Newnham Croft Primary School – Science Skills Progression

Science investigation skills at the school are split into different categories: Planning, Observing, Recording, Concluding, Evaluation. Science concepts are split into phases from the National Curriculum and follow themes of Plants and Seasons, Animals including Humans, Living things and their habitats, Materials and their properties, Forces, Light and Sound and Electricity.

	Reception	KS1	Lower KS2	Upper KS2
Planning	• To ask simple questions about the immediate environment. • To try out different ideas	• To ask simple questions based on a situation • Select appropriate equipment to test things out	• To ask relevant questions • To set up simple practical enquiries, comparative and fair tests • To use the language of independent and control variables. • To select information to support ideas	• To plan a fair tests selecting the most suitable variables to measure, change and keep the same • To recognise when variables need to be controlled or cannot be controlled • To identify when and how to use fair tests • To make predictions based on previous test results
Observing	• To talk about similarities and differences between events • To listen and respond to stories about scientific processes/ events/ objects • To sort items into an order • To explore objects/ materials/ living things/ resources designed to model scientific processes	• To observe closely, using simple equipment • To perform simple tests • To observe and measure changes over time • To use senses/ equipment to observe events • Top compare and contrast differences	• To identify and classify objects • To make accurate measurements using standard units, using a range of equipment, for example thermometers • To use systematic/careful observations • To use simple classification keys • To link two variables to events	• To take measurements, using a range of scientific equipment with increasing accuracy and precision • To use complex classification keys • Identify evidence that supports/ refutes causal relationship
Recording	• To use simple scientific criteria to record what they observe • Create drawings and models of their environment	• To gather and record data to help in answering questions • To select information from a range of given sources • Explore and create diagrams, drawings and physical models • To use pictograms and simple tables • To describe and explain what has happened or been observed	• To gather, record, classify and present data in a variety of ways to help in answering the question • To record findings using simple scientific language, drawings, labelled diagrams, bar charts and tables • To represent accurate measurements using time graphs • Create labelled diagrams and drawings and physical models	• To record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, scatter graphs and models • To present findings in written form, displays and other presentations • Take repeat readings when appropriate • To create own versions of models

Concluding	● To explain simple phenomena: How? Why? What?	● To use their observations and ideas to suggest answers to questions ● To analyse by comparing numerical data	● To report on findings from enquiries, including oral and written, displays or presentations of results and conclusions ● To identify differences, similarities or changes related to simple scientific ideas and processes ● To explain an observation or an event in scientific terms ● To begin to link evidence from secondary sources as well as primary ● To use scientific evidence to answer questions or to support their findings	● To report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions ● To use simple models to describe scientific ideas ● To identify evidence that has been used to support or refute ideas ● To evaluate original hypothesis against observed evidence and reach appropriate conclusions ● Begin to identify how reliable the data is
Evaluation	● To talk about things they would do differently	● To ask new simple questions from looking at answers ● To suggest improvements to tests ● To evaluate the effectiveness of observations	● To use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests ● Suggest improvements to tests	● To identify scientific evidence that has been used to support or refute ideas or arguments ● To use test results to make predictions to set up further comparative tests
Plants and Seasons	● To plant seeds and watch plants grow ● To name some common plants ● To make observations of plants and explain why some things occur, and talk about changes ● Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter	● Observe changes over time in the seasons ● To name the four seasons and discuss features of them ● To talk about how the seasons affect them (clothes, weather, etc) ● To identify and name a variety of common wild and garden plants, including deciduous and evergreen trees in nature walks ● Identify and describe the basic structure of a variety of common flowering plants, Including trees ● Observe and describe how seeds and bulbs grow into mature plants ● Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy	● To dissect a flower to see the basic parts of a flower ● To identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers ● To explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant ● Investigate the way in which water is transported within plants ● Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation	● To name the parts of flowering plants including male and female reproductive parts and know the functions of these – pollination, fertilization

Living Things and their Habitats	● To know about similarities and differences in relation to places, objects, materials and living things. ● To talk about the features of their own immediate environment and how environments might vary from one another.	● To use scientific language to describe causal relationships between living things and their habitats ● To explore and compare the differences between things that are living, dead, and things that have never been alive ● To identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other ● To identify and name a variety of plants and animals in their habitats, including microhabitats, including fish, amphibians, reptiles, birds and mammals ● To describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food ● To compare and classify animals groups such as carnivore, herbivore, omnivore ● To identify and classify living and non-living things, creating their own criteria- using Venn and Carrol diagrams to show data in a variety of ways	● To sort animals into a range of complex groups according to own criteria, for example vertebrate / invertebrate ● To use different information sources to find information about habitats ● To recognise that environments can change and that this can sometimes pose dangers to living things. ● To recognise that living things can be grouped in a variety of ways ● To explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment ● To construct and interpret a variety of food chains, identifying producers, consumers and predators	● To observe and raise questions about animals and how they are adapted to their environment ● To compare how some living things are adapted to survive in extreme conditions ● To analyse the advantages and disadvantages of specific adaptations ● To 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 ● To recognise that living things have changed over time ● To understand that fossils provide information about living things that inhabited the Earth millions of years ago. ● To understand that living things produce offspring which are not identical to their parents ● To understand that adaptation can lead to evolution
Animals including humans	● To make observations of animals and explain why some things occur, and talk about changes	● To understand that animals, including humans, have offspring which grow into adults ● To find out about and describe the basic needs of animals, including humans, for survival (water, food and air) ● To describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene ● To describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals ● To name the different parts of a human body – linking to senses Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense	● To identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food and get nutrition from what they eat ● To identify that humans and some other animals have skeletons and muscles for support, protection and movement ● To identify bones in the body, organs and some of the functions of them in the body ● To describe the simple functions of the basic parts of the digestive system in humans ● To identify the different types of teeth in humans and their simple functions	● To identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood ● To explore the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health ● To recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function ● To describe the ways in which nutrients and water are transported within animals, including humans ● To explain the life cycles of mammals ● To explain the human life cycle and milestones

Materials and their properties	• Sorting objects in to different groups such as sparkly and shiny materials, or rough and smooth • To name and describe materials around them	• To recall different materials and their properties • To identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock • To describe the simple physical properties of a variety of everyday materials, compare and group together a variety of everyday materials on the basis of their simple physical properties • To identify what materials are suitable for based on their properties • To test materials for different purposes based on their properties, for example making boats • To understand the vocabulary of Opaque, Translucent and transparent • To identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses	• To compare and group together different kinds of rocks on the basis of their appearance and simple physical properties • To describe in simple terms how fossils are formed when things that have lived are trapped within rock • To recognise that soils are made from rocks and organic matter • To compare and group together different kinds of rocks on the basis of their appearance and simple physical properties • To understand how soil is formed and about the permeability of different soils • To compare and group materials together, according to whether they are solids, liquids or gases • To observe that some materials change state when they are heated or cooled, and measure the temperature at which this happens in degrees Celsius (°C) • To identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature • Explain the properties of different materials using scientific language • To sort materials into groups according to their properties	• To accurately describe changes of state between solids, liquids and gases, including the characteristics, properties of each • To use scientific terminology in relation to evaporation and condensation • To understand the solubility of materials in order to separate mixtures • To measure the rate of evaporation in an experimental situation • To understand the changing temperature of melting ice • To separate mixtures using knowledge of materials and solubility / particle size
Forces			• To compare how things move on different surfaces • To explain how friction on different surfaces happens when contact between two objects happens • To sort and name magnetic and nonmagnetic materials • To investigate the strength of magnets and explain that magnets attract some materials • To learn about the magnetic poles • To explain how magnetic forces can act at a distance • To observe how magnets attract or repel each other and attract some materials and not others • To compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials	• To explain the effect of gravity on an object • To measure forces in Newtons using newton meters • To know and describe the effects of air resistance, water resistance and friction on objects • To understand how gears, levers and pulleys are used to transfer forces • To name, order and know key facts about planets in the solar system and how they relate to each other in size and features • To explain day, night, shadows, phases of moon and seasons using appropriate vocabulary • To know that a star is a glowing ball of gas and that these are grouped in constellations • To understand the basic concept of the big bang and where the universe comes from

Light and Sound			● To identify how sounds are made, associating some of them with something vibrating ● To recognise that vibrations from sounds travel through a medium to the ear ● To find patterns between the pitch of a sound and features of the object that produced it ● To find patterns between the volume of a sound and the strength of the vibrations that produced it ● To recognise that sounds get fainter as the distance from the sound source increases ● To recognise that they need light in order to see things and that dark is the absence of light ● To notice that light is reflected from surfaces ● To recognise that light from the sun can be dangerous and that there are ways to protect their eyes ● To recognise that shadows are formed when the light from a light source is blocked by an opaque object ● To explore the way that the size of shadows change with distance	● To recognise that light appears to travel in straight lines ● To 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 ● To 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 ● To use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them
Electricity			● To identify common appliances that run on electricity ● To construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers ● To identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery ● To recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit ● To recognise some common conductors and insulators, and associate metals with being good conductors	● To associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit ● To 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 ● To use recognised symbols when representing a simple circuit in a diagram. ● To explore the benefits of parallel circuits ● To recognise the different parts of an electrical circuit and to be able to name them