



Science Curriculum Progression Map

Year group	Key skills and knowledge Working scientifically	Key vocabulary	Links to Faith & Values
Year 1	<p><u>Working scientifically</u></p> <ul style="list-style-type: none"> • 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 <p>Know that we can ask questions about the world and that when we observe the world to answer these questions, this is science Set up a test to see eg Is your arm span the same size as your height? Do plant's grow bigger if watered with milk, coke or water? Seed race which will grow fastest: lentils, black beans, pop corn, split peas or chick peas? Know if the test has been successful and say what they have learned Know that we can use magnifying glasses to observe objects - minibeasts, plants and trees Know that we can use measures (within Y1 mathematical limits) to help find out more about the investigations undertaken Know that we can write down numbers and words or draw pictures to record what we find With help, observe changes over time e.g. seed race, watering a plant with different liquids Begin to use scientific language With help, record and communicate findings in a range of ways Use simple equipment to make measurements</p>	<p>properties, observe, test, magnifying glass, object, record, equipment, why, find out</p>	<p>Books on Islamic scientists can be found in our school library to link to working scientifically</p>

<p>Year 2</p>	<p><u>Working scientifically</u></p> <ul style="list-style-type: none"> 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 <p>Know that we can ask questions about the world and that when we observe the world to answer these questions, this is science Know that we can use equipment such as thermometers and rain gauges to help observe changes to local environment as the year progresses Use microscopes to find out about small creatures and plants Know that we can test our questions to see if they are true Know how to set up a fair test and do so when finding out about how seeds grow best Classify or group things according to a given criteria, e.g. deciduous and coniferous trees Know that we can write down numbers and words or draw pictures to record what we find Use measures (within Year 2 mathematical limits) to help find out more about the investigations they are engaged with Make observations and comparisons using simple equipment, following simple instructions</p> <p><u>Skills</u> Record data Use simple measurements and equipment to gather data Carry out simple tests. Talk about what we have found out and how we have found it</p>	<p>Continued from Y1 properties, observe, test, magnifying glass, object, record, equipment, measure, check, fair test, predict, thermometer, temperature</p>	<p>Books on Islamic scientists can be found in our school library to link to working scientifically</p>
<p>Year 3</p>	<p><u>Working scientifically</u></p> <ul style="list-style-type: none"> 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 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 use straightforward scientific evidence to answer questions or to support their findings. <p>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 altered (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 Know how to draw bar charts; how to label a diagram using lines to connect information to the diagram; how to use a coloured key how to draw a neat table; how to draw a classification key Know – with structured guidance – how to write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a conclusion Know how to precis a scientific enquiry write-up into a brief oral discussion of what was found in a scientific enquiry Know that scientific enquiries can suggest relationships, but that they do <u>not</u> prove whether a prediction is true Know that the conclusions of scientific enquiries can lead to further questions, where results can be clarified or extended to different contexts (e.g. effect of changing sunlight on a plant – does this work with other plants / different types of light / etc) Know that they can draw conclusions from the findings of other scientists</p> <p><u>Skills</u> Raise relevant questions about the world around them. Set up simple practical enquiries, comparative and fair tests. Recognise when a simple fair test is necessary and help decide how to set it up. Talk about criteria for grouping, sorting and classifying; and use simple keys. Make systematic and careful observations. Help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used.</p>	<p>prediction, measurement, enquiry, dependent variable, independent variable, fair test, similar, theory, hypothesis</p>	<p>Books on Islamic scientists can be found in our school library to link to working scientifically</p>

	<p>Begin to look for naturally occurring patterns and relationships and decide what data to collect and identify them.</p> <p>Take accurate measurements using standard units</p> <p>Collect and record data from their own observations and measurements in a variety of ways: notes, bar charts and tables, standard units, drawings, labelled diagrams, keys and help to make decisions about how to analyse data.</p> <p>With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions.</p> <p>Use relevant simple scientific language to discuss their ideas and communicate their findings in ways that are appropriate for</p> <ul style="list-style-type: none"> different audiences, including oral and written explanations, displays or presentations of results and conclusions. 		
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<p>Year 4</p>	<p><u>Working scientifically</u></p> <ul style="list-style-type: none"> 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 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 use straightforward scientific evidence to answer questions or to support their findings. <p>Know that we can ask questions and answer them by setting up scientific enquiries</p> <p>Know how to make relevant predictions that will be tested in a scientific enquiry</p> <p>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 conditions are kept the same</p> <p>Know how to use a range of equipment to measure accurately, including thermometers, data loggers, rulers and stopwatches</p> <p>Know how to draw bar charts; how to label a diagram using lines to connect information to the diagram; how to use a coloured key how to draw a neat table; how to draw a classification key; how to show the relationship between an independent variable in a two-way table; and how to label specific results in a two-way table</p> <p>Know how – with structured guidance - to write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a conclusion</p> <p>Know how to precis a scientific enquiry write-up into a brief oral discussion of what was found in a scientific enquiry</p> <p>Know that scientific enquiries can suggest relationships, but that they do <u>not</u> prove whether a prediction is true</p> <p>Know that scientific enquiries are limited by the accuracy of the measurements (and measuring equipment) and by the extent to which conditions can vary even, and that repeating enquiries, measurements and taking measures to keep conditions as consistent as possible can improve an enquiry</p> <p>Know that the conclusions of scientific enquiries can lead to further questions, where results can be clarified or extended to different contexts (e.g. effect of changing sunlight on a plant – does this work with other plants / different types of light / etc)</p> <p>Know that they can draw conclusions from the findings of other scientists</p> <p>Know that a theory is an explanation of observations that has been tested to some extent and that a hypothesis is an explanation that has not yet been tested, but that can be tested through a scientific enquiry</p> <p><u>Skills</u></p> <p>Raise their own relevant questions about the world around them.</p> <p>Should be given a range of a scientific experiences including different types of science enquiries to answer questions.</p> <p>Start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions.</p> <p>Set up simple practical enquiries, comparative and fair tests.</p> <p>Recognise when a simple fair test is necessary and help decide how to set it up.</p> <p>Talk about criteria for grouping, sorting and classifying; and use simple keys.</p> <p>Recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations.</p> <p>Make systematic and careful observations.</p> <p>Help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used.</p> <p>Begin to look for naturally occurring patterns and relationships and decide what data to collect and identify them.</p> <p>Take accurate measurements using standard units</p> <p>Learn how to use a range of (new) equipment, such as data loggers / thermometers appropriately.</p> <p>Collect and record data from their own observations and measurements in a variety of ways: notes, bar charts and tables, standard units, drawings, labelled diagrams, keys and help to make decisions about how to analyse data.</p>	<p><u>Ongoing from Year 3</u></p> <p>prediction, measurement, enquiry, dependent variable, independent variable, fair test, similar, theory, hypothesis</p>	<p>Books on Islamic scientists can be found in our school library to link to working scientifically</p>
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	<p><i>With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions.</i></p> <p><i>Use relevant simple scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences, including oral and written explanations, displays or presentations of results and conclusions.</i></p> <p><i>With support, they should identify new questions arising from the data, making predications for new values within or beyond the data they have collected and finding ways of improving what they have already done.</i></p>		
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<p>Year 5</p>	<p><u>Working scientifically</u></p> <ul style="list-style-type: none"> • <i>planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</i> • <i>taking measurements, using a range of scientific equipment, with increasing accuracy and precision</i> • <i>recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar and line graphs</i> • <i>using test results to make predictions to set up further comparative and fair tests</i> • <i>reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as displays and other presentations</i> • <i>identifying scientific evidence that has been used to support or refute ideas or arguments.</i> <p><i>Know how to choose appropriate variables to test a hypothesis (e.g. plant height as a dependent variable when measuring effect of light on plant growth)</i></p> <p><i>Know how to identify conditions that were imperfectly controlled and can explain how these might affect results</i></p> <p><i>Know how to accurately use further measuring devices, including digital and analogue scales, measuring cylinders and beakers, recognizing the relative accuracy of each device</i></p> <p><i>Know how and when to repeat measurements, how to find an average of a set of measurements and how to recognize and remove outliers from a set of data, justifying the removal as a potential mis measurement</i></p> <p><i>Know how to independently write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a conclusion</i></p> <p><i>Know how to present brief oral findings from an enquiry, speaking clearly and with confidence and using notes where Necessary</i></p> <p><i>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).</i></p>	<p><i>Continue from year 3 and 4 and line graph, relationship, , outlier</i></p>	<p><i>Books on Islamic scientists can be found in our school library to link to working scientifically</i></p>
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<p>Year 6</p>	<ul style="list-style-type: none"> • <i>planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</i> • <i>taking measurements, using a range of scientific equipment, with increasing accuracy and precision</i> • <i>recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar and line graphs</i> • <i>using test results to make predictions to set up further comparative and fair tests</i> • <i>reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as displays and other presentations</i> • <i>identifying scientific evidence that has been used to support or refute ideas or arguments.</i> • <i>Explore and talk about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically</i> • <i>Draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.</i> <p><i>Know how to choose appropriate variables to test a hypothesis (e.g. plant height as a dependent variable when measuring effect of light on plant growth)</i></p> <p><i>Know how to identify conditions that were imperfectly controlled and can explain how these might affect results</i></p> <p><i>Know how to accurately use further measuring devices, including digital and analogue scales, measuring cylinders and beakers, recognizing the relative accuracy of each device</i></p> <p><i>Know how and when to repeat measurements, how to find an average of a set of measurements and how to recognize and remove outliers from a set of data, justifying the removal as a potential mis-measurement</i></p> <p><i>Know how to independently write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a conclusion</i></p> <p><i>Know how to present brief oral findings from an enquiry, speaking clearly and with confidence and using notes where necessary</i></p> <p><i>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)</i></p>	<p><i>line graph, relationship, outlier, prediction, measurement, enquiry, dependent variable, independent variable, fair test, similar, theory, hypothesis</i></p>	<p><i>Books on Islamic scientists can be found in our school library to link to working scientifically</i></p> <p>Inspirational Muslim Scientist known for scientific method: Hassan ibn al Haitham https://www.youtube.com/watch?v=vp7RaadW9KM</p>
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Year group	Key skills and knowledge (including working scientifically) Biology	Key vocabulary	Links to Faith & Values
Year 1	<p><u>Animals including humans</u> Know names of some minibeasts found in school grounds eg woodlouse, spider, ladybird, slug, worm Know that a trout is an example of fish, a frog is an example of an amphibian; a lizard is an example of a reptile; a robin is an example of a bird; a rabbit, a tiger, a meerkat and a human are examples of a mammal Know that herbivorous animals eat plants; a carnivorous animal eats other animals; omnivorous animals eat both animals and plants Know that a tiger is an example of a carnivore; that a rabbit is an example of a herbivore; know that many humans are examples of omnivores (though not vegetarians) Know that fish, amphibians, reptiles, birds and mammals are similar in that they have internal skeletons; these are known as vertebrates, which means they are animals that have a backbone Know that fish are different in having gills so that they can breathe underwater and scaly skin Know that amphibians are different in that they begin their lives with gills but then develop lungs and breath on land Know that reptiles are different in that they breath air and have scaly skin Know that birds are different to other animals in that they have feathers and wings Know that mammals are different to other animals in that they have fur/hair and they feed milk to their young Know that feet, legs, arms, hands, head, skin, ears, eyes, nose, mouth, skull, torso and tongue are part so the body and identify them Know the five senses are touch, smell hear, see, taste Know which body part is associated with each sense eg that eyes are associated with sight, ears with sound, nose with smell, tongue with taste and skin with touch.</p> <p><u>Plants</u></p> <ul style="list-style-type: none"> Know a rose bush, a sunflower and a dandelion by sight Know an oak tree, a silver birch tree, a willow and a horse chestnut tree by sight Know that evergreen trees maintain their leaves throughout the year and that deciduous trees shed their leaves in autumn Know that a flowering plants consist of roots, stem, leaves and flowers, and that a tree's stem is called a trunk	<p>Senses (touch, see, taste, hear, smell), growth, habitat, fish, amphibian, reptile, bird, mammal, offspring, carnivore, herbivore, omnivore, vertebrate, skeleton, torso, ears, nose, mouth, hands, feet, head, skull, tongue</p> <p>growth, deciduous, evergreen, flower, plant, tree, branch, roots, stem, leaf, trunk,, bulb petal, fruit, seed</p>	<p>Animals:</p> <ul style="list-style-type: none"> Children could sort the animals mentioned in Quran into the animal groups. The animals mentioned in Quran are: ants, apes, bee, bird, calf, camel, cattle, cow, crow, dog, donkey, elephant, ewe, fish, fly, frog, goat, hoopoe, horse, lice, lion, locust, mosquito, moth, mule, pig, quail, sheep, snake, spider, wolf. <p>Senses</p> <ul style="list-style-type: none"> 23:78 "It is He who created for you (the faculties of) hearing, sight, feeling and understanding. Little you are grateful." <p>Plants</p> <ul style="list-style-type: none"> Children could look at pictures of plants mentioned in the Quran and recognize similarities (e.g. roots, stem/trunk, leaves, flowers) Plants mentioned in Quran include tamarisk (34:16); <i>Salvadora persica</i> also known as toothbrush plant (34:16); onions (2:61); Garlic (2:61); Mustard (34:16); Pomegranate (6:141); Basic (55:12); Olives (24:35); the lote tree (34:16); <i>Vachellia Tortilis/Samura tree</i> (48:18); Grapes/raisins (17:91); Cucumber (2:61); Camphor (76:5); Palm/date tree (13:4 or 16:11 or 19:25); Figs (95:1); Lentils (2:61); Banana (56:27-30); Al Darie (88:1-3); Ginger (76:17); Pumpkin (37:1-3)
Year 2	<p><u>Living things and their habitats</u> Know that living things move, grow, consume nutrients and reproduce; that dead things used to do these things, but no longer do; and that things that never lived have never done these things. Know that animals are adapted to their environments I.e. thickness of skin and texture of skin. Know that plants are adapted to their environment Know that woodland, wetland and grassland are examples of micro-habitats Know that animals live in micro-habitats. Know that plants absorb energy from the Sun; that this energy is consumed by herbivorous animals; and that carnivorous animals eat other animals. Know that this is a food chain. Know that the arrows on a food chain show the direction that the energy travels.</p>	<p>birth, living, once lived, never alive, dead decay, energy, microhabitat, life cycle, food chain, source, nutrients, producer, consumer environment, adapt</p>	<p>Animals and their habitats</p> <ul style="list-style-type: none"> Discuss how animals are born from their mother and grow into adults and interact with other animals and their community/environment around them. Link this to the Quran 6:38 "There is no animal on land nor a bird that flies with its wings but they are communities like yourselves"

	<p>Skills Apply compare, sort and group animals based on classification knowledge. Record and communicate our findings using scientific language. Use observations to discuss and answer questions. Create a food chain showing an understanding of the arrows etc.</p> <p>Animals, including humans</p> <ul style="list-style-type: none"> Know that animals, including humans, need food, water and air to survive Know that animals, including humans, are born from their mother and grow into adult animals.(offspring) Know the basic food groups: fruit and vegetables, carbohydrates, protein, dairy, fat and sugary foods Know that more than half of our diet should be made up of carbohydrates, fruit and vegetables Know that fats and sugary foods should be eaten rarely and in small amounts Know that people need to exercise often to help their body stay strong and fit Know that keeping clean, including washing and brushing teeth, is an important part of staying healthy <p>Plants</p> <p>Know that seeds and bulbs need to be buried underground in soil and that they will grow into adult plants under the right conditions (water, warmth)</p> <p>Know that plants absorb energy from the sun and that plants deprived of light, food or air will not grow and will die.</p> <p>Know that plants reproduce to make new plants.</p> <p>Know that cacti and pine trees are examples of plants adapted to their environment – thick skin keeps a store of water safe; sharp spikes keep animals from stealing the water, pine trees have thick bark and pine cones to protect against cold winters</p> <p>Skills</p> <p>Communicate using scientific language what they have observed over time</p> <p>Understand the changes that are taking place over time</p> <p>Use a thermometer to measure temperature and find when plants grow best.</p>	<p>oxygen, conditions for life, air, rest, water, exercise, life cycle, reproduction, offspring, adult, , hygiene, exercise, young growth, carbohydrate, protein, fat, vitamins</p> <p>bulb, seed, temperature, drought, nutrients, conditions</p>	<p>Healthy living</p> <ul style="list-style-type: none"> Reflect on the provision of food by Allah using verses 80:24-32 and 2:22 – link to the value of gratitude for what Allah has provided us Children to sort the foods in the Quran into the food groups: banana, cucumber, corn, dates, water, milk, honey, olive oil, buckthorn, fig, garlic, ginger, gourd, grapes, grain, herbs, mustard, manna, olive, onion, pomegranate, pulses, saffron, wheat, camels, cattle, cows, goat, meat, quail, fish, seafood, sheet, salt Staying healthy and eating healthy <ul style="list-style-type: none"> 7:31 "...And eat and drink but do not be extravagant. Surely He (Allah) does not like the extravagant." Quran 2:168 "eat what is lawful and good in the Earth." Brushing teeth – Narrations say that the prophet would brush his teeth thrice every night. Once before sleeping, once when he woke up for the night prayers and once before leaving for the Fajr Prayer (Makarim al Akhlaq 39) Muslim invention of the toothbrush: https://www.youtube.com/watch?v=vp7RaadW9KM Being clean: <ul style="list-style-type: none"> Quran 2:222 "Indeed Allah loves those who are constantly repentant and loves those who purify themselves." The prophet has said "Try to be clean as much as you are able to. Verily, Allah has based the foundation of Islam on cleanliness; hence, never can a person enter paradise but the clean ones." (Kanzu Ummal Tradition 26002) <p>Plants:</p> <ul style="list-style-type: none"> Look at plants from the quran and sort into those that grow from a seed and those that grow from a bulb. Plants mentioned in Quran include tamarisk (34:16); <i>Salvadora persica</i> also known as toothbrush plant (34:16); onions (2:61); Garlic (2:61); Mustard (34:16); Pomegranate (6:141); Basic (55:12); Olives (24:35); the lote tree (34:16); <i>Vachellia Tortilis/Samura tree (48:18);</i>
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			<p>Grapes/raisins (17:91); Cucumber (2:61); Camphor (76:5); Palm/date tree (13:4 or 16:11 or 19:25); Figs (95:1); Lentils (2:61); Banana (56:27-30); Al Darie (88:1-3); Ginger (76:17); Pumpkin (37:1-3)</p>
<p>Year 3</p>	<p><u>Animals including humans</u> <i>Know that proteins are good for growth, carbohydrates for energy and fruit and vegetables provide vitamins and minerals which help keep us healthy (e.g. calcium for healthy bones and teeth)</i> <i>Know that getting the right amount of each food group (including over half of the diet made up of fruit, vegetables and carbohydrates) is called a balanced diet</i></p> <p><i>Know that lack of a nutrient can cause ill health</i> <i>Know that excess of a food group can cause ill health, such as tooth decay due to excess sugar</i> <i>Know that animals, including humans, have a skeleton made up of solid objects.</i> <i>Know that some animals (such as insects) have an exoskeleton – a solid covering on the outside of their body</i> <i>Know that many invertebrates (such as earthworms and slugs) have water held inside by muscles which act like a skeleton</i> <i>Know that skeletons provide support for muscles and protect the body; for example, the ribcage protects the vital organs in the human body</i> <i>Know that human skeletons are made up of bones and cartilage</i> <i>Know that muscles can only contract, so they must be arranged in pairs in the body so that as one contracts the other loosens</i></p> <p><u>Plants</u> <i>Know that different parts of plants have one or more functions (jobs)</i> <i>Know that the roots collect water and minerals from the soil, and hold the plant firmly in the ground</i> <i>Know that the stem holds up the leaves so that they can gather light to make food and holds up the flowers so that they can receive pollen and disperse their fruits; know that the stem also transports water and minerals from the roots to the other parts of the plant</i> <i>Know that the leaves make food by trapping light and using its energy to turn carbon dioxide and water into carbohydrates</i></p> <p><u>Skills</u> <i>-See Working Scientifically</i></p>	<p>vitamins and , minerals balanced diet, calcium, cartilage, invertebrate, contract, loosen, ribcage, insect, skeleton, muscles, nutrition, protection, protein, carbohydrate, suga</p> <p>Roots, stem, leaves, flower, bud, growth, blossom, petals, fruit, vegetables, bulb, seed, pollination, water, light, formation, dispersal, germination, reproduction, nutrition, nutrients, air, soil, fruit, nectar, petal, pollen, stigma, stamen, function, exchange, dispersal, fertilization</p>	<p>Animals, including humans</p> <ul style="list-style-type: none"> - Children to choose a food from the Quran, identify which food group it belongs in and research the benefits of foods mentioned in the Quran: banana, cucumber, corn, dates, water, milk, honey, olive oil, buckthorn, fig, garlic, ginger, gourd, grapes, grain, herbs, mustard, manna, olive, onion, pomegranate, pulses, saffron, wheat, camels, cattle, cows, goat, meat, quail, fish, seafood, sheet, salt - Eating excess of a food group can cause ill health – Quran 7:31 “...And eat and drink but do not be extravagant. Surely He (Allah) does not like the extravagant.” - Human body in the Quran “Then We made this drop into a clot, then We made the clot into a lump, then We made the lump into bones, then We clothed the bones with flesh, and then We caused it to produce another creation. So blessed be Allah, the Best of creators.”
<p>Year 4</p>	<p><u>Animals, including humans</u> <i>Know that food passes through the body with the nutrients being extracted and the waste products excreted, and that this process is called digestion</i> <i>Know that the process of digestion involves breaking complex food stuffs into simpler building blocks that can be absorbed by the body</i> <i>Know that the process of digestion begins with food being chewed in the mouth by the teeth and saliva added</i> <i>Know that a human has three types of teeth – incisors, canines and molars – and that these each perform different functions</i> <i>Know that incisors slice food, canines tear food (especially meat) and that molars grind food</i> <i>Know that children develop an initial set of teeth which are gradually replaced between the ages of 6 and 12</i> <i>Know that food is squeezed down the oesophagus towards the stomach in a wave-like action called peristalsis</i> <i>Know that the stomach releases acid and enzymes to continue breaking down the food; the stomach is an organ; an organ is a part of living thing that is self-contained and has a specific important job</i> <i>Know that further enzymes and bile break down the food further as it moves through the duodenum towards the small intestine</i> <i>Know that the small intestine adds more enzymes and then absorbs the nutrients</i> <i>Know that the large intestine absorbs water from the undigested food</i> <i>Know that undigested food is stored in the rectum before being excreted through a muscle called the anus</i> <i>Know that a food chain traces the path of energy through a habitat</i> <i>Know that all energy for a food chain initially comes from the Sun which is absorbed and turned into energy by plants which are called producers</i> <i>Know that consumers take in energy by eating</i> <i>Know that an animal that is eaten by another is called prey, and that an animal that eats other animals is called a</i></p>	<p>digestion, excretion, peristalsis, anus, duodenum, small intestine, large intestine, stomach, rectum, esophagus, tongue, saliva, acid, bile, enzymes, incisors, canines, molars, predator, prey, producer, consumer, primary, secondary, tertiary</p> <p>kingdom, classification key, species, fungi, bacteria, climate change, characteristics, offspring, extinction, pollution</p>	<p>Animals including humans</p> <ul style="list-style-type: none"> • Reflect on the orderliness of the creation of the digestive system and how this is a blessing of Allah. • Link the benefits of fasting (physical and spiritual) with learning about digestion – Quran 2:183-184 can be used to support

	<p>predator Know that the first consumer in a food chain is called a primary consumer, the second is called a secondary consumer and above it is called a tertiary consumer Know that the arrows in a food chain show the direction that energy is travelling through a habitat</p> <p><u>Living things and their habitats</u> Know that animals can be grouped based on their physical characteristics (e.g. vertebrates and invertebrates) and based on their behaviour (e.g. herbivores, carnivores and omnivores) Know that living things are divided into kingdoms: the animal kingdom, plants, fungi, bacteria, and single-celled organisms Know that a species is a group of living things have many similarities that can reproduce together produce offspring Know that a classification key uses questions to sort and identify different living things Know how to use a classification key to identify living things Know how to create a classification key to sort plants on the school premises Know that changes to the environment can make it more difficult for animals to survive and reproduce; in extreme cases this leads to extinction, where an entire species dies Know that human activity – such as climate change caused by pollution - can change the environment for many living things, endangering their existence Know that the polar bear is a famous example of climate change endangering the existence of a species; as the climate changes and gets warmer, the sea ice on which polar bears live reduces in amount making it harder for them to survive and reproduce.</p>		<p>-Living things and their habitats</p> <ul style="list-style-type: none"> Species is a group of living things – link to Quranic Ayaat 6:38. Children could sort the animals mentioned in Quran into groups such as herbivore/carnivore /omnivore or use classification keys to sort them into groups. The animals mentioned in Quran are: ants, apes, bee, bird, calf, camel, cattle, cow, crow, dog, donkey, elephant, ewe, fish, fly, frog, goat, hoopoe, horse, lice, lion, locust, mosquito, moth, mule, pig, quail, sheep, snake, spider, wolf.
<p>Year 5</p>	<p><u>Animals, including humans</u> Know that humans go through stages of development; they begin as fertilized eggs and then develop into embryos before developing into babies; once they are born, these newborn babies become infants (roughly 2 months to 2 years) then into young children (roughly 2-12 years old); children develop into adults during adolescence (roughly 12-16 years old) at which age they become physically capable of reproduction; as adults develop into old age (roughly 55+ years old) they experience changes in their body which require them to move more carefully and rest more frequently.</p> <p><u>Living things and their habitats</u> Know that the life cycle of a living thing is a series of stages of development starting with a fertilized egg in animals or a seed in many plants Know that in most mammals (e.g. dogs) a fertilized egg develops in the womb into an embryo and is then born and fed on milk before it is weaned onto the food that is adapted to eat; it then develops to maturity in a period called adolescence after which it can reproduce and the cycle can begin again Know that in amphibians (e.g. frogs) a fertilized egg develops into an embryo and then hatches into a tadpole; the tadpole develops adult characteristics, metamorphoses into the adult form after which it can reproduce and the cycle can begin again Know that in many insects (e.g. butterflies) a fertilized egg develops into wingless feeding form called a larva (caterpillar); the larva feeds then later becomes a pupa (chrysalis) with a protective cocoon; inside this cocoon, the pupa metamorphoses into the adult butterfly after which it can reproduce and the cycle can begin again Know that in birds (e.g. robins) a fertilized egg hatches in a nest (a hatchling) and is fed by its parents until it is ready to fly (i.e. becomes a fledgling); it then leaves the nest and grows into an adult after which it can reproduce and the cycle can begin again.</p> <p><u>Skills</u></p> <ul style="list-style-type: none"> Observations <p>Identifying scientific evidence that has been used to support or refute ideas or arguments.</p>	<p>life cycle, life span, embryo, womb, weaned, adolescence.</p> <p>Metamorphosis, pupa, larva, chrysalis, caterpillar, tadpole, hatchling, fledgling, insect</p>	<ul style="list-style-type: none"> Verse about how our bodies change 30:54 "It is Allah who created you in a state of weakness, then developed your weakness in to strength, then developed your strength into weakness and old age. He creates whatever He wills. For He is All-Knowing, Most Capable." Human reproduction and body go through stages of development 71:4 "God created you in stages" Human reproduction 39:6 "God creates you inside the bodies of your mothers, in stages, one after another." Embryo development – 22:5 "We cause whom we will to rest in the womb for an appointed term" <p>Development of egg to embryo and baby stages of development Quran 23:14 "We have fashioned the thing which clngs into a chewed lump of flesh and We fashioned the chewed lump of flesh into bones then we clothed the bones with intact flesh."</p>


<p>Year 6</p>	<p><u>Living things and their habitats</u> Know that there are three types of micro-organism: viruses, fungi and bacteria; of these three, viruses are often not really considered to be alive by many scientists mainly because they don't have the 'machinery' to reproduce inside them Know that germs are disease-causing bacteria Know that an arthropod is an invertebrate with a hard , external skeleton and jointed limbs Know that insects are a type of arthropod; their bodies consist of six legs, a head, a thorax and an abdomen; most insects also have a pair of antennae and a pair of wings Know that an arachnid (e.g. spider) is a type of arthropod with eight legs and no antennae or wings Know that a crustacean is a type of arthropod with two pairs of antennae (e.g. woodlouse) Know that a myriapod is an arthropod with a flat and long or cylindrical body and many legs (e.g. centipede) Know the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification</p> <p><u>Animals, including humans</u> Know that the heart and lungs are organs protected by the ribcage Know that blood travels around the body transporting nutrients that have been absorbed into the blood stream from digestion; blood also carries oxygen around the body which is used to power the body; this use of oxygen to create energy is called respiration Know that the heart beats, pumping blood around the body and that blood vessels carry the blood; arteries carry blood away from the heart; veins carry blood towards the heart; capillaries are tiny blood vessels that connect arteries and veins Know that the heart is composed of four chambers: two atria and two ventricles; the aorta is the largest artery in the body and most major arteries branch off from it Know that when we exercise, our heart beats more frequently so that the oxygen that is used around the body can be replenished; it returns to a resting heart rate afterwards; fitter people tend to have lower resting heart rates Know that drugs are chemicals that have an impact on the natural chemicals in a person's; know that drugs can be harmful or helpful, depending on what they are and how they are used; know that all drugs can be harmful if overused Know that paracetamol and aspirin are examples of drugs that can be helpful as a painkiller Know that cannabis and cocaine are examples of illegal drugs that can have serious negative effects Know that alcohol and tobacco are examples of drugs that are legal to adults but that can have serious negative effects, such as liver disease and lung disease, respectively</p> <p><u>Evolution and inheritance</u> Know that all life on Earth began from a single point around 4.5 billion years ago Know that living things changes over time and that this gradual change is called evolution Know that natural selection is the cause of this change; natural selection works as across a species there is natural variation within a species; there is also competition to survive and reproduce and that members of a species with advantageous characteristics survive and reproduce - these characteristics are passed down to their offspring; members of a species with less advantageous characteristics do not survive and reproduce – these characteristics are not passed down to offspring Know that offspring vary and are not identical to their parents Know that Charles Darwin posited this theory of evolution by natural selection Know that the gradual change of species over millions of years can be observed by looking at examples of fossil Find out about the work of palaeontologists such as Mary Anning and how Charles Darwin and Alfred Wallace developed their ideas on evolution</p>	<p>micro-organism, virus, thorax, arthropod, abdomen, arachnid, antenna, jointed limbs</p> <p>artery, aorta, atrium, blood vessels capillary, circulatory system, vein, pulse, ventricle, replenished, resting heart rate, body</p> <p>evolution, natural selection, variation, advantageous</p>	<p>Quranic example of arthropod</p> <ul style="list-style-type: none"> - bees (An-Nahl)- quranic reference about honey bee specifically 16:68-69 - ant(an-naml) <p>Quranic example of an arachnid – spider (Al-ankabut)- 29:41</p> <p>Heart mentioned a lot in the quran (more in a spiritual way) = qalb (39:22; 13:28) قلب</p> <p>Reflect on the many miracles of our human bodies and link to the value of gratitude – being grateful for these systems that keep our body going and we do not even have to think of them</p> <p>Evolution and inheritance Teacher knowledge: What does Islam say about evolution? - https://www.al-islam.org/media/what-does-islam-say-about-evolution (Please note that this may differ between denominations so is purely for the subject knowledge of teachers not for children)</p> <p>When talking about how life began link to 7:54 "Allah created the heavens and earth and all that is between them in six days"</p> <p>Life came from water 24:45 "Allah has created every animal from water. Of them are some that creep on their bellies, some that walk on two legs, and some that walk on four. Allah creates what he will sfor truly Allah has power over all things"</p> <p>•</p>
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Year group	Key skills and knowledge (including working scientifically) Chemistry	Key vocabulary	Links to Faith & Values
Year 1	<p>Everyday materials Know from observation how to distinguish between materials made of wood, plastic, glass, metal, water, rock Know that an object is made from/of a material Know that materials can be hard, soft, strong, weak, absorbent, heavy, light, solid and runny, smooth and rough; these descriptions denote the properties of a material Compare and group together a variety of everyday materials on the basis of their physical properties</p>	absorb, property, wood, plastic, glass, metal, water, rock man-made, natural, hard, strong, rough, bendy, solid, smooth, light, soft, transparent waterproof	Could look at some faith based items (e.g quran stand, quran, prayer mat, tasbeeh) or visit a mosque and use words to label the materials and descriptions.
Year 2	<p>Uses of everyday materials Know that many types of plastic are waterproof, that steel (a type of metal) is strong, that rock is hard, that cotton wool is soft, that rubber is flexible, that rock is rigid, that polystyrene (a type of plastic) is light and that iron (a type of metal) is heavy, Know that when objects move across a surface there is friction when they rub against each other and that sometimes this friction is larger or smaller Know that applying forces to objects can change their shape Skills Apply knowledge to sort materials by their properties Understand and explain why materials are used for a purpose</p>	Revise Year 1 and ... brick, paper, cardboard, friction, movement, suitable, surface, stretch, twist, waterproof, flexible, rigid, absorb, force	Could discuss which materials would be needed to build a quran stand/a mosque and why you would choose those materials.
Year 3	<p>Rocks Know that there are three kinds of rocks: igneous, sedimentary and metamorphic Know that the Earth has a solid crust made up of tectonic plates with molten rock beneath Know types of igneous rock and that igneous rocks form from molten rock below the Earth's crust Know types of sedimentary rock which form when small, weathered fragments of rock or shell settle and stick together, often in layers Know types of metamorphic rock which form when rocks in Earth's crust get squashed and heated in processes such as when tectonic plates press against each other Know that fossils form when a plant or animal dies and is quickly covered with silt or mud so that it cannot be rotted by microbes or eaten by scavenging animals; in time layers of sediment build, squashing the mud and turning it to stone around the dead plant or animal; the materials in the body are replaced by minerals that flow in water through the rock, leaving a rock in the shape of the animal or plant that was once there Know that soil is made from tiny particles of rock broken down by the action of weather (weathering) Skills -See Working Scientifically</p>	extinction, igneous, metamorphic, sedimentary, archaeologist, weathering, molten rock, crust, tectonic plates, scavengers, fossil, durable	3 kinds of rock and 3 kinds of heart – Quran 2:74 (note that this verse links types of rock and types of heart rather than a scientific description of rock)
Year 4	<p>States of matter Know that things are composed of a material in one of three states of matter: solid, liquid or gas Know that things are made of particles (tiny building blocks) and that these are organized differently in different states Know that materials can change state when temperature changes Know that there are bonds between the particles (building blocks) in a solid; as temperature increases, these bonds are somewhat overcome as the particles absorb energy and solids can change into liquids; with a further increase in temperature, the particles become even more energetic and the bonds are overcome entirely so the liquid changes into a gas Know that when solids turn into liquids, this is called melting and that the reverse process is called freezing Know that when liquids turn into gases, this is called evaporation and that the reverse process is called condensation Know that when a solid turns into a gas without passing through the liquid state, this is called sublimation Know that the melting point of water is 0° C and that the boiling point of water is 100° C Know that water flows around our world in a continuous process called the water cycle Know that, along with evaporation, water on the Earth's surface moves to the air in a process called transpiration in which water turns into water vapour (gas) on the surface of leaves on plants Know that rain condenses in clouds and falls to earth as rain, snow or hail in a process called precipitation Know that water flows across the land in rivers and streams in a process called surface run-off and under the ground as groundwater</p>	bond, condensation, evaporation, reversible, boiling point, melting point, liquid, gas, thermometer, water cycle, continuous precipitation, surface run off process, sublimation absorption, dissolving, energy, evaporation, freezing, matter, melting, particle, temperature, ice,	<p>Water cycle Quran 30:48 "Allah is He who sends forth the winds so they raise a cloud, then He spreads it forth in the sky as He pleases, and He breaks it up so that you see the rain coming forth from inside it; then when He cases it to fall upon whom He pleases of His servants, lo! They are joyful." Quran 39:21 "Do you not see that Allah sends down rain from the sky and makes it flow</p>

		<p>water, solid, atoms, degrees celsius.</p>	<p>as springs..."</p> <p>Quran 23:18 "And we send down water from the sky according to (due) measure, and we cause it to soak in the soil and we certainly are able to drain it off."</p> <p>Also talk about why water is so special</p> <p>(https://www.facebook.com/Thaqlain/videos/wudu-you-might-have-never-thought-this-way-about-it-sayed-ammar-nakshawani-imam-/2123530014531472/) what do we use it for (including in faith to purify, wudhu, ghusl), is it special in other faiths (could link to baptism in Christianity).</p>
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<p>Year 5</p>	<p><u>Properties and changes of materials</u></p> <p>Know that materials can be sorted in a variety of ways based on their properties</p> <p>Know that in some solid materials the bonds between particles break when surrounded by a liquid; this allows the liquid to absorb the solid; when this happens, the solid is called a solute, the liquid is called a solvent and the result is a solution; when a solid does dissolve in a liquid it is described as being soluble in that solvent (e.g. sugar in water); when it cannot it is insoluble (e.g. sand in water)</p> <p>Know that a given amount of solvent can only absorb a certain amount of solid before no more will dissolve; when this happens the liquid is said to be saturated</p> <p>Know how to dissolve and a solute in a solvent and then how to evaporate the solvent to recover the solute</p> <p>Know that a reversible change is one that can be reversed and that examples of this are mixing, dissolving and changes of state where no chemical reaction takes place</p> <p>Know that an irreversible change is one that cannot be reversed and that examples of this often involve a chemical change where a new material is made, often a gas (e.g. burning, boiling an egg, the reaction of bicarbonate of soda and acid)</p> <p>Know that filtering allows solids and liquids to be separated and that sieving allows solids made up of different sizes parts to be separated</p> <p>Know how to separate a mixture of sand, salt and small stones by sieving (to remove the small stones), followed by dissolving in water (so the salt is absorbed), followed by filtering to remove the sand from the mixture, followed finally by evaporation of the water to recover the salt.</p> <p>Know that materials' different properties can be tested through acting upon them, including testing to find whether materials are magnetic, thermally conductive and electrically conductive; know that the various properties of different materials make them suitable for a given function</p> <p>Know how to explain orally and in writing the reasons why various materials are suited or unsuited to a function</p> <p><u>Skills</u></p> <ul style="list-style-type: none"> • Use their science experiences to explore ideas and raise different kinds of questions. • Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions. • Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact. • Decide how to record data and results. • Use results to make predictions and identify further observations. <p>Choose the most appropriate equipment for the task.</p>	<p>irreversible, dissolve, soluble, insoluble, solvent, solute, solution, filter, sieve, saturation, crystallization, thermal, chemistry</p>	<p>Inspirational Islamic Chemist – Jabbar Ibn Hayyan: https://www.youtube.com/watch?v=X9zYhtghavM</p> <p>Link change in states of matter with making changes in ourselves- Quran 13:11 "Allah does not change people until they change themselves."</p> <p>Chemistry – Muslim Invention https://www.youtube.com/watch?v=wNPRIMoRbQA</p>
<p>Year 6</p>			

Year group	Key skills and knowledge (including working scientifically) Physics	Key vocabulary	Links to Faith & Values
Year 1			
Year 2			

<p>Year 3</p>	<p>Light <i>Know that light is a form of energy</i> <i>Know that energy comes in different forms</i> <i>Know that we need light to see things and that darkness is the absence of light</i> <i>Know that light travels in straight lines</i> <i>Know that light is reflected when it travels from a light source and then 'bounces' off an object</i> <i>Know that everything that we can see is either a light source or something that is reflecting light from a light source into our eyes</i> <i>Know that the Sun is a light source, but that the Moon is not and is merely reflecting light from the Sun</i> <i>Know that many light sources give off light and heat</i> <i>Know that sunglasses can protect eyes from sunlight but looking at the Sun directly – even with sunglasses – can damage the eyes</i> <i>Know that opaque objects block light creating shadows and that light passes through transparent objects</i> <i>Know that opacity/transparency and reflectiveness are properties of a material</i> <i>Know that as objects move towards a light source, the size of the shadow increases</i> <i>Know how to show the changing of shadow size</i></p> <p>Forces and magnets <i>Know that a force can be thought of as a push or a pull</i> <i>Know that objects move differently on rough and smooth surfaces; objects resist movement more on rough surfaces because there is higher friction as the object moves</i> <i>Know that there are also non-contact forces that can act between objects without them touching and that magnetism is an example of a non-contact force</i> <i>Know that magnets have two poles called north and south</i> <i>Know that like poles (south-south and north-north) of two magnets repel each other and that opposite poles of two magnets (north-south) attract each other</i> <i>Know that some materials are magnetic, meaning that they are attracted to a magnet, while other materials are non-magnetic</i></p> <p>Skills <i>-See Working Scientifically</i></p>	<p>mirror, image, beam, solid, opaque,transparent, object, source, opaque, transparent, translucent, reflection, dark, light source, shadow, solid, straight, natural, artificial, travels, shortest, longest, highest, lowest, shape, change, block</p> <p>metal, material, surface, friction, force magnetic, non- magnetic, pole, north, south, forces, repel, attract, magnets</p>	<p>Light <i>Sun in Quran is called 'Shams' and moon is called 'Qamar'</i> <i>Quran talks about the sun and moon as sources of light 10:5 "It is He who made the sun a shining light and the moon a derived light and determined for it phases – that you may know the number of years and account (of time). Allah has not created this except in truth. He details the signs for a people who know."</i> <i>- When discussing this ayaat it is a good time to link in the phases of the moon and about the lunar calendar that muslims follow.</i></p> <p>Forces and Magnets <i>Look at the image of the kaba. Tell the children that this image was made using magnetism and ask them to recreate it or explain how it works:</i></p>  <p><i>You may want to discuss why the artist chose to use magnets – what is the symbolism</i></p>
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<p>Year 4</p>	<p><u>Sound</u> <i>Know that sound is generated when an object vibrates; some of the energy from the vibrating object is transferred to the air, making the air particles move</i> <i>Know that energy comes in different forms and can be neither created nor destroyed, only changed from one form to another</i> <i>Know that sound is a form of energy that transfers in a longitudinal wave - like that seen in a slinky - <u>not</u> a transverse wave - like that seen in water ripples</i> <i>Know that sound travels through a medium (e.g. particles in the air) and thus sounds does <u>not</u> travel through a vacuum which has no particles in it at all</i> <i>Know that longitudinal sound waves are detected in the ear by humans and that the brain interprets this as the sounds we hear</i> <i>Know that sound travels at different speeds through different objects; it travels at around 340 metres per second in air, much slower than light travels; this is why we often hear thunder <u>after</u> we see lightning as the light reaches our eye before the sound reaches our ears</i> <i>Know that pitch is how high or low a sound is and that this is determined by how many vibrations per second are being made by the vibrating object; the number of vibrations per second is called frequency</i> <i>Know that volume is how loud or quiet a sound is and that this is determined by the amount of energy in the wave (e.g. from how hard or soft a percussion instrument is hit)</i> <i>Know that the volume of a sound is quieter if the listener is further away from the object</i> <i>Know the anatomy of an ear and how it relates to the hearing of sound.</i></p> <p><u>Electricity</u> <i>Know that electrical energy is one of many forms of energy</i> <i>Know that current electricity is the flow of charged particles called electrons around a circuit</i> <i>Know that electrical current flows well through some materials, called electrical conductors, and poorly through other materials, called electrical insulators</i> <i>Know that conductors have free electrons and that when electrical current flows around a conductor the electrons move</i> <i>Know that electrical conductivity (how well a material conducts electricity) is an example of a property</i> <i>Know that metals are good electrical conductors</i> <i>Know that water is a good, yet dangerous electrical conductor.</i> <i>Know that more than one cell lined up to work together is called a battery</i> <i>Know that electrical current can flow if there is a complete circuit</i> <i>Know that wires – which contain a conductor inside them, usually made of metal – can allow electrical current to flow around a circuit</i> <i>Know that insulators are important for safety reasons when working with electricity.</i> <i>Know that when electrical current flows through a circuit components within that circuit – such as <u>buzzers</u> which make a noise and bulbs which emit light – begin to work</i> <i>Know that a switch functions by completing or breaking a complete circuit</i> <i>Know how to construct a simple circuit using components</i> <i>Know that exposure to high levels of electrical current can be dangerous</i></p>	<p>absorption, conductor, energy, insulator, wave particle, vibration, percussion instrument, wind instrument, string instrument, frequency, volume, pitch, transverse wave, longitudinal wave, medium, vacuum</p> <p>component, conductor, energy, insulator, particle, property, material circuit, appliance, charge, electron, battery, cell, bulb, buzzer, switch, wire, current electricity, static electricity, negative terminal, positive terminal, chemical reaction, emit</p>	<p>Sound</p> <p>- Being grateful for the hearing God has given us. Quran says 67:23 "Say: It is He who has created you (and made you grow(</p>
<p>Year 5</p>	<p><u>Forces</u> <i>Know that a force is measured in a unit called Newtons, named after a British scientist called Sir Isaac Newton who discovered lots about gravity and how planets move</i> <i>Know that pull forces can be measured using a device called a force meter</i> <i>Know that the amount of matter (stuff) in an object is its mass</i> <i>Know that gravity is a force that acts between all objects in the universe, but that it acts much more strongly between objects that have more mass and that are close together</i> <i>Know that unsupported objects are pulled towards the Earth by the force of gravity</i> <i>Know that air resistance is a force felt by an object as it moves through the air; it is caused by the object bumping into the gas particles that make up air; the quicker an object moves, the more gas particles it bumps into and the more air resistance it experiences</i> <i>Know that a falling object will accelerate until its air resistance matches the gravitational force pulling it down; at this point, the object will continue to move at this speed (called its terminal velocity) without getting any quicker or slowing down</i> <i>Know that a parachute's shape increases the air resistance that a falling object experiences, giving it a much lower terminal Velocity</i> <i>Know that water resistance is a force felt by an object as it moves through water; it is caused by the object bumping into the water particles</i> <i>Know that the shape of an object determines how much air resistance or water resistance it experiences; shapes of object that experience little air resistance or water resistance are described as streamlined</i></p>	<p>energy, matter, particle, surface, friction, force, stretch, squash, rotation, rough, smooth, sliding friction, static friction acceleration, air resistance, buoyancy, effort, force meter, fulcrum, gravity, load, mass, mesh, Newton, pivot, rigid, streamlined, terminal velocity, unsupported, water resistance, weight</p>	<p>Forces/Gravity in the Quran 13:2 "Allah is He who raised the heavens without any pillars which you (can) see, then He established Himself on 'Arsh (The Throne of authority) and subjected the sun and the moon, each one runs unto an appointed term.</p> <p>- Tafsir states that 'without any pillars which you can see' refers to a scientific force which was unknown at the time. Some say it is referring to the separation of parents</p>

	<p>Know how to draw a force diagram with arrows representing the different forces acting on an object</p> <p>Know that a lever is a rigid length pivoting around a fulcrum</p> <p>Know that a pulley is a wheel with a fulcrum that supports a moving cable or belt</p> <p>Know that a gear is a rotating wheel with cut teeth that mesh with the teeth of another gear so that turning one gear turns an adjacent gear in the opposite direction</p> <p>Know that gears, levers and pulleys are simple machines that used to allow a smaller force to have a greater effect; they do this by moving a smaller force over a longer distance at one end of the machine, which the machine turns into a larger forcer over a small distance at the other end.</p> <p><u>Skills</u></p> <ul style="list-style-type: none"> • Use their science experiences to explore ideas and raise different kinds of questions. • Talk about how scientific ideas have developed over time. • To set up fair tests and explain which variables need to be controlled and why <p>Look for different casual relationships in their data and identify evidence that refuses or supports their ideas.</p>		<p>from one another</p>
<p>Year 6</p>	<p><u>Light</u></p> <p>Know that translucent objects allow some light to pass through, but some of the light changes direction as it passes through the object; this means that an something seen through a translucent object is not clearly defined</p> <p>Know that when light passes from one medium to another (e.g. from air to water), it changes direction; this is called refraction; this happens because light travels at different speeds in different media.</p> <p>Know that white light comprises all the colours of light</p> <p>Know that white light refracted by two surfaces in a prism will spread out so that all of its constituent colours can be seen; this array of colours is called a spectrum; it happens because the different colours of that constitute white light travel at different speeds.</p> <p>Know how to draw a diagram to show why the shape of a shadow will match the shape of an object</p> <p>Know that when light reflects off an object, the angle of incidence is equal to the angle of reflection</p> <p>Know that a periscope takes advantage of the predictable angles of incidence and reflection to allow an image to be shown to a viewer (working scientifically to design and make a periscope)</p> <p><u>Electricity</u></p> <p>Know that voltage is a measure of the power of a cell to produce electricity; it is a measure of the 'push' of electric current, not the size of the electric current</p> <p>Know that as the number and voltage of cells in a circuit increases, the brightness of a bulb or the volume of a buzzer will increase (though too high a voltage may 'blow' the bulb or buzzer)</p> <p>Know how to draw simple circuit diagrams including using the scientific symbols</p> <p>Know the recognized symbols for a battery, bulb, motor, buzzer and wire</p> <p>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</p> <p>Know that two bulbs in a circuit can be wired up to create a series circuit or a parallel circuit; if one bulb blows in a series circuit the other will not shine as the circuit has been broken; in contrast, if one bulb blows in a parallel circuit, there will still be a complete circuit for the other bulb so it will continue to shine; use this knowledge to explain the advantages of using parallel circuits (e.g. in the lighting in homes)</p>	<p>absorption, energy, property, reflection, wave, mirror, incident ray, image, beam, photons (Tier 3), solid, opaque, transparent, object, source, angle of incidence, angle of reflection, refraction, spectrum, translucent, medium, periscope</p> <p>circuit, component, conductor, energy, insulator, particle, property, material, appliance, charge, electron, battery, cell, bulb, buzzer, switch, wire, current electricity, static electricity, negative terminal, positive terminal, voltage, chemical reaction, emit series circuit, parallel circuit, resistance, voltage</p>	<p>Light</p> <p>Discuss the purpose of light and then introduce Quranic verse 24:35 which says "Allah is the light of the heavens and the earth..." and discuss why is Allah considered the light of the heavens and earth.</p> <p>Could mention the use of shadows to how prayer times are determined. The afternoon prayers are determined by the length of the shadow of the stick. Specific timings differ between denominationsdenomination s so do not mention specifics about when each prayer is but just that shadow of a stick was used.</p> <p>Quranic verse use of light in knowing time/calender 10:5 "He it is who made the sun a radiation and the moon a light, and determined it by stations, electricity, static electricity, that you might know the number of years and the reckoning (of time). Allah did not create that save in truth. (Thus) does He explain the Signs in detail, for a people who know."</p>

Year group	Key skills and knowledge (including working scientifically) Our Planet	Key vocabulary	Links to Faith & Values
Year 1	<p>Seasonal changes Know that days are longer in the summer and shorter in winter Know that weather changes through the year, getting hotter in the summer and colder in the winter Know that the winter is likely to bring ice on the ground when water freezes due to the cold Know the four seasons and key changes that occur. Observe and describe weather associated with the seasons and how the day length varies</p>	freezing, melting, , clouds, wind, snow, ice, spring, summer, autumn, winter, temperature, weather, season Autumn, Spring, Summer, Autumn	<p>When comparing the seasons talk about what you are grateful for in each season.</p> <p>In this country, our days are longer in the summer and shorter in the winter. Discuss if anything in our faith changes because of the changes in the length of the day? (e.g. the change in prayer time, the change in fast times)</p>
Year 2			
Year 3	<p>Light The Sun is a form of energy We need light to see things and that darkness is the absence of light Light travels in straight lines Everything that we can see is either a light source or something that is reflecting light from a light source into our eyes The Sun is a light source, but that the Moon is not and is merely reflecting light from the Sun</p> <p>Rocks and fossils BIG IDEAS: E3 Know that there are three kinds of rocks: igneous, sedimentary and metamorphic Know that the Earth has a solid crust made up of tectonic plates with molten rock beneath Know types of metamorphic rock which form when rocks in Earth's crust get squashed and heated in processes such as when tectonic plates press against each other</p> <p>Skills -See Working Scientifically</p>	mirror, image, beam, solid, opaque, transparent, object, source, opaque, transparent, translucent, reflection, dark, light source, shadow, solid, straight, natural, artificial, travels, shortest, longest, highest, lowest, shape, change, block extinction, igneous, metamorphic, sedimentary, archaeologist, weathering, molten rock, crust, tectonic plates, scavengers, fossil, durable	<p>Quranic verse about sun being a source of light/energy and its use in knowing time/calender 10:5 "He it is who made the sun a radiation and the moon a light, and determined it by stations, that you might know the number of years and the reckoning (of time). Allah did not create that save in truth. (Thus) does He explain the Signs in detail, for a people who know."</p> <p>Quranic verse that the moon is reflecting light from the sun 25:61 "Blessed is He Who has set in heaven constellations, and has set therein a lamp (the sun) and the moon illuminating." - Tafsir tells us that this verse indicates that The moons light doesn't belong to itself but is illuminated by the sun.</p> <p>Rocks 3 kinds of rock and 3 kinds of heart – Quran 2:74 (note that this verse links types of rock and types of heart rather than a scientific description of rock)</p>
Year 4			

<p>Year 5</p>	<p><u>Earth and space</u></p> <ul style="list-style-type: none"> Know that the universe comprises all matter and space in existence <p>Know that a celestial body is a large object in the universe</p> <p>Know that a star is an exceptionally hot ball of gas, originally made from hydrogen and helium</p> <p>Know that the Sun is a star</p> <p>Know that a planet (e.g Earth) is defined as a spherical celestial body that orbits a star and that has cleared the neighbourhood of its orbit of other objects, some of which crash into the planet and others that become moons of that planet</p> <p>Know it was once thought that everything orbited the Earth, but that scientists like Copernicus and Galileo used telescopes and measurement to show that the Earth orbited the Sun</p> <p>Know that there are eight major planets in our solar system: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune</p> <p>Know that the universe is utterly vast and that our solar system makes up a tiny fraction of the universe</p> <p>Know that a satellite orbits a planet and that moons are natural satellites</p> <p>Know that the Moon orbits the Earth roughly every 28 days</p> <p>Know that as the Moon orbits the Sun, different parts of it are lit up by the Sun, which is why we see a different shape lit up on the Moon as the lunar cycle progresses</p> <p>Know that humans have sent man-made satellites into orbit that assist with telecommunication</p> <p>Know that all the planets in the solar system orbit the Sun and that the further away they are from the Sun, the longer their orbit</p> <p>Know that the Earth spins around an imaginary line through its centre called an axis and that this axis is tilted relative to the Earth's orbit</p> <p>Know that night and day are the result of the Earth rotating on its axis</p> <p>Know that the tilt of the Earth towards and away from the Sun's light as the Earth orbits the Sun leads to the seasons as during winter the light is spread over a wider area</p> <p>Know that a solar eclipse occurs when the Moon is between the Sun and the Earth, casting a shadow on the Earth; a lunar eclipse occurs when the Earth is between the Sun and the Moon, casting a shadow on the Moon</p> <p><u>Skills</u></p> <ul style="list-style-type: none"> Research led. Identify scientific evidence that has been used to support or refute ideas and arguments. 	<p>planet, satellite, sphere, solar system, eclipse, star, universe, constellation, axis, celestial body, Moon, rotating, lunar, solar, telescope, rotation</p>	<p>Muslim astronomer and Discovery of 1st Galaxy – Abd al Rahman al-Sufi</p> <p>Quranic verse 21:33 "It is He who created the night and the day and the sun and the moon; all (the celestial bodies) swim along, each in its rounded course."</p> <p>Quranic verse 39:5 "He has created the heavens and the earth with truth. He makes the night to go in the day and makes the day to go in the night. And He has subjected the sun and the moon, each running for an appointed term. Know that He is the Exalted in Might, the Oft Forgiving."</p> <p>Sun and moon in their own orbit</p> <ul style="list-style-type: none"> Quran 21:33 "It is He who created the night and the day, and the sun and the moon. Each of them is floating in its orbit." Quran 36:40 "Neither is it expedient for the sun that it should overtake the moon, nor can the night outstrip the day; each swims along in (its own) orbit" Quran 55:5 "The sun and the moon follow a reckoning" <p>Planet and orbits</p> <ul style="list-style-type: none"> Quran 23:17 "We have indeed fashioned above you
<p>Year 6</p>			