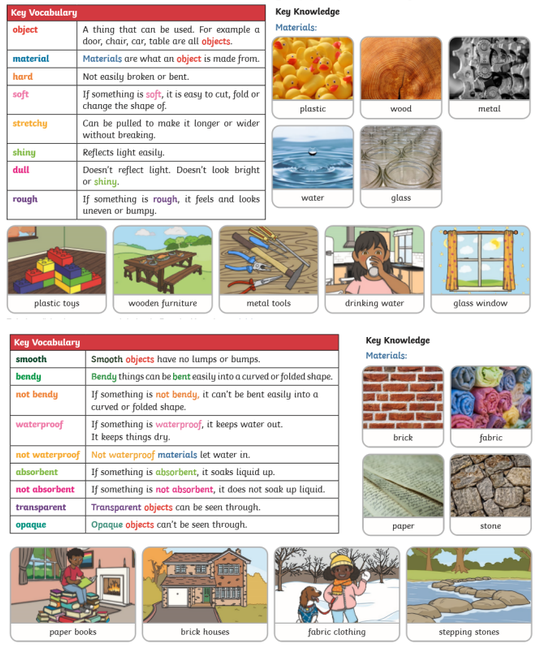
STEM - Materials and states of matter

For Key Stage one click here https://docs.google.com/document/d/1WRkyKdaDrxuZsHnW4F-dBdGVsxLVxXvU/edit#heading=h.gjdgxs
For years 3 and 4 Changes of state click here https://docs.google.com/document/d/1sBbAnDcSLXxgpz7q4D6_JZbQNkLRBy-t/edit

		National Curriculum Objectives	Substantive Concepts	Skills	Knowledge	Key Vocabulary	When
R	Year A	Children know about similarities and differences in relation to places, objects, materials and living things. They	That objects have different qualities, names and purposes.	Talk about a range of objects. Know what they are used for.	Building up of nouns to describe every day objects		
YR 1	Year A	**Everyday 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.	That objects are made of different things	• Observe carefully using increasingly accurate language. • Sorting • Carry out simple practical tests using simple equipment (waterproofing etc) •	Be able to name a range of every day materials and say what a variety of objects are made of Talk about different materials using appropriate adjectives.  	Material Wood Plastic Glass Rubber Leather Wool Fabric Brick Stone Glass metal hard smooth bumpy squashy absorbent opaque brittle dull rigid transparent soft bendy rough waterproof.	
Yr 2	Year A	**Use of every day materials** identify and compare the suitability of a variety of everyday materials,	That different materials have different properties which make them suitable for different uses.	• Oserve carefully – describing using correct nouns and adjectives. • Decide how to sort and clssify objects. • Record and communicate findings. • Choose a material based on its properties for a specific purpose.	Talk about how objects are grouped and common properties Using the vocabulary increasingly accurately. Explain why the properties of a material make it suitable for a	As above -	

		including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	**That the properties of objects can be changed by force.**	• **Change the shape of a material to improve its use for a desired situation.**	**purpose.** **That some objects can be bent into shape with hands but some objects need a greater force.** 		
YR 3	**Year B**	**Rocks and soils** 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.	**That there are different types of rocks which are formed in different ways.**	• **Observe carefully using magnifying glasses and microscopes.** • **Record and present findings use drawings, labelled diagrams, keys and bar charts.** • **Talk about and decide upon criteria for sorting and classifying** • **Group and classify** • **Carry out a fair test – deciding what elements need to change or stay the same.** • **Draw simple conclusions from results.** • **Say why an experiment is fair or not fair.** • **Begin to compare their own results with secondary sources**	**Know how igneous, sedimentary and metamorphic rocks are formed. Describe the process.** **Identify different kinds of rocks.** **Fossils are formed over time by rock forming over a dead creature.** **Identify**		
YR 4	**Year A**	**Changes of state – evaporation and condensation** compare and group materials together, according to whether they are solids, liquids or gasses observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	**That all matter is solid, liquid or gas (plasma as a 4th) and that materials can change their state if they are heated or cooled.** **To link the changes is state of water to the water cycle.**	• **Observe carefully using magnifying glasses and microscopes.** • **Record and present findings use drawings, labelled diagrams, keys and bar charts.** • **Talk about and decide upon criteria for sorting and classifying** • **Group and classify** • **Carry out a fair test – deciding what elements need to change or stay the same.** • **Draw simple conclusions from results.** • **Say why an experiment is fair or not fair.** • **Begin to compare their own results with secondary sources** • **Year 4 skills are moved on from year 3 in terms of presenting and recording. Year 4s will draw on a range of ways for presenting evidence and will start ot make their own decisions about the ways in which they record and present data.** • **Year 4 will draw conclusions based more solidly in scientific language and findings.**	**Matter can exist in one of three main states: solid, liquid, or gas. Solid matter is composed of tightly packed particles. A solid will retain its shape; the particles are not free to move around. Liquid matter is made of more loosely packed particles. It will take the shape of its container. Particles can move about within a liquid, but they are packed densely enough that volume is maintained.** **Gaseous matter is composed of particles packed so loosely that it has neither a defined shape nor a defined volume. A gas can be compressed.** **Note – water as a solid (ice) takes up more room than as a liquid.**	**Solid** **Liquid** **Gas** **Evaporate** **Condensate** **Molecules** **Freezing point** **Melting point** **Boiling point** **Matter**	
YR 5	**Year B**	**Properties and changes in**	That the state of materials is dependent on many factors and is not a	• **Choose the most appropriate equipment to measure and record results** • **Take measurements using a range of scientific**	**Know how to test for a range or properties** **Know how solids, liquids and gasses will change with**	**Sublimation** **Dissolve** **Saturate**	

		materials compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution use knowledge of solids, liquids and gasses to decide how mixtures might be separated, including through filtering, sieving and evaporating give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic demonstrate that dissolving, mixing and changes of state are reversible changes explain that 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.	constant. To know that combining materials, new material can be formed That some changes can be reversed but some cannot be undone.	**equipment** • **Make careful and focused observations.** • **Group and classify with increasing independence** • **Use keys and tree diagrams** • **Decide how to record data** • **Present data clearly and relevantly.** • **Notice patterns** • **Use scientific knowledge to explain findings** • **Read, spell and pronounce scientific words correctly** • **Talk about accuracy of test results.** • **Use primary and secondary sources** • **Begin to separate opinion from fact** • **Use relevant scientific language and illustrations to communicate and justify their ideas.**	**temperature.** **Know which materials will dissolve** **Know how to carry out a fair test and check for accuracy.** **Know how to filter a liquid** **Know how to reverse an action** **Know which actions are reversible and which ae irreversible.**	**Soluble** **Conductivity** **Solution** **Filter** **Sieve** **Reversible** **Irreversible** **Molecular.**	
YR 6	**Year A**						
YR 6+							