



Questions to Develop Children's Spirituality in Science:	Do you believe there is creator of the earth? Do you believe in evolution, that humans came from monkeys and we all developed from fish? Does the theory of evolution mean you are just a monkey? Are you just a pile of atoms? In what ways are you like your parents (made in their image)? What is it like to be made in the image of God? Why is it that no two people on the earth are exactly the same- not even twins? Is your behaviour learnt or inbuilt- are we naturally selfish? When you look around at the wonders of the natural world do you think these things were created by accident or by design?
Development of the child:	Questioning, wonder, critical mind, reasoning and awe.



<p>Topic: Survival- Properties of Materials and reversible and irreversible changes</p> <p>Subject: Science</p>	<p>Prior Knowledge/Links: Great Outdoors- Everyday Materials (Y1/2) Buckets and Spades- Use of Everyday Materials (Y1/2) Water, Water- States of Matter (Y3/4)</p> <p>Children should already know:</p> <ul style="list-style-type: none"> • materials can be compared and grouped according to whether they are solids, liquids or gases • materials can change state when they are heated or cooled and know the temperatures at which this happens • the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature 	
<p>National Curriculum Objectives</p>	<p>Key Knowledge and Vocabulary</p>	
<p>Compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets</p> <p>Understand that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</p> <p>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</p> <p>Give reasons, based on evidence from comparative and fair tests, for the uses of everyday materials, including metals, wood and plastic</p> <p>Demonstrate that dissolving, mixing and changes of state are reversible changes</p>	<ul style="list-style-type: none"> • Know how compare materials according to their properties e.g., solubility, conductance • Know which materials are thermal conducting or insulating • Know which conductors make a bulb shine brightest. • Know that some materials will dissolve in liquid to form a solution. • Know that dissolving, mixing and changes of state are reversible changes. • Know the vocabulary that describes changes of state – melting, boiling, evaporating, condensing, freezing and to be able to apply it to a material e.g. changes that can be made to water • Know that some mixtures can be separated by filtering, sieving and evaporating. • Know that some changes result in the formation of new materials and that this kind of change is usually irreversible. • Know some irreversible changes, such as chemical changes, cooking and burning and the visible changes that occur, as well as the formation of other materials such as gases – bubbles, vapour, flames etc. 	<p>reversible irreversible conductor insulator dissolve soluble mix melt boil evaporate condense freeze filter sieve cook burn vapour bubble flame gas</p>



<p>Topic: Earthlings- Earth and Space</p> <p>Subject: Science</p>	<p>Prior Knowledge/Links: There's No Place Like Home-Light (Y3/4)</p> <p>Children should already know:</p> <ul style="list-style-type: none"> • we need light in order to see things and dark is the absence of light. • light from the sun can be dangerous and there are ways to protect our eyes. • patterns in the way that the size of shadows change 	
<p>National Curriculum Objectives</p> <p>Describe the movement of the Earth and other planets relative to the sun in the solar system.</p> <p>Describe the movement of the moon relative to the Earth.</p> <p>Describe the sun, Earth and moon as approximately spherical bodies.</p> <p>Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky</p>	<p>Key Knowledge and Vocabulary</p> <ul style="list-style-type: none"> • Know that the sun is a star in the centre of our solar system. • Know the 8 planets of our solar system: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. • Know that the Earth rotates on an axis, which is linked to day and night (24 hours) and the movement of the sun across the sky. • Know that the Earth revolves around the sun, which creates the seasons (365 days). • Know that a moon is a celestial body that orbit a planet (Earth has 1 moon, Jupiter has 4 moons and numerous larger ones) • Know that Earth's moon takes approximately 28 days to rotate and revolve and how this is linked to its change of appearance in the sky. • Know how ideas about the solar system have developed from the geocentric model to the heliocentric model. 	<p>Earth Sun moon Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune planet solar system star rotate revolve axis day night season celestial geocentric/heliocentric</p>



<p>Topic: Inventors and Inventions -Forces</p> <p>Subject: Science</p>	<p>Prior Knowledge/Links: What the Romans Did for Us- Forces and Magnets (Y3/4)</p> <p>Children should already know:</p> <ul style="list-style-type: none"> • how things move on different surfaces • some forces need contact between two objects, but magnetic forces can act at a distance • magnets attract or repel each other and attract some materials and not others • a magnet has two poles 	
<p>National Curriculum Objectives</p>	<p>Key Knowledge and Vocabulary</p>	
<p>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.</p> <p>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces.</p> <p>Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect</p>	<ul style="list-style-type: none"> • Know that unsupported objects will fall towards the Earth as a result of gravity. • Know how air resistance, water resistance act between moving surfaces. • Know that mechanisms such as levers, pulleys and gears allow a smaller force to have a greater effect. • Know how air resistance can be changed by investigating parachutes. • Know how water resistance can be changed by investigating the shape of boats. • Know the effects of friction on movement e.g. how it stops or slows moving objects. • Know how scientists such as Galileo and Isaac Newton helped to develop the theory of gravity. 	<p>Gravity Earth air resistance water resistance friction mechanism lever pulley gear force Isaac Newton Galileo</p>



<p>Topic: Amazon Adventure- Living Things and their Habitats</p> <p>Subject: Science</p>	<p>Prior Knowledge/Links: Wind in the Willows- Living Things and Their Habitats (Y1/2) Hunted- Living Things and Their Habitats (Y3/4)</p> <p>Children should already know:</p> <ul style="list-style-type: none"> • living things can be grouped in a variety of ways. • how to use classification keys to help group, identify and name a variety of living things in their local and wider environment. • environments can change and that this can sometimes pose dangers to living things. 		
<p>National Curriculum Objectives</p>	<p>Key Knowledge and Vocabulary</p>		
<p>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Describe the life process of reproduction in some plants and animals.</p>	<ul style="list-style-type: none"> • Know that flowers can be pollinated by wind or by insect. • Know about the process of fertilisation. • Know that the new plants are genetically identical – rather than offspring that share DNA of male and female ‘parents’, these are essentially genetic ‘copies’ of the plant. • Know the advantages and disadvantages of sexual and asexual reproduction in plants. • Know about reproduction in different mammals and the stages of reproduction. • Know about Jane Goodall’s work with chimpanzees in Tanzania. • Know that some animals that undergo metamorphosis. Compare the life cycles of an amphibian and an insect and discuss differences and similarities. • Know the life cycle of birds and name the parts of an egg. 	<p>sexual reproduction asexual reproduction gamete cell pollen ovule fusion fertilisation pollination stigma style ovary filament</p>	<p>penis vagina pregnancy marsupial endangered extinct metamorphosis amphibian/reptile/ bird/mammal/fish larvae pupa albumen yolk</p>



<p>Topic: Higher, Faster, Stronger- Animals, including humans</p> <p>Subject: Science</p>	<p>Prior Knowledge/Links:</p> <p>Animals- Animals, including humans (Y1/2) Robots- Animals, including humans (Y1/2) Fighting Fit- Animals, including humans (Y1/2) Healthy Humans- Animals, including humans (Y3/4) Marvellous Creations- Animals, including humans (Y3/4) Passport to Europe- Animals, including humans (Y3/4)</p> <p>Children should already know:</p> <ul style="list-style-type: none"> • animals, including humans need the right types and amount of nutrition. • humans and some other animals have skeletons and muscles for support, protection and movement. 		
<p>National Curriculum Objectives</p>	<p>Key Knowledge and Vocabulary</p>		
<p>Describe the changes as humans develop to old age.</p> <p>Pupils should draw a timeline to indicate stages in the growth and dev of humans.</p> <p>Research the gestation periods of other animals and compare them with humans.</p> <p>Find out and record the length and mass of a baby as it grows</p>	<ul style="list-style-type: none"> • Know that organisms reproduce sexually or asexually. • Know about the development of a human embryo and foetus. • Know six stages of human development and place correctly on a timeline, describing key changes during each stage. • Know how babies grow in their first year of life – look at data for height and weight. • Know the physical changes that occur during puberty in humans. • Know what menstruation is and have an understanding of the menstrual cycle in humans. • Know the changes to humans in old age. • Know the relationship between the gestation period and life expectancy of animals. 	<p>egg sperm foetus gestation period adolescence infancy adulthood prenatal puberty pubic hair genitals</p>	<p>menstruation period old age life expectancy causal relationship correlation findings discrete data continuous data bar chart line graph</p>



<p>Topic: Survival-Evolution and Inheritance</p> <p>Subject: Science</p>	<p>Prior Knowledge/Links: Rock and Roll- Rocks (Y3/4)</p> <p>Children should already know:</p> <ul style="list-style-type: none"> • how to compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. • how fossils are formed when things that have lived are trapped within rock. • soils are made from rocks and organic matter. 		
<p>National Curriculum Objectives</p>	<p>Key Knowledge and Vocabulary</p>		
<p>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.</p> <p>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.</p> <p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</p>	<ul style="list-style-type: none"> • Know inherited characteristics that are passed on to offspring. Develop understanding of how this leads to variation. Look at characteristics that are learned rather than inherited. • Know the cell structure of living things and the DNA that is the code that provides organisms with the information they need to function in certain ways. • Know that adaptation usually comes about from mutations in the DNA code and how this leads to the development of adaptive traits. • Know about invasive species of plants and animals and the effect they can have on native species. • Know about the theory of evolutionary change and the scientists who proposed it and popularised it. • Know that animals have become extinct e.g., the dodo. • Know that humans have created new varieties of living things through selective breeding. 	<p>inheritance parent offspring characteristics variation adaptation environment habitat DNA Genes adaptive traits mutation replication accidental</p>	<p>theory of evolution fossil record common ancestor apes, mammals homo sapiens family genus species taxonomy human intervention selective breeding modification</p>



<p>Topic: A Ship Called Hope-Light</p> <p>Subject: Science</p>	<p>Prior Knowledge/Links: There's No Place Like Home-Light and Shadows (Y3/4)</p> <p>Children should already know:</p> <ul style="list-style-type: none"> • light is reflected from surfaces. • shadows are formed when the light from a light source is blocked by an opaque object. 	
<p>National Curriculum Objectives</p>	<p>Key Knowledge and Vocabulary</p>	
<p>Recognise that light appears to travel in straight lines.</p> <p>Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.</p> <p>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.</p> <p>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</p>	<ul style="list-style-type: none"> • Know that light is a type of energy and that it comes from light sources. • Know that light waves travel in straight lines. • Know that although light is a wave, it does not need a medium to travel through and that it can travel through space. • Know the science behind how we see with our eyes – light travels from a light source and is reflected off objects, and that it is this reflected light entering our eyes that enables our brain to interpret the images and colour. • Know the basics of how we see colour – that objects 'absorb' certain wavelengths of colour and what we see is the other wavelengths reflected so that we perceive colour. • Know that 'white' light can be separated into the colours of the rainbow and that this 'rainbow effect' can be achieved by shining light through a prism. • Know how mirrors work and to be able to use combinations of mirrors to see around corners or obstacles. • Know how shadows are formed and how an object's shadow can be made to appear larger or smaller. 	<p>light light source wave particle of energy wavelength reflect absorb retina optic nerve lens incident ray reflected ray inverted image visible spectrum prism shadow transparent translucent opaque</p>



<p>Topic: Heroes and Villains- Animals including humans – Exercise, Health & the Circulatory System</p> <p>Subject: Science</p>	<p>Prior Knowledge/Links:</p> <p>Animals- Animals, including humans (Y1/2) Robots- Animals, including humans (Y1/2) Fighting Fit- Animals, including humans (Y1/2) Healthy Humans- Animals, including humans (Y3/4) Marvellous Creations- Animals, including humans (Y3/4) Passport to Europe- Animals, including humans (Y3/4)</p> <p>Children should already know:</p> <ul style="list-style-type: none"> • the simple functions of the basic parts of the digestive system in humans • the different types of teeth in humans and their simple functions • how to construct and interpret a variety of food chains, identifying producers, predators and prey 	
<p>National Curriculum Objectives</p>	<p>Key Knowledge and Vocabulary</p>	
<p>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</p> <p>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.</p> <p>Describe the ways in which nutrients and water are transported within animals, including humans.</p>	<ul style="list-style-type: none"> • Know that the circulatory system consists of the heart, arteries, veins and capillaries, and its function is to pump oxygenated blood around the body. • Know that the circulatory system works together with the respiratory system. Oxygen breathed into the lungs in the respiratory system moves into blood vessels and is then that oxygen-rich blood is circulated around the body. • Know some of the biology of the heart – that deoxygenated blood enters the heart through two veins and the heart pumps that blood through a valve to the lungs. Oxygenated blood flows into the heart through a vein and then the heart pumps that through the aorta (the start of the artery system) to the rest of the body. • Know the function of white and red blood cells. • Know that besides oxygen, your circulatory system also carries nutrients from food around the body. Food is broken down during digestion and as the food moves through the small intestine, the nutrients enter the bloodstream. • Know the effect of diet and exercise on the way the body functions by describing the effects of a healthy lifestyle. • Know how to take accurate pulse measurements. • Know what we mean by the terms ‘chemicals’, ‘substances’, ‘medicine’ and ‘drugs’. • Know the impact of drugs on body functions and the harmful effects that they can have. • Know the work of significant individuals such as Louis Pasteur. 	<p>circulatory system respiratory system digestive system artery vein capillary oxygenated blood deoxygenated blood pump valve aorta nutrient white blood cell red blood cell chemicals substances medicine drugs controlled substance alcohol</p>



<p>Topic: Super Sleuth-Living Things and Their Habitats</p> <p>Subject: Science</p>	<p>Prior Knowledge/Links: Wind in the Willows- Living Things and Their Habitats (Y1/2) Hunted- Living Things and Their Habitats (Y3/4)</p> <p>Children should already know:</p> <ul style="list-style-type: none"> • living things can be grouped in a variety of ways. • how to use classification keys to help group, identify and name a variety of living things in their local and wider environment. • environments can change and that this can sometimes pose dangers to living things. 		
<p>National Curriculum Objectives</p>	<p>Key Knowledge and Vocabulary</p>		
<p>Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals</p> <p>Give reasons for classifying plants and animals based on specific characteristics.</p>	<ul style="list-style-type: none"> • Know how living things are classified into broad groups according to common observable characteristics • Know the reasons for classifying plants and animals based on specific characteristics. • Know that living things can be grouped into micro-organisms, plants and animals. • Know about the work of Carl Linnaeus and his taxonomic system • Know that vertebrates can be grouped as fish, amphibians, reptiles, birds and mammals. • Know that invertebrates' groupings include insects, arachnids, crustaceans, molluscs, and annelids. • Know that plants can be grouped as flowering plants (incl. trees and grasses) and non-flowering plants (such as ferns and mosses). • Know that micro-organisms can be helpful or harmful. 	<p>classify sort group Linnaean system of classification taxonomy taxonomic rank order family genus species vertebrates invertebrates fish amphibians reptiles</p>	<p>birds mammals insects arachnids crustaceans molluscs annelids flowering plants ferns mosses micro-organisms bacteria fungi virus</p>



<p>Topic: Oh I Do Like to be Beside the Seaside- Electricity</p> <p>Subject: Science</p>	<p>Prior Knowledge/Links: Sparks Might Fly-Electricity (Y3/4)</p> <p>Children should already know:</p> <ul style="list-style-type: none"> • common appliances that run on electricity. • how to construct a simple series circuit, identifying and naming its basic parts – cells, wires, bulbs, switches, buzzers. • whether 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. • that a switch open and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. • some common conductors and insulators and associate metals with being good conductors. 	
<p>National Curriculum Objectives</p>	<p>Key Knowledge and Vocabulary</p>	
<p>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.</p> <p>Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.</p> <p>Use recognised symbols when representing a simple circuit in a diagram.</p>	<ul style="list-style-type: none"> • Know the importance of the major discoveries in electricity, in the history of science. • Know the recognised symbols when representing a simple circuit in a diagram. • Know that the brightness of a lamp or the volume of a buzzer is associated with the number and voltage of cells used in the circuit. • Know the reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. • Know how to interpret circuit diagrams to construct a variety of more complex circuits predicting whether they will work. • Know how to construct a circuit that will solve a set challenge or a series of challenges and draw that circuit as an accompanying diagram. 	<p>electrical electrical systems electricity components circuits circuit diagrams buzzer cell bulb switch motor series parallel safety symbols</p>