WOMBWELL PARK STREET PRIMARY SCHOOL

SUBJECT: Science **SUBJECT LEADER: Miss Fury (supported by Mrs Longden)**

UPPER KEY STAGE 2				
YEAR GROUP	**SCIENCE TOPICS COVERED: THEMATIC/TOPIC LINKS CURRICULUM DELIVERY METHOD**	**NC CONTENT: KNOWLEDGE AND SKILLS COVERED** (Which key skills and content from NC is covered) **PUPILS WILL BE TAUGHT TO…**	**LEARNING OUTCOMES**	**KEY VOCABULARY CONCEPTUAL LINKS ACROSS THE CURRICULUM**
YEAR 5	**AUTUMN:** **<u>Light: What can we find out about light? Delving deeper</u>** **<u>Sound: What can we find out about sound?</u>**	**LIGHT** • associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit • compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches • use recognised symbols when representing a simple circuit in a diagram **SOUND** • identify how sounds are made, associating some of them with something vibrating • recognise that vibrations from sounds travel through a medium to the ear	**LIGHT** • I can explain how light travels. • I can explain and demonstrate how we see objects. • I can explain why shadows have the same shape as the object that casts them. • I can explain how simple optical instruments work, e.g. periscope, telescope, binoculars, mirror, magnifying glass etc. **EXP** Without support, it is recognised that light appears to travel in straight lines. Independently, idea that light travels in straight lines is used to explain that objects are seen because they give out or reflect light into the eyes. Generally, there is a good understanding of how we see. Explanations and diagrams are used to describe the process. **GDS** It is clearly recognised that light appears to travel in straight lines and explanations are offered for why. The idea that light travels in straight lines is fully understood and used to explain that objects are seen because they give out or reflect light into the eyes. Fluent, clear and concise explanations and diagrams describe the process of seeing. **SOUND** • I can describe how sound is made. • I can explain how sound travels from a source to our ears. • I can explain the place of vibration in hearing. • I can explore the correlation between pitch and the object producing a sound. • I can explore the correlation between the volume of a sound and the strength of the vibrations that produced it. • I can describe what happens to a sound as it travels away from its source. **EXP**	**LIGHT** Light light source names of light sources e.g. torch dark/darkness direct/ direction reflect reflective mirror transparent opaque translucent **SOUND** sound sound source noise vibrate/vibration tune travel solid/liquid/gas instrument percussion strings brass woodwind tuned instrument high/low pitch

	SPRING: **<u>What are forces?</u>**	• find patterns between the pitch of a sound and features of the object that produced it • find patterns between the volume of a sound and the strength of the vibrations that produced it • recognise that sounds get fainter as the distance from the sound source increases **FORCES** • explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • identify the effects of air resistance, water resistance and friction, that act between moving surfaces • recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect	Generally, the way in which sounds are made is identified, and with prompting, some of them are associated with something vibrating. Generally, the word vibrations is used to describe how sounds travel through various media to the ear. Generally, patterns are found between the pitch of a sound and features of the object that produced it. **GDS** The way in which sounds are made is clearly identified, and some of them are associated with something vibrating. Fluent and clear explanations about how vibrations from sounds travel through various media to the ear are given. Independently, patterns are found between the pitch of a sound and features of the object that produced it. **FORCES** • I can explain what gravity is and its impact on our lives. • I can identify and explain the effect of air resistance. • I can identify and explain the effect of water resistance. • I can identify and explain the effect of friction. • I can explain how levers, pulleys and gears allow a smaller force to have a greater effect. **EXP** It is explained that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. Generally, the effect of drag forces, such as air resistance, water resistance and friction that acts between moving surfaces, is identified. With support, falling objects begin to be explored and questions are raised about the effects of air resistance. Generally, the effects of air resistance are explored by observing how different objects such as parachutes and sycamore seeds fall. Generally, good explanations of the effects of mechanisms in terms of force and effort are given. **GDS** It is explained, with the aid of an independent diagram, that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. The effect of drag forces, such as air resistance, water resistance and friction that acts between moving surfaces, is identified and debated. Without support, falling objects are explored and questions are raised about the effects of air resistance. The effects of air resistance are explored by observing and recording how different objects such as parachutes and sycamore seeds fall. The terms forces, mechanisms and effort are used fluently to describe transference of energy.	**FORCES** magnetic force magnet attract fall Earth gravity air resistance water resistance friction moving surfaces mechanisms levers pulleys gears force transfers weight, mass

	SUMMER: **<u>I'm a celebrity get me out of here?</u>** **All living things, habitats, plants and lifecycles** **DELIVERY METHOD** Weekly science lessons. Science elements also integrated into creative, enquiry based creative curriculum. **ENRICHMENT/EXTRA-CURRICULAR OPPORTUNITIES** Science and technology week. Health and Sports Week. Educational Visits: Whitby	**LIVING THINGS IN THEIR HABITATS** • describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird • describe the life process of reproduction in some plants and animals • describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals • give reasons for classifying plants and animals based on specific characteristics **WORKING SCIENTIFICALLY IN YEAR 5 AND 6 PUPILS SHOULD BE TAUGHT TO:** • plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat	**LIVING THINGS IN THEIR HABITATS** • I can describe the life cycle of different living things, e.g. mammal, amphibian, insect bird. • I can describe the differences between different life cycles. • I can describe the process of reproduction in plants. • I can classify living things into broad groups according to observable characteristics and based on similarities & differences. • I can describe how living things have been classified. • I can give reasons for classifying plants and animals in a specific way. **EXP** Generally, the life cycles common to a variety of animals, including humans (birth, growth, development, reproduction and death) are described. Generally, broad groups are identified and used to classify living things. The terminology of similarities, differences, micro-organisms and animals is generally used when describing groups. Generally, suggestions are given as to how to classify plants and animals, with reasons given for the classification. **GDS** There is a sound understanding and knowledge of all basic life processes. Without support, the life cycles common to a variety of animals, including humans (birth, growth, development, reproduction and death) are described. Broad groups to identify and classify living things are fully understood and, used appropriately and justified clearly. Reasons for classifying plants and animals are explained and justified. **WORKING SCIENTIFICALLY LEARNING OUTCOMES BY THE END OF UPPER KS 2** • I can plan different types of scientific enquiry. • I can control variables in an enquiry. • I can measure accurate and precisely using a range of equipment. • I can record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • I can use the outcome of test results to make predictions and set up a further comparative fair test. • I can report findings from enquiries in a range of ways. • I can explain a conclusion from an enquiry. • I can explain causal relationships in an enquiry.	**LIVING THINGS IN THEIR HABITATS** life cycle reproduction sexual asexual mammal amphibian insect bird fish reptile eggs live young pollination seed formation seed dispersal pollen germination stamen stigma plantlets e.g. spider plant runners e.g. strawberry plant organism micro-organisms fungus mushrooms flowering/non flowering, habitat, wind/animal pollinated, deciduous or evergreen, endoskeleton or exoskeleton n classification keys environment fish amphibians reptiles birds mammals vertebrates invertebrates name some invertebrates arachnid mollusc insect crustacean **WORKING SCIENTIFICALLY Y5 AND Y6** scientific definition observe changes over time notice patterns link secondary sources opinion/fact comparative tests fair tests prediction independent variable dependent variable controlled variable careful accuracy precision degree of trust observations equipment gather measure record evidence present data/evidence/results

		readings when appropriate • record data and results of increasing complexity using scientific diagrams • label, classification keys, tables, scatter graphs, bar and line graphs • use test results to make predictions to set up further comparative and fair tests • report and present findings from enquiries, including conclusions, causal 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	• I can relate the outcome from an enquiry to scientific knowledge in order to state whether evidence supports or refutes an argument or theory. • Read, spell and pronounce scientific vocabulary accurately.	bar charts scatter graphs line graphs table conclusions causal relationships comparative tests fair tests variables independent variable dependent variable controlled variable careful accurate accuracy precision degree of trust observations equipment gather measure record results evidence present data/evidence/results keys bar charts scatter graphs line graphs table results conclusions causal relationships prediction support/refute
YEAR 6	**AUTUMN:** **<u>What is Electricity and how can it be used? Delving deeper</u>**	**ELECTRICITY** • associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit • compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of	**ELECTRICITY** • I can explain how the number & voltage of cells in a circuit links to the brightness of a lamp or the volume of a buzzer. • I can compare and give reasons for why components work and do not work in a circuit. • I can draw circuit diagrams using correct symbols. **EXP** The brightness of a lamp or the volume of a buzzer is associated with the number and voltage of cells used in the circuit. With reminders, comparisons are made and reasons are given for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.	**ELECTRICITY** Electricity appliances/device electrical circuit complete circuit circuit diagram circuit symbol components cell battery positive/negative terminal connect/connection loose connection short circuit wire crocodile clip bulb bright/dim switch buzzer volume motor fast(er)/slow(er) conductor insulator metal/non-metal

	SPRING: **<u>What can we discover about the circulatory system?</u>** **<u>What impact does diet, exercise and drugs have on our bodies?</u>** **Animals including humans**	buzzers and the on/off position of switches • use recognised symbols when representing a simple circuit in a diagram **ANIMALS INCLUDING HUMANS** • describe the changes as humans develop to old age • identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood • recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function	Generally, most recognised symbols are used appropriately. **GDS** Independently, the brightness of a lamp or the volume of a buzzer is associated with the number and voltage of cells used in the circuit, and reasons are given for how changing the number of cells changes the observable results. Without support, comparisons are made and reasons are given for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. Recognised symbols are known and used appropriately and consistently. **ANIMALS INCLUDING HUMANS** • I can identify and name the main parts of the human circulatory system. • I can describe the function of the heart, blood vessels and blood. • I can discuss the impact of diet, exercise, drugs and life style on health. • I can describe the ways in which nutrients and water are transported in animals, including humans. **EXP** Generally, the main parts of the human circulatory system are identified and named, and the functions of the heart, blood vessels and blood, including the pulse and clotting, are explained. Scientific names are used for some major organs of body systems and the position of these in the human body can be located. Generally, there is a good understanding on the impact of diet, exercise, drugs and lifestyle on the body's major organs. Generally, there is a good understanding of water absorption, the circulatory system, sweating and urination. With some fluency, comparisons of plants, animals and human water and nutrient transportation are made. **GDS** Independently, the main parts of the human circulatory system are identified and named, and the functions of the heart (including the chambers and the valve) and the blood vessels (veins, arteries) and blood (including the pulse and clotting) are explained. The main functions of the organs of the human body are described without support. There is a fluent and full understanding that diet, exercise, drugs and lifestyle affect many aspects of how the human body functions. Examples are given related to a number of different scenarios. With some fluency, comparisons of plants, animals and human water and nutrient transportation are made.	voltage current resistance series circuit parallel circuit **ANIMALS INCLUDING HUMANS** circulatory system heart blood blood vessels pumps oxygen carbon dioxide lungs diet exercise drugs lifestyle nutrients water

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	SUMMER **<u>What is the story behind chocolate?</u>** **Properties and changes of materials** **<u>What has inheritance and evolution got to do with us?</u>** **DELIVERY METHOD** Weekly science lessons. Blocked topics. Science elements also integrated into creative, enquiry based creative curriculum. **ENRICHMENT/EXTRA-CURRICULAR OPPORTUNITIES** Science and technology week. Health and Sports Week. Educational Visits: Crucial Crew Workshop: chocolate making Cookery and nutrition lessons	**PROPERTIES AND CHANGES OF MATERIALS** • compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets • know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution • use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating • give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic • demonstrate that dissolving, mixing and changes of state are reversible changes • explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning	**PROPERTIES AND CHANGES OF MATERIALS** I can compare and group materials based on their properties (e.g. hardness, solubility, transparency, conductivity, [electrical & thermal], and response to magnets). • I can describe how a material dissolves to form a solution; explaining the process of dissolving. • I can describe and show how to recover a substance from a solution. • I can describe how some materials can be separated. • I can demonstrate how materials can be separated (e.g. through filtering, sieving and evaporating). • I know and can demonstrate that some changes are reversible and some are not. • I can explain how some changes result in the formation of a new material and that this is usually irreversible. • I can discuss reversible and irreversible changes. • I can give evidenced reasons why materials should be used for specific purposes. **EXP** Generally, it is understood how some materials dissolve in liquid to form a solution, and how to recover a substance from a solution can be described. The terms 'soluble' and 'insoluble' are used accurately. Knowledge of solids, liquids and gases is used to decide how mixtures might be separated, including through filtering, sieving and evaporating. Knowledge is used to explain, for example, the water cycle. It is demonstrated that dissolving, mixing and changes of state are reversible changes Changes are beginning to be classified using the terms 'reversible' and 'non reversible'. Knowledge of reversible and non-reversible changes is used to make predictions about whether changes are reversible or not. Generally, it is understood that some changes result in the formation of new materials and that this kind of change is not usually reversible, including changes associated with burning, oxidisation and the action of acid on bicarbonate of soda **GDS** It is independently understood how some materials dissolve in liquid to form a solution and how to recover a substance from a solution is clearly described. The terms 'soluble' and 'insoluble' are used accurately. Independently, clear knowledge of solids, liquids and gases is used to decide how mixtures might be separated, including through filtering, sieving and evaporating. Independently, it is demonstrated that dissolving, mixing and changes of state are reversible changes.	**PROPERTIES AND CHANGES OF MATERIALS** melting states of matter solid liquid gas change state dissolve solution soluble insoluble solute solvent particle mix/mixture condensing gas given off filtering sieving decanting evaporating residue not usually reversible new material reversible changes

		and the action of acid on bicarbonate of soda. **YEAR 5 AND 6 WORKING SCIENTIFICALLY SEE ABOVE**	Without support, knowledge of how a mixture can be separated is used to suggest ways in which other similar mixtures might be separated, e.g. salt and water, sand and water. Changes are described as reversible or non-reversible. Without support, it is understood that some changes result in the formation of new materials and that this kind of change is not usually reversible, including changes associated with burning, oxidisation and the action of acid on bicarbonate of soda. **YEAR 5 AND 6 WORKING SCIENTIFICALLY SEE ABOVE**	**YEAR 5 AND 6 WORKING SCIENTIFICALLY SEE ABOVE**
CONCEPTUAL LINKS TO OTHER CURRICULUM AREAS **GEOGRAPHY –** links with climate, weather, biomes, location in relation to temperature and climate. Map skills physical and human elements of geography. Conservation. Geology – tectonic plates. Climate change. **DESIGN & TECHNOLOGY –** links to properties of materials and suitability to function and purpose. Elements of building design and architecture. **PSHE –** Links between biology and the importance of diet, fitness and mental wellbeing to health. Conservation. Climate Change. SRE reproduction – genetics/inheritance. **HISTORY –** links between historical periods covered and science knowledge and understanding at the time. How historical scientific innovation has impacted on our lives today. **MATHEMATICAL CONCEPTS –** measurement. Recording, presenting and interpreting data				