


THRUSSINGTON SCIENCE KNOWLEDGE PROGRESSION YEAR A

Class 1 Year A		
Term	NC objectives	Knowledge
1	<p>Animals Including Humans (Y1) Sc1/2.2d identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</p>	<p>Big ideas B2, B3 Know that feet, legs, arms, hands, torso, head, skin, ears, eyes, nose, mouth and tongue are part so the body and identify them Know that eyes are associated with sight, ears with sound, nose with smell, tongue with taste and skin with touch.</p>
2	<p>Seasonal Changes (Y1): Autumn Sc1/4.1a observe changes across the 4 seasons Sc1/4.1b observe and describe weather associated with the seasons and how day length varies.</p>	<p>Big Ideas E2 <u>New learning and vocabulary</u> energy, freezing, melting, orbit, reflection, Sun, clouds, wind, snow, ice, spring, summer, autumn, winter 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 that the Earth orbits the Sun with one orbit constituting a year of 365/366 days</p>
3	<p>Seasonal Changes: Winter</p>	<p>(NB: the Sun and the Earth are capitalised when being discussed in an astronomical context.)</p>
4	<p>Everyday Materials (Y1) Sc1/3.1a distinguish between an object and the material from which it is made Sc1/3.1b identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock Sc1/3.1c describe the simple physical properties of a variety of everyday materials Sc1/3.1d compare and group together a variety of everyday materials on the</p>	<p>Big Ideas C1, C2 <u>New learning and vocabulary</u> absorption, matter, property, wood, plastic, glass, metal, water, rock 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 Know that matter (stuff) is made from tiny building blocks</p>

THRUSSINGTON SCIENCE KNOWLEDGE PROGRESSION YEAR A

	<p>basis of their simple physical properties</p>	
<p>5</p>	<p>Animals (Y1) Sc1/2.2a identify and name a variety of common animals including, fish, amphibians, reptiles, birds and mammals Sc1/2.2b identify and name a variety of common animals that are carnivores, herbivores and omnivores Sc1/2.2c describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets)</p>	<p><u>Big Idea</u> B2, B3 <u>New learning and vocabulary</u> energy, growth, habitat, fish, amphibian, reptile, bird, mammal, offspring, carnivore, herbivore, omnivore, vertebrate, skeleton, organ</p> <p>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 and a human are examples of a mammal Know that herbivorous animals eats plants; a carnivorous animal eats other animals; omnivorous animals eat both animals and plants Know that a cat 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 and organs; 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</p>
<p>6</p>	<p>Living Things and their Habitats (Y2) Sc2/2.1a explore and compare the differences between things that are living, dead, and things that have never been alive Sc2/2.1b identify that most living things live in habitats to which they are suited and describe how different habitats provide for the</p>	<p><u>Big idea(s):</u> B1, B3</p> <p><u>Revision</u> habitat, growth, absorption, deciduous, evergreen, flower, plant, tree, structure, roots, stem, leaf, trunk, flower, herbivore, carnivore, omnivore</p> <p>Dandelions, rose bushes, grass, ash trees, birch trees and conifers trees are examples of plants. Trees can be deciduous or evergreen. 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 and a human are examples of a mammal Herbivorous animals eats plants; a carnivorous animal eats other animals; omnivorous animals eat both animals and plants</p>

THRUSSINGTON SCIENCE KNOWLEDGE PROGRESSION YEAR A

	<p>basic needs of different kinds of animals and plants, and how they depend on each other</p> <p>Sc2/2.1c identify and name a variety of plants and animals in their habitats, including microhabitats</p> <p>Sc2/2.1d describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.</p>	<p><u>New learning and vocabulary</u> birth, decay, energy, microhabitat, dead, life cycle, food chain, source, nutrients, reproduction, consumption, environment</p> <p>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.</p> <p>Know that polar bears are an example of an animal adapted to its environment – thick fur for warmth and oily paw pads to ensure that they don't freeze to the ice.</p> <p>Know that sharks are another example – smooth skin and streamlined shape for quick swimming; and gills for breathing underwater</p> <p>Know that cacti are an example of a plant adapted to its environment – thick skin keeps a store of water safe; sharp spikes keep animals from stealing the water</p> <p>Know that pine trees have thick bark and pine cones to protect against cold winters</p> <p>Know that woodlice live under logs – an example of a microhabitat - as they need somewhere dark and damp so that they do not dry out</p> <p>Know that frogs can live in ponds – an example of a microhabitat - as they water in which to lay their eggs (frogspawn)</p> <p>Know that plants absorb energy from the Sun; that this energy is consumed by herbivorous animals; and that carnivorous animals eat other animals.</p> <p>Know that the arrows on a food chain show the direction that the energy travels.</p>
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THRUSSINGTON SCIENCE KNOWLEDGE PROGRESSION YEAR A

Class 2 - Year A		
Term	NC objectives	Knowledge
1	<p>Forces</p> <p>Sc3/4.2a compare how things move on different surfaces</p> <p>Sc3/4.2b notice that some forces need contact between 2 objects, but magnetic forces can act at a distance</p> <p>Sc3/4.2c observe how magnets attract or repel each other and attract some materials and not others</p> <p>Sc3/4.2d compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials</p> <p>Sc3/4.2e describe magnets as having 2 poles</p> <p>Sc3/4.2f predict whether 2 magnets will attract or repel each other, depending on which poles are facing.</p>	<p><u>Big idea(s):</u> P2</p> <p><u>Revision</u> energy, matter, property, wave, metal, material, surface, friction, force, stretch, squash, rough, smooth</p> <p>Metal is a material from which objects can be made. As objects move across a surface there is friction when they rub against each other and that sometimes this friction is larger or smaller. Applying forces to objects can change their shape. Know that the roughness of a material is an example of a property</p> <p><u>New learning and vocabulary</u> magnetic, non-magnetic, pole, north, south, sliding friction, static friction, elastic, resist, attraction, repulsion</p> <p>Know that a force can be thought of as a push or a pull Know that there are three types of contact force: impact forces (when two surfaces collide), frictional forces (when two surfaces are already in contact) and strain forces (when an elastic material is stretched or squashed). 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 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 Know that magnets have two poles called north and south 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 Know that there is a magnetic field around a magnet which is strongest at each pole Know that some materials are magnetic, meaning that they are attracted to a magnet, while other materials are non-magnetic</p>

THRUSSINGTON SCIENCE KNOWLEDGE PROGRESSION YEAR A

2	Living things and their habitats	<p><u>Big idea(s):</u> B2, B3</p> <p><u>Revision</u> decay, energy, habitat, freezing plant, structure, herbivore, carnivore, omnivore, microhabitat, environment, reproduction, vertebrate</p> <p>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. Polar bears are an example of an animal adapted to its environment – thick fur for warmth and oily paw pads to ensure that they don't freeze to the ice. 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 and a human are examples of a mammal Herbivorous animals eats plants; a carnivorous animal eats other animals; omnivorous animals eat both animals and plants A cat 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) Fish, amphibians, reptiles, birds and mammals are similar in that they have internal skeletons and organs; these are known as vertebrates, which means they are animals that have a backbone Fish are different in having gills so that they can breathe underwater and have scaly skin Amphibians are different in that they begin their lives with gills but then develop lungs and breath on land Reptiles are different in that they breath air and have scaly skin Birds are different to other animals in that they have feathers and wings Mammals are different to other animals in that they have fur/hair and they feed milk to their young Know a rose bush, grass, dandelion by sight Know an ash tree, birch tree and conifer tree by sight</p> <p><u>New learning and vocabulary</u> kingdom, classification key, species, fungi, bacteria, climate change, characteristics, offspring, extinction, pollution</p> <p>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</p>
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THRUSINGTON SCIENCE KNOWLEDGE PROGRESSION YEAR A

	<ul style="list-style-type: none"> Sc4/3.1c identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 	<p>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</p> <p>Revision States of matter 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>
3	<p>Sc3/3.1a compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</p> <p>Sc3/3.1c recognise that soils are made from rocks and organic matter.</p>	<p><u>Big idea(s):</u> C1, C2, C3, E3</p> <p><u>Revision</u> decay, matter, melting, material, Rock is a type of solid material.</p> <p><u>New learning and vocabulary</u> extinction, igneous, metamorphic, sedimentary, paleontologist, weathering, molten rock, crust, tectonic plates, scavengers, fossil</p> <p>Know that there are three kinds of rocks: igneous, sedimentary and metamorphic</p> <p>Know that the Earth has a solid crust made up of tectonic plates with molten rock beneath</p> <p>Know that granite and basalt are types of igneous rock and that igneous rocks form from molten rock below the Earth's crust</p>

THRUSSINGTON SCIENCE KNOWLEDGE PROGRESSION YEAR A

		<p>Know that limestone and sandstone are types of sedimentary rock which form when small, weathered fragments of rock or shell settle and stick together, often in layers</p> <p>Know that marble and slate are 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>Know that soil is made from tiny particles of rock broken down by the action of weather (weathering)</p>
4	<p>Living Things</p> <ul style="list-style-type: none"> Sc4/2.1c recognise that environments can change and that this can sometimes pose dangers to living things. <p>Rocks</p> <ul style="list-style-type: none"> Sc3/3.1b describe in simple terms how fossils are formed when things that have lived are trapped within rock 	<p>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</p> <p>Know that human activity – such as climate change caused by pollution - can change the environment for many living things, endangering their existence</p> <p>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>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</p>
5	<p>Sc4/2.2a describe the simple functions of the basic parts of the digestive system in humans</p> <p>Sc4/2.2b identify the different types of teeth in humans and their simple functions</p> <p>Sc4/2.2c construct and interpret a variety of food chains, identifying</p>	<p><u>Big idea(s):</u> B3</p> <p><u>Revision</u> absorption, component, energy, nutrients, consumption, hygiene, herbivore, carnivore, organ</p> <p>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) A food group can cause ill health, such as tooth decay due to excess sugar Living things move, grow, consume nutrients and reproduce Plants absorb energy from the Sun; that this energy is consumed by herbivorous animals; and that carnivorous animals eat other animals.</p> <p><u>New learning and vocabulary</u></p>

THRUSSINGTON SCIENCE KNOWLEDGE PROGRESSION YEAR A

	<p>producers, predators and prey.</p>	<p>dissolving, 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>Know that food passes through the body with the nutrients being extracted and the waste products excreted, and that this process is called digestion</p> <p>Know that the process of digestion involves breaking complex foodstuffs into simpler building blocks that can be absorbed by the body</p> <p>Know that the process of digestion begins with food being chewed in the mouth by the teeth and saliva added</p> <p>Know that a human has three types of teeth – incisors, canines and molars – and that these each perform different functions</p> <p>Know that incisors slice food, canines tear food (especially meat) and that molars grind food</p> <p>Know that children develop an initial set of teeth which are gradually replaced between the ages of 6 and 12</p> <p>Know that food is squeezed down the esophagus towards the stomach in a wave-like action called peristalsis</p> <p>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</p> <p>Know that further enzymes and bile break down the food further as it moves through the duodenum towards the small intestine</p> <p>Know that the small intestine adds more enzymes and then absorbs the nutrients</p> <p>Know that the large intestine absorbs water from the undigested food</p> <p>Know that undigested food is stored in the rectum before being excreted through a muscle called the anus</p> <p>Know that a food chain traces the path of energy through a habitat</p> <p>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</p> <p>Know that consumers take in energy by eating</p> <p>Know that an animal that is eaten by another is called prey, and that an animal that eats other animals is called a predator</p> <p>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</p> <p>Know that the arrows in a food chain show the direction that energy is travelling through a habitat</p>
6	<p>Sc3/2.1a identify and describe the functions of different parts of flowering</p>	<p><u>Big idea(s):</u> B1, B2, B3</p> <p><u>Revision</u></p>

THRUSSINGTON SCIENCE KNOWLEDGE PROGRESSION YEAR A

<p>plants: roots, stem/trunk, leaves and flowers</p> <p>Sc3/2.1b explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant</p> <p>Sc3/2.1c investigate the way in which water is transported within plants</p> <p>Sc3/2.1d explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</p>	<p>component, energy, growth, habitat, reproduction, decay, offspring, adult, bulb, seed, survival, temperature, deciduous, evergreen, flower, plant, tree, structure, roots, stem, leaf, trunk, flower,</p> <p>Evergreen trees maintain their leaves throughout the year and that deciduous trees shed their leaves in autumn</p> <p>Flowering plants consist of roots, stem, leaves and flowers, and that a tree's stem is called a trunk</p> <p>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.</p> <p>Plants absorb energy from the Sun; that this energy is consumed by herbivorous animals; and that carnivorous animals eat other animals.</p> <p>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>The arrows on a food chain show the direction that the energy travels.</p> <p>Plants that are deprived of light, food or air will not grow and will die.</p> <p><u>New learning and vocabulary</u></p> <p>extinction, fruit, nectar, anther, ovary, ovule, petal, pollen, stigma, style, stamen, function, exchange, dispersal, fertilization,</p> <p>Know that different parts of plants have one or more functions (jobs)</p> <p>Know that the roots collect water and minerals from the soil, and hold the plant firmly in the ground</p> <p>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</p>
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THRUSSINGTON SCIENCE KNOWLEDGE PROGRESSION YEAR A

	<p>Know that the leaves make food by trapping light and using its energy to turn carbon dioxide and water into carbohydrates</p> <p>Know that the function of a flower is reproduction, where flowers of the same kind exchange pollen – made by an anther – in a process called fertilisation, and a structure in the flower's ovary called an ovule becomes a seed; the ovary then becomes a fruit which helps the seed leave the plant in a process called dispersal</p>
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Class 3 - Year A		
Term	NC objectives	Knowledge
1	<p>Forces (Y5) Sc5/4.2a explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</p> <p>Sc5/4.2b identify the effects of air resistance, water resistance and friction, that act between moving surfaces</p> <p>Sc5/4.2c recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect</p>	<p><u>Big idea(s):</u> P1, P2</p> <p><u>Revision</u> energy, matter, particle, surface, friction, force, stretch, squash, rotation, rough, smooth, sliding friction, static friction</p> <p>A force can be thought of as a push or a pull As objects move across a surface there is friction when they rub against each other and that sometimes this friction is larger or smaller. Applying forces to objects can change their shape. Know that the roughness of a material is an example of a property There are three types of contact force: impact forces (when two surfaces collide), frictional forces (when two surfaces are already in contact) and strain forces (when an elastic material is stretched or squashed). Objects move differently on rough and smooth surfaces; objects resist movement more on rough surfaces because there is higher friction as the object moves</p> <p><u>New learning and vocabulary</u> acceleration, air resistance, buoyancy, effort, force meter, fulcrum, gravity, load, mass, mesh, Newton, pivot, rigid, streamlined, terminal velocity, unsupported, water resistance, weight</p>

THRUSSINGTON SCIENCE KNOWLEDGE PROGRESSION YEAR A

		<p>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</p> <p>Know that pull forces can be measured using a device called a force meter</p> <p>Know that the amount of matter (stuff) in an object is its mass</p> <p>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</p> <p>Know that unsupported objects are pulled towards the Earth by the force of gravity</p> <p>Know that acceleration is a change in speed and that unbalanced forces acting on an object cause it to accelerate</p> <p>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</p> <p>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</p> <p>Know that a parachute's shape increases the air resistance that a falling object experiences, giving it a much lower terminal velocity</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>
2	<p>Earth and Space (Y5)</p> <p>Sc5/4.1a describe the movement of the Earth, and other planets, relative to the Sun in the solar system</p> <p>Sc5/4.1b describe the movement of the Moon relative to the Earth</p> <p>Sc5/4.1c describe the Sun, Earth and Moon as approximately spherical bodies</p>	<p><u>Big Ideas E1, E2</u></p> <p><u>Revision</u></p> <p>absorption, energy, freezing, melting, orbit, reflection, wave, Sun, spring, summer, autumn, winter</p> <p>Days are longer in the summer and shorter in winter</p> <p>Weather changes through the year, getting hotter in the summer and colder in the winter</p> <p>Earth orbits the Sun with one orbit constituting a year of 365/366 days</p> <p>Light is a form of energy</p> <p>We need light to see things and that darkness is the absence of light</p> <p>Light travels in straight lines</p> <p>Everything that we can see is either a light source or something that is reflecting light from a light source into our eyes</p>

THRUSSINGTON SCIENCE KNOWLEDGE PROGRESSION YEAR A

Sc5/4.1d use the idea of the Earth's rotation to explain day and night, and the apparent movement of the Sun across the sky.

The Sun is a light source, but that the Moon is not and is merely reflecting light from the Sun

Many light sources give off light and heat

The Sun gives off light and heat when hydrogen turns into helium

(NB: the Sun and the Earth are capitalized when being discussed in an astronomical context.)

New learning and vocabulary

planet, satellite, sphere, solar system, eclipse, star, universe, constellation, axis, celestial body, Moon, rotating, lunar, solar, telescope, rotation

Know that the universe comprises all matter and space in existence

Know that a celestial body is a large object in the universe

Know that a star is an exceptionally hot ball of gas, originally made from hydrogen and helium

Know that the Sun is a star

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

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

Know that there are eight major planets in our solar system: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune

Know that the universe is utterly vast and that our solar system makes up a tiny fraction of the universe

Know that a satellite orbits a planet and that moons are natural satellites

Know that the Moon orbits the Earth roughly every 28 days

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

Know that humans have sent man-made satellites into orbit that assist with telecommunication

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

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

Know that night and day are the result of the Earth rotating on its axis

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

THRUSSINGTON SCIENCE KNOWLEDGE PROGRESSION YEAR A

		<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>3</p>	<p>Electricity (Y6) Sc6/4.2a 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>Sc6/4.2b 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>Sc6/4.2c use recognised symbols when representing a simple circuit in a diagram.</p>	<p><u>Big idea(s):</u> P1, P3</p> <p><u>Revision</u> 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</p> <p>An object is made from/of a material Metal is a material from which objects can be made. Matter (stuff) is made from tiny building blocks Electrical energy is a form of energy Energy comes in different forms and can be neither created nor destroyed, only changed from one form to another Static electricity is an imbalance of charged particles on a material; it does <u>not</u> operate by flowing around a complete circuit Current electricity is the flow of charged particles called electrons around a circuit Electrical current flows well through some materials, called electrical conductors, and poorly through other materials, called electrical insulators Conductors have free electrons, and when electrical current flows through a conductor, the electrons move like people in a queue Electrical conductivity (how well a material conducts electricity) is an example of a property Metals are good electrical conductors A chemical reaction inside a cell produces the charged particles that can flow around a circuit More than one cell lined up to work together is called a battery Electrical current can flow if there is a complete circuit Wires – which contain a conductor inside them, usually made of metal – can allow electrical current to flow around a circuit When electrical current flows through a circuit components within that circuit – such as buzzers which make a noise and bulbs which emit light – begin to work A switch functions by completing or breaking a complete circuit A simple circuit can be constructed using components Exposure to high levels of electrical current can be dangerous</p>

THRUSSINGTON SCIENCE KNOWLEDGE PROGRESSION YEAR A

		<p><u>New learning and vocabulary</u> series circuit, parallel circuit, resistance, voltage</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</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>
4	<p>Forces (Y5 cont.) Sc5/4.2b identify the effects of air resistance, water resistance and friction, that act between moving surfaces</p>	<p>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</p> <p>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</p> <p>Know how to draw a force diagram with arrows representing the different forces acting on an object</p>
5	<p>Animals incl Humans (Y5) Sc5/2.2a describe the changes as humans develop to old age.</p>	
6	<p>Animals incl Humans (Y6)</p> <p>Sc6/2.2a identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood</p> <p>Sc6/2.2b recognise the impact of diet, exercise,</p>	<p><u>Big idea(s): B1</u></p> <p><u>Revision</u> component, energy, growth, survival, nutrients, consumption, skeleton, ribcage, protein, carbohydrate, fat, digestion, skeleton, organ</p> <p>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.</p> <p>Animals, including humans, need food, water and air to survive</p> <p>People need to exercise often to help their body stay strong and fit</p>

THRUSSINGTON SCIENCE KNOWLEDGE PROGRESSION YEAR A

drugs and lifestyle on the way their bodies function

Sc6/2.2c describe the ways in which nutrients and water are transported within animals, including humans.

Keeping clean, including washing and brushing teeth, is an important part of staying healthy

There are food groups: fruit and vegetables, carbohydrates, protein, dairy, fat and sugary foods

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)

More than half of our diet should be made up of carbohydrates, fruit and vegetables

Fats and sugary foods should be eaten rarely and in small amounts

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

A lack of a nutrient can cause ill health; for example, a lack of vitamin D leads to a disease called rickets

Know that excess of a food group can cause ill health, such as tooth decay due to excess sugar

NB – some food groups are difficult to afford for some families so sensitivity is required in teaching this area

Food passes through the body with the nutrients being extracted and the waste products excreted, and that this process is called digestion

The process of digestion involves breaking complex foodstuffs into simpler building blocks that can be absorbed by the body

New learning and vocabulary

artery, aorta, atrium, blood vessels capillary, circulatory system, vein, pulse, ventricle, replenished, resting heart rate, body

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

THRUSINGTON SCIENCE KNOWLEDGE PROGRESSION YEAR A

	<p>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>NB – note that discussion of drugs needs sensitive teaching due to family circumstances</p>
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This Curriculum was developed using Chris Such's Curriculum mapping ideas.

THE BIG IDEAS OF SCIENCE

Physics

P1: The universe follows unbreakable rules that are all about forces, matter and energy.

P2: Forces are different kinds of pushes and pulls that act on all the matter that is in the universe. Matter is all the stuff, or mass, in the universe.

P3: Energy, which cannot be created or destroyed, comes in many different forms and tends to move away from objects that have lots of it.

Chemistry

C1: All matter (stuff) in the universe is made up of tiny building blocks.

C2: The arrangement, movement and type of the building blocks of matter and the forces that hold them together or push them apart explain all the properties of matter (e.g. hot/cold, soft/hard, light/heavy, etc).

C3: Matter can change if the arrangement of these building blocks changes.

Biology

B1: Living things are special collections of matter that make copies of themselves, use energy and grow.

B2: Living things on Earth come in a huge variety of different forms that are all related because they all came from the same starting point 4.5 billion years ago.

B3: The different kinds of life, animals, plants and microorganisms, have evolved over millions of generations into different forms in order to survive in the environments in which they live.

Earth science

E1: The Earth is one of eight planets that orbit the sun.

E2: The Earth is tilted and spins on its axis leading to day and night, the seasons and the climate.

THRUSSINGTON SCIENCE KNOWLEDGE PROGRESSION YEAR A

E3: The Earth is made up of several layers, including a relatively thin rocky surface which is divided into tectonic plates, and the movement of these plates leads to many geologic events (such as earthquakes and volcanoes) and geographical features (such as mountains.)

Along with the 'big ideas' of science, it can be worthwhile to consider 'big ideas' about science¹. The former underpin the substantive knowledge of primary science; the latter underpin the disciplinary knowledge:

Big ideas about science

D1: Science seeks to explain things that we see in the natural world by attempting to understand their causes.

D2: Scientific theories are explanations of what we see in the natural world that best fit with evidence that has been gathered. Because of this, theories can be changed when new evidence is found.

D3: The knowledge produced by science leads to new technology that humans find useful. These technologies don't always necessarily make the world better so we have to think carefully about how – and whether – we use them.

The disciplinary knowledge of science is supported by the 'working scientifically' statements of the national curriculum that relate to the scientific enquiries that children should undertake in primary science.

Repeating key concepts

Also contained within this science curriculum document are 26 key concepts that repeat in different topics across the curriculum: **absorption, birth, bond, circuit, component, condensation, conductor, decay, dissolving, energy, evaporation, extinction, freezing, growth, habitat, insulator, irreversible, matter, melting, orbit, particle, property, reflection, reproduction, reversible, wave**. All of the vocabulary that children learn is important for their understanding of science. However, an understanding of these key concepts is essential and provides uniquely powerful opportunities to assess children's grasp of the knowledge contained within the curriculum.

¹ Harlen, Wynne, ed. *Principles and big ideas of science education*. Association for Science Education, 2010.

THRUSSINGTON SCIENCE KNOWLEDGE PROGRESSION YEAR A