ST LAWRENCE C.E. PRIMARY SCHOOL SUBJECT MANAGER OVERVIEW

SUBJECT: Science – Working Scientifically

CONCEPT: Transformations YEAR GROUP: 1

NATIONAL CURRICULUM OBJECTIVES	**KEY KNOWLEDGE**	**VOCABULARY** Tier 3	**PRACTICAL EXAMPLES**
- asking simple questions and recognising that they can be answered in different ways - observing closely, using simple equipment - performing simple tests - identifying and classifying - using their observations and ideas to suggest answers to questions - gathering and recording data to help in answering questions	Know that we can ask questions about the world. Know that when we **observe** the world to answer these questions, this is science. Know that we can use **magnifying glasses** to observe objects closely. Know that we can **test** our questions to see if they are true. Know that objects can be **identified** or **sorted** into groups based on their observable **properties**. Know that we can write down numbers and words or draw pictures to **record** what we find.	observe magnifying glasses test identify sort properties record	<u>Seasons</u> - observing the school grounds at different times of the year (sensory walk) - making tables and charts about the weather <u>Materials</u> - describing how they identify and group different materials - performing simple tests to explore questions, for example: 'What is the best material for a …..? <u>Animals</u> - using their observations to compare and contrast animals at first hand or through videos and photographs - describing how they identify and group them - grouping animals according to what they eat; <u>Human Body</u> - using their senses to compare different textures, tastes, sights, sounds and smells

			<u>Plants</u> - Observing closely different plants using magnifying glasses - describing how they were able to identify and group different plants - drawing diagrams showing the parts of different plants including trees - growing their own plant and observe how it grows over time

ST LAWRENCE C.E. PRIMARY SCHOOL SUBJECT MANAGER OVERVIEW

SUBJECT: Science – Working Scientifically

CONCEPT: Leadership YEAR GROUP: 2

NATIONAL CURRICULUM OBJECTIVES	KEY KNOWLEDGE	VOCABULARY Tier 3	PRACTICAL EXAMPLES
- asking simple questions and recognising that they can be answered in different ways - observing closely, using simple equipment - performing simple tests - identifying and classifying - using their observations and ideas to suggest answers to questions - gathering and recording data to help in answering questions	Know that we can ask questions about the world. Know that when we **observe** the world to answer these questions, this is science. Know that we can use **magnifying glasses** to observe objects closely. Know that we can **test** our questions to see if they are true. Know that objects can be **identified** or **sorted** into groups based on their observable **properties**. Know that we can write down numbers and words or draw pictures to **record** what we find.	observe magnifying glasses test identify sort properties record	<u>Living things and habitats</u> - sorting and classifying things according to whether they are living, dead or were never alive - describing how they decided to group things - construct a simple food chain that includes humans (e.g. grass, cow, human) - describe the conditions in different habitats and micro-habitats <u>Materials</u> - comparing the uses of everyday materials in and around the school with materials found in other places - grouping materials according to their properties - observing closely, identifying and classifying the uses of different materials, and recording their observation - investigate waterproof materials (waterproof paper with wax crayons, testing materials for waterproofing a boat – measuring amount of water absorbed) - investigate and observe if different materials can bend, squash, twist and stretch

			<u>Plants</u> - observing and recording, with some accuracy, the growth of plants as they change over time from a seed or bulb (grass heads) - setting up a comparative test to show that plants need light and water to stay healthy <u>Animals</u> - observing, through video or first-hand observation and measurement, how different animals, including humans, grow - asking questions about what things animals need for survival and what humans need to stay healthy - suggesting ways to find answers to their questions

ST LAWRENCE C.E. PRIMARY SCHOOL SUBJECT MANAGER OVERVIEW

SUBJECT: Science – Working Scientifically

CONCEPT: Achievement YEAR GROUP: 3

NATIONAL CURRICULUM OBJECTIVES	KEY KNOWLEDGE	VOCABULARY Tier 3	PRACTICAL EXAMPLES
- asking relevant questions and using different types of scientific enquiries to answer them - setting up simple practical enquiries, comparative and fair tests - making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers - gathering, recording, classifying and presenting data in a variety of ways to help in answering questions - recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables	Know that we can ask questions and answer them by setting up **scientific enquiries**. Know how to make relevant **predictions** that will be tested in a scientific enquiry. Know that in a **fair test** one thing is changed (**independent variable**) and one thing that may change as a result is measured (**dependent variable**) while all other conditions are kept the same. Know how to use a range of **equipment** to measure accurately such as a ruler. Know how to record **results** including drawing **bar charts**, label a **diagram** and using a **table**. Know how to interpret the results from a scientific enquiry and draw **conclusions**. Know that the conclusions of scientific enquiries can lead to further questions. Know that they can draw conclusions from the findings of other scientists. Know that scientific enquiries can suggest relationships, but that they do <u>not</u> prove whether a prediction is true. Know that scientific enquiries are limited by the **accuracy** of the measurements (and measuring equipment) and by the extent to which conditions can vary. Know that repeating enquiries, measurements and taking measures to keep conditions as consistent as possible can improve an enquiry.	scientific enquiries predictions fair test independent variable dependent variable equipment results bar chart diagram table conclusions accuracy	<u>Skeletons</u> - identifying and grouping animals with and without skeletons - exploring ideas about what would happen if humans did not have skeletons <u>Rocks</u> - observing rocks and exploring how and why they might have changed over time - using a magnifying lens to help them to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them - research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed - explore different soils and identify similarities and differences between them <u>Light</u> - looking for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes - reflecting light targets using mirrors and torches

- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions - using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions - identifying differences, similarities or changes related to simple scientific ideas and processes - using straightforward scientific evidence to answer questions or to support their findings			<u>Forces</u> - comparing how different things move and grouping them - raising questions and carrying out tests to find out how far things move on different surfaces and gathering and recording data to find answers their questions (measuring distance) - exploring the strengths of different magnets and finding a fair way to compare them - sorting materials into those that are magnetic and those that are not <u>Plants</u> - comparing the effect of different factors on plant growth, for example, the amount of light, the amount of fertiliser (measuring height) - discovering how seeds are formed by observing the different stages of plant life cycles over a period of time - looking for patterns in the structure of fruits that relate to how the seeds are dispersed - observe how water is transported in plants, for example, by putting cut, white carnations into coloured water and observing how water travels up the stem to the flowers

ST LAWRENCE C.E. PRIMARY SCHOOL SUBJECT MANAGER OVERVIEW

SUBJECT: Science – Working Scientifically

CONCEPT: Diversity YEAR GROUP: 4

NATIONAL CURRICULUM OBJECTIVES	KEY KNOWLEDGE	VOCABULARY Tier 3	PRACTICAL EXAMPLES
- asking relevant questions and using different types of scientific enquiries to answer them - setting up simple practical enquiries, comparative and fair tests - making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers - gathering, recording, classifying and presenting data in a variety of ways to help in answering questions - recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables	Know that we can ask questions and answer them by setting up **scientific enquiries**. Know how to make relevant **predictions** that will be tested in a scientific enquiry. Know that in a **fair test** one thing is changed (**independent variable**) and one thing that may change as a result is measured (**dependent variable**) while all other conditions are kept the same. Know how to use a range of **equipment** to measure accurately such as a ruler. Know how to record **results** including drawing **bar charts**, label a **diagram** and using a **table**. Know how to interpret the results from a scientific enquiry and draw **conclusions**. Know that the conclusions of scientific enquiries can lead to further questions. Know that they can draw conclusions from the findings of other scientists. Know that scientific enquiries can suggest relationships, but that they do <u>not</u> prove whether a prediction is true. Know that scientific enquiries are limited by the **accuracy** of the measurements (and measuring equipment) and by the extent to which conditions can vary. Know that repeating enquiries, measurements and taking measures to keep conditions as consistent as possible can improve an enquiry.	scientific enquiries predictions fair test independent variable dependent variable equipment results bar chart diagram table conclusions accuracy	<u>Sound</u> - see and feel vibrations in a verity of ways, for example drum and rice, vibrating voice box, candle flame - string and cup investigation - make earmuffs from a variety of different materials to investigate which provides the best insulation against sound - make and play their own instruments by using what they have found out about pitch and volume <u>Electricity</u> - observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot (insulators) be used to connect across a gap in a circuit - create and test their own switches <u>States of matter</u> - grouping and classifying a variety of different materials - exploring the effect of temperature on substances such as chocolate, butter, ice

- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions - using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions - identifying differences, similarities or changes related to simple scientific ideas and processes - using straightforward scientific evidence to answer questions or to support their findings			- research the temperature at which materials change state - observe and record evaporation over a period of time, such as a puddle in the playground <u>Human (digestion and teeth)</u> - draw and discuss their ideas about the digestive system and compare them with models or images - comparing the teeth of carnivores and herbivores, and suggesting reasons for differences - finding out what damages teeth and how to look after them <u>Living things and their habitats</u> - creating classification keys - raising and answering questions based on their observations of animals and what they have found out about other animals that they have researched

ST LAWRENCE C.E. PRIMARY SCHOOL SUBJECT MANAGER OVERVIEW

SUBJECT: Science – Working Scientifically

CONCEPT: Conflict YEAR GROUP: 5

NATIONAL CURRICULUM OBJECTIVES	KEY KNOWLEDGE	VOCABULARY Tier 3	PRACTICAL EXAMPLES
- 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,	Know that a **theory** is an explanation of observations that has been tested to some extent. Know that a **hypothesis** is an explanation that has not yet been tested, but that can be tested through a scientific enquiry. Know how to choose appropriate **variables** to test a hypothesis. Know how to accurately use further measuring devices, including **digital** and **analogue** scales, **measuring cylinders** and **beakers**, recognizing the relative accuracy of each device. Know how and when to repeat measurements. Know how to find an **average** of a set of measurements. Know examples of instances where scientific **evidence** has been used to support or refute ideas or arguments (e.g. fossil records as evidence of natural selection).	theory hypothesis variables digital analogue measuring cylinders beakers average evidence	<u>Earth and Space</u> - comparing the time of day at different places on the Earth - creating simple models of the solar system - research the different phases of the moon and find answers for their questions <u>Materials</u> - carrying out tests to answer questions, such as investigating how to separate solutions - observe and compare the changes that take place when we burn materials, such as a candle and wax, toast, wood - investigate reversible and irreversible changes such as mixing bicarbonate of soda and vinegar - research and discuss how chemical changes have an impact on our lives, for example, cooking, and discuss the creative use of new materials such as super-sticky and super-thin materials (Spencer Silver and Arthur Fry) <u>Forces</u> - Use force meters to discover link between force of gravity measured in Newtons (N) and mass measure in kilograms (kg)

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			- investigate friction with force meters by pulling the same object across different surfaces - investigate different helicopter spinner designs (time how long it takes to fall from a given distance), then create a change to one aspect of the design, carrying out fair tests to determine which designs are the most effective - explore resistance in water by making and testing play doh in different shapes - design and make products that use levers, pulleys, gears and/or springs and explore their effects <u>Human (ageing)</u> - researching the gestation periods of other animals and comparing them with humans <u>Life Cycles and Reproduction</u> - observing and comparing the life cycles of plants and animals - asking questions and suggesting reasons for similarities and differences - observe changes in an animal over a period of time (for example, by hatching and rearing chicks or butterflies) - comparing how different animals reproduce and grow

ST LAWRENCE C.E. PRIMARY SCHOOL SUBJECT MANAGER OVERVIEW

SUBJECT: Science – Working Scientifically

CONCEPT: Legacy YEAR GROUP: 6

NATIONAL CURRICULUM OBJECTIVES	KEY KNOWLEDGE	VOCABULARY Tier 3	PRACTICAL EXAMPLES
- 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,	Know that a **theory** is an explanation of observations that has been tested to some extent. Know that a **hypothesis** is an explanation that has not yet been tested, but that can be tested through a scientific enquiry. Know how to choose appropriate **variables** to test a hypothesis. Know how to accurately use further measuring devices, including **digital** and **analogue** scales, **measuring cylinders** and **beakers**, recognizing the relative accuracy of each device. Know how and when to repeat measurements. Know how to find an **average** of a set of measurements. Know examples of instances where scientific **evidence** has been used to support or refute ideas or arguments (e.g. fossil records as evidence of natural selection).	theory hypothesis variables digital analogue measuring cylinders beakers average evidence	<u>Electricity</u> - systematically identifying the effect of changing one component at a time in a circuit - investigate how voltage effects either a bulb or buzzer - What will happen to a bulb, or buzzer if the voltage was changed? - design and make an alarm <u>Light</u> - investigate different surfaces – which surface reflects light the best? - designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works - investigate the relationship between light sources, objects and shadows - investigation of which materials are opaque, transparent and translucent <u>Living things and their habitats</u> - using classification keys to identify some animals and plants in the immediate environment - research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system

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			<u>Evolution and Inheritance</u> - 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 - analyse the advantages and disadvantages of specific adaptations, such as having a long or a short beak <u>Human (circulatory system)</u> - explore the relationship between heart rate and exercise - exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health