UTTOXETER LEARNING TRUST
INSPIRED TEACHING
INSPIRING CHILDREN

Science Progression

Working Scientifically – Designing Experiments

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Observations	▪ Describe what they see, hear and feel whist outside. ▪ Explore the natural world around them, making observations	▪ To know that the term observe means to watch someone or something carefully. ▪ To observe closely using simple equipment I.e. a magnifying glass (supported).	▪ To observe closely using simple equipment I.e. a magnifying glass.	▪ To know how to use a range of equipment to make systematic and careful observations accurately, including thermometers, apps, rulers and stopwatches (supported).	▪ To know how to use a range of equipment to make systematic and careful observations accurately, including thermometers, apps, rulers and stopwatches.	▪ To know how to take measurements using a range of scientific equipment with increasing accuracy and precision, including digital and analogue scales, measuring cylinders and beakers (supported).	▪ To know how to take measurements using a range of scientific equipment with increasing accuracy and precision, including digital and analogue scales, measuring cylinders and beakers.
Predictions	• To suggest what might be the 'best' or 'worst.'	• To predict what might happen (supported).	• To predict what might happen.	• To predict cause and effect (causal prediction).	• To predict a trend (relationship prediction).	• To use knowledge and understanding to explain a prediction (relationship).	• To use knowledge and understanding to make a hypothesis.
Equipment	• To use a range of everyday items to investigate.	• To use limited range of science equipment correctly (supported).	• To use a range of scientific equipment correctly.	• To select and use suitable equipment for the task (supported).	• To select and use suitable equipment for the task.	• To select equipment with the right scale for the task (supported).	• To select and use equipment for increased precision.
Design	• To suggest an idea to investigate with help. • To know that factors change in an investigation. • To follow a demonstration and spoken instructions (with support).	• To suggest an idea to investigate and ask questions. • To know that we carry out a test to check our predictions. • To begin to identify variables in an investigation. • To know the meaning of 'fair' and 'unfair' in an experiment (supported). • To follow a demonstration, spoken and picture instructions.	• To suggest an idea to investigate from observations. • To know that we carry out a test to check our predictions. • To know the meaning of 'fair' and 'unfair' in an experiment • To identify variables in an investigation (label and describe). • To follow short spoken and written instructions in order.	• To identify cause and effect in my investigation. • To know that in a fair test one thing is altered (independent variable) and one thing that may change as a result is measured (dependent variable) while all other things are kept the same (constant variables). • To suggest a suitable data range for a variable. • To follow written instructions and write a simple method. • To know how to set up a fair or comparative test to explore and answer simple practical enquiries.	• To plan a fair test by selecting variables to change and measure. • To know that in a fair test one thing is altered (independent variable) and one thing that may change as a result is measured (dependent variable) while all other things are kept the same (constant variables). • To suggest a data range and an interval for a variable. • To design and write a simple ordered method (from a plan). • To know how to set up a fair or comparative test to explore and answer simple practical enquiries.	• To plan a fair test and ensure controlled variables kept the same. • To suggest a data range, interval and sufficient readings. • To design and write an ordered method (controls variables).	• To plan a reliable fair test (use of variable terminology). • To plan to collect repeat readings (x3) and calculate the mean. • To design and write an ordered reliable method (with repeated readings).

Working Scientifically – Data, tables, diagrams and graphs

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Data	• To position numbers on a number track up to 20. • To use non-standard units to measure and compare.	• To gather and record data to help in answering questions (supported). • To position numbers on a number track up to 100. • To measure in non-standard units and compare e.g. heavier/lighter.	• To gather and record data to help in answering questions. • To measure labelled divisions on a number line (positive values). • To measure in standard units (including length, mass, capacity).	• To measure unmarked divisions on a number line (positive values). • To measure and compare values units in standard units.	• To measure divisions on a number line below zero (negative numbers). • To measure and convert values in standard units (including time).	• To scale up/down a number line (axis) and decide on limits. • To measure and convert values in standard units (including area).	• To scale up/down a number line (axis) confidently. • To measure and calculate with standard units (including area and volume).

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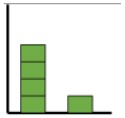
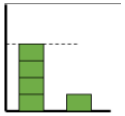
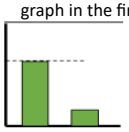
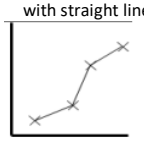
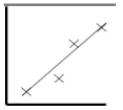
Science Progression

Diagrams	• To use appropriate pictures and words to label items.	• To add scientific vocabulary to diagrams (with help).	• To add scientific vocabulary and information to diagrams (with help).	• To add scientific vocabulary and information to diagrams.	• To annotate diagrams to help describe and explain.	• To begin to draw and annotate my own diagrams.	• To draw and annotate my own diagrams to describe and explain.
Tables	• To use a simple table by recording in pictures and words.	• To use a simple table by recording in words and numbers.	• To use a simple table recording in words and numbers (e.g. tally).	• To use a frame to construct a simple table of results.	• To construct a simple table to compare cause and effect.	• To use a frame to construct a complex table of results.	• To construct a complex table to show repeated data.
Graphs	• To use prepared pictograms to record observations. • To add to pictograms by counting up.	• To use a frame to add to pictograms and block charts. • To add to block charts by counting up. 	• To construct simple pictograms & block charts. • To use the scale on a block chart to add the correct blocks. 	• To use a frame to construct a bar chart (supported). • To draw bars on a bar chart.	• To construct bar charts correctly (including numerical axis). • To plot coordinates on a graph in the first quadrant. 	• To use a frame to construct a graph and to scale axes (with support). • To join plotted coordinates with straight lines. 	• To construct graphs and to scale at least one axis independently. • To plot mean values and draw a trend line for linear data. 

Working Scientifically –Making conclusions							
	EYFS	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Patterns	• To recognise, create and describe simple patterns (e.g. size). • To begin to use 'more' or 'less' to compare observations.	• To recognise, create and describe number patterns. • To begin to use 'more' or 'less' to compare numbers.	• To describe simple features and patterns in data and charts. • To see obvious differences in sets of numbers.	• To describe simple patterns in data, charts and graphs. • To see subtle differences in sets of numbers.	• To describe simple patterns, trends and relationships in data. • To see differences (error) in repeated data.	• To describe patterns, trends and relationships in data. • To spot anomalous data that doesn't fit the pattern. • To use test results to make predictions to set up further comparative and fair tests (supported).	• To describe changing patterns, trends and relationships. • To spot anomalous data and explain from the method. • To use test results to make predictions to set up further comparative and fair tests.
Conclusions	• To talk about changes that I observe during activities. • To explore, 'what if…' questions through play.	• To describe the changes that are happening. • To suggest answers to questions using their observations and ideas (supported). • To explore different ways to do things through play.	• To describe the changes that have happened. • To suggest answers to questions using their observations and ideas. To suggest a different way to do things (supported).	• To describe results by linking cause and effect. • To gather, record, classify and present data in a variety of ways to help in answering questions (supported). • To use scientific evidence to answer questions or to support their findings (supported). • To suggest improvements to the method.	• To describe trends and begin to use scientific knowledge to explain. • To gather, record, classify and present data in a variety of ways to help in answering questions. • To use scientific evidence to answer questions or to support their findings. • To suggest sensible improvements to the method and raise further questions.	• To use data in my conclusion and use science to explain. • To know how to report and present findings from enquiries in a variety of oral and written forms (supported). • To know how to identify scientific evidence that has been used to support or refute ideas or arguments (supported). • To identify strengths and weaknesses and improvements.	• To use data and science ideas in my conclusions. To know how to report and present findings from enquiries in a variety of oral and written forms. • To know how to identify scientific evidence that has been used to support or refute ideas or arguments. • To suggest limitations (data) and practical improvements.

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Science Progression

Biology – Plants

	EYFS	Year 1	Year 2	Year 3
Plants	• Explore the natural world around them. • Drawing pictures of plants. • To understand the effect of changing seasons on the natural world around them.	• To know the names of a variety of common wild and garden plants, including deciduous and evergreen trees. • To know that evergreen trees maintain their leaves throughout the year and that deciduous trees shed their leaves in autumn. • To identify a variety of common wild and garden plants, including deciduous and evergreen trees. • To identify and describe the basic structure of a variety of common flowering plants, including trees. • Seasonal changes • To observe changes across the four seasons. • To observe and describe weather associated with the seasons and how day length varies. •	• To observe and describe how seeds and bulbs grow into mature plants. • To find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. • To know what seeds, need to germinate and grow. • To observe and record how a plant changes over time.	• To identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. • To know the job of the root, petals, stem. • 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. • To investigate the way in which water is transported within plants. • To know how flowers reproduce and disperse their seeds. • To explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

Biology – Living things and their habitats

	EYFS	Year 2	Year 4	Year 5	Year 6
Living things and their habitats	• To explore the natural world around them. • To recognise some environments that are different to the one in which they live.	• To explore and compare the differences between things that are living, dead, and things that have never been alive. • To know that living things move, grow, consume nutrients and reproduce. • To know the terms habitat and micro-habitat. • To know how a habitat provides for the basic needs of animals and plants. • To describe how animals obtain their food from plants and other animals. • To know how a simple food chain works. • 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 know that all animals have certain characteristics that are essential for keeping them alive and healthy. • To identify and name a variety of plants and animals in their habitats, including microhabitats. • 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 explain what carnivores, herbivores and omnivores are.	• To recognise that living things can be grouped in a variety of ways. • To know that animals can be grouped based on their physical characteristics. • To explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. • To know that a classification key uses questions to sort and identify different living things. • To recognise that environments can change and that this can sometimes pose dangers to living things. • To know that changes to the environment can make it more difficult for living things to survive and reproduce. • To know the impact of humans on environments.	• To describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. • To observe and compare the life cycles of plants and animals. • To describe the life process of reproduction in some plants and animals. • To explain the difference between sexual and asexual reproduction. • To compare how animals change over time.	• To 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. • To know that animals can be categorised into broad groupings and then sub divided. • To give reasons for classifying plants and animals based on specific characteristics.

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Science Progression

Biology – Animals including Humans

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Animals inc Humans	• To explore the natural world around them • To understand the effect of changing seasons on the natural world around them. • Draw pictures of animals.	• To identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. • To identify and name a variety of common animals that are carnivores, herbivores and omnivores. • To know that herbivores eat plants; carnivores eat other animals and omnivores eat both animals and plants. • To describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). • To 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 understand how humans change over time. • To name the basic body parts of animals and humans. • To know the 5 human senses and their job.	• To know that animals, including humans, have offspring which grow into adults. • To know, explore and understand the life cycle of a human and animal. • To know how animals reproduce. • 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 and eating the right amounts of different types of food. • To know the basic food groups. • To know the effects that fatty foods can have on our bodies. • To know the impact of exercise on the heart and body. • To describe the importance for humans of hygiene. • To know the reasons for keeping clean and staying healthy.	• To identify that animal, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat. • To know that humans and some animals have skeletons and muscles for support, protection and movement. • To know that skeletons provide support for muscles and protect the body. • To know the function of the human skeleton. • To know that muscles work in pairs. • To know what vertebrate and invertebrate means. • To know that a nutritious diet can be achieved in a variety of ways.	• To know and be able to explain the digestive system. • To describe the simple functions of the basic parts of the digestive system in humans. • To construct and interpret a variety of food chains, identifying producers, predators and prey. • To know what a primary and secondary consumer are. • To identify the different types of teeth in humans and their simple function. • To know that a human has three types of teeth, incisors, canines and molars and that these each perform different functions.	• To describe the changes as humans, develop to old age. • To know that humans go through stages of development. • To know what happens to their bodies as they go through puberty. • To explore and research the gestational periods of other animals and compare this to humans. • To find out and record the length and mass of a human body as it grows.	• To identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. • To know that oxygen is pumped around your body through the blood by the heart. • To know the names of the parts of the heart and how blood circulates through it. • To know what makes the heart beat faster. • To know that the lungs are an important part of the circulatory system. • To recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. • To know what damages their body. • To explore the relationship between diet, exercise, drugs, lifestyle and health. • To describe the ways in which nutrients and water are transported within animals including humans.

Biology – Evolution and Inheritance

	Year 6
Evolution and Inheritance	• To recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. • To know that living things change over time and that this is called evolution. • To know that the gradual change of species over millions of years can be observed by looking at examples of fossils. • To recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. • To know that characteristics are passed from parents to their offspring. • To identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

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Science Progression

Chemistry – Uses of Everyday Materials

	EYFS	Year 1	Year 2	Year 5
Uses of Everyday Materials	• Use all their senses in hands-on explorations of natural material. • Explore collections of materials with similar and/ or different properties. • Talk about the differences between materials and changes they notice.	• To distinguish between an object and the material from which it is made. • Be able to raise, discuss and answer questions about everyday materials. • To know that an object is made from/of a material. • To know and name a wide variety of materials. • To identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. • To know that materials have properties and name these. • To describe the simple physical properties of a variety of everyday materials. • To compare and group together a variety of everyday materials on the basis of their simple physical properties.	• To compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. • To identify the properties of materials that make them suitable or unsuitable for particular purposes. • To find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. • To know that applying forces to objects can change their shape, by squeezing, stretching, bending and twisting.	• To 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. • To know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. • To use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. • To give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. • To 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 and the action of acid on bicarbonate of soda.

Chemistry – Rocks

	Year 3
Rocks	• To compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. • To know that there are three types of rocks: igneous, sedimentary and metamorphic. • To know the properties of igneous, metamorphic and sedimentary rocks. • To describe in simple terms how fossils are formed when things that have lived are trapped within rock. • To know that fossils can help us learn about things that lived long ago. • To know and recognize that soils are made from rocks and organic matter. • To know that soils are made from.

Chemistry – States of Matter

	Year 4
States of Matter	• 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 or research the temperature at which this happens in degrees Celsius (°C). • To know that some changes are irreversible. • To identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. • To know that, as temperature increases, solids can change into liquids. • To know that, with a further increase of temperature, the liquid changes into gas. • To know when solids turn into liquids, this is called melting and that the reverse process is called freezing. • To know when liquids turn into gasses, this is called evaporation and that the reverse process is called condensation. • To know that the melting point of water is 0 degrees Celsius and that the boiling point is 100 degrees Celsius. • To know that water flows around our world in a continuous process called the water cycle.

Physics - Light

Science Progression

	Year 3	Year 6
Light	• To recognise that they need light in order to see things and that dark is the absence of light. • To know how light behaves. • To know that objects can be opaque, translucent or transparent. • To know that light is reflected from a surface. • 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 light from the light source is blocked by an opaque object. • To know what might cause a shadow to change. • To know that the size of a shadow changes dependant on where the light source is. • To find patterns in the way that the size of shadows change.	• To recognise that light appears to travel in straight lines. • To know that when light reflects off an object, the angle of incidence is equal to the angle of reflection. • To know that light travels 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 object that cast them. • To know and explain refraction. • To know that white light comprises all the colours of light.

Physics – Forces and Magnets		
	Year 3	Year 5
Forces and magnets	• To compare how things move on different surfaces. • To know objects move differently on rough and smooth surfaces. • To know objects resist movement more on rough surfaces because there is higher friction as the object moves. • To know a force can be thought of as a push or a pull. • To describe magnets as having two poles (north and south). • To observe how magnets attract or repel each other and attract some materials and not others. • To notice that some forces need contact between two objects, but magnetic forces can act at a distance. • 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 predict whether two magnets will attract or repel each other, depending on which poles are facing.	• To be able to explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. • To know unsupported objects are pulled towards the Earth by the force of gravity. • To know a force is measured in a unit called Newtons. • To know and name the scientist who discovered gravity. • To know the amount of matter in an object is its mass. • To know that gravity is a force that acts between all objects. • To know that gravity acts stronger when objects have more mass and are close together. • To explore how forces make things move faster or slower. • To identify the effects of air resistance, water resistance and friction that act between moving surfaces. • To explore the effects of air resistance on different objects. • To know that gears, levers and pulleys are simple machines that are used to allow a smaller force to have a greater effect. • To recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

Physics – Sound	
	Year 4
Sound	• To identify how sounds are made, associating some of them with something vibrating. • To know that sound is generated when an object vibrates. • To explore and identify the way musical instruments use vibration to make sound. • 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 know how sounds can be changed in a variety of ways for example, through pitch and volume. • To find patterns between the volume of a sound and the strength of the vibrations that produced it. • To know which materials provide the best insulation against sound. • To recognise that sounds get fainter as the distance from the sound source increases. • To know that the volume of a sound is quieter if the listener is further away from the object.

Physics – Electricity

Science Progression

	Year 4	Year 6
Electricity	• To identify common appliances that run on electricity. • To identify how to work safely with electricity. • To know cells, batteries and the mains are all sources of electrical energy. • To construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. • To know how to draw simple circuit diagrams. • To know that electrical current can flow if there is a complete circuit. • To know that when electrical current is needed to make a circuit work. • To know that wires allow electrical current to flow around a circuit. • 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 know that a switch functions by completing or breaking a complete circuit. • 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 draw and explain a circuit with symbols.	• 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 know that voltage is a measure of the power of a cell to produce electricity. • To know how to predict whether components will function in a given circuit, depending on whether or not the circuit is complete; whether or not a switch is in an on or off position; and whether or not there is a cell to provide electrical current to 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 know that as the number and voltage of cells in a circuit increases the brightness of a bulb or the volume of a buzzer. • To know the recognized symbols for a battery, bulb, motor, buzzer and wire. • To use recognised symbols when representing a simple circuit in a diagram. • To know what a series circuit is and explain how it works. • To know how to construct a simple series circuit using components.

Physics – Earth and Space	
	Year 5
Earth and Space	• To describe the movement of the Earth and other planets relative to the sun in the solar systems. • To know that the Sun is a star at the centre of our solar system and that it has eight planets. • To know that all planets in our solar system orbit the sun. • To know that the Earth takes 365.25 days to orbit the sun. • To describe the movement of the moon relative to the Earth. • To know that a moon orbits a planet. • To describe the sun, Earth and moon as approximately spherical bodies. • To explain the idea of the Earth's rotation for day and night and the apparent movement of the sun across the sky. • To know that the work of scientists and astronauts has informed our current knowledge of space and how it continues to change. • To know that women have had an impact on space travel in the last 20 years.