Materials Knowledge Progression

		Key Vocabulary
Nursery		
Reception		
Y1	Material means the 'stuff' that objects are made out of, such as wood, plastic, metal, glass, rubber, fabric. Every object is made out of at least one material. Some objects are made out of more than one material. We can identify the materials that objects are made out of by looking closely at their properties and thinking about the ways we can describe them. Properties of materials: **Soft**: easy to cut, fold or change the shape of **Hard**: Not easily broken or bent **Stiff**: Doesn't change shape easily **Stretchy**: Can be pulled to make it longer or wider without breaking **Shiny**: Reflects light easily **Dull**: Doesn't reflect light or look bright **Rough**: Feels and looks uneven and bumpy **Smooth**: no bumps or lumps can be seen or felt **Waterproof**: when it doesn't let water through or go soggy. **Transparent**: easy to see through **Inflatable:** can be filled with air Common materials and their properties include: Wood: Hard, strong, stiff Plastic: Strong, shiny, bendy, waterproof Glass: transparent, smooth, stiff, waterproof Metal: Hard, strong, shiny Rock: Hard, strong **John Dunlop**, born in Scotland in 1840, first had the idea for an inflatable rubber tyre when he saw his young son trying to ride his tricycle across the yard at their home in Ireland. The boy found it difficult to make the tricycle move quickly over the cobblestones on metal wheels. He made a tube out thin rubber sheets and filled it with air using a football pump. These new tyres were fitted to both the back wheels of his son's tricycle and as a result movement was both easier and smoother.	**Properties**: Different ways to describe different materials **Liquid:** Liquids can flow or be poured easily. **Surface**: An outside part or layer of something **Object:** A thing that can be seen and touched
Y2	Material means the 'stuff' that objects are made out of, such as wood, plastic, metal, glass, rubber, fabric. Different materials have different properties, such as: ¨ Transparent: a material you can see through ¨ Opaque: a material you can't see through ¨ Stable: when an object is not likely to overturn or fall down because it is firmly fixed -Flexible: when a material can be bent or pressed without breaking -Waterproof: when it doesn't let water through or go soggy	**Transparent**: a material you can see through **Opaque:** a material you can't see through **Stable:** when an object is not likely to overturn or fall down because it is firmly fixed **Flexible:** when a material can be bent or pressed without breaking **Waterproof:** when it doesn't let water through or go soggy **Natural:** a material found in nature **Man-made**: a material that does not occur naturally

	¨ Natural: a material found in nature ¨ Man-made: a material that does not occur naturally Designers think carefully about the properties of materials to make sure they choose the best material for the job. For example, a raincoat must be waterproof and a window to look out of must be transparent. Famous inventors: **John Dunlop**: Born in 1840; an expert in rubber; invented the first inflatable tyre. **Charles Macintosh**: Born in 1766; invented the first waterproof fabric; the 'mac' raincoat is named after him. **John McAdam**: Born in 1756, he invented building roads with a smooth, hard surface. This way of building roads is still used and is called 'macadamisation'.	
Y3	ROCKS <u>Comparing and grouping types of rock</u> There are three naturally occurring types of rock: igneous, metamorphic and sedimentary. Igneous rock has been formed from magma or lava. Examples are obsidian, granite and basalt Metamorphic rock started out as igneous or sedimentary rock but changed due to being exposed to heat or pressure. Examples are marble, quartzite, slate Sedimentary rock has been formed by layers of sediment being pressed down hard and sticking together. You can see the layers of sediment in the rock. Examples are chalk, sandstone, limestone, coal (Limestone quarry in Cadeby/Sprotbrough) <u>Describing how fossils are formed</u> 1. An animal dies. It gets covered with sediment which eventually become rock 2. More layers of rock cover it. Only hard parts of the creature remain eg bones, shell, teeth 3. Over thousands of years, sediment might enter the mould to make a cast fossil. Bones may change to mineral but will stay the same shape 4. Changes in sea level take place over a long period 5. As erosion and weathering take place, eventually the fossil becomes exposed <u>Recognise soil is made from rocks and organic matter</u> Soil is the upper most layer of the Earth. It is a mixture of different things: Minerals (link to plants unit – the roots take the minerals from the soil to the plant) Air Water Organic matter (including living and dead plants and animals)	**Igneous rock –** rock formed from magma or lava **Sedimentary rock –** rock formed from layers of sediment being pressed together **Metamorphic rock –** started as igneous or sedimentary rock but changed due to being exposed to heat or pressure **Sediment**: natural solid material that is moved and dropped off in a new place by water or wind eg sand
Y4	There are three states of matter: solid, liquid and gas Particles in a solid are close together and cannot move. They only vibrate. Particles in a liquid are close together but can move around each other easily. Particles in a gas are spread out and can move around very quickly in all directions When water and other liquids reach a certain temperature, they change state into a solid or a gas. The temperatures that these changes happen at are called the boiling, melting or freezing point. Solid to Liquid If a solid is heated to its melting point, it melts and changes to a liquid. This is because the particles start to move faster and faster until they are able to move over and around each other. Liquid to Solid When freezing occurs, the particles in the liquid begin to slow down as they get colder and colder. They can then only move gently on the spot, giving them a solid structure.	**Solid:** These are materials that keep their shape unless a force is applied to them (link to Y3 forces) They can be hard, soft or even squashy. Solids take up the same amount of space no matter what has happened to them. **Liquid:** Liquids take the shape of their container. They can change shape but do not change the amount of space that they take up. They can flow or be poured. **Gas:** Gases can spread out to completely fill the container or room they are in. They don't have any fixed shape but they do have a mass **Melt:** When a solid changes to a liquid **Freeze:** When a liquid changes to a solid **Evaporate:** Turn a liquid into a gas **Condense:** Turn a gas into a liquid **Water Vapour**: This is water that takes the form of a gas. When water is boiled, it evaporates into water vapour

	Evaporation Evaporation occurs when water turns into water vapour. This happens very quickly when the water is hot, like in a kettle, but it can also happen slowly, like a puddle evaporating in the warm air. Condensation Condensation occurs when water vapour is cooled down and turns into water. You can see this when droplets of water form on a window. The water vapour in the air cools when it touches the cold surface	
Y5	Children will know the different **properties of materials:** • electrical conductivity • thermal conductivity • insulators (thermal) • flexibility • hardness • magnetism • solubility – insoluble/soluble • permeability • transparency (opaque, translucent, transparent) And that materials are used for certain jobs because of these properties. There are **3 main states of matter;** **solids, liquids and gases.** Know that: • Solid melts • Liquid freezes • Gas condenses • Liquid evaporates Know that there are reversible and irreversible changes. **Reversible** – such as mixing and dissolving solids and liquids – can be reversed using • Sieving • Filtering • Evaporating **Irreversible** changes often lead to new materials being made (reactants) **Soluble** materials dissolve forming a solution. A **suspension** is when materials do not dissolve. Know the different **processes**: • Melting • Freezing • Dissolving • Evaporating • Condensing • Filtering • Sieving • Mixing Know that there processes can be used in order to separate some materials from others.	**Reversible –** such as mixing and dissolving solids and liquids – can be reversed using • Sieving • Filtering • Evaporating **Irreversible -** changes often lead to new materials being made (reactants) Soluble Suspension
Y6		