini beasts, Bird Girl book and web links. Tiger who came to Tea or Zoo book.

Possible Trips

Hollins Nature Reserve

Zoo

Year 1: Which materials should the Three Little Pigs have used to build their house?

KS1 Science (Y1: Everyday Materials)

- Distinguish between an object and the materials from which it is made;
- Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock;
- Describe the simple physical properties of a variety of everyday materials;
- Compare and group together a variety of everyday materials on the basis of their simple physical properties.

WOW suggestion: *Start with a discussion about the materials used by the Three Little Pigs to build each house .*

LC1	Can you identify objects which are made from different materials and group them including wood, plastic, glass, metal, water and rock?
LC2	Can you describe properties of different every day materials?
LC3	Can you compare and group every day materials by their properties?
LC4	Can you explore and test materials to answer and explain some of the following and your own questions? • Which material should the pigs have used to build their house? • Which material is best for an umbrella? • Which material is best for a book shelf? • Which material is best for a gymnast's leotard? • Which material is best for lining a dog basket? • Which material is best for curtains? • Which material is best for a window?
LC5 Reflection	Which bridge will be best to hold a kg weight? (Children build bridges with different materials i.e straws, paper, building bricks, fabric. Children could suggest and pick materials. They can then predict and test which will hold a kg weight and note their findings and explain why)

Curriculum Intent Statements

NC Everyday Materials.
• **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 simple properties of a variety of everyday materials (hard/soft, stretchy/stiff, shiny/dull, rough/smooth, bendy/not bendy, waterproof/not waterproof, absorbent, not absorbent, opaque/transparent.**
• **Compare and group together a wide variety of everyday materials on the basis of their simple physical properties, wooden objects, plastic objects, glass objects, metal object including foil, rock, brick, fabrics, elastic, paper.**
• **Explain what material are best for different given purposes through testing and then developing explanations.**

Cross Curricular Links	
DT	Design and build a house of the 3 little pigs
English	Traditional tales
Maths	Classifying

Suggested Resources

Plastic, wood, metal, glass, rocks, water, fabrics, transparent and opaque materials, bricks, straw, paper kg weights

Year 1:How could you become a weather reporter?

KS1 Science (Y1 Seasonal Changes)

- Observe changes across the four seasons;
- Observe and describe weather associated with the seasons and how day length varies.
- Observe and make tables and charts about weather.

WOW suggestion: *Someone comes into the classroom dressed as Mr/s Autumn (leaf suit). Children to prepare questions to ask him or her.*

LC1	What types of weather are there in our country? Can you make a weather chart? (make a chart over a few weeks or a longer period)
LC2	What changes do we see in our country with each season? (weather, leaves, day length)
LC3	How do trees change over the seasons?
LC3	Why are the days longer in the summer?
LC4	Why are so many of the things you enjoy doing dependent on the time of year and the weather?
LC5	What is a meteorologist? How did/do June Bacon Bercey and Aisling Creevy help us to know what the weather will be like?
LC6	Reflection: In small groups, can you create a typical weather forecast summary which will be filmed?

Curriculum intent statements

NC Seasonal Changes
• **Observe and make tables and charts about weather.** • **Observe and describe the changes across the four seasons.** • **Know the 4 seasons in order.** • **Observe and describe weather associated with the seasons.** • **Understand how and why day length varies over the year.**

Cross Curricular Links	
Maths	Ordering and measuring temperature and rainfall

Suggested Resources

June Bacon Bercey and Aisling Creevy weblinks

Year 1: Which plants grow in our nature reserve?

KS1 Science (Y1 Plants)

- Identify and name a variety of common, wild and green plants, including deciduous and evergreen trees;
- Identify and describe the basic structure of a variety of common flowering plants, including trees.
- Keep an observation log to explain how a plant grows.

WOW suggestion: *Children visit the nature reserve or a garden centre.*

LC1	Can you plant some plants and keep an observation log of its growth? (Encourage use of vocabulary for parts of plants in logs look at vegetables, plants, flowering plants)
LC2	What different plants and trees grow in our nature reserve? How could we group them? (children decide different ways to group them from pictures including deciduous and evergreen, trees, plants, flowering plants etc)
LC3	Can you identify and keep a tally of the different plants and trees we see during our nature walk?
LC4	Can you describe and compare common plants or parts of plants from our nature walk using magnifying glasses to help you? (i.e leaves, flowers, roots, whole plants)
LC5	Can you label the parts of plants and trees? (leaves, flowers/blossom, petals, fruit, roots, bulb, seed, trunk, branches, stem).
LC7	Reflection: Can you make a labelled picture to show the different plants and trees in the nature reserve? OR video themselves in the nature reserve performing a documentary about the plants.

Curriculum Intent Statements

NC Plants
• **Identify and name a variety of common wild and garden plants including deciduous and evergreen trees.** • **Identify and describe the basic structure of flowering plants, including trees.** • **Identify and name a variety of plants in their habitats.** • **Keep an observation log to explain how a plant grows.**

Cross Curricular Links	
Maths	Collecting data (tally)
English	Recount non-fiction reading and writing
Art	Sculpture plants

Suggested Resources

Seeds, variety of plants to grow e.g plants with and without flowers, cress.
Leaves, flowers, roots, plants from nature reserve.

Suggested Trip

Hollins Nature Reserve

Ongoing Curriculum Intent Statements

NC Working Scientifically
• Ask simple scientific questions and recognise they can be answered in different ways (All units)
• Observe closely using simple equipment (Plants and Animals)
• Perform simple tests (Materials)
• Identify and classify (Plants, Animals, Materials)
• Use observations and ideas to suggest answers to questions (All units)
• Gather and record data to help answer questions (Plants, Animals, Seasonal Changes)
• Compare objects (Materials)
• Compare living things (Animals, Plants)
• Sort and group objects (Materials)
• Sort and group living things (Animals, Plants)
• Observe changes over time (Seasonal Changes, Plants)
• Notice patterns and relationships (Seasonal Changes)
• Use secondary resources (Plants, Animals, Seasonal Changes)
• Ask people questions (Animals, Seasonal Changes)
• Use simple measurements and equipment (hand lenses, egg timers) (Plants, Animals)
• Use simple scientific language (All Units)
• Record and communicate findings in a range of ways.(All Units)

Suggested resources for scientist and inventors Year 1

Topic	How could you become an animal expert?	How could you become a weather reporter?	
Scientist/ Inventor	Dr Mya Rose Craig- Ornithologist	June Bacon Bercey Aisling Creevy -Meteorologists	
Suggested resources	Websites https://www.birdgirluk.com/ https://www.youtube.com/watch?v=Eki3J1a8oek Books We have a Dream Dr Maya Rose Craig	Websites https://www.youtube.com/watch?v=sGw9o58_KfU https://www.blackpast.org/african-american-history/people-african-american-history/june-bacon-bercey-1928-2019/ https://www.marathi.tv/anchor/aisling-creevey/ The above wouldn't be suitable for the children but you could use the info to make presentation https://www.youtube.com/watch?v=UWZifwEzJ4Q https://www.youtube.com/watch?v=_YKnQDcowfQ	

Science
Learning Challenges

Year 2

Year 2: How could you be the next sporting super star? (Put in any relevant name.)

Curriculum Intent statements.

KS1 Science (Y2 Animals, including humans)

- Find 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 amount of different types of food, and hygiene.

WOW suggestion: *Show extracts of chosen sporting star in action.*

LC1	What do humans need to survive?
LC2	What do we need to do to keep healthy like …… and why? (food, drink, exercise and hygiene)
LC3	What fruits and vegetables do your classmates eat every day? How could you find this out?
LC4	Can you create a healthy menu, exercise plan and hygiene routine?
LC5	Reflection: Can you make up a TV advert to convince children to lead a healthy life style and how to do this?

NC Animals Including Humans
• **Find out about and describe the basic needs of animals, including humans, for survival (water, food, air)** • **Describe the importance for humans of exercise, eating the right amounts of different types of food and hygiene.** • **Plan a healthy menu, exercise plan and hygiene routine.** • **Create a survey to collect data about fruit and vegetables.**

Cross Curricular Links	
DT	Making a Healthy wrap.

Year 2: What happens as animals grow?

KS1 Science (Y2 Animals, including humans)

- Notice that animals, including humans, have offspring, which grow into adults;

WOW suggestion: Real *chicks or ducks or caterpillars to observe and measure or videos.*

LC1	Can you make a life cycle of a human?
LC2	Can you make life cycles of different animals and describe the changes? (chickens, butterflies, frogs, sheep)
LC3	Can you observe an animal growing over a period of time and record you observations (If possible make measurements of length, height, mass or use pictures and videos to compare..
LC4	Reflection: Make a text about a life cycle or a nature documentary about a life cycle.

Curriculum Intent Statements

NC Animals including humans
• **Understand that animals including humans, have offspring which grow into adults.** • **Create and explain life cycles (egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog, lamb sheep; baby, toddler, child, teenager, adult)** • **Observe through video or real life how animals grow and make observations / measurements.**

Cross Curricular Links	
English	Lit Lang Unit Frog Life Cycle. Write Explanation text about life cycle of a frog.

Suggested Resources

Videos of frog, chicken or sheep life cycle.

Year 2: What materials are in our school?

KS1 Science (Y2 Uses of Everyday Materials)

- Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, rock, brick, 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.

WOW suggestion: *Collect together a range of objects and use them to talk about what they are made of.*

LC1	Can you find and group items made of the same material and suggest why they are made of the material?
LC2	What material can a spoon be made out of and why? What would not be a suitable material for a spoon? (Explore other objects which can be made from different materials and suggest unsuitable materials for the objects children could make own questions)
LC3	What are the advantages and disadvantages of different materials?
LC4	Which solid objects can change shape if you squash, bend, stretch or twist them?
LC5	Why was John Dunlop/Charles Macintosh/John McAdam important?
LC6	Can you compare how different materials are used in school and in the grounds/local area and record your observations? (children could choose)
LC7	Reflection: Each group will take a different material and give a presentation about their chosen material.

Curriculum Intent Statements

NC Materials
• **Identify and compare the suitability of a variety of every day materials including wood, metal, plastic glass, brick rock, paper and cardboard for particular purposes.** • **Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.** • **Understand how the some materials can have different uses.** • **Understand that in some cases the same object can be made from different materials.** • **I can find out about people who have developed useful materials i.e John Dunlop or Charles Macintosh or John McAdam** • **Compare how materials used in school may have different uses in the grounds/local area.**

Suggested Resources

Materials made from wood, plastic, metal, paper, spoons made from different materials, objects which bend, stretch, squash, twist and those that don't. Twinkl resources Dunlop. Macintosh and McAdam.

Cross Curricular Links	
Art	Design a house tile

Year 2: How can we grow our own plants?

KS1 Science (Y2 Plants)

- Observe and describe how seeds and bulbs grow into mature plants;
- Find out and describe how plants need water, light and suitable temperature to grow and stay healthy.

WOW suggestion: Visit to garden centre to look at different types of plants, seeds and bulbs or buy seeds and bulbs to grow.

LC1	What do plants grow from?(seeds bulbs) Where do plants keep their seeds? If possible look at different types of seeds and bulbs and predict and discuss the plants they grow into and where you find the seeds in the plant.
LC2	Can you keep an observational diary describing and comparing the growth of different and similar plants from seeds and bulbs?
LC3	What do plants need to grow and be healthy?
LC4	Can you set up a fair investigation to compare what happens if plants have different levels of light and amounts of water? (children to be included in creating question to investigate)
LC5	What is a botanist and why was Jeanne Baret important?
LC6	Reflection: Children could grow and look after their own vegetables, herbs or salad veg and use to make a meal or salad OR plan, design, plant and look after a flower bed or hanging basket.

Curriculum Intent Statements

NC Plants
• **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.** • **Make observations and recordings to show how plants grow from seeds and bulbs and what similar plants look like at different stages of growth.** • **Compare plants which have had different levels of light and amounts of water.**

Cross Curricular Links	
English	Reading instructional texts Writing text how to take care of a plant/grow a plant. Labelling diagrams
Maths	Measuring, constructing tables
Art	Seed and fruit landscapes, sculpture, collage and mixed media painting

Suggested Resources

Seeds, bulbs, bean seeds, salad veg seeds and herbs or flowering plants, planters or baskets, Exploradoras book on Baret and weblinks.

Year 2: Why can't a woodlouse live on the seashore?

KS1 Science (Y2 Living Things and their Habitats)

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

WOW suggestion: Watch videos of different animals in habitats

LC1	Can you sort and compare images into living, dead and never alive?
LC2	Can you predict which animals and plants we might find in given local micro habitats and explain why? (under logs, stones, leaf litter, areas in the nature reserve)
LC3	Can you identify and record using charts/ images animals and plants in different local habitats and micro habits?
LC4	Why do animals and plants live in the habitats we explored?
LC5	Can you make a simple food chain using animals from the habitats we explored?
LC6	What animals live on the sea shore/ ocean/ rainforest and why?
LC7	Reflection: Children pick 2 animals from very different habitats and explain why they live where they do and why they couldn't swap habitats.

Curriculum Intent Statements

NC Living Things and their habitats.
• **Explore and compare the differences between things that are living, dead and things that have never been alive.**
• **Identify that most living things live in habitats to which they are suited.**
• **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 name different sources of food.**
• **Compare animals in familiar habitats and unfamiliar habitats and why they live there (local habitat and micro habitats e.g stones, logs, leaf litter woodland and unfamiliar habitats eg seashore, ocean, rainforest.)**

Cross Curricular Links	
Maths	Interpreting and constructing charts and block graphs

Suggested Trips

Hollins Nature Reserve

Ongoing Curriculum Intent Statements

NC Working Scientifically
• Ask simple scientific questions and recognise they can be answered in different ways (All units)
• Observe closely using simple equipment (All units)
• Perform simple tests (Materials, plants)
• Identify and classify (All units)
• Use observations and ideas to suggest answers to questions (All units)
• Gather and record data to help answer questions (All units)
• Compare objects and materials (Materials)
• Compare living things (Animals, Plants, Habitats)
• Sort and group objects (Materials, Habitats)
• Sort and group living things (Animals, Plants, Habitats)
• Observe changes over time (Animals)
• Notice patterns and relationships (Animals, habitats, materials)
• Use secondary resources (All units)
• Use simple measurements and equipment (hand lenses, egg timers) (animals, habitats)
• Use simple scientific language (All Units)
• Record and communicate findings in a range of ways.(All Units)

Suggested resources for scientist and inventors Year 2

topic	What materials are in our school?	- How can we grow our own plants?	History topic Explorers
Scientist/ Inventor	John Boyd Dunlop (inventor) or Charles MacIntosh (chemist and inventor)	Jeanne Baret (botanist)	Katherine Johnson (mathematician orbital mechanics) Mae Jemison and Neil Armstrong (astronauts)
Suggested resources	Websites Twinkl	Books Exploradoras book Websites https://exploration.marinersmuseum.org/subject/jeanne-baret/ Site for info only could use info to make powerpoint for children	Websites Twinkl Books Counting on Katherine Mae Jemison Reaching for your Dreams

Science
Lower Key Stage 2

Lower Key Stage 2

Science
Learning Challenges

Year 3

Year 3: How can Usain Bolt move so quickly?

KS2 Science (Y3 Animals, including humans)

- identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat
- identify that humans and some other animals have skeletons and muscles for support, protection and movement.

WOW suggestion: *Check to see how far each child can run in the 9.68 secs which is the world record for 100m. Compare with Usain Bolt. Make graphs of their groups results*

LC1	What are the main bones in the body and what are their functions?
LC2	Why do we have muscles? Where are our muscles and how do they work? (for example what role do the muscles have in helping the arms and legs to move for running?)
LC3	Can you Identify and group animals with and without skeletons? How do they move differently?
LC4	What food and drink do we need to keep our body healthy?
LC5	Can you plan a healthy menu fit for Usain Bolt considering food groups?
LC6	Can you compare, contrast and group animals by their diet? (This could include children's pets)
LC7	Reflection: Can they explain how Usain Bolt moves so quickly with reference to bones, muscles, good nutrition and diet.

Curriculum Intent Statements

NC Animals Including Humans.
• **Identify animals, including humans, need the right types of nutrition, and 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.** • **Record findings using simple scientific language drawings, labelled diagrams and bar charts.** • **Identify the main body parts associated with the skeleton and muscles.** • **Identify and group animals with and without skeletons and observe and comparing their movement** • **Compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat.** • **Research different food groups and how they keep us healthy and design meals based on what they find out.**

Cross Curricular Links	
DT	Eating Seasonally
Maths	Measuring time

Year 3: What can you find out about pushes, pulls and magnets?

KS2 Science (Y3 Forces and Magnets)

- 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.

WOW suggestion: *Explore with a number of magnets and work out which side attracts and which side repels*

LC1	What is a force? Can you group activities by push or pull?
LC2	What is friction? What surface do you think will make a car travel faster? (children be involved in deciding question to investigate)
LC3	Can you investigate and record which materials are attracted and repelled by magnets? (children be involved in deciding question to investigate)
LC4	Can you predict and investigate whether two magnets will attract or repel each other, depending on which poles are facing?
LC5	Can you create a fair test to test magnets of different strengths and record your predictions and findings? (children be involved in deciding question to investigate)
LC6	Reflection: Suggest some creative uses for different magnets and present your suggestions.

Curriculum Intent Statements

NC Forces and Magnets
• Can you compare how things move on different surfaces?
• Understand 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
• Understand magnets as having two poles
• Predict whether two magnets will attract or repel each other, depending on which poles are facing.
• Observe that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary (for example, opening a door, pushing a swing).
• Explore the behaviour and everyday uses of different magnets (for example, bar, ring, button and horseshoe).
• Investigate out how far things move on different surfaces, predict, gather and record data to find answers their questions;
• Explore the strengths of different magnets and finding a fair way to compare them;
• Sort materials into those that are magnetic and those that are not;
• Look for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another;
• Identify how these properties make magnets useful in everyday items and suggesting creative uses for different magnets

Suggested Resources

Ramps with different surfaces, cars, magnets, magnetic and non-magnetic materials.

Year 3: What do rocks tell us about the way the Earth was formed? (Linked to 'What makes the Earth Angry?')

KS2 Science (Y3 Rocks)

- compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
- describe in simple terms how fossils are formed when things that have lived are trapped within rock
- recognise that soils are made from rocks and organic matter.

WOW suggestion: *Bring in a collection of rocks and let the children touch and talk about them.*

LC1	Can you group rocks based on their appearance and physical properties? (For example use hand lenses to group considering crystals, grains, fossils)
LC2	What can you find out about sedimentary and igneous rocks?
LC3	Can you describe in simple terms how fossils are formed when things that have lived are trapped within rock?
LC4	Can you explain how rocks change over time?
LC4	What is soil and how is it formed?
LC5	What types of soil are there and how are they similar and different?
LC6	Why was Kulsala Rajerdan so important? (Could go in Earth's angry topic)
LC7	Can you investigate what happens when different rock are rubbed together? OR What happens when you put different rocks in water?

Curriculum Intent Statements.

NC Rocks.
• Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
• Describe in simple terms how fossils are formed when things that have lived are trapped within rock
• Recognise that soils are made from rocks and organic matter.
• Explore different kinds of rocks and soils, including those in the local environment.
• Observe rocks, including those used in buildings and gravestones, and exploring how and why they might have changed over time
• Use a hand lens or microscope to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them.
• Research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed.
• Explore different soils and identify similarities and differences between them and investigate what happens when rocks are rubbed together or what changes occur when they are in water.
• Answer questions about the way soils are formed.

Cross Curricular Links	
English	Stig of the Dump and Stone Age Boy
Art	Pre-historic Art

Suggested Resources

Rocks, magnifying glasses, soil, water, Twinkl resources for Rajerdan.

Year 3: How did that blossom become an apple?

KS2 Science (Y3 Plants) – (May or June)

- 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.

WOW suggestion: *Look different plants, flowers, fruits group by part of plant.*

LC1	Can you make a labelled diagram of the parts of a flowering plant and their function? (roots, stem/trunk, leaves and flowers)
LC2	Why are flowers so important for plants?(look at pollination, seed formation, reproduction and seed dispersal.)
LC3	What is manual pollination and why was Edmond Albius important for production of vanilla?
LC3	Why are the root and stem important? Can you investigate how water and nutrients travels up the roots and stem of a plant and record your findings? (for example, by putting cut, white carnations into coloured water and observing and recording how water travels up the stem to the flowers)
LC4	Can you investigate the structure of different fruits to identify and compare the seeds? Find out how the seeds from each plant will be dispersed.
LC5	What do plants need to grow? How may this vary for different plants? ((air, light, water, nutrients from soil, and room to grow)
LC6	Reflection: Can you make a life cycle of an apple from growing from a seed to seed dispersal?

Curriculum Intent Statements

NC Plants.
• Identify and describe the functions of different parts of flowering plants (roots, stem/trunk, leaves and flowers). • Explore the requirement 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 and nutrients are transported within plants. • Explore the part that flowers play in the life cycle of flowering plants, including pollination, reproduction, seed formation and seed dispersal. • Identify the structure and function of the parts of a plant • Know the role of the leaves roots and stem in nutrition and support. (They don't need to know the details of photosynthesis) • Pupils to work scientifically by: looking for patterns in the structure of fruits that relate to how the seeds are dispersed. • Observe how water is transported in plants, for example, by putting cut, white carnations into coloured water and observing how water travels up the stem to the flowers.

Suggested Resources

Fruits with different seeds, apples, flowering plants with roots, carnations, dye, weblinks for Albius

Year 3: What can you find out about shadows?

KS2 Science (Y3 Light)

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

WOW suggestion: *Use torches to create different shapes and attempt to photograph them. Encourage children to ask questions about what they notice.*

LC1	Why do we need light? What is darkness?
LC2	What happens when light is reflected off a mirror and other shiny surfaces?
LC3	How are shadows formed?
LC4	Why should we not look directly at the sun?
LC5	Can you investigate what happens to shadows when the light source moves or the distance between the light source and the object changes? (children can be involved in developing question to investigate)
LC6	OR Can you investigate how your shadow changes length and direction throughout the day?
LC7	What did Ibn al-Shāṭir build? Why was it useful? What did Hippolyte Marie-Davey invent why was it useful?
LC8	Reflection- Can you make a sundial and explain how it works? OR Can you make a periscope and explain how it works?

Curriculum Intent Statements

NC Light.
• Recognise that they need light in order to see things and that dark is the absence of light. • Notice that light is reflected from surfaces. • Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. • Recognise that shadows are formed when the light from a light source is blocked by a solid object. • Find patterns in the way the size of shadows change. • Explore what happens when light reflects off a mirror or other reflective surfaces, including playing mirror games to help them to answer questions about how light behaves. • Understand why it is important to protect their eyes from bright lights. • Measure, shadows, and find out how they are formed and what might cause the shadows to change. • Work scientifically by: looking for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes

Cross Curricular Links	
Maths	Measurement length

Suggested Resources

Torches, batteries, mirrors, shiny materials, websites for Ibn al-Shāṭir and Hippolyte Marie-Davey, materials to make sundial or periscope

Ongoing Curriculum Intent Statements

NC Working Scientifically
• Ask relevant questions and using different types of scientific enquiries to answer them (All units)
• Set up simple practical enquiries, comparative and fair tests (All units)
• Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment (All units)
• Gather, record classify and present data in a variety of ways to help in answering questions (All Units)
• Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables(All units)
• Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions (All Units)
• Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions (All Units)
• Identifying differences, similarities or changes related to simple scientific ideas and processes (All Units)
• Using straightforward scientific evidence to answer questions or to support their findings. (All units)

Suggested resources for scientist and inventors Year 3

topic	What do rocks tell us about how the earth was formed?	How did that blossom become an apple?	What can you find out about shadows?
Scientist/ Inventor	Kulsala Rajerdan (seismologist / earth scientist)	Edmond Albius (horticulturalist)	Ibn al-Shāṭir (astronomer inventor- sundial) Hippolyte Marie-Davey (inventor periscope)
Suggested resources	Websites Twinkl	Websites https://www.nationalgeographic.com/science/article/the-little-boy-who-shouldve-vanished-but-didn't For info only some parts not suitable for children. https://www.blackpast.org/african-american-history/edmond-albius-1829-1880/	Websites https://www.howold.co/person/hippolyte-marie-davy/biography https://beforenewton.blog/daily-readings/science-in-the-islamic-world/ibn-al-shatir/

Science
Learning Challenges

Year 4 Science

Year 4: What happens to the food we eat?

- **Science Y4: Animals, including Humans**
- describe the simple functions of the basic parts of the digestive system in humans
- identify the different types of teeth in humans and their simple functions
- construct and interpret a variety of food chains, identifying producers, predators and prey.

WOW suggestion: *Children to eat a piece of chocolate at the beginning of the day with a view to tracking its journey through the body.*

LC1	What happens to that piece of chocolate once you swallow it?
LC2	What is the digestive system and why is it so important? (function of mouth, tongue, teeth, oesophagus, stomach and small and large intestine)
LC3	How can you make a simple model, using junk material, to show how the digestive system works?
LC4	Who was William Beaumont And why was he important?
LC5	What types of teeth do humans have and why do we have different types of teeth?
LC6	What damages our teeth and how should we look after them? Children could ask questions and suggest liquids to investigate what damages our teeth the most?
LC7	What are the difference between the teeth of herbivores and carnivores? Why?
LC8	What are food chains, producers, predators and prey?
LC9	Reflection: Can you make different food chains for given animals and plants? Make a poster about teeth and looking after teeth.

Curriculum Intent Statements.

NC Animals, including humans.
• Describe the simple functions of the basic parts of the digestive system in humans • Identify the different types of teeth in humans and their simple functions • Construct and interpret a variety of food chains, identifying producers, predators and prey. • Know the mouth, tongue, teeth, oesophagus, stomach and small and large intestine and their function. • Compare the teeth of carnivores and herbivores, and suggesting reasons for differences; • Know what damages teeth and how to look after them. • Make models of the digestive system and explain how it works.

Cross Curricular Links	
English	Recount steps of the digestive system.

Suggested Resources

Items for junk modelling, teeth models, websites on Beaumont

Year 4: What is sound and how do we make different sounds?

Science Y4: Sound

- identify how sounds are made, associating some of them with something vibrating
- recognise that vibrations from sounds travel through a medium to the ear
- find patterns between the pitch of a sound and features of the object that 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.

WOW suggestion: *Listen to a range of different music: rock, classical and opera and discuss likes and dislikes*

LC1	How are sounds made?
LC2	How do your ears work?
LC3	What do we mean by the pitch and volume of the sound?
LC4	Does sound have the same intensity the further away you go from the source? Children could be involved in developing question to investigate.
LC5	Does the thickness of a rubber band affect its pitch? Children could come up with own question to investigate if given different rubber bands.
LC6	Can you explain how different instruments produce sound and how you might change the pitch and volume?
LC7	Which materials produce the best ear muffs? Children to be involved in developing question and deciding how to investigate.
LC8	Reflection : Can you make a musical instrument and explain how it produces sound?

Curriculum Intent Statements

:NC Sound
• Identify how sounds are made, associating some of them with something vibrating • Recognise that vibrations from sounds travel through a medium to the ear • Find patterns between the pitch of a sound and features of the object that 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 • Pupils should explore and identify the way sound is made through vibration in a range of different musical instruments from around the world; and find out how the pitch and volume of sounds can be changed in a variety of ways. • Pupils might work scientifically by: finding patterns in the sounds that are made by different objects such elastic bands of different thicknesses. • Make earmuffs from a variety of different materials to investigate which provides the best insulation against sound. • Make and play their own instruments by using what they have found out about pitch and volume.

Cross Curricular Links	
Music	Making sounds with different instruments.
Art	Design instruments from recycled materials. Picasso collage of instruments

Suggested Resources

Rubber bands, instruments, fabric and materials of different thickness, items for junk modelling for musical instruments.

Year 4: How could we cope without electricity for one day?

- **Science Y4: Electricity**
- **identify common appliances that run on electricity**
- **construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers**
- **identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery**
- **recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit**
- **recognise some common conductors and insulators, and associate metals with being good conductors.**

WOW suggestion**:** Discuss all the things in class which would not be available to them without electricity.

LC1	Can you identify common appliances from home and school which run on electricity?
LC2	Who was Lewis Latimer and why was he important?
LC3	How can you create electrical circuits with switches, bulbs and buzzers and draw and label your circuits? (children explore components and make own circuits)
LC4	Can you predict if a bulb will work or not in a given circuit and explain why/why not? (Show children complete and incomplete circuits children make predictions).
LC5	What are conductors and insulators and how are they associated with electricity?
LC6	Can you create an experiment to test if materials are conductors or insulators and record your findings? (children could come up with question to investigate if given materials)
LC7	Reflection: Working as a team, can role play what happens in complete and incomplete electrical circuits.

Curriculum Intent Statements

NC Electricity.
• Identify common appliances that run on electricity • construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery • recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit • Recognise some common conductors and insulators, and associate metals with being good conductors • Construct simple series circuits, trying different components, for example, bulbs, buzzers and motors, and including switches, and use their circuits to create simple devices. • Draw circuits as a pictorial representation, not using conventional circuit symbols at this stage; these will be introduced in year 6. • Pupils should be taught about precautions for working safely with electricity. • Work scientifically by: observing patterns, for example, , that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit.

Cross Curricular Links	
English	Information texts circuits.
DT	Electrical systems torches.

Suggested Resources

Batteries, wires with crocodile clips, bulbs, switches, buzzers, insulators and conductors, Twinkl resources and books on Latimer.

Year 4: What are solids, liquids and gases?

Science Y4: States of Matter

- compare and group materials together, according to whether they are solids, liquids or gases
- observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)
- identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

WOW suggestion: Look at a range of solids, liquids and gases in real life and video

LC1	What are solids, liquids and gases? (solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container). Can you group materials into solids liquids and gases?
LC2	How can water be a solid, liquid and gas? Can you investigate the temperatures at intervals from ice cube to water? Children can be involved in deciding question and how to investigate.
LC3	Can you investigate what temperature different solids melt (i.e iron, ice, chocolate, butter, ice-cream children could come up with suggestions)
LC4	How can we make water into a gas? (Note changes from water to gas)
LC5	What is evaporation and condensation in the water cycle?
LC6	Where do puddles on the playground disappear to? Can you investigate how long a puddle takes to evaporate and measure how it changes over time?
LC7	Reflection: Can they make a group role play or written explanation with diagrams to explain how water changes state from ice to water to gas?

Curriculum Intent Statements

NC States of Matter
• Compare and group materials together, according to whether they are solids, liquids or gases
• Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)
• Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.
• Explore a variety of everyday materials and develop simple descriptions of the states of matter (solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container).
• Observe water as a solid, a liquid and a gas and should note the changes to water when it is heated or cooled. .
• Pupils might work scientifically by: grouping and classifying a variety of different materials; exploring the effect of temperature on substances such as chocolate, butter, cream. Research the temperature at which materials change state, for example, when iron melts.
• Observe and record evaporation over a period of time, for example, a puddle in the playground.

Cross Curricular Links	
Maths	Measuring puddles over time Drawing charts.

Suggested Resources

Thermometers, ice cubes, chocolate, butter, ice cream.

Year 4: Which animals and plants thrive in your locality?

Science Y4: Living Things and their Habitats

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

WOW suggestion: Visit to nature reserve

LC1	Can you group vertebrates into fish, mammals, amphibians, reptiles and birds?
LC2	What is an invertebrate? Can you group some invertebrates? snails and slugs (molluscs), worms, spiders (arachnids) and insects.
LC3	Who was Charles Henry Turner and why was he important?
LC3	What plants grow in the nature reserve/school grounds? Can you group them (flowering plants including grasses non flowering plants including ferns and mosses)
LC4	Can you make a simple key to classify some animals and plants from the local area?
LC5	Why are there large wild animals like the tiger in danger of extinction today?
LC6	Why is our nature reserve good for the environment? (Could ask a ranger to talk to them about this)
LC7	Why is it so dangerous to drop litter in the nature reserve?
LC8	Reflection: Can you create a poster to explain why we should not drop litter in the nature reserve?

Suggested Trips

Hollins Nature Reserve

Visit from Ranger

Curriculum Intent Statements.

NC Living things and their habitats.
• Recognise that living things can be grouped in a variety of ways • Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment • Recognise that environments can change and that this can sometimes pose dangers to living things. • Use the local environment to raise and answer questions that help them to identify and study plants and animals in their habitat. • Explore possible ways of grouping a wide selection of living things that include animals and flowering plants and non-flowering plants. • Put vertebrate animals into groups such as fish, amphibians, reptiles, birds, and mammals; and invertebrates into snails and slugs, worms, spiders, and insects. • Group plants into categories such as flowering plants (including grasses) and non-flowering plants, such as ferns and mosses. • Explore examples of human impact (both positive and negative) on environments, for example, the positive effects of nature reserves, , and the negative effects of litter. • Work scientifically by: using and making simple guides or keys to explore and identify local plants and animals;

Cross Curricular Links	
Maths	classifying
PSHCE	litter

Suggested Resources

Books and websites on Turner, plants from nature reserve or photos of them.

Ongoing Curriculum Intent Statements.

Working Scientifically
• Ask relevant questions and using different types of scientific enquiries to answer them (All units)
• Set up simple practical enquiries, comparative and fair tests (All units)
• Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment (All units)
• Gather, record, classify and present data in a variety of ways to help in answering questions (All Units)
• Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables(All units)
• Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions (All Units)
• Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions (All Units)
• Identifying differences, similarities or changes related to simple scientific ideas and processes (All Units)
• Using straightforward scientific evidence to answer questions or to support their findings. (All units)

Suggested resources for scientist and inventors Year 4

topic	What happens to the food we eat?	How could we cope without electricity for one day?	Which plants thrive in your locality?
Scientist/ Inventor	William Beaumont (surgeon)	Lewis Latimer (inventor)	Charles Henry Turner (zoologist)
Suggested resources	Websites https://kids.kiddle.co/William_Beaumont https://www.youtube.com/watch?v=UmCGynmao6I	Websites Twinkl Books Lewis Latimer: The Man Behind a Better Light Bulb (Little Inventor) How I Met Lewis Howard Latimer	Websites https://www.youtube.com/watch?v=zQu9SiEroSs https://www.youtube.com/watch?v=JZx0XNeIYr4 Books Buzzing with Questions: The Inquisitive Mind of Charles Henry Turner

Science
Upper Key Stage 2

Upper Key Stage 2

Science
Learning Challenges

Year 5

Year 5: How different will you be when you are as old as your grandparents?

Science Y5: Animals (including Humans) • describe the changes as humans develop to old age.	
WOW suggestion: *Use the photographic app that shows what they will look like in 20 years time and talk about what their feelings are, etc.*	
LC1	Choose a baby, themselves, a teenager, an adult, a grandparents and explore and record changes as humans develop (changes in physical features and activities they can/can't do)
LC2	What do we understand by the term 'puberty'? (non statutory)
LC3	Can you research and compare the gestation of a human baby and another animal?
LC4	Can you make line and scattergraphs to compare mass and length of a baby as it grows?
LC5	Reflection: Write a letter to their current self pretending to be their adult self describe what they are like physically and what they can do, accomplishments, use scientific words learnt etc)

Curriculum Intent Statements.

NC Animals Including Humans
• **Describe the changes as humans develop to old age** • **Draw a timeline to indicate stages in the growth and development of humans.** • **Learn about the changes experienced in puberty.** • **Work scientifically by researching the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows.**

Cross Curricular Links	
Art	Sketching relatives- tone and shade
Maths	Graphs to plot growth of a baby
PSHCE	Puberty Talk

Year 5: Could you be the next CSI investigator?

Science Y5: Properties and Changes of Materials

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

WOW suggestion: *Burn a number of different materials, examine the remains and see whether the original item can be identified. Observe and compare changes*

LC1	Can you group materials by properties? (hardness, conductivity, solubility, transparency, magnetic) Can you suggest uses for the materials?
LC2	What materials can dissolve and how can we recover a substance from a solution?
LC3	What are reversible and irreversible changes? (evaporation, sieving, melting, dissolving, filtering, burning, rusting)
LC4	Can you plan a fair investigation to separate a number of given materials? (include things which could be separated by sieving, filtering, evaporating) (children can be involved in deciding questions to investigate and how to do this)
LC5	What is bicarbonate of soda and what impact does it have on different materials? (bicarbonate soda and vinegar)
LC6	Can you research a chemist who created a new material i.e Spencer Silver and Ruth Benerito
LC7	Reflection: Explain how forensic scientists may use some of the things you have learnt to solve crimes.

Curriculum Intent Statements.

NC Properties and Changes of Matter
• **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 sod**
• **Explore reversible changes, including, evaporating, filtering, sieving, melting and dissolving, recognising that melting and dissolving are different processes.**
• **Explore changes that are difficult to reverse, for example, burning, rusting and other reactions, for example, vinegar with bicarbonate of soda.**
• **Find out about how chemists create new materials, for example, Spencer Silver, who invented the glue for sticky notes and Ruth Benerito, who invented wrinkle-free cotton.**

Cross Curricular Links	
English	Biography of Ruth Benerito

Suggested Resources

Variety of materials to sort by properties, sugar, salt, water, sieves, filter paper, bicarbonate soda, vinegar, plastic bottles, Twinkl resources on Benerito

Year 5: Will we ever send another human to the moon?

Science Y5: Earth and Space

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

WOW suggestion: *Visit to Jodrell Bank*

LC1	Can you explain why we have day and night and the apparent movement of the sun across the sky?
LC2	Why does the moon appear to change shape?
LC3	Can you describe how the Earth and other planets orbit the sun?
LC4	What can we learn about the solar system and the other planets in it?
LC5	How did the work of work of scientists such as Ptolemy, Alhazen/Ibn al Haytham and Ibn al Shatir and Copernicus. Help us find out about the solar system?
LC6	Can you compare the time of day with other countries on Earth?
LC7	Why do some people believe Stonehenge was an astronomical clock?
LC8	Reflection: Could you create a model on the solar system and use it to explain what you have learnt about the Earth, Sun, Moon and planets?

Curriculum Intent Statements

NC Earth and Space
• Describe the movement of the Earth, and other planets, relative to the Sun in the solar system • Describe the movement of the Moon relative to the Earth • Describe the Sun, Earth and Moon as approximately spherical bodies • Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. • Find out about the way that ideas about the solar system have developed, understanding how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy and Alhazen/ Ibn Al Haytham, Ibn al Shatir and Copernicus. • Work scientifically by: comparing the time of day at different places on the Earth through internet links. • Work scientifically by creating simple models of the solar system • Find out why some people think that structures such as Stonehenge might have been used as astronomical clocks.

Cross Curricular Links	
Maths	Measuring time 24 hour clock and time in different countries.

Suggested Resources

Websites and books on Ptolemy, Alhazen/Ibn al Haytham and Ibn al Shatir and Copernicus. Material to make models of solar system

Suggested Trip

Jodrell Bank

Year 5: Can you feel the force?

Science Y5: Forces

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

WOW: *Find a hill to run up and down and consider the question, 'Why does it take longer to run up rather than down a hill?'*

LC1	What is friction and how does it affect moving objects?
LC2	What is gravity and why is Isaac Newton/ Galileo Galilei linked to it?
LC3	Can you design and make a parachute to help you understand more about air resistance? (Children be involved in deciding questions to investigate and how to do this.)
LC4	What is water resistance?
LC5	Can you investigate which shaped boats travel faster in water? (Children could be involved in deciding questions to investigate.)
LC6	What are pulleys, leavers and gears and why are they useful?
LC7	What helps you to climb hills on your bicycle?
LC8	Reflection: Put together a presentation to show the advantages and disadvantages of friction in your life.

Curriculum Intent Statements

NC Forces
• Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • Identify the effects of air resistance, water resistance and friction, that act between moving surfaces • Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect • Pupils should explore falling objects and raise questions about the effects of air resistance. • Explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall. • Explore the effects of friction on movement and find out how it slows or stops moving objects, for example, by observing the effects of a brake on a bicycle wheel. • Explore the effects of levers, pulleys and simple machines on movement. • Find out how scientists, for example, Galileo Galilei and Isaac Newton helped to develop the theory of gravitation. • Work scientifically by designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective. • Explore resistance in water by making and testing boats of different shapes.

Suggested Resources

Tissue paper, string, plasticine, water, timers, buckets, containers. Books, websites and Twinkl resources on Newton.

Year 5: Do all animals and plants start life as an egg?

Science Y5: Living Things and their Habitats

- 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.

WOW suggestion: *Show clips of film of animals at different points in their life cycles and talk about life cycles.*

LC1	What is reproduction? (sexual and asexual reproduction in plants and reproduction in animals)
LC2	Who are David Attenborough and Jane Goodall and what would you ask them if you met them?
LC3	How can you create and compare life cycles of a bird, amphibian, insect and mammal?
LC4	Can you observe and record life cycle changes over time (i.e plant and grow a vegetable or flowering plant, watch chicks hatch and grow)
LC5	Can you compare the life cycle of a local plant or animal with those from another environment? (could include rainforest, ocean, desert or pre-historic animal or plant)
LC6	Reflection: Children to create a documentary of a chosen animal or plant showing its life cycle.

Curriculum Intent Statements

NC Living things in their habitats.

- **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.**
- **Observe life-cycle changes in a variety of living things, for example, plants in the vegetable garden or flower border, and animals in the local environment.**
- **Find out about the work of naturalists and animal behaviourists, for example, David Attenborough and Jane Goodall.**
- **Pupils should find out about different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals.**
- **Work scientifically by: observing and comparing the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times), asking pertinent questions and suggesting reasons for similarities and differences.**
- **Observe changes in an animal over a period of time (for example, by hatching and rearing chicks), comparing how different animals reproduce and grow.**

Suggested Resources

Film clips about life cycles, books and Twinkl resources on Attenborough and Goodall, seeds for vegetables or flowering plants, pots or planters, chicks or ducks if ethical.

Ongoing Curriculum Intent Statements.

NC Working Scientifically
• Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary (All Units)
• Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate (All Units)
• Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs (All Units)
• Use test results to make predictions to set up further comparative and fair tests (All units except space)
• Report and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations (All Units)
• Identify scientific evidence that has been used to support or refute ideas or arguments. (All Units)

Suggested resources for scientist and inventors Year 5

topic	Could you be the next CSI investigator?	Will we ever send another human to the moon?	Can you feel the force?	Do all animals and plants start of life as an egg?
Scientist/ Inventor	Ruth Benerito or Spencer Silver (chemists)	Ptolemy or Copernicus Alhazen/Ibn Al Haytham (astronomers) and physicist) Ibn al Shatir (astronomer)	Galileo Galilei (physicist, engineer astronomer) and Isaac Newton (physicist and astronomer)	David Attenborough (naturalist) and Jane Goodall (ethologist)
Suggested resources	Websites twinkl	Websites twinkl https://www.ibnalhaytham.com/discover/who-was-ibn-al-haytham/ https://en.unesco.org/courier/july-august-2009/over-moon https://www.youtube.com/watch?v=0zpAhIll4hk https://www.youtube.com/watch?v=5h6795eqhgU https://www.youtube.com/watch?v=MmPTTFff44k https://www.youtube.com/watch?v=s6efb-Lz1N4 Books Ibn al-Haytham: The Man Who Discovered How We See	Websites Twinkle Books Who was Galileo? Isaac Newton: The Scientist Who Changed Everything (National Geographic World History Biographies)	Websites Twinkl Books The Chimpanzee Lady : Jane Goodall - Biography Book Series for Kids

Science
Learning Challenges

Year 6 Science

Year 6: Could a Spiderman really exist?

Science Y6: Living Things and their Habitats

- describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals
- give reasons for classifying plants and animals based on specific characteristics.

WOW suggestion: Watch a video of spiderman *Consider the attributes that Spiderman has and give realistic thought to whether a spiderman could exist now or in the future.*

LC1	What are vertebrates and invertebrates? What characteristics do the different vertebrate families have?
LC2	Can you create your own classification system that will take account some plants and animals within the nature reserve?
LC3	Can you classify some of the invertebrates from our nature reserve and some other invertebrates (insects, molluscs, annelids, arthropods, arachnids, crustaceans, myriapod)
LC4	Can you make a key to classify plants and animals from our nature reserve?
LC5	Who was Libby Hyman and why is she important? What challenges did she face?
LC6	What are micro-organisms and how would you classify them? Can you describe decomposition?
LC7	Can you plan an experiment to show what speeds up decomposition? Children could be involved in deciding questions to investigate and how to do this.
LC8	Reflection: Write classifications with reasons for an invertebrate and invertebrate.

Curriculum Intent Statements

NC Living Things and Their Habitats

- Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals
- Give reasons for classifying plants and animals based on specific characteristics.
- Know that broad groupings, such as micro-organisms, plants and animals can be subdivided.
- Classify animals into commonly found invertebrates (such as insects, spiders (arachnids) , snails (molluscs) , worms (annelids) and vertebrates (fish, amphibians, reptiles, birds and mammals).
- Discuss reasons why living things are placed in one group and not another.
- Work scientifically by: using classification systems and keys to identify some animals and plants in the immediate environment.

Suggested Resources

Twinkl resources on Hyman, bread, containers/sealable bags.

Year 6: What would a journey through your body look like?

- **Science Y6: Animals, including humans**
- identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood
- recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function
- describe the ways in which nutrients and water are transported within animals, including humans.

WOW suggestion: *Everyone will start by running around the playground or on the spot and then observe and recording what happens to their bodies*

LC1	What is pulse and why do we have one?
LC2	What are the parts of the circulatory system and how does the circulatory system work?
LC3	What have we learnt from pioneers like William Harvey?
LC4	Who was Daniel Hale Williams and why was he important? What challenges did he face?
LC5	Can you carry out an investigation to show the impact of different exercises on the body? Eg What exercise has the most effect on your pulse rate? Children could be involved in suggestion question to investigate and how to do this.
LC6	What are drugs and why is it dangerous to our body to take some drugs?
LC7	What do we need to do to keep our heart healthy?
LC8	Reflection: Write an explanation of how the heart works for best writing. Create a poster to explain ways to keep our heart healthy.

Suggested Resources

Timers, websites, books and Twinkl resources on Harvey and Hale Williams.

Curriculum Intent Statements

NC Animals Including Humans
• Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood • describe the ways in which nutrients and water are transported within animals, including humans. • Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function • Explore and answer questions that help them to understand how the circulatory system enables the body to function. • Pupils should learn how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body. Exploring the work of scientists William Harvey and Daniel Hale Williams.

Cross Curricular Links	
English	• Role play how the circulatory system works • Write an explanation text about the circulatory system • Write instructions for a science experiment to show impact of exercise on the pulse • Comprehension on Hale Williams, Harvey and the Circulatory System • Guided Read • How the Heart Works

Year 6: Have we always looked like this?

Science Y6: Evolution and Inheritance

- 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.

WOW suggestion: *Videos which show images of evolution*

LC1	What is evolution? Why do we not look exactly like our parents?
LC2	Who was Charles Darwin and what was his theory?
LC3	How have some animals and plants adapted over time and why?
LC4	What do fossils tell us about how animals have adapted over time? (How have fossils shown us how horses and camels have evolved and adapted?)
LC5	How have we evolved from apes, monkeys or primates?
LC7	Reflection: Can you explain how humans have adapted over time stemming from a question e.g why do humans walk on two legs?

Suggested Resources

Fossils, Twinkl resources and websites and books on Darwin

Curriculum Intent Statements.

NC Evolution & inheritance
• 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. • Understand that characteristics are passed from parents to their offspring • Appreciate that variation in offspring over time can make animals more or less able to survive in particular environments, for example, by exploring how giraffes' necks got longer, or the development of insulating fur on the arctic fox. • Pupils might find out about the work of palaeontologists or naturalists such Charles Darwin • Work scientifically by: observing and raising animals and how they are adapted to their environment; comparing how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels

Cross Curricular Links	
RE	Creation and Science – conflict or complimentary
English	Comprehensions Darwin

Year 6: Why is a electrical power source so important?

Science Y6: Electricity

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

WOW suggestion: Video electricity
https://www.youtube.com/watch?v=yHFkaeDZJWs

LC1	Can you explain how a circuit works?
LC2	Can you understand what circuit symbols represent and make circuit diagrams?
LC3	Can you make circuits which work and don't work and explain why?
LC4	Can you plan an investigation to find out what makes a motor go faster or slower including prediction, method, diagrams, results and conclusion? Children can be involved in choosing question to investigate and how to do this.
LC5	Reflection: Explain what makes a bulb brighter, what makes a buzzer louder, what happens if a switch is on or off in a circuit. Children will make a steady hand game in DT.

Curriculum Intent Statements

NC Electricity
• Associate the brightness of a lamp or the volume of a buzzer or speed of a motor 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, speed of a motor. • Use recognised symbols when representing a simple circuit in a diagram. • Construct simple series circuits, to help them to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors. • Pupils might work scientifically by: systematically identifying the effect of changing one component at a time in a circuit; designing and making a set of traffic lights, a burglar alarm or some other useful circuit.

Cross Curricular Links	
DT	Electrical systems make a steady hand game

Suggested Resources

Batteries, wires and crocodile clips, switches, buzzers, bulbs, motors, conductors, insulators

Year 6: Why is light so important?

Science Y6: Light

- recognise that light appears to travel in straight lines
- use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye
- explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes
- use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

WOW**:** *Spend time in a blacked out room and consider how the eyes adapt and why it is difficult to see anything.*

LC1	How do your eyes work?
LC2	How can you set up an experiment to show that light travels in straight lines? (Must include a prediction)
LC3	Why do shadows have the same shape as objects that cast them?
LC4	How can you use mirrors to see around blind corners? Where is the best place to put a mirror on a car and why?
LC5	What do you notice when you look at a straw in water?
LC6	What do prisms tell us about light?
LC7	Reflection: Create a role play or documentary to show what they have learnt about how the eye works and light.

Curriculum Intent Statements

NC Light
• Recognise that light appears to travel in straight lines. • Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye • Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes • Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. • They should talk about what happens and make predictions. • Pupils might work scientifically by: deciding where to place rear-view mirrors on cars; designing and making a periscope and using the idea that light appears to travel

Cross Curricular Links	
English	Role play or documentary

Possible Resources

Mirrors, torches, batteries, cds, black paper, lolly sticks, glasses, straws, prisms, white card.

Ongoing Curriculum Intent Statement.

NC Working Scientifically
• Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary (All Units except evolution) • Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate (All Units except evolution) • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs (All Units) • Use test results to make predictions to set up further comparative and fair tests (All units except evolution) • Report and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations (All Units) • Identify scientific evidence that has been used to support or refute ideas or arguments. (All Units)

Suggested resources for scientist and inventors Year 6

topic	Could a spiderman really exist	What would a journey through your bod look like?	Have we always looked like this?	History – Golden Age of Islam
Scientist/ Inventor	Libby Hyman Zoologist	William Harvey (physician) Daniel Hale Williams (surgeon)	Charles Darwin (naturalist, geologist and biologist)	Range of Islamic scientist and inventors. Alhazen/Ibn Al Haytham (inventor and physicist, optics) Al Jazari (inventor and engineer) Abbas Ibn Firnas (inventor) Abdul Qassin Al Zahrwi (surgeon) Maeriam Al Astrulabi (astronomer Ibn al Shatir (astronomer) This year only not from next year when history curriculum changes.
Suggested resources	Website Resources: twinkl	Websites Resource:comprehension Twinkl https://www.youtube.com/watch?v=mQGosagoZr8 Books The Heart of a Hero: The Dr. Daniel Hale Williams Story	Websites Twinkl TIES-MS-Guided-Lessons-for-Evolutionary-Biology.pdf	See history plan for resources

Appendix

Science Curriculum Key Vocabulary Progression Chart

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Working Scientifically question, answer, observe, observing, equipment, identify, sort, group, compare, differences, similarities, pattern, describe, measurements, ,measure, test, results, secondary sources record, diagram, chart, table.		**Working Scientifically** explain, results, conclusion, predictions, criteria, classify, question, identify, changes, data, compare, different, same, contrast, evidence, improve, secondary sources, guides, keys, construct, interpret ,research, relevant question, equipment, thermometer, data, gather, standard units, record, classify, present record – drawings, labelled diagrams, simple keys, bar charts,		**Working Scientifically** plan, variables, accuracy, precision, repeat justify, readings, further comparative and fair test, and describe, systematic, quantitative measurements report, scientific diagrams, labels, classification keys, scatter graphs, line graphs report and present – conclusions, casual relationships, explanations, degree of trust, evidence, support, refute, ideas or arguments	
Animals including humans **How could you become an animal expert?** amphibians, fish, reptiles, mammals, birds (examples of these from common animals and pets) herbivore, omnivore, carnivore head, nose, ear, neck, face, eye, hair, mouth shoulder, arm, elbow, wrist, hand, back, chest, hip, leg, knee, ankle, foot, wing, beak, tail, antennae, body, fin, gill, feathers fur sight, smell, touch, taste, hearing, habitat, ornithologist	**Animals including humans** **What happens as animals grow?** baby, toddler, child, teenager, adult, offspring, young frog spawn, tadpole, froglet, frog, egg, chick. chicken, lamb, sheep, caterpillars, pupa, butterflies, life cycle, length, mass, height, hatch, develop **How could you be the next sporting superstar?** survival, water, air, food, drink, hygiene, healthy, fruit, vegetables, dairy, meat, fish, sugar, salt, exercise, hygiene, balanced diet carbohydrates **Living things & their habitats** **Why can't a woodlouse live on the sea shore?** living, dead, alive, never alive, habitat, microhabitat, woodland, meadow, hedgerow, pond, stones, logs, leaf litter, seashore, ocean, rainforest, damp, shade, suited food chain, prey, predator, food source	**Animals including humans** **How can Usain Bolt move so quickly?** vertebrate, invertebrate, skeleton, endo skeleton, exo-skeleton, skull, jaw, clavicle, humerous, ribcage pelvis, radius, spine, femur, tibula, fibula, ulna, bones, muscles, joints, tendons, tricep, bicep, movement, support, function, compare, contract, relax protection, nutrition, food groups, proteins, fats, fibre, vitamins, minerals, nutrients, energy, diet	**Living things & their habitats (animals)** **Which wild animals and plants thrive in your locality?** vertebrates, invertebrates, snail, slug, worm, spider insect, arachnid, mollusc environment, habitat, classification key, zoologist, extinction, endangered, classify **Animals including humans** **What happens to the food we eat?** Digestive system, mouth, tongue, teeth, oesophagus, stomach, small intestine, large intestine, anus, rectum, faeces, nutrients, absorb, canine, incisor, molar, pre molar, primary teeth, tooth decay, plaque, enamel producer, consumer, apex predator.	**Living things & their habitats** **Do all animal and plants start life as an egg?** life process, reproduction (sexual and asexual), offspring, naturalist, animal behaviourist, pre-historic, egg, sperm, fertilisation **Animals including humans** **How different will you be when you are as old as your grandparents?** uterus, ovary, fallopian tubes, vagina, breasts, hormones, pubic hair, penis, testicles, larynx foetus, embryo, gestation, baby, toddler, teenager, adolescence, puberty, menstruation, elderly growth, development, puberty	**Living things & their habitats** **Could a spiderman really exist?** characteristic, classification, organism, warm blooded, cold blooded, mammary glands, micro-organism, virus, fungi, bacteria, insects, molluscs, annelids, arthropods, arachnids, crustaceans, myriapod **Animals including humans** **What would a journey through your body look like?** pulse, function, circulatory system, heart, valve, blood vessel, vein, artery, atrium, ventricle, pulmonary vein/artery/valve, aorta, aortic valve, mitral valve, tricuspid valve, capillaries, lungs, oxygen, carbon dioxide, tobacco, transport, oxygenated, vena cava, deoxygenated lifestyle, drug, legal, illegal, alcohol, caffeine, nicotine, prescription,

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants **What plants grow in our nature reserve?** deciduous, evergreen, tree, leaf, flower (blossom), petals, fruit, roots, stem, trunk, Branches, bud, wild plants, garden plants.	**Plants** **How can we grow our own plants?** Bulb, seeds, water, growth, germinate, light, Temperature, seedling, sapling, wilt, lifecycle, botanist	**Plants** **How did that blossom became an apple?** air, water, water transportation, nutrients, soil, reproduction, seed formation, seed dispersal, pollination, manual pollination, nectar, pollen, stamen, anther, filament, carpel, stigma, style, ovary, sepal, carbon dioxide	**Living things & their habitats (plants)** **Which wild animals and plants thrive in your locality?** Grasses, ferns, mosses, nature reserves, flowering plants, non flowering plants	**Living things & their habitats** **Do all animal and plants start life as an egg?** tuber, runners/side branches, plantlet, cuttings	
Everyday materials **Which materials should the little pigs have used to build their house?** wood, plastic, glass, paper, metal, rock hard, soft, rough, smooth, shiny, dull, bendy, stiff, stretchy, waterproof, opaque, transparent, material	**Everyday materials and their uses** **What materials are in our school?** brick, fabric, elastic, foil, cardboard property, solid, waterproof, absorbent, opaque, transparent, squash, bend, flexible, twist, stretch push, pull, roll, slide, bounce, suitable, unsuitable, use	**Rocks** **What do rocks tell us about how the earth was formed?** soils, organic matter, fossil, crystal, grains sandstone, granite, marble, Pumice, top soil, base soil, base rock, sandy, chalky, clay, peaty, loamy, subsoil, bedrock, mineral, organic matter, compost absorbent, crumble sedimentary, layer, sediment igneous, magma, lava, gas bubbles (tiny holes/spaces) metamorphic, change, squeeze, pressure, seismologist, fossil, permeable, impermeable, lava, magma			**Evolution and Inheritance** **Have we always looked like this?** palaeontologist, trace fossil, mould fossil, cast fossil,

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
					Evolution & Inheritance **Have we always looked like this?** adaptation, evolution, characteristic, adaptive trait reproduction, gene, survival, offspring, variation, fitness, natural selection, primate, generation, inherited trait, mutation, environment, climate
			States of matter **What are solids, liquids and gases?** solid, liquid, gas, evaporation, condensation, particle, temperature, freezing, heating, heat, cool, precipitation	**Properties and changes to materials** **Could you be the next CSI investigator?** hardness, transparency, conductivity (electrical, thermal) solubility, solution dissolve, filter, evaporate, precipitation, sieve, reversible, irreversible, rust, separate, mixture, burning, chemist	
Seasonal change **How could you become a weather reporter?** season, spring, summer, autumn, winter, month, year, day, night, daylight, sun, moon, light, dark, rain, sunny, dry, hot, cold, sleet, wind, breeze, snow, hail, cloudy, ice, icy, frost, thunder, lightening, overcast, storm, temperature, weather forecast, meteorologist				**Earth & Space** **Will we ever send another human to the moon?** Earth, sun, moon, solar system, axis of rotation, day, night, phases of the moon, wax, wane, crescent, gibbous star, constellation, celestial body, planets, Mercury, Venus, Earth, Mars, Jupiter, Venus, Saturn, Uranus, geocentric model, heliocentric model, astronomer	,

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		Light **What can you find out about shadows?** light source, mirror, reflect, reflective, reflection shadow, blocked transparent, translucent, Opaque, shiny, periscope, sundial, uv light, glare	**Sound** **What is sound and how do we make different sounds?** vibration, sound wave, volume, pitch, tone, insulation, fainter, louder, sound source, sound proof, absorb sound, ear drum, pinna, ear canal, malleus, stapes, incus, cochlea, auditory nerve		**Light** **Why is light so important?** refraction, reflection, spectrum, rainbow, prism, cornea, iris, pupil, lense, retina, rods and cones, optic nerve, ray, beam, straight, visible
		Forces & magnets **What can you find out about pushes, pulls and magnets?** force, contact, surface, magnetic, non-magnetic attract, repel, poles push, pull, friction, iron, steel, metal, nickel		**Forces** **Can you feel the force?** air resistance, water resistance, friction, gravity lever, gear, pulley, Newtons, parachute, brake, gravitation, streamlined, buoyancy, upthrust,	
			Electricity **How could we cope without electricity for one day?** appliance, battery power, main power, circuit, series, cell, battery, buzzer, wire, bulb, switch, break in circuit conductor, insulator, complete circuit, incomplete circuit		**Electricity** **Why is an electrical power source so important?** circuit - series, parallel voltage, volts, amps, current, voltage, circuit symbol. LED, warning blub, motor, cell. filament