

Year 4 – Materials - Solids, Liquids & Gases

National Curriculum Objectives	Sticky Knowledge	Vocabulary	
<ul style="list-style-type: none"> Compare and group materials together, according to whether they are solids, liquids or gases. Observe that some materials change state when heated or cooled, and measure and research the temperature at which this happens in degrees Celsius. Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 	<ul style="list-style-type: none"> Solids, liquids and gases are described by observable properties. Materials can be divided into solids, liquids and gases. Heating causes solids to melt into liquids and liquids evaporate into gases. d) Cooling causes gases to condense into liquids and liquids to freeze into solids. The temperature at which given substances change state are always the same. 	Solid, liquid, gas, particles, state, materials, properties, matter, melt, freeze, water, ice, temperature, process, condensation, evaporation, water vapour, energy, precipitation, collection,	
Maths National Curriculum Objectives	Key Question(s):	Key Scientists	Linked Texts
<ul style="list-style-type: none"> Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and line graphs. Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and line graphs. 	<ul style="list-style-type: none"> How does the amount of water added to flour affect its state? How does the amount of detergent added to water affect how slippery it is? How does the temperature affect how viscous a liquid is (use cooking oil)? Place a peach in a glass of lemonade and watch it spin. Why does it behave that way and can you prove it? How does the material sprinkled on ice and snow affect how quickly it melts? What chocolate would be best to smuggle? How does the type of chocolate affect its melting temperature? What is the melting temperature of ice and how does it compare with the freezing temperature of water? Is the melting temperature of wax the same as its freezing temperature? 	Anders Celcius (Celcius Temperature Scale)	Once Upon a Raindrop: The Story of Water (James Carter)
Working Scientifically Objectives		Daniel Fahrenheit (Fahrenheit Temperature Scale / Invention of the Thermometer)	Sticks (Diane Alber)
1.1 asking relevant questions and using different types of scientific enquiries to answer them 1.2 setting up simple practical enquiries, comparative and fair tests 1.3 making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers 1.4 gathering, recording, classifying and presenting data in a variety of ways to help in answering questions 1.5 recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables 1.6 reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions 1.7 using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions 1.8 identifying differences, similarities or changes related to simple scientific ideas and processes 1.9 using straightforward scientific evidence to answer questions or to support their findings.		Prior Learning	
		In KS1 children should: <ul style="list-style-type: none"> 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. Identify and compare the suitability of a variety of everyday materials, 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.	
	Future Learning		
In Year 5 children will: <ul style="list-style-type: none"> 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 gases 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 wood, metals 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 this kind of change is usually not reversible, including changes associated with burning and the action acid on bicarbonate of soda. 			

Teaching Ideas

Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research	BIG Question – Assessment Opportunity
How does the mass of a block of ice affect how long it takes to melt? How does the surface area of water affect how long it takes to evaporate? Does seawater evaporate faster than fresh water?	Can you group these materials and objects into solids, liquids, and gases? How would you sort these objects/materials based on their temperature?	Which material is best for keeping our hot chocolate warm? How does the level of water in a glass change when left on the windowsill?	Is there a pattern in how long it takes different sized ice lollies to melt? How does evaporation rate change as you add more salt to your water?	What are hurricanes, and why do they happen?	Where do ice cubes go when they disappear? Why does it rain and hail?