Long Term Plan Science Cycle A KS2

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|  | Autumn  | Spring | Summer |
| Year 3/4 | Invasion**Companion – Warp and Weft****No Science Coverage****Are all sea creatures the same?** | Misty Mountain, Wining River**Companion – What do Squirrels eat?** | Ancient Civilisations**No Science Coverage****Electrical Circuits** | Predator**Driver Subject - Science****Companion – Can we block sound?****How far can sound travel?****Why do cat’s eyes glow at night?** | Potions**Driver Subject - Science** | Burp, Bottoms and Bile**Driver Subject - Science** |
| Skills | * Compare and contrast the diets of different animals.
* Ask relevant scientific questions, independently, about the world around them and begin to identify how they can answer them.
* Begin to independently plan, set up and carry out a range of comparative and fair tests, making predictions and following a method accurately.
* Use scientific vocabulary to report and answer questions about their findings based on evidence collected, draw simple conclusions and identify next steps, improvements and further questions.
* Identify differences, similarities or changes related to simple scientific ideas and processes
* Use straightforward scientific evidence to answer questions or to support their findings.
 | * Describe the water cycle using words or diagrams and explain the part played by evaporation and condensation
* Describe how environments can change due to human and natural influences and the impact this can have on living things.
 | * Construct operational simple series circuits using a range of components and switches for control.
* Predict and describe whether a circuit will work based on whether or not the circuit is a complete loop and has a battery or cell.
* Describe materials as electrical conductors or insulators.
* Begin to choose which observations to make and for how long and make systematic, careful observations and comparisons, identifying changes and connections.
* Begin to independently plan, set up and carry out a range of comparative and fair tests, making predictions and following a method accurately.
* Describe materials as electrical conductors or insulators.
* Explain the precautions needed for working safely with electrical circuits.
* Ask relevant scientific questions, independently, about the world around them and begin to identify how they can answer them.
* Use scientific vocabulary to report and answer questions about their findings based on evidence collected, draw simple conclusions and identify next steps, improvements and further questions.
 | * Compare and contrast the diets of different animals.
* Describe simply how fossils are formed, using words, pictures or a model.
* Gather and record findings in a variety of ways (diagrams, tables, charts and graphs) with increasing accuracy
* Investigate how water is transported within plants.
* Describe how humans need the skeleton and muscles for support, protection and movement.
* Make increasingly careful observations, identifying similarities, differences and changes and making simple connections.
 | * Ask relevant scientific questions, independently, about the world around them and begin to identify how they can answer them.
* Group and sort materials into solids, liquids or gases.
* Begin to independently plan, set up and carry out a range of comparative and fair tests, making predictions and following a method accurately.
* Take accurate measurements in standard units, using a range of equipment.
* Use scientific vocabulary to report and answer questions about their findings based on evidence collected, draw simple conclusions and identify next steps, improvements and further questions.
* Begin to choose which observations to make and for how long and make systematic, careful observations and comparisons, identifying changes and connections.
* Observe and explain that some materials change state when they are heated or cooled and measure or research the temperature in degrees Celsius (˚C) at which materials change state.
 | * Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including 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, keys, 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, make predictions for new values, suggest improvements and raise further questions.
* Identify differences, similarities or changes related to simple scientific ideas and processes
* Use straightforward scientific evidence to answer questions or to support their findings.
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| Knowledge | - Classification is the way we categorise living and non-living things according to their observable characteristics.- All living things are named with the ‘binomial system’, which uses Latin words. Each name has two parts: genus and species. Humans belong to the Homo genus and the sapiens species, so we are Homo sapiens. Other examples include the Orcinus orca (killer whale) and Cancer pagurus (brown crab).- Aquatic animals are vertebrates or invertebrates that live in water for most or all of their lives.- Aquatic vertebrates include bony fish (fish, seahorses and rays), amphibians, reptiles (turtles, snakes and lizards) and mammals (whales, dolphins, seals and walruses).- Aquatic invertebrates include insects, arachnids, crustaceans (crabs, lobster and shrimp), annelids and molluscs (squid, cuttlefish, octopus, mussels, oyster and winkles).- Fishmongers, including supermarket counters, sell whole aquatic animals, such as sprats, mackerel, sole, plaice, shrimp, crab, oysters, eel, mussels, cockles, skate, squid and octopus. Keep the animals in the freezer until needed then defrost overnight in the fridge.- You can buy dried seahorses and starfish but check they come from an ethical source. | * Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.
* Recognise that environments can change and that this can sometimes pose dangers to living things.
 | * Electrical components include cells, wires, lamps, motors, switches and buzzers. Switches open and close a circuit and provide control.
* A circuit is a collection of components connected by wires through which an electric current can flow. A circuit must be a complete loop to work.
* A series circuit has a single path for an electric current to flow through.
* A series circuit is a simple loop with only one path for the electricity to flow. A series circuit must be a complete loop to work and have a source of power from a battery or cell.
* Electrical conductors allow electricity to flow through them, whereas insulators do not. Common electrical conductors are metals. Common insulators include wood, glass, plastic and rubber.
* Results are information, such as data or observations, that have been found out from an investigation. A conclusion is the answer to a question that uses the evidence collected.
* An observation involves looking closely at objects, materials and living things. Observations can be made regularly to identify changes over time.
* Scientific enquiries can be set up and carried out by following or planning a method. A prediction is a statement about what might happen in an investigation, based on some prior knowledge or understanding. A fair test is one in which only one variable is changed and all others remain constant.
* Electrical conductors allow electricity to flow through them, whereas insulators do not. Common electrical conductors are metals. Common insulators include wood, glass, plastic and rubber.
* Working with electrical circuits can be dangerous. Precautions include not touching electrical components with wet hands and not putting batteries in mouths.
* Plugs and cabling are made from a combination of conductive and insulating materials. Insulating plastic covers conductive metals to make plugs safe to use.
* Questions can help us find out about the world and can be answered using scientific enquiry.
 | * Animals cannot make their own food and need to get nutrition from the food they eat. Carnivores get their nutrition from eating other animals. Herbivores get their nutrition from plants. Omnivores get their nutrition from eating a combination of both plants and other animals.
* Fossils form over millions of years and are the remains of a once-living organism, preserved as rock. Scientists can use fossils to find out what life on Earth was like in prehistoric times. Fossils form when a living thing dies in a watery environment. The body gets covered by mud and sand and the soft tissues rot away. Over time, the ground hardens to form sedimentary rock and the skeletal or shell remains turn to rock.
* Data can be recorded and displayed in different ways, including tables, charts, graphs and labelled diagrams. Data can be used to provide evidence to answer questions.
* Water is transported in plants from the roots, through the stem and to the leaves, through tiny tubes called xylem.
* Humans have a skeleton and muscles for movement, support and protecting organs. Major bones in the human body include the skull, ribs, spine, humerus, ulna, radius, pelvis, femur, tibia and fibula. Major muscle groups in the human body include the biceps, triceps, abdominals, trapezius, gluteals, hamstrings, quadriceps, deltoids, gastrocnemius, latissimus dorsi and pectorals.
* An observation involves looking closely at objects, materials and living things, which can be compared and grouped according to their features.
 | * Ask relevant questions and using different types of scientific enquiries to answer them.
* Questions can help us find out about the world and can be answered using scientific enquiry.
* Compare and group materials together, according to whether they are solids, liquids or gases.
* Set up simple practical enquiries, comparative and fair tests.
* Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.
* Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.
* Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.
* Use straightforward scientific evidence to answer questions or to support their findings.
* Identify differences, similarities or changes related to simple scientific ideas and processes.
* Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.
* 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).
 | * 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, keys, 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, make predictions for new values, suggest improvements and raise further questions.
* Use straightforward scientific evidence to answer questions or to support their findings.
* Identify the different types of teeth in humans and their simple functions.

Are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future. |
|  | Autumn | Spring | Summer |
| Year 5/6 | Off with her headNo Science CoverageHow do levers help us? | Frozen Kingdoms | Tomorrow’s World | MayaNo Science Coverage**Companion; How clean are your hands?** | Darwin’s Delights**Driver Subject - Science** | Britain at War**No Science Coverage****Companion; Can you send a coded message?** |
| Skills | * Within a group, decide which observations to make, when and for how long, and make systematic and careful observations, using them to make comparisons, identify changes, classify and make links between cause and effect.
* Use relevant scientific vocabulary to report on their findings, answer questions and justify their conclusions based on evidence collected, identify improvements, further questions and predictions.
* Describe and demonstrate how simple levers, gears and pulleys assist the movement of objects.
 | - Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.- Classify living things, including microorganisms, animals and plants, into groups according to common observable characteristics and based on similarities and differences. View progression- Research unfamiliar animals and plants from a range of habitats, deciding upon and explaining where they belong in the classification system.- Use and construct classification systems to identify animals and plants from a range of habitats.- Identify how animals and plants are adapted to suit their environment, such as giraffes having long necks for feeding, and that adaptations may lead to evolution.- Ask and answer deeper and broader scientific questions about the local and wider world that build on and extend their own and others' experiences and knowledge.- Plan and carry out a range of enquiries, including writing methods, identifying and controlling variables, deciding on equipment and data to collect and making predictions based on prior knowledge and understanding. | - Describe, using diagrams, how light behaves when reflected off a mirror (plane, convex or concave) and when passing through a lens (concave or convex)- Explain that, due to how light travels, we can see things because they give out or reflect light into the eye.- Create circuits using a range of components and record diagrammatically using the recognised symbols for electrical components.- Explain how the brightness of a lamp or volume of a buzzer is affected by the number and voltage of cells used in a circuit.- Plan and carry out a range of enquiries, including writing methods, identifying and controlling variables, deciding on equipment and data to collect and making predictions based on prior knowledge and understanding. | - Plan and carry out a range of enquiries, including writing methods, identifying and controlling variables, deciding on equipment and data to collect and making predictions based on prior knowledge and understanding.- Ask and answer deeper and broader scientific questions about the local and wider world that build on and extend their own and others' experiences and knowledge. | - Identify how animals and plants are adapted to suit their environment, such as giraffes having long necks for feeding, and that adaptations may lead to evolution.- Plan and carry out a range of enquiries, including writing methods, identifying and controlling variables, deciding on equipment and data to collect and making predictions based on prior knowledge and understanding.- Classify living things, including microorganisms, animals and plants, into groups according to common observable characteristics and based on similarities and differences.- Choose an appropriate approach to recording accurate results, including scientific diagrams, labels, timelines, classification keys, tables, models and graphs (bar, line and scatter), linking to mathematical knowledge.  - Identify that living things produce offspring of the same kind, although the offspring are not identical to either parent.  | - Plan and carry out a range of enquiries, including writing methods, identifying and controlling variables, deciding on equipment and data to collect and making predictions based on prior knowledge and understanding.- Choose an appropriate approach to recording accurate results, including scientific diagrams, labels, timelines, classification keys, tables, models and graphs (bar, line and scatter), linking to mathematical knowledge.  |
| Knowledge | * A lever is a simple ‘machine’ that gives us a mechanical advantage. They can help us move heavy loads using less effort.
* Mechanical advantage is a measurement of how much a simple machine multiplies the force that we put in. The bigger the mechanical advantage, the less force we need to apply.
* Levers have three main parts. The load is the object you are trying to move, the effort is the force applied to move the load, and the fulcrum is the point where the load is pivoted.
* There are three types or class of lever, which depend on where the load and effort are located in relation to the fulcrum.
* The fulcrum in a class 1 lever is between the effort and the load and examples include a seesaw, scissors and pliers. Class 2 levers place the load between the effort and the fulcrum and examples include wheelbarrows and hinged doors. Class 3 levers place the effort between the load and the fulcrum and examples include fishing rods and tennis rackets.
* We measure mass in kilograms (kg) and force in newtons (N).
* An observation involves looking closely at objects, materials and living things. Accurate observations can be made repeatedly or at regular intervals to identify changes over time.
* The results are information, such as measurements or observations, that have been collected during an investigation. A conclusion is an explanation of what has been discovered using evidence collected.
* Mechanisms, such as levers, pulleys and gears, give us a mechanical advantage. A mechanical advantage is a measurement of how much a simple machine multiplies the force that we put in. The bigger the mechanical advantage, the less force we need to apply.
 | - The Solar System is made up of the Sun and everything that orbits around it. There are eight planets in our Solar System: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. Earth orbits around the Sun and a year (365 days) is the length of time it takes for Earth to complete a full orbit.-Scientists classify living organisms into broad groups according to their characteristics. Vertebrates are an example of a classification group. There are a number of ranks, or levels, within the biological classification system. The first rank is called a kingdom, the second a phylum, then class, order, family, genus and species.- Living things are classified into groups, according to common observable characteristics and based on similarities and differences.- Classification keys help us identify living things based on their physical characteristics.- An adaptation is a physical or behavioural trait that allows a living thing to survive and fill an ecological niche. Adaptations evolve by natural selection. Favourable traits help an organism survive and pass on their genes to subsequent generations.- Questions can help us find out about the world and can be answered using a range of scientific enquiries, including fair tests, research and observation.- A method is a set of clear instructions for how to carry out a scientific investigation, including what equipment to use and observations to make. A variable is something that can be changed during a fair test. A prediction is a statement about what might happen in an investigation based on some prior knowledge or understanding. | - Mirrors and lenses are used in a range of everyday objects (telescopes, periscopes, cards and on roads). The human eye has a lens that bends and focuses light on the back of the eye (retina) so that we can see.- Light sources give out light. They can be natural or artificial. When light hits an object, it is absorbed, scattered, reflected or a combination of all three. Light from a source or reflected light enter the eye. Vertebrates, such as mammals, birds and reptiles, have a cornea and lens that refracts light that enters the eye and focuses it on the nerve tissue at the back of the eye, which is called the retina. Once light reaches the retina, it is transmitted to the brain via the optic nerve.- There are recognised symbols for different components of circuits.- Voltage is measured in volts (V) and is a measure of the difference in electrical energy between two parts of a circuit. The bigger the voltage, the more electrons are pushed through the circuit. The more voltage flowing through a lamp, buzzer or motor, the brighter the lamp, the louder the buzzer and the faster the motor.- A method is a set of clear instructions for how to carry out a scientific investigation, including what equipment to use and observations to make. A variable is something that can be changed during a fair test. A prediction is a statement about what might happen in an investigation based on some prior knowledge or understanding. | • Microorganism is a general term for a living organism that can only be seen with a microscope and includes bacteria, fungi and viruses. Correctly speaking, viruses are not microorganisms, but they are commonly included in this definition.• Nutrient agar is used for growing microorganisms. When melted and poured into petri dishes, it sets into a firm jelly. These prepared dishes are called agar plates.• On an agar plate, individual bacteria feed on the nutrients and multiply rapidly until they form a visible mound, which is called a colony.• Fungi grow on agar plates by extending a network of long branching filaments called a mycelium, which gives them a fuzzy appearance.• Viruses do not grow on agar plates as they require a living ‘host’ to replicate and survive.• Aseptic means ‘free from disease-causing microorganisms’. When using agar plates, ‘aseptic techniques’ prevent contamination. In laboratories, scientists wear gloves and work with a lit Bunsen burner to sterilise the air and reduce contamination. | - An adaptation is a physical or behavioural trait that allows a living thing to survive and fill an ecological niche. Adaptations evolve by natural selection. Favourable traits help an organism survive and pass on their genes to subsequent generations.- A method is a set of clear instructions for how to carry out a scientific investigation, including what equipment to use and observations to make. A variable is something that can be changed during a fair test. A prediction is a statement about what might happen in an investigation based on some prior knowledge or understanding.- Scientists classify living organisms into broad groups according to their characteristics. Vertebrates are an example of a classification group. There are a number of ranks, or levels, within the biological classification system. The first rank is called a kingdom, the second a phylum, then class, order, family, genus and species.- Data can be recorded and displayed in different ways, including tables, bar and line charts, scatter graphs, classification keys and labelled diagrams.- Animals that sexually reproduce generate new offspring of the same kind by combining the genetic material of two individuals. Each offspring inherits two of every gene, one from the female parent and one from the male parent. | - A method is a set of clear instructions for how to carry out a scientific investigation, including what equipment to use and observations to make. A variable is something that can be changed during a fair test. A prediction is a statement about what might happen in an investigation based on some prior knowledge or understanding.- Data can be recorded and displayed in different ways, including tables, bar and line charts, scatter graphs, classification keys and labelled diagrams. |