**Early Science Learning**

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| **KEY LEARNING**  **Secure**  **All children should be able to:** |
| Communication and Language  Understand ‘why’ questions, like: “Why do you think the  caterpillar got so fat?”  Physical Development  Make healthy choices about food, drink, activity and toothbrushing  Understanding the World  • Explore collections of materials with similar and/or different properties.  • Talk about what they see, using a wide vocabulary.  • Begin to make sense of their own life-story and family’s history.  • 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.  • Use all their senses in hands-on exploration of natural materials. |

**Foundation Stage**

ELG: The Natural World

Children at the expected level of development will:

- 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.

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| **KEY LEARNING**  **Secure**  **All children should be able to:** | |
| Communication and Language  Learn new vocabulary.  • Ask questions to find out more and to check what has been  said to them.  • Articulate their ideas and thoughts in well-formed sentences.  • Describe events in some detail.  • Use talk to work out problems and organise thinking and activities. Explain how things work and why they might happen.  • Use new vocabulary in different contexts. | Understanding the World   * Explore the natural world around them. * Comment and asks questions about aspects of their familiar world such as the place where they live or the natural world * Talk about why things happen and how things work * Develop an understanding of growth, decay and changes over time * Show care and concern for living things and the environment * Begin to understand the effect their behaviour can have on the environment * Look closely at similarities, differences, patterns and change in nature and seasons * Know about similarities and differences in relation to places, objects, materials and living things * Talk about the features of their own immediate environment and how environments might vary from one another * Make observations of animals and plants and explains why some things occur, and talks about changes |
| Physical Development  Know and talk about the different factors that support their overall health and wellbeing:  - regular physical activity  - healthy eating  - toothbrushing  - sensible amounts of ‘screen time’  - having a good sleep routine  - being a safe pedestrian |

**Y1 Plants**

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

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|  | PRECEDING CONTENT | **YEAR 1 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | • 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. | * Name some garden plants from memory. * Identify some common plants in the wild. * Label the parts of a plant (roots, stem, leaves and flower) * Say three things that plants need to grow. * Recognise that we eat plants. * Say the names of parts of trees. * Match leaves they have collected to pictures of a leaf. * Know that some trees lose their leaves and some keep their leaves all year around. * Generate questions about plants. | * Describe the difference between deciduous and evergreen. * Use their observations to give reasons for their answers to questions. |
| Working scientifically | * Plant seeds and care for growing plants. | * Make close observations of leaves, seeds, flowers etc. * Compare two leaves, seeds, flowers etc. * Classify leaves, seeds, flowers etc. using a range of characteristics * Identify plants by matching them to named images * Make observations of how plants change over a period of time * Measure the growth of plant. * When further afield, spot plants that are the same as those in the local area studied regularly, describing the key features that helped them | * Use information they have gathered to answer a question. * Suggest a way to answer a question using the equipment that has been provided. |

**Y1 Animals – see next sheet for human statement**

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

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|  | PRECEDING CONTENT | **YEAR 1 ESSENTIAL CONTENT** | Extension content |
| Scientific Knowledge | * 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. | * Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. * Describe and compare the features of animals from a range of groups. * Name and identify animals that are herbivore, carnivore or omnivore. | * Name, locate and label parts of the human body and make suggestions about what the main parts of the body do. * Name the five senses and the part of the body they are related to and explain how they use each of their senses and how they keep them safe. * Identify a wide range of common animals. |
| Working scientifically |  | * Observe and identify animals in the world around them and sort and classify them into simple groups. * Make careful observations of animals in the same group and can use simple features to compare living things (animals). * Use simple secondary sources to find answers to help them sort and classify animals according to what they eat. * Use their senses to carry out simple practical tests, using simple equipment. After making careful observations, they can draw simple conclusions and can, with support, record and communicate their findings. | * Independently observe and identify animals in the world around them. With minimal support, they sort and classify them into simple groups. * Independently use multiple simple secondary sources to find answers to help them sort and classify animals according to what they eat. * Independently use their senses to carry out simple practical tests, using simple equipment. After making careful observations, they can draw simple conclusions and can confidently record and communicate their findings in a range of ways. |

**Y1 Humans – see previous sheet for animal statements**

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

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|  | PRECEDING CONTENT | **YEAR 1 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | Know and talk about the different factors that support their overall health and wellbeing:  - regular physical activity  - healthy eating  - toothbrushing  - sensible amounts of ‘screen time’  - having a good sleep routine  - being a safe pedestrian | * Name and locate parts of the human body and begin to make suggestions about what some parts of the body do. * Name the five senses and the part of the body they are related to. * Explain how they use each of their senses. * Identify a variety of common animals. | * Name, locate and label parts of the human body and make suggestions about what the main parts of the body do. * Name the five senses and the part of the body they are related to and explain how they use each of their senses and how they keep them safe.   • Identify a wide range of common animals. |
| Working scientifically |  | * Make first-hand close observations of parts of the body e.g. hands, eyes. * Compare two people. * Take measurements of parts of their body. * Compare parts of their own body. * Look for patterns between people e.g. Do people with big hands have big feet? * Classify people according to their features. * Investigate human senses. | * Use first-hand close observations to make detailed drawings * Talk about their findings from investigations using a range of vocabulary |

**Y1 Everyday materials**

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

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|  | PRECEDING CONTENT | **YEAR 1 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * Talk about the differences between materials and changes they notice. * Use all their senses in hands-on exploration of natural materials. | * Name objects and the material it is made from. * Label a picture or diagram of an object made from different materials. * Describe the properties of different materials * Classify materials based on their properties | * Classify objects made of one material in different ways e.g. a group of objects made of metal * Classify in different ways one type of object made from a range of materials e.g. a collection of spoons made of different materials |
| Working scientifically |  | * Make a prediction. * Test the properties of objects e.g. absorbency of cloths, strength of party hats made of different papers, stiffness of paper plates, waterproofness of shelters * Use their observations to answer simple questions. * Sort objects 3 ways | * Make a prediction and suggest a reason. * Suggest how a simple test could be made fair. * Use their observations, ideas and experiences to ask and answer simple questions. * Explain an outcome and suggest reasons for it. |

**Y1 Seasonal Change**

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

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|  | PRECEDING CONTENT | **YEAR 1 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * Explore the natural world around them. * Comment and asks questions about aspects of their familiar world such as the place where they live or the natural world * Talk about why things happen and how things work * Develop an understanding of growth, decay and changes over time | * Name the four seasons and identify when in the year they occur. * Name an event or occasion which happens in each season. * Describe how day length varies between two seasons. * Name different types of weather. * Make observations about the weather. * Describe the weather associated which each season. | • Make a more detailed comparison between two seasons. |
| Working scientifically |  | * Collect and record simple data. * Interpret simple data. * Make simple observations about changes across the seasons. |  |

**Y2 Living things and their habitat**

1. Explore and compare the differences between things that are living, dead, and things that have never been alive
2. Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other
3. Identify and name a variety of plants and animals in their habitats, including micro-habitats
4. Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food

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|  | PRECEDING CONTENT | **YEAR 2 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. * Describe and compare the features of animals from a range of groups. * Name and identify animals that are herbivore, carnivore or omnivore. | * Find a range of items outside that are living, dead and never lived * Name a range of animals and plants that live in a habitat and micro-habitats that they have studied * Talk about how the features of these animals and plants make them suitable to the habitat * Talk about what the animals eat in a habitat and how the plants provide shelter for them * Construct a food chain that starts with a plant and has the arrows pointing in the correct direction | * Identify a variety of plants and animals in a range of habitats. * Choose their own objects to go into given categories. * Suggest why the plants in a habitat need the animals. |
| Working scientifically | * Observe and identify animals in the world * Make careful observations of animals * Use simple secondary sources to find * Use their senses to carry out simple practical tests | * Explore the outside environment regularly to find objects that are living, dead and have never lived * Classify objects found in the local environment * Observe animals and plants carefully, drawing and labelling diagrams * Create simple food chains for a familiar local habitat from first-hand observation and research * Create simple food chains from information given e.g. in picture books (Gruffalo etc.) | * Use information they have gathered to suggest an answer to a question. * Can give key features that mean the animal or plant is suited to its micro-habitat. * Using a food chain can explain what animals eat. * Can explain in more detail why an animal or plant is suited to a habitat e.g. the caterpillar cannot live under the soil like a worm as it needs fresh leaves to eat; the seaweed we found on the beach cannot live in our pond because it is not salty. |

**Y2 Plants**

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

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|  | PRECEDING CONTENT | **YEAR 2 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * Name some garden plants from memory. * Identify some common plants in the wild. * Label the parts of a plant (roots, stem, leaves and flower) * Say three things that plants need to grow. * Recognise that we eat plants. * Say the names of parts of trees. * Match leaves they have collected to pictures of a leaf. * Know that some trees lose their leaves and some keep their leaves all year around * Generate questions about plants. | * Label the main parts of plants and trees * Describe the stages in the life cycle of a   plant.   * Explain that plants need water, light and a   suitable temperature to grow well. | * Explain that different plants have different needs. * Compare the growth of different plants. * Give reasons for their answers. * Use observations to suggest conditions that food crops need to grow well. |
| Working scientifically | * Make close observations of leaves, seeds, flowers etc. * Compare two leaves, seeds, flowers etc. * Classify leaves, seeds, flowers etc. using a range of characteristics * Identify plants by matching them to named images * Make observations of how plants change over a period of time * Measure the growth of plant.   When further afield, spot plants that are the same as those in the local area studied regularly, describing the key features that helped them | * Make observational drawings of plants. * Measure the growth of plants with a ruler. * Record the growth of plants in a bar chart. * Use observations to explain how we can tell that plants are living things. * Set up a simple comparative test.   Make a simple prediction. | * Make close observations of seeds and bulbs * Classify seeds and bulbs * Research and plan when and how to plant a range of seeds and bulbs * Look after the plants as they grow – weeding, thinning, watering etc. * Make close observations and measurements of their plants growing from seeds and bulbs * Make comparisons between plants as they grow |

**Y2 Animals including humans**

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

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|  | PRECEDING CONTENT | **YEAR 2 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * Name and locate parts of the human body and begin to make suggestions about what some parts of the body do. * Name the five senses and the part of the body they are related to. * Explain how they use each of their senses. * Identify a variety of common animals. | * Identify and match several animal offspring and their adult forms. * Describe the main stages of at least two different animal life cycles. * Start to compare life cycles. * Identify several ways that humans grow and develop through each life cycle stage. * Name the three basic needs of all animals to survive. * Describe the specific needs of a given animal. * Describe the effects of exercise and begin to explain the importance of exercise for the human body. * Identify several foods according to the basic food groups and can talk about the importance of a balanced diet. Explain how to be hygienic and why this is important. | * Can suggest multiple similarities or differences when comparing life cycles. * Can independently identify multiple ways that humans grow and develop through each life cycle stage. * Independently describe the specific needs of a given animal in detail. * Confidently describe the effects of exercise and explain the importance of exercise for the human body. * Identify a range of foods according to the basic food groups and can talk about the importance of a balanced diet. * Can confidently explain how to be hygienic and why this is important. |
| Working scientifically | * Observe and identify animals in the world * Make careful observations of animals * Use simple secondary * Carry out simple practical tests | * Sort and classify objects (animals) into simple groups. * Describe, including using diagrams, the life cycle of some animals, including humans, and their growth to adults * Can measure/observe how animals, including humans, grow. * Show what they know about looking after a baby/animal. Explain how development and health might be affected by differing conditions and needs being met/not met. | * Can confidently use scientific language to talk about their findings. * Can independently notice patterns and relationships * Can use a range of secondary sources to find answers to a question. * Can confidently ask simple scientific questions and use a wide range of scientific language to answer them. * Can use their observations and ideas to suggest more complex answers to questions. |

**Y2 Uses of everyday materials**

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

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|  | PRECEDING CONTENT | **YEAR 2 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * Talk about the differences between materials and changes they notice. * Use all their senses in hands-on exploration of natural materials. * Name objects and the material it is made from. * Label a picture or diagram of an object made from different materials. * Describe the properties of different materials * Classify materials based on their properties | * Name objects, say what material it is made from, identify its properties and make a link between the properties and a particular use * Label a picture or diagram of an object made from different materials * For a given object identify what properties a suitable material needs to have * Whilst changing the shape of an object can describe the action used * Use the words flexible and/or stretchy to describe materials that can be changed in shape and stiff and/or rigid for those that cannot * Recognise that a material may come in different forms which have different properties | * Classify the uses of different everyday materials. * Compare and explain the suitability of everyday materials in different circumstances. * Use their observations, ideas and experiences to ask and answer simple questions. * Suggest reasons for specific outcomes. * Explain how recycling impacts positively on * the environment. * Explain how the inventions and discoveries of others have impacted on our lives today. |
| Working scientifically | * Make a prediction. * Test the properties of objects e.g. absorbency of cloths, strength of party hats made of different papers, stiffness of paper plates, waterproofness of shelters * Use their observations to answer simple questions. * Sort objects 3 ways | * Classify materials * Make suggestions about alternative materials for a purpose that are both suitable and unsuitable * Test the properties of materials for particular uses e.g. compare the stretchiness of fabrics to select the most appropriate for Elastigirl’s costume, test materials for waterproofness to select the most appropriate for a rain hat | * Sort materials using a range of properties * Explain using the key properties why a material is suitable or not suitable for a purpose * Begin to choose an appropriate method for testing a material for a particular property * Use their test evidence to select appropriate material for different purposes |

**Y3 Plants**

1. Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
2. Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant
3. Investigate the way in which water is transported within plants
4. Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal

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|  | PRECEDING CONTENT | **YEAR 3 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * Label the main parts of plants and trees * Describe the stages in the life cycle of a * plant. * Explain that plants need water, light and a * suitable temperature to grow well. | * Identify the different parts of flowering plants. * Identify the main stages of the life cycle of flowering plants * Explain the functions of the different parts of plants. * Identify different parts of a flower. * Identify and describe the stages of the life cycle of flowering plants. | * Explain in detail the functions of the parts of a flowering plant * Describe the life cycle of flowering plants, including pollination, seed formation, seed dispersal, and germination * Give different methods of pollination and seed dispersal, including examples |
| Working scientifically | * Make observational drawings of plants. * Measure the growth of plants with a ruler. * Record the growth of plants in a bar chart. * Use observations to explain how we can tell that plants are living things. * Set up a simple comparative test.   Make a simple prediction. | * Observe what happens to plants over time when the leaves or roots are removed * Observe the effect of putting cut white carnations or celery in coloured water * Investigate what happens to plants when they are put in different conditions * Spot flowers, seeds, berries and fruits outside throughout the year * Observe flowers carefully to identify the pollen * Observe flowers being visited by pollinators * Observe seeds being blown from the trees * Research different types of seed dispersal | * Classify seeds in a range of ways including by how they are dispersed * Explain observations made during investigations referring to previous learning |

**Y3 Animals including humans**

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

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|  | PRECEDING CONTENT | **YEAR 3 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * Identify and match several animal offspring and their adult forms. * Describe the main stages of at least two different animal life cycles. * Start to compare life cycles. * Name the three basic needs of all animals to survive. * Exercise and diet. | * Name the nutrients found in food * State that to be healthy we need to eat the right types of food to give us the correct amount of these nutrients * Name some bones that make up their skeleton giving examples that support, help them move or provide protection * Describe how muscles and joints help them to move | * Show a confident understanding of the food groups and the nutrients humans need for a healthy diet and why we need them. * Talk about how and why different animals require a different balance of nutrients and can talk confidently about what the information on food labels tells us. * Can confidently describe the features and advantages and disadvantages of different types of skeleton, discussing how they support movement. |
| Working scientifically | * Sort and classify objects (animals) into simple groups. * Describe, including using diagrams, the life cycle of some animals, including humans, and their growth to adults * Can measure/observe how animals, including humans, grow. * Show what they know about looking after a baby/animal Explain how development and health might be affected by differing conditions and needs being met/not met. | * Classify food in a range of ways * Use food labels to explore the nutritional content * Use secondary sources to find out they types of food that contain the different nutrients * Plan a daily diet contain a good balance of nutrients * Explore the nutrients contained in fast food * Use secondary sources to research the parts and functions of the skeleton * Investigate pattern seeking questions such as   Can people with longer legs run faster?  Can people with bigger hands catch a ball better?   * Compare, contrast and classify skeletons of different animals | * Suggest improvements to a meal so that it provides more nutrients. * Independently present data from food labels to help in answering questions, including investigating statements that they have suggested themselves. * Confidently group and classify animal skeletons and can use scientific vocabulary to talk about animal skeletons. * Can confidently set up and carry out a test that is fair, including making decisions about what measurements to take and devising their own table to record results. |

**Y3 Rocks**

1. Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
2. Describe in simple terms how fossils are formed when things that have lived are trapped within rock
3. Recognise that soils are made from rocks and organic matter

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|  | PRECEDING CONTENT | **YEAR 3 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * Name objects, say what material it is made from, identify its properties and make a link between the properties and a particular use. | * Give examples of natural and human-made rocks. * Name the three different types of rocks (Igneous, sedimentary and metamorphic) * Handle, examine rocks to identify their properties * Group rocks by their properties and identify simple similarities and differences * Name some rocks and give physical features of each. * Explain how a fossil is formed * State the four different types of matter that soil is composed of (water, air, organic matter and minerals) * Explain, using simple scientific language, how soil is formed | * Make systematic observations. * Explain the main processes of fossilisation. |
| Working scientifically | * Make a prediction. * Test the properties of objects e.g. absorbency of cloths, strength of party hats made of different papers, stiffness of paper plates, waterproofness of shelters * Use their observations to answer simple questions.   Sort objects 3 ways | * Observe rocks closely * Classify rocks in a range of ways based on their appearance * Devise a test to investigate the properties e.g. hardness of a range of rocks * Devise a test to investigate how much water different rocks absorb * Observe how rocks change over time e.g. gravestones or old building * Research using secondary sources how fossils are formed * Observe soils closely * Classify soils in a range of ways based on their appearance * Devise a test to investigate the water retention of soils * Observe how soil can be separated through sedimentation * Research the work of Mary Anning | * Classify rocks in a range of different ways * Link rocks changing over time with their properties e.g. soft rocks get worn away more easily * Identify the importance of Mary Anning’s work to the field of palaeontology. |

**Y3 Light**

1. Recognise that they need light in order to see things and that dark is the absence of light
2. Notice that light is reflected from surfaces
3. Recognise that light from the sun can be dangerous and that there are ways to protect their eyes
4. Recognise that shadows are formed when the light from a light source is blocked by an opaque object
5. Find patterns in the way that the size of shadows change

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|  | PRECEDING CONTENT | **YEAR 3 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * Name objects, say what material it is made from, identify its properties and make a link between the properties and a particular use. * Name and locate parts of the human body and begin to make suggestions about what some parts of the body do. | * Identify light sources. * Understand that we need light to see and that dark is the absence of light. * Identify some parts of the eye. * Know that light travels in a straight line. * Identify reflective surfaces and understand how surfaces reflect light. * Recognise that a mirror appears to reverse an image * Know that the Sun can damage their eyes and how to protect eyes. * Understand that a shadow is formed when a solid object blocks light. Identify opaque, translucent and transparent objects. * Know how shadows change size. | * Explain the properties of materials that reflect light well. * Understand why shadows change size. |
| Working scientifically | * Sort and classify objects into simple groups. * Can measure/observe how animals, including humans, grow/change. | * Explore how different objects are more or less visible in different levels of lighting * Explore how objects with different surfaces e.g. shiny vs matt are more or less visible * Explore shadows which are connected to and disconnected from the object e.g. shadows of clouds and children in the playground * Explore how shadows vary as the distance between a light source, an object or surface is changed * Choose suitable materials to make shadow puppets * Create artwork using shadows | * Describe patterns in visibility of different objects in different lighting conditions and predict which will be more or less visible as conditions change * Explain the properties of materials that reflect light well. * Understand and explain why shadows change size. * Can describe, demonstrate and make predictions about patterns in how shadows vary |

**Y3 Forces and magnets**

1. Compare how things move on different surfaces
2. Notice that some forces need contact between two objects, but magnetic forces can act at a distance
3. Observe how magnets attract or repel each other and attract some materials and not others
4. Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials
5. Describe magnets as having two poles
6. Predict whether two magnets will attract or repel each other, depending on which poles are facing****

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|  | PRECEDING CONTENT | **YEAR 3 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * For a given object identify what properties a suitable material needs to have * Whilst changing the shape of an object can describe the action used * Recognise that a material may come in different forms which have different properties | * Identify forces as pushes and pulls. * Give examples of forces in everyday life * Can give examples of objects moving differently on different surfaces * Describe friction as a force that slows objects down. * Feel the pulling force of a magnet. * Explain that magnets produce an invisible pulling force. * Sort materials according to whether they are magnetic or not. * Identify magnetic materials. * Identify the different poles of a bar magnet and identify when magnets will repel or attract based on their poles. * Identify different types of magnet. * Use a magnetic compass with four points. | * Make generalisations about the types of surfaces that produce the most or least friction. * Identify and describe the invisible magnetic field around a magnet. * Make generalisations about the types of materials that are attracted to magnets. |
| Working scientifically | * Classify materials * Make suggestions about alternative materials for a purpose that are both suitable and unsuitable * Test the properties of materials for particular uses | * Carry out investigations to explore the force of friction produced by different surfaces. * Explore what materials are attracted to a magnet * Classify materials according to whether they are magnetic * Explore the way that magnets behave in relation to each other * Use a marked magnet to find the unmarked poles on other types of magnets * Explore how magnets work at a distance * Devise an investigation to test the strength of magnets | * Use their results to make predictions for further tests * Give detailed examples of forces in everyday life. |

**Y4 Living things and their habitats**

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

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|  | PRECEDING CONTENT | **YEAR 4 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * Identify the different parts and functions flowering plants. * Identify vertebrates and invertebrates. | * Sort living things into groups using different types of diagrams. * Generate questions about animals. * See and explain similarities and differences between invertebrates. * Use questions to sort animals using a key * Identify vertebrate groups and their characteristics. * Identify the characteristics of living things. * Suggest how to have a positive effect on the local environment. * Record observations on a map. * Name some endangered species. | * Explain, using evidence, how they have identified invertebrates. * Explain in more detail how changes to the environment have affected endangered species. |
| Working scientifically | * Observe what happens to plants over time when the leaves or roots are removed * Spot flowers, seeds, berries and fruits outside throughout the year | * Observe plants and animals in different habitats throughout the year * Compare and contrast the living things observed * Use classification keys to name unknown living things * Classify living things found in different habitats based on their features * Create a simple identification key based on observable features * Use fieldwork to explore human impact on the local environment e.g. litter, tree planting * Use secondary sources to find out about how environments may naturally change * Use secondary sources to find out about human impact, both positive and negative, on environments | * Keep a careful record of living things found in different habitats throughout the year (diagrams, tally charts etc.) * Create their own classification keys to identify unknown plants and animals * Present their learning about changes to the environment in different ways e.g. campaign video, persuasive letter etc. |

**Y4 Animals including humans**

1. Describe the simple functions of the basic parts of the digestive system in humans
2. Identify the different types of teeth in humans and their simple functions
3. Construct and interpret a variety of food chains, identifying producers, predators and prey

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|  | PRECEDING CONTENT | **YEAR 4 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * Name the nutrients found in food * State that to be healthy we need to eat the right types of food to give us the correct amount of these nutrients * Name some bones that make up their skeleton giving examples that support, help them move or provide protection * Describe how muscles and joints help them to move | * Name the main internal organs of the human body. * Sequence the main parts of the digestive system * Draw the main parts of the digestive system onto a human outline * Describe what happens in each part of the digestive system * Name and point to the three different types of teeth in their mouth and talk about their shape and what they are used for * Name producers, predators and prey within a habitat   Construct food chains | * Construct the digestive system. * Explain in detail the functions of the digestive system. * Construct and interpret a variety of food chains. |
| Working scientifically | * Classify food in a range of ways * Use food labels to explore the nutritional content * Use secondary sources to find out they types of food that contain the different nutrients * Plan a daily diet contain a good balance of nutrients * Use secondary sources to research the parts and functions of the skeleton * Investigate pattern seeking questions | * Research the function of the parts of the digestive system * Create a model of the digestive system using household objects * Explore eating different types of food, to identify which teeth are being used for cutting, tearing and grinding (chewing) * Investigate the effect of different foods on teeth. * Classify animals as herbivores, carnivores or omnivores according to the type of teeth they have in their skulls * Use food chains to identify producers, predators and prey within a habitat * Use secondary sources to identify animals in a habitat and find out what they eat | * Explain how the teeth in animal skulls show they are carnivores, herbivores or omnivores. * Create food chains based on research |

**Y4 States of matter**

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

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|  | PRECEDING CONTENT | **YEAR 4 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * Recognise that a material may come in different forms which have different properties | * Sort materials into solids, liquids and gases * Name properties of solids, liquids and gases * Explain that heating causes melting, and cooling causes freezing * Give everyday examples of melting and freezing * Identify the melting and freezing point of water and other materials * Describe evaporation and condensation using practical examples. * Can describe the water cycle identifying the stages. | * Explain the behaviour of the particles in solids, liquids and gases. * Explain why a material’s melting and freezing point is the same temperature. * Explain how heating and cooling can cause   materials to evaporate and condense.   * Explain why a higher temperature will speed up evaporation. * Use the water cycle to explain why the water * We have on Earth today is the same water that has been here for millions of years. |
| Working scientifically | * Classify materials * Make suggestions about materials for a purpose * Test the properties of materials for particular uses. | * Observe closely and classify a range of solids and liquids * Explore making gases visible * Classify materials according to whether they are solids, liquids and gases * Observe a range of materials melting * Investigate how to melt ice more quickly * Investigating melting point of different materials * Explore freezing different liquids * Use a thermometer to measure temperatures e.g. icy water (melting), tap water, hot water, boiling water (demonstration) * Observe water evaporating and condensing e.g. on cups of icy water and hot water * Set up investigations to explore changing the rate of evaporation e.g. washing, puddles, handprints on paper towels, liquids in containers * Use secondary sources to find out about the water cycle | * Give reasons to justify why something is a solid liquid or gas * Using their data, can explain what affects how quickly a solid melts * Can explain why there is condensation on the inside the hot water cup but on the outside of the icy water cup * From their data, can explain how to speed up or slow down evaporation * Can present their learning about the water cycle in a range of ways e.g. diagrams, explanation text, story of a water droplet |

**Y4 Sound**

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

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|  | PRECEDING CONTENT | **YEAR 4 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * Name parts of the body * Know where the smallest bone in the body is located * Know the names and uses of different materials. * Begin to understand forces. | * Name sound sources and state that sounds are produced by the vibration of the object. * Explain how sounds travel through different mediums such as air, water, metal * Describe the pitch of a sound and give examples to demonstrate how the pitch of a sound are linked to the features of the object that produced it * Give examples of how to change the volume of a sound e.g. increase the size of vibrations by hitting or blowing harder * Give examples to demonstrate that sounds get fainter as the distance from the sound source increases | * Explain how we interpret sounds. * Explain why sounds travel better through solids than gases. * Explain why some materials absorb sound. |
| Working scientifically | * Explore how objects with different surfaces have different properties * Choose suitable materials to investigate a question. | * Classify sound sources * Explore making sounds with a range of objects such as musical instruments and other household objects * Explore how string telephones or ear gongs work * Explore using objects that change in feature to change pitch and volume such as length of guitar string, bottles of water or tuning forks * Measure sounds over different distances * Measure sounds through different insulation materials | * Set up reliable and accurate investigations. * Make and explain predictions. * Make and record accurate observations. * Use scientific language to explain their findings. * Be able to ask and answer questions based on their learning using scientific language. |

**Y4 Electricity**

1. Identify common appliances that run on electricity
2. Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers
3. Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery
4. Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit
5. Recognise some common conductors and insulators, and associate metals with being good conductors

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|  | PRECEDING CONTENT | **YEAR 4 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * Identify light sources. * Understand that we need light to see and that dark is the absence of light. | * identify electrical and non-electrical appliances. * Name the components in a circuit * Make electric circuits * Explain, with support, how a circuit works. * Control a circuit using a switch and explain how a switch turns the electric current on and off. * Name some metals that are conductors * Name materials that are insulators | * Explain why a circuit is incomplete. * Generalise about types of materials that conduct electricity. |
| Working scientifically | * Explore how different objects are more or less visible in different levels of lighting. | * Construct a range of circuits * Explore which materials can be used instead of wires to make a circuit * Classify the materials that were suitable/not suitable for wires * Explore how to connect a range of different switches and investigate how they function in different ways * Choose switches to add to circuits to solve particular problems such as a pressure switch for a burglar alarm * Apply their knowledge of conductors and insulators to design and make different types of switch | * Explain in detail how conductors and insulators are used in real life * Investigate the conductivity of different metals |

**Y5 Living things and their habitats**

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

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|  | PRECEDING CONTENT | **YEAR 5 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * Identify the different parts of flowering plants. * Identify the main stages of the life cycle of flowering plants * Explain the functions of the different parts of plants. * Identify different parts of a flower. | * Identify parts of a flower and explain the function of the parts of a flower. * Describe ways plants can be pollinated * Identify plants that reproduce asexually * Describe ways to grow new plants other than from seed * Give differences between sexual and asexual reproduction. * Identify the features of plants pollinated by insects or the wind. * Describe the stages of sexual reproduction. * Describe the stages of the life cycles of mammals, birds, insects and amphibians. Identify similarities and differences between the life cycles of different plants and animals. | Give two advantages and disadvantages of sexual and asexual reproduction.  • Explain how a plant’s features are adapted to pollination by insect or wind.  • Explain that plants that reproduce asexually are genetically identical to the parent plant.  • Explain the classification of different mammals.  • Compare the stages of the life cycles of plants, mammals, birds, insects and amphibians. |
| Working scientifically | * Make observational drawings of plants. * Measure the growth of plants with a ruler. * Use observations to explain how we can tell that plants are living things. * Set up a simple comparative test. * Make a simple prediction. | * Use secondary sources and, where possible, first-hand observations to find out about the life cycle of a range of animals * Compare the gestation times for mammals and look for patterns e.g. in relation to size of animal or length of dependency after birth * Look for patterns between the size of an animal and its expected life span * Grow and observe plants that reproduce asexually e.g. strawberries, spider plant, potatoes * Take cuttings from a range of plants e.g. African violet, mint * Plant bulbs and then harvest to see how they multiply * Use secondary sources to find out about pollination and the work of Jane Goodall | * Present their understanding of the life cycle of a range of animals in different ways. * Identify patterns in life cycles * Compare and contrast a range of animal life cycles studied * Explain in detail how a range of plants reproduce asexually |

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

1. Describe the changes as humans develop to old age

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|  | PRECEDING CONTENT | **YEAR 5 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * Identify and match several animal offspring and their adult forms. * Describe the main stages of at least two different animal life cycles. * Start to compare life cycles. * Name the three basic needs of all animals to survive. * Exercise and diet. | * Name and order the 6 stages of human development. * Demonstrate understanding of how babies grow in height. * Describe the main changes that occur during puberty. * Give reasons why changes occur during puberty * Explain the main changes that take place in old age. | * Explain the changes that occur during stages of human development. * Demonstrate understanding of how babies grow in height and weight. * Analyse the similarities and differences between how boys and girls experience puberty |
| Working scientifically | * Sort and classify objects (animals) into simple groups. * Describe, including using diagrams, the life cycle of some animals, including humans, and their growth to adults * Can measure/observe how animals, including humans, grow. * Show what they know about looking after a baby/animal Explain how development and health might be affected by differing conditions and needs being met/not met. | * Compare graph types and select which is most appropriate for the data. * Analyse and report findings in written explanations. |  |

**Y5 Properties and changes of materials**

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

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|  | PRECEDING CONTENT | **YEAR 5 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * Name objects, say what material it is made from, identify its properties and make a link between the properties and a particular use * Sort materials into solids, liquids and gases * Give everyday examples of melting and freezing * Describe evaporation and condensation. | * Identify a range of materials and use understanding of properties to explain everyday uses of materials. * Explain the uses of thermal and electrical conductors and insulators and order materials according to their electrical conductivity. * Explain what dissolving means, giving examples * Use knowledge of liquids, gases and solids to suggest how materials can be recovered from solutions or mixtures by evaporation, filtering or sieving * Describe some simple reversible and non-reversible changes to materials, giving examples | * Explain why materials have dissolved in certain conditions. * Identify the new materials made in irreversible changes. |
| Working scientifically | * Classify and test materials * Make suggestions about alternative materials for a purpose that are both suitable and unsuitable * Explore making gases visible * Classify materials according to whether they are solids, liquids and gases * Observe a range of materials melting | * Investigate the properties of different materials in order to recommend materials for particular functions depending on these properties. * Explore adding a range of solids to water and other liquids * Investigate rates of dissolving by carrying out comparative and fair test * Separate mixtures by sieving, filtering and evaporation, choosing the most suitable method and equipment for each mixture * Explore a range of non-reversible changes * Carry out comparative and fair tests involving non-reversible changes | * Devise their own ways to test a material’s properties. * Select and explain the most suitable processes to separate different mixtures. * Use their results to make generalisations and further predictions. * Ask and answer questions based on their learning using scientific language * Research new materials produced by chemists e.g. Spencer Silver (glue of sticky notes) and Ruth Benerito (wrinkle free cotton) |

**Y5 Earth and space**

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

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|  | PRECEDING CONTENT | **YEAR 5 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * Explore the natural world around them. * Comment and asks questions about aspects of their familiar world such as the place where they live or the natural world * Develop an understanding of growth, decay and changes over time * Begin to understand the effect their behaviour can have on the environment | * Describe the Sun, Earth and Moon as spherical. * Name the planets in the solar system * Distinguish between heliocentric and geocentric ideas of planetary movement. * Can show using diagrams the rotation of the Earth and how this causes day and night * Can explain what causes day and night * Show using diagrams the movement of the Earth and Moon * Can explain the movement of the Earth and Moon | * Name at least two different shapes the Earth was thought to be. * Describe some features of the planets. |
| Working scientifically | * Look closely at similarities, differences, patterns and change in nature and seasons * Know about similarities and differences in relation to places, objects, materials and living things * Talk about the features of their own immediate environment and how environments might vary from one another | * Use secondary sources to help create a model e.g. role play or using balls, to show the movement of the Earth around the Sun and the Moon around the Earth. * Use secondary sources to help make a model to show why day and night occur * Make first-hand observations of how shadows caused by the Sun change through the day * Make a sundial * Research time zones * Consider the views of scientists in the past and evidence used to deduce shapes and movements of the Earth, Moon and planets before space travel | * Identify scientific evidence that has been used to support or refute ideas * Explain theories of planetary movement in the solar system using evidence. * Explain why we get seasons on Earth. |

**Y5 Forces**

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

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|  | PRECEDING CONTENT | **YEAR 5 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * Identify forces as pushes and pulls. * Give examples of forces in everyday life * Can give examples of objects moving differently on different surfaces * Describe friction as a force that slows objects down. * Feel the pulling force of a magnet. * Explain that magnets produce an invisible pulling force. | * Identify and explain the different forces acting on objects * Identify and explain balanced and unbalanced forces * Explain Newton’s role in discovering gravity * Demonstrate the effect of gravity acting on an unsupported object * Explain how to increase the effects of air resistance * Identify streamlined shapes * investigate the effects of friction * Give examples of when it is beneficial to have high or low friction, water resistance and air resistance * Demonstrate and explain how pulleys, levers and gears work | * Explain the difference between weight and mass * Explain the link between the weight and mass of an object * Make generalisations about how to increase the effects of air resistance * Explain how to minimise the effects of water resistance * make generalisations about the properties of   materials that create the most friction  Explain how a mechanism they have designed alters force and motion to achieve a purpose |
| Working scientifically | * Carry out investigations to explore the force of friction produced by different surfaces. * Explore what materials are attracted to a magnet * Explore how magnets work at a distance * Devise an investigation to test the strength of magnets | * Investigate the effect of friction in a range of contexts e.g. trainers, bath mats, mats for a helter-skelter * Investigate the effects of water resistance in a range of contexts e.g. dropping shapes through water, pulling shapes e.g. boats along the surface of water * Investigate the effects of air resistance in a range of contexts e.g. parachutes, spinners, sails on boats * Explore how levers, pulleys and gears work * Make a product that involves a lever, pulley or gear * Create a timer that uses gravity to move a ball * Research how the work of scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation | * Use their results to make generalisations and further predictions * Be able to ask and answer questions based on their learning using scientific language |

**Y6 Living things and their habitats**

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

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|  | PRECEDING CONTENT | **YEAR 6 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * See and explain similarities and differences between invertebrates. * Identify vertebrate groups and their characteristics. * Identify parts of a flower and explain the function of the parts of a flower. * Describe the stages of the life cycles of mammals, birds, insects and amphibians. Identify similarities and differences between the life cycles of different plants and animals. | * Give examples of animals in the five vertebrate groups and some of the invertebrate groups * Give the key characteristics of the five vertebrate groups and some invertebrate groups * Compare the characteristics of animals in different groups * Classify plants and animals based on specific characteristics and explain classification * Give examples of flowering and non-flowering plants * Describe the characteristics of different micro-organisms and useful and harmful effects of different micro-organisms | * Explain how living things are classified at each level of the Linnaean system. * Describe and compare the structure of cells of different organisms. * Describe the characteristics of groups of organisms. |
| Working scientifically | * Use secondary sources and, where possible, first-hand observations to find out about the life cycle of a range of animals * Compare the gestation times for mammals and look for patterns * Grow and observe plants that reproduce asexually e.g. strawberries, spider plant, potatoes * Take cuttings from a range of plants e.g. African violet, mint * Plant bulbs and then harvest to see how they multiply * Use secondary sources to find out about pollination and the work of Jane Goodall | * Use secondary sources to learn about the formal classification system devised by Carl Linnaeus and why it is important * Use first- hand observation to identify characteristics shared by the animals and plants in a group * Use secondary sources to research the characteristics of animals that belong to a group * Use information about the characteristics of an unknown animal or plant to assign it to a group * Classify plants and animals presenting this in a range of ways – Venn diagrams, Carroll diagrams and keys * Create an imaginary animal which has features from one or more groups | * Design a creature that has a specific set of characteristics. * Explain their predictions and conclusions into harmful microorganisms. |

**Y6 Animals including humans**

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

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|  | PRECEDING CONTENT | **YEAR 6 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * Name the nutrients found in food * Explain what we need to be healthy * Name some bones that make up their skeleton giving examples that support, help them move or provide protection * Describe how muscles and joints help them to move * Name the main internal organs of the human body. * Describe what happens in each part of the digestive system | * Identify the main parts of the circulatory system. * Draw a diagram to explain the main functions of the heart, lungs and blood vessels in the circulatory system and annotate it to show what the parts do. * State how the digestive system breaks down nutrients. * Understand the processes of how water and nutrients are transported in the body. * Explain what constitutes a healthy lifestyle and state the beneficial impact of a healthy diet and exercise on the human body. * Describe how drugs and alcohol can impact negatively on the body. | * Name the organs, the main parts of those organs and the functions of each in the circulatory system. * Identify and explain the processes which break down food into nutrients. * Understand how the circulatory and digestive system connect to transport water and nutrients throughout the body. |
| Working scientifically | * Research the function of the parts of the digestive system * Explore eating different types of food, to identify which teeth are being used for cutting, tearing and grinding (chewing) * Classify animals as herbivores, carnivores or omnivores according to the type of teeth they have in their skulls * Use food chains to identify producers, predators and prey within a habitat | * Create a role play model for the circulatory system * Carry out a range of pulse rate investigations * Fair test – effect of different activities on my pulse rate * Pattern seeking – exploring which groups of people may have higher or lower resting pulse rates * Observation over time - how long does it take my pulse rate to return to my resting pulse rate (recovery rate) * Pattern seeking – exploring recovery rate for different groups of people * Learn about the impact of exercise, diet, drugs and lifestyle on the body. | * Identify and explain the variables they will * control in an investigation. * Choose the most appropriate graph to * present their data. * Explain how scientific evidence has changed ideas about smoking |

**Y6 Evolution and inheritance**

1. Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
2. Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
3. Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution

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|  | PRECEDING CONTENT | **YEAR 6 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * Recognise that living things can be grouped in a variety of ways * Recognise that environments can change and that this can sometimes pose dangers to living things. | * Identify inherited traits and adaptive traits. * Explain the process of evolution * Give examples of how plants and animals are suited to an environment * Give examples of how an animal or plant has evolved in time * Give examples of living things that lived millions of years ago and the fossil evidence that can be used to support the theory of evolution * Develop an understanding of the development of evolutionary ideas and theories over time. * Explain how human evolution has occurred and compare modern humans with those of the same genus and family. | * Explain the terms adaptation, evolution and natural selection and use these in context. * Describe how living things evolve via the process of natural selection. * Explain in simple terms what genes and DNA are. Investigate the ethical issues of human intervention in the process of evolution by natural selection. |
| Working scientifically | * Construct and interpret a variety of food chains, identifying producers, predators and prey | * Design a new plant or animal to live in a particular habitat * Complete Investigations to demonstrate evolution e.g. Darwin’s finches bird beak activity * Use secondary sources to find out about how the population of peppered moths changed during the industrial revolution * Make observations of fossils to identify living things that lived on Earth millions of years ago * Identify features in animals and plants that are passed on to offspring * Explore this process by considering the artificial breeding of animals or plants e.g. dogs * Compare the ideas of Charles Darwin and Alfred Wallace on evolution * Research the work of Mary Anning and how this provided evidence of evolution |  |

**Y6 Light**

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

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|  | PRECEDING CONTENT | **YEAR 6 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * Identify light sources. * Know that light travels in a straight line. * Understand that a shadow is formed when a solid object blocks light. * Identify opaque, translucent and transparent objects. | * Describe how light enables us to see * Understand reflection as light bouncing off a surface and that all objects reflect light. * Describe with diagrams or models as appropriate how light travels in straight lines either from sources or reflected from other objects into our eyes. * Describe with diagrams or models as appropriate how light travels in straight lines past translucent or opaque objects to form a shadow of the same shape. * Explain Isaac Newton’s experiments about light and colour. | * Explain how light enables us to see an object reflected in a mirror. * Recognise that the angles of incidence and reflection are equal. * Explain how light is refracted as it travels through glass or water. * Recognise that the colours of the visible spectrum have different wavelengths. * Understand how filters reflect or absorb different colours of light. * Recognise how Isaac Newton used proof to support his ideas about light and colour. |
| Working scientifically | * Explore how objects with different surfaces are more or less visible * Explore how shadows vary as the distance between a light source, an object or surface is changed * Explore shadows which are connected to and disconnected from the object e.g. shadows of clouds and children | * Explore different ways to demonstrate that light travels in straight lines e.g. shining a torch down a bent and straight hose pipe, shining a torch through different shaped holes in card * Understand that shadows are the same shape as the object that casts them. * Investigate how shadows change size. * Explore the uses of the behaviour of light, reflection and shadows such as in periscope design, rear view mirrors and shadow puppets. | * Set up reliable and accurate investigations. * Make and explain predictions. * Make and record accurate observations. * Use scientific language to explain their findings. * Be able to ask and answer questions based on their learning using scientific language. |

**Y6 Electricity**

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

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|  | PRECEDING CONTENT | **YEAR 6 ESSENTIAL CONTENT** | Extension content |
| Scientific knowledge | * Identify electrical and non-electrical appliances. * Name the components in a circuit * Make electric circuits * Explain, with support, how a circuit works. * Control a circuit using a switch and explain how a switch turns the electric current on and off. * Name some metals that are conductor and insulators. | * Make electric circuits and demonstrate how variation in the working of particular components, such as the brightness of bulbs can be changed by increasing or decreasing the number of cells or using cells of different voltages * Draw circuit diagrams of a range of simple series circuits using recognised symbols * Explain how our understanding of electricity has changed over time | * Explain how major discoveries led to the widespread use of electricity; * Explain the effect of increasing or decreasing the voltage on different parts of a circuit; |
| Working scientifically | * Construct a range of circuits * Explore how to connect a range of different switches and investigate how they function in different ways * Choose switches to add to circuits to solve particular problems such as a pressure switch for a burglar alarm * Apply their knowledge of conductors and insulators to design and make different types of switch | * Incorporate a switch into a circuit to turn it on and off * Change cells and components in a circuit to achieve a specific effect * Communicate structures of circuits using circuit diagrams with recognised symbols * Devise ways to measure brightness of bulbs, speed of motors, volume of a buzzer during a fair test * Predict results and answer questions by drawing on evidence gathered | * Explain how they have ensured a high degree of trust in their results * Identify variations in component function. |