
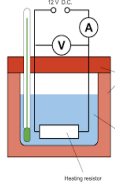
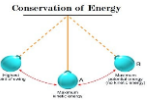

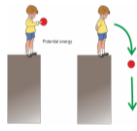







Science Year 9 AC1

Core Knowledge			Sequenced learning				
1	Energy stores and transfers		Energy stores:- Thermal, nuclear, kinetic, magnetic, electrostatic, gravitational potential, chemical potential, elastic potential energy stores. Energy can be transferred between two stores by heating, electrically, mechanically or radiation (light or sound)	7	Specific heat capacity and latent heat		Specific heat capacity is the amount of energy needed to raise the temperature of 1 kg of substance by 1°C. $Q = mc\Delta T$ Where Q=change in energy (joules), m=mass (Kg), c= specific heat capacity (j/kg°C) and ΔT = change in temperature (°C) Latent heat is the energy is taken in / or given out when a material changes state e.g. solid to liquid or liquid to gas. $Q = ml$ Where l = specific latent heat (J/Kg)
2	Conservation of energy		Energy can be stored or transferred, but it cannot be created or destroyed. This means that the total energy of a system stays the same	8	Efficiency Sankey diagrams		Efficiency is a measure of how much energy is converted into useful energy $\text{Efficiency} = (\text{Useful energy output} / \text{Total energy input}) \times 100$
3	Calculate KE, GPE and EPE		$KE = 0.5mv^2$ where KE is in joules, mass (m) is in kilograms and velocity (V) is in metres per second $GPE = mgh$ Where GPE is in joules, mass (m) is in kilogram, gravity (g) is in Newtons per Kilogram and height(h) is in metres $EPE = 0.5 \times \text{spring constant} \times \text{extension}^2$ Where EPE is in joules, spring constant is in Newton per metre and extension is in metres	9	Respiration		Is the process by which living organisms release energy from glucose. Glucose is stored in the muscles as glycogen This energy is used:- <ul style="list-style-type: none"> - in chemical reactions to build larger molecules - to movement (via muscle contraction) - maintaining a steady body temperature (keeping warm) - active transport Respiration is an exothermic reaction as it releases energy
4	Work done		Work is the measure of energy transfer when a force(F) moves an object through a distance (d) $W = Fd$	10	Aerobic and anaerobic respiration	Aerobic $\text{Oxygen} + \text{Glucose} \rightarrow \text{Carbon dioxide} + \text{Water} + \text{Energy}$ Anaerobic $\text{Glucose} \rightarrow \text{Lactic acid} + \text{Energy}$ - Anaerobic respiration leads to oxygen debt, as need oxygen to react with lactic acid. Lactic acid is transferred to the liver where it is converted back to glucose	
5	Power	$P = \frac{W}{t}$	Power (Measured in watts) is the rate at which work is done. Where work done (W) is measured in joules, time (t) is measured in seconds and energy transferred (E) is measured in joules $P = W/t$ or $P = E/t$ 1 watt = 1 joule of energy transferred per second	11	Response to exercise		The main responses to exercise are increase in heart rate, increase in breathing rate and depth of breathing (leading to an increase in breath volume) .
6	Conduction, convection and radiation		Energy can be transferred by conduction, convection and radiation. Conduction is the process where vibrating particles transfer energy to neighbouring particles. It occurs in solids. Convection is where energetic particles move away from hotter regions to cooler regions, occurs in liquids and gases. Heat can be transferred by radiation, this does not involve particles	12	Metabolism	Is the sum of all the reactions that happen in a cell or in the body	



VOCABULARY

**Excellence.
No Excuses.**

Science Year 9 AC1

12	Word	Definition	Synonyms	Antonyms	Etymology
13	energy	The capacity for doing work.	Efficiency	Apathy	1590s, "force of expression,"
14	energy store	The different ways in which energy can be stored, including chemical, kinetic, gravitational potential, elastic potential and thermal stores.	Stock, abundance	Sparsity, lack of	mid-13c., "to supply or stock,"
15	Internal energy	The total kinetic energy and potential energy of the particles in an object.	From within	Outside, external	early 15c., "extending toward the interior,"
16	transfer	When something is moved from one place to another. This may be people, objects or energy.	Transmission	Stagnation	from Old French <i>transferer</i> "carry over,"
17	efficiency	The fraction of the energy supplied to a device which is transferred in a useful form.	Capability	Ineptness	1590s, "power to accomplish something,"
18	rate	Per unit time or 'per second'. For example, if 2,000 J are transferred over a period of 10 s, then the rate of transfer is 200 J/s or 200 W. This value is the power rating.	Amount, Percentage	whole	"estimated value or worth," early 15c.
19	specific heat capacity	The amount of energy needed to raise the temperature of 1 kg of substance by 1°C.			
20	molecule	A collection of two or more atoms held together by chemical bonds.	Particle, Atom	Compound	1794, "extremely minute particle,"
21	renewable	Energy sources that are replenished and not exhausted, eg solar power.	Sustainable	Finite	late 14c., from re- "again"
22	finite	Something that has a limited number of uses before it is depleted.	Non-renewable	Unlimited	early 15c., "limited in space or time, finite,"
23	activation energy	The minimum amount of energy that colliding particles must have for them to react.	Successful collision	Unsuccessful collision	1590s, "force of expression,"
24	Exothermic	Reaction in which energy is given out to the surroundings. The surroundings then have more energy than they started with so the temperature increases.	Release of energy	Endothermic	1874, in chemistry, "relating to a liberation of heat,"
25	Product	A substance formed in a chemical reaction.	Made, formed	Reactant	early 15c., noun use of neuter past participle of <i>producere</i> "bring forth"
26	Reactant	A substance that reacts together with another substance to form products during a chemical reaction.	Materials	Product	
27	Carbohydrate	Food belonging to the food group consisting of sugars, starch and cellulose.	Glucose		1851, from carbo- , form of <i>carbon</i> , + hydrate (n.), denoting compound combine with water
28	Enzyme	A protein which catalyses or speeds up a chemical reaction.	Boi-catalyst	Preventer	Modern Greek cfrom <i>en</i> "in" + <i>zymē</i> "leaven"
29	Metabolism	All the chemical reactions in the cells of an organism, including respiration.	Growth	Inanimate	From Greek <i>metabole</i> "a change,"
30	aerobic respiration	Respiration that requires oxygen.	Energy using oxygen	Anaerobic respiration	late 14c., Latin <i>respirationem</i> (nominative <i>respiratio</i>) "breathing, respiration,"