

Meden School Curriculum Planning							
Subject	Biology	Year Group	9	Sequence No.	1	Topic	Cardiovascular system & Respiration

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>KS2 Learning Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</p> <p>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.</p> <p>KS3 Learning</p> <p>Year 7 Organisms & Body Systems topic Identifying whether certain things are alive or not alive, by using MRS. GREN. Which stands for movement, respiration, sensitivity, growth, reproduction, excretion and nutrition. Basic cells, tissues, organs, organ systems and organisms. Different types of muscle: cardiac (only in</p>	<p>L1: What is the structure of the lungs? The structure of the lungs includes the Trachea, Diaphragm, Pleural membranes, Heart, Intercostal, muscles, Rib, Oesophagus, Bronchus, Bronchiole, Alveoli. Differences between the healthy lungs and the smoker's lungs. Chronic obstructive pulmonary disease (COPD) is the name for a collection of lung diseases including chronic bronchitis and emphysema. Symptoms of COPD include breathlessness, persistent cough and frequent chest infections.</p> <p>L2: How do we breathe? Inhaling is the scientific term for breathing in, your diaphragm contracts, your chest expands, and the ribcage moves up and out using your intercoastal muscles. Exhaling the scientific term for breathing out, your diaphragm relaxes your chest contracts, and your ribcage moves down and in. The oxygen travels through the following structures: Mouth/nose, trachea, bronchus, bronchioles, alveoli, blood, diffuses into body cells for respiration. The lungs contain millions of tiny air sacs called alveoli which have a large surface area. They are surrounded by a network of blood capillaries. This is where gas exchange happens. Blood passing next to the alveolus has returned from the body, so it has very little oxygen, but it has a lot of carbon dioxide. Oxygen diffuses out of the alveolus and into the red blood cells. Carbon dioxide diffuses out of the blood plasma and into the alveolus to be exhaled.</p> <p>L3 – What is the structure of the heart? The heart is an organ in the body that is part of the circulatory system. On diagrams the heart is the opposite way around. Oxygenated blood travels through the left side of the heart, deoxygenated blood travels through the right side of the heart. The left side is larger with a thicker muscle wall, because it</p>	<p>L1: Should smoking be banned? New Zealand will ban the sale of tobacco to its next generation, in a bid to eventually phase out smoking. Anyone born after 2008 will not be able to buy cigarettes or tobacco products in their lifetime.</p> <p>L6: How can we relieve the pressure on the NHS? Atherosclerosis is a condition where the arteries become blocked with fatty deposits and atheromas which can lead to blood clots, cardiac arrest and strokes. It is usually caused by an unhealthy lifestyle.</p>

<p>the heart), smooth (no stripes), skeletal (stripy)</p> <p>Year 8</p> <p>Plant Structure and Reproduction topic plants also carry out aerobic respiration to release energy for life processes. Students should know the word equation for aerobic respiration is glucose + oxygen – carbon dioxide + water.</p> <p>Microbes' topic The importance of yeast (fungi) in baking, know what is meant by aerobic and anaerobic respiration and the relevance to fermentation.</p> <p>Digestion topic The Villi structures in the small intestine is only one cell thick so there is a short diffusion pathway. There are also many blood capillaries, so a concentration gradient is maintained.</p>	<p>needs to transport the oxygenated blood through the aorta at high pressure around the body. The heart is made up of four chambers. The structures in the heart are; left atrium, right atrium, left ventricle, right ventricle, pulmonary artery, pulmonary vein, aorta, vena cava, septum, valves, thicker muscle wall.</p> <p>L4 – How does our heart pump blood? The heart is made from different muscle tissues; Smooth/involuntary muscle, Striated/voluntary muscle, Cardiac cells make cardiac (heart) tissue. The heart is part of the circulatory system The circulatory system is made up of the heart, blood vessels and blood It is known as a double circulatory system is two circuits joined together. The right ventricle pumps deoxygenated blood to the lungs The left ventricle pumps oxygenated blood around the body. At the body cells the red blood cells give up the oxygen by diffusion. As the heart is a muscle, its needs to be supplied with its own oxygen so it can beat. Coronary arteries are on the outside of the heart. They supply the cardiac muscle with oxygen for them to respire. If they become blocked the part of the cardiac muscle they supply will die, leading to cardiac arrest. Pacemakers are devices that can be implanted into people who need their heart regulating when their own sinoatrial node isn't working correctly. The pacemaker then sends the electrical impulse to the heart to trigger it beat</p> <p>L5 – GPA task – Testing students' knowledge of the topic so far.</p> <p>L6 – What carries our blood? The three blood vessels involved in transporting the blood are; arteries, veins and capillaries. Arteries have thick elastic walls so they can withstand high pressures, they have smaller lumens in the centre. They are made from elastic muscle fibres to allow them to stretch and return to normal. Veins have thinner walls and a bigger lumen; they carry the blood at lower pressures back to the heart. They have valves in them to stop the backflow of deoxygenated blood. Capillaries are the smallest blood vessels and are usually one cell thick. They make up a huge network around the body, they go close to all cells in the body and are made of permeable walls to allow them to exchange substances in the body e.g. oxygen and carbon dioxide at the alveoli. Atherosclerosis is a condition where the arteries become blocked with fatty deposits and atheromas which can lead to blood clots, cardiac arrest and strokes.</p> <p>L7 – What are the components of the blood? The four components in blood are red blood cells, white blood cells, platelets and plasma.</p>	
--	--	--

Red blood cells contain a **pigment** called **haemoglobin** which **binds** to the **oxygen** to become **oxyhaemoglobin**, they have **no nucleus** and a **biconcave** shape to give them a **bigger volume** and **surface area** to carry the oxygen.

White blood cells fight off **pathogens** that enter our body. They **engulf** the **pathogen** and **digest** it.

Platelets, are tiny **fragments of cells** in our blood that involved in **blood clotting** and **scab forming**.

Plasma is a yellow straw like **fluid** which allows the blood to be transported around the body, it also carries the **waste products, nutrients, hormones, proteins, antibodies and antitoxins**.

L8 – How do I transfer energy for walking?

Aerobic Respiration is a **chemical reaction**:

Oxygen (6O₂) + glucose (C₆H₁₂O₆) --> carbon dioxide (6CO₂) + water (6H₂O) + (energy released).

Misconception to address – RESPIRATION IS NOT BREATHING!

Respiration occurs in the mitochondria of all **animal** and **plant cells** and is how we get our **energy**

Misconception to address – ENERGY IS NOT CREATED it is released/transferred

L9 – How do I transfer energy to sprint?

Anaerobic Respiration is a **chemical reaction**:

glucose (C₆H₁₂O₆) --> Lactic acid + (limited energy released).

Anaerobic respiration occurs when **oxygen** has run out in the body. Without the presence of **oxygen glucose** is unable to be fully **broken down**. **Lactic acid** builds up as a **bi-product** causing muscle to **fatigue** and **ache**.

After **vigorous** exercise our body will try to **replenish** the **oxygen** that it has used and restore it to normal levels. This is known as **oxygen debt**. It is the reason you continue to breathe heavily and your heart beats quickly after you have finished exercise.

L10 – How is anaerobic respiration used in the food and drink industry?

Anaerobic respiration within plants is a **reaction** that occurs without the presence of **oxygen**.

Glucose --> ethanol + carbon dioxide.

The **Yeast cells metabolize** the **starches** and **sugars** in the flour, turning them into **alcohol** and **carbon dioxide**. This is known as **Fermentation** and the **carbon dioxide (gas)** that is produced causes the bread to rise. The **ethanol** that is produced during the **fermentation** process makes drink **alcoholic**.

L11: EoTT

L12: GPA.

--	--	--