

Meden School Curriculum Planning							
Subject	Physics	Year Group	8	Sequence No.	7	Topic	Simple Energy Transfers

Retrieval	Core Knowledge	Student Thinking
What do teachers need retrieve from students before they start teaching new content ?	What specific ambitious knowledge do teachers need teach students in this sequence of learning?	What real life examples can be applied to this sequence of learning to development of our students thinking, encouraging them to see the inequalities around them and 'do something about them!'
<p>Y8 Digestive system refers to foods containing energy.</p> <p>Y8 Electricity and Energy Resources. Electricity moves energy from one place to another. Energy resources are used to generate electricity.</p> <p>KS2 Changing state</p> <p>KS2 Changing state and temperature</p> <p>KS2 Heat travels from warmer to colder things.</p> <p>KS2 Conductors and Insulators Some materials allow heat to pass through them easily. Metals are good conductor and wood, plastic and fabrics are good insulators.</p>	<p>L1: Energy is the ability to do work. Energy exists in 8 different stores. Energy is measured in Joules which has a capital "J" as the unit. It is a capital because it is the name of a scientist. The 8 energy stores are: kinetic found in anything moving, gravitational potential found in anything with height, thermal stored in all matter and depends on its temperature, chemical stored in the bonds holding atoms together, elastic potential stored in objects that can be stretched or squashed and bounce back, nuclear stored between the particles found in the nucleus of atoms, electrostatic found between charged particles and magnetic stored between magnetic matters.</p> <p>L2: Energy is transferred between energy stores by a transfer mechanism. There are 5 transfer mechanisms: chemical reactions, electrical currents, forces, radiation or via heating. Heating has three methods of transferring thermal energy: conduction through solids, convection through fluids and radiation via infra-red. Energy cannot be created or destroyed it can only be transferred between energy stores, this is known as the Law of Energy Conservation. Energy is often transferred to several different energy stores at the same time. Some transfers do useful work but other transfers result in wasted energy. Most wasted energy is transferred to the surroundings in the form of thermal energy this is called dissipation.</p> <p>L3: Thermal energy moves via three methods: conduction, convection and radiation. Thermal energy moves from areas of higher temperature of areas of lower temperature, this is way melting happens. Convection happens in fluids which have particles that are free to move. When a fluid heats up the particles gain energy and move more causing them to spread out, therefore hotter fluids are less dense, and this causes them to rise above colder fluids. Density is a measure of the number of particles in a fixed volume, less particles = less dense. Convection currents occur when fluids have a continuous source of heating at their base. Convection currents are the cause of plate tectonic movement and weather patterns. Global warming is altering the convection currents in the world's oceans and atmosphere.</p>	<p>How are convections currents used by Gliders, paragliders, hot-air balloonists?</p>

	<p>L4: Metals are good conductors which mean they transfer thermal energy easily. Glass, ceramics, plastics, wood and fabrics are examples of insulators, this means that thermal energy is not transferred easily. Heating is the transfer of energy to the thermal energy store of an object. Conduction is the transfer of thermal energy in solids the extra thermal energy is transferred to the kinetic energy store of the particles causing them to vibrate more., vibrating particles pass on their extra energy to neighbouring particles.</p> <p>L5: Different materials have different insulation properties. The scientific method can be used to investigate which materials are the better insulators. Control variables need to be kept the same during an investigation, the independent variable is the one being changed, the dependent variable is measured to see the effect of the dependent variable. A risk assessment should be carried out before any practical work, hazards should be identified and precautions to reduce the risk of each hazard identified.</p> <p>L6: Experimental results are usually presented in graphical form. A bar graph is used when the independent variable is categoric data, a line/scatter graph is used when the independent variable is continuous. Insulators are good insulators as they limit the amount of conduction and convection that can occur. Insulators off have trapped air pockets as this prevents convection currents.</p> <p>L7/8: Poorly insulated houses allow thermal energy to escape to the environment, this costs money and is bad for the environment as it means more energy is used. Most energy is transferred through the walls and roof of a house. Insulation methods include loft insulation (fibre glass), foam cavity wall insulation, double glazing, draught excluders. Loft insulation and cavity wall insulation are the most cost effective methods. Payback is the name given to the time it takes for the savings made by an insulation method to payback the initial outlay for the installation of the insulation.</p> <p>L9: Specialist cold weather clothing needs to be designed to be a good insulator but must be good at wicking, this is when a material draws moisture (sweat) away for the skin. Good product design requires extensive research and development.</p>	<p>Product designers need to know the science of conduction etc when creating cookware.</p> <p>Careers in product design</p> <p>Greta Thunberg, extinction rebellion, insulate Britain are all asking governments to invest in house insulation.</p> <p>Scientist are living at the artic to monitor global warming</p> <p>Careers in material design and clothing</p>
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