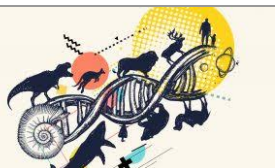


Year	Topic	Topic	Topic	Topic	Topic
1	Plants (Identifying Plants)	Seasonal changes	Animals, including humans (Identifying Animals)	Everyday materials	
2	Plants (Growing Plants)	Living things and their habitats (Living in Habitats)	Animals, including humans (Growth and Survival)	Uses of everyday materials (Exploring Everyday Materials)	
3	Plants (How Plants Grow)	Light (Light and Shadow)	Animals, including humans (Health and Movement)	Rocks (Rocks, Fossils and Soils)	Forces and magnets
4	Sound	Living things and their habitats (Living in Environments)	Animals, including humans (Eating and Digestion)	States of matter	Electricity (Circuits and Conductors)
5	Earth and space	Living things and their habitats (Life Cycles curriculum links to Sex Ed/RSE)	Animals, including humans (Changes and Reproduction)	Properties and changes of materials	Forces (Forces in Action)
6	Evolution and inheritance	Living things and their habitats (Classifying Organisms)	Animals, including humans (Healthy Bodies)	Light (Seeing Light)	Electricity (Changing Circuits)

Progression in Working Scientifically;

Upper KS2 (for pupils working towards Year 5 and 6 Curriculum):	Check list
Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.	
Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.	
Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.	
Using test results to make predictions to set up further comparative and fair tests.	
Reporting and presenting findings from enquiries, including conclusions, casual relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.	
Identifying scientific evidence that has been used to support or refute ideas or arguments.	



Year 6 – Evolution and inheritance

NC Objectives and Learning Objectives/Assessment criteria from Classroom Monitor	Essential Knowledge	Working Scientifically (follow year 5 and 6)
	Key Learning:	Key Question(s):
- Know about evolution and can explain what it is. - Know how fossils can be used to find out about the past. - Recognise that living things produce offspring, but offsprings vary and are not identical to their parents. - Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution-recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago - I can recognise that living things have changed over time, by looking at fossils. - I can explain that fossils provide information about living things that lived on Earth millions of years ago. - I can identify evidence on evolution from fossils. - I can recognise that living things produce offspring of the same kind - I can recognise that offspring do vary, and may not be identical to their parents - I can identify how animals and plants are adapted to suit their environments in	Children must know and understand that: - Life cycles have evolved to help organisms survive to adulthood. - Over time the characteristics that are most suited to the environment become increasingly common. <i>NB: The following could be duplicated in Year 6 Living things and their habitats.</i> - Organisms best suited to their environment are more likely to survive long enough to reproduce. - Organisms are best adapted to reproduce are more likely to do so. - Organisms reproduce and offspring have similar characteristic patterns. - Variation exists within a population (and between offsprings of some plants) - Competition exists for resources and mates	- Why are we all different? - What is variation and why is it important? - How did life begin on Earth? - How do we change? - What is evolution? - What evidence is there for evolution? - How does evolution happen? - What reasons do animals become extinct? - Polar Bears' habitat is rapidly changing. What possible future do they face and can we predict which is most likely to happen? - How did Darwin come up with his theory? - Why was his theory not initially accepted?
	Using and Applying knowledge: - Design a new plant or animal to live in a particular habitat. - Make observations of fossils to identify living things that lived on Earth millions of years ago. - Identify features in animals and plants that are passed onto their offsprings.	PLAN Resources for Assessment (via Canvas): - Progression in working scientifically skills Year 5&6 - Working scientifically skills Year 5&6 - PLAN Primary Science – Supporting Assessment (Evolution and Inheritance Year 6 - Muharem)

different ways, and that adaptation may lead to evolution. - I can explain how humans have evolved over millions of years. - I can explain how human intervention affects evolution. - I can explain what evolution means. - I can explain what inheritance means by giving examples.	- Explore the process of artificial breeding of animals or plants e.g. cows, horses etc. - Compare the ideas of Charles Darwin and Alfred Wallace on evolution.	FBS Resources: Rocks, Fossils Website: https://www.countryfile.com/go-outdoors/top-10-fossil-hunting-destinations/
Prior Learning From Key Stages 1 & 2 children should: - Understand that there is a variety of life on Earth - Know that some differences in animals are important to their survival - Know how animals and plants reproduce - Know how fossils form over time	Misconceptions: - Adaptions occur during animals' lifetime e.g. giraffes' necks stretch during their lifetime to reach higher leaves, animals living in cold environments grow thick fur during their lifetime. - Human characteristics as a result of parent's behaviour during their lifetime can be inherited e.g. dying hair, tattooing their skin, footballing skills. - Caveman and dinosaurs were aliens at the same time (Flintstones).	<i>In Key Stage 3 children will learn about:</i> - hereditary as the process by which genetic information is transmitted from one generation to the next - the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of the variation - the variation between species and individuals of the same species means some organisms compete more successfully, which can drive natural selection - changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction - the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material.
Vocabulary [TA to create a list of key vocabulary, add sign graphics AND pictures next to each word]: Fossils, Adaptation, Evolution, Characteristics, Reproduction, Genetics, Variation, Inherited, Environment, Mutation, Competition, Survival of the Fittest, Evidence		
Teaching Ideas (examples) – Year 5 & 6 Working Scientifically		

Ask questions	Observing closely	Performing test	Identifying & classifying	Gathering & recording data	Using observation to suggest answers to questions
Can we find fossils in the UK? [Yes, if you go to Lyme Regis, Dorset, you will find some fossils among the rocks.]	How have the skeleton and appearance of mammoths and elephants changed over time?	What is the most common eye colour in our class?	Compare skeletons of apes, humans, and Neanderlands – how are they similar and different?	Gather information about common eye colour in class/KS1 & KS2, record, analyse and share findings.	What happened when Charles Darwin visited the Galapagos Islands?



Year 6 – Living things and their habitats (Classifying Organisms)

NC Objectives and Learning Objectives/Assessment criteria from Classroom Monitor	Essential Knowledge	Working Scientifically (follow year 5 and 6)
	Key Learning:	Key Question(s):
- Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals. - Give reasons for classifying plants and animals based on specific characteristics. I can describe how living things are classified into groups. I can identify and match groups of animals based on their characteristics. I can use classification systems and keys to identify the characteristics of different types of animals. I can give reasons for classifying animals based on their similarities and differences. I can classify organisms given to me as part of my project. I can summarise the significant work of scientist Carol Linnaeus, a pioneer of classification.	Children must know and understand that: - Variation exists within a population (and between offspring of some plants) – <i>NB: this Key Idea is duplicated in Year 6 Evolution and Inheritance.</i> - Organisms best suited to their environment are more likely to survive long enough to reproduce. - Organisms are best adapted to reproduce are more likely to do so. - Organisms reproduce and offspring have similar characteristic patterns. - Competition exists for resources and mates.	- Why do we need to classify living things? - How do we classify? - What are the difficulties with classification? (penguins, whales, platypus) - How do animals change over time? - Why does variation exist? - What happens if animals of different species breed? (hybrids) - What happens to house plants outside? - What are microorganisms? - How can we prevent the spread of disease? - Why do animals and plants compete – and what for?
	Using and Applying knowledge: - Observe different animals in a shared group, identify their characteristics e.g. be able to explain why an animal belongs in this specific group. - Use information about the characteristics of an unknown animal or plant and classify it into a group. - Create classification key for plants and animals. - Classify plants and animals and present it using Venn diagrams or Carroll diagrams.	PLAN Resources for Assessment (via Canvas): - Progression in working scientifically skills Year 5&6 - Working scientifically skills Year 5&6 - PLAN Primary Science – Supporting Assessment (Living things and their Habitats Year 6 - Kiruthiga)

Prior Learning		Misconceptions:			
In Year 5 Children should: - Describe the life cycles of different mammals. - Compare the life cycles of amphibians and insects. - Compare the life cycles of a mammal, an amphibian, an insect and a bird. - Describe how some plants reproduce [recall from year 3 Plants]. - Describe how some animals reproduce.		- All micro-organisms are harmful. - Mushrooms are plants.		<i>In Key Stage 3 children will learn about:</i> - the dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere - the adaptations of leaves for photosynthesis. - the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops - the importance of plant reproduction through insect pollination in human food security - how organisms affect, and are affected by, their environment, including the accumulation of toxic materials.	
Vocabulary [TA to create a list of key vocabulary, add sign graphics AND pictures next to each word]:					
Variation Organisms Populations. Classification Characteristics Environment, flowering, nonflowering, plants, animals, vertebrates, fish, amphibians, reptiles, mammals, invertebrate, human impact, nature reserves, deforestation. Classify, compare, bacteria, microorganism, organism, invertebrates, vertebrates.					
Teaching Ideas (examples) – Year 5 & 6 Working Scientifically					
Ask questions	Observing closely	Performing simple test	Identifying & classifying	Do practical enquiry, comparative and fair tests Gathering & recording data	Using observation to suggest answers to questions
Does yeast work best in cold or hot temperatures?	Observe which conditions are best for making bread with yeasts?	What happens to a piece of bread if you leave it on the windowsill for two weeks?	Identify and classify ‘good’ and ‘bad’ micro-organisms.	Yeast in different conditions.	Where do you put micro-organisms in the classification key for vertebrates/invertebrates or micro-organisms?



Year 6 – Animals, including humans (Healthy Bodies)

NC Objectives and Learning Objectives/Assessment criteria from Classroom Monitor	Essential Knowledge	Working Scientifically (follow year 5 and 6)
	Key Learning:	Key Question(s):
- Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. - Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. - Describe the ways in which nutrients and water are transported within animals, including humans. I can identify and label parts of the circulatory system. I can explain the functions of the heart and how it pumps blood around the body. I can describe the main functions of the lungs. I can explain the functions of blood vessels. I can name and describe the differences between three blood vessels. I can explain how nutrients are broken down in the digestive system. I can describe how water and nutrients are transported around the body.	Children must know and understand that: - The heart pumps blood around the body. - There are three different blood vessels and the roles they play in the circulatory system. - Oxygen is breathed into the lungs where it is absorbed by the blood. - Muscles need oxygen to release energy from food to work. (Oxygen is taken into the blood in the lungs; the heart pumps the blood through blood vessels to the muscles; the muscles take the oxygen and nutrients from the blood.)	- Why do we need oxygen? - How do we breathe? - Do fish and plants breathe? - Do all living things need oxygen? - How does the size of a person's lungs affect their lung capacity? - Are there ways to increase/decrease our lung capacity? Is lung capacity fixed? - Why do we have blood? - How does our heart work? - How does the size of muscles affect our pulse rates? - How does exercise effect our pulse rates? - How might the circulatory system of an elephant, a hummingbird, or a polar bear differ? - Is the air you breathe out, the same as that you breathe in?
	Using and Applying knowledge: - Class to do a role play model of the circulatory system (BBC Bitesize – Circulatory System) Do scientific experiment on pulse rate (after doing activity/exercise); - Fair testing – 3 rounds of same activity/exercise, check pulse on the same part of body	PLAN Resources for Assessment (via Canvas): - Progression in working scientifically skills Year 5&6 - Working scientifically skills Year 5&6 - PLAN Primary Science – Supporting Assessment (Animals including humans Year 6 - Muharem)

• I can describe how poor diet and no exercise can impact on human bodies. • I can identify what a healthy lifestyle looks like by giving examples. • I can do a scientific experiment on pulse rates. I will record and present my findings using BSL.	• Record and identify pattern e.g. which group of people have higher or lower resting pulse rates • Observation over time – how long does it take for the pulse rate to resume to resting pulse rate? • Record and identify a pattern e.g. which group of people resume to resting pulse rates • Research different good and bad drugs e.g. tobacco/smoking, tablets to reduce pains.	
Prior Learning	Misconceptions:	
In Year 5 Children should: • I can draw, label and describe the stages of human development (from baby to an old person). • I can explain how babies are developed. • I can describe what changes girls and boys go through during puberty. • I can describe the life cycles of different living things e.g. mammals, amphibians, birds. • I can explain the differences in the life cycles of mammals, amphibians and birds. • I can draw and explain how plants reproduce (recall Plants Year 3).	• Human heart is on the left side or centre of your chest • The heart makes blood • Blood travels in one loop from the heart to the lungs and around the body • Some blood in our bodies are blue and some blood are red • We eat food for energy • All 'fat' is bad for you • All dairy products are good for you • Protein is good for you, so you can eat as much as you like • Food only contain fat when you can see it Cross reference to Drugs Wise in PSHE/RSE Curriculum; • All drugs are bad for you • Tablets (painkillers) are not drugs	<i>In KS3 Children will:</i> • the hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms. • the tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food (enzymes simply as biological catalysts) • calculations of energy requirements in a healthy daily diet • the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases • the structure and functions of the gas exchange system in humans, including adaptations to function • the effects of recreational drugs (including substance misuse) on behaviour, health and life processes.
Vocabulary [TA to create a list of key vocabulary and add sign graphics AND pictures next to each word]: Oxygenated, Deoxygenated, Valve, Exercise, Respiration Circulatory system, heart, lungs, blood vessels, blood, artery, vein, pulmonary, alveoli, capillary, digestive, transport, gas exchange, villi, nutrients, water, oxygen, alcohol, drugs, tobacco.		

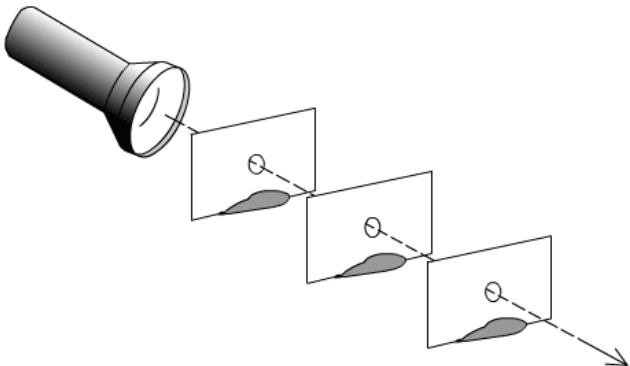
Teaching Ideas (examples) – Year 5 & 6 Working Scientifically

Ask questions	Observing closely	Performing test	Identifying & classifying	Do practical enquiry, comparative and fair tests Gathering & recording data	Using observation to suggest answers to questions
How and why does your heart beat?	What did the pulse test show?	How well do we perform if we missed breakfast? Do we need breakfast to help us to stay alert?	Based on the pulse test, record and classify the results from the findings.	Do 3 rounds of same activity/exercise, check pulse on the same part of body. Record and identify a pattern e.g. which group of people have higher or lower resting pulse rates	Can regular exercise help our lung capacity?



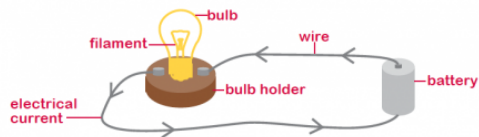
Year 6 – Light (Seeing Light)

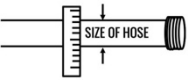
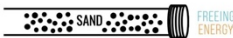
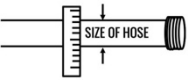
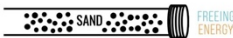
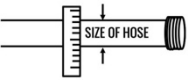
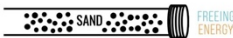
NC Objectives and Learning Objectives/Assessment criteria from Classroom Monitor	Essential Knowledge	Working Scientifically (follow year 5 and 6)
	Key Learning:	Key Question(s):
- Recognise that light appears to travel in straight lines. - Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye. - Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. - Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. - Know how simple optical instruments work, e.g. periscope, telescope, binoculars, mirror, magnifying glass etc. I can explain that light travels in straight lines from light sources to our eyes, from light sources to objects and then to our eyes. I can understand how mirrors reflect light, and how they can help us see objects. I can investigate how refraction changes the direction in which light travels.	Children must know and understand that: - Animals see light sources when light travels from the source into their eyes. - Animals see objects when light is reflected off that object and enters their eyes. - Light reflects off all objects (unless they are black). Non shiny surfaces scatter the light so we don't see the beam. - Light travels in straight lines.	- How does the size of an object affect the size of a shadow? - How does the distance between the light and the object change the size of a shadow? - How does the distance between the object and the size of the screen affect the size of a shadow? - How would a solar eclipse be different if: - The moon was a different size? - The earth spun faster or slower? - The sun was larger or smaller? - If the earth and moon were the same size but further away in the solar system? - How does the amount of aluminium foil crumpled affect how much light is scattered? - How does the amount of polishing affect how well a piece of metal scatters light? - How perfect are our mirrors? Do some scatter light more than others? - What happens to light when it is shone through water? How is this affected by putting glitter, salt or talc in the water? - How does a periscope/microscope/telescope work?
	Using and Applying knowledge:	PLAN Resources for Assessment (via Canvas):

• I can investigate how a prism changes a ray of light. • I can explain why shadows have the same shape as the object that casts them.	• Explore different ways to demonstrate that light travels in straight lines e.g. shining a torch down a bent and straight hose pipe, shining a torch through different shaped holes in card. • Explore the uses of the behaviour of light, reflection and shadows such as in periscope design, rear view mirrors and shadow puppets.	• Progression in working scientifically skills Year 5&6 • Working scientifically skills Year 5&6 • PLAN Primary Science – Supporting Assessment (Light Year 6 – Muharem)
Prior Learning In Year 4 Children should: • I can recognise that I need light to see things, and that dark is the absence of light. • I can use a mirror to reflect light and explain how mirrors work. • I know that light from the sun can be dangerous and that there are ways we can protect our eyes. • I can demonstrate how shadows are created. • I can investigate which materials block light to form shadows. • I can recognise that shadows are formed when the light from a light source is blocked by a solid object • I can find patterns in the way that the size of shadows change.	Misconceptions: • We see objects because light travels from our eyes to the object. Experiment: 	<i>In KS3 Children will:</i> • the similarities and differences between light waves and waves in matter • light waves travelling through a vacuum; speed of light • the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface Science • use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye • light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras • colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection.
Vocabulary [TA to create a list of key vocabulary, add sign graphics AND pictures next to each word]: Light source, dark, reflect, ray, mirror, bounce, visible, beam, sun, glare, travel, straight, opaque, shadow, block, transparent, translucent. Reflect Absorb Emitted Scattered Refraction.		
Teaching Ideas (examples) – Year 5 & 6 Working Scientifically		

Research	Observing closely	Performing test	Identifying & classifying	Gathering & recording data	Using observation to suggest answers to questions
How does my shadow change over the day?	Observe how light travels in a straight line.	Which material is most reflective?	Can you identify all the colours of light that make white light when mixed together? What colours do you get if you mix different colours of light together?	Gather information as to which materials is most reflective and record it.	Why does my shadow change length over the course of a day?

Year 6 – Electricity (Changing Circuits)



NC Objectives and Learning Objectives/Assessment criteria from Classroom Monitor	Essential Knowledge	Working Scientifically (follow year 5 and 6)									
- 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 the variations in how different components function e.g. the brightness of bulbs, the loudness of buzzers and the on/off position of switches. - Use recognised symbols when representing a simple circuit in a diagram. I can associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. I can observe and explain the effects of differing volts in a circuit. I can compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches I can use recognised symbols when representing a simple circuit in a diagram.	Key Learning: Children must know and understand that: - Batteries are a source of energy. This energy pushes electricity round the circuit. When the battery's energy runs out it stops pushing. Voltage measures the 'push.' - The greater the current flowing through a device, the harder it works. - Current is how much electricity is being flowed around a circuit. - When the current flows through wires, heat is released. The greater the current, the more heat is released. Electricity is like a water hose <table border="0"> <tr> <td>Voltage</td> <td>Volts (V)</td> <td></td> </tr> <tr> <td>Current</td> <td>Amps (A or I)</td> <td></td> </tr> <tr> <td>Resistance</td> <td>Ohms (R or Ω)</td> <td></td> </tr> </table>	Voltage	Volts (V)		Current	Amps (A or I)		Resistance	Ohms (R or Ω)		Key Question(s): - Do all batteries push as hard as each other? - What is electricity? - How does the voltage of a battery affect how much current is being pushed? - How does the length of time I leave the current flowing for, affect the brightness of the bulb? - How does the number of bulbs affect the brightness of a lamp? - Are all types of wires good for conducting electricity? - Why are wires insulated in plastic? Do specific types of materials make a difference? - Does the length of a wire make a difference? - Does the type of circuit affect how the components work/how long the battery lasts for? - What renewable ways can we generate electricity? - How does current affect heat? - What are the dangers of a short circuit?
Voltage	Volts (V)										
Current	Amps (A or I)										
Resistance	Ohms (R or Ω)										
	Using and Applying knowledge:	PLAN Resources for Assessment (via Canvas):									

I can conduct an investigation, record my data and report my findings.	- Explain how a circuit operates to achieve a particular operation e.g. control the light from a torch with different brightnesses or how to make a motor go faster or slower. - Make circuits to solve particular problems e.g. set up quiet/loud burglar alarm. - Make circuits that can be controlled as part of D&T project (application).	- Progression in working scientifically skills Year 5&6 - Working scientifically skills Year 5&6 - PLAN Primary Science – Supporting Assessment (Electricity Year 6 – Julie)			
Prior Learning	Misconceptions:				
In Year 4 Children should: - Identify common appliances that use electricity. - Construct a simple electrical circuit, id naming its’ parts e.g. cells, wires, bulbs, switches and buzzers. - Identify whether or not a lamp will light in a simple circuit, with or without a battery. - Recognise that a switch opens and closes a circuit and associate this with lighting a lamp in a simple circuit. - Recognise some common conductors and insulators, and associate metals with being good conductors.	- Large-sized batteries make bulbs brighter. - A complete circuit uses up electricity. - Components in a circuit that are closer to the battery get more electricity.	<i>In KS3 Children will:</i> - Electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge - Potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current - Differences in resistance between conducting and insulating components (quantitative). - Separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects - The idea of electric field, forces acting across the space between objects not in contact.			
Vocabulary [TA to create a list of key vocabulary, add sign graphics AND pictures next to each word]: Electricity, neutrons, protons, electrons, nucleus, atom, electric current, appliances, mains, crocodile clips, wires, bulbs, battery cell, battery holder, motor, buzzer, switch, conductor, insulator.					
Teaching Ideas (examples) – Year 5 & 6 Working Scientifically					
Research	Observing closely	Performing test	Identifying & classifying	Gathering & recording data	Using observation to suggest answers to questions

How can we measure how quickly a battery is used up?

Which brand/s of batteries lasts the longest?

Build a circuit independently, and work with different components such as increasing the brightness of bulbs – how?

Draw and justify your answers/findings.

How does the voltage of the batteries in a circuit affect the brightness of the lamp?

Record the number of volts of batteries in the circuits and the effect it has on the brightness of the bulb.

Demonstrate the difference between series and parallel circuits.

