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| **Year 5** | Topic 1 | Topic 2 | Topic 3 | Topic 4 | Topic 5 |
| Concept | **Living things and their habitats** | **Forces** | **Earth and space** | **Properties of materials** | **Animals including humans** |
| Why are we learning this? | So that we can understand how animals change and grow through their life cycle and how we interact with them | So that we can understand how and why objects move like they do when forces act on them | So that we understand our position in the solar system and | So that we can use the correct material for a job and successfully separate objects when we need to | So that we can understand how our own bodies change through our own life time |
| Learning Focus | * Exploring life cycles | * Identifying forces and their affects | * The Earth and it’s movement * Where we are in the solar system | * Using and describing different materials * How to separate materials * Reversible and irreversible changes | * The changes in the human body during our life cycle |
| Substantive  Knowledge  (Knowledge) | * Life cycles of a mammal, an amphibian, an insect and a bird   reproduction in some plants and animals. | * 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 * Mechanical devices such as gears, pulleys, levers and springs, allow a smaller force to have a greater effect. | * Describe the movement of the Earth. * 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 | * Compare and group together everyday materials on the basis of their properties * Decide how mixtures might be separated, including through filtering, sieving and evaporating * The particular uses of everyday materials, including metals, wood and plastic. * Describe how to recover a substance from a solution * Reversible changes   irreversible changes. | * Changes as humans develop to old age. * Process of reproduction in humans |
| Disciplinary knowledge  (Skills) | * Identifying scientific evidence that has been used to support or refute ideas or arguments. | * Planning scientific enquiries to answer a questions * Taking measurements * Recording data and results   using test results to make predictions | * Identifying scientific evidence that has been used to support or refute ideas or arguments. * Planning different types of scientific enquiries to answer questions | * Planning scientific enquiries to answer a questions * Taking measurements * Recording data and results * Using test results to make predictions | * Produce graphs to represent data recorded |
| Progression from previous learning |  |  |  |  |  |
| Enrichment | Science week | | | | |
| Assessment | Google quiz assessment | Google quiz assessment | Google quiz assessment | Google quiz assessment | Google quiz assessment |

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| **Year 6** | Topic 1 | Topic 2 | Topic 3 | Topic 4 | Topic 5 |
| Concept | **Living things and their environment** | **Electricity** | **Evolution** | **light** | **Animals including humans** |
| Why are we learning this? | So that we can recognise animals and to understand how we can classify new animals using their features | So that we understand how to use electricity safely | So we understand how organisms have adapted and evolved over time to inhabit all corners of the globe | So we understand how the Suns light travels to us and what the affects of light are on an object | So we have an understanding of how our body including our digestive system work and how we can keep healthy |
| Learning Focus | * Classification and using keys | * Building simple circuits and making changes in the circuit | * Changes over time and animal adaptations | * How light travels and interacts with objects | * The digestive system |
| Substantive  Knowledge  (Knowledge) | * Micro-organisms, plants and animals can be classified into groups | * 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 * Use recognised symbols when representing a simple circuit in a diagram | * Recognise that living things produce offspring of the same kind * Recognise that living things have changed over time * Identify how animals are adapted to suit their environment | * Recognise that light appears to travel in straight lines * Objects are seen because they give out or reflect light into the eye * Light travels from light sources to our eyes or from light sources to objects and then to our eyes   shadows | * Identify and name the main parts of the human circulatory system, * 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 |
| Disciplinary knowledge  (Skills) | * Give reasons for classifying plants and animals based on specific characteristics * Use a key to identify organisms | * Build a working simple circuit * Use circuit diagrams to build simple circuits * Troubleshoot problems to ensure circuits work * Creating and testing a simple hypothesis | * Use observations to show how organisms have evolved over time * Compare organisms and their adaptations * Produce a variety of graphs and tables to represent data recorded | * Use mirrors to reflect light onto an object * Investigate the type of shadow created by different light source and objects | * Plan a simple investigation * Creating and testing a simple hypothesis * Recording and representing data collected |
| Progression from previous learning | (Yr 4)   * 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.   (Yr 5)   * 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. | (Yr 4)   * 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. | (Yr 3)   * Describe in simple terms how fossils are formed when things that have lived are trapped within rock.   (Yr 5)   * Describe the life process of reproduction in some plants and animals | (Yr 3)   * 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 a solid object * find patterns in the way that the size of shadows change. | Yr 3)   * 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 animals have skeletons and muscles for support, protection and movement   (Yr 4)   * Describe the simple functions of the basic parts of the digestive system in humans * Identify the different types of teeth in humans and their simple functions * Construct and interpret a variety of food chains, identifying producers, predators and prey.   (Yr 5)   * Describe the changes as humans develop to old age. |
| Enrichment | Science week | | | | |
| Assessment | Google quiz assessment | Google quiz assessment | Google quiz assessment | Google quiz assessment | Google quiz assessment |

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| **Year 7** | Topic 1 | Topic 2 | Topic 3 | Topic 4 | Topic 5 | Topic 6 | Topic 7 | Topic 8 | Topic 9 |
| Concept | **Reactions** | **Energy** | **Waves** | **Organisms** | **Matter** | **Ecosystems** | **Genes** | **Forces** | **Electro-magnetism** |
| Why are we learning this? | * To understand reactions such as rusting and why my bike rusts * To understand why we use some metals for jewellery and not others * To understand the dangers when using acids and alkalis around the house | * Links to last topic – Reactions in chemicals happen due to stored energy in the bonds * We need to understand where the energy we use comes from * So we can make informed choices about the energy we use in our homes * Budgeting for a home | * Links to last topic – Last topic we looked at energy, this topic is a look at 2 of those types of energy in particular * It is important to understand how we hear sounds around us and why we get echoes * To understand why we can see the objects around us * How light interacts with various objects | * Links to last topic – Energy enables us to do things and grow – this topic looks at how we and other organisms use the energy in our food * We can understand our bodies more by looking inside them * So we can compare the similarities and differences between us and plant * To understand how we are built from individual cells working together to function as a multicellular organism | * Links to last topic – Energy as we have seen enables things to happen including physical changes such as changing states * So we can understand how solids, liquids and gases are able to change state * We can understand why things objects sink but something as big as a cruise ship can float * What to do if we need to separate objects and the best way to do this | * Links to last topic – energy is needed as we have seen in the last topic to help us grow. This topic shows how animals get that energy and then use that energy to reproduce * So we know where our energy in the food we eats comes from * How the organisms in an environment depend on each other and how we can affect that | * Links to last topic – Last topic we looked at plant reproduction and how plants use the energy they harvest from the Sun to reproduce. This topic we will be looking at human reproduction * So we know how humans reproduce for our own future * So we know where we get our features from and whether they are inherited from our parents or shaped by the environment | * Links to last topic – Energy as we are finding out is needed to do anything the more energy exerted on an object will have an affect on that object such as kinetic energy pushing a car. This topic will explore what happens when forces are applied to an object and the effects of gravity and weight on an object. * So we can calculate our speed | * Links to last topic – Energy as we are finding out is needed to do anything. This topic is looking at one type of energy in particular - Electricity * So we can understand how we can use electricity around the house * Calculate current, potential difference and resistance in a circuit and where we use these circuits safely around the house or work |
| Learning Focus | Acids and alkalis. Metals and Non-metals | Energy costs and transfers | Light and sound | Movement and cells | Particle model and separating techniques | Interdependence and plant reproduction | Variation and human reproduction | Speed and gravity | Voltage, Resistance and current |
| Substantive  Knowledge  (Knowledge) | * Metals and non-metals react with oxygen to form oxides which are either bases or acids. * Metals can be arranged as a reactivity series in order of how readily they react with other substances. * Some metals react with acids to produce salts and hydrogen. * The pH of a solution depends on the strength of the acid: strong acids have lower pH values than weak acids. * Mixing an acid and alkali produces a chemical reaction, neutralisation, forming a chemical called a salt and water. | * We pay for our domestic electricity usage based on the amount of energy transferred. * Electricity is generated by a combination of resources which each have advantages and disadvantages. * We can describe how jobs get done using an energy model where energy is transferred from one store at the start to another at the end. * When energy is transferred, the total is conserved, but some energy is dissipated, reducing the useful energy. | * Sound consists of vibrations which travel as a longitudinal wave through substances. The denser the medium, the faster sound travels. * The greater the amplitude of the waveform, the louder the sound. The greater the frequency (and therefore the shorter the wavelength), the higher the pitch. * When a light ray meets a different medium, some of it is absorbed and some reflected. For a mirror, the angle of incidence equals the angle of reflection. * The ray model can describe the formation of an image in a mirror and how objects appear different colours. * When light enters a denser medium it bends towards the normal; when it enters a less dense medium it bends away from the normal. | * The parts of the human skeleton work as a system for support, protection, movement and the production of new blood cells. * Antagonistic pairs of muscles create movement when one contracts and the other relaxes. * Multicellular organisms are composed of cells which are organised into tissues, organs and systems to carry out life processes. * There are many types of cell. Each has a different structure or feature so it can do a specific job. | * Properties of solids, liquids and gases can be described in terms of particles in motion but with differences in the arrangement and movement of these particles: closely spaced and vibrating (solid), in random motion but in contact (liquid), or in random motion and widely spaced (gas). * Observations where substances change temperature or state can be described in terms of particles gaining or losing energy. * A pure substance consists of only one type of element or compound and has a fixed melting and boiling point. * Mixtures may be separated due to differences in their physical properties. * The method chosen to separate a mixture depends on which physical properties of the individual substances are different. | * Organisms in a food web (decomposers,   producers and consumers) depend on each other for nutrients. So, a change in one population leads to changes in others.   * The population of a species is affected by the number of its predators and prey, disease, pollution and competition between individuals for limited resources such as water and nutrients. * Plants have adaptations to disperse seeds using wind, water or animals. * Plants reproduce sexually to produce seeds,   which are formed following fertilisation in the ovary. | * There is variation between individuals of the same species. Some variation is inherited, some is caused by the environment and some is a combination. * Variation between individuals is important for the survival of a species, helping it to avoid extinction in an always changing environment. * Multicellular organisms are composed of cells which are organised into tissues, organs and systems to carry out life processes. * The menstrual cycle prepares the female for pregnancy and stops if the egg is fertilised by a sperm. * The developing foetus relies on the mother to provide it with oxygen and nutrients, to remove waste and protect it against harmful substances. | * If the overall, resultant force on an object is not zero, its motion changes and it slows down, speeds up or changes direction. * Mass and weight are different but related. Mass is a property of the object; weight depends upon mass but also on gravitational field strength. * Every object exerts a gravitational force on every other object. The force increases with mass and decreases with distance. * Gravity holds planets and moons in orbit around larger bodies. | * We can model voltage as an electrical push from the battery, or the amount of energy per unit of charge transferred through the electrical pathway. * In a series circuit, voltage is shared between each component. In a parallel circuit, voltage is the same across each loop. * Components with resistance reduce the current flowing and shift energy to the surroundings Current is a movement of electrons and is the same everywhere in a series circuit. Current divides between loops in a parallel circuit, combines when loops meet, lights up bulbs and makes components work. * Around a charged object, the electric field affects other charged objects, causing them to be attracted or repelled. The field strength decreases with distance. |
| Disciplinary knowledge  (Skills) | * Testing a hypothesis * Writing a scientific conclusion * Evaluating how an investigation has gone | * Calculating energy costs for domestic appliances | * Construct ray diagrams to show how light reflects off mirrors, forms images and refracts. | * Use a light microscope to observe and draw cells. | * Use standard techniques to separate mixtures. | * Interpreting graphs to construct explanations and justify opinions * Discussing limitations to food chains and presenting data * Communicating ideas | * Producing bar graphs/Histograms to plot continuous and discontinuous variation. | * Use the formula: speed = distance (m)/time (s) or distance-time graphs, to calculate speed. * Use the formula: weight (N) = mass (kg) x gravitational field strength (N/kg). * Analysing and interpreting data from graphs | * Calculate resistance using the formula: resistance (Ω) = potential difference (V) ÷ current (A). * Building series and parallel circuits to measure voltage, resistance and current. |
| Progression from previous learning | * Year 5 Properties of Materials topic | * Year 4 Electricity topic * Year 6 Electricity topic | * Year 4 Sound topic * Year 6 Light topic | * Year 5 Animals including humans topic | * Year 5 Properties of materials | * Year 5 Living things and their environment topic * Year 6 Living things and their environment topic | * Year 6 Living Things and their Habitats topic * Year 6 Evolution and inheritance topic | * Year 5 Forces topic | * Year 4 Electricity topic * Year 6 Electricity topic |
| Enrichment | Science week | | | | | | | | |
| Assessment | Google quiz assessment | Google quiz assessment | Google quiz assessment | Google quiz assessment | Google quiz assessment | Google quiz assessment | Google quiz assessment | Google quiz assessment | Google quiz assessment |

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| **Year 8** | Topic 1 | Topic 2 | Topic 3 | Topic 4 | Topic 5 | Topic 6 | Topic 7 | Topic 8 | Topic 9 | Topic 10 |
| Concept | **Matter** | **Reactions** | **Waves** | **Earth** | **Electro-magnetism** | **Organisms** | **Energy** | **Forces** | **Ecosystems** | **Genes** |
| Why are we learning this? | * To understand how the elements we find in everyday life are linked * To understand how everyday substances like water are made up of elements | * Links to last topic – Last topic we looked at elements and compounds. This topic we look at chemical reactions that occur when the bonds holding the elements together in the compounds are broken to form new compounds * To understand energy is not created or destroyed but merely transferred * To understand how things like hand warmers use chemical reactions to work | * Links to last topic – Last topic we looked chemical reactions. Reactions can be exothermic or endothermic. Heat is a type of energy as is sound. Both of these travel as waves. * So we understand how sound and light waves can be used to our advantage in technology such as RADAR or baby scans | * Links to last topic – We looked at the electromagnetic spectrum and how heat can travel through a vacuum. It is this reason the Suns heat travels to us. This topic will look at what is happening to our climate and why the Earth is heating up * So we can understand how the choices we are making as humans are affecting the planet * So we understand the importance of the Earths resources | * Links to last topics - We looked at the electromagnetic spectrum this topic we are going to look at electromagnets and how we can use them to help in the battle to recycle. And how the Earth acts like a giant magnet itself. * So we can understand how compasses work with the Earths magnetic field * So we know how microphones and headphones work | * Links to last topics – Move onto biology and look at how and why we have to eat and breath * So we can understand why we need a healthy and balanced diet * So we know how our body works | * Links to last topics – Last topic we looked at how we eat and breath to carry out a process called respiration which gives us the energy we require to do anything and everything. This topic we are looking at how objects transfer energy and how we can measure how much energy it takes to do a job. * So we can stay warm ourselves * So we can keep food hot or cold by minimising heat loss or gain | * Links to last topics – Last topic we looked at how work is done energy is applied to an object. This is applied to an object by applying a force. We are looking at those force this topic * So we can understand how friction works and when it is useful and when it’s not * So we can why our ears pop when in an plane or underwater | * Links to last topics – Last topic we looked at how work is done energy is applied to an object. This topic is a more detailed look at where we get our energy from in the process we were introduced to in breathing and digestion. And a look at where plants get there energy from too. * So we can understand how our body uses the food we eat * So we can understand the symbiotic relationship between photosynthesis and respiration | * Links to last topics – All living things have respire and reproduce but how are there so many living things on the planet and how do we pass on the characteristics that enable us to photosynthesise or respire? * So we can understand why we look like our family * So we can understand how we can use genetics to our advantage if we wish |
| Learning Focus | Elements and the periodic table | Chemical energy and types of reactions | Wave effects and properties | Climate change and Earths resources | Electromagnets and magnetism | Breathing and digestion | Work, heating and cooling | Contact forces and pressure | Photosynthesis and Respiration | Evolution and inheritance |
| Substantive  Knowledge  (Knowledge) | * The elements in a group all react in a similar way and sometimes show a pattern in reactivity. * As you go down a group and across a period the elements show patterns in physical properties. * Most substances are not pure elements, but   compounds or mixtures containing atoms of  different elements. They have different properties to the elements they contain. | * During a chemical reaction bonds are broken (requiring energy) and new bonds formed (releasing energy). If the energy released is greater than the energy required, the reaction is exothermic. If the reverse, it is endothermic. * Combustion is a reaction with oxygen in which energy is transferred to the surroundings as heat and light. * Thermal decomposition is a reaction where a single reactant is broken down into simpler products by heating. * Chemical changes can be described by a model where atoms and molecules in reactants rearrange to make the products and the total number of atoms is conserved. | * When a wave travels through a substance, particles move to and fro. Energy is transferred in the direction of movement of the wave. Waves of higher amplitude or higher frequency transfer more energy. * A physical model of a transverse wave demonstrates it moves from place to place, while the material it travels through does not, and describes the properties of speed, wavelength and reflection. | * Carbon is recycled through natural processes in the atmosphere, ecosystems, oceans and the Earth’s crust (such as photosynthesis and respiration) as well as human activities (burning fuels). * Greenhouse gases reduce the amount of energy lost from the Earth through radiation and therefore the temperature has been rising as the concentration of those gases has risen. * Scientists have evidence that global warming caused by human activity is causing changes in climate. * There is only a certain quantity of any resource on Earth, so the faster it is extracted, the sooner it will run out. * Recycling reduces the need to extract resources. * Most metals are found combined with other elements, as a compound, in ores. The more reactive a metal, the more difficult it is to separate it from its compound. * Carbon displaces less reactive metals, while electrolysis is needed for more reactive metals. | * An electromagnet uses the principle that a current through a wire causes a magnetic field. Its strength depends on the current, the core and the number of coils in the solenoid. * Magnetic materials, electromagnets and the Earth create magnetic fields which can be described by drawing field lines to show the strength and direction. * The stronger the magnet, and the smaller the distance from it, the greater the force a magnetic object in the field experiences. | * In gas exchange, oxygen and carbon dioxide move between alveoli and the blood. * Oxygen is transported to cells for aerobic respiration and carbon dioxide, a waste product of respiration, is removed from the body. * Breathing occurs through the action of muscles in the ribcage and diaphragm. * The amount of oxygen required by body cells determines the rate of breathing. * The body needs a balanced diet with carbohydrates, lipids, proteins, vitamins, minerals, dietary fibre and water, for its cells’ energy, growth and maintenance. * Organs of the digestive system are adapted to break large food molecules into small ones which can travel in the blood to cells and are used for life processes. | * Work is done and energy transferred when a force moves an object. The bigger the force or distance, the greater the work. Machines make work easier by reducing the force needed. Levers and pulleys do this by increasing the distance * The thermal energy of an object depends upon its mass, temperature and what it’s made of. When there is a temperature difference, energy transfers from the hotter to the cooler object. * Thermal energy is transferred through different pathways, by particles in conduction and convection, and by radiation. | * When the resultant force on an object is zero, it is in equilibrium and does not move, or remains at constant speed in a straight line. * One effect of a force is to change an object’s form, causing it to be stretched or compressed. * In some materials, the change is proportional to the force applied. * Pressure acts in a fluid in all directions. It increases with depth due to the increased weight of fluid, and results in an upthrust. * Objects sink or float depending on whether the weight of the object is bigger or smaller than the upthrust. * Different stresses on a solid object can be used to explain observations where objects scratch, sink into or break surfaces. | * Respiration is a series of chemical reactions, in cells, that breaks down glucose to provide energy and form new molecules. * Most living things use aerobic respiration but switch to anaerobic respiration, which provides less energy, when oxygen is unavailable. * Plants and algae do not eat, but use energy from light, together with carbon dioxide and water to make glucose (food) through photosynthesis. * Plants and algae use the glucose as an energy source, to build new tissue, or store it for later use. * Plants have specially-adapted organs that   allow them to obtain resources needed for photosynthesis. | * Natural selection is a theory that explains how species evolve and why extinction occurs. * Biodiversity is vital to maintaining populations. * Within a species variation helps against environment changes, avoiding extinction. * Within an ecosystem, having many different species ensures resources are available for other populations, like humans. * Inherited characteristics are the result of genetic information, in the form of sections of DNA called genes, being transferred from parents to offspring during reproduction. * Chromosomes are long pieces of DNA which   contain many genes. Gametes, carrying half the total number of chromosomes of each parent, combine during fertilisation. |
| Disciplinary knowledge  (Skills) | * Use particle diagrams to classify a substance as an element, mixture or compound and as molecules or atoms. * Name simple compounds using rules: change non-metal to –ide; mono, di, tri prefixes; and symbols of hydroxide, nitrate, sulfate and carbonate. | * Write word equations from information about chemical reactions. * Present data for others to communicate your ideas. | * Communicate ideas when discussing similarities and differences between properties of sound and light waves. * Examine the consequences of damage to either the ear or eye. | * Evaluate claims that human activity is causing global warming or climate change. * Use data to evaluate proposals for recycling materials. | * Discuss limitations in the design of a device using an electromagnet and suggest improvements. * Predict the pattern of field lines and the force around two magnets placed near each other and how an object made of a magnetic material will behave in or rolled through a magnetic field. | * Analysing patterns seen in test results * Drawing conclusions from test results | * Using scientific keywords to explain how simple machines work. * Use the formula: work done (J) = force (N) x distance moved (m) | * Sketch the forces acting on an object, and label their size and direction. * Use the formula: fluid pressure, or stress on a surface = force (N)/area (m2). | * Utilising word equations to explain similarities and differences between photosynthesis and respiration * Collecting data and examining consequences on how particular conditions affect plants and humans * Creating graphs from data acquired | * Review and interrogate theories of extinction. * Use research to justify and formulate your opinions on theories such as extinction |
| Progression from previous learning | * Year 5 Properties of Materials topic * Year 7 Matter topic | * Year 5 Properties of Materials topic * Year 7 Reactions topic | * Year 6 Light topic * Year 7 Waves topic | * Yr 3 Rocks * Year 7 Earth topic | * Year 7 Electromagnetism topic | * Year 8 Ecosystems topic * Year 7 Organisms topic | * Year 7 Energy topic | * Year 5 Forces topic * Year 7 Forces topic | * Year 7 topic Organisms * Year 7 Ecosystems topic | * Year 6 Evolution and inheritance topic * Year 7 Genes topic |
| Enrichment | Science week  IET Faraday challenge day | | | | | | | | | |
| Assessment | Google quiz assessment | Google quiz assessment | Google quiz assessment | Google quiz assessment | Google quiz assessment | Google quiz assessment | Google quiz assessment | Google quiz assessment | Google quiz assessment | Google quiz assessment |