KS3 Science Knowledge Organiser Periodic Table

B. Periodic Table

н

Li

Na

Κ

Rb

Cs

Fr

Lithium

Sodium

Potassium

Rubidium



C. Group 1 – The Alkali Metals

- Physical properties:
- Melting point decreases from top to bottom of Group 1.
 - Boiling point decreases from top to bottom of Group 1.
 Chemical properties:
- Very reactive reactivity
- Cesium increases as you go from top to bottom. Francium • Produce alkaline
 - Produce alkaline solutions when reacting with water.

For further guidance see pages 60-69 of the Actvivate 2 textbook on Kerboodle.



A. Key Terms:		
1. Boiling point	The temperature at which a substance boils.	
2. Chemical properties.	How a substance behaves in its chemical reactions.	
3. Density.	The mass of a material in a certain volume.	
4. Displacement.	In a displacement reaction, a more reactive metal displaces – or pushes out – a less reactive metal from its compound.	
5. Element.	A substance that cannot be broken down into other substances.	
6. Group.	A vertical column of the Periodic Table. The elements in a group have similar properties.	
7. Melting point.	The temperature at which a substance melts.	
8. Metal.	Elements on the left of the stepped line of the Periodic Table.	
9. Metalloid.	Elements near the stepped line of the Periodic Table are metalloids.	
10. Non-metal.	Elements on the right of the stepped line of the Periodic Table.	
11. Period.	A horizontal row of the Periodic Table.	
12. Physical properties.	A property of a material that you can observe or measure.	

D. Group 7 – The Halogens

F ←→ fluorine

CI +-- chlorine

Br +-- bromine

←→ iodine

At 🔶 astatine

Physical properties:

- Melting point increases from top to bottom of Group 7.
 - Boiling point increases from top to bottom of Group 7.
- Chemical properties:Very reactive with iron
 - reactivity decreases as you go from top to bottom.
 - Produce alkaline solutions when reacting with water.



E. Group 0 – The Noble Gases

Physical properties:

- Melting point increases from top to bottom of Group 0.
- Boiling point increases from top to bottom of Group 0.
- Melting and boiling points are very low.

Chemical properties:

• Very unreactive – take part in very few reactions.

KS3 Science Knowledge Organiser The Human Body



C. Respiratory system.



A. Key Terms:	
1. Balanced diet.	Eating food containing the right nutrients in the correct amounts.
2. Carbohydrates.	Nutrient that provides energy.
3. Diffusion.	The movement of liquid or gas particles from a place of high concentration to a place of low concentration.
4. Digestion.	Process where large molecules are broken down into small molecules.
5. Exhalation.	The process of breathing out to remove carbon dioxide.
6. Gas exchange.	The transfer of gases between an organism and its environment.
7. Inhalation.	The process of breathing in to take in oxygen.
8. Minerals.	Essential nutrients needed in small amounts to keep you healthy.
9. Obesity.	A condition where one is extremely overweight.
10. Proteins.	Nutrient used for growth and repair.
11. Vitamins.	Essential nutrients needed in small amounts to keep you healthy.

D. Food tests – starch. 1. Crush the food using a postlo and mortor.

- pestle and mortar.Add a few drops of water and mix well.
- Add a few drops of iodine solution to the food solution.
- 4. If the solution turns a dark blue-black colour, the food contains starch.

1. Crush the food using a pestle and mortar.

E. Food tests – lipids.

- 2. Add a few drops of water and mix well.
- 3. Add a few drops of ethanol to the food solution.
- 4. Shake the test tube and leave for one minute.
- 5. Pour water in to the ethanol/food mixture and if the solution becomes cloudy the food contains lipids.

F. Food tests – sugar.

- 1. Crush the food using a pestle and mortar.
- 2. Add a few drops of water and mix well.
- 3. Add a few drops of Benedict's solution to the food.
- 4. Heat the test tube in a water bath and if the solution turns orange-red the food contains sugar.



G. Food tests – protein.

- 1. Crush the food using a pestle and mortar.
- 2. Add a few drops of water and mix well.
- 3. Add a few drops of copper sulfate solution to the food, then a few drops of sodium hydroxide solution.
- 4. If the solution turns purple, the food contains protein.



KS3 Science Knowledge Organiser Energy

B. Key equations
Energy (J)
Power $(W) = $ Time (s)
Work done (J) = Force (N) x Distance (m)
Cost of energy = Power x Time x Price (kW) (hrs) (per kWh)
For further guidance see pages 144-149 & 152- 155 of the Actvivate 2 textbook on Kerboodle.



I	A. Key Terms:	
1. Chemical store.		Energy stored in food and fuels.
J	2. Conduction.	The way in which energy is transferred through solids and to a much lesser extent in liquids and gases.
	3. Conductor.	A material that conducts charge or energy well.
	4. Convection.	The transfer of energy by the movement of gases or liquids.
	5. Convection current.	The movement of heated liquids or gases.
	6. Dissipated.	Energy that has become spread out and transferred by heating the environment.
	7. Elastic store.	Energy stored when objects change shape.
	8. Equilibrium.	Objects are at thermal equilibrium when they are at the same temperature.
	9. Gravitational potential.	Energy due to the position of an object in a gravitational field.
	10. Insulator.	A material that does not conduct electricity or transfer energy well.
1	11. Joule.	The unit of energy, symbol J.
	12. Kinetic energy.	Energy of moving objects.
	13. Power.	The rate of doing work.
	14. Radiation.	The transfer of energy as a wave.
	15. Temperature.	A measure of how hot or cold something is.
	16. Thermal energy.	Energy in objects as a result of the motion of their particles.
	17. Thermometer.	An instrument used to measure temperature.
7	18. Watt.	The unit of power, symbol W.
	19. Work.	A way of transferring energy that does not involve heating.

KS3 Science Knowledge Organiser Bioenergetics					
B. Pho	oto	synth	esis		
Carbon Dioxide	+	Water		Glucose +	Oxygen
6CO ₂	+	6H ₂ O		C ₆ H ₁₂ O ₆ +	60 ₂

C. Aero	bic respiration		
Glucose	+ Oxygen Carbon Dioxide	+	Water
$C_{6}H_{12}O_{6}$	+ 60 ₂ - 6C0 ₂	+	6H ₂ O

D. Anaerobic respiration			
Glucose \longrightarrow Lactic Aci C ₆ H ₁₂ O ₆ \longrightarrow 2C ₃ H ₆ O ₃	d		

For further guidance see **pages 22-27** & **30-33** of the **Actvivate 2** textbook on Kerboodle.



A. Key Terms:	
1. Aerobic respiration.	Chemical reaction where glucose reacts with oxygen to release energy, carbon dioxide and water.
2. Algae.	Green unicellular or multicellular organisms that perform photosynthesis and live underwater.
3. Anaerobic respiration.	Chemical reaction that takes place without oxygen. Glucose is converted into lactic acid and energy is released.
4. Chlorophyll.	Green pigment that absorbs light for use in photosynthesis.
5. Consumer.	Organisms that eat other organisms as food.
6. Deficiency.	A lack of minerals that causes poor growth.
7. Fermentation.	Chemical reaction used by microorganisms to convert glucose into ethanol, carbon dioxide and energy.
8. Fertiliser.	Chemical containing minerals, normally applied to soil.
9. Haemoglobin.	The substance in blood that carries oxygen around the body.
10. Mitochondria.	The organelle where aerobic respiration takes place.
11. Photosynthesis.	The process plants use to make their own food. Carbon dioxide and water react together to make glucose and oxygen.
12. Plasma.	The liquid part of blood which carries carbon dioxide to the lungs where it is exhaled.
13. Producer.	Organism that makes its own food using photosynthesis.
14. Stomata.	Holes found on the bottom of the leaf that allow gases to diffuse in and out of the leaf.

E. Internal structure of the leaf



KS3 Science Knowledge Organiser Forces

B. Key equations

Weight = mass (kg) x gravitational field (N) strength (N/kg)

Moment (N/m) = force (N) x perpendicular distance from the pivot (m)

For further guidance see **pages 112-121** of the **Activate 1 & 162-169** of the **Activate 2** textbook on Kerboodle.



A. Key Terms:	
1. Air resistance.	The force on an object moving through the air that causes it to slow down.
2. Balanced forces.	Forces acting on an object that are the same size but act in opposite directions.
3. Compress.	To squash into a smaller space.
4. Contact force.	A force that acts when an object is in contact with a surface, air or water.
5. Deform.	To change shape.
6. Drag.	The force acting on an object moving through air or water that causes it to slow down.
7. Electrostatic force.	The force acting between two charged objects.
8. Extension.	The amount by which an object gets longer when a force is applied.
9. Friction.	The force that resists movement because of contact between surfaces.
10. Gravity.	A non-contact force that acts between two masses.
11. Incompressible.	Unable to squash something into a small space.
12. Lubrication.	A substance that reduces friction between surfaces when they rub together.
13. Magnetic force.	The force between two magnets, or a magnet and a magnetic material.
14. Mass.	The amount of matter a thing is made up of.
15. Moment.	A measure of the ability of a force to rotate an object about a pivot.
16. Newton.	The unit of force, symbol N.
17. Newton meter.	A piece of equipment used to measure weight in Newtons.
18. Non-contact.	A magnetic, electrostatic or gravitational force that acts between objects not in contact.
19. Pivot.	The point about which a lever or see-saw balances.
20. Pressure.	The force exerted on a certain area.
21. Reaction.	The support force provide by a solid surface like a floor.
22. Streamlined.	Shaped to reduce resistance to motion from air or water.
23. Tension.	A stretching force.
24. Unbalanced.	Opposing forces on an object that are unequal.
25. Weight.	Force caused by gravity – the gravitational force between an object and the Earth.

KS3 Science Knowledge
Organiser
Reactions

B. Signs of a chemical reaction

- 1. Change in temperature.
- 2. Light.
- 3. Change in colour.
- 4. Bubbles/fizzing to show a gas is being made.

C. Naming compounds

1. When combining a metal with a non-metal the product will be a **metal -ide** e.g. potassium + oxygen \rightarrow potassium oxide.

2. When combining two elements with oxygen the compound formed will be a **metal –ate**

e.g. Magnesium + nitrogen + oxygen \rightarrow Magnesium nitrate.

3. Mono = one e.g. monoxide = one oxygen. Di = two e.g. dioxide = two oxygens. Tri = three e.g. trioxide = three oxygens.

D. Common formulae

- 1. Hydroxide = OH
- 2. Nitrate = NO_3
- 3. Sulfate = SO_4
- 4. Carbonate = CO_3

A. Key Terms:		
1. Catalyst.	A substance that increases the rate of a chemical reaction without itself undergoing any permanent chemical change.	
2. Chemical change.	A change in which atoms are rearranged to create new substances.	
3. Combustion.	A chemical reaction in which a substance reacts quickly with oxygen and gives out light and heat.	
4. Conservation of mass.	In a chemical reaction, the total mass of reactants is equal to the total mass of products.	
5. Endothermic.	A transfer of energy from the surroundings.	
6. Exothermic.	A transfer of energy to the surroundings.	
7. Fuel.	A material that burns to transfer useful energy.	
8. Oxidation.	A chemical reaction in which substances react with oxygen to form oxides.	
9. Physical change.	A change that is reversible, in which new substances are made.	
10. Product.	A substance that is made in a chemical reaction.	
11. Reactant.	A starting substance in a chemical reaction.	
12. Reversible.	Something that is capable of being changed back to its original state/form.	

E. Representing reactions Word equations: Potassium + oxygen \rightarrow Potassium oxide Reactants Products Symbol equations: $4 + 0_2 \rightarrow 2 \times 20$ Balanced equations

KS3 Science Knowledge Organiser Waves





For further guidance see **pages 124-145** of the **Actvivate 1** textbook on Kerboodle.



A. Key Terms:	
1. Absorb.	Taken into a material.
2. Amplitude.	The distance from the middle to the top or bottom of a wave.
3. Dispersion.	The splitting up of a ray of light of mixed wavelengths by refraction into its components.
4. Emitted.	To give out.
5. Frequency.	The number of complete waves or vibrations produced in one second (measured in hertz).
6. Hertz.	The unit of frequency (Hz).
7. Longitudinal.	A wave where the vibrations are in the same direction as the direction the wave moves.
8. Luminous	Gives out light.
9. Non-Iuminous.	Objects that produce no light.
10. Opaque.	Objects that absorb, scatter or reflect light and do not allow any light to pass through.
11. Oscillation.	Something that moves backwards and forwards.
12. Pitch.	A property of sound determined by its frequency.
13. Reflection.	The change in direction of a ray or wave after it hits a surface and bounces off.
14. Refraction.	The change in direction of a ray or wave as a result of its change in speed.
15. Superpose.	When waves join together so that they add up or cancel out.
16. Translucent.	Objects that transmit light but diffusing (scattering) the light as it passes through.
17. Transmit.	When light or other radiation passes through an object.
18. Transparent.	Objects that transmit light and you can see through them.
19. Transverse.	The vibrations are at right angles to the direction the wave moves.
20. Ultrasound.	Sound at a frequency greater than 20,000 Hz, beyond the range of human hearing.
21. Vacuum.	A space in which there is no matter.
24. Wavelength.	The distance between two identical points on a wave.

KS3 Science Knowledge Organiser Inheritance.

B. Genetic materials



For further guidance see **pages 50-55** of the **Actvivate 2** textbook on Kerboodle.



A. Key Terms:	
1. Allele.	Alternative forms of the same gene.
2. Biodiversity.	The range of organisms living in an area.
3. Chromosomes.	Long strand of DNA that contains many genes.
4. DNA.	Chemical that contains all the information needed to make an organism.
5. Evolution.	Development of a species over time.
6. Extinction.	When no more individuals of a species are left anywhere in the world.
7. Gene bank.	A store of genetic samples, used for research and to try and prevent extinction.
8. Genes.	Section of DNA that contains the information for a characteristic.
9. Natural selection.	Process by which the organisms with the characteristics that are most suited to the environment survive and reproduce, passing on their genes.

B. Natural selection

1. Organisms in a species show variations which is caused by differences in their genes.

2. The organisms with the characteristics that are best adapted to the environment survive and reproduce. Less well adapted organisms die.

3. Genes from successful organisms are passed to the offspring in the next generation. This means the offspring are likely to possess the characteristics that made their parents successful.

4. This process is then repeated many times. Over a period of time this can lead to the development of a new species.

KS3 Science Knowledge Organiser Magnetism

B. Attraction and repulsion

- 1. North poles REPEL north poles.
- 2. South poles REPEL south poles.
- 3. North poles ATTRACT south poles.

C. Increasing the strength of an electromagnet.

The strength of an electromagnet depends on:

- 1. The number of turns or loops on the coil. Increasing the number of turns will increase the strength of the electromagnet.
- 2. The current flowing in the wire. Increasing the current flowing in the wire will increase the strength of the electromagnet.
- 3. The type of core. Using a magnetic material in the core will increase the strength of the electromagnet.

A. Key Terms:	
1. Attract.	Be pulled together, for example, opposite poles of a magnet attract and positive and negative charges attract.
2. Core.	A rod of a magnetic material placed inside a coil to make the magnetic field of an electromagnet stronger.
3. Electromagnet.	A temporary magnet produced using an electric current.
4. Magnetic field.	A region where there is a force on a magnet or magnetic material.
5. Magnetic field lines.	Imaginary lines that show the direction of the force on magnetic material.
6. Magnetic material.	A material that is attracted to a magnet, such as iron, steel, nickel or cobalt.
7. Motor.	A component or machine that spins when a current flows through it.
8. North pole.	The pole of a magnet that points towards the north.
9. Relay.	Electrical device that uses current flowing through it in one circuit to switch on and off a current in a second circuit.
10. Repulsion.	Be pushed away from each other, for example, like magnetic poles repel or like electric charges repel.
11. South pole.	The pole of a magnet that points towards the south.

D. Magnetic field around a bar magnet



For further guidance see **pages 50-55** of the **Actvivate 2** textbook on Kerboodle.



KS3 Science Knowledge Organiser Climate

For further guidance see **pages 112-117** of the **Actvivate 2** textbook on Kerboodle.



B. The greenhouse effect <u></u> Some of this heat is absorbed by greenhouse gases. These gases then radiate Heat from the Sun the heat back enters the Earth's towards Earth atmosphere and warms the Earth's The Earth surface becomes warmer as a result The Earth's surface becomes hotter and radiates heat back out

A. Key Terms:	
1. Carbon cycle.	The carbon cycle shows stores of carbon and summarises how carbon and its compounds enter and leave these stores.
2. Climate change.	A long term change in weather patterns.
3. Combustion.	A burning reaction in which a substance reacts quickly with oxygen and gives out light and heats the surroundings.
4. Deforestation.	The cutting down or burning of tress in forests.
5. Dissolving.	The mixing of a substance (the solute) with a liquid (the solvent) to make a solution.
6. Greenhouse effect.	The absorbing of energy by gases in the atmosphere, such as carbon dioxide, which keeps the Earth warmer than it would be otherwise.
7. Greenhouse gas.	A gas that contributes to climate change such as carbon dioxide.
8. Global warming.	The gradual increase in the Earth's mean air temperature.
9. Photosynthesis.	The process plants use to make their own food, glucose. In photosynthesis, carbon dioxide and water react together to make glucose and oxygen.
10. Radiation.	The transfer of energy as a wave.
11. Recycling.	Collecting and processing materials that have been used to make new objects.
12. Respiration.	The process that transfers energy from plants and animals. In respiration, glucose reacts with oxygen to make carbon dioxide and water.

C. The carbon cycle.

