

<u>Science – Substantive Knowledge Progression Document</u>

This document outlines the progression of science objectives, separated into the following areas:

Animals Including Humans:

- Physical Health
- Parts of the Body
- Changing from a Baby to an Adult
- Survival
- Food Change
- Key Vocabulary

Everyday Materials & States of Matter:

- Materials and their Properties
- Solids, Liquids and Gases
- Key Vocabulary

Seasons:

- Seasonal Changes
- Key Vocabulary

Living Things & Their Habitats

- Habitats
- Living Things
- Key Vocabulary

Rocks

- Rocks
- Key Vocabulary

Plants

- Types of Plant
- Parts of a Plant
- Growing Healthy Plants
- Key Vocabulary

Light:

- Light
- Key Vocabulary

Forces and Magnets

- Forces and Magnets
- Key Vocabulary

Sound

- Sound
- Key Vocabulary

Electricity

- Electricity
- Key Vocabulary

Earth and Space

- Earth and Space
- Key Vocabulary

Evolution and Inheritance

- Evolution and Inheritance
- Key Vocabulary

Working Scientifically

- Observing Changes Over Time and Noticing
- Grouping and Classifying

- Research
- Comparative and Fair Tests
- Asking Questions
- Recording and Presenting Findings
- Key Vocabulary

| | Key Stage One | Lower Key Stage Two | Upper Key Stage Two |
|---------------|--|---|--|
| Units Studied | Seasonal Changes Living Things and Their Habitats Everyday Materials Animals Including Humans Plants | Forces and Magnets Rocks Animals Including Humans Light Plants Sound States of Matter Electricity Living Things | Properties of Materials and Changing State Animals Including Humans Living Things Earth and Space Light Evolution and Inheritance |

| | Nursery 1 (Age 2 – 3) | Nursery 2 (Age 3 – 4) | Reception (Age 4 – 5) | Key Stage One | Lower Key Stage Two | Upper Key Stage Two |
|---|--|---|---|---|---|--|
| Animals Including Humans: Physical Health | | | I am beginning to make healthy food choices. | I know that humans need to exercise, eat a balanced diet and keep good hygiene to stay healthy. (CyA:Su1) | I know that animals, including humans, need the right types of nutrition to survive. (CyA:Su2) I know that animals, including humans, cannot make their own food. (CyA:Su2) | I know the impact of diet, exercise, drugs and lifestyle on the way the body functions. (CyB:Sp1; CyB:Su2) I know the ways in which nutrients and water are transported within animals, including humans. (CyB:Sp1) I know how the circulatory system enables the body to function. (CyB:Su2) I can explore the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health. (CyB:Sp1) |
| Animals Including Humans: Parts of the Body | I am learning to use the toilet with help, and then independently. | I am learning to use the toilet with help, and then independently. | I am using the toilet independently most of the time. | I can say which part of the body is associated with each sense. (CyB:Au2) | I can explain why animals and humans have skeletons and muscles (for support, protection and movement). (CyA:Su2) I know why animals and humans have skeletons and muscles. (CyA:Sp1) I know the parts of the digestive system and their functions. (CyB:Sp2) I know the names of human teeth. (CyB:Sp2) I know the functions of different human teeth. (CyB:Sp2) | I know the names of the main parts of the human circulatory system. (CyB:Sp1) I know the functions of the heart, blood vessels and blood. (CyB:Sp1) |
| Animals Including Humans: Changing from a Baby to an Adult | | I can talk about the concept of growing up. I understand how I have grown and changed. | I know about growth and change. | I know that animals including humans have offspring that grow into adults. (CyA:Su1) I can record the life cycle of an animal such as a frog or a butterfly. (CyA:Su1) | | I know the 6 stages of human development. (CyA:Sp1) I know the changes that occur during puberty. (CyA:Sp1) I know that different species of animal have different gestation periods. (CyA:Sp1) |

| Animals Including Humans: Survival | | | | I know that animals including humans need water, food and shelter to survive. (CyB:Au2) | I know what animals need to survive. (CyA:Sp1) | |
|--|------------------------------|---|---|--|---|--|
| Animals Including Humans: Food Chains | | | | I know the differences between carnivores, herbivores and omnivores. (CyB:Au2) I can construct a simple food chain. (CyB:Su2) | I know how food chains work. (CyB:Su2) I know the parts that different animals play in food chains. (CyB:Su2) I can construct a food chain. (CyB:Su2) | |
| Animals Including Humans: Key Vocabulary | toilet poo wee wash | grow baby child adult toddler | see hear feel smell touch taste healthy | offspring balanced diet hygiene life cycle birds mammals reptiles amphibians carnivores herbivores omnivores | skeleton muscle nutrition protection incisor canine molar pre-molar enamel decay plaque food chain predator prey producer consumer primary secondary tertiary | human development puberty gestation circulatory functions organs blood vessels |

| | Nursery 1 (Age 2 – 3) | Nursery 2 (Age 3 – 4) | Reception (Age 4 – 5) | Key Stage One | Lower Key Stage Two | Upper Key Stage Two |
|---|---|--|---|--|--|--|
| Everyday Materials & States of Matter: Materials and Their Properties | I can explore different materials and their properties. I can explore natural materials indoors and outside. | I can make choices about which materials to use when creating. | I can identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and paper. I am beginning to understand what 'recycle' means, and why we should do it. I understand how different materials feel and explore them freely, for example: malleable, fabrics, natural. | I know the names of the following materials; wood, plastic, glass, metal and rock. (CyA:Sp1; CyB:Au1) I know the following properties; hard, soft, bendy, rigid, smooth, rough, transparent, opaque and waterproof. (CyA:Sp1; CyB:Au1) I can distinguish the difference between an object and the material from which it is made. (CyA:Sp1: CyB:Au1) I know why different materials are suitable for different uses. (CyB:Au1) I know that some materials can have their shape changed easily. (CyB:Sp2) | I know that some materials can change state. (CyB:Au2) | I know that dissolving, mixing and changes of state are reversible changes. (CyA:Au2;CyA:Su1) I know that some changes result in the formation of new materials, including changes associated with burning. (CyA:Au2,CyA:Su1) I can compare and group together everyday materials on the basis of their properties, including solubility. (CyA:Su1) |
| Everyday Materials & States of Matter: Solids, Liquids and Gases | | | I understand some important processes and changes in the natural world around me, including the changing states of matter. | I know how the properties of solids and liquids affect how they behave. (CyB:Sp2) | I know the differences between solid, liquids and gases. (CyB:Au2) I can investigate the stages of the water cycle. (CyB:Au2) (This learning is supported by this half term's Y3/4 geography unit of work.) | I know that some materials will dissolve in liquid to form a solution. (CyA:Au2; CyA:Su1) I know how to recover a substance from a solution. (CyA:Au2; CyA:Su1) I know how different mixtures can be separated, through filtering, sieving and evaporating. (CyA:Au2;CyA:Su1) |
| Everyday Materials & States of Matter: Key Vocabulary | hot cold | bendy soft rough hard strong smooth | melt float sink waterproof plastic wood metal paper glass | properties transparent opaque translucent suitability solids liquids | state of matter water cycle evaporate condense melt solidify | dissolve solution substance mixture filter sieve evaporate reversible change change of state |

| | Nursery 1 (Age 2 – 3) | Nursery 2 (Age 3 – 4) | Reception (Age 4 – 5) | Key Stage One | Lower Key Stage Two | Upper Key Stage Two |
|----------------------------------|---|---|--|---|---------------------|---------------------|
| Seasonal Changes | I can explore and respond to different natural phenomena in my setting. | I can explore changes in autumn, spring, summer and winter. I can explore what happens on a cold winter's day. | I can learn about the seasons and know it is autumn, spring, summer or winter. I can talk about the seasons and have some understanding about the changes that happen, for example, the food that grows on the farm in different seasons. | I know that the length of the day varies throughout the year. (CyA:Au1; CyA:Sp2; CyB:Sp1) I know the types of weather associated with the four season. (CyA:Au1; CyA:Sp2; CyB:Sp1) I can observe changes across the four seasons. (CyA:Au1; CyA:Sp2; CyB:Sp1) | | |
| Seasonal Changes: Key Vocabulary | rain sun wind snow | wet dry warm windy cloudy weather day night | autumn spring summer winter frost ice freezing lighter darker | season autumn spring summer winter | | |

| | Nursery 1 (Age 2 – 3) | Nursery 2 (Age 3 – 4) | Reception (Age 4 – 5) | Key Stage One | Lower Key Stage Two | Upper Key Stage Two |
|---|--|--|---|---|---|--|
| Living Things and Their Habitats: Habitats | | | I have an understanding of some animal habitats and can describe them and who lives in them. I can name a range of animals and where they live (habitat). | I know what a habitat and microhabitat is. (CyA:Au2) I know that most living things need shelter and food to survive. (CyA:Au2) I know that different living things are suited to different habitats. (CyA:Au2) I can describe the conditions in different habitats. (CyA:Au2) | | |
| Living Things and Their Habitats: Living Things | I enjoy stories about people and nature (birds, bees, cats, dogs etc.) and I'm interested in photographs of myself with these. | I enjoy stories about people and nature (birds, bees, cats, dogs etc.) and I'm interested in photographs of myself with these. | I can describe an animal using some scientific vocabulary. I can care for and look after animals, and encourage others to do so. I can compare animals and observe their changes (life cycles). I can talk about members of my family and my relationship to them, for example, mum and dad. | I know that there are seven life processes that all living things do; movement, respiration, sensitivity, nutrition, excretion, reproduction and growth. (CyB:Su2) I know the differences between things that are living, dead and things that have never been alive. (CyB:Su2) I know the differences between birds, reptiles, mammals, fish and amphibians. (CyB:Au2) | I know the difference between a vertebrate and an invertebrate. (CyB:Su1) I know the differences between different groups of vertebrates, including: fish, amphibians, reptiles, birds and mammals. (CyB:Su1) I know the differences between different groups of invertebrates, such as snails and slugs, worms, spiders and insects. (CyB:Su1) | I know the life process of reproduction in some plants. (CyA:Sp2) I know the life process of reproduction in some animals. (CyA:Sp2) I know the differences in the life cycles of mammals, amphibians, insects and birds. (CyA:Sp2) I know the difference between sexual and asexual reproduction in plants. (CyA:Sp2) I know how living things are classified into broad groups, including micro-organisms, plants and animals. (CyB:Su1) I know the reasons for classifying plants and animals based on specific characteristics. (CyB:Su1) I know the differences in the life cycles of mammals, amphibians, insects and birds. (CyA:Sp2) I know the life process of reproduction in some animals. (CyA:Sp2) |
| Living Things and Their Habitats: Key | animals people bugs | insects inside outside | animal names pond garden habitat wild birds insects life cycle | habitat microhabitat life processes food chain | vertebrate invertebrate fish amphibian reptile bird mammal insect | |

| | Nursery 1 (Age 2 – 3) | Nursery 2 (Age 3 – 4) | Reception (Age 4 – 5) | Key Stage One | Lower Key Stage Two | Upper Key Stage Two |
|--------------------------------|-----------------------|-----------------------|--|--|--|---|
| Plants: Types of Plants | | | I can observe the plants and trees around me, and how they change. | I know the names of the following plants; daffodils, daisies, buttercups, roses, poppies, tulips and dandelions. (CyA:Su2; CyB:Su1) I know that there are evergreen and deciduous trees. (CyA:Su2; CyB:Su1) | I can group plants into flowering plants and non- flowering plants. (CyB:Su1) | |
| Plants: Parts of a Plant | | | I can name the parts of a plant. | I can identify the basic structure of a flowering plant including a stem, leaves, roots and petals. (CyA:Su2; CyB:Su1) | I can label the functions of each part of a flowering plants (roots, stem/trunk, leaves and flowers). (CyA:Su1) | |
| Plants: Growing Healthy Plants | | | I can grow my own plants and look after them. | I know that plants need water, light and warmth to grow healthily. (CyA:Su2; CyB:Su1) | I know what plants need to grow. (CyA:Su1) I know the part that flowers play in the plant's life cycle. (CyA:Su1) | I know the life process of reproduction in some plants. (CyA:Sp2) I know the difference between sexual and asexual reproduction in plants. (CyA:Sp2) |
| Plants: Key Vocabulary | | | leaf flower seed tree plant | plant names evergreen deciduous | functions transported | life process reproduction root cutting parent plant propagation |

| | Nursery 1 (Age 2 – 3) | Nursery 2 (Age 3 – 4) | Reception (Age 4 – 5) | Key Stage One | Lower Key Stage Two | Upper Key Stage Two |
|------------|-----------------------|-----------------------|-----------------------|---------------|---|---------------------|
| Rocks | | | | | I can identify the three different types of rocks. (CyA:Au2) I know how fossils are formed. (CyA:Au2) I know how soil is formed. (CyA:Au2) I know how rocks may change in water. (CyA:Au2) | |
| Rocks: Key | V Cabural y | | | | fossil sedimentary igneous metamorphic eroding | |

| | Nursery 1 (Age 2 – 3) | Nursery 2 (Age 3 – 4) | Reception (Age 4 – 5) | Key Stage One | Lower Key Stage Two | Upper Key Stage Two |
|-----------------------|-----------------------|-----------------------|-----------------------|---------------|--|---|
| Light | | | | | I know that light is needed in order to see things. (CyA:Sp2) I know that dark is the absence of light. (CyA:Sp2) I know that light is reflected from surfaces. (CyA:Sp2) I know how and why I need to protect my eyes from the sun. (CyA:Sp2) I can investigate how shadows are formed and how they change. (CyA:Sp2) | I know that light appears to travel in straight lines. (CyB:Au2) I know that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. (CyB:Au2) I know that objects are seen because they give out or reflect light into the eye. (CyB:Au2) I know that light travels in straight lines so shadows have the same shape as the objects that cast them. (CyB:Au2) |
| Light: Key Vocabulary | | | | | absence reflect surface | light source reflect reflective refract prism |

| | Nursery 1 (Age 2 – 3) | Nursery 2 (Age 3 – 4) | Reception (Age 4 – 5) | Key Stage One | Lower Key Stage Two | Upper Key Stage Two |
|----------------------------|-----------------------|-----------------------|-----------------------|---------------|--|---|
| Forces and Magnets | | | | | I know that magnets can attract and repel. (CyA,Au1) I can investigate how objects move differently on different surfaces. (CyA,Au1) I know that magnets have two poles. (CyA,Au1) I know the difference between a push and a pull. (CyA:Au1) | I know that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. (CyA:Au1) I know about the effects of air resistance, water resistance and friction that act between moving surfaces. (CyA:Au1) I know that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. (CyA:Au1) |
| Forces and Magnets: Key | | | | | magnets attract repel force | gravity air resistance friction mechanism surface area |

| | Nursery 1 (Age 2 – 3) | Nursery 2 (Age 3 – 4) | Reception (Age 4 – 5) | Key Stage One | Lower Key Stage Two | Upper Key Stage Two |
|-----------------------|-----------------------|-----------------------|-----------------------|---------------|---|---------------------|
| Sound | | | | | I know that sound is made from vibrations. (CyB:Au1) I know the differences between patterns of vibrations. (CyB:Au1) I know that sounds get fainter as the distance from the sound source increases. (CyB:Au1) | |
| Sound: Key Vocabulary | | | | | vibration source decibel | |

| | Nursery 1 (Age 2 – 3) | Nursery 2 (Age 3 – 4) | Reception (Age 4 – 5) | Key Stage One | Lower Key Stage Two | Upper Key Stage Two |
|--------------------------------|-----------------------|-----------------------|-----------------------|---------------|---|---|
| Electricity | | | | | I know how to construct a simple series electrical circuit. (CyB:Sp1) I know some common electrical conductors and insulators. (CyB:Sp1) I know that a switch opens and closes a circuit. (CyB:Sp1) I know how to work safely when working with electricity. (CyB:Sp1) | I know what the components of the circuit are. (CyB:Au1) I know the electrical symbol for each component. (CyB:Au1) I know that the brightness of a bulb is determined by the number and voltage of cells used in a circuit. (CyB:Au1) I know that the volume of a buzzer is determined by the number and voltage of cells used in a circuit. (CyB:Au1) |
| Electricity: Key Vocabulary | | | | | series circuit conductor insulator switch component | component symbol bulb buzzer voltage cell |

| | Upper Key Stage Two | | | | | | | | |
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| Earth and Space | I know that the Sun is a star at the centre of our solar system. (CyA:Su2) I know that our solar system has eight planets: Mercuy, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. (Pluto is a 'dwarf planet.) (CyA:Su2) I know that a moon is a celestial body that orbits a planet. (CyA:Su2) I can describe the movement of the Earth, and other planets, is relative to the Sun in the solar system. (CyA:Su2) I can describe the movement of the Moon relative to the Earth. (CyA:Su2) I know that the Sun, Earth and Moon are approximately spherical bodies. (CyA:Su2) I know how the Earth's rotation explains day and night and the apparent movement of the Sun across the sky. (CyA:Su2) | | | | | | | | |
| Earth and Space: Key | planet names solar system celestial spherical rotate relative to | | | | | | | | |

| | Upper Key Stage Two | | | | | | | |
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| Evolution | I know that fossils provide information about living things that inhabited the Earth millions of years ago. (CyB:Sp2) I know that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. (CyB:Sp2) I know that animals and plants are adapted to suit their environment in different ways. (CyB:Sp2) I can explore how palaeontologists such as Mary Anning, Charles Darwin and Alfred Wallace developed their ideas of evolution. (CyB:Sp2) | | | | | | | |
| Evolution and Inheritance | identical variation adapt inherit evolve | | | | | | | |

| | Nursery 1 (Age 2 – 3) | Nursery 2 (Age 3 – 4) | Reception (Age 4 – 5) | Key Stage One | Lower Key Stage Two | Upper Key Stage Two |
|--------------------------------------|--|--|--|---|--|---|
| Working Scientifically: Observing | I can observe what animals, people and vehicles do, for example, watching where a spider has scuttled away under leaves. I can talk about what I can see. I can notice and am becoming interested in the transformative effect of my actions on materials and resources. I can manipulate and play with different materials. | I can observe what animals, people and vehicles do, for example, watching where a spider has scuttled away under leaves. I can talk about what I can see. I can notice and am becoming interested in the transformative effect of my actions on materials and resources. I can manipulate and play with different materials. | I can compare animals and observe their changes (life cycles). I can observe the plants and trees around me, and how they change. | I can observe what I see and record this through drawing. (CyA:Au1;Sp2;Su2;CyB:Sp1;Su1;Su2) I can observe what I see and record this through drawing. | I can make observations using scientific equipment. (CyA:Sp2;Su1) | I can draw conclusions from the observations that I make. (CyA:Au1;Sp2;Su2) |
| Working Scientifically: Grouping and | | | I can name a range of animals and where they live (habitat) and can sort some animals into the country that they live in. | I can group and classify based on criteria given to me by my teacher. (CyB:Au2) | I can compare and classify after choosing my own set of criteria. (CyA:Au2;CyB:Sp1) | I can compare and classify, after choosing my own set of criteria, and draw a conclusion from my findings. |
| Working Scientifically: Research | | | | | I can use straightforward scientific evidence to answer questions. (CyA:Su2;CyB:Su2) | I can identify scientific evidence that has been used to support or refute ideas or arguments. (CyA:Sp1) |
| Working Scientifically: Comparative | I am beginning to explore and experiment with an increasing range of media and movement through multi-sensory exploration and expression. I can explore different materials, using all of my senses to investigate them. | I am beginning to explore and experiment with an increasing range of media and movement through multi-sensory exploration and expression. I can explore different materials, using all of my senses to investigate them. | I understand what curiosity is and the importance of asking questions. I can explore the natural world around me, making observations. | I can perform simple tests to answer a question. | I can set up simple, practical enquiries. (CyA:Au1;CyB:Au2.Sp2) | I can plan different types of scientific enquiries to answer questions, including recognising and controlling variables. I can take measurements, using a range of scientific equipment. I can use test results to make predictions to set up further tests. (CyA:Au2;CyB:Au1) |

| Working Scientifically: Asking Questions | | | I can ask simple questions. (CyA:Au2;CyB:Au1;Sp2) | I can ask relevant questions, using different types of scientific enquiry to answer them. I can use results to draw simple conclusions, make predictions and suggest improvements. (CyA:Sp1;CyB:Au1;Su1) | I can plan different types of scientific enquiry to answer questions. (CyA:Su1;CyB:Su2) |
|--|--|--|---|--|---|
| Working Scientifically: Recording and | | I can explore the natural world around me, drawing pictures of animals and plants. | I can record data to help me to answer questions. (CyA:Au1;Au2;Sp2;Su1;CyB:S p1) | I can give oral and written explanations of results and conclusions. (CyA:Au2;Sp1;Sp2;Su2;CyB:Au1;Au2;Sp1;Sp2;Su2) I can record findings using drawings, labelled diagrams, bar charts and/or tables. (CyA:Au1;Sp1;Sp2;Su1;Su2;CyB:Au1;Au2;Sp2;Su1) | I can record data and results using scientific diagrams, classification keys, tables, scatter graphs and/or line graphs. (All units of work.) I can report and present my findings, including conclusions, causal relationships and explanations in oral and written forms. (All units of work.) |
| Working Scientifically: Key Vocabulary | | | observe data describe record group and classify investigate | enquire findings labelled diagrams compacting explanation criteria conclusion scientific evidence predict data logger equipment fair test | causal relationship refute present findings scientific diagram characteristic criteria present findings |