

Science Year 8– Spring Term 2022

	What? When? Why?			
	BIOLOGY 8C Breathing & Respiration	CHEMISTRY 8F Periodic Table	PHYSICS 8J Light	CHEMISTRY 8G Metals & their uses
Lesson 1 Learning intentions	<u>The Gas exchange system</u> Recall the main organs in the human gaseous exchange system. Recall definitions for the terms: breathing, breathing rate, ventilation, inhalation, exhalation. Recall the functions of the organs in the human gaseous exchange system and what happens during gas exchange. Describe how muscles attached to ribs and the diaphragm produce breathing movements and use a model to explain how lungs expand and contract. Use a pressure model to explain ventilation. Explain how specialised cells keep the lungs clean (mucus production and ciliated epithelial cells).	<u>Dalton’s model of the atom</u> Recall that different elements have different physical properties Recall Dalton’s ideas about atoms Recall how to identify the chemical symbols for some common elements and vice versa Recall how to record two-letter symbols correctly Use a simple (Dalton’s) atomic model to describe an element. Use the idea of atoms to explain why different elements have different physical properties Use information about reaction ratios to calculate atomic masses	<u>How do we see objects?</u> State the meaning of: reflect, scatter, transmit, absorb Use the ray model of light to explain how we see things that are not sources of light. Describe some uses of plane mirrors. Describe the difference between even reflection and scattering, and recall the law of reflection. State the meaning of: diffuse, specular, incident ray, reflected ray. Use ray diagrams to explain the law of reflection and to describe the differences in light reflected from smooth and rough surfaces	<u>Corrosion</u> State the meaning of: rusting Recall some reactions that happen slowly and some that happen quickly Recall ways in which iron can be prevented from rusting Describe the corrosion of metals by reactions with oxygen. Relate the uses of different elements to their chemical properties. Explain how barrier methods protect iron from rust.
Lesson 2	<u>Gas exchange</u>	<u>Physical Trends</u>	<u>Images formed by mirrors</u>	<u>Oxidation Reactions</u>

<p>Learning intentions</p>	<p>Recall the structure of the lungs</p> <p>Recall how diffusion works in terms of particles.</p> <p>Explain how the lungs are adapted for efficient gas exchange.</p> <p>Explain how and why a concentration gradient is maintained for oxygen and carbon dioxide between the blood and lungs.</p>	<p>Recall that different elements have different physical properties</p> <p>Explain melting, freezing and boiling points and use them to predict the state of a substance</p> <p>Use the idea of atoms to explain why different elements have different physical properties</p>	<p>Describe the characteristics of the image formed by a plane mirror and use ray diagrams to explain its formation.</p> <p>Use the ray model of light to explain how a periscope works.</p> <p>State the meaning of: convex mirror, concave mirror.</p> <p>Use ray diagrams to explain some of the features of images in periscopes.</p>	<p>Recall and explain the products formed by the oxidation of metals</p> <p>Model simple oxidation reactions using word equations.</p> <p>Identify the products and reactants using a symbol equation.</p> <p>Model simple reactions using balanced symbol equations</p>
<p>Lesson 3 Learning intentions</p>	<p><u>Peak Flow Investigation</u></p> <p>Recall the definitions of the terms: range, anomalous result, correlation.</p> <p>Use a peak flow meter</p> <p>Explain why data with a small range is of good quality.</p> <p>Calculate means and explain their use.</p> <p>Identify anomalous results in data.</p> <p>Identify correlations using scatter graphs.</p>	<p><u>Investigating the properties of metals & non-metals</u></p> <p>Recall that different elements have different physical properties</p> <p>Describe and identify trends in physical properties within the periodic table</p> <p>Identify metals and non-metals by their properties and position in the periodic table</p> <p>Use the idea of atoms to explain why different elements have different physical properties</p>	<p><u>Refraction</u></p> <p>State the meaning of: refraction, angle of refraction, refracted ray, convex lens, converging lens.</p> <p>Recall that light, sound travels at different speeds in different materials.</p> <p>Draw ray diagrams to describe the refraction of light as it passes into and out of different media</p> <p>Describe what refraction is.</p> <p>Explain why refraction occurs.</p> <p>State the meaning of: total internal reflection, critical angle.</p> <p>Describe some uses of total internal reflection such as in optical fibres and in binoculars.</p>	<p><u>Metals & water (reactions)</u></p> <p>Describe the reactions of different metals with water</p> <p>Describe the gas test for hydrogen</p> <p>Use information on the reactions of metals with water to place them in an order of reactivity</p> <p>Relate the uses of different elements to their chemical properties</p> <p>Use ideas about reactivity to explain how sacrificial metals can protect iron from rusting</p>

<p>Lesson 4 Learning intentions</p>	<p><u>Effect of exercise investigation</u></p> <p>Recall the definitions of the terms: range, anomalous result, correlation.</p> <p>Carry out an experiment to try to correlate the strenuousness of an activity with the effect it has on pulse and breathing rates.</p> <p>Identify the ranges of readings in data.</p> <p>Explain why data with a small range is of good quality.</p> <p>Calculate means and explain their use.</p> <p>Identify anomalous results in data.</p>	<p><u>Group 1: Alkali Metals</u></p> <p>Describe the reactions of metals with water.</p> <p>Recall the typical properties of alkali metals</p> <p>Identify a pattern of reactivity in the reaction between some alkali metals and water and use this to predict the reactivity of other alkali metals.</p> <p>State that atoms can be joined up to make molecules or giant lattice structures</p>	<p><u>Lenses</u></p> <p>Describe some uses of lenses.</p> <p>Describe the effects of convex lenses on parallel beams of light.</p> <p>State the meaning of focal length, focus, and principal axis.</p> <p>Relate the power of a lens to its shape</p> <p>Describe the effects of concave lenses on parallel beams of light.</p> <p>Describe the causes and effects of long-sight and short-sight and how different types of lens are used to correct these defects.</p> <p>Explain how different types of lens are used to correct long-sight and short-sight</p>	<p><u>Metals & Water (equations)</u></p> <p>Identify and explain the products formed by the reactions of metals with water.</p> <p>Model simple reactions of metals and water using word equations.</p> <p>Supply missing reactants or products to complete a symbol equation</p>
<p>Lesson 5 Learning intentions</p>	<p><u>Effect of exercise explanation</u></p> <p>Recall how breathing rate and heart rate are affected by exercise.</p> <p>Recall how substances reach respiring cells from the blood and how waste products are returned to the blood.</p> <p>Explain the changes in heartbeat and breathing rate during exercise.</p>	<p><u>Group 7: The Halogens</u></p> <p>Recall the typical properties of halogens</p> <p>Recall there is usually a regular gradation in chemical properties as you go down a group.</p> <p>Use data to identify trends in chemical properties within a group.</p>	<p><u>Cameras and eyes</u></p> <p>Recall the primary colours for light.</p> <p>Identify the parts of the eye (including rods and cones) and state their functions.</p> <p>Identify the parts of a camera and state their functions.</p> <p>Use ray diagrams to explain image formation in pinhole cameras.</p>	<p><u>Metals & Acids (reactions)</u></p> <p>Recall some reactions that happen slowly and some that happen quickly</p> <p>Relate the uses of different elements to their chemical properties</p> <p>Use information on the reactions of metals with acids to place them in order of reactivity</p>

	<p>Explain some of the effects of reduced oxygen supply on the body.</p> <p>Explain why exercise is recommended to help people with cardiovascular disease</p>		<p>Identify which parts of the eye cause refraction of light and describe how light is focused on the retina.</p> <p>Describe similarities and differences between cameras and eyes.</p> <p>Describe some examples of the absorption of energy transferred by light leading to chemical or electrical effects (in the retina or in a camera sensor).</p> <p>Describe how secondary colours of white light can be made from primary colours of light.</p> <p>Describe the way our eyes detect different colours.</p>	
<p>Lesson 6 Learning intentions</p>	<p><u>Smoking & Gas exchange</u></p> <p>Recall some harmful chemicals in tobacco smoke. 3rd</p> <p>Recall the effects of nicotine, tar and carbon monoxide in tobacco smoke.</p> <p>Describe how asthma, emphysema and tobacco tar can reduce gas exchange.</p> <p>Explain the effects of some chemicals in tobacco smoke on the body</p>	<p><u>Mendeleev's table</u></p> <p>Identify the alkali metals, halogens, (transition metals) and noble gases in the periodic table</p> <p>State what elements in the same group of the periodic table share</p> <p>Recall that the noble gases are chemically inert compared with other elements</p> <p>Explain how Mendeleev made predictions using his table.</p>	<p><u>Colour</u></p> <p>Describe how to split light into different colours using a prism and correctly use the terms: spectrum, dispersion.</p> <p>Recall the colours of the visible spectrum, in order.</p> <p>Recall that the appearance of an object depends on the colour of light shining on it.</p> <p>Recall that filters can be used to make coloured light.</p>	<p><u>Metals & acids (equations)</u></p> <p>Describe the reactions of acids with metals</p> <p>Recall which salts are produced by which acids</p> <p>Model simple reactions of metals and acids using word equations.</p> <p>Model simple reactions using symbol equations.</p> <p>Write and derive the formulae for common acids and simple salts,</p>

		<p>Describe how the periodic table is arranged (in terms of elements in groups of similar properties).</p> <p>Explain how Mendeleev originally arranged the periodic table by placing the elements in order of atomic weight</p>	<p>Explain why coloured objects appear coloured.</p> <p>Explain how filters can be used to make coloured light.</p> <p>Explain why objects look different in light of different colours.</p> <p>Explain how paints of different colours can be made by colour subtraction.</p>	<p>given the ratios of atoms or the formulae of reactants</p> <p>Model simple reactions using balanced symbol equations</p>
<p>Lesson 7 Learning intentions</p>	<p><u>Gas exchange & respiration</u></p> <p>Recall the definition for aerobic respiration.</p> <p>Recall ways in which respiration can be detected (limewater, hydrogen carbonate indicator, heat).</p> <p>Compare respiration in plants and animals.</p> <p>Describe how gas exchange occurs in plants.</p> <p>Compare the human gaseous exchange system with those of other animals.</p> <p>Compare the efficiencies of different gas exchange organs.</p>	<p><u>Chemical Properties/compunds</u></p> <p>Recall how chemical reactions are different from physical changes</p> <p>Recall the difference between physical and chemical properties of a substance</p> <p>Recall observations used to decide whether a chemical reaction has taken place</p> <p>Use a simple (Dalton's) atomic model to describe a compound</p> <p>Model more complex chemical reactions using word equations.</p> <p>Describe how atoms are rearranged in chemical reactions.</p> <p>Write simple chemical formulae from information on structure.</p>		<p><u>Pure metals</u></p> <p>Describe what happens during changes of state</p> <p>State what happens at a material's melting, freezing and boiling point</p> <p>State what is meant by: pure</p> <p>State that a pure material has a fixed melting point and boiling point.</p> <p>Describe how impurities alter melting, freezing and boiling points.</p> <p>Identify a pure substance from its melting or boiling point.</p> <p>Describe some ways in which purity is stated</p>

	<p>Identify the limitations of lungs, gills and body surface covering as sites of gas exchange.</p>	<p>Interpret formulae to identify the types of and ratio of atoms in a compound.</p> <p>Give a simple description of the valency of an element and use this to deduce the formula of compounds (containing two main group elements)</p>		
<p>Lesson 8 Learning intentions</p>	<p><u>Anaerobic Respiration</u></p> <p>Recall what happens in anaerobic respiration in humans.</p> <p>Recall why aerobic and anaerobic respiration occur in humans at the same time.</p> <p>Recall that anaerobic respiration releases less energy than aerobic respiration.</p> <p>Model anaerobic respiration using a word equation.</p> <p>Describe how lactic acid is removed from tissues.</p> <p>Explain why anaerobic activity cannot be sustained.</p> <p>Analyse and explain the changes in heartbeat and breathing rate during and after exercise (including EPOC/oxygen debt).</p>	<p><u>Reactions of Metals & Non-metal oxides</u></p> <p>Describe the reactions of metals with oxygen</p> <p>Describe the reactions of non-metals with oxygen</p> <p>Compare the physical and chemical properties of metal and non-metal oxides.</p> <p>State that atoms can be joined up to make molecules</p> <p>Describe the difference between molecules and giant lattice structures</p>		<p><u>Alloys</u></p> <p>State the meaning of: alloy</p> <p>Explain why metals are often alloyed with other elements</p> <p>Use models to explain why converting pure metals into alloys often increases the strength of the product.</p> <p>Plot and interpret graphs of melting point or boiling point for mixtures of varying compositions</p>

	Explain the effects of poisons that disrupt certain metabolic processes.			
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