

Design and Technology: Conceptual Knowledge Progression Map 1

	Materials	Mechanisms
EYFS	Materials can be artificial (man-made) or natural.	
Y1	<p>Materials include woods, paper, card, rubber, plastics, metals, fabrics, glass, rock, water, plasticine/clay</p> <p>Science: Materials have different properties and are used to make different objects.</p> <p>Science: Physical properties of materials include hard / soft, dull / shiny, rough / smooth.</p>	<p>A mechanism makes changes movement or makes movement easier.</p> <p>A mechanism has an input and an output.</p> <p>A lever is a simple mechanism. It is a rigid beam that pivots (turns).</p> <p>A slider is a simple mechanism. It is a rigid beam that moves back and forth on a straight line.</p> <p>A linkage is a system of links that are joined together to control movement. A lever is an example of a linkage.</p>
Y2	<p>Science: Physical properties of materials include the above plus malleable / not malleable, waterproof / not waterproof, heatproof / not heatproof, windproof / not windproof, absorbent / not absorbent.</p> <p>Materials - including different types of fabric - have different properties and are used to make different objects.</p>	<p>A moving buggy will include the body, wheels, axles, axle holders, and chassis.</p> <p>There are two types of axle: fixed and free.</p> <p>Fixed axles attach to the chassis.</p> <p>Free axles are not attached to the chassis and can spin within the chassis.</p>
Y3	Science: Physical properties of materials include the above plus transparent / translucent / opaque, magnetic / non-magnetic.	
Y4	<p>Science: Physical properties of materials include the above plus good electrical conductor / poor electrical conductor (insulator), good thermal conductor / poor thermal conductor (insulator)</p> <p>Science: Chemical properties of materials include toxicity and flammability.</p>	<p>A pulley is a simple mechanism. It is a grooved wheel that spins on an axle.</p> <p>A drive belt transfers movement from one pulley to another.</p> <p>A cam changes the direction of movement from rotary to reciprocal.</p> <p>A spring is an energy store. It stores energy that can be transferred to a different energy store.</p> <p>Pulleys can redirect forces, or reduce the force required to lift heavy objects.</p>
Y5	Explicit review of the above.	Explicit review of the above.
Y6	Explicit review of the above.	

Design and Technology: Conceptual Knowledge Progression Map 2

	Structures	Programming & Control	D&T Shaping the World
Y1	<p>2D shapes have a length and width.</p> <p>3D shapes have a length and width and height.</p> <p>Free-standing structures can be made stronger with stiffer materials, thicker materials, or with more layers of material (laminating).</p> <p>Free-standing structures can be made more stable by having a wider base or a heavier base.</p>	<p>Computing: Electronic control systems have inputs, outputs and a central processor.</p> <p>Computing: A process flow chart drives a programmable system.</p>	<p>Examples of levers in everyday life include see-saws, wheelbarrows, door handles and scissors.</p> <p>An artist makes something beautiful that has meaning. Designers make things that are useful and have a purpose, which may also look beautiful.</p> <p>Designers and architects make models of spaces like towns to help them plan them.</p>
Y2	<p>Triangulation makes structures stronger and more stable.</p>	<p>Computing: Flow charts use key words of 'if', 'then', 'stop', 'start', 'repeat' and other command words (depending on software)</p> <p>Computing: Programmes can run for a given number of loops or a set amount of time, or until something is no longer true.</p> <p>Computing: A variable is something that be changed.</p>	<p>An artist makes something beautiful that has meaning. Designers make things that are useful and have a purpose, which may also look beautiful. Engineers are scientists who use their knowledge to make things that work like bridges and cars.</p> <p>History: The wheel is a very important invention because it helped people to move heavy things more easily. They did not need to carry them or use animals to carry them.</p>
Y3	<p>Triangulation makes structures and joints stronger and more stable.</p> <p>Free-standing structures can be made more stable by adding a stand.</p> <p>Ties can make structures more stable.</p>		<p>Free standing structures in the world around us have been made strong and stable with triangulation, using strong materials and having a wide base.</p>
Y4	<p>Structures can be made by slotting items together.</p> <p>A shell structure has a continuous outer 'shell' and do not have a frame, like an egg shell or a dome in a building.</p> <p>A frame structure is made from separate pieces of material called members that form a frame, like a climbing frame or most houses.</p>	<p>Science: A complete circuit has at least one cell and at least one functioning component connected in a continuous loop. An incomplete circuit has components missing or is not connected in a continuous loop.</p> <p>Science: A short circuit is a circuit with just a cell and no other components. They can be dangerous.</p> <p>Science: Electrical components include: wire, lamp, buzzer, motor and switch.</p>	<p>History: Prehistoric Britons, Ancient Egyptians, Ancient Greeks and Ancient Maya used knowledge of strong structures to build Stonehenge, pyramids and temples a very long time ago.</p> <p>Flat pack furniture has made it easier for people to buy and transport furniture to their home.</p> <p>There are natural and artificial shell structures and frame structures all around us.</p>

	<p>Frame and shell structures can be made by folding 2D nets.</p>	<p>Science: Electrical appliances should be switched off when not in use.</p> <p>Science: Switches complete or break a circuit.</p> <p>Apply the above to a D&T context.</p>	
Y5	<p>Explicit review of the above.</p>		<p>Technology – and programmable technology – has had a huge impact on the world in living memory.</p> <p>History: Prehistoric Britons, Ancient Egyptians, Ancient Greeks, Ancient Maya, Early Islamic Civilisation, and Romans used knowledge of mechanisms to make levers and pulleys.</p>
Y6	<p>Explicit review of the above.</p>	<p>Science: A non-renewable energy source is one that is used much faster than it is created. Fossil fuels take millions of years to form but minutes to burn, so we will run out. Burning fossil fuels to transfer electrical energy is a non-renewable energy source.</p> <p>Science: Renewable energy sources quickly replenish themselves, meaning that we can use them again and again and we will not run out. Wind, solar, geothermal and hydrological power are all examples of renewable energy sources.</p> <p>Apply the above to a D&T context.</p>	<p>Designers and engineers have developed sustainable systems in agriculture, waste and electricity generation.</p>