# OUR LADY AND ST. HUBERT'S PRIMARY Science Knowledge and Skills Progression





#### At Our Lady and St. Hubert's, home, school and parish work together, knowing that God is with us in all we do.

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OUR LADY AND ST. HUBERT'S PRIMARY | Science Knowledge and Skills Progression

#### Science Curriculum Intent

At Our Lady and St Hubert's, students will gain a strong understanding of the world around them, whilst acquiring specific skills and knowledge to help them to think scientifically. Children will aim to develop a sense of excitement and curiosity about natural phenomena and an understanding of how the scientific community contributes to our past, present and future. We want pupils to develop a complex knowledge of Biology, Chemistry and Physics, but also adopt a broad range of skills in working scientifically and beyond. The scheme of work is inclusive and meaningful, so all pupils may experience the joy of science and make associations between their science learning and their lives outside the classroom. Studying science allows children to appreciate how new knowledge and skills can be fundamental to solving arising global challenges linking to citizenship.

They will be encouraged to think about how they can use their scientific understanding to assist them in finding solutions to real world problems, using a range of skills.

### Implementation of the Science Curriculum

To meet the aims of the National curriculum for science at OLSH and in response to the Ofsted Research review into science, we have identified the following key strands for children to work through as they progress through school:

#### Scientific knowledge and understanding of:

- Biology living organisms and vital processes.
- Chemistry matter and its properties. Physics how the world we live in 'works.
- Working scientifically processes and methods of science to answer questions about the world around us.
- Science in action uses and implications of science in the past, present and for the future.

Through following Rosenshein's principles, we are allowing our children to know more and remember more. Our science scheme is a spiral curriculum, with essential knowledge and skills revisited with increasing complexity, allowing pupils to revise and build on their previous learning. A range of engaging recall activities promote frequent pupil reflection on prior learning, ensuring new learning is approached with confidence. The Science in action strand is interwoven throughout the scheme to make the concepts and skills relevant to pupils and inspiring for future application. Cross-curricular links are included throughout each unit, allowing children to make connections and apply their Science skills to other areas of learning. Each unit is based upon one of the key science disciplines; Biology, Chemistry and Physics and to show progression throughout the school we have grouped the National curriculum content into six key areas of science: Plants Animals, including humans Living things and habitats Materials Energy Forces, Earth and space. Pupils explore knowledge and conceptual understanding through engaging activities and an introduction to relevant specialist vocabulary. As suggested in Ofsted's Science research review (April

2021), the 'working scientifically' skills are integrated with conceptual understanding rather than taught discreetly. This provides frequent, but relevant, opportunities for developing scientific enquiry skills. The scheme utilises practical activities that aid in the progression of individual skills and also provides opportunities for full investigations.

### Impact of the Science Curriculum

We want our children at OLSH to develop a sense of excitement and curiosity about natural phenomena and an understanding of how the scientific community contributes to our past, present and future. We want pupils to develop a complex knowledge of Biology, Chemistry and Physics, but also adopt a broad range of skills in working scientifically and beyond. The scheme of work is inclusive and meaningful, so all pupils may experience the joy of science and make associations between their science learning and their lives outside the classroom. Studying science allows children to appreciate how new knowledge and skills can be fundamental to solving arising global challenges. Our curriculum aims to encourage critical thinking and empower pupils to question the hows and whys of the world around them. Our science scheme of work enables pupils to meet the end of key stage attainment targets in the National curriculum and the aims also align with those set out in the National curriculum.

When children leave OLSH, we want them to be competent and confident in their knowledge and be able to face real-world problems head on, funding new and inquisitive solutions to solve them.

### Whole School Science Overview

|        | OUR LADY AND ST. HUBERT'S PRIMARY<br>Whole School Science Overview |                          |                           |                                  |   |                                      |                    |  |
|--------|--|--------------------------|---------------------------|----------------------------------|---|--------------------------------------|--------------------|--|
|        | Autumn 1     Autumn 2     Spring 1     Spring 2     Summer 1       |                          | Summer 1                  | Sumr                             | ner 2                                   |                                      |                    |  |
|        | A Moment in Time   | Wonderful World          | Peace and Conflict        | Nurturing Nature                 | Change and Continuity                   | Our Place ir                         | n the World        |  |
| EYFS   | All About Me*  | Materials*               | Animal adventures         | l am a scientist                 | Our beautiful Plant                     | Changing                             | g Seasons          |  |
| Year 1 | Seasonal Changes   | Everyday Materials       | Sensitive Bodies          | Comparing Animals                | Introduction to Plants                  | Making Connections                   |                    |  |
| Year 2 | Habitats   | Microhabitats            | Use of Everyday Materials | Lifecycles and Health            | Plant Growth                            | Making Connections                   |                    |  |
| Year 3 | Movement and Nutrition   | Forces and Magnets       | Rocks and Soils           | Light and Shadows                | Plant Reproduction                      | Making Co                            | Making Connections |  |
| Year 4 | Digestion and Food   | Electricity and Circuits | States of Matter          | Sound and Vibrations             | Classification and Changing<br>Habitats | Making Connections                   |                    |  |
| Year 5 | Mixtures and Separation  | Properties and Changes   | Earth and Space           | Lifecycles and Reproduction      | Imbalanced Forces                       | Human Making<br>Timeline Connections |                    |  |
| Year 6 | Classifying Big and Small  | Light and Reflection     | Evolution and Inheritance | Circuits, Batteries and Switches | Circulation and Health                  | Making Connections                   |                    |  |

\*not units on Kapow

#### Substantive Vocabulary

Words typically classified as Tier 1 vocabulary, such as 'bird', are familiar to most learners due to their frequent use in everyday language. However, in science lessons, it is crucial that children learn the specific scientific meanings of these words, which often involve more detailed and precise definitions than their general usage. For example, while 'bird' is commonly known as a type of animal, scientifically, it specifically refers to a group of warm-blooded vertebrates with feathers, wings, and a beak, most of which are able to fly. We have included these kind of words in our progression, therefore.



#### **Tier 3 vocabulary**

These words are used infrequently in conversation and often their use is subject-specific. Textbook glossaries usually focus on Tier 3 words as they can tend to be abstract in nature. They require explicit teaching and contextualisation.

#### **Tier 2 vocabulary**

These words are of high-utility as they are words which appear across the school curriculum and in written texts. Often explicit teaching of Tier 2 words is not planned for but this can be the most productive place to focus vocabulary instruction.

#### **Tier 1 vocabulary**

The most basic words. These are the words that typically appear in conversation, meaning children are exposed to them often from a very early age. They rarely require explicit teaching because they are already familiar to the majority of children.

### Disciplinary Vocabulary

|  | Year 1   | Year 2             | Year 3  | Year 4                         | Year 5  |  |
|--|--|--------------------|---|--------------------------------|---|--|
|  |  | V                  | Vorking scientifical                              | lly                            |   |  |
| Question<br>Plan and predict           | plan   | predict            | variable<br>fair<br>method<br>investigate         | control variable               | model<br>testable<br>safety<br>hazard   |  |
| Observe, test<br>and measure<br>Record | observe<br>measure<br>diagram<br>table<br>sort<br>group  | test<br>research   | record<br>bar chart<br>results table<br>stopwatch | classify<br>classification key | temperature<br>thermometer<br>relationship<br>estimate<br>line of best fit<br>line graph<br>data<br>anomaly |  |
| Conclude<br>Evaluate                   | compare<br>similarity<br>difference  | results<br>pattern | conclusion<br>trustworthy                         | proof                          | evidence<br>advantage/<br>disadvantage/ strength/<br>weakness   |  |
|  | Science in action  |                    |   |                                |   |  |
|  | science<br>scientist   | invention          |   | ethics                         | discovery   |  |
|  | *The words on this need one Tier Queende with high utility serves a number of subjects Hervery it is important to ensure that in asi |                    |   |                                |   |  |

\*The words on this page are Tier 2 words, with high utility across a number of subjects. However, it is important to ensure that in scien understand the scientific meaning of these words, which may differ from their general usage or usage across other subjects.

| Year 6   |
|--|
|  |
| rate   |
|  |
|  |
| mean average<br>secondary data/source<br>units |
| scale  |
|  |
| evaluate<br>reliable                           |
|  |
|  |
|  |
| theory   |
|  |
| ence lessons, children                         |

| Year 1  | Year 2  | Year 3   | Year 4 | Year 5 |     |
|---|---|--|--------|--------|-----|
|   |   | Pla  | nts    |        |     |
| growth (1)<br>garden plants<br>wild plants<br>deciduous*<br>evergreen*<br>fruit (1)<br>seed (1)<br>bulb<br>flower (1)<br>leaf (1)<br>roots (1)<br>stem (1)<br>trunk (1) | germinate<br>energy* (2)<br>nutrient* (2)<br>life cycle* (2)<br>shoot | female (1)<br>male (1)<br>petal<br>pollen<br>pollination<br>seed formation<br>disperse (2)<br>support (2)<br>transport (2) | N/A    | N/A    | N/A |

\*This word occurs in the vocabulary progression for another key area.

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| Year 1   | Year 2  | Year 3  | Year 4  | Year 5  | Ye   | ear 6  |  |
|--|---|---|---|---|--|--|--|
|  | Living things and their habitats  |   |   |   |  |  |  |
|  |   | Aniı  | mals, including hun   | nans  |  |  |  |
| senses (1)<br>sight (1)<br>taste (1)<br>touch (1)<br>hearing (1)<br>amphibian<br>bird (1)<br>fish (1)<br>mammal<br>reptile<br>carnivore<br>herbivore<br>omnivore<br>diet | habitats/microhabitats<br>microhabitat<br>minibeast<br>habitat (2)<br>shelter (1)<br>alive (1)<br>dead (1)<br>predator (2)<br>prey (2)<br>food chain (2)<br>energy* (2)<br>depend (2)<br>teenager (1)<br>toddler (1)<br>health (1)<br>hygiene (1)<br>basic needs<br>survive<br>life cycle* (2)<br>egg (1)<br>pupa<br>tadpole<br>live young<br>spawn | N/A<br>balanced (diet) (2)<br>carbohydrate<br>fat<br>fibre<br>vitamin<br>mineral<br>nutrient*<br>protein<br>skeleton<br>vertebrate<br>invertebrate<br>bone (1)<br>joint<br>muscle (1) | conservation (2)<br>deforestation (2)<br>endangered (2)<br>pollution (2)<br>nature reserve<br>flowering plants<br>non-flowering plants<br>saliva<br>small intestine<br>stomach (1)<br>mouth (1)<br>oesophagus<br>large intestine<br>digest (2)<br>faeces<br>incisor<br>canine<br>molar<br>premolar<br>producer* | adolescence* (2)<br>characteristic (2)<br>asexual reproduction<br>fertilisation*<br>mating<br>offspring<br>reproduction (2)<br>incubation<br>gestation<br>gills<br>lungs*<br>ovule<br>germination<br>foetus<br>gestation period<br>hormones<br>period (menstruation)<br>puberty | organism<br>life processes<br>warm-blooded<br>cold-blooded<br>Insect (1)<br>exoskeleton<br>micro-organism<br>circulatory system<br>heart (1)<br>blood (1)<br>blood stream<br>blood vessels<br>lungs<br>pulse<br>heart rate<br>carbon dioxide<br>oxygen<br>drug | adaptation (2)<br>competition (2)<br>environment (2)<br>evolution (2)<br>extinct (2)<br>fossil*<br>gene<br>inherit/inheritance (2)<br>natural selection<br>parent (biological) (1)<br>population (2)<br>selective breeding<br>survival of the fittest (2)<br>variation (2) |  |

The 'Living things and their habitats' and 'Animals, including humans' units share strong connections and overlap. To avoid repetition, we have combined the vocabulary from these key areas into a single progression.

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| Year 1  | Year 2 | Year 3   | Ye   | ar 4   | Year 5  | Year 6 |
|---|--------|--|--|--|---|--------|
|   |        | Fo   | rces, Earth and Sp   | ace  |   |        |
| weather (1)<br>season (1)<br>deciduous tree*<br>evergreen tree* | N/A    | force (2)<br>contact force<br>non-contact force<br>friction (2)<br>magnetism (2)<br>magnet (2)<br>north pole<br>south pole<br>attract (2)<br>repel (2) | celestial bodies<br>spherical<br>orbit (2)<br>moon (1)<br>star (1)<br>planet (1)<br>gravity (2)<br>phase (2) | solar system<br>Mercury<br>Venus<br>Earth<br>Mars<br>Jupiter<br>Saturn<br>Uranus<br>Neptune<br>Pluto | unbalanced (2)<br>balanced (2)<br>air resistance<br>water resistance<br>gear<br>lever<br>pulley | N/A    |

| Year 1 | Year 2 | Year 3   | Yea  | ar 4   | Year 5 | Year 6   |
|--------|--------|--|--|--|--------|--|
|        |        |  | Energy   |  |        |  |
| N/A    | N/A    | cast (a shadow)<br>light source<br>luminous<br>non-luminous<br>opaque<br>reflect<br>reflection<br>reflective (shiny)<br>shadow (1)<br>translucent<br>transparent | air (1)<br>vibration<br>eardrum<br>insulator*<br>pitch (2)<br>volume (2) | appliance<br>electricity (1)<br>power source<br>mains<br>circuit (2)<br>bulb<br>buzzer<br>cell/battery<br>motor<br>switch (2)<br>wire (1)<br>property*<br>electrical conductor*<br>electrical insulator* | N/A    | light ray<br>optical fibre<br>periscope<br>pupil<br>ray diagram<br>circuit diagram<br>current<br>resistance (2)<br>voltage |

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| Year 1  | Year 2  | Year 3  | Year 4   | Year 5   | Year 6 |
|---|---|---|--|--|--------|
|   |   | Mate  | erials   |  |        |
| material<br>object<br>fabric<br>glass (1)<br>metal (1)<br>plastic (1)<br>rock (1)<br>wood (1)<br>absorbent<br>tough<br>waterproof (1) | property<br>suitable (1)<br>elastic<br>flexible (2) | crystal<br>fossil<br>grain<br>hard<br>hardness<br>sediment<br>sedimentary rock<br>sedimentation<br>soft | boiling<br>condensing<br>evaporating<br>evaporation rate<br>freezing<br>gas<br>liquid<br>melting<br>precipitation<br>solid<br>steam<br>the water cycle | conductor*<br>insulator*<br>electrical conductivity*<br>thermal conductivity<br>mixture<br>irreversible change<br>reversible change<br>rust/rusting<br>burning<br>dissolve<br>soluble<br>insoluble<br>solution<br>filtering (2)<br>sieve/sieving | N/A    |

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| 1 | 1 |  |
|---|---|--|
| 1 |   |  |
|   |   |  |

OUR LADY AND ST. HUBERT'S PRIMARY | Science Knowledge and Skills Progression

### Disciplinary Vocabulary

|  | Year 1   | Year 2             | Year 3  | Year 4                         | Year 5  |  |
|--|--|--------------------|---|--------------------------------|---|--|
|  |  | v                  | Vorking scientifical                              | ly                             |   |  |
| Question<br>Plan and predict           | plan   | predict            | variable<br>fair<br>method<br>investigate         | control variable               | model<br>testable<br>safety<br>hazard   |  |
| Observe, test<br>and measure<br>Record | observe<br>measure<br>diagram<br>table<br>sort<br>group  | test<br>research   | record<br>bar chart<br>results table<br>stopwatch | classify<br>classification key | temperature<br>thermometer<br>relationship<br>estimate<br>line of best fit<br>line graph<br>data<br>anomaly |  |
| Conclude<br>Evaluate                   | compare<br>similarity<br>difference  | results<br>pattern | conclusion<br>trustworthy                         | proof                          | evidence<br>advantage/<br>disadvantage/ strength/<br>weakness   |  |
|  | Science in action  |                    |   |                                |   |  |
|  | science<br>scientist   | invention          |   | ethics                         | discovery   |  |
|  | *The words on this need are Tier Querds with high utility screes a number of subjects. However, it is important to ensure that is so |                    |   |                                |   |  |

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| Year 6   |
|--|
|  |
| rate   |
|  |
|  |
| mean average<br>secondary data/source<br>units |
| scale  |
|  |
| evaluate<br>reliable                           |
|  |
|  |
|  |
| theory   |
|  |
| ence lessons, children                         |

### Types of Vocabulary

# Receptive vs expressive vocabulary



#### **Receptive vocabulary**

The words a person understands when they hear or read them. Vocabulary that an individual can recognise and comprehend even if they do not actively use it in conversation or writing.



Some vocabulary will be used in lessons earlier than indicated in this document; this is done intentionally. Pupils often understand vocabulary receptively *before* they can confidently use it expressively. Our lesson plans guide teachers to model new vocabulary before the vocabulary is explicitly taught and before pupils are expected to use it to communicate ideas themselves. At times, the teacher may model use of new word, but children may use synonyms

The year groups listed represent when pupils are expected to retain the vocabulary and its meanings, and begin to actively use the words in appropriate contexts. We have chosen to focus on when vocabulary is used expressively, as this makes it easier for teachers to assess.

However, active use of new vocabulary does not necessarily imply complete mastery of each word or concept, as understanding continues to evolve and deepen over time. For instance, in Year 1, pupils might recognise the term 'season' as different times of the year characterised by specific weather patterns. By Year 5, they develop a deeper understanding of why seasons occur, exploring the Earth's tilt and its orbit around the Sun.

#### **Expressive vocabulary**

The words that a person can actively use in speech or writing to communicate.

### EYFS

|  | EYFS (Re   | eception)  |   |
|--|--|--|---|
| Animal adventures  | I am a scientist - coming soon!  | Our beautiful planet- coming soon!   |   |
| <ul> <li>To know the names of familiar animals (e.g. farm animals, pets and animals seen in storybooks.)</li> <li>To know the main body parts of common animals (number of legs, wings, fur, tail).</li> <li>To know that animals, including humans use their senses to explore the world.</li> <li>To know that animals need food.</li> <li>To know that animals and plants move, grow and feed.</li> <li>To know the difference between things that are living and things that are non-living.</li> <li>To know that plants and animals live in a range of different places (land, sea, air).</li> <li>To name some different places where animals live on the school site.</li> </ul> | To recognise that things around us<br>are made from different materials.<br>To describe materials using the<br>senses (hard, soft, strong, bendy).<br>To understand that some materials<br>can change shape. | To know the name for the basic plant<br>parts (leaves, flowers, stem and roots.)<br>To know the names of some familiar<br>flowering plants (e.g. daisy, rose,<br>sunflower, daffodil).<br>To know plants are alive.<br>To know that seeds need water to<br>grow.<br>To know that seeds grow into plants if<br>taken care of. | To know<br>four set<br>To know<br>(leaves<br>daffod<br>To know<br>throug<br>To know<br>(rain, set |

#### **Changing seasons**

w that some animals hibernate re food in winter.

w that some trees change in the easons.

ow some signs of each season s on the ground, cold weather, fils growing and sunny weather).

ow that the weather changes ghout the year.

ow and compare weather types sun, snow, wind).

|   |  | Year 1  |  |
|---|--|---|--|
| Seasonal changes  | Everyday materials   | Sensitive bodies  | Comparing animals  |
| *To know the name and order of<br>the four seasons; spring, summer,<br>autumn and winter.<br>To know that it is unsafe to look<br>directly at the Sun.<br>*To know weather associated<br>with the four seasons and how it<br>changes (in the UK).<br>To understand that day length<br>varies across the four seasons,<br>with fewer daylight hours in the<br>winter and more in the summer. | <ul> <li>To know that objects are items or things.</li> <li>To know that a material is what an object is made from.</li> <li>To identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock.</li> <li>To know that property refers to how a material can be described.</li> <li>To describe the physical properties of a variety of everyday materials.</li> <li>To understand that materials can be grouped based on their physical properties.</li> </ul> | To know key parts of the human<br>body (including head, neck, arms,<br>elbows, legs, knees, face, ears,<br>eyes, hair, mouth, teeth).<br>To know the five main senses:<br>sight, smell, hearing, taste and<br>touch.<br>To know that eyes are used for<br>sight, the nose is used for smell,<br>ears are used for hearing, the<br>tongue and mouth are used for<br>taste and the skin is used for<br>touch. | <ul> <li>*To know the main body parts of common animals (arms, legs, wings, tails, fins, head, trunk, horns/tusks, shell)</li> <li>*To know a variety of common animals (including fish, amphibians, reptiles, birds and mammals).</li> <li>*To know that a carnivore is an animal that eats other animals and give some examples.</li> <li>*To know that a herbivore is an animal that eats only plants and give some examples.</li> <li>*To know that an omnivore is an animal that eats both animals and plants, and give some examples.</li> </ul> |

|   | Introduction to plants   |
|---|--|
| f | To know a variety of common plants, and how they differ.   |
|   | To know that deciduous trees<br>lose their leaves seasonally, but<br>evergreen trees do not.   |
|   | *To know the basic structure<br>(including leaves, flowers<br>(blossom), fruit, roots, bulb, seed,<br>trunk, branches, stem) of a<br>variety of common plants,<br>including flowering plants and<br>trees. |
| I | *To begin to understand how<br>plants grow and change over<br>time.  |
| ı |  |
|   |  |
|   |  |
|   |  |

|  |   | Year 2  |  |   |
|--|---|---|--|---|
| <u>Habitats</u>  | <u>Micro-</u><br>habitats   | Uses of everyday materials  | Life cycles and health   | Plant growth  |
| To know that a habitat is the enviror<br>lives/grows, because it provides what<br>To know that a micro-habitat is a ver<br>and leaf litter).<br>To know that living things depend up<br>shelter.)<br>*To begin to understand some of<br>the life processes, including<br>movement, reproduction,<br>sensitivity, growth, excretion and<br>nutrition.<br>*To know the difference between<br>things that are living, dead, and<br>things that have never been alive,<br>using some of the life processes.<br>To name a variety of habitats,<br>including woodland, ocean,<br>rainforest and coastal.<br>To understand that a food chain<br>can be used to show how animals<br>obtain food from eating either<br>plants and/or other animals. | hals and describe some differences.<br>Inment where an animal or plant<br>at they need to survive.<br>In y small habitat (e.g. stones, logs<br>pon each other (e.g. for food, | <ul> <li>*To know why objects are made<br/>from particular materials and to<br/>give examples of their suitability.</li> <li>*To know that one material can be<br/>used for a range of purposes (and<br/>to give examples.)</li> <li>*To know that different materials<br/>can be used for the same purpose<br/>(and to give examples.)</li> <li>*To know why certain materials<br/>are unsuitable for particular<br/>objects.</li> <li>To know that a push or pull must<br/>be applied to change the shape of<br/>a solid object.</li> <li>*To know that solid objects can be<br/>squashed, bent, twisted or<br/>stretched.</li> <li>To know that different solid<br/>objects may take a different<br/>amount of force to change shape.</li> </ul> | <ul> <li>To understand how living things change, and that animals have offspring that grow into adults.</li> <li>To know which offspring comes from which parent animal.</li> <li>To know the stages in some animal life cycles.</li> <li>To know that animals, including humans, need water, food and air to survive.</li> <li>To understand the importance of exercise, a balanced diet and hygiene for humans.</li> </ul> | <ul> <li>*To know that seeds and bulbs grow into seedlings by producing roots and shoots.</li> <li>To know that seedlings grow into mature plants by developing parts such as roots, stems, leaves and flowers.</li> <li>*To know that seeds need water and warmth to germinate.</li> <li>*To know that plants need water, light and a suitable temperature for growth and health.</li> </ul> |
|  |   |   |  |   |

|   |   | Year 3  |  |   |
|---|---|---|--|---|
| Movement and nutrition  | Forces and magnets  | Rocks and soil  | Light and shadows  |   |
| <ul> <li>To know that animals can be grouped based on the presence of a skeleton.</li> <li>To know that the skeleton in humans and some animals is used for movement, protection and support.</li> <li>*To know that the muscular system in humans and some animals works with the skeleton for movement.</li> <li>To know the main bones in the body.</li> <li>To know that animals, including humans, need the right types and amount of nutrition.</li> <li>To understand that humans cannot make their own food and therefore eat to get the nutrition needed.</li> <li>*To know the main food groups (carbohydrates, protein, fats, fibre, vitamins, minerals and water) and their simple functions.</li> <li>To know that a balanced diet should include all food groups.</li> <li>To describe the diets of different animals.</li> </ul> | <ul> <li>To know some examples of contact and non-contact forces.</li> <li>To know that some forces are a result of contact between two surfaces, but some forces can act at a distance (e.g. magnetism).</li> <li>To know the North and South poles of a magnet.</li> <li>To know some examples of magnetic materials, including iron and nickel, and how they react to a magnet and each other.</li> <li>To know some different examples of magnets, including bar, horseshoe, button and ring,</li> <li>To know some uses of magnets.</li> <li>*To know that friction is a contact force that acts between two surfaces to slow an object down.</li> <li>To know that magnetism is a non-contact force that affects objects containing magnetic metal.</li> <li>To understand that the opposite poles of a magnet attract one another and like poles repel one another.</li> </ul> | To know that rocks can be<br>grouped based on their<br>appearance or properties, (e.g.<br>colour, texture, hardness,<br>permeability.)<br>To know that rocks may contain<br>grains, crystals or fossils.<br>To know that grains and crystals<br>appear differently and can be<br>used to classify rocks.<br>To know that soils are made from<br>rocks and dead matter.<br>*To understand the relationship<br>between the properties of rocks<br>and their uses.<br>To know that fossils can form<br>from the remains of living things.<br>To know that rocks can change<br>over time (e.g. erosion,<br>weathering). | <ul> <li>To know that light travels from a source (e.g. the Sun, light bulbs and torches).</li> <li>To know that light is needed to see things and that dark is the absence of light.</li> <li>To know that light from the Sun can be dangerous and how to protect their eyes.</li> <li>To know that materials reflect light.</li> <li>*To know that shadows are formed when the light from a light source is blocked by an opaque object.</li> <li>To know that shadows change as a result of different factors: <ul> <li>Changing the position of the light source.</li> <li>Changing the distances between the light source, object and surface.</li> </ul> </li> <li>To know that shadows change position and length throughout the day as the Sun changes position in the sky.</li> </ul> | T broken<br>from the term of the term of the term of terms o |
|   | To understand that the strength of different magnets may vary.  | *This knowledge is revisite<br>Does hand span affect grip   | ed in our Year 3 Making connect<br>o <u>strength?</u>  | io  |

#### Plant reproduction

- To understand the functions of the pasic parts of a plant and the elationship between structure and unction.
- To know that water is transported within a plant from the root, through he stem, to the leaves.
- To know that plants need water, light, air, nutrients/fertilizer and a suitable emperature for growth and health.
- To understand that the needs for growth and health vary from plant to plant.
- To know the life cycle of a plant from seed to mature plant.
- To know that flowers are the reproductive organ of a plant.
- To know that the process of collination is the transfer of pollen to he female (part of the) flower.
- To know that the process of seed ormation is the growth of a seed after pollination/fertilisation.
- To know some different methods of seed dispersal and the benefits of each.

#### ons unit:

|  |   | Ye   | ear 5  |  |
|--|---|--|--|--|
| Mixtures and separation  | Properties and changes  | Earth and space  | Life cycles and<br>reproduction  | Unbalanced forces  |
| To know that some substances<br>will dissolve in a liquid to form<br>a solution.<br>To know the factors that affect<br>the rate of dissolving,<br>including temperature and<br>stirring.<br>*To know that some liquids<br>and solids can be separated<br>using sieving, filtering and<br>evaporation and to describe<br>these processes. | *To describe a broader range<br>of materials and their<br>properties, including<br>hardness, solubility,<br>transparency, conductivity<br>and response to magnets.<br>To understand that dissolving,<br>mixing and changes of state<br>are reversible changes.<br>To understand that some<br>changes result in the<br>formation of new materials<br>and that these are usually<br>irreversible. (e.g. burning,<br>rusting, the action of acid on<br>bicarbonate of soda.) | <ul> <li>To know that the Sun is a star at the centre of our solar system.</li> <li>*To know that the Sun, Earth and Moon are approximately spherical bodies.</li> <li>To know the names, order and relative positions of the planets and other main celestial bodies.</li> <li>To know that a moon is a celestial bodies.</li> <li>To know that a moon is a celestial body that orbits a planet and give examples of moons that orbit other planets.</li> <li>*To know that the Earth and other planets orbit around the Sun.</li> <li>To know that the tilt of the Earth and its orbit around the Sun.</li> <li>To know that the tilt of the Earth and its orbit around the Sun causes the seasons.</li> <li>To know that the Moon orbits around the Earth.</li> <li>To understand how the Earth's rotation causes day and night and the apparent movement of the Sun across the sky.</li> </ul> | To know that a life<br>cycle shows the<br>changes an animal<br>or plant goes<br>through until the<br>reproduction of a<br>new generation<br>when the cycle<br>starts again.<br>To know that all<br>living things must<br>reproduce for the<br>species to survive.<br>To know that<br>sexual<br>reproduction<br>requires two<br>parents, whereas<br>asexual<br>reproduction only<br>requires one<br>parent.<br>*To know that<br>there are different<br>processes plants<br>and animals use to<br>reproduce (asexual<br>and sexual<br>reproduction). | To know that gravity is a non-contact<br>that pulls objects together.<br>*To know that air resistance and wat<br>resistance are both types of friction.<br>*To know that unsupported objects f<br>towards the Earth because of gravity<br>To know that friction, air resistance a<br>water resistance act in the opposite<br>direction to a moving object.<br>To know that when forces are imbala<br>the speed, shape or direction of an of<br>changes.<br>To know that when forces are balance<br>speed, shape or direction of an object<br>the same.<br>To know that some mechanisms inclu-<br>levers, pulleys and gears allow a sma<br>force to have a greater effect.<br>To know that rougher surfaces have<br>friction between them than smoother<br>surfaces and how that may affect<br>movement.<br>To know that the larger the surface a<br>an object the greater the air or water<br>resistance it creates. |

|                 | <u>Human timeline</u>  |
|-----------------|--|
| force           | To describe the human life<br>cycle, including the stages of<br>growth and development<br>(baby, toddler, child,<br>teenager, adult, elderly). |
| all             | To describe changes that<br>occur during puberty (in boys<br>and girls).   |
| nd              | To know that gestation<br>periods vary across<br>mammals.  |
| nced,<br>ject   |  |
| ed the<br>stays |  |
| ding<br>ler     |  |
| nore            |  |
| rea of          |  |
|                 |  |

|   |  | Year 6   |  |
|---|--|--|--|
| Classifying big and small   | Light and reflection   | Evolution and inheritance  | Circuits, batteries and switches   |
| To know that 'organism' is a term<br>used to refer to an individual<br>living thing.<br>To know that micro-organisms<br>are organisms that are incredibly<br>small and cannot usually be seen<br>by the naked eye.<br>*To know the characteristics of<br>the different groups of vertebrate<br>and commonly found<br>invertebrates. | To know that light travels in a<br>straight line from a light source.<br>*To understand that luminous<br>objects are seen as a result of light<br>directly entering the eye, whereas<br>non-luminous objects reflect light<br>into the eye.<br>To know that shiny surfaces reflect<br>light uniformly.<br>*To know that when light is<br>reflected off a surface, its direction<br>changes.<br>To know that mirrors and<br>periscopes work using reflection of<br>light on smooth surfaces.<br>To understand why shadows have<br>the same shape as the objects that<br>cast them as a result of light<br>travelling in straight lines.<br>To understand relationships<br>between light sources, objects and<br>shadows.<br>To understand how and why the<br>distance between the object and<br>the screen affects the size of the<br>shadow.<br>To understand how the angle of a<br>reflected ray is affected by the<br>angle of the incoming ray, when<br>reflected from a plane surface. | To know that living things have<br>changed over time.<br>To know that fossils provide us<br>with information about living<br>things that inhabited the Earth<br>millions of years ago.<br>*To know that characteristics are<br>passed from parents to their<br>offspring, but that all offspring<br>vary from their parents.<br>*To know that over time,<br>variation in offspring can affect<br>animals' chances of survival in<br>particular environments.<br>*To know that animals and plants<br>have adapted to suit their<br>environment over many millions<br>of years and that this process can<br>be called evolution. | *To know a wider variety of<br>components in a series circuit<br>(including buzzer and motor).<br>*To know the conventions used to<br>draw circuit diagrams, including<br>the recognised symbols for<br>common components and using<br>straight lines.<br>To know that the voltage of a<br>circuit can be changed and how<br>this affects bulb brightness (or<br>buzzer volume). |

#### **Circulation and health**

To know the main parts of the human circulatory system (heart, blood vessels and blood).

To know that the heart pumps blood around the body.

To know that the blood vessels transport blood around the body.

To know that the blood transports vital substances around the body, including oxygen and nutrients.

To understand the relationships between different organ systems.

\*To understand the impact of diet, exercise, drugs and lifestyle on the way a body functions.

To know that the heart rate is the number of beats per minute.

To know that exercise increases heart rate.

#### Making connections

The Making connections units are an integral part of the Kapow Primary Science scheme, designed around the principle that deep learning occurs when pupils can link new information with existing knowledge. They are the culminating unit in each year group and allow pupils an opportunity to revisit, revise and apply their learning in a new context.

The units integrate and connect scientific concepts and working scientifically skills studied in recent units, as pupils engage in full enquiries and apply the enquiry cycle in new contexts. The emphasis on practical, hands-on lessons and guided enquiries supports the development of independent learning skills and scientific thinking.

'Consolidation of knowledge takes time. The curriculum therefore needs to not just take account of when new component knowledge is introduced, but also ensure that there is sufficient time for this knowledge to be practised and securely remembered in long-term memory.

Ofsted research review series: Science, 2021

#### Aims of the Making connections units:

- To **revise** key knowledge and skills from units throughout the year, embedding disciplinary knowledge within substantive content.
- To provide further opportunities for **practical**, **hands-on** learning, engaging pupils in experiments and scientific investigations to apply their knowledge practically and learn how disciplinary knowledge is used across different substantive contexts.
- To foster teamwork by encouraging collaboration and communication among pupils, enhancing social skills and cooperative learning.
- To inspire **awe and wonder in pupils**, igniting their curiosity about the natural world and demonstrating the real-life applications and societal significance of scientific theory.
- To promote **outdoor and active** learning by using movement-based activities and outdoor space wherever possible, providing real-world contexts for scientific enquiry and exploration.
- To establish **cross-curricular links**, enhancing pupils' overall educational experience by connecting science learning with other subjects

\*These aims align with recommendations from the 'Early Endowment Foundation: Improving Primary Science' (November 2023) and the 'Research Review Series: Science' (April 2021). Both documents highlight the importance of revisiting and consolidating knowledge, practical science activities and the development of scientific enquiry skills.



### Scientific Enquiry KS2

The 5 main types of Scientific Enquiry include research using secondary sources, observing over time, comparative and fair testing, identifying, classifying and groups, pattern seeking. Once children have had experience with these enquiry types, and a competent in their knowledge of them, they may encounter Problem Solving. Children will encounter questions which cannot be answered by using one of the 5 main types of scientific enquiry. In this event, children will use their scientific knowledge to support themselves in finding a solution using problem solving.

Over the course of each academic year, pupils will carry out several investigations which involve different types of enquiries.



### Scientific Enquiry KS1







### Scientific Enquiry Cycle – Working Scientifically Skills

This part of the curriculum is the area in which children will develop their disciplinary knowledge. Children will have opportunities to carry out practical investigations in science that help them to develop their scientific skills. The ways in which these skills are used will progress throughout year groups and become more independent. The use of each of these skills will be taught to children explicitly where necessary, before being used as part of a scientific investigation so that children can develop their understanding behind the use of each skill and how to use them appropriately.



# Working Scientifically – Progression of skills EYFS

| EYI                               | S: Reception   | Animal adventures | l am a scientist -<br>coming soon! | Our beautiful planet -<br>coming soon! | ( |
|-----------------------------------|--|-------------------|------------------------------------|--|---|
| Posing questions                  | With support, asking questions about the natural world.                                    | ~                 |                                    |  |   |
| Planning                          | Beginning to share ideas and suggestions<br>about what to do, when working<br>practically. |                   |                                    |  |   |
| Predicting                        | Beginning to make guesses about what might happen.   |                   |                                    |  |   |
| Observing<br>(qualitative data)   | Commenting on what they see and hear<br>in the natural world.                              | ~                 |                                    |  |   |
| Measuring<br>(quantitative data)  | Using non-standard units to measure.   |                   |                                    |  |   |
| Researching                       | Recognising that information can be found online and in books.                             | ~                 |                                    |  |   |
| Recording (diagrams)              | Drawing and labelling pictures of plants<br>and animals.                                   | ~                 |                                    |  |   |
| Recording (tables)                | Recognising that tables can be used to<br>record information.                              |                   |                                    |  |   |
| Grouping and classifying          | With support, grouping objects, plants<br>and animals.                                     | ~                 |                                    |  |   |
| Analysing and drawing conclusions | Describing their discoveries when<br>working practically.                                  |                   |                                    |  |   |



|                     | Year 1  | Seasonal changes | <u>Everyday</u><br>materials | Sensitive bodies | Comparing<br>animals | Introduction to<br>plants | Investigating<br>science through<br>stories |
|---------------------|---|------------------|------------------------------|------------------|----------------------|---------------------------|---|
| Posing<br>questions | Exploring the world around<br>them and raising their own<br>simple questions.       | ~                |                              |                  |                      | ~                         | ~   |
|                     | Recognising there are different<br>types of enquiry (ways to<br>answer a question). |                  |                              | ~                | ~                    | ~                         | ~   |
|                     | Responding to suggestions on how to answer questions.                               |                  | ~                            |                  | ~                    | ~                         | ~   |
| Planning            | Beginning to recognise whether a planned test is fair.                              |                  | ~                            |                  |                      |                           | ~   |
|                     | With support, deciding if suggested observations are suitable.                      |                  | ~                            |                  | ~                    | ~                         | ~   |
|                     | Ordering a simple method.   |                  |                              |                  |                      | ~                         |   |
| Predicting          | Suggesting what might happen,<br>often justifying with personal<br>experience.      | ~                | ~                            |                  |                      | ~                         | ~   |

|                                     | Year 1   | Seasonal changes | Evervdav<br>materials | Sensitive bodies | Comparing<br>animals | Int |
|-------------------------------------|--|------------------|-----------------------|------------------|----------------------|-----|
| Observing<br>(qualitative<br>data)  | Using their senses to describe,<br>in simple terms, what they<br>notice or what has changed.                   | ~                | ~                     | ~                | ~                    |     |
|                                     | Using non-standard units to<br>measure and compare.  |                  |                       | ~                |                      |     |
| Measuring<br>(quantitative<br>data) | Beginning to use standard units<br>and read simple scales to<br>measure and compare.                           |                  |                       |                  |                      |     |
|                                     | Beginning to use simple<br>measuring equipment to make<br>approximate measurements.                            |                  |                       |                  |                      |     |
| Researching                         | Gathering specific information<br>from one simplified, specified<br>source.                                    | ~                |                       |                  |                      |     |
| Recording<br>(diagrams)             | Drawing and labelling simple diagrams.   |                  |                       | ~                | ~                    |     |
| Recording<br>(tables)               | Using a prepared table to<br>record results including:<br>Numbers.<br>Simple observations.<br>Tally frequency. | ~                | ~                     | ~                |                      |     |
| Grouping and                        | Grouping based on visible characteristics.   |                  | ~                     | ~                | ~                    |     |
| classifying                         | Organising questions to create<br>a simple classification key.   |                  | Covered in Year 2     |                  |                      |     |



|  | Year 1  | <u>Seasonal changes</u> | <u>Evervdav</u><br>materials | Sensitive bodies | Comparing<br>animals | Int |
|--|---|-------------------------|------------------------------|------------------|----------------------|-----|
| Graphing                                 | Representing data using<br>pictograms and block graphs.                             | ~                       |                              |                  | ~                    |     |
| Analysing and<br>drawing<br>conclusions. | Using their results to answer simple questions.                                     | ~                       | ~                            | ~                | ~                    |     |
|  | Beginning to recognise when results or observations do not match their predictions. |                         | ~                            |                  |                      |     |



|                     | Year 2  | <u>Habitats</u> | <u>Micro-</u><br>habitats | <u>Uses of everyday</u><br><u>materials</u> | <u>Life cycles and</u><br><u>health</u> | <u>Plant growth</u> | <u>Plant-based</u><br><u>materials</u> |
|---------------------|---|-----------------|---------------------------|---|---|---------------------|--|
| Posing<br>questions | Exploring the world around<br>them and raising their own<br>simple questions.       | ~               | ~                         |   |   | ~                   | ~                                      |
|                     | Recognising there are different<br>types of enquiry (ways to<br>answer a question). | ~               | ~                         | ~   | ~                                       | ~                   | ~                                      |
|                     | Responding to suggestions on<br>how to answer questions.                            |                 | ~                         |   |   | ~                   | ~                                      |
|                     | Beginning to recognise<br>whether a planned test is fair.                           |                 |                           |   |   | ~                   | ~                                      |
| Planning            | With support, deciding if<br>suggested observations are<br>suitable.                |                 | ~                         |   |   | ~                   | ~                                      |
|                     | Ordering a simple method.   |                 | ~                         |   |   |                     |  |
| Predicting          | Suggesting what might happen,<br>often justifying with personal<br>experience.      |                 | ~                         |   |   | ~                   | ~                                      |

|                                     | Year 2   | <u>Habitats</u> | <u>Micro-</u><br>habitats | <u>Uses of evervdav</u><br><u>materials</u> | Life cvcles and<br>health | E |
|-------------------------------------|--|-----------------|---------------------------|---|---------------------------|---|
| Observing<br>(qualitative<br>data)  | Using their senses to describe,<br>in simple terms, what they<br>notice or what has changed.                   |                 | ~                         |   |                           |   |
| Measuring<br>(quantitative<br>data) | Using non-standard units to<br>measure and compare.  |                 |                           | ~   |                           |   |
|                                     | Beginning to use standard units<br>and read simple scales to<br>measure and compare.                           |                 |                           |   | ~                         |   |
|                                     | Beginning to use simple<br>measuring equipment to make<br>approximate measurements.                            |                 |                           |   | ~                         |   |
| Researching                         | Gathering specific information<br>from one simplified, specified<br>source.                                    | ~               | ~                         |   | ~                         |   |
| Recording<br>(diagrams)             | Drawing and labelling simple diagrams.   |                 |                           |   |                           |   |
| Recording<br>(tables)               | Using a prepared table to<br>record results including:<br>Numbers.<br>Simple observations.<br>Tally frequency. | ~               | ~                         | ~   | ~                         |   |
| Grouping and classifying            | Grouping based on visible characteristics.   | ~               | ~                         | ~   |                           |   |
|                                     | Organising questions to create<br>a simple classification key.   |                 | ~                         |   |                           |   |



|  | Year 2  | <u>Habitats</u> | <u>Micro-</u><br>habitats | <u>Uses of evervdav</u><br><u>materials</u> | Life cycles and<br><u>health</u> | <u>Plant growth</u> | <u>Plant-based</u><br><u>materials</u> |
|--|---|-----------------|---------------------------|---|----------------------------------|---------------------|--|
| Graphing                                 | Representing data using<br>pictograms and block graphs.                             |                 |                           | ~   |                                  |                     |  |
| Analysing and<br>drawing<br>conclusions. | Using their results to answer simple questions.                                     |                 | ~                         | ~   | ~                                | ~                   | ~                                      |
|  | Beginning to recognise when results or observations do not match their predictions. |                 | ~                         |   |                                  | ~                   | ~                                      |

|                     | Year 3  | <u>Movement and</u><br><u>nutrition</u> | Forces and<br>magnets | Rocks and soil | Light and<br>shadows | Plant<br>reproduction | Does hand span<br>affect grip<br>strength? |
|---------------------|---|---|-----------------------|----------------|----------------------|-----------------------|--|
|                     | Beginning to raise further questions during the<br>enquiry process.   |   |                       |                | ~                    | ~                     | ~  |
| Posing<br>questions | Considering what makes a testable question.   |   |                       |                | ~                    | ~                     |  |
|                     | Beginning to recognise that there are different<br>types of enquiry and that they are suitable for<br>different questions.  |   |                       |                | ~                    | ~                     | ~  |
|                     | Beginning to make suggestions about how different questions could be answered   |   |                       |                | ~                    | ~                     |  |
|                     | Beginning to select from options which variables will be changed, measured and controlled.  |   | ~                     |                |                      |                       | ~  |
|                     | Beginning to suggest what observations to make and how long to make them for.   |   |                       |                |                      | ~                     |  |
| Planning            | Planning a simple method, verbally and in writing.  |   | ~                     |                |                      | ~                     |  |
|                     | Beginning to write a simple method in numbered steps.   |   | ~                     |                |                      |                       |  |
|                     | Selecting and beginning to decide what simple equipment might be used to aid observations and measurements.   |   |                       |                |                      | ~                     |  |
| Predicting          | <ul> <li>Making predictions about what they think will happen by: <ul> <li>Using scientific knowledge and/or personal experience to explain their prediction (because)</li> <li>Beginning to consider cause and effect when making predictions, where appropriate.</li> <li>Predicting a trend by considering how the changing variable will affect the measured variable. (The smoother the surface, the longer the distance the car will travel)</li> </ul> </li> </ul> |   |                       | ~              |                      |                       | ~  |

|                                 | Year 3   | Movement and<br>nutrition | Forces and<br>magnets | Rocks and soil | Light and<br>shadows |
|---------------------------------|--|---------------------------|-----------------------|----------------|----------------------|
| Observing<br>(qualitative data) | Using their senses to describe, in more detail and with simple scientific vocabulary, what they notice or what has changed.  |                           |                       | v              | v                    |
|                                 | Using standard units to measure and compare.   | ~                         |                       |                | ~                    |
| Measuring<br>(quantitative      | Using measuring equipment with increasing accuracy.  | ~                         |                       |                | ~                    |
|                                 | Reading scales with unmarked intervals between numbers.  | ~                         |                       |                | V                    |
| Researching                     | Gathering specific information from a variety of sources.  | ~                         | V                     | ~              |                      |
| Recording<br>(diagrams)         | <ul> <li>Beginning to draw more scientific diagrams by:</li> <li>Using some standard symbols.</li> <li>Drawing in 2D to produce simple line diagrams.</li> <li>Labelling with more scientific vocabulary.</li> </ul> |                           | ~                     | ~              |                      |
|                                 | Using a prepared table to record results including more detailed observations.   | ~                         |                       |                | v                    |
|                                 | Using tables with more than two columns.   |                           |                       |                | v                    |
| Recording (tables)              | Identifying and adding headings to tables.   |                           |                       |                | ~                    |
|                                 | Beginning to design simple results tables.   |                           |                       |                | ~                    |
| Grouping and classifying        | Grouping based on visible characteristics and measurable properties.   | ~                         |                       | ~              | v                    |
|                                 | Populating a pre-prepared branching and number key.  |                           |                       | Covered i      | n Year 4             |
|                                 | Choosing appropriate questions for<br>classification keys.   |                           | Covered in Year 4     |                |                      |



OUR LADY AND ST. HUBERT'S PRIMARY | Science Knowledge and Skills Progression

|              | Year 3   | Movement<br>and nutrition | Forces and<br>magnets | Rocks and<br>soil | Light and<br>shadows | Plant<br>reproduction | Does hand<br>span affect<br>grip<br>strength? |
|--------------|--|---------------------------|-----------------------|-------------------|----------------------|-----------------------|---|
|              | Representing data using bar charts.  |                           | ~                     | ~                 |                      | ~                     | ~   |
| Graphing     | Drawing bars with greater accuracy.  |                           |                       | ~                 |                      | ~                     | ~   |
|              | Reading the value of bars with greater accuracy.   |                           |                       | ~                 | ~                    |                       | ~   |
|              | Writing a conclusion to summarise findings using simple scientific vocabulary.   | ~                         | ~                     | ~                 | ~                    | ~                     | ~   |
|              | Beginning to suggest how one variable may have affected another.   |                           | ~                     |                   | ~                    | ~                     | ~   |
| Analysing    | Beginning to quote results as evidence of relationships.   |                           | ~                     |                   | ~                    | ~                     |   |
| conclusions. | Identifying data that does not fit a pattern (anomalous data).   |                           |                       |                   | ~                    | ~                     | ~   |
|              | Recognising when results or observations do not match their predictions.   |                           |                       |                   | ~                    | ~                     | ~   |
|              | Beginning to use identified patterns to predict new values or trends.  |                           |                       | ~                 | ~                    | ~                     | ~   |
|              | Beginning to identify steps in the method that need changing and suggest improvements.   |                           |                       |                   | ~                    | ~                     | ~   |
|              | Identifying which variables were difficult to control and suggesting how to<br>better control them.  |                           |                       |                   | ~                    | ~                     | ~   |
| Evaluating   | <ul> <li>Commenting on the degree of trust by reflecting on:         <ul> <li>Results that do not fit a pattern (anomalies).</li> <li>The quality of results (accurate measurements and maintaining control variables).</li> </ul> </li> </ul> |                           |                       |                   | ~                    | ~                     | ~   |
|              | Beginning to identify new questions that would further the enquiry.  | ~                         |                       |                   | ~                    | www.kapov             | primary.com 16                                |

OUR LADY AND ST. HUBERT'S PRIMARY | Science Knowledge and Skills Progression

|            | Year 4  | Digestion and food | Electricity and<br>circuits | States of matter | Sound and<br>vibrations | <u>Classifica-</u><br>tion and changing<br><u>habitats</u> | How does the flow<br>of liquids<br>compare? |  |  |  |
|------------|---|--------------------|-----------------------------|------------------|-------------------------|--|---|--|--|--|
|            | Beginning to raise further questions during the enquiry process.  | ~                  |                             |                  |                         |  | ~   |  |  |  |
| Posing     | Considering what makes a testable question.   |                    | ~                           | ~                |                         |  |   |  |  |  |
| questions  | Beginning to recognise that there are<br>different types of enquiry and that they are<br>suitable for different questions.  | ~                  | ~                           |                  |                         |  | ~   |  |  |  |
|            | Beginning to make suggestions about how different questions could be answered   |                    | ~                           | ~                |                         |  |   |  |  |  |
|            | Beginning to select from options which<br>variables will be changed, measured and<br>controlled.  | ~                  | ~                           |                  | ~                       |  | ~   |  |  |  |
|            | Beginning to suggest what observations to make and how long to make them for.   | Covered in Year 3  |                             |                  |                         |  |   |  |  |  |
| Planning   | Planning a simple method, verbally and in writing.  |                    | ~                           |                  |                         |  |   |  |  |  |
|            | Beginning to write a simple method in<br>numbered steps.  |                    | ~                           |                  |                         |  |   |  |  |  |
|            | Selecting and beginning to decide what simple equipment might be used to aid observations and measurements.   |                    | ~                           |                  |                         |  |   |  |  |  |
| Predicting | <ul> <li>Making predictions about what they think will happen by:</li> <li>Using scientific knowledge and/or personal experience to explain their prediction (because)</li> <li>Beginning to consider cause and effect when making predictions, where appropriate.</li> <li>Predicting a trend by considering how the changing variable will affect the measured variable. (The smoother the surface, the longer the distance the car will travel)</li> </ul> |                    |                             | ~                |                         |  | ~   |  |  |  |

|                                     | Year 4   | Digestion and<br>food | Electricity and<br>circuits | States of matter | Sound and<br>vibrations |
|-------------------------------------|--|-----------------------|-----------------------------|------------------|-------------------------|
| Observing<br>(qualitative data)     | Using their senses to describe, in more detail<br>and with simple scientific vocabulary, what they<br>notice or what has changed.  | V                     | V                           | ~                | v                       |
|                                     | Using standard units to measure and compare.   | V                     |                             | ~                |                         |
| Measuring<br>(quantitative<br>data) | Using measuring equipment with increasing accuracy.  | ~                     |                             | ~                |                         |
|                                     | Reading scales with unmarked intervals between numbers.  |                       |                             | v                |                         |
| Researching                         | Gathering specific information from a variety of sources.  |                       |                             | ~                | v                       |
| Recording<br>(diagrams)             | <ul> <li>Beginning to draw more scientific diagrams by:</li> <li>Using some standard symbols.</li> <li>Drawing in 2D to produce simple line diagrams.</li> <li>Labelling with more scientific vocabulary.</li> </ul> |                       | ~                           | ~                |                         |
|                                     | Using a prepared table to record results including more detailed observations.   | v                     | ~                           |                  |                         |
| Recording                           | Using tables with more than two columns.   | V                     | ~                           |                  |                         |
| (tables)                            | Identifying and adding headings to tables.   |                       | v                           |                  |                         |
|                                     | Beginning to design simple results tables.   | v                     |                             |                  |                         |
| Classification<br>keys              | Grouping based on visible characteristics and measurable properties.   | v                     | v                           |                  |                         |
|                                     | Populating a pre-prepared branching and number key.  |                       |                             |                  |                         |
|                                     | Choosing appropriate questions for<br>classification keys.   |                       |                             |                  |                         |



|                             |   |                       | 10                          |                  |                  |
|-----------------------------|---|-----------------------|-----------------------------|------------------|------------------|
|                             | Year 4  | Digestion and<br>food | Electricity and<br>circuits | States of matter | Sound a vibratio |
|                             | Representing data using bar charts.   |                       |                             |                  | v                |
| Graphing                    | Drawing bars with greater accuracy.   |                       |                             |                  | v                |
|                             | Reading the value of bars with greater accuracy.  |                       |                             |                  | V                |
|                             | Writing a conclusion to summarise findings using simple scientific vocabulary.  | ~                     | ~                           | V                |                  |
|                             | Beginning to suggest how one variable may have affected another.  | ~                     | ~                           |                  |                  |
| Analysing<br>and            | Beginning to quote results as evidence of relationships.  | ~                     |                             |                  |                  |
| drawing<br>conclusion<br>s. | Identifying data that does not fit a pattern (anomalous data).  | ~                     |                             |                  |                  |
|                             | Recognising when results or observations do not match their predictions.  |                       |                             |                  | v                |
|                             | Beginning to use identified patterns to predict new values or trends.   |                       | ~                           | ~                |                  |
|                             | Beginning to identify steps in the method that need changing and suggest improvements.  | ~                     |                             |                  |                  |
| Evaluating                  | Beginning to identify which variables were difficult to control and suggesting how to better control them.  | ~                     |                             |                  |                  |
|                             | Commenting on the degree of trust by reflecting on: <ul> <li>Results that do not fit a pattern (anomalies).</li> <li>The quality of results (accurate measurements and maintaining control variables).</li> </ul> | ~                     |                             |                  |                  |
|                             | Beginning to identify new questions that would further the enquiry.   | ~                     |                             |                  |                  |



|                     | Year 5   | <u>Mixtures and</u><br>separation | Properties and<br>changes | Earth and<br>space | Life cycles and<br>reproduction | <u>Unbalanced</u><br><u>forces</u> | <u>Human</u><br><u>timeline</u> | Does the size<br>of an asteroid<br>affect its<br>impact<br>strength? |
|---------------------|--|-----------------------------------|---------------------------|--------------------|---------------------------------|------------------------------------|---------------------------------|--|
| Posing<br>questions | Raising questions throughout the<br>enquiry process.   |                                   |                           | ~                  | ~                               |                                    |                                 | ~  |
|                     | Identifying testable questions.  |                                   |                           | ~                  | ~                               |                                    |                                 | ~  |
|                     | Selecting the most appropriate enquiry method to answer questions and give justification.  | ~                                 |                           | ~                  | ~                               |                                    |                                 | ~  |
|                     | Suggesting which variables will be<br>changed, measured and controlled.  | ~                                 |                           |                    | ~                               | ~                                  |                                 | ~  |
|                     | Making and explaining decisions about<br>what observations to make and how long<br>to make them for.   | ~                                 |                           |                    | ~                               | ~                                  |                                 |  |
| Planning            | Writing a method including detail about<br>how to ensure control variables are kept<br>the same.   |                                   | ~                         |                    |                                 | ~                                  |                                 |  |
|                     | Writing a method that considers reliability by planning repeated readings.   |                                   |                           |                    |                                 | ~                                  |                                 |  |
|                     | Suggesting the most appropriate<br>equipment to make observations and<br>measurements and justifying their<br>choices.   |                                   | ~                         |                    | ~                               | ~                                  |                                 |  |
| Predicting          | <ul> <li>Making increasingly scientific predictions by: <ul> <li>Using previous scientific knowledge and evidence to inform their predictions.</li> <li>Using scientific language to describe a potential outcome or explain why they think something will happen.</li> <li>Making links between topics to evidence a prediction.</li> </ul> </li> </ul> |                                   | ~                         | ~                  | ~                               |                                    | ~                               | ~  |

|                                    | Year 5   | Mixtures and separation | Properties and<br>changes | Earth and space | Life cycles and<br>reproduction | Unbalanced<br>forces |
|------------------------------------|--|-------------------------|---------------------------|-----------------|---------------------------------|----------------------|
| Observing<br>(qualitative<br>data) | Using their senses to describe, in detail and<br>with a broader range of scientific<br>vocabulary, what they notice or what has<br>changed.  | ~                       |                           |                 | ~                               |                      |
| Measuring                          | Using standard units to measure and<br>compare with increasing precision<br>(decimals).  |                         | ~                         | ~               |                                 |                      |
| (quantitative<br>data)             | Reading a wider variety of scales with<br>unmarked intervals between numbers.  |                         |                           | ~               |                                 |                      |
| Researching                        | Gathering answers to open-ended<br>questions from a variety of sources.  | ~                       |                           |                 | ~                               |                      |
| Recording<br>(diagrams)            | <ul> <li>Drawing scientific diagrams by:</li> <li>Using a wider range of standard symbols.</li> <li>Drawing with increasing accuracy.</li> <li>Labelling with a broader range of scientific vocabulary.</li> <li>Annotating diagrams to explain concepts and convey opinions.</li> </ul> | ~                       |                           | ~               |                                 | ~                    |
|                                    | Using tables with columns that allow for repeat readings.  |                         |                           |                 |                                 | 4                    |
| Recording                          | Suggesting headings to tables, including units.  |                         | ~                         | ~               |                                 | ~                    |
| (tables)                           | Designing results tables with increasing independence with consideration of variables where applicable.  |                         | ~                         | ~               |                                 | ~                    |
|                                    | Calculating the mean average.  |                         |                           |                 |                                 | ~                    |
|                                    | Grouping in a broader range of contexts.   |                         |                           |                 | Covered in Year 6               |                      |
| Grouping and<br>classifying        | Organising the layout of number and branching keys.  |                         |                           |                 | Covered in Year 6               |                      |
|                                    | Formulating appropriate questions for<br>classification keys.  |                         |                           |                 | Covered in Year 6               |                      |



OUR LADY AND ST. HUBERT'S PRIMARY | Science Knowledge and Skills Progression

|  | Year 5   | Mixtures and<br>separation | Properties and<br>changes | Earth and space | Life cycles and<br>reproduction | Unbalanced<br>forces | <u>Human timeline</u> | Does the size of<br>an asteroid affect<br>its impact<br>strength? |
|--|--|----------------------------|---------------------------|-----------------|---------------------------------|----------------------|-----------------------|---|
| Graphing                                   | Representing data by using line graphs and scatter graphs.   |                            |                           |                 | ~                               | ~                    | ~                     | ~   |
|  | Plotting points with greater accuracy.   |                            |                           |                 | ~                               | ~                    | ~                     | ~   |
|  | Reading the value of plotted points with greater accuracy.   |                            |                           | ~               | ~                               | ~                    | ~                     | ~   |
| Analysing<br>and<br>drawing<br>conclusions | Writing a conclusion to summarise findings using<br>increasingly complex scientific vocabulary.  |                            |                           | ~               | ~                               | ~                    | ~                     | ~   |
|  | Suggesting with increasing independence how one variable may have affected another.  |                            | ~                         |                 | ~                               | ~                    | ~                     | ~   |
|  | Quoting relevant data as evidence of relationships.  |                            | ~                         | ~               | ~                               | ~                    | ~                     | ~   |
|  | Identifying anomalies in repeat data and excluding results where appropriate.  |                            |                           |                 |                                 | ~                    | ~                     | ~   |
|  | Comparing individual, class and/or model data to the prediction and recognising when they do not match.  |                            |                           |                 | ~                               | ~                    |                       | ~   |
|  | Using identified patterns to predict new values or trends.   |                            |                           | ~               | ~                               |                      | ~                     | ~   |
| Evaluating                                 | Identifying steps in the method that need changing and suggesting improvements.  |                            |                           |                 |                                 | ~                    |                       | ~   |
|  | Identifying which variables were difficult to control and suggesting how to better control them.   |                            |                           |                 |                                 | ~                    |                       | ~   |
|  | <ul> <li>Commenting on the degree of trust by also reflecting on:</li> <li>Accuracy (human error with equipment).</li> <li>Reliability (repeating results).</li> <li>Sources of information (e.g. websites, books).</li> </ul> |                            | ~                         |                 |                                 | ~                    | ~                     | ~   |
|  | Deciding what data to collect to further test direct relationships.  |                            |                           |                 | ~                               |                      | × .                   | ~   |

| Year 6              |  | Classifving big<br>and small | Light and<br>reflection | Evolution and<br>inheritance | <u>Circuits.</u><br>batteries and<br>switches | <u>Circulation and</u><br><u>health</u> | <u>Are some</u><br><u>sunglasses safer</u><br><u>than others?</u> |
|---------------------|--|------------------------------|-------------------------|------------------------------|---|---|---|
| Posing<br>questions | Raising questions throughout the enquiry process.  |                              | ~                       |                              |   |   | ~   |
|                     | Identifying testable questions.  |                              | ~                       |                              |   |   | ~   |
|                     | Selecting the most appropriate enquiry<br>method to answer questions and give<br>justification.  |                              | ~                       | ~                            |   |   | ~   |
| Planning            | Suggesting which variables will be changed, measured and controlled.   |                              | ~                       |                              | ~   | ~                                       | ~   |
|                     | Making and explaining decisions about what<br>observations to make and how long to make<br>them for.   |                              |                         |                              | ~   | ~                                       | ~   |
|                     | Writing a method including detail about how to ensure control variables are kept the same.   |                              |                         |                              | ~   | ~                                       | ~   |
|                     | Writing a method that considers reliability by<br>planning repeated readings.  |                              |                         |                              | ~   | ~                                       | ~   |
|                     | Suggesting the most appropriate equipment<br>to make observations and measurements and<br>justifying their choices.  |                              |                         |                              | ~   | ~                                       | ~   |
| Predicting          | <ul> <li>Making increasingly scientific predictions by:</li> <li>Using previous scientific knowledge<br/>and evidence to inform their<br/>predictions.</li> <li>Using scientific language to describe<br/>a potential outcome or explain why<br/>they think something will happen.</li> <li>Making links between topics to<br/>evidence a prediction.</li> </ul> |                              | ~                       |                              | ~   | ~                                       | ~   |

| Year 6                              |  | <u>Classifying big</u><br>and small | Light and<br>reflection | Evolution and<br>inheritance | <u>Circuits,</u><br><u>batteries and</u><br><u>switches</u> | <u>Circulation and</u><br><u>health</u> | <u>Are some</u><br><u>sunglasses safer</u><br><u>than others?</u> |
|-------------------------------------|--|-------------------------------------|-------------------------|------------------------------|---|---|---|
| Observing<br>(qualitative data)     | Using their senses to describe, in detail and<br>with a broader range of scientific vocabulary,<br>what they notice or what has changed.   | ~                                   |                         | ~                            | ~   | ~                                       | ~   |
| Measuring<br>(quantitative<br>data) | Using standard units to measure and<br>compare with increasing precision<br>(decimals).  |                                     |                         |                              | ~   | ~                                       | ~   |
|                                     | Reading a wider variety of scales with<br>unmarked intervals between numbers.  |                                     | ~                       |                              | ~   | ~                                       | ~   |
| Researching                         | Gathering answers to open-ended questions from a variety of sources.   |                                     |                         |                              |   | ~                                       | ~   |
| Recording<br>(diagrams)             | <ul> <li>Drawing scientific diagrams by:</li> <li>Using a wider range of standard symbols.</li> <li>Drawing with increasing accuracy.</li> <li>Labelling with a broader range of scientific vocabulary.</li> <li>Annotating diagrams to explain concepts and convey opinions.</li> </ul> |                                     | ~                       |                              | ~   |   | ~   |
|                                     | Using tables with columns that allow for repeat readings.  |                                     | ~                       | ~                            | ~   | ~                                       | ~   |
| Decording (tables)                  | Suggesting headings to tables, including units.  |                                     |                         |                              | ~   | ~                                       | ~   |
| Recording (tables)                  | Designing results tables with increasing<br>independence with consideration of<br>variables where applicable.  |                                     |                         |                              | ~   |   | ~   |
|                                     | Calculating the mean average.  |                                     | ~                       | ~                            | ~   | ~                                       | ~   |
|                                     | Grouping in a broader range of contexts.   | ~                                   |                         | ~                            |   |   | ~   |
| Grouping and<br>classifying         | Organising the layout of number and<br>branching keys.   | ~                                   |                         |                              |   |   |   |
|                                     | Formulating appropriate questions for<br>classification keys.  | ~                                   |                         |                              |   | www.ka                                  | powprimary.com <b>27</b>  |

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| Year 6                                   |  | <u>Classifving big</u><br>and small | Light and<br>reflection | Evolution and<br>inheritance | Circuits.<br>batteries and<br>switches | <u>Circulation and</u><br><u>health</u> | Are some<br>sunglasses safer<br>than others? |
|--|--|-------------------------------------|-------------------------|------------------------------|--|---|--|
| Graphing                                 | Representing data by using line graphs and scatter graphs.   |                                     | ~                       |                              |  | ~                                       | ~  |
|  | Plotting points with greater accuracy.   |                                     | ~                       |                              |  | ~                                       | ~  |
|  | Reading the value of plotted points with greater accuracy.   |                                     |                         |                              |  | ~                                       | ~  |
| Analysing<br>and drawing<br>conclusions. | Recognise the following across a broader range of contexts and in<br>more complexity: <ul> <li>Naturally occurring patterns and relationships.</li> <li>Making comparisons to group and classify.</li> <li>Changes over time.</li> <li>Relevant secondary data.</li> </ul> |                                     | ~                       | ~                            | ~                                      | ~                                       | ~  |
|  | Writing a conclusion to summarise findings using increasingly<br>complex scientific vocabulary.  |                                     | ~                       | ~                            | ~                                      | ~                                       | ~  |
|  | Suggesting with increasing independence how one variable may have affected another.  |                                     | ~                       | ~                            | ~                                      | ~                                       | ~  |
|  | Quoting relevant data as evidence of relationships.  |                                     | ~                       | ~                            | ~                                      | ~                                       | ~  |
|  | Identifying anomalies in repeat data and excluding results where appropriate.  |                                     | ~                       | ~                            | ~                                      | ~                                       | ~  |
|  | Comparing individual, class and/or model data to the prediction<br>and recognising when they do not match.   |                                     | ~                       | ~                            | ~                                      | ~                                       | ~  |
|  | Using identified patterns to predict new values or trends.   |                                     | ~                       |                              | ~                                      | ~                                       | ~  |
| Evaluating                               | Identifying steps in the method that need changing and suggesting improvements.  |                                     |                         | ~                            | ~                                      |   | ~  |
|  | Identifying which variables were difficult to control and suggesting how to better control them.   |                                     | ~                       | ~                            | ~                                      |   | ~  |
|  | Commenting on the degree of trust by also reflecting on:<br>Accuracy (human error with equipment).<br>Reliability (repeating results).<br>Sources of information (e.g. websites, books).   |                                     | ~                       | ~                            | ~                                      | ~                                       | ~  |
|  | Deciding what data to collect to further test direct relationships.  |                                     |                         |                              |  |   |  |

#### The 6Cs and Science

At Our Lady and St Hubert's, our lessons are underpinned by our 6Cs- '21st Century skills for effective learning'. These skills will support our children in being prepared for whatever they encounter when they leave education and enter society and the workforce.

|   |  | The 6Cs and Science   |  |  |  |  |  |  |
|---|--|---|--|--|--|--|--|--|
|   | How                                      | How our 6Cs will be evident through our computing curriculum  |  |  |  |  |  |  |
| Character   |  | Citizenship   |  |  |  |  |  |  |
| Children will develop perseverance and resilience, solving real-we debugging their solutions.                                     | orld problems and Children about is      | will learn to use technology safely and responsibly. They will use techn<br>sues affecting their community and the wider world. They will design t<br>solutions to real-world problems. | cology to learn<br>technological Children will use IT to pre<br>technologies to communic |  |  |  |  |  |
| Collaboration   | Ģ  | Creativity  |  |  |  |  |  |  |
| Children will work collaboratively to solve problems and design digi<br>make use of communications technologies to collaborate mo | al artefacts. They will ore effectively. | n will be given lots of opportunities to identify problems, and then hav<br>d make programs and digital artefacts that solve them, incorporating th<br>of algorithms and programming.   | re chances to<br>Children will use the pro<br>real-world problems. Th                    |  |  |  |  |  |

Communication

esent and communicate their learning. They will use internet cate, adapting their modes of communication appropriately.

Critical thinking

presses of Computational thinking to logically analyse and solve ney will learn to evaluate the reliability of information they find online and analyse it critically.