Year 6 Unit Progression in disciplinary knowledge, followed by unit summaries

Year 6	Alive (Structure and Function) Identify the structure and function of main different parts of the human circulatory system	Alive (Structure and Function) Use knowledge of structure and function of plants and animals to classify them in broad groups	Diversity Recognise ways in which humans can support or hinder their ability to thrive. Identify adaptions and its role in evolution		Energy - Light Explore how light energy travels in straight lines.	Energy – Electricity Explore the impact of varying voltage in a circuit
Disciplinary progression	Children can identify CV and DV in a given enquiry and use to plan and carry out an investigation, interpreting results presented on line graphs.	Children can identify **possible CV and DV** and **knowledge of enquiry structure to generate** a an enquiry question; plan and carry out an investigation, interpreting results	Children can identify possible CV and DV and knowledge of given enquiry structure to generate an enquiry question; plan and carry out an investigation, interpreting results **and making new predictions**		Children can identify possible CV and DV and knowledge of **all enquiry structures** to generate an enquiry question; plan and carry out an investigation, interpreting **and questioning** results and making new predictions	Children can identify possible CV and DV and knowledge of **all enquiry structures** to generate an enquiry question; plan and carry out an investigation, interpreting **and questioning** results and making new predictions
Observing and measuring	• **I use my knowledge of variables and measures to make reasoned decisions about what to observe and measure and which equipment to use.** • **I know that systematic observation is based on the control variable** • I know that repeating measurements and observations increases their reliability		•	•	•	
Recording Data	• I know that scientific diagrams mainly contain labelled features relevant to the variables • **I know that a line graph represents changes over time.** • **I know that the x axis is the control variable** • **I know that the y axis is the dependent variable**	• **I know that scientific diagrams mainly contain labelled features relevant to the variables** • I know how to use yes no answers to build a classification key	• **I know how to organise data using my knowledge of control and dependent variables in tables, charts and diagrams.**			• I know that scientific diagrams mainly contain labelled features relevant to the variables • **I know how to use yes no answers to build a classification key**
Asking and exploring questions	• I know how to use variables to generate an enquiry question for different enquiry types. • I can identify how to control variables in different enquiry types - I can design a fair test •	• **I know how to use variables to generate an enquiry question for different enquiry types.** • I can explain my choice of enquiry choice •	• **I can explain my choice of enquiry choice**		• **I can identify how to control variables in different enquiry types - I can design a fair test**	• **I know how to use variables to generate an enquiry question for different enquiry types.** • **I can explain my choice of enquiry choice**
Performing Tests	• I can plan and perform part of an investigation independently •	• **I can plan and perform part of an investigation independently**	•		• I can plan and perform part of an investigation independently	• I can plan and perform part of an investigation independently
Concluding, prediction, evaluating	• I know that predictions are based on my scientific knowledge of how variables are likely to behave.	• I know that predictions are based on my scientific knowledge of how variables are likely to behave**.** •	• **I know that predictions are based on my scientific knowledge of how variables are likely to behave.**		• I know that predictions are based on my scientific knowledge of how variables are likely to behave. • I know that all results allow me to question and predict, however, not all results are reliable • **I can use my scientific knowledge to question my findings and decide when further testing is required**	• **I know that all results allow me to question and predict, however, not all results are reliable**
Applications & Communication	**Applications** • I can use my knowledge of science to understand its uses and implication	**Communicating** • I know that relevant scientific language and illustrations can be used to communicate and justify my ideas •	**Communicating** • I know how scientific ideas have developed over time. **Applications** • I can use my knowledge of science to understand its uses and implication			**Communicating** • I know that relevant scientific language and illustrations can be used to communicate and justify my ideas

Yr 6 A1	**BIG Q: How can I enable my body to thrive?** Pupils should build on their learning from years 3 and 4 about the main body parts and internal organs (skeletal, muscular and digestive system) to explore and answer questions that help them to understand how the circulatory system enables the body to function. Pupils should learn how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body. Pupils might work scientifically by: exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health.					
Lesson Qs	**Elicitation / Activate**	What is the structure of the circulatory system?	What is the function of the parts of the circulatory system?	How can a pulse rate change during exercise?	How can lifestyle choices affect the way a body functions?	**Application / Assess** How can I enable my body to thrive?
Key Concepts Alive (Structure and Function) Identify the structure and function of main different parts of the human circulatory system	• Animals and plants need nutrition (energy) to survive and thrive (function / work done). • The supply of energy (food) travels through digestive system, where different structures perform different functions (work done) allowing the body to survive and thrive.	• Know the names and location of the parts of the circulatory system: heart, lungs, mouth and nose, blood vessels and blood	• Know that the function of the heart is to pump blood around the body. • Know that the function of the lungs is to bring oxygen into the body and excrete carbon dioxide • Know that carbon dioxide is waste product • Know that blood carries oxygen, CO2, water and nutrients. • Know that blood vessels transport the blood to all areas of the body.	• Know that carbon dioxide is waste product • Know that the function of the heart is to pump blood around the body. • Know that blood vessels transport the blood to all areas of the body. • Know that blood carries oxygen, CO2, water and nutrients. • Know that exercise leads to greater well-being both physically and mentally	• Know that an unbalanced diet leads to poor health • Know that exercise leads to greater well-being both physically and mentally • Know that some drugs can be harmful to the human body, e.g. ……	The body needs oxygen, water and nutrients to function (survive). These travel through the circulatory system where different parts (structures) perform different functions. Lifestyle choices can affect the way the body functions.
Disciplinary Concepts	***Observing and measuring*** • *I know that I observe / measure the dependent variable.* • *I know that a dependent variable is the variable that is changing* • *I know that systematic observation is one that is controlled.* ***Asking and exploring Questions*** • *I know there are different types of scientific enquires.* • *I know that comparative and fair testing involves exploring cause and effect.* • *I can identify the control and dependent variables* • *I can recognise a fair test*	**Observing and measuring** • I use my knowledge of variables and measures to make reasoned decisions about what to observe and measure and which equipment to use. **Recording Data** • I know that scientific diagrams mainly contain labelled features relevant to the variables **Asking and exploring questions** • I know how to use variables to generate an enquiry question for different enquiry types.	**Observing and measuring** • I know that systematic observation is based on the control variable • I know that repeating measurements and observations increases their reliability **Asking and exploring questions** • I can identify how to control variables in different enquiry types - I can design a fair test **Performing Tests** • I can plan and perform part of an investigation independently	**Recording Data** • I know that a line graph represents changes over time. • I know that the x axis is the control variable • I know that the y axis is the dependent variable **Concluding, prediction, evaluating** • I know that predictions are based on my scientific knowledge of how variables are likely to behave.	**Concluding, prediction, evaluating** • I know that predictions are based on my scientific knowledge of how variables are likely to behave. **Applications** • I can use my knowledge of science to understand its uses and implication	•
Key learning tasks	Why is it called the digestive system? What is its purpose? What do I know about the concept of Alive (structure and function) What is the function of control and dependent variables in a fair test?	• Research enquiry – identify the control variable for the research (e.g. circulatory system) and the dependent variable (structure – parts). • Use variables to generate research enquiry question • Justify why enquiry is research • Record results as a scientific diagram with labels related to the dependent variable.	• Add functions to the labelled diagram of circulatory system. • Investigate breathing out • Identify the control (size, gender,, arm span, length of torso) and dependent variables (quantity of excretion, length etc.) • Use variables to generate comparative and fair test enquiry into breathing out (excreting) e.g. how does the size of the person affect the length of out breath? • Perform test and take multiple readings	• Investigate pulse rate, taking multiple readings • Use variables to generate observation over time investigation (or comparative fair test) • Identify what the x and y axes are • From a produce line graph of their results – predict outcome for given scenario – e.g. increased exercise – increased rest.	• Predict the likely outcome of lifestyle choices on the function of the circulatory system.	
Generalisation	The body needs oxygen, water and nutrients to function (survive). The supply of energy (food) travels through digestive system, where different structures perform different functions (work done) allowing the body to survive and thrive.	The body needs oxygen, water and nutrients to function (survive). These travel through the circulatory system which has different parts (structures)	The body needs oxygen, water and nutrients to function (survive). These travel through the circulatory system where different parts (structures) perform different functions.	Know that our actions (exercise) can change the way structures (our organs) function	Lifestyle choices can affect the way the body functions	The body needs oxygen, water and nutrients to function (survive). These travel through the circulatory system where different parts (structures) perform different functions. Lifestyle choices can affect the way the body functions.

Yr 6 A2	**BIG Q: How does classification help us to identify species?** Pupils should build on their learning about grouping living things in year 4 by looking at the classification system in more detail. They should be introduced to the idea that broad groupings, such as micro-organisms, plants and animals can be subdivided. Through direct observations where possible, they should classify animals into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals). They should discuss reasons why living things are placed in one group and not another. Pupils might find out about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification. Pupils might work scientifically by: using classification systems and keys to identify some animals and plants in the immediate environment. They could research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.					
Lesson Qs	**Elicitation / Activate**	How do scientists classify vertebrates into different groups?	How do scientists classify invertebrates into different groups?	How do scientists classify plants into different groups?	How and why do scientists classify living things?	**Application / Assess** How does classification help us to identify species?
Key Concepts: Alive (Structure and Function) Use knowledge of structure and function of plants and animals to classify them in broad groups	• *The structure and function of living things and materials have similarities and differences. These enable us to group them and identify individual diversity between species (types).* • *Adult animal (humans) offspring do not always have the same structure and function as their parents but do grow into the same type of adult (species).*	• Know the 5 classifications of vertebrates: mammals, birds, fish, amphibians and reptiles. • give reasons for classifying animals based on specific characteristics.	• Know the difference between vertebrates and invertebrates • Know that invertebrates can be worms, insects and spiders • give reasons for classifying animals based on specific characteristics.	• Know the difference between flowering plants and non-flowering plants • give reasons for classifying plants and animals based on specific characteristics.	• Know the difference between a plant, micro-organisms and an animal • Know that a micro-organism is a living thing • Know that a microorganism is a bacteria or a virus that can be helpful or harmful • give reasons for classifying plants and animals based on specific characteristics.	• describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals **Generalisation:** The structure and function (characteristics) of living things have similarities and differences. These enable us to classify them into species and identify diversity within species.
Disciplinary Concepts	***Recording Data*** • *I know that scientific diagrams mainly contain labelled features relevant to the variables* ***Asking and exploring Questions*** • *I know how to use variables to generate an enquiry question for different enquiry types.* ***Performing Tests*** • *I can plan and perform part of an investigation independently*	**Recording Data** • I know that scientific diagrams mainly contain labelled features relevant to the variables • I know how to use yes no answers to build a classification key **Performing Tests** • I can plan and perform part of an investigation independently **Communicating** • I know that relevant scientific language and illustrations can be used to communicate and justify my ideas	**Recording Data** • I know how to use yes no answers to build a classification key **Asking and exploring questions** • I know how to use variables to generate an enquiry question for different enquiry types. **Performing Tests** • I can plan and perform part of an investigation independently	**Asking and exploring questions** • I know how to use variables to generate an enquiry question for different enquiry types. • I can explain my choice of enquiry choice **Communicating** • I know that relevant scientific language and illustrations can be used to communicate and justify my ideas	**Concluding, prediction, evaluating** • I know that predictions are based on my scientific knowledge of how variables are likely to behave. **Asking and exploring questions** • I know how to use variables to generate an enquiry question for different enquiry types. • I can explain my choice of enquiry choice	**Communicating** • I know that relevant scientific language and illustrations can be used to communicate and justify my ideas **Applications** • I can use my knowledge of science to understand its uses and implication
Key learning tasks		• Label diagrams or table comparison of characteristics of different 5 groups of vertebrates. • Identifying, enquiry – vertebrates. • Identify how dependent variables build the classification key and then steer how to perform the test. • Key vocabulary used in building and recording of classification key using the dependent variables	• Label diagrams or table comparison of characteristics of invertebrates using dependent variable (characteristics) (worms, spider, insects) • What enquiry type would you use to investigate the differences between invertebrates (control: invertebrates, dependent – characteristics)? • Record the key based on dependent variables.	• Use variables to generate enquiry questions into the differences in plants. (identifying? Grouping? Classifying? • What enquiry type would you use to investigate the differences between flowering and non-flowering plants? • Through the classification – identify the species of plant and justify the allocation to that species through labelled features. (DV)	• Research enquiry into micro-organisms – control variable – micro-organisms, DV – (impact) harmful / helpful • Classification key for living things (CV), DV – structure	Investigate the Linnaeus system as an application
Generalisation	• The structure and function of living things and materials have similarities and differences. These enable us to group them and identify individual diversity between species (types). • Adult animal (humans) offspring do not always have the same structure and function as their parents but do grow into the same type of adult (species).	The structure (characteristics) and function of vertebrates have a common similarity (backbone) and differences, which enable us to identify species.	The structure (characteristics) and function of invertebrates have a common similarity (no backbone) and differences, which enable us to identify species.	The structure and function (characteristics) of plants have similarities and differences. These enable us to classify them into species and identify diversity within species.	The structure and function (impact) of micro-organisms have similarities and differences. These enable us to classify them.	The structure and function (characteristics) of living things have similarities and differences. These enable us to classify them into species and identify diversity within species.

Yr 6 Sp1	**BIG Q: How have adaptations helped living things to thrive and survive?** Building on what they learned about fossils in the topic on rocks in year 3, pupils should find out more about how living things on earth have changed over time. They should be introduced to the idea that **characteristics are passed from parents to their offspring**, for instance by considering different breeds of dogs, and **what happens when, for example, labradors are crossed with poodles**. They should also appreciate that variation in **offspring over time can make animals more or less able to survive in particular environments**, for example, by exploring how giraffes' necks got longer, or the development of insulating fur on the arctic fox. Pupils might find out about the work of palaeontologists such as Mary Anning and about how Charles Darwin and Alfred Wallace developed their ideas on evolution. Note: at this stage, pupils are not expected to understand how genes and chromosomes work. Pupils might work scientifically by: observing and raising questions about local animals and how they are adapted to their environment; **comparing how some living things are adapted to survive in extreme conditions**, for example, cactuses, penguins and camels. They might analyse the **advantages and disadvantages of specific adaptations, such as being on 2 feet rather than 4, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers**.					
Lesson Qs	**Elicitation / Activate**	How are characteristics passed through to offspring?	How have plants and animals adapted over time to suit their environments?	How does adaptation passed to offspring result in species change?	What do fossils tell us about plants and animals from the past?	**Application / Assess** How have adaptations helped living things to thrive and survive?
Key Concepts: Diversity Recognise ways in which humans can support or hinder their ability to thrive. Identify adaptions and its role in evolution	• *The structure and function (characteristics) of living things have similarities and differences. These enable us to classify them into species and identify diversity within species.* • *Animals and plants have different parts (structure) which enables the function of reproduction. This allows the species to thrive and survive.*	• Know that animal offspring are similar to, but not identical to their parents. • Know that characteristics are passed to offspring from their mother and father.	• Know that animals and plants have characteristics that are suited to the habitat in which they live. • Know that overtime, animals and plants adapt to suit their environment.	• Know that adaptations can be passed from offspring to offspring over many years. • Know that adaptations passed through many offspring result in permanent change which is called evolution.	• Know that fossils are evidence of the plants and animals alive millions of years ago.	Over time species evolve, adapting their structure and functions to better suit their habitats. They develop characteristics that help them to improve their species ability to survive and thrive through generations.
Disciplinary Concepts	**SECURED PRIOR KNOWLEDGE** ***Observing and measuring*** • *I know that systematic observation is based on the control variable* ***Recording Data*** • *I know how to use yes no answers to build a classification key* ***Asking and exploring questions*** • *I know how to use variables to generate an enquiry question for different enquiry types.* ***Communicating*** • *I know that relevant scientific language and illustrations can be used to communicate and justify my ideas*	**Recording Data** • I know how to organise data using my knowledge of control and dependent variables in tables, charts and diagrams. **Asking and exploring questions** • I can explain my choice of enquiry choice **Performing Tests** • I can plan and perform part of an investigation independently	**Recording Data** • I know how to organise data using my knowledge of control and dependent variables in tables, charts and diagrams. **Asking and exploring questions** • I can explain my choice of enquiry choice **Concluding, prediction, evaluating** • I know that predictions are based on my scientific knowledge of how variables are likely to behave.	**Concluding, prediction, evaluating** • I know that predictions are based on my scientific knowledge of how variables are likely to behave. **Communicating** • I know how scientific ideas have developed over time. **Applications** • I can use my knowledge of science to understand its uses and implication	**Concluding, prediction, evaluating** • I know that predictions are based on my scientific knowledge of how variables are likely to behave. **Communicating** • I know how scientific ideas have developed over time. **Applications** • I can use my knowledge of science to understand its uses and implication	•
Key learning tasks		• Label diagrams or table comparison of characteristics which are passed on by each parent to create new breed. • Identifying or research enquiry –breeds within species. • Identify control and dependent variables to create question and organise how to record and analyse the results. • Perform test and record the results.	• Label diagrams or table comparison of how animals have adapted to suit their environment • Identifying or Research enquiry – animal adaption to the environment • Identify control (environment – habitat) and dependent variables (animal adaptions) to create question and organise how to record and analyse the results. • Perform test and record the results. • Through pattern spotting in adaptions, predict the characteristics of another animal	• Label diagrams or table comparison of how humans have evolved over time – look into the work of Chrles Darwin • Observation over time or Research enquiry – animal evolution • Identify control (evolution) and dependent variables (animal adaptions) to create question and organise how to record and analyse the results. • Perform test and record the results. • Through pattern spotting in evolution, predict the evolutionary change in the future – given climate change.	• Identify the structure and function of the features of a chosen dinosaur e.g. T Rex • Research enquiry into advantages and disadvantages of specific adaptations (see above in bold) • Identify control (adaption) and dependent variables (IMPACT: adv / diadvan) to create question and organise how to record and analyse the results. • Perform test and record the results. • Through pattern spotting, predict an adaption that would mostly advantage a given species	
Generalisation		The characteristics (structure and function) of species is passed on from the parents to the next generation.	Over time species adapt their characteristics (structure and function) to better suit their habitats.	Over time, **generations of a** species adapt their characteristics (structure and function) to better suit their habitats. **These result in a permanent change called evolution**	Fossils provide evidence of species characteristics (structure and function) in the past, helping us understand how species have evolved	Over time species evolve, adapting their structure and functions to better suit their habitats. They develop characteristics that help them to improve their species ability to survive and thrive through generations.

Yr 6 Su1	BIG Q: How does light allow us to see? Pupils should build on the work on light in year 3, exploring the way that light behaves, including light sources, reflection and shadows. They should talk about what happens and make predictions. Pupils might work scientifically by: deciding where to place rear-view mirrors on cars; designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works. They might investigate the relationship between light sources, objects and shadows by using shadow puppets. They could extend their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water, and coloured filters (they do not need to explain why these phenomena occur).					
Lesson Qs	**Elicitation / Activate**	How does light travel?	How does light help us to see?	How can we change or interrupt the pathway of light?	How can see round corners?	**Application / Assess** How does light allow us to see?
Key Concepts Energy - Light Explore how light energy travels in straight lines.	• *The sun is the main source of heat energy and light energy on earth.* • *Light travels from a source to an object and can be controlled by changing the journey.* • *Light (energy) gives us the capacity to see (work)*	• To know that light appears to travel in straight lines • To know that shadows are the same shape as objects as light travels in straight lines.	• To know that light can travel directly to the eye. • To know that light can travels from a source to an object and then to the eye.	• To know that light can be reflected into the eye.	• (application of previous substantive knowledge)	How can we change the path of light?
Disciplinary Concepts	***Recording Data*** • *I know how to organise data using my knowledge of control and dependent variables in tables, charts and diagrams.* ***Asking and exploring questions*** • *I can explain my choice of enquiry choice* ***Concluding, prediction, evaluating*** • *I know that predictions are based on my scientific knowledge of how variables are likely to behave.*	**Asking and exploring questions** • I can identify how to control variables in different enquiry types - I can design a fair test **Concluding, prediction, evaluating** • I know that predictions are based on my scientific knowledge of how variables are likely to behave. **Communicating** • I know that relevant scientific language and illustrations can be used to communicate and justify my ideas	**Asking and exploring questions** • I can identify how to control variables in different enquiry types - I can design a fair test **Concluding, prediction, evaluating** • I know that predictions are based on my scientific knowledge of how variables are likely to behave. • I know that all results allow me to question and predict, however, not all results are reliable • I can use my scientific knowledge to question my findings and decide when further testing is required **Communicating** • I know that relevant scientific language and illustrations can be used to communicate and justify my ideas	**Asking and exploring questions** • I can identify how to control variables in different enquiry types - I can design a fair test **Concluding, prediction, evaluating** • I know that predictions are based on my scientific knowledge of how variables are likely to behave. • I know that all results allow me to question and predict, however, not all results are reliable • I can use my scientific knowledge to question my findings and decide when further testing is required **Applications** • I can use my knowledge of science to understand its uses and implication	**Asking and exploring questions** • I can identify how to control variables in different enquiry types - I can design a fair test **Concluding, prediction, evaluating** • I know that predictions are based on my scientific knowledge of how variables are likely to behave. • I know that all results allow me to question and predict, however, not all results are reliable • I can use my scientific knowledge to question my findings and decide when further testing is required **Communicating** • I know that relevant scientific language and illustrations can be used to communicate and justify my ideas	
Key learning tasks		• Represent understanding of light travelling in straight lines and forming shadows. • Comparative and fair test enquiry • Identify control variable you are testing and control variable kept the same for fair testing • Perform test and record results appropriately, demonstrating understanding of dependent variable • Conclude through pattern spotting and make a new prediction based on results.	• Represent understanding of how we see (work done) using pathways of light energy. • Comparative and fair test enquiry • Identify control variable you are testing and control variable kept the same for fair testing • Perform test and record results appropriately, demonstrating understanding of dependent variable • Conclude through pattern spotting and make a new prediction based on results. • Evaluate results and justify whether further testing is required	• Represent understanding of how we see (work done) using pathways of light energy that has been reflected through application of a rear-view mirror. • Comparative and fair test enquiry • Identify control variable you are testing and control variable kept the same for fair testing • Perform test and record results • Conclude through pattern spotting and make a new prediction based on results. • Evaluate results and justify whether further testing is required	• Chose another application of light energy to solve a problem, e.g. periscope • Comparative and fair test enquiry • Identify control variable you are testing and control variable kept the same for fair testing • Perform test and record results • Conclude through pattern spotting and make a new prediction based on results. • Evaluate results and justify whether further testing is required	
Generalisation		Light appears to travel in straight lines from a source to an object. Pathways of light can be changed through blocking it.	Light appears to travel in straight lines from a source to an object to receiver (eye). Pathways of light represent how light energy travels from the source enabling us to see (work done)	Light appears to travel in straight lines from a source to an object to receiver (eye). Pathways of light represent how light energy travels from the source enabling us to see (work done)	Pathways of light energy can be changed through blocking or reflecting it.	Light appears to travel in straight lines from a source to an object to receiver (eye). Pathways of light energy can be changed through blocking it or reflecting it.

Yr 6 Su2	**BIG Q: How can I change the output of a series circuit?** Building on their work in year 4, pupils should construct simple series circuits, to help them to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors. They should learn how to represent a simple circuit in a diagram using recognised symbols. Note: pupils are expected to learn only about series circuits, not parallel circuits. Pupils should be taught to take the necessary precautions for working safely with electricity. Pupils might work scientifically by: systematically identifying the effect of changing one component at a time in a circuit; designing and making a set of traffic lights, a burglar alarm or some other useful circuit.					
Lesson Qs	**Elicitation / Activate**	How does energy travel in an electrical circuit?	How can we control the energy in an electrical series circuit?	How does varying the components affect the output (work done)?	How does varying the volts affect the output (work done)?	**Application / Assess** How can I change the output of a series circuit?
Key Concepts Energy – Electricity Explore the impact of varying voltage in a circuit	• *Electricity (energy) travels in a circuit from the power source to the component to make it work (work done)* • *Materials have properties (structure) which enables function and therefore a use, e.g. electrical conductors and insulators, this impacts the work done.*	• To know that voltage is an electrical force. • To know that a cell is 1.5v • To know that a battery is multiple cells. • To know that a series circuit is one where all the components create one loop. • To know the recognised circuit symbols for switch, cell(s) and bulb.	• To know that voltage is an electrical force. • To know that a cell is 1.5v • To know that a battery is multiple cells. • To know that a series circuit is one where all the components create one loop. • To know the recognised circuit symbols for buzzer and switch..	• To know that changing the type and number of components in a circuit impacts the how the components function.	• To know that changing the volts in a circuit impacts the how the components function.	
Disciplinary Concepts	***Asking and exploring questions*** • *I can identify how to control variables in different enquiry types - I can design a fair test* ***Concluding, prediction, evaluating*** • *I know that predictions are based on my scientific knowledge of how variables are likely to behave.* • *I know that all results allow me to question and predict, however, not all results are reliable* ***Applications*** • *I can use my knowledge of science to understand its uses and implication*	**Asking and exploring questions** • I can identify how to control variables in different enquiry types - I can design a fair test **Concluding, prediction, evaluating** • I know that all results allow me to question and predict, however, not all results are reliable **Communicating** • I know that relevant scientific language and illustrations can be used to communicate and justify my ideas	**Asking and exploring questions** • I can identify how to control variables in different enquiry types - I can design a fair test **Concluding, prediction, evaluating** • I know that all results allow me to question and predict, however, not all results are reliable **Communicating** • I know that relevant scientific language and illustrations can be used to communicate and justify my ideas	**Recording Data** • I know that a line graph represents changes over time. • I know that the x axis is the control variable • I know that the y axis is the dependent variable **Concluding, prediction, evaluating** • I know that all results allow me to question and predict, however, not all results are reliable **Communicating** • I know that relevant scientific language and illustrations can be used to communicate and justify my ideas	**Recording Data** • I know that a line graph represents changes over time. • I know that the x axis is the control variable • I know that the y axis is the dependent variable **Concluding, prediction, evaluating** • I know that all results allow me to question and predict, however, not all results are reliable **Communicating** • I know that relevant scientific language and illustrations can be used to communicate and justify my ideas	**Asking and exploring questions** • I can identify how to control variables in different enquiry types - I can design a fair test **Concluding, prediction, evaluating** • I know that all results allow me to question and predict, however, not all results are reliable **Communicating** • I know that relevant scientific language and illustrations can be used to communicate and justify my ideas **Applications** • I can use my knowledge of science to understand its uses and implication
Key learning tasks		• Create series circuits and represent them with agreed scientific symbols, demonstrating understanding of series circuits with different number of cells and components (see above). • Comparative and fair test – adding components – identify the control variable being tested (e.g. no of bulbs), control variable to keep the same and the dependent variable (e.g. brightness) • Perform test and record result appropriately • Conclude through pattern spotting and make a new prediction based on results. • Evaluate results to question whether reliable – fit scientific understanding	• Create series circuits as last week but add a switch and buzzer notice the impact on energy flow in the circuit • Comparative and fair test – adding components – identify the control variable being tested (e.g. no of bulbs), control variable to keep the same and the dependent variable (e.g. loudness of the single buzzer) • Perform test and record result appropriately • Conclude through pattern spotting and make a new prediction based on results. • Evaluate results to question whether reliable – fit scientific understanding	• Provide write up of and interrogate the results of a comparative or fair test enquiry into the impact of adding components. • Chn id control and dependent variable • Chn id why it is a fair test • Children analyse the results presented in line graph form to: • conclude through pattern spotting and make a new prediction based on results. • Evaluate results to question whether reliable – fit scientific understanding	• Interrogate the results of a comparative or fair test enquiry into the impact of adding volts. • Chn id control and dependent variable • Chn id why it is a fair test • Children analyse the results presented in line graph form to: • conclude through pattern spotting and make a new prediction based on results. • Evaluate results to question whether reliable – fit scientific understanding	
Generalisation	• *Electricity (energy) travels in a circuit from the power source to the component to make it work (work done)* • *Materials have properties (structure) which enables function and therefore a use, e.g. electrical conductors and insulators, this impacts the work done.*	Voltage is an electrical force that pushes electricity through a circuit. Electrical energy (electricity) travels in a **series** circuit from the power source (battery) to the components to make them work (work done)	Voltage is an electrical force that pushes electricity through a circuit. Electrical energy (electricity) travels in a series circuit from the power source (battery) to the components to make them work (work done)	When the voltage stays the same, varying the number of components in a series circuit affects the amount of work done as the energy is shared between them.	Varying the voltage in a series circuit affects the amount of work done as the greater the voltage, the stronger the push, and the more energy is transferred to components in the circuit.	Varying the components and voltage in a circuit affects the amount of work done.