Thursfield Primary School	
Substantive Knowledge	The Curriculum

Biology; Plants			
EYFS	Y1 and Y2	Y3 and Y4	Y5 and Y6
• There are lots of different plants and flowers • Some trees lose their leaves in autumn • Flowers have roots, a stem, flowers and leaves • Plants need water and sunlight to grow	• There is a variety of common wild and garden plants. • Trees can be deciduous and evergreen. • Common flowering plants, including trees have a basic structure consisting of root, stem, leaves and flower • Observe and describe how seeds and bulbs grow into mature plants. • With the required conditions seeds germinate, grow into seedlings, grow roots and then into a fully grown plant. • Under the required conditions bulbs grow roots, germinate a shoot and then grow into a fully grown plant. Bulbs will repeat this process each year around the same time. • Plants need water, light and a suitable temperature to grow and stay healthy.	• Roots anchor the plants to the ground and absorb the nutrients. • Bright flowers attract insects the plants to encourage pollination. • Leaves absorb the sunlight which allows the plant to make its food. • The stem transports water and nutrients up from the roots all the way to the leaves. • The stem transports sugars from the leaves to the rest of the plant. • For a plant to survive it needs air, light, water, nutrients from the soil and room to grow. • The amount of these required varies from plant to plant. • Flowers are made up of male and female parts. • The male parts of the plant includes the stamen which is made up of the anther and filament. • The female part of the plant is known as the pistil. This include the stigma, style, ovary and ovule. • Bright petals attract animals and insects to pollinate the plants. • Once the plant is pollinated the seed forms in the ovary of the plant. • When the seed is developed they are spread in different ways either through animal consumption or seed dispersal.	None

Biology; Animals, Including Humans			
EYFS	Y1 and Y2	Y3 and Y4	Y5 and Y6
• Different types of animals live in different places • Not all animals can be found in our country • Some animals are nocturnal and sleep all day. Some animals are diurnal and sleep at night • Some animals hibernate during winter • We need to keep our bodies healthy by eating good food, exercising and brushing our teeth • Humans have babies which grow into toddlers, children, teenagers and adults. • We change a lot from being a baby and learn how to do lots of new things	• Fish, amphibians, reptiles, birds and mammals are varieties of common animals. • Carnivores, herbivores and omnivores are types of common animals. • There are different groups of animals. These groups are fish, amphibians, reptiles, birds and mammals, including pets. • The human body has a head, legs, arms, a body. • The human face has hair, eyes, a nose, ears, a chin and a forehead. • There are five senses including smell, sight, sound, touch and taste. • Animals, including humans, have offspring which grow into adults. • The basic needs for human survival are: Food, water, shelter and air. • The food groups are: Carbohydrates, Proteins, Dairy, Fruits and Vegetable, Sugars and Fats. • We should be active/ exercising for at least one hour every day to keep our muscles, heart and bones healthy and strong. • Good hand, personal and dental hygiene keeps our bodies healthy and helps to stop the spread of bacteria and viruses.	• Animals and humans get their nutrition from their food- they do not make their own food. • Animals and humans need to eat a balanced diet to get the right types of nutrition. • Humans need to eat a combination of protein carbohydrates, dairy, fruits and vegetables and fats and sugars. • Different animals have varying diets. This depends on their habitats. • For a human to remain healthy they need to eat appropriate amounts of each food group i.e. do not consume too much fat and sugar. • Humans and some animals have skeletons. • Muscles and tendons work together with the skeleton to support movement. • Tendons connect the muscle to the bones. • Muscles often work in pairs. • When one muscle contracts the opposite muscle relaxes. • Some muscles move involuntarily i.e. heart.	• The main parts of the human circulatory system are the heart, blood vessels, (arteries, veins capillaries) and blood. • The heart pumps blood around the body. • Blood is made up of 4 different cells, white blood cells, red blood cells, plasma and platelets. • Blood carries water, gasses and nutrients. • Arteries carry blood away from the heart. • Veins carry blood towards the heart. • Capillaries are tiny blood vessels that allow the exchange of nutrients and gasses from the blood into the body and vice versa. • Diet, exercise, drugs and lifestyle affect the performance of the heart.

Biology; Living Things and their Habitats			
EYFS	Y1 and Y2	Y3 and Y4	Y5 and Y6
• Animals live in different homes called habitats • Some animals live in hot habitats, some in cold. Different animals live in different habitats and they are suited to those places (for example, a polar bear has thick skin and lots of fur to keep it warm) • Some animals only eat plants, they are call herbivores • Some animals only eat meat, they are call carnivores • A life cycle is how an animal or insect grows (egg, caterpillar, chrysalis, butterfly), (egg, tadpole, frog)	• Living things move, respire, are sensitive, grow, reproduce, excrete and take in nutrients. • Dead things are not living, but were once alive. • Some things have never lived. • Living things live in habitats to which they are suited. • Animals can be classified as herbivores (eat plants), carnivores (eat meat) and omnivores (eat plants and meat) • Different habitats provide for the basic needs of different kinds of animals and plants. • The animals and plants that share the same habitat depend on one another to survive. • A micro habitat is a small habitat that exists within a larger habitat. • Animals obtain their food from plants and other animals; this is called a food chain.	• Living things can be grouped in many ways. E.g. Vertebrates- have a back bone. Invertebrates- have no back bone. Lay eggs/don't lay eggs. • Mammals are covered in hair or fur, give birth to live young, feed on mother's milk and are warm blooded. • Reptiles- have scales, skin is dry, usually lay eggs and cold blooded. • Amphibians- lay eggs in water, start life in water and can live on land as adults, webbed feet, moist skin and cold blooded. • Birds- have feathers and wings, have beaks or bills, lay eggs and are warm blooded. • Fish- breathe underwater with gills, have scales and fins, lay eggs and are cold blooded. • Flowering plants- most flowers produce seeds. • Non- flowering plants-reproduce by releasing spores or cones. • Classification keys can be used to find the name of a variety of living things. • Environments can change and that this can sometimes pose dangers to living things. • All living things depend on the environment to provide them with the essentials of life - light, water, nutrients, air and space to grow and move. Changes that affect these resources such as droughts and floods, rising temperatures or deforestation	• Life cycle of a bird – egg – chick – adult • Life cycle of an amphibian (frog)– egg – tadpole –froglet – adult • Life cycle of an mammal – Birth – Juvenile – Adult – mating stage • Life cycle of an insect – egg – larva – pupa – adult • Life cycle of a plant – seed – germination – growth – reproduction – pollination – seed spreading stages • Living things including micro-organisms, plants and animals, are classified into broad groups according to common observable characteristics and based on similarities and differences. • Plants and animals can be classified based on specific characteristics

		also affect the living things that rely on them. • Food chains are constructed to show the feeding relationships between living things in a certain habitat.	

Biology; Evolution and Inheritance			
EYFS	Y1 and Y2	Y3 and Y4	Y5 and Y6
• As we grow up we are able to do more things • I have changed from being a baby, I can do a lot more things than I could when I was a baby	None	None	• Living things have evolved or changed overtime. • Fossils provide information about living things that inhabited the Earth millions of years ago. • Living things produce offspring of the same kind. • Normally offspring vary and are not identical to their parents. • Animals and plants are adapted to suit their environment in different ways. • Adaptation may lead to evolution.

Chemistry: Materials/ States of Matter/ Rocks			
EYFS	Y1 and Y2	Y3 and Y4	Y5 and Y6
• Objects are made from different materials • Different materials are better suited for different purposes (using a wooden brick for a bridge and not a piece of fabric) • Some materials are waterproof and won't get damaged if they get wet • Water can be changed to ice when it gets very cold, or to steam when it gets very hot • Some liquids and solids can be frozen or melted	• Objects are made from different everyday materials, such as wood, metal, plastic, glass, water and rock • Materials have different physical properties (waterproof, hard, soft, flexible, transparent, rough, smooth, stretchy, opaque, strong) • Materials can be sorted and grouped based on their properties such as their texture, appearance, their uses, size and flexibility. • Materials can be changed by physical force (twisting, squashing, bending & stretching) • Certain materials are suitable for different things • Materials can be tested to determine their suitability	• Materials can be grouped into solids, liquids and gases • Solids have a fixed shape and volume. Particles are closely packed and are rigid. • Liquids do not hold their shape it takes the shape of its container. • Gases have no fixed shape and no volume. All gases escape. • When heated materials can change state e.g. melting, cooking, burning. • When cooled materials can change state e.g. freezing, setting. • Evaporation is when liquid turns into a gas. • Condensation changes from a gas to a liquid. • The water cycle describes how water evaporates from the surface of the earth, rises into the atmosphere, cools and condenses into rain, hail, sleet or snow and falls to the surface as precipitation. • Rocks have different properties dependent on the type of rock. • There are three types of rock. Sedimentary, igneous and metamorphic. • Sedimentary rocks are formed when layers of sediment become compacted over years and form a rock. Examples of sedimentary rocks include sandstone and chalk.	• Materials can be grouped according to their properties including hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. • Some materials will dissolve in liquid to form a solution • A substance can be recovered from a solution by evaporation • Mixtures can be separated, through filtering, sieving and evaporating. • Solids have a fixed shape and fixed volume, which means they don't move to fill a container when they're placed in it. They hold their own shape and volume • Liquids are a material whose particles have gaps between them and moderate energy. • A liquid takes the shape of the container it is in; it will flow but can be contained relatively easily • A gas is a substance made up of high energy particles that are constantly moving rapidly. The particles are not in a fixed structure and are not close together either – they are spaced out and always moving. • Gases have no fixed shape. They can flow, take the shape of a container and even be squashed too. • Materials, including metals, wood and plastic have different uses depending on their properties.

		• Igneous rocks are formed when magma cools. Examples of igneous rock include basalt and granite. • Metamorphic rocks are formed when rocks are changed due to heat or pressure. Examples of metamorphic rocks include slate and marble. • Fossils are formed when things that have lived are trapped within rock. • After an animal dies, the soft parts of its body decompose leaving the hard parts, like the skeleton, behind. • This becomes buried by small particles of rock called sediment. • As more layers of sediment build up on top, the sediment around the skeleton begins to compact and turn to rock. • Fossils are not animal bones. They are the cast of the bones that have formed through this process. • Soil is a mixture of tiny particles of rock, dead plants and animals, air and water.	•Dissolving, mixing and changes of state are reversible changes. • Some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.

Physics: Energy (Light/Sound)			
EYFS	Y1 and Y2	Y3 and Y4	Y5 and Y6
• Some sounds can be loud and some can be quiet • We can make different sounds using different instruments • We use our eyes to see and our ears to hear • The sun provides us with light during the day. We can use lightbulbs, torches or candles to see at night • We can see our shadows on the ground when our bodies block the sunlight	None	• Sounds are made when objects vibrate. • The vibration makes the air around the object vibrate and the air vibrations enter your ear. • The source of sound vibrates, this results in sound vibrations travelling through the air to the eardrum. • Smaller, shorter, thinner, tighter and denser objects make more high -pitched sounds • Low pitched sounds are made by slow vibrations. • Larger, longer, thicker, looser and less-dense objects make more low-pitched sounds. • Large sound waves equal loud sound. • Small sound waves equal quiet sound. • Sounds get fainter as the distance from the sound source increases. • We need light in order to see things. • Dark is the absence of light. • Light is reflected from surfaces. • Light from the sun can be dangerous. • Ways people can protect their eyes include wearing sunglasses. • Shadows are formed when the light from a light source is blocked by an opaque object. • When an object is closer to the light source it appears bigger. • When an object is further from the light source its shadow appears smaller.	• Light waves travel in straight lines. • Objects are seen because they give out or reflect light into the eye. • We see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. • Shadows have the same shape as the objects that cast them.

		• Shadows outdoors move and this is dependent on the position of the sun in the sky.	

Physics: Electricity			
EYFS	Y1 and Y2	Y3 and Y4	Y5 and Y6
• We can turn some objects on or off that are connected to electricity • Some objects use batteries to turn on or off • Electricity is needed to make our lightbulbs, TVs, ovens and fridges work	None	• Common electrical appliances using mains electricity include fridges, washing machines, toasters etc • Common electrical appliances use batteries e.g torches, remote control etc • Some appliances use both mains electricity and batteries Phones, laptops etc, • A complete circuit needs a battery, appliance and wires and no breaks. • A switch opens and closes a circuit. • Conductors enable the flow of electricity. • Insulators stop the flow of electricity.	• The brightness of a lamp will increase with the number and voltage of cells used in the circuit. • The volume of a buzzer will increase with the number and voltage of cells used in the circuit. • Switches allow electricity to close or open a circuit and this affects the function of other components in the circuit. • Recognised symbols are used when representing a simple circuit in a diagram.

Physics: Forces			
EYFS	Y1 and Y2	Y3 and Y4	Y5 and Y6
• Objects can be pushed or pulled and this makes them move • Some toys need us to do something to make them move (such as spin, push or pull a part of it) • Magnets stick to metal objects	None	• Objects move differently dependent on the surface they are travelling on. • Objects appear to move further and faster on smooth surfaces as these create less friction. • Objects appear to move slower and not so far on rougher surfaces as these create more friction. • Friction is the force that slows things down. • Friction acts against the objects that is moving. • Some forces need contact between two objects e.g. a push or a pull. • Magnetic forces can act at a distance. • Magnets attract when the opposing poles are facing one another. • Magnets repel when the same poles are facing one another. • For a material to attract to a magnet it must be magnetic. • Magnetic materials include iron, steel, nickel and cobalt. • Non-magnetic metals include gold, silver, copper and aluminium. • Any material that is not made from metal is non-magnetic. • Magnets have two poles- a north pole and a south pole.	• Unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. • Air resistance, water resistance and friction slow or stop objects moving easily. • Mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect

Physics: Earth, Space & Seasons			
EYFS	Y1 and Y2	Y3 and Y4	Y5 and Y6
• There are four seasons in a year – autumn, winter, spring and summer • The weather changes with each season • We can spot signs of each season by noticing what happens to the plants, trees, animals and weather • We need to wear warmer clothes in autumn and winter as the temperature is colder. • In spring and summer we might need to wear sun cream and a hat to protect our skin from the heat	• There are the four seasons consisting of Autumn, Spring, Summer, Winter. • Each season is different. • Changes in the environment can be seen in each season. • The seasons have different types of weather associated with them. • Day length can vary in each season. • Seasons dictate the clothes we wear.	None	• Earth and other planets spin around their axis, just as a top spin around its spindle. This spinning movement is called rotation. While the planets spin on their axis, they also orbit, or revolve around the Sun. This movement is called revolution. • Like the planets, the Moon has two types of movement: orbit and spin. The Moon orbits, or travels around, Earth. It takes the Moon about 27 days to make one trip around Earth. The Moon also spins about its centre. • The Sun, Earth and Moon are approximately spherical bodies. • Day and night are caused because of the Earth's rotation around the Sun. • The Sun's movement is linked to the Earth's rotation around the sun