
# Science

# Science Education Progression

## Knowledge/ Skills

## Substantive and Disciplinary Knowledge

| | Nursery | Reception | Year 1 | Year 2 |
|---|---|---|---|---|
| Working Scientifically | **UTW 3-4** Use all their senses in hands-on exploration of natural materials.<br>Explore collections of materials with similar and/or different properties.<br>Talk about what they see, using a wide vocabulary.<br>Begin to make sense of their own life-story and family's history.<br>Explore how things work.<br>Show interest in different occupations. | **UTW** Explore the natural world around them.<br>Describe what they see, hear and feel while they are outside.<br>**ELG Literacy word reading**<br>Use and understand recently introduced vocabulary during discussions about stories, non-fiction, rhymes and poems and during role play. | **Talk** about what they see, touch, smell, hear or taste?<br>**Use** simple equipment to help them make observations?<br>**Perform** a simple test?<br>**Tell** other people about what they have done?<br>**Think** of some questions to ask?<br>**Identify** and classify things they observe?<br>**Answer** some scientific questions?<br>**Explain** what they have found out?<br>**Show** their work using pictures, labels and captions?<br>**Record** their findings using standard units?<br>**Put** some information in a chart or table?<br>**Give** a simple reason for their answers?<br>**Explain** what they have | **Use** some scientific words to describe what they have seen and measured**?**<br>**Use** see, touch, smell, hear or taste to help them answer questions?<br>**Compare** several things?<br>**Carry out** a simple fair test?<br>**Explain** why it might not be fair to compare two things?<br>**Say** whether things happened as they expected?<br>**Use** prompts to find things out?<br>**Suggest** how to find things out**?**<br>**Organise** things into groups**?**<br>**Find** simple patterns (or associations)?<br>**Identify** animals and plants by a specific criteria, e.g. lay eggs or not; have feathers or not?<br>**Use** text, diagrams, pictures, charts, tables to record their observations**?**<br>**Measure** using simple |

| | | | | |
|---|---|---|---|---|
| | | | found out using scientific vocabulary?<br>**Use** ICT to show their working?<br>**Talk** about similarities and differences? | equipment?<br>**Use** information from books and online information to find things out?<br>**Suggest** ways of finding out through listening, hearing, smelling, touching and tasting?<br>**Say** whether things happened as they expected and if not why not? |
| Animals including Humans (Animals) | **UTW 3-4** Understand the key features of the life cycle of a plant and an animal.<br>Begin to understand the need to respect and care for the natural environment and all living things | **UTW** Explore the natural world around them, making observations and drawing pictures of animals and plants. | **Point** out some of the differences between different animals?<br>**Sort** photographs of living things and non-living things?<br>**Identify** and **name** a variety of common animals? (birds, fish, amphibians, reptiles, mammals, invertebrates)<br>**Describe** how an animal is suited to its environment?<br>**Identify** and name a variety of common animals that are carnivores, herbivores and omnivores?<br>**Classify** animals by what they eat? (carnivore, herbivore, omnivore)<br>**Compare** the bodies of different animals? | |

| | | | | |
|---|---|---|---|---|
| | | | **Name** a range of domestic animals?<br>**Name** a range of wild animals?<br>**Explain** what they have found out using scientific vocabulary?<br>**Mastery**<br>**Classify** animals according to a number of given criteria?<br>**Point** out differences between living things and non-living things? | |
| Animals including Humans (Humans) | **PD 3-4** Make healthy choices about food, drink, activity and tooth brushing.<br>**UTW 3-4** Begin to make sense of their own life-story and family's history. | **PD** Know and talk about the different factors that support their overall health and wellbeing:<br>- regular physical activity<br>- healthy eating<br>- tooth brushing<br>- sensible amounts of 'screen time'<br>- having a good sleep routine<br>- being a safe pedestrian<br><br>**ELG** Manage their own basic hygiene and personal needs, including dressing, going to | **Name** the parts of the human body that they can see?<br>**Draw** & **label** basic parts of the human body?<br>**Identify** the main parts of the human body and link them to their senses?<br>**Name** the parts of an animal's body?<br>**Find out** by watching, listening, tasting, smelling and touching? | **Describe** what animals need to survive?<br>**Explain** that animals grow and reproduce?<br>**Explain** why animals have offspring which grow into adults?<br>**Describe** the life cycle of some living e.g. egg, chick, chicken) including animals that do not look like their parents e.g. butterfly?<br>**Explain** the basic needs of animals, including humans for survival? (water, food, air) |

| | | | | |
|---|---|---|---|---|
| | | the toilet and understanding the importance of healthy food choices. | **Mastery**<br>**Name** some parts of the human body that cannot be seen?<br>S**ay** why certain animals have certain characteristics? | **Describe** why exercise, balanced diet and hygiene are important for humans?<br>**Talk** about the work of Dr Ernest Madu and how this has helped to develop healthcare in low-resource nations.<br><br>**Mastery**<br>**Explain** that animals reproduce in different ways?<br>**Suggest** more than one way of grouping animals and plants and explain their reasons? |
| Living Things and their Habitats | **UTW 3-4** Understand the key features of the life cycle of a plant and an animal.<br>Begin to understand the need to respect and care for the natural environment and all living things | **UTW** Recognise some environments that are different to the one in which they live.<br><br>**ELG** Explore the natural world around them, making observations and drawing pictures of animals and plants. Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. | | **Match** certain living things to the habitats they are found in?<br>**Explain** the differences between living and non-living things?<br>**Describe** some of the life processes common to plants and animals, including humans?<br>**Decide** whether something is living, dead or non-living?<br>**Describe** how a habitat |

| | | | | |
|---|---|---|---|---|
| | | | | and micro habitats provides for the basic needs of things living there?<br>**Describe** a range of different habitats?<br>**Describe** how plants and animals are suited to their habitat?<br>**Explain** a simple food chain?<br><br>**Mastery**<br><br>**Name** some characteristics of an animal that help it to live in a particular habitat?<br>**Describe** what animals need to survive and link this to their habitats? |
| Plants | **UTW 3-4**<br>Plant seeds and care for growing plants.<br>Understand the key features of the life cycle of a plant and an animal.<br>Begin to understand the need to respect and care for the natural environment and all living things. | **UTW** Understand the effect of changing seasons on the natural world around them.<br><br>**GLD** Explore the natural world around them, making observations and drawing pictures of animals and plants. Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter | **Name** the petals, stem, leaf, bulb, flower, seed, stem and root of a plant?<br>**Identify** and name a range of common plants and trees?<br>**Recognise** deciduous and evergreen trees?<br>**Name** the trunk, branches and root of a tree?<br>**Describe** the parts of a plant (roots, stem, leaves and | **Describe** what plants need to survive?<br>**Observe** and **describe** how seeds and bulbs grow into mature plants?<br>**Find out & describe** how plants need water, light and a suitable temperature to grow and stay healthy? |

| | | | | |
|---|---|---|---|---|
| | | | flowers)?<br>**Talk** about how Wangari Maathai began a movement to plant trees and re-forest her country.<br><br>**Mastery**<br><br>**Name** the main parts of a flowering plant? | **Describe** what plants need to survive and link it to where they are found?<br><br>**Mastery**<br><br>**Explain** that plants grow and reproduce in different ways?<br>**Suggest** more than one way of grouping animals and plants and explain their reasons? |
| Seasonal Change | **UTW 3-4**<br>Use all their senses in hands-on exploration of natural materials.<br>Explore collections of materials with similar and/or different properties.<br>Explore and talk about different forces they can feel. | **UTW** Understand the effect of changing seasons on the natural world around them. Describe what they see, hear and feel whilst outside.<br><br>**ELG** Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. | **Observe** changes across the four seasons?<br>**Name** the four seasons in order?<br>**Observe** and **describe** weather associated with the seasons?<br>**Observe** and **describe** how day length varies?<br>**Observe** and talk about changes in the weather?<br>**Observe** features in the environment and explain that these are related to a specific season? | |

| | | | | |
|---|---|---|---|---|
| | | | **Mastery**<br>**Talk about** weather variation in different parts of the world?<br>Can they **make** accurate measurements? | |
| Everyday Materials | **UTW 3-4** Talk about the differences between materials and changes they notice. | **UTW** Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. | **Distinguish** between an object and the material from which it is made?<br>**Describe** materials using their senses, using specific scientific words?<br>**Explain** what material objects are made from?<br>**Explain** why a material might be useful for a specific job?<br>**Name** some different everyday materials? e.g. wood, plastic, metal, water and rock<br>**Sort** materials into groups by a given criteria?<br>**Explain** how solid shapes can be changed by squashing, bending, twisting and stretching? | **Describe** the simple physical properties of a variety of everyday materials?<br>**Compare** and **group** together a variety of materials based on their simple physical properties**?**<br>**Sort** materials into groups and say why they have sorted them in that way?<br>**Say** which materials are natural and which are man-made?<br>**Explore** and **explain** how the shapes of solid objects can be changed? (squashing, bending, twisting, stretching)<br>**Find out** about people who developed useful new materials? (John Dunlop, |

| | | | | |
|---|---|---|---|---|
| | | | **Talk** about scientist who have impacted the material industry (Charles Macintosh and Martin Brock).<br><br>**Mastery**<br><br>**Describe** things that are similar and different between materials?<br>**Explain** what happens to certain materials when they are heated, e.g. bread, ice, chocolate?<br>**Explain** what happens to certain materials when they are cooled, e.g. jelly, heated chocolate? | Julie Brusaw, John McAdam).<br><br>**Identify** and **compare** the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper, cardboard for particular uses?<br><br>**Explain** how things move on different surfaces?<br><br>**Mastery**<br><br>**Describe** the properties of different materials using words like, transparent or opaque, flexible, etc.?<br><br>**Explain** how materials are changed by heating and cooling?<br><br>**Tell** which materials cannot be changed back after being heated, cooled, bent, stretched or twisted? |
| Forces and Magnets | **UTW 3-4** Explore and talk about different forces they can feel. | | | |

| | | | | |
|---|---|---|---|---|
| Speaking | **C & L 3-4**<br>Understand a question or instruction that has two parts, such as “Get your coat and wait at the door”.<br>Understand ‘why’ questions, like: “Why do you think the caterpillar got so fat?”<br>Be able to express a point of view and to debate when they disagree with an adult or a friend, using words as well as actions.<br>Use a wider range of vocabulary | **C & L** Learn new vocabulary.<br>Ask questions to find out more and to check what has been said to them.<br>Articulate their ideas and thoughts in well-formed sentences.<br>Describe events in some detail.<br>Use talk to work out problems and organise thinking and activities. Explain how things work and why they might happen.<br>Use new vocabulary in different contexts.<br><br>**ELG** Make comments about what they have heard and ask questions to clarify their understanding.<br>Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary.<br>Offer explanations for why things might happen, making use of recently introduced vocabulary from stories, non-fiction, rhymes and poems when appropriate. | Speak clearly and confidently in front of people in my class.<br>Re-tell a well-known story and remember the main characters.<br>Hold attention when playing and learning with others.<br>Keep to the main topic when we are talking in a group.<br>Ask questions in order to get more information.<br>Start a conversation with an adult I know well or with my friends.<br>Listen carefully to the things other people have to say in a group.<br>Join in with conversations in a group.<br>Join in with role play. | Ask question to get more information and clarify meaning.<br>Talk in complete sentences.<br>Decide when I need to use specific vocabulary.<br>Take turns when talking in pairs or a small group.<br>Aware that formal and informal situations require different language (beginning).<br>Retell a story using narrative language and linking words and phrases.<br>Hold the attention of people I am speaking to by adapting the way I talk.<br>Understand how to speak for different purposes and audiences (beginning).<br>Perform a simple poem from memory |

| | Year 3 | Year 4 | Year 5 | Year 6 |
|---|---|---|---|---|
| Working Scientifically | **Use** different ideas and suggest how to find something out?<br>**Make** and record a prediction before testing?<br>**Plan** a fair test and explain why it was fair?<br>**Set up** a simple fair test to make comparisons?<br>**Explain** why they need to collect information to answer a question?<br>**Measure** using different equipment and units of measure?<br>**Record** their observations in different ways? E.g. Labelled diagrams and charts.<br>**Describe** what they have found using scientific language?<br>**Make** accurate measurements using standard units?<br>**Explain** what they have found out and use their measurements to say whether it helps to answer their question?<br>**Use** a range of equipment (including a data-logger) in a simple test?<br><br>**Explain** their findings in different ways (display, presentation and writing)? | **Set up** a simple fair test to make comparisons?<br>**Plan** a fair test and isolate variables, explaining why it was fair and which variables have been isolated?<br>**Suggest** improvements and predictions?<br>**Decide** which information needs to be collected and decide which is the best way for collecting it?<br>**Use** their findings to draw a simple conclusion?<br>**Make** accurate measurements using standard units?<br>**Take** measurements using different equipment and units of measure and record what they have found in a range of ways?<br>**Explain** their findings in different ways (display, presentation and writing)?<br>**Find** any patterns in their evidence or measurements?<br>**Make** a prediction based on something they have found out?<br>**Evaluate** what they have found using scientific language, drawings, labelled diagrams, bar charts and tables?<br>**Use** straightforward scientific evidence to answer | **Plan** and **carry out** a scientific enquiry to answer questions, including recognising and controlling variables where necessary?<br>**Make** a prediction with reasons?<br>**Use** test results to **make** predictions to set up comparative and fair tests?<br>**Present** a report of their findings through writing, display and presentation?<br>**Take** measurements using a range of scientific equipment with increasing accuracy and precision?<br>**Take** repeat readings when appropriate?<br>**Record** more complex data and results using scientific diagrams, labels, classification keys, tables, scatter graphs, bar and line graphs?<br>**Report** and **present** findings from enquiries through written explanations and conclusions?<br>**Use** a graph to answer scientific questions?<br>**Explore** different ways to test an idea, choose the best way and give reasons?<br>**Vary** one factor whilst keeping the others the same in an experiment? | **Explore** different ways to test an idea, choose the best way, and give reasons?<br>**Vary** one factor whilst keeping the others the same in an experiment? Can they explain why they do this?<br>**Plan** and **carry out** an investigation by controlling variables fairly and accurately?<br>**Make** a prediction with reasons?<br>**Use** information to help make a prediction?<br>**Use** test results to make further predictions and set up further comparative tests?<br>**Explain,** in simple terms, a scientific idea and what evidence supports it?<br>**Present** a report of their findings through writing, display and presentation?<br>**Explain** why they have chosen specific equipment? (including ict based equipment)<br>**Decide** which units of measurement they need to use?<br>**Explain** why a measurement needs to be repeated?<br>**Record** heir measurements in different ways (bar charts, tables and line graphs)? |

| | | | | |
|---|---|---|---|---|
| | **Record** and present what they have found using scientific language, drawings, labelled diagrams, bar charts and tables?<br>**Suggest** improvements and predictions for further tests?<br>**Record** and present what they have found using scientific language, drawings, labelled diagrams, bar charts and tables?<br>**Use** their findings to draw a simple conclusion? | questions or to support their findings?<br>**Identify** differences, similarities or changes related to simple scientific ideas or processes?<br>**Use test** results to make further predictions and set up further comparative tests?<br>**Record** more complex data and results using scientific diagrams, classification keys, tables, bar charts, line graphs and models?<br>**Report** findings from investigations through written explanations and conclusions?<br>**Use** a graph or diagram to answer scientific questions?<br>**Plan** and **carry out** an investigation by controlling variables fairly and accurately?<br>**Report** findings from investigations through written explanations and conclusions?<br>**Record** more complex data and results using scientific diagrams, classification keys, tables, bar charts, line graphs and models? | **Explain**, in simple terms, a scientific idea and what evidence supports it?<br>**Decide** which units of measurement they need to use?<br>**Explain** why a measurement needs to be repeated?<br>**Find** a pattern from their data and explain what it shows?<br>**Link** what they have found out to other science?<br>**Suggest** how to improve their work and say why they think this? | **Take** measurements using a range of scientific equipment with increasing accuracy and precision?<br>**Find** a pattern from their data and explain what it shows?<br>**Use** a graph to answer scientific questions?<br>**Link** what they have found out to other science?<br>**Suggest** how to improve their work and say why they think this?<br>**Record** more complex data and results using scientific diagrams, classification keys, tables, bar charts, line graphs and models?<br>**Report** findings from investigations through written explanations and conclusions?<br>**Identify** scientific evidence that has been used to support to refute ideas or arguments?<br>**Explain** how a scientist has used their scientific understanding plus good ideas to have a breakthrough?<br>**Make** precise measurements?<br>**Collect** information in different ways?<br>**Explain** qualitative and quantitative data?<br>**Draw** conclusions from their |

| | | | | |
|---|---|---|---|---|
| | | | | work? |
| Animals including Humans (Humans) | **Classify** living things and non-living things by a number of characteristics that they have thought of?<br>**Explain** the importance of a nutritionally balanced diet?<br>**Describe** how nutrients, water and oxygen are transported within animals and humans?<br>**Identify** that animals, including humans, cannot make their own food: they get nutrition from what they eat?<br>**Describe** and **explain** the skeletal system of a human?<br>**Describe and explain t**he muscular system of a human?<br>**Discuss and explain** the work of Wilhelm Rontgen?<br><br>**Mastery**<br><br>**Explain** how the muscular and skeletal systems work together to create movement?<br>**Explain** how people, weather and the environment can affect living things?<br>**Explain** how certain living things depend on one another to survive? | **Identify** and **name** the basic parts of the digestive system in humans?<br>**Describe** the simple functions of the basic parts of the digestive system in humans?<br>**Identify** the simple function of different types of teeth in humans?<br>**Compare** the teeth of herbivores and carnivores?<br>**Explain** what a simple food chain shows?<br>**Explain** how certain living things depend on one another to survive?<br>**Construct** and **interpret** a variety of food chains, identifying producers, predators and prey?<br>**Discuss** and **explain** the work of William Beaumont?<br><br>**Mastery**<br><br>**Classify** living things and non-living things by a number of characteristics that they have thought of?<br>**Explain** how people, weather and the environment can affect living things? | **Describe** the changes as humans develop to old age?<br>**Describe** the changes experienced in puberty?<br>**Draw** a timeline to indicate stages in the growth and development of humans?<br><br>**Mastery**<br>**Create** a timeline to indicate stages of growth in certain animals, such as frogs and butterflies? | **Identify** and **name** the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood?<br>**Recognise** the impact of diet, exercise, drugs and lifestyle on the way their bodies function?<br>**Describe** the ways in which nutrients and water and transported within animals, including humans?<br>**Name** the major organs in the human body?<br>**Locate** the major human organs?<br><br>**Mastery**<br><br>**Explore** the work of medical pioneers, for example, William Harvey and Galen and recognise how much we have learnt about our bodies?<br>**Compare** the organ systems of humans to other animals?<br>**Make** a diagram of the human body and explain how different parts work and depend on one another? |

| | | | | |
|---|---|---|---|---|
| Living Things and their Habitats | | **Recognise** that living things can be grouped in a variety of ways?<br>**Explore** and **use** a classification key to group, identify and name a variety of living things? (plants, vertebrates, invertebrates)<br>**Compare** the classification of common plants and animals to living things found in other places? (under the sea, prehistoric)<br>**Name and group** a variety of living things based on feeding patterns? (producer, consumer, predator, prey)<br>**Recognise** that environments can change and this can sometimes pose a danger to living things?<br>**Explain** the work of Jane Goodall and the work she did to protect chimpanzees from extinction?<br>**Give reasons** for how they have classified animals and plants, using their characteristics and how they are suited to their environment?<br><br>**Mastery**<br><br>**Research** and **explain** the work of scientists? (e.g. Carl Linnaeus or Dr Seirian Sumner) | **Describe** the differences in the life cycles of a mammal, an amphibians, an insects and a bird?<br>**Describe** the life cycles of common plants?<br>**Explore** the work of well know naturalists and animal behaviourists? (David Attenborough, Lucy Evelyn Cheesman and Jane Goodall)<br><br>**Mastery**<br><br>**Observe** their local environment and draw conclusions about life-cycles, e.g. plants in the vegetable garden or flower border?<br>**Compare** the life cycles of plants and animals in their local environment with the life cycles of those around the world, e.g. rainforests? | **Explain** why classification is important?<br>**Group** animals into reptiles, fish, amphibians, birds and mammals?<br>**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?<br>**Group** animals into vertebrates and invertebrates?<br>**Give reasons** for classifying plants and animals based on specific characteristics?<br><br>**Mastery**<br><br>**Sub divide** their original groupings and explain their divisions?<br>**Find** out about the significance of the work of scientists such as Carl Linnaeus or Chris Nelson, a pioneer of classification? |

| | | | | |
|---|---|---|---|---|
| | | **Explain** the impact that humans can have on the environment both positively and negatively? | | |
| Forces and Magnets | **Compare** how things move on different surfaces?<br>**Observe** that magnetic forces can be transmitted without direct contact?<br>**Observe** how some magnets attract or repel each other?<br>**Classify** which materials are attracted to magnets and which are not?<br>**Notice** that some forces need contact between two objects, but magnetic forces can act at a distance?<br>**Compare** and **group** together a variety of everyday materials on the basis of whether they are attracted to a magnet?<br>**Identify** some magnetic materials?<br>**Describe** magnets have having two poles (north & south)?<br>**Predict** whether two magnets will attract or repel each other depending on which poles are facing? | | **Explain** that unsupported objects fall towards the earth because of the force of gravity acting between the earth and the falling object?<br>**Design** very effective parachutes?<br>**Identify** the effects of air resistance, water resistance and friction that act between moving surfaces?<br>**Work out** how water can cause resistance to floating objects?<br>**Recognise** that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect?<br><br>**Mastery**<br><br>**Describe** and **explain** how motion is affected by forces? (including gravitational attractions, magnetic attraction and friction)<br>**Explore** how scientists, such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation? | |

| | | | | |
|---|---|---|---|---|
| | **Mastery**<br><br>**Investigate** the strengths of different magnets and find fair ways to compare them?<br>**Discuss** and **explain** the work of Michael faraday? | | | |
| Rocks | **Compare and group** together different rocks on the basis of their appearance and simple physical properties?<br>**Describe** and **explain** how different rocks can be useful to us?<br>**Describe** and **explain** the differences between sedimentary and igneous rocks, considering the way they are formed?<br>**Classify** igneous and sedimentary rocks?<br>**Describe** in simple terms how fossils are formed when things that have lived are trapped within rock?<br>**Recognise** that soils are made from rocks and organic matter?<br><br>**Research** and **talk** about the work of Mary Anning and the important finds she made in Jurassic fossil beds in Dorset? | | | |

| | | | | |
|---|---|---|---|---|
| | **Mastery**<br><br>**Relate** the properties of rocks with their uses? | | | |
| Light | **Recognise** that they need light in order to see things?<br>**Explain** why lights need to be bright or dimmer according to need?<br>**Recognise** that dark is the absence of light?<br>**Explain** the difference between transparent, translucent and opaque?<br>**Notice** that light is reflected from surfaces?<br>**Recognise** that light from the sun can be dangerous and that there are ways to protect their eyes?<br>**Recognise** that shadows are formed when the light from a light source is blocked by a solid object?<br>**Find** patterns in the way that the size of shadows change?<br>**Explain** why their shadow changes when the light source is moved closer or further from the object?<br><br>**Mastery**<br><br>**Discuss** and **explain** the work of Justus von Liebig? | | | **Recognise** that light appears to travel in straight lines?<br>**Explain** that objects are seen because they give out or reflect light into the eye?<br>**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?<br>**Use** the idea that light travels in straight lines to **explain** why shadows have the same shape as the objects that cast them?<br>**Use** and **explain** how simple optical instruments work? (periscope, telescope, binoculars, mirror, magnifying glass, newton's first reflecting telescope)<br><br>**Mastery**<br><br>**Explain** how different colours of light can be created?<br>**Explore** a range of phenomena, including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters. |

| | | | | |
|---|---|---|---|---|
| | | | | **Research** and **discuss** the work of Abu Ali al-Hasan or Ben Jensen? |
| States of Matter | | **Compare** and **group** materials together, according to whether they are solids, liquids or gases?<br>**Explain** what happens to materials when they are heated or cooled?<br>**Group** and **classify** a variety of materials according to the impact of temperature on them?<br>**Measure** or **research** the temperature at which different materials change state in degrees celsius?<br>**Use** measurements to explain changes to the state of water?<br>**Identify** the part that evaporation and condensation has in the water cycle?<br>**Associate** the rate of evaporation with temperature?<br><br>**Mastery**<br><br>**Explain** what happens over time to materials such as puddles on the playground or washing hanging on a line?<br>**Relate** temperature to | | |

| | | | | |
|---|---|---|---|---|
| | | change of state of materials? **Research** and **discuss** the work of Bernard Palissy? | | |
| Plants | **Identify** and **describe** the functions of different parts of flowering plants? (Roots, stem/trunk, leaves and flowers)?<br>**Explore** the requirement of plants for life and growth (air, light, water, nutrients from soil, and room to grow)?<br>**Explain** how they vary from plant to plant?<br>**Investigate** the way in which water is transported within plants?<br>**Explore** the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal?<br><br>**Discuss** and **explain** the work of Joseph Hooker and Monique Simmonds?<br><br>**Mastery**<br><br>**Classify** a range of common plants according to many criteria (environment found, size, climate required, etc.)? | | | |

| | | | | |
|---|---|---|---|---|
| Sound | | **Describe** a range of sounds and explain how they are made?<br>**Associate** some sounds with something vibrating?<br>**Compare** sources of sound and **explain** how the sounds differ?<br>**Explain** how to change a sound (louder/softer)?<br>**Explain** why sound gets fainter or louder according to the distance?<br>**Recognise** how vibrations from sound travel through a medium to an ear?<br>**Find** patterns between the pitch of a sound and features of the object that produce it?<br>**Find** patterns between the volume of the sound and the strength of the vibrations that produced it?<br>**Explain** how pitch and volume can be changed in a variety of ways?<br>**Investigate** how different materials can affect the pitch and volume of sounds?<br>**Work out** which materials give the best insulation for sound?<br><br>**Mastery**<br><br>**Research** and **record** their findings about the work of | | |

| | | | | |
|---|---|---|---|---|
| | | Christian Doppler? | | |
| Electricity | | **Identify** common appliances that run on electricity?<br>**Explain** why cautions are necessary for working safely with electricity?<br>**Construct** a simple series electric circuit?<br>**Identify** and **name** the basic part in a series circuit, including cells, wires, bulbs, switches and buzzers?<br>**Explain** how a bulb might get lighter?<br>**Discuss** and **explain** the work of Thomas Edison?<br>**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?<br>**Recognise** that a switch opens and closes a circuit?<br>**Associate** a switch opening with whether or not a lamp lights in a simple series circuit?<br>**Recognise** some common conductors and insulators?<br>**Associate** metals with being good conductors?<br><br>**Mastery**<br><br>**Recognise** if all metals are conductors of electricity and **work out** which metals can | | **Identify** and **name** the basic parts of a simple electric series circuit? (cells, wires, bulbs, switches, buzzers)<br>**Compare** and **give reasons** for variations in how components function, including the brightness of bulbs, the loudness of buzzers, the on/off position of switches?<br>**Use** the recognised symbols when representing a simple circuit in a diagram?<br>**Explain** the effect of changing the voltage of a battery?<br>**Explain** how to make changes in a circuit and how the changes impact the circuit?<br><br>**Mastery**<br><br>**Make** their own traffic light system or something similar?<br>**Explain** the danger of short circuits?<br>**Explain** what a fuse is?<br>**Research** the work of Nicholas tesla or peter Rawlinson? |

| | | | | |
|---|---|---|---|---|
| | | be used to connect across a gap in a circuit? | | |
| Earth and Space | | | **Identify** and **explain** the movement of the Earth and other plants relative to the sun in the solar system?<br>**Explain** how seasons and the associated weather is created?<br>**Describe** and **explain** the movement of the Moon relative to the Earth?<br>**Describe** the sun, earth and moon as approximately spherical bodies?<br>**Use** the idea of the earth's rotation to explain day and night and the apparent movement of the sun across the sky?<br>**Compare** the time of day at different places on the earth?<br>**Create** shadow clocks?<br><br>**Mastery**<br><br>**Understand** how older civilizations used the sun to create astronomical clocks, e.g. Stonehenge?<br>**Explore** the work of some scientists? (Ptolemy, Alhazen, Copernicus) | |

| | | | | |
|---|---|---|---|---|
| Properties and Change of Materials | | | **Compare** and **group** together everyday materials on the basis of their properties, including hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets?<br>**Explain** how some materials dissolve in liquid to form a solution?<br>**Describe** how to recover a substance from a solution?<br>**Use** their knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving, evaporating?<br>**Give reasons**, based on evidence for comparative and fair tests for the particular uses of everyday materials, including metals wood and plastic?<br>**Describe** changes using scientific words? (evaporation, condensation)<br>**Demonstrate** that dissolving, mixing and changes of state are reversible changes?<br>**Explain** that some changes result in the formation of new materials, and that this kid of change is not usually reversible, including changes associated with burning and the action of | |

| | | | | |
|---|---|---|---|---|
| | | | acid on bicarbonate of soda?<br>**Use** the terms 'reversible' and 'irreversible'?<br><br>**Mastery**<br><br>**Work out** which materials are most effective for keeping us warm or for keeping something cold?<br>**Use** their knowledge of materials to suggest ways to classify? (solids, liquids, gases)<br>**Explore** changes that are difficult to reverse, e.g. Burning, rusting and reactions such as vinegar with bicarbonate of soda?<br>**Explore** the work of chemists who created new materials, e.g. Spencer Silver, Joe Keddie or Ruth Benerito? | |
| Evolution and Inheritance | | | | **Recognise** that living things have changed over time and that fossils provide information about living things that inhabited the earth millions of years ago?<br>**Recognise** that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents?<br>**Give reasons** why offspring are not identical to each other or to their parents? |

| | | | | |
|---|---|---|---|---|
| | | | | **Explain** the process of evolution and describe the evidence for this?<br>**Identify** how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution?<br>**Understand** what is meant by DNA?<br><br>**Mastery**<br><br>**Talk about** the work of Charles Darwin, Mary Anning and Alfred Wallace?<br>**Explain** how some living things adapt to survive in extreme conditions?<br>**Analyse** the advantages and disadvantages of specific adaptations, such as being on two rather than four feet? |
| Speaking | Sequence and communicate ideas in an organised and logical way, always using complete sentences.<br>Vary the amount of detail and choice of vocabulary, depending on the purpose and the audience.<br>Take a full part in paired and group discussions. Show that I know when standard English is required and use it (beginning). | Questions to clarify or develop my understanding.<br>Sequence, develop and communicate ideas in an organised and logical way, always using complete sentences.<br>Show that I understand the main point and the details in a discussion.<br>Adapt what I am saying to the needs of the listener or audience (increasingly). | Engage the listener by varying my expression and vocabulary.<br>Adapt my spoken language depending on the audience, the purpose or the context.<br>Develop my ideas and opinions, providing relevant detail.<br>Express my point of view.<br>Understand the main points, including implied meanings in a discussion. | |

| | | | | |
|---|---|---|---|---|
| | Retell a story using narrative language and add relevant detail.<br>Show that i have listened carefully because I make relevant comments.<br>Present ideas or information to an audience.<br>Recognise that meaning can be expressed in different ways, depending on the context.<br>Perform poems from memory adapting expression and tone as appropriate. | Show that I know that language choices vary in different contexts.<br>Can present to an audience using appropriate intonation; controlling the tone and volume so that the meaning is clear.<br>Can justify an answer by giving evidence.<br>Use standard English when it is required.<br>Perform poems or plays from memory, conveying ideas about characters and situations by adapting expression and tone. | Listen carefully in discussions. I make contributions and ask questions that are responsive to others' ideas and views.<br>I use Standard English in formal situations.<br>Beginning to use hypothetical language to consider more than one possible outcome or solution.<br>Perform my own compositions, using appropriate intonation and volume so that meaning is clear.<br>Perform poems and plays from memory, making careful choices about how I convey ideas. I adapt my expression and tone.<br>Begin to select the appropriate register according to the context. | |