Science

Subject overview (inc. cultural capital) ……………………………………………………………………………………………………………………………………………….121

Yearly overview of science units and coverage of units in Key Stage 1 and Key Stage 2 ..............................…………………………………………

Progression of skills and knowledge Y1-Y6 ……………………......……………………………………………………………………………………………………………..122

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| Subject Lead |
| Briony Lea |
| **Why we learn Science at Ewelme C.E. Primary School** | | **Cultural Capital** |
| * To develop an understanding of ourselves – how our bodies work, develop and evolve. * To encourage a sense of awe, wonder and intrigue about the world we live in. * To instil a sense of being curious, inquisitive – to as questions about why/how things are like they are. * To understand how science and engineering can help to shape our futures – career development, links to local businesses etc. * To conduct, lead and revise investigations. * To develop independent learning, analytical and enquiry skills. * To take risks, to challenge and become resilient learners. * To create cross-curricular links, particularly with mathematics. * To assess the validity of new facts and statistics presented to them based on scientific knowledge and understanding. * To highlight the importance of healthy living (including links to PSHE – diet, exercise, personal development and growth). * To understand why it can be useful to categorise animals, as well as using and designing classification keys, webs and food chains. | | * Investigations across a range of topics where children are reasoning and problem solving throughout their work. * A science week in Term 6, with a focus on investigation and scientific skills. * Opportunities to visit museums, scientific/engineering places of work, arboretums, the new centre for learning at Science Oxford. * Visitors to work with our pupils, including local businesses/engineering firms, STEM Ambassadors, Oxford University outreach departments. * Children to interact with a range of external agencies such as the local fire service when working on materials. |

**Yearly overview of Science units:**

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| **Year Group** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| **Reception/Y1 A** | Humans and Dinosaurs | | Seasons and Materials | | Seeds and Plants | |
| **Reception/Y1 B** | Animals | | Floating and Sinking | | Trees | |
| **Year 2** | Uses of Everyday Materials | | Plants/Living Things and their habitats | | Animals including Humans/Teeth | |
| **Year 3/4 A** | Living Things and their Habitats/Muscles and Skeletons | | Light and Shadow | | Electricity | |
| **Year 3/4 B** | Digestion/States of Matter | | Forces and Magnetism /Rocks | | Sound /Plants | |
| **Year 5/6 A** | Living things and their habitats/Forces | | Earth and Space/Electricity | | Light | |
| **Year 5/6 B** | Evolution | | Materials | | Animals including Humans | |

**Yearly Knowledge and Skills taught in Science units**

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| **Year Group** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| **Reception/Y1 A** | Humans and Dinosaurs | | Seasons | | Seeds and Plants | |
| *-identify and name a variety of common animals that are carnivores, herbivores and omnivores*  *-identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense*  *-(identify common appliances that run on electricity )* | | *-Observe changes across the four seasons.*  *-Observe and describe weather associated with the seasons and how day length varies* | | *-identify and describe the basic structure of a variety of common flowering plants, including roots, stem/trunk, leaves and flowers*  *\*observe and describe how seeds and bulbs grow into mature plants.* | |
| **Working Scientifically** | Explore senses (C&FT)  -Be curious and talk about ideas for testing how things behave  -(with help)Use senses to investigate and record  -Talk about what they did and noticed | Sorting animals (I&C)  -Be curious and ask about similarities and differences  - Use senses to sort and match  -Talk about how they sorted and matched | Weather (OoT)  -Be curious and ask questions about things that change  -Look closely and make simple observations)  -Talk about what they did and noticed | | Where do plants grow?(PS)  -Recognise and ask questions about simple patterns  -Use senses to observe and identify  -Talk about what they did and what patterns they spotted | |
| **Reception/Y1 B** | Animals | | Floating and Sinking | | Trees | |
| *-identify and name a variety of common animals including fish, amphibians, reptiles, birds, mammals and invertebrates*  *-describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets)*  *-(identify common appliances that run on electricity )* | | *-distinguish between an object and the material from which it is made*  *-describe the simple physical properties of a variety of everyday materials*  *-identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock*  *-compare and group together a variety of everyday materials on the basis of their simple physical properties* | | *-identify and name a variety of common wild and garden plants, including deciduous and evergreen trees*  *-identify and describe the basic structure of trees, including roots, stem/trunk, leaves and flowers* | |
| **Working Scientifically** | Researching animals (R)  -Be curious and ask questions about their topic  - With support use a source of information to answer  -Check, does their answer make sense? | | What floats? (C&FT)  -Be curious and talk about ideas for testing how things behave  -Use senses to investigate and record (with help)  -Talk about what they did and noticed | | Tree ID (I&C)  -Be curious and ask about similarities and differences  - Use senses to sort and match  -Talk about how they sorted and matched | |

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| **Year Group** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| **Year 2** | Uses of Everyday Materials | | Plants/ Living Things and their Habitats | | Animals including Humans | |
| *-identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses*  *-find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.*  *\*-compare how things move on different surfaces*  *\*-recognise that they need light in order to see things and that dark is the absence of light* | | *-identify and name a variety of plants and animals in their habitats, including microhabitats*  *-Observe and describe how seeds and bulbs grow into mature plants.*  *-Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy*  *-Explore and compare the differences between things that are living, dead, and things that have never been alive* | *-Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other*  *-Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.* | *-Notice that animals, including humans, have offspring which grow into adults*  *find out about and describe the basic needs of animals, including humans, for survival (water, food and air)*  *-Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.*  *\*-identify the different types of teeth in humans and their simple functions* | |
| **Working Scientifically** | Which materials are bendy? (I&C)  -Decide what to observe to identify and sort things  -sort by observable, behavioural features, recording observations with drawings/ diagrams/tables etc  -identify and discuss the similarities and differences discovered | | Where do plants grow best? (C&FT)  -With help notice links between cause and effect. Identify variables to change and measure  -Use senses to investigate and record (with help)  -Talk about what they did and noticed | Do more birds come on sunny days? (OoT)  -Decide what patterns to observe and measure and suggest how (with help)  -Record in words or pictures or simple prepared formats  -Identify and sequence the changes and talk about if the change was expected | Have older children lost more teeth?(PS)  -Decide what patterns to observe /measure and suggest how  -Use tables/tally charts to record  -Identify simple patterns and talk about if the pattern was expected | What makes a healthy meal? (R)  - Raise a question and describe how to answer (with support)  -Describe and choose simple evidence sources to answer and support findings  -Use evidence to provide a valid answer to the question |

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| **Year Group** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| **Year 3/4 A** | Living Things and their Habitats/Animals including Humans (Rivers) | | Light (Ancient Egypt) | | Electricity (Our Village) | |
| *recognise that living things can be grouped in a variety of ways*  *explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment*  *recognise that environments can change and that this can sometimes pose dangers to living things.* | *describe the simple functions of the basic parts of the digestive system in humans*  *construct and interpret a variety of food chains, identifying producers, predators and prey.* | *notice that light is reflected from surfaces*  *recognise that light from the sun can be dangerous and that there are ways to protect their eyes*  *recognise that shadows are formed when the light from a light source is blocked by an opaque object*  *find patterns in the way that the size of shadows change.* | | *construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers*  *identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery*  *recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit*  *recognise some common conductors and insulators, and associate metals with being good conductors.*  *(identify common appliances that run on electricity )* | |
| **Working Scientifically** | How can we group animals? (R)  - Select appropriate questions for investigation  -Explain the secondary sources they can use  -Use evidence from different sources to explain answers  -Explain how using other sources improved the answers | Which foods are easiest to digest? (C&FT)  -Help to plan a fair test deciding on equipment and how to make observations/what to record  -make records using a range of equipment  -use simple scientific language to describe simple relationships | What happens to a shadow as the light source moves? (PS)  -Decide what data to collect and the equipment to use  -use equipment to collect data using standard measures  -make records of observations using tables and bar charts  -talk about patterns using scientific lang. | Which colour reflects light the best? (C&FT)  -Help to plan a fair test deciding on equipment and how to make observations/what to record  -make records using a range of equipment  -use simple scientific language to describe simple relationships | How can we turn on a bulb? (PS)  -talk about where patterns might be found and decide how to answer questions  -record data appropriately and accurately  -recognise the patterns in results  -draw conclusions and evaluate how well patterns were IDed | Which materials are conductors? (I&C)  -Decide what equipment to use to sort/classify things  - carry out simple tests to sort according to behaviour  - record observations in simple tables  - use scientific language to talk about how things are the same or different |
| **Year Group** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| **Year 3/4 B** | Animals Including Humans/ States of Matter (Prehistory) | | Forces and Magnetism / Rocks (Roman Britain) | | Sound / Plants (Vikings and Anglo-Saxons) | |
| *-identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat*  *-identify that humans and some other animals have skeletons and muscles for support, protection and movement.* | *-compare and group materials together, according to whether they are solids, liquids or gases*  *-observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)* | *-notice that some forces need contact between two objects, but magnetic forces can act at a distance*  *-observe how magnets attract or repel each other and attract some materials and not others*  *-compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials*  *-describe magnets as having two poles*  *-predict whether two magnets will attract or repel each other, depending on which poles are facing.* | *-compare and group together different kinds of rocks on the basis of their appearance and simple physical properties*  *-recognise that soils are made from rocks and organic matter* | *-identify how sounds are made, associating some of them with something vibrating*  *-recognise that vibrations from sounds travel through a medium to the ear*  *-find patterns between the pitch of a sound and features of the object that produced it*  *-find patterns between the volume of a sound and the strength of the vibrations that produced it*  *-recognise that sounds get fainter as the distance from the sound source increases.* | *-identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers*  *-explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant*  *-investigate the way in which water is transported within plants*  *-explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.* |
| **Working Scientifically** | Why do we need a skeleton? (R)  - Select appropriate questions for investigation  -Explain the secondary sources they can use  -Use evidence from different sources to explain answers  -Explain how using other sources improved the answers | Which chocolate melts the fastest? (C&FT)  -Help to plan a fair test deciding on equipment and how to make observations/what to record  -make records using a range of equipment  -use simple scientific language to describe simple relationships | Which objects are magnetic? (I&C)  -Decide what equipment to use to sort/classify things  - carry out simple tests to sort according to behaviour  - record observations in simple tables  - use scientific language to talk about how things are the same or different | How can we identify rocks? (I&C)  -talk about what criteria can be used to sort things  -make keys and branching databases with 4+ items  -evaluate how well their keys worked  -draw simple conclusions about things that were sorted and classifed | Which instrument is the loudest? (C&FT)  -decide what equipment will make the measurements as accurate as possible  -begin to use and interpret data from dataloggers  -eval. the effectiveness of fair testing including which variables were hard to control  -draw simple conclusions | How water travels around a plant (OoT)  -decide what observations to make, how often and what equipment to use  -make records and observations using tables and bar charts  -talk about conclusions from changes observed  - suggest ways to improve how observations were made |
| **Year Group** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| **Year 5/6 A** | Living things and their habitats/Forces (Amazing Americas) | | Earth and Space/ Electricity | | Light (Off with their Heads) | |
| describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals  give reasons for classifying plants and animals based on specific characteristics. | -explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object  -identify the effects of air resistance, water resistance and friction, that act between moving surfaces  -recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. | -describe the movement of the Earth, and other planets, relative to the Sun in the solar system  -describe the movement of the Moon relative to the Earth  -describe the Sun, Earth and Moon as approximately spherical bodies  -use the idea of the Earth’s rotation to explain day and night and the apparent movement of the sun across the sky.  *(Recognise that vibrations from sounds travel through a medium to the ear and therefore there is no sound travel through space, a vacuum.)* | -associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit  -compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches  -use recognised symbols when representing a simple circuit in a diagram. | recognise that light appears to travel in straight lines  use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye  explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes  use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. | |
| **Working Scientifically** | How are living things classified at different levels? (I&C)  -talk about known criteria for classification  -decide what secondary sources of information to use  -use secondary sources to identify  -draw valid conclusions | How fast do different objects fall? (C&FT)  -plan a fair test selecting the most suitable variables to measure, change and keep the same  -use equipment to accurately collect observations  -draw valid conclusion based on the data | Exploring the solar system (R)  -select appropriate questions that can be researched scientifically  -understand the sources of data and consider if it is biased, opinion based, out of date or reliable  -link finding from several sources  -evaluate how well the question has been answered | How does voltage effect buzzers and bulbs? (PS)  -decide how detailed data needs to be and what equipment to use  -recognise the effect of sample size on reliability  -Explain the cause and effect patterns using scientific vocabulary | How do shadows change over time? (OoT)  -talk about when questions on changes can be answered by observation over time  -decide what equipment should be used to make observations as accurate as possible  -record data appropriately presenting it in line graphs  -recognise the effect of changing the time or number of observations  -evaluate recording and use data to draw valid  conclusions  -talk about and explain changes using scientific knowledge and understanding | |
| **Year Group** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| **Year 5/6 B** | Evolution (The Victorians) | | Materials (Democracy) | | Animals including Humans (War and Peace) | |
| recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago  *describe in simple terms how fossils are formed when things that have lived are trapped within rock*  recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents  identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. | | -compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets  -know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution  -use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating  -give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic  -demonstrate that dissolving, mixing and changes of state are reversible changes  -explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. | | -identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood  -recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function  -describe the ways in which nutrients and water are transported within animals, including humans.  -describe the changes as humans develop to old age. | describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird  describe the life process of reproduction in some plants and animals. |
| **Working Scientifically** | Explore connections between adaptation lead to evolution (R)  -select appropriate questions that can be researched scientifically  -understand the sources of data and consider if it is biased, opinion based or reliable  -link finding from several sources  -evaluate how well the question has been answered | | Which separation methods work or different mixtures? (I&C)  -decide on equipment and tests to use  -use a series of tests to sort and classify  -draw valid conclusions | What happens in irreversible changes create? (I&C)  -decide what secondary sources of information to use  -use secondary sources to identify  -draw valid conclusions | How are exercise and heart rate connected?  (C&FT)  -plan a fair test selecting variables to measure, change and keep the same  -accurately record observations  -draw valid conclusions | Different life cycles- bug spotting  (PS) -decide how detailed data should be and equipment to use  -accurately collect observations  -talk about and explain cause and effect patterns |

Scientific skills include: Pattern Seeking(PS), Observation over Time (OoT), Comparative and Fair Tests (C&FT), Identifying and Classifying (I&C) and Research (R). Each skill is covered in each class and is developed using a Plan-Do-Review format, which progresses in complexity and depth from class to class.

**Coverage of units in Key Stage 1 and 2**

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| **Title** | **Key Stage 1** | **Key Stage 2** |
| **Working scientifically** | Across all year groups scientific knowledge and skills should be learned by working scientifically. | |
| **Biology** | **Plants** • Identify, classify and describe their basic structure. • Observe and describe growth and conditions for growth. **Habitats** • Look at the suitability of environments and at food chains. **Animals and humans** • Identify, classify and observe. • Look at growth, basic needs, exercise, food, teeth\* and hygiene.  **All living things\*** • Investigate differences. | **Plants** • Look at the function of parts of flowering plants, requirements of growth, water transportation in plants, life cycles and seed dispersal. **Evolution and inheritance** • Look at resemblance in offspring. • Look at changes in animals over time. • Look at adaptation to environments. • Look at differences in offspring. • Look at adaptation and evolution. • Look at changes to the human skeleton over time. **Animals and humans** • Look at nutrition, transportation of water and nutrients in the body, and the muscle and skeleton system of humans and animals. • Look at the digestive system in humans.  • Look at the human circulatory system. **All living things** • Identify and name plants and animals • Look at classification keys. • Look at the life cycle of animals and plants. • Look at classification of plants, animals and micro-organisms. • Look at reproduction in plants and animals, and human growth and changes. • Look at the effect of diet, exercise and drugs. |
| **Chemistry** | **Materials** • Identify, name, describe, classify, compare properties and changes. • Look at the practical uses of everyday materials. | **Rocks and fossils** • Compare and group rocks and describe the formation of fossils. States of matter • Look at solids, liquids and gases, changes of state, evaporation, condensation and the water cycle. **Materials** • Examine the properties of materials using various tests. • Look at solubility and recovering dissolved substances. • Separate mixtures. • Examine changes to materials that create new materials that are usually not reversible. |
| **Physics** | **Light\*** • Look at sources and reflections. **Sound\*** • Look at sources.  **Forces** • Describe basic movements. Earth and space • Observe seasonal changes. | **Light** • Look at sources, seeing, reflections and shadows. • Explain how light appears to travel in straight lines and how this affects seeing and shadows. **Sound** • Look at sources, vibration, volume and pitch. **Electricity** • Look at appliances, circuits, lamps, switches, insulators and conductors. • Look at circuits, the effect of the voltage in cells and the resistance and conductivity of materials. **Forces and magnets** • Look at contact and distant forces, attraction and repulsion, comparing and grouping materials. • Look at poles, attraction and repulsion. • Look at the effect of gravity and drag forces. • Look at transference of forces in gears, pulleys, levers and springs. **Earth and space**  • Look at the movement of the Earth and the Moon   * Explain day and night |

Items marked \* are not statutory.

**Skills and knowledge progression – Year 1-6:**

Working scientifically:

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| **Key Stage 1** | **Year 3 and 4** | **Year 5 and 6** |
| • Ask simple questions.  • Observe closely, using simple equipment.  • Perform simple tests.  • Identify and classify.  • Use observations and ideas to suggest answers to questions.  • Gather and record data to help in answering questions. | • Ask relevant questions.  • Set up simple, practical enquiries and comparative and fair tests.  • Make accurate measurements using standard units, using a range of equipment, e.g. thermometers and data loggers.  • Gather, record, classify and present data in a variety of ways to help in answering questions.  • Record findings using simple scientific language, drawings, labelled diagrams, bar charts and tables.  • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.  • Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests.  • Identify differences, similarities or changes related to simple, scientific ideas and processes.  • Use straightforward, scientific evidence to answer questions or to support their findings. | • Plan enquiries, including recognising and controlling variables where necessary.  • Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work.  • Take measurements, using a range of scientific equipment, with increasing accuracy and precision.  • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models.  • Report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions.  • Present findings in written form, displays and other presentations.  • Use test results to make predictions to set up further comparative and fair tests.  • Use simple models to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments. |

Scientific vocabulary:

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| Year Group | New vocabulary |
| Chaucer (R/1) | **Working scientifically:** *changes over time, comparing, results, describing, equipment, grouping, identify, patterns, record, sorting, test.*  **Plants:** *branches, bud, bulb, deciduous tree, evergreen tree, flowers, fruit, garden/flowering plants, leaves, petals, roots, seed, stem, trunk, wild plants.*  **Animals, including humans:** *amphibians, arms, birds, body parts, carnivores, ears, elbows, environment, eyes, face, fish, habitat, hair, head, hearing, herbivores, knees, legs, mammals, mouth, neck, omnivores, pets, reptiles, seeing, senses, smells, sounds, taste, teeth, touch.*  **Everyday materials:** *glass, hard/soft, liquid, metal, plastic, property, rock, rough/smooth, shiny/dull, solid, squashing, stretching, stretchy/stiff, twisting, water, waterproof/not waterproof, wood.*  **Seasonal changes:** *autumn, dark, day length, days, hours, light, months, moon, shadow, spring, summer, sun, winter.* |
| Roet (2) | **Working scientifically:** *comparing, contrasting, data/results, observation, investigation.*  **Living things and their habitats:** *adaptation, alive, characteristics, conditions, consumer, dead, excrete, feed, food chain, grow, habitat, heat, life processes, light, living/non-living, micro-habitat, move, ocean, pond, producer, rainforest, reproduce, respire, respond to stimuli, seashore, sound, touch, woodland*.  **Plants:** *germination, insect pollination, nutrients, pollination, seed dispersal, wind pollination.*  **Animals, including humans:** *adult, baby, bacteria, balanced diet, carbohydrates, child, circulation, dairy, exercise, fats, fibre, fitness, food groups, germs, growth, healthy, heart rate, infection, life cycle, minerals, nutrition, protein, teenager, toddler, unhealthy, vitamins.*  *(Plus Teeth from Year 3 - canines, cavities, chewing, enamel, fluoride toothpaste, gums, incisors, molars, plaque, premolars, saliva, swallowing, tooth decay.)*  **Uses of everyday materials:** *absorbent/not absorbent, bending, bendy/not bendy, characteristics, classification, gas, man-made, natural, properties.* |
| Burghersh (3/4) | **Working scientifically:** *accurate, cause and effect, criteria, data/results, effect of change, fair test, identification, method, observations, variables.*  **Plants :** *absorb, competition for resources, function, minerals, optimum conditions, plant life cycle, plant tissues, pores (stomata), reproduction, seed formation, structure, support, well-aerated soil, well-drained soil.*  **Animals, including humans :** *ankle, arteries, backbone, ball and socket joints, bone, brain, branching blood vessels, capillaries, cardio-vascular system, cartilage, collar bone, contract, endoskeleton, exoskeleton, extensor, finger, fixed joints, flexor, foot, hand, heart, hinge joints, involuntary muscles, joints, knee cap, ligaments, moveable joints, movement, muscles, opposing pairs, pelvis, protection, shoulder blades, skeletal and muscular systems, relax, ribs, skeletons, skull, sliding joints, spinal cord, sternum, support, thigh bone, toe, veins, vertebrates, voluntary muscles, wrist.*  *absorption of food into blood stream, chemical breakdown by enzymes, chewing, churning in stomach, digestion, digestive system, faeces, gastric juice, intestine, nerves, predators, prey, producers, reabsorption of water from waste, saliva, swallowing.*  **Rocks:** *crystalline, crystals, erosion, fossils, grains, layers (strata), igneous, metamorphic, molten magma, particles, permeability, permeable, physical properties, sedimentary, soils.*  **Light:** *absorb, bright, dim, emit, light beam, light sources, light spectrum, opaque, rays, reflect, reflection, speed of light, sunlight, torch, translucent, transparent.*  **Forces and magnets:** *air resistance, attract, compress, direction of force, floating, flying, forcemeter, forces, friction, gravity, magnetic, magnetic field, magnetic forces, Newton meter, Newtons (N), non-magnetic, north pole, poles, pull, push, repel, sliding, south pole, streamlined, water resistance.*  **Living things and their habitats:** *classification keys, differences, human effects on the environment (population, development, deforestation, pollution), invertebrates (snails and slugs, worms, spiders, insects), organism,**plant groups (trees, grasses, flowering plants, non-flowering plants), similarities, variation characteristics, vertebrates (fish, amphibians, reptiles, birds, mammals).*  **States of matter:** *boiling, condensation, degrees Celsius (°C), energy transfer solid, evaporation, fixed shape and volume, forces of attraction, freezing, gaseous, liquid, melting, particles, rate of evaporation, solidifying, temperature, thermometer, vibrate, water cycle.*  **Sound:** *echo, frequency of vibration, pitch (higher, lower), reflection of sound, sound insulation, sound wave, tuning fork, vacuum, vibration, volume (louder, softer).*  **Electricity:** *battery, bulbs, buzzers, cell, closed circuit, conductor, crocodile clips, electrical appliances, insulator, motors, open circuit, switches, wires.* |
| De la Pole (5/6) | **Working scientifically:** *bias, frequency, opinion, reliability, sample size, secondary sources.*  **Living things and their habitats and Animals, including humans:** *anther, asexual reproduction, bud, carpel, chromosomes, cross-pollination, death, egg cell (ovum), embryo, fallopian tubes, female gamete, fertilization, filament, gestation, hormones, male gamete, menstrual cycle, microorganisms, ovaries, ovary, ovulation, penis, petals, placenta, puberty, sepals, sexual reproduction, sperm, stamens, stigma, style, testes, uterus, vagina, vertebrates, zygote*  **Properties and changes of materials:** *buoyancy, burning, change of state, chemical changes, chemical reaction, density, dissolving, elasticity, electrical conductivity, evaporating, filtering, filtrate, hardness, irreversible or hard-to-reverse change, magnetism, polymer, residue, reversible change, rusting (oxidisation), sieving, solubility, solute, solution, solvent, suspension, thermal conductivity,*  **Earth and space:** *asteroids, axis, celestial body, comets, Earth, Earth’s rotation, elliptical orbit, gravitational force, heliocentric model of the solar system, galaxy, geocentric model, hemisphere, Jupiter, light year, Mars, Mercury, meteors, moon, Neptune, phases of the moon, Saturn, shadow clock, shooting stars, Sun, sundial, time zones, Uranus, Venus*  **Forces:** *drag forces, gears, levers, pulleys, springs, transference of force and motion*  **Living things and their habitats:** *classification, classification keys, dichotomous/binary keys, five kingdoms (bacteria, protists, animals, plants, fungi), genetic variation, invertebrates, vertebrates (reptiles, fish, amphibians, birds, mammals)*  **Animals, including humans:** *adrenaline, aerobic respiration, alveoli, aorta, arteries, atrium, blood, blood vessels, bronchi, bronchioles, capillaries, carotid artery, circulatory system, clotting, deoxygenated, diaphragm, gills, haemoglobin, heart, heart rate, intercostal muscles, lungs, oxygenated, plasma, platelets, pulmonary artery, pulmonary vein, pulse, red blood cells, veins, ventricles, white blood cells, wind pipe (trachea)*  **Evolution and inheritance:** *adaptation, chromosomes, competition, DNA, environmental conditions, environmental variations, evolution, evolutionary change, features, fossil records, genes, genetic variation, inheritance, natural selection, palaeontologist, survival of the fittest, variation over time*  **Light:** *absorption, lenses, light source, optics, periscope, prism, rainbow, reflection, refraction, spectrum, transmission*  **Electricity:** *circuits, circuit diagrams, components, parallel circuit, series circuit, voltage* |

Biology:

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|  | **Year 1 and Year 2** | | | | **Year 3 and 4** | | | | **Year 5 and 6** |
| **Plants** | • Identify and name a variety of common plants, including garden plants, wild plants and trees and those classified as deciduous and evergreen.  • Identify and describe the basic structure of a variety of common flowering plants, including roots, stem/trunk, leaves and flowers.  • Observe and describe how seeds and bulbs grow into mature plants.  • Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. | | | | • Identify and describe the functions of different parts of flowering plants: roots, stem, leaves and flowers.  • Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant.  • Investigate the way in which water is transported within plants.  • Explore the role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. | | | | • *Identify how plants are adapted to suit their environment in different ways and that adaptation may lead to evolution* |
| **Animals and humans** | | • Identify and name a variety of common animals that are birds, fish, amphibians, reptiles, mammals and invertebrates.  • Identify and name a variety of common animals that are carnivores, herbivores and omnivores.  • Describe and compare the structure of a variety of common animals (birds, fish, amphibians, reptiles, mammals and invertebrates, including pets).  • Identify name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.  • Notice that animals, including humans, have offspring which grow into adults.  • Investigate and describe the basic needs of animals, including humans, for survival (water, food and air).  • Describe the importance for humans of exercise, eating the right amounts of different types of food and hygiene.  • Identify the different types of teeth in humans and their simple functions. | | | • Identify that animals, including humans, need the right types and amounts of nutrition, that they cannot make their own food and they get nutrition from what they eat.  • Construct and interpret a variety of food chains, identifying producers, predators and prey.  • Identify that humans and some animals have skeletons and muscles for support, protection and movement.  • Describe the simple functions of the basic parts of the digestive system in humans. | | | • Describe the changes as humans develop to old age.  • Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.  • Recognise the importance of diet, exercise, drugs and lifestyle on the way the human body functions.  • Describe the ways in which nutrients and water are transported within animals, including humans. | | |
| **Living things** | | • Explore and compare the differences between things that are living, that are dead and that have never been alive.  • Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants and how they depend on each other.  • Identify and name a variety of plants and animals in their habitats, including micro-habitats.  • Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. | | • Recognise that living things can be grouped in a variety of ways.  • explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment  • Recognise that environments can change and that this can sometimes pose dangers to specific habitats. | | | • Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.  • Describe the life process of reproduction in some plants and animals.  • Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals .  • Give reasons for classifying plants and animals based on specific characteristics. | | | |
| **Evolution and inheritance** | | *• Identify how humans resemble their parents in many features.* | *• Identify how plants and animals, including humans, resemble their parents in many features.*  *• Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.*  *• Identify how animals and plants are suited to and adapt to their environment in different ways.* | | | • Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.  • Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.  • Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. | | | | |

Chemistry:

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|  | **Key Stage 1** | **Year 3 and 4** | **Year 5 and 6** |
| **Materials** | • Distinguish between an object and the material from which it is made.  • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock.  • Describe the simple physical properties of a variety of everyday materials.  • Compare and group together a variety of everyday materials on the basis of their simple physical properties.  • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.  • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick/rock, and paper/cardboard for particular uses. | • Compare and group together different kinds of rocks on the basis of their simple, physical properties.  • Recognise that soils are made from rocks and organic matter.  • Compare and group materials together, according to whether they are solids, liquids or gases.  • Observe that some materials change state when they are heated or cooled, and measure the temperature at which this happens in degrees Celsius (°C), building on their teaching in mathematics.  • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. | • Compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, conductivity (electrical and thermal), and response to magnets.  • Understand how some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution.  • Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.  • Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.  • Demonstrate that dissolving, mixing and changes of state are reversible changes.  • Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning, oxidisation and the action of acid on bicarbonate of soda.  • Describe in simple terms how fossils are formed when things that have lived are trapped within sedimentary rock. |

Physics:

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|  | **Key Stage 1** | **Year 3 and 4** | | | **Year 5 and 6** | |
| **Movement, forces and magnets** | *• Notice and describe how things move, using simple comparisons such as faster and slower.*  *• Compare how different things move.* | • Compare how things move on different surfaces.  • Notice that some forces need contact between two objects, but magnetic forces can act at a distance.  • Observe how magnets attract or repel each other and attract some materials and not others.  • Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials.  • Describe magnets as having two poles.  • Predict whether two magnets will attract or repel each other, depending on which poles are facing. | | | • Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.  • Identify the effect of drag forces, such as air resistance, water resistance and friction that act between moving surfaces.  • Understand that some mechanisms including levers, pulleys and gears, allow a smaller force to have a greater effect. | |
| **Light** | *• Observe and name a variety of sources of light, including electric lights, flames and the Sun, explaining that we see things because light travels from them to our eyes.* | • Recognise that they need light in order to see things and that dark is the absence of light.  • Notice that light is reflected from surfaces.  • Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.  • Recognise that shadows are formed when the light from a light source is blocked by an opaque object.  • Find patterns in the way that the size of shadows change. | | | • Understand that light appears to travel in straight lines.  • Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eyes.  • Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them, and to predict the size of shadows when the position of the light source changes.  • Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. | |
| **Sound** | *• Observe and name a variety of sources of sound, noticing that we hear with our ears.* | • Identify how sounds are made, associating some of them with something vibrating.  • Recognise that vibrations from sounds travel through a medium to the ear. • Find patterns between the pitch of a sound and features of the object that produced it.  • Find patterns between the volume of a sound and the strength of the vibrations that produced it.  • Recognise that sounds get fainter as the distance from the sound source increases. | | | *• Recognise that vibrations from sounds travel through a medium to the ear and therefore there is no sound travel through space, a vacuum.* | |
| **Electrical circuits** | • Identify common appliances that run on electricity. | • Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.  • Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery.  • Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.  • Recognise some common conductors and insulators, and associate metals with being good conductors. | | | | • Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.  • Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.  • Use recognised symbols when representing a simple circuit in a diagram. |
| **Earth and space** | *• Observe the apparent movement of the Sun during the day.*  • Observe changes across the four seasons.  • Observe and describe weather associated with the seasons and how day length varies. | | *• Describe the movement of the Earth relative to the Sun in the solar system.*  *• Describe the movement of the Moon relative to the Earth.* | • Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.  • Describe the movement of the Moon relative to the Earth.  • Describe the Sun, Earth and Moon as approximately spherical bodies.  • Use the idea of the Earth’s rotation to explain day and night and the apparent movement of the sun across the sky. | | |