B4 Organising animals and plants

Lessons TBAT	Key Knowledge	Practical	Assessment
Describe the functions of each blood component Explain the features of each blood vessel Identify the direction of blood flow through the body Evaluate the treatment methods for heart problems Describe the structure of the human gas exchange system Explain the adaptations of a leaf	Students should know the structure and functioning of the human heart and lungs, including how lungs are adapted for gaseous exchange. The heart is an organ that pumps blood around the body in a double circulatory system. The right ventricle pumps blood to the lungs where gas exchange takes place. The left ventricle pumps blood around the rest of the body. Knowledge of the blood vessels associated with the heart is limited to the aorta, vena cava, pulmonary artery, pulmonary vein and coronary arteries. Knowledge of the names of the heart valves is not required. Knowledge of the lungs is restricted to the trachea, bronchi, alveoli and the capillary network surrounding the alveoli. The natural resting heart rate is controlled by a group of cells located in the right atrium that act as a pacemaker. Artificial pacemakers are electrical devices used to correct irregularities in the heart rate. Students should be able to explain how the structure of these vessels relates to their functions. The body contains three different types of blood vessel: Vein, arteries and capillaries. Blood is a tissue consisting of plasma, in which the red blood cells, white blood cells and platelets are suspended. Students should know the functions of each of these blood components.	Observing and drawing blood cells seen under a microscope. Observation and drawing of a transverse section of leaf. Measure the rate of transpiration by the uptake of water. Investigate the distribution of stomata and guard cells.	End of unit test Maths Skills Students should be able to use simple compound measures such as rate and carry out rate calculations for blood flow. Process data from investigations involving stomata and transpiration rates to find arithmetic means, understand the principles of sampling and calculate surface areas and volumes. Translate information between graphical and numerical form • plot and draw appropriate graphs,

Compare the transport systems of xylem and phloem Explain the importance of stomata and guard cells in transpiration	Students should be able to recognise different types of blood cells in a photograph or diagram, and explain how they are adapted to their functions. Students should be able to evaluate the advantages and disadvantages of treating cardiovascular diseases by drugs, mechanical devices or transplant. In coronary heart disease layers of fatty material build up inside the coronary arteries, narrowing them. This reduces the flow of blood through the coronary arteries, resulting in a lack of oxygen for the heart muscle. Stents are used to keep the coronary arteries		selecting appropriate scales for axes • extract and interpret information from graphs, charts and tables

Investigate the effect of environmental factors on rates of water uptake	open. Statins are widely used to reduce blood cholesterol levels which slows down the rate of fatty material deposit. In some people heart valves may become faulty, preventing the valve from opening fully, or the heart valve might develop a leak. Students should understand the consequences of faulty valves. Faulty heart valves can be replaced using biological or mechanical valves. In the case of heart failure a donor heart, or heart and lungs can be transplanted. Artificial hearts are occasionally used to keep patients alive whilst waiting for a heart transplant, or to allow the heart to rest as an aid to recovery. Students should be able to explain how the structures of plant tissues are related to their functions. Plant tissues include: • epidermal tissues • palisade mesophyll • spongy mesophyll • xylem and phloem • meristem tissue found at the growing tips of shoots and roots. The leaf is a plant organ. Knowledge limited to epidermis, palisade and spongy mesophyll, xylem and phloem, and guard cells surrounding stomata. Students should be able to explain how the structure of root hair cells, xylem and phloem are adapted to their functions. Students should be able to explain the effect of changing temperature, humidity, air movement and light intensity on the rate of transpiration.	Key stage 3 Gas exchange systems • The structure and functions of the gas exchange system in humans, including adaptations to function • The mechanism of breathing to move air in and out of the lungs, using a pressure model to explain the movement of gases, including simple measurements of lung volume • The impact of exercise, asthma and smoking on the human gas exchange system • The role of leaf stomata in gas exchange in plants. The skeletal and muscular systems • The structure and functions of the human skeleton, to include support, protection, movement and making blood cells

	The roots, stem and leaves form a plant organ system for transport of substances around the plant. Students should be able to describe the process of transpiration and translocation, including the structure and function of the stomata. Root hair cells are adapted for the efficient uptake of water by osmosis, and mineral ions by active transport. Xylem tissue transports water and mineral ions from the roots to the stems and leaves. It is composed of hollow tubes strengthened by lignin adapted for the transport of water in the transpiration stream. The role of stomata and guard cells are to control gas exchange and water loss. Phloem tissue transports dissolved sugars from the leaves to the rest of the plant for immediate use or storage. The movement of food molecules through phloem tissue is called translocation. Phloem is composed of tubes of elongated cells. Cell sap can move from one phloem cell to the next through pores in the end walls. Detailed structure of phloem tissue or the mechanism of transport is not required.	

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