

**Heathcoat Primary School**

**Science Curriculum – Progression of Key Skills and Knowledge**

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| Date | Review date | Subject leaders |
| 1.7.2021 | July 2022 | Steph Bowkett  Helen Emanuel  Amy Johnson |
| It is our intention that pupils will be taught a curriculum that:    • builds upon prior knowledge. The progression of skills is created to ensure all children have a secure understanding and knowledge of key science concepts  • develops creativity and challenges all  • will develop aspirational learners with an awareness of the key role that science plays within our community and the world, and the opportunities that this creates for future careers  • encourages our children to be self-motivated, independent, curious and resilient learners by developing inquiry-based skills and sessions. | | |

**Curriculum Organisation**

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| **Year / Term** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| **1** | Animals including humans | Seasonal changes | Everyday materials | Animals | Plants |  |
| **2** | Uses of everyday materials | Living things and their habitats | Animals including humans |  | Plants |  |
| **3** | Light | Rocks | Forces and magnets |  | Animals including humans -Skeletons | Plants |
| **4** | States of matter | Sound | Electricity |  | Animals including humans – Digestion and teeth, food chains | Living things and their habitats - classification, changing environments |
| **5** | Properties and changes of materials |  | Forces | Earth and Space | Animals including humans - Human development from birth to old age | Living things and their habitats - life cycles and reproduction |
| **6** |  | Light | Electricity | Evolution and inheritence | Animals including humans- circulation, nutrition, lifestyles | Living things and their habitats - classification |

(Topics may be moved around across the year)

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| Progression Map | | | | | |
| **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| Research | | | | | |
| **Animals including humans**  Research different animal/ groups of animals and their unique features. | **Animals including humans**  Ask questions and use secondary sources to find out about animals and the life cycles of some animals.  Ask questions of a parent about how they look after their baby  Ask pet owners questions about how they look after their pet. | **Animals including humans**  Use food labels to explore the nutritional content of a range of food items.  Use secondary sources to find out the types of food that contain different nutrients  Use food labels to answer enquiry questions e.g. How much fat do different types of pizza contain? How much sugar is in soft drinks?  Use secondary sources to research the parts and functions of the skeleton  Investigate pattern seeking questions such as; Can people with longer legs run faster? Can people with bigger hands catch a ball better?  Refer to school dinner menu; what is the example from each food group on each day? | **Animals including humans**  Research and then create food chains. | **Animals including humans**  Research the gestation periods of other animals and comparing them with humans. | **Animals including humans**  Research to gain information to be able to write a scientific report on how the human circulatory system works.  Use labelled diagrams to support understanding of how nutrients and oxygen are delivered around the body.  Use information to identify the main components of the heart. |
|  | **Living things and their habitats:**  Create simple food chains for a familiar local habitat from first-hand observation and research. |  | **Living things and their habitats**  Use research to explore human impact on the local environment e.g. litter, tree planting, plastic pollution.  Use secondary sources to find out about how environments may naturally change. | **Living things and their habitats**  Draw and label appropriate scientific diagrams following use of secondary sources and first-hand observations relating to the life cycle of a range of animals. | **Living things and their habitats**  Research an unfamiliar animal or plant using its characteristics to establish where it belongs in the classification system  Use secondary sources to learn about the formal classification system devised by Carl Linnaeus and why it is important. |
| **Plants**  Research common and wild plants and trees. | **Plants**  Research and plan when and how to plant a range of seeds and bulbs. | **Plants**  Children research and observe flowering plants in the school environment  Research different types of seed dispersal  Spot flowers, seeds, berries and fruits outside throughout the year. |  |  |  |
| **Materials**  Research everyday materials and the properties they have. | **Use of everyday materials**  Research using secondary sources- What are the uses of wood? |  | **States of matter**  Investigate and explore making gases visible  Investigate melting point of different materials.  Investigate how to melt ice more quickly.  Use secondary sources to find out about the water cycle. | **Properties and changes of materials**  Research new materials produced by chemists e.g. Spencer Silver (glue of sticky notes) and Ruth Benerito (wrinkle free cotton). |  |
|  |  | **Light**  Investigates questions related to an object and the shadow it will cause. |  |  | **Light**  Investigate the use of mirrors to reflect light and record using straight line diagrams to indicate the direction of light. |
|  |  | **Rocks**  Can identify plant/animal matter and rocks in samples of soil. |  |  |  |
|  |  | **Forces and magnets**  Make and investigate predictions on whether two magnets will attract or repel, depending on which poles are facing. |  |  |  |
| **Seasonal changes**  Research about the sun and moon and how they affect our seasons/days. |  |  |  | **Earth and space**  Use secondary sources to research the movement of the Earth around the Sun and the Moon around the Earth.  Use secondary sources to find out about and possibly create a model to show why day and night occur.  Research time zones around the world. |  |
|  |  |  | **Sound**  Research and show how sound travels through particles and into the ear. |  |  |
|  |  |  | **Electricity**  Investigate which materials can be used instead of wires to make an electrical circuit. |  |  |
|  |  |  |  | **Forces**  Research how the work of scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation. |  |
|  |  |  | **Sound**  Research and show how sound travels through particles and into the ear. |  |  |
|  |  |  |  |  | **Evolution and inheritance**  Research the work of Mary Anning and understand how this provided evidence of evolution.  Compare the ideas of Charles Darwin and Alfred Wallace on evolution.  Refer to and use examples of fossil evidence that support the theory of evolution. |
| Pattern Seeking | | | | | |
| **Animals including humans**  Take measurements of parts of the body and present results in a table to interpret. | **Animals including humans**  Measuring body parts of children of different ages. | **Animals including humans**  Investigate pattern seeking questions such as: Can people with longer legs run faster? Can people with bigger hands catch a ball better? |  | **Animals including humans**  Find out and record the length and mass of a baby as it grows. |  |
|  | **Living things and their habitats**  Can give key features that mean the animal or plant is suited to its microhabitat. Using a food chain can explain what animals eat. Can explain in simple terms why an animal or plant is suited to a habitat |  | **Living things and their habitats**  Use secondary sources to find out about human impact, both positive and negative, on environments | **Living things and their habitats**  Use data to compare and find patterns, for example to compare the gestation times for mammals and look for patterns e.g. in relation to size of animal or length of dependency after birth/Look for patterns between the size of an animal and its expected life span). |  |
| **Plants**  Point to and name the parts of a plant, recognising that they are not always the same e.g. leaves and stems may not be green, the leaves are different shapes | **Plants**  Make comparisons between plants as they grow.  Can spot similarities and difference between bulbs and seeds. | **Plants-** Observe what happens to plants over time when the leaves or roots are removed. Observe the effect of putting cut white carnations or celery in coloured water. |  |  |  |
| **Materials**  Explore similarities and differences of a variety of materials e.g. is this a stretchy material or is this rigid? | **Use of everyday materials**  Ask and answer questions about everyday materials that they experience in their everyday life. |  | **States of matter**  Explore freezing different liquids.  Observe and measure temperature of icy water, tap water, hot water.  Observe water evaporating and condensing. |  |  |
| **Seasonal changes**  Use their evidence to describe some other features of the weather, surroundings, themselves, animals, and plants found in autumn. |  |  |  | **Earth and space**  Consider the views of scientists in the past and how evidence was used to deduce the shapes and movements of the Earth, Moon and planets before space travel. |  |
|  |  | **Light**  Research how light can be reflected off surfaces(eg shiny; foil, mirrors and matt; sugar paper) in a darker environment according to which reflect most light. |  |  |  |
|  |  | **Forces and magnets**  Compare and group materials following magnetic testing, recording findings and use the outcome to answer questions about which materials are magnetic. |  |  |  |
|  |  |  |  |  | **Electricity**  Make electric circuits and demonstrate, following investigation, how variation in the working of components can be changed |
|  |  |  |  |  | **Evolution and inheritance**  Identify characteristics that will make a plant or animal suited or not suited to a particular habitat. |
| Change over Time | | | | | |
| **Animals including humans**  Make first-hand close observations of animals from each of the groups (Pennywell farm visit/pets). | **Animals including humans**  Observe animals growing over a period of time e.g. chicks, caterpillars, a baby.  Measure/observe how animals, including humans, grow. | **Animals including humans**  Explore the nutrients contained in fast food  Plan a daily diet containing a good balance of nutrients and record and present findings. | **Animals including humans**  Recreate the human stomach and observe representation of how food breaks down. | **Animals including humans**  Learn about the changes to the human body during puberty.  Draw a timeline to indicate stages in the growth and development of humans. |  |
|  | **Living things and their habitats**  Observe animals and plants carefully, drawing and labelling diagrams. |  |  | **Living things and their habitats**  Grow and observe plants that reproduce asexually e.g. strawberries, spider plant, potatoes |  |
| **Plants**  Use photographs and their own observations to talk about how plants change over time (e.g. seed to sapling to tree) and over the year (deciduous and fruit bearing trees).  Plant seeds and observe how they grow and change by making simple observations. | **Plants**  Make close observations of seeds and bulbs.  Look after the plants as they grow – weeding, thinning, watering etc.  Make close observations and measurements of their plants growing from seeds and bulbs. | **Plants**  Investigate what happens to plants when they are put in different conditions e.g. in darkness, in the cold, deprived of air, different types of soil, different fertilisers, varying amount of space.  Observe flowers carefully to identify the pollen  Observe flowers being visited by pollinators e.g. bees and butterflies in the summer.  Observe seeds being blown from the trees e.g. sycamore seeds. |  |  |  |
|  | **Use of everyday materials**  Explain from their observations how materials change when a force is exerted on them by squashing, bending, twisting and stretching. |  | **States of matter**  Observe the changes that are non-reversible relating (common ingredients).  Set up investigations to explore changing the rate of evaporation | **Properties and changes of materials**  Carry out comparative and fair tests involving non-reversible changes e.g. What affects the rate of rusting? What affects the amount of gas produced?  Explore a range of non-reversible changes e.g. rusting, adding fizzy tablets to water, burning. |  |
| **Seasonal changes**  Observe and discuss changes to the lengths of the day through the seasons. Why do we have longer days in the summer and shorter days in the winter?  Use data to create a pictogram and use this to describe changes in day length over the seasons.  Use gathered evidence to describe the general types of weather and changes in day length over the seasons. |  |  |  | **Earth and space**  Make first-hand observations of how shadows caused by the Sun change through the day.  Make a sundial and report on findings following observation of the changing place of the shadow, making conclusions as to what this demonstrates and how the sundial was used to indicate the time. |  |
|  |  | **Light**  Investigate the size of shadows according to times of day and year, by tracing shadows outside and comparing differences. |  |  | **Light**  Use mirrors, torches and protractors to demonstrate and record how light is reflected in a mirror and how we see ourselves in a mirror. |
|  |  |  | **Sound**  Make own instruments that produce a range of pitches. |  |  |
|  |  |  | **Electricity**  Construct and investigate a range of circuits  Investigate the effect of a switch and combinations of switches in simple circuits Investigate switches and consider variations for specific uses, such as a pressure switch for a burglar alarm. |  | **Electricity**  Draw circuit diagrams of a range of simple series circuits, using recognised symbols.  Communicate structures of circuits using circuit diagrams with recognised symbols |
|  |  | **Rocks**  Can devise tests to explore the properties of rocks and use data to rank the rocks.  Can devise a test to explore the water retention of soils. |  |  |  |
|  |  |  |  |  | **Evolution and inheritance**  Demonstrate an understanding, with specific examples, of how an animal or plant has evolved over time e.g. penguin, peppered moth. |
| Classification | | | | | |
| **Animals including humans**  Classify animals using a range of features e.g. lay eggs/give birth to live young. herbivore, omnivore (these terms do not have to be explicitly taught).  Identify animals by matching statements to named images. | **Animals including humans**  Classify food in a range of ways, including using the Eatwell guide. | **Animals including humans**  Classify food in a range of ways | **Animals including humans**  Identifies differences, and similarities of different types of teeth according to herbivore, omnivore and carnivore. |  | **Animals including humans**  Research an unfamiliar animal or plant using its characteristics to establish where it belongs in the classification system.  Use information about the characteristics of an unknown animal or plant to assign it to a group. |
|  | **Living things and their habitats**  Explore the outside environment regularly to find objects that are living, dead and have never lived Classify objects found in the local environment.  Can sort into living, dead and never lived. |  | **Living things and their habitats**  Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.  Classify living things found in different habitats based on their features. | **Living things and their habitats**  Organise mammals into different groups - sea and land and marsupials and use scientific evidence to refute/support correct/incorrect statements (such as ‘dolphins are fish’).  Compare and contrast the life cycles of different living things and classify them. | **Living things and their habitats**  Classify plants and animals and record conclusions from the use of classification keys.  Use information about the characteristics of an unknown animal or plant to assign it to a group. |
| **Plants**  Can sort and group parts of plants using similarities and differences e.g. the shape of leaves, the colour of the flower/blossom.  Can use simple charts and Venn diagrams etc. to identify and classify plants. | **Plants**  Sort and classify seeds, plants and trees. | **Plants**  Classify seeds in a range of ways including by how they are dispersed. |  |  |  |
| **Materials**  Compare and group together a variety of everyday materials on the basis of their simple physical properties.  Classify objects made of one material in different ways e.g. a group of objects made of metal.  Classify one type of object made from a range of materials e.g. a collection of spoons made of different materials. | **Use of everyday materials**  Classify and sort materials by their properties e.g. manmade, natural |  | **States of matter**  Observe closely and classify a range of solids and liquids.  Classify materials according to whether they are solids, liquids and gases. |  |  |
| **Seasonal changes**  Classify images of trees through the four seasons and discuss the changes they see. |  |  |  |  |  |
|  |  | **Light**  Observe and identify changes to the size and orientation of shadows, relative to their proximity to the light source.  Observe and identify the difference in shadows of opaque, translucent and transparent objects/materials.  Observe how shadows are formed and affected by different circumstances.  Classify materials according to opaque, transparent and translucent. |  |  |  |
|  |  | **Rocks**  Can compare and group together different kinds of rocks on the basis of their appearance and simple physical properties  Can link rocks changing over time with their properties e.g. soft rocks get worn away more easily. |  |  |  |
|  |  |  | **Sound**  Note how vibrations make sounds of different volumes and travel to our ears.  Identify and show how sound travels through particles and into the ear. |  |  |
|  |  |  | **Electricity**  Classify materials that conduct electricity and those that don’t following investigation and record findings. |  |  |
| Fair and comparative testing | | | | | |
| **Animals including humans**  Conduct simple sense experiments. Which part of my body is good for feeling, which is not? Which food/flavours can I identify by taste? Which smells can I match? | **Animals including humans**  Investigate the effect of exercise on their bodies. Investigate washing hands, using glitter gel.  Explain how development and health might be affected by differing conditions and needs being met/not met | **Animals including humans**  Compare, contrast and classify skeletons of different animals | **Animals including humans**  Construct and interpret a variety of food chains, identifying producers, predators and prey.  Can record the teeth in their mouth (make a dental record).  Label the different parts of the digestive system. |  | **Animals including humans**  Conduct a fair investigation on the effects of exercise on the heart.  Use scientific equipment to track results and record data using tables and graphs.  Analyse whole class data after investigation to compare and reflect on findings and draw conclusions. |
|  |  |  | **Living things and their habitats**  Observe plants and animals in different habitats throughout the year and use recordings to compare the living things observed.  Create a simple identification key based on observable features. |  |  |
|  | **Plants**  Investigate; What do bulbs/seeds need so that they can grow healthily? | **Plants**  Create a new species of flowering plant  Can explain observations made during investigations. Can look at the features of seeds to decide on their method of dispersal.  Can draw and label a diagram of their created flowering plant to show its parts, their role and the method of pollination and seed dispersal. |  |  |  |
| **Materials**  Chosen an appropriate method for testing an object for a particular property.  Use their test evidence to answer the questions about properties e.g. Which cloth is the most absorbent?  Test the properties of objects e.g. absorbency of cloths, strength of party hats made of different papers, stiffness of paper plates, waterproofness of shelters | **Use of everyday materials**  Investigate and observe what happens to different materials during testing and use this to inform explanation of their properties?  Investigate which materials are fit for a purpose e.g. What is the best material for an umbrella?  Investigate the transparency of objects. |  | **States of matter**  Using their data, can explain what affects how quickly a solid melts.  From their data, can explain how to speed up or slow down evaporation. Present learning about the water cycle in a range of ways e.g. diagrams, explanation text, story of a water droplet. | **Properties and changes of materials**  Investigate the properties of different materials in order to recommend materials for particular functions depending on these properties e.g. test waterproofness and thermal insulation to identify a suitable fabric for a coat.  Investigate rates of dissolving by carrying out comparative and fair tests and record findings.  Explore a range of non-reversible changes e.g. rusting, adding fizzy tablets to water, burning. |  |
| **Seasonal changes**  Gather and record data about weather conditions in autumn, drawing on observation and using simple equipment (such as a container to measure rainfall). |  |  |  |  |  |
|  |  |  | **Sound**  Experiment with at least three different instruments to observe and explore volume and pitch.  Make predictions and draw conclusions about the pitch and volume of sounds. |  |  |
|  |  |  | **Electricity**  Apply their knowledge of conductors and insulators to design and make different types of switch. |  | **Electricity**  Plan and select resources for a fair scientific enquiry, deciding which variables to control.  Record results from an experiment using tables and graphs.  Evaluate and explain their investigation, results and conclusions. |
|  |  | **Light**  Use oral and written explanations to report on why shadows are formed and how the length and size of a shadow can be changed. |  |  | **Light**  Plan and conduct a test to investigate how light travels and explain/present the findings  Measure and record the angle of incidence and angle of reflection using a protractor and detailed diagram. |
|  |  | **Rocks**  Can compare and group together different kinds of rocks based on their appearance and simple physical properties  Can present in different ways their understanding of how fossils are formed e.g. in role play, comic strip, chronological report, stop-go animation etc |  |  |  |
|  |  | **Forces and magnets**  Record and report on findings from investigations, involving how things move on different surfaces |  | **Forces**  Investigate the effects of air resistance in a range of contexts e.g. parachutes, spinners, sails on boats.  Explore how levers, pulleys and gears work.  Investigate the effects of water resistance in a range of contexts e.g. dropping shapes through water, pulling shapes e.g. boats along the surface of water.  Investigate the pull on different objects using a newton meter and record forces in Newtons. |  |
| Vocabulary | | | | | |
| List the vocab per topic | | | | | |
|  |  |  |  |  | **Evolution and Inheritance**:  Offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils |
|  |  |  | **Electricity:**  Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series, Conductors, Insulator |  | **Electricity**:  Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage  NB Children do not need to understand what voltage is but will use volts and voltage to describe different batteries. The words cells and batteries are now used interchangeably |
| **Animals including humans:**  Fish, Reptiles, Mammals, Birds, Amphibians (+ examples of each) Herbivore, Omnivore, Carnivore, Leg, Arm, Elbow, Head, Ear, Nose, Back, Wings, Beak | **Animals including humans:**  Survival, Water, Air, Food, Adult, Baby, Offspring, Kitten, Calf, Puppy, Exercise, Hygiene | **Animals including humans:**  Movement, Muscles, Bones, Skull, Nutrition, Skeletons, | **Animals including humans:**  Mouth, Tongue, Teeth, Oesophagus, Stomach, Small Intestine, Large Intestine, Herbivore, Carnivore, Canine, Incisor, Molar | **Animals including humans:**  Foetus, Embryo, Womb, Gestation, Baby, Toddler, Teenager, Elderly, Growth, Development, Puberty | **Animals including humans:**  Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs and lifestyle |
|  | **Living things and their habitats**:  Living, Dead, Habitat, Energy, Food chain, Predator, Prey, Woodland, Pond, Desert |  | **Living things and their habitats**:  Vertebrates, Fish, Amphibians, Reptiles, Birds, Mammals, Invertebrates, Snails, Slugs, Worms, Spiders, Insects, Environment, Habitats | **Living things and their habitats**:  Mammal, Reproduction, Insect, Amphibian, Bird, Offspring | **Living things and their habitats**:  Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering and non-flowering |
|  |  | **Light**:  Light, Shadows, Mirror, Reflective, Dark, Reflection |  |  | **Light**:  Refraction, Reflection, Light, Spectrum, Rainbow, Colour |
| **Plants:**  Deciduous, Evergreen trees, Leaves, Flowers (blossom), Petals, Fruit, Roots, Bulb, Seed, Trunk, Branches, Stem | **Plants:**  Seeds, Bulbs, Water, Light, Temperature, Growth | **Plants:**  Air, Light, Water, Nutrients, Soil, Reproduction, Transportation, Dispersal, Pollination, Flower |  |  |  |
| **Seasonal changes:**  Summer, Spring, Autumn, Winter, Sun, Day, Moon, Night, Light, Dark |  |  |  | **Earth and space:**  Earth, Sun, Moon, Axis, Rotation, Day, Night, Phases of the Moon, star, constellation |  |
|  |  | **Forces and magnets:**  Magnetic, Force, Contact, Attract, Repel, Friction, Poles, Push, Pull |  | **Forces:** Air resistance, Water resistance, Friction, Gravity, Newton, Gears, Pulleys |  |
| **Materials:**  Wood, Plastic, Glass, Paper, Water, Metal, Rock, Hard, Soft, Bendy, Rough, Smooth | **Uses of everyday materials:**  Hard, Soft, Stretchy, Stiff, Shiny, Dull, Rough, Smooth, Bendy, Waterproof, Absorbent, Opaque, Transparent Brick, Paper, Fabrics, Squashing, Bending, Twisting, Stretching Elastic, Foil |  | **States of matter:**  Solid, Liquid, Gas, Evaporation, Condensation, Particles, Temperature, Freezing, Heating | **Properties and changes of materials:**  Hardness, Solubility, Transparency, Conductivity, Magnetic, Filter, Evaporation, Dissolving, Mixing |  |
|  |  |  | **Sound:**  Volume, Vibration, Wave, Pitch, Tone, Speaker |  |  |
|  |  | **Rocks:**  Fossils, Soils, Sandstone, Granite, Marble, Pumice, Crystals, Absorbent |  |  |  |