Year 8 : Cycle 1: Science 100% sheet

Section 1 – Skeletal and muscular systems		Section 2: Properties and uses of metals	
Muscular-skeletal system	Allows movement, holds us upright, protects organs. Muscles contract and pull-on bones to allow movement.	**Copper**	Used for electrical wiring – good electrical conductor and ductile.
Joint	Where two bones join. Ends of the bones are covered in cartilage, synovial fluid lubricates the joint.	**Gold**	Used to make jewellery – shiny and resistant to corrosion.
Ligament	Elastic tissue that joins two bones together.	**Steel**	Used for buildings, bridges and cars- very strong alloy of iron.
Tendon	Inelastic tissue that joins a muscle to a bone.	**Aluminium**	Used for aeroplanes and overhead cables- low density.
Antagonistic muscles	Muscles that work in pairs. When one contracts (shortens), the other relaxes (lengthens).	**Titanium**	Used for joint replacements – resistant to corrosion, strong, low density.
Section 3: Food groups		Section 4: Reactivity and alloys	
Carbohydrates	Main source of energy.	**Most reactive metals**	Potassium, sodium, lithium and calcium – react with water so they have to be stored in oil.
Vitamins and minerals	Needed in small amounts to maintain health e.g., calcium for strong teeth and bones, iron for red blood cells.	**Alloy**	A mixture of metals or a mixture of metal and other elements.
Proteins	For growth and repair.	**Mild Steel**	An alloy of iron and carbon.
Lipids (Fats/ oils)	Acts as a store of energy; body fat keeps us warm.	**Bronze**	An alloy of copper and tin.
Fibre	Helps food move through the gut; prevents constipation.	**Brass**	An alloy of copper and zinc.
Section 5: The Digestive system		Section 6: Reactions of metals	
Mouth	Teeth chew food and mix with saliva to make swallowing easier.	**Metal + acid**	Metal + acid → salt + hydrogen. A metal will react if it is more reactive than hydrogen.
Oesophagus	Connects the mouth to the stomach.	**Metal + oxygen**	Metal + oxygen → metal oxide. This is an oxidation reaction as the metal gains oxygen.
Stomach	Food is churned in hydrochloric acid, proteases are added.	**Metal + water**	Metal +water → metal hydroxide + hydrogen. Metal hydroxides produce alkaline solutions that turn universal indicator purple.
Small and large intestines	Small = enzymes complete digestion, small food molecules absorbed into blood. Large = re-absorbs water into bloodstream.	**Displacement reaction**	A more reactive metal displaces a less reactive metal from its compound.
Rectum	Undigested food is compacted and stored as faeces.	**Rusting**	Occurs when iron or steel react with both oxygen and water.

Section 7: Respiratory system		Section 8: Extraction and recycling of metals	
Trachea	Windpipe carries air into the lungs.	**Ore**	A rock that you can extract a metal from e.g. bauxite contains aluminium.
Bronchi	Trachea splits into two tubes that each supply a lung with air.	**Extraction using carbon**	Use if the metal is less reactive than carbon by heating the metal oxide with carbon. The carbon displaces the metal.
Alveoli	Small air sacs where gas exchange occurs.	**Extraction using electrolysis**	Use if the metal is more reactive than carbon. Split up the metal oxide using an electrical current.
Diaphragm	Sheet of muscle under the ribcage that contracts, changing the volume of the thorax to control breathing.	**Advantages of recycling**	Less waste sent to landfill. Less energy used as less mining and extraction required. Conserves ores which are limited resources.
Gas exchange	Oxygen diffuses into the blood; carbon dioxide diffuses into the lungs.		

Section 9: Mass and weight 1		Section 10: Mass and weight 2	
Mass	Measure of the amount of material something is made up of. Mass is the same on all planets.	**Measuring Weight**	Weight is a force so is measured using a Newton meter.
Measuring Mass	Use a mass balance.	**Equation**	Weight = mass x gravitational field strength $(w = m \times g)$.
Units for Mass	Kilograms (kg) or grams (g).	**Gravitational Field Strength**	Strength of gravity on a planet. On Earth, $g = 10$ N/kg.
Weight	Measure of the force on something due to gravity. Changes depending on the gravitational field strength of the planet.	**Units for Weight**	Newtons (N).

Section 11: Speed, distance and time		Section 12: Stretching springs	
Equation	speed = distance / time $(s = d/t)$	**Deformation**	Changing the shape of an object – stretching, compressing or bending. Requires at least two forces.
Units	speed = metres per second (m/s) distance = m time = s	**Elastic Deformation**	The object returns to its original size and shape once the forces are removed.
Distance – Time Graphs	Straight diagonal line = constant speed. Steeper line = faster speed. Flat horizontal line = stationary.	**Inelastic Deformation**	The object does not return to its original size and shape once the forces are removed.
Typical speed values	Walking = 1.5 m/s, Running = 3 m/s, Cycling = 6 m/s, Car = 25 m/s, Sound (in air) = 330 m/s.	**Hooke's Law**	The extension of a stretched spring is directly proportional to the force applied to it, up to the limit of proportionality.
		Equation	Force = spring constant x extension $(f = k \times e)$.

Section 13: Forces - maths skills	
Converting Distances	1 m = 100 cm; 1 km = 1000 m.
Converting Times	1 minute = 60 s; 1 hour = 60 minutes.
Directly Proportional	Shown on a graph by the line of best fit being a straight line through the origin. If one variable doubles, the other doubles.
Force – Extension Graphs	Plot force on the y axis, extension on the x axis. The steeper the line, the stiffer the spring.