Progression of skills for Science

Year	Autumn	Spring	Summer
Lower School Cycle B	**Stone Age to Iron Age / (Iron Rocks!)** **Materials** Re-cap ks1 knowledge of materials: Distinguish between an object and the material from which it is made. Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. Describe the simple physical properties of a variety of everyday materials Compare and group together a variety of everyday materials on the basis of their simple physical properties. **Rocks and Soils** Application of KS1 ideas to properties of rocks. Rocks have different strengths, absorbencies, and hardness. Compare rocks with other materials for building. Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. Describe in simple terms how fossils are formed when things that have lived are trapped within rock. Recognise that soils are made from rocks and organic matter. **I can sort materials based on a range of physical properties.** **I can recognise that there are different type of rocks and soils that have different properties.** **I can describe in simple terms how fossils are formed.**	**Mountains, rivers and coasts.** **Plants** Roots are for collecting water and to support the plant. Stems are used for transporting water and provide structure. Leaves absorb sunlight and carbon dioxide. The plant makes its own food in the leaves. The leaf uses the sun light to turn carbon dioxide and water into food for growth. (Future – year long study) **Animals** Animals have skeletons to support their bodies and protect vital organs. Moveable joints connect bones. Muscles are connected to the bones and move them when they contract. **I can identify the different parts of a plant and their function.** **I can describe how plants can make their own food in their leaves.** **I can identify the 3 functions of the skeleton (support/protection/movement) with examples of specific bones.**	**The Egyptians (Tomb Raiders)** **Forces** *(Ensure children understand push and pull forces as not taught in KS1)* Magnets exert attractive forces on some materials. These materials are called magnetic. The force is non-contact that acts through many materials. All magnets have a north and south poles. Like poles repel and opposite poles attract. Magnets exert attractive and repulsive forces with other magnets. Magnetic forces are affected by the strength of the magnet, the distance from object, type of material it is acting through. **Light** Light is generated from a source We need light to see things, even shiny things. Darkness is the absence of light. Light bounces off reflective materials. Opaque objects don't let light through light. Transparent materials let light through and you can see through them. Translucent materials let light through and you cannot see through them. **I can describe the forces between 2 magnets.** **I can identify magnetic and non-magnetic materials.** **I can describe the 3 different types of materials based on their light properties.**

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Lower School Cycle A	What did the Romans' do for us? (Rotten Romans)	Natural Disasters and Rainforests (What a disaster!)	Saxons and Vikings (Kingdom Invasion)
	Solids, Liquids & Gases Solids hold their shape unless forced. Liquids flow. Gases move freely in all directions (even up). Heating a solid turns it to a liquid (melting) Cooling a liquid turns it to a solid (freezing) Heating a liquid turns it to a gas (evaporation) Cooling a gas turns to a liquid (condensation) The temperature a substance boils is the boiling temperature (etc. for others). Even gases have mass. **Mixtures** A mixture is when you put 2 or more substances together. When 2 or more substances are mixed and remain present the mixture can be separated. A substance is dissolved if you cannot see any of the bits and you can see through the liquid, the substance has mixed with the water to create a solution. **I can recognise the 3 states of matter: solid, liquid and gas.** **I can describe how materials change state.** **I can describe the difference between a mixture and a solution.**	**Circuits and conductors** A source of electricity (mains or battery) is needed to make electrical devices work. Batteries push the electricity round a circuit. More batteries push harder. A complete circuit is needed for electricity to flow. Insulators don't allow electricity to flow. Conductors allow electricity to flow. Incomplete circuits don't work. **Environment** Living things can be grouped based on their characteristics – based on their local environment. Different food chains occur in different habitats. Environmental change affects different organisms and therefore habitats differently. Human activity affects the environment. (habitats/ organisms). (Future – year long study) **I can recognise different sources of electricity and explain the purpose of a battery in a circuit.** **I can test a material for electrical conductivity and insulation.** **I can describe different foods chains and how they are affected by changes in the environment.**	**Teeth and Eating** **How I turn a sausage into a leg?** Animals are made from the food they eat. Food is broken down by the teeth and further in the stomach and intestines where nutrients go into the blood. The blood takes nutrients around the body. Different teeth do different jobs. Different animals are adapted to eat different types of food. **Flowering Plants** Flowering plants have specific parts to carry out pollination, fertilisation and seed growth. Seed dispersal improves chances of germination and growth into mature plants. Seeds and bulbs need the right conditions to germinate. They contain a food store for the first stages of growth. **I can describe the different types of teeth and their function.** **I can describe the purpose of different parts of the digestive system.** **I can describe the different parts of a flower and their purpose.**

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Upper School Cycle B	**Arabian Nights) / Mexico Study** **Heart** Every muscle needs oxygen and sugar to contract. The heart is a muscle. The blood contains oxygen (from breathing) and sugar (from digestion). Oxygen goes into the blood from the lungs. The heart pumps blood around the body. When muscles work they produce waste (CO_2 and water) which is transported away from the muscles by the blood. **Sound** Sound is produced when an object vibrates. Sound moves through all materials by making them vibrate. Sound travel can be blocked. Sound spreads out as it travels. Sound travels from its source in all directions and we hear it when it travels to our ears. Bigger vibration produce louder sounds and smaller vibrations produce quieter sounds. Faster vibrations (higher frequencies) produce higher pitched sounds. Changing the way an object vibrates changes its sounds. Changing the shape, size and material of an object will change the sound it produces. **I can describe in simple terms how the heart works.** **I can recognise that sound is produced when a material vibrates.** **I can describe ways in which a sound can be changed.**	**Out of this world / Portsmouth** **Earth & Space** **<u>How could we live in space?</u>** Gravity is a force of attraction between any 2 masses. Gravity acts over distances. Gravitational attraction is stronger with larger masses and closer together. Smaller mass objects like planets orbit larger mass objects like stars. Objects like planets, moons and stars spin. Stars produce light and heat. All other objects reflect light. **I can name and describe in simple terms the planets in our solar system.** **I can explain in simple terms how gravity has caused the planets to orbit the sun and moons to orbit some planets.** **I can recognise in simple terms which objects in space produce light and which reflect light.**	**Forces (Flight) / Changes** **Forces** Air resistance and water resistance are forces against motion caused by objects having to move air and water out of the way. Friction is a force against motion caused by two surfaces rubbing against each other. Friction is caused by the undulations in every surface interlocking. **Animals** Different organisms have different lifecycles. Lifecycles have evolved to help organisms survive to adulthood and therefore reproduce. Asexual reproduction of plants. (Link to SRE – puberty) **I can explain the force of friction and give examples where it is shown or used in real life.** **I can explain in simple terms how air resistance and water resistance are forces acting in the opposite direction to movement.** **I can describe the life-cycle of at least 3 different organisms.**

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Upper School Cycle A	**Water as a resource and renewable energy (Fuelling the Future)** **Changing Circuits - Electrical** Current is how much electricity is flowing. The battery is a store of energy. The battery pushes the current. The higher the voltage of the battery the bigger the push. All materials resist the flow of current. Some materials are bigger resisters than others. When current flows through wires heat is produced. **How we see (light)** Light travels in straight lines All surfaces reflect light unless they are perfectly black Non shiny surfaces scatter light so we don't see a single beam or a reflection. Shiny surfaces reflect light without scattering. Animals see when light enters their eye. Animals see objects when light is reflected off an object and enters their eye. **I can explain that an electrical current is the flow of electricity around a circuit.** **I can show that light travels in straight lines.** **I can explain how animals see objects when light is reflected off an object and enters their eye.**	**Ancient Greek democracy and monarchs past and present (Power!)** **Materials** **Have we made something new?** Sometimes when we heat or mix substances we create new substances that were not there before. Evidence for new materials could be changing properties, fizzing, temperature and difficult to reverse. If a change has not made something new it is usually reversible. **I can explain when a change to a material is reversible.** **I can decide when a new substance has been made.** **I can find evidence that a material is changing – for example it produces a gas or you cannot reverse the process.**	**Evolution and inheritance (Discovering Darwin)** **Evolution and variation** Animals and plants change over time, the key evidence is fossils. Organisms reproduce offspring that are similar but there is variation. There is competition for resources and animals that are already better adapted are more likely to reach maturity and reproduce. They will pass on these characteristics to their offspring. If that process continues over many generations the population will adapt. **I can describe that plants and animals change over time.** **I can describe how animals that are better adapted to their environment are more likely to survive and pass on their characteristics to their offspring.** **I can identify ways that animals have adapted to their environments.**