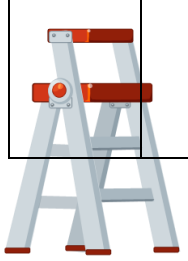
Human Biology

%	I can …	Prove it!
80%+	**2.10. Evaluate the advantages and disadvantages of treating cardiovascular diseases using drugs, mechanical devices or transplants** **2.11. Evaluate risks associated with the use of blood products** **3.3. Discuss the human and financial cost of non-communicable diseases (individual, local community, national and global level)** **5.2. Describe how urea is formed from excess amino acids (triple only)** **5.3. Explain how the kidneys produce urine (triple only)** **5.5. Describe the effect of ADH on the permeability of the kidney tubules and link to the 'negative feedback loop' (triple only)** **5.6. Explain how kidney failure may be treated (including dialysis and kidney transplant) (triple only)** **5.7. Evaluate treating organ failure with mechanical devices e.g. transplant (triple only)** **5.4. Use bar charts & tables of glucose, ions & urea to analyse data from before & after filtration (triple only)** **6.4. Explain how surface area: volume ratio of a single celled organism (amoeba) allows sufficient molecule transport**	1) Create a mind map to show the treatments for cardiovascular disease and the advantages and disadvantages of each. 2) A patient has lost a lot of blood and needs a blood transfusion. You are the doctor looking after their care. What would be the risks and gains involved in doing this procedure? 3) For a class debate you must plan a list of bullet points which argue the importance of staying healthy to avoid diseases that are non-communicable including information on the costs to the individual, the local community and on a national level. 4) Create a patient leaflet for a kidney ward at a hospital which outlines the structure and function of the kidneys, how they should work normally, and what happens when they are diseased. Include a section which describes the different treatments for kidney disease. 5) What can you conclude about the concentration of protein in the three different substances? Can you provide evidence and an explanation for this conclusion? 6) What can you conclude about the concentration of urea in each of the three substances? Can you provide evidence and an explanation for this conclusion? **Substance / Concentration in blood / Concentration in kidney filtrate / Concentration in urine** *Water*: 91 / 99 / 96 *Protein*: 8.00 / 0.00 / 0.00 *Glucose*: 0.10 / 0.10 / 0.00 *Ions*: 0.75 / 0.75 / 1.50 *Urea*: 0.03 / 0.03 / 2.00 1) Another student does not believe that not all living organisms have lungs. Explain to them why smaller organisms such as the amoeba do not have lungs using the term 'surface area: volume ratio'.
70%	**1.5 Explain how lactic acid is broken down following a period of vigorous activity (triple only)** **3.1. Construct and interpret frequency tables and diagrams** **4.9. Explain the 5 processes that contribute to our metabolism (starch formation, lipid formation, protein synthesis, respiration and protein breakdown)** **6.3. Calculate surface area: volume ratios** **6.5. Explain adaptations for exchange materials in: small intestines, lungs, gills, roots and leaves** **6.2. Explain how different factors affect the rate of diffusion (concentration, surface area, temperature)**	1) Mr. Trueman wants to know why he gets muscle fatigue after he has been teaching P.E all day. Write a paragraph to him explaining why this happens and why it is important to continue to take deep breaths following this activity. 2) Use the data in the table to draw a graph. Remember to choose the correct type of graph for this data! Describe the pattern you see in the data from the graph. **Type of disease / Number of students in class 11F** Chicken pox: 5 Diarrhoea: 10 Athlete's foot: 3 Conjunctivitis: 8 Tonsillitis: 14 Eczema: 6 3) For each example, write one sentence describing what it is and how it contributes to our metabolism. **starch formation, lipid formation, protein synthesis, respiration and protein breakdown** 4) Complete the table below to calculate the surface area to volume ratio of different sized cubes where L is the length of each side of a cube. **Length of each side (L) cm / Area of each face (L^2) cm^2 / Surface area of the whole cube (L^2) x $6cm^2$ / Volume of the cube (L^3)cm^3 / Surface area to volume ratio $\frac{\text{Surface area } (cm^2)}{\text{volume } (cm^3)}$** 1 / / / / 2 / / / / 3 / / / / 4 / / / / 5 / / / / 5) Write 3 bullet points to explain how each of the following are adapted for exchange of materials: **small intestines, lungs, gills, roots and leaves** 6) List the perfect conditions needed for diffusion and write a sentence for each one explaining why you have chosen it.



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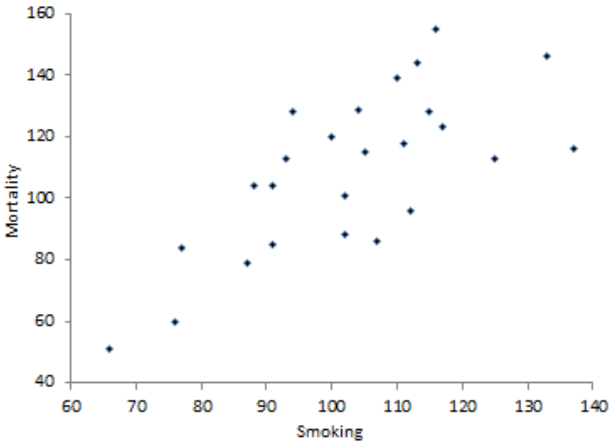
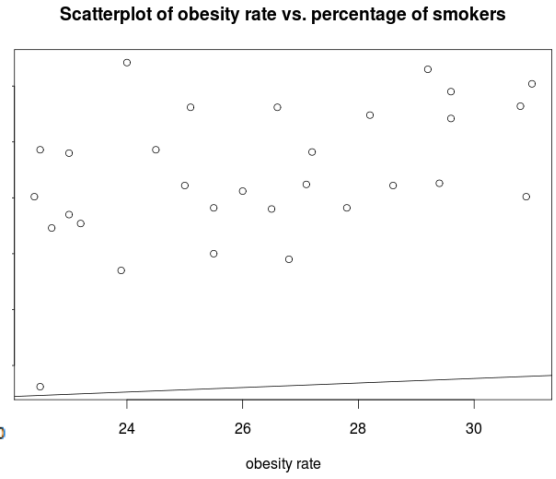
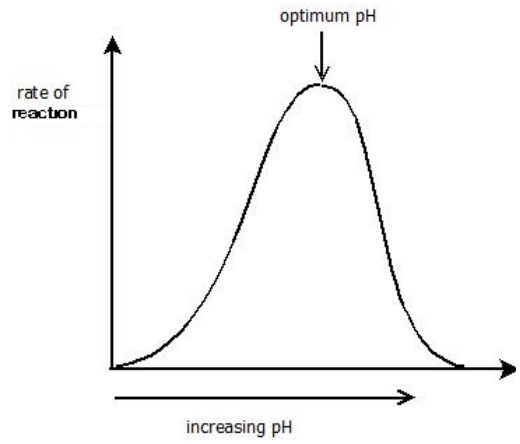
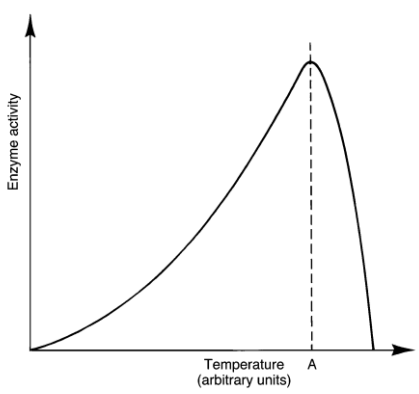
%	I can …	Prove it!
60%	**1.3. Explain when anaerobic respiration occurs in humans and recall the word equation for this process** **1.6. Explain anaerobic respiration in plants and yeast, recalling the word equation for this process** **1.7. Describe how this process of anaerobic respiration (fermentation) is used by humans in the manufacturing industry** **2.4. Carry out rate calculations for blood flow** **2.5. Describe how our body controls our natural resting heart rate** **3.5. Use a scatter diagram to identify a correlation between two variables (linking to disease incidence)** **4.3. Explain the role of enzymes in the digestive system making reference to 'lock and key'** **4.4. Explain how carbohydrates, proteins and lipids are synthesised, broken down and used, making reference to sugars, amino acids, fatty acids and glycerol** **4.7. Describe the effects of temperature and pH on the rate of enzyme reactions and investigate the effect of pH on the rate of reaction of amylase**	1) Define the term 'anaerobic' and write a word equation for the reaction. Give three examples of when anaerobic respiration would happen. 2) Write down the word equation for the anaerobic respiration of yeast and plant cells. 3) Ms. McCormick wants to know why yeast helps the bread dough rise. Write an email to her explaining why. 4) Calculate the amount of blood pumped in one minute if: (a) the heart is beating at 80bpm at a stroke volume of 65cm^3. (b) the heart is beating at 50bpm at a stroke volume of 85cm^3. 5) Make a leaflet to be displayed on a cardiovascular ward at a hospital which explains what an artificial pacemaker is and how it mimics the real heart. 6) Look at the graphs below. Identify which one shows a correlation and write one sentence describing what the graph shows about the relationship between the two variables. Graph 1:  Graph 2:  7) draw and annotate a diagram to show the stages in an enzyme-catalysed reaction in digestion (hint: use the lock and key mechanism). 8) Complete the table below to show the main enzymes involved in digestion in humans: | Enzyme | Substrate | Product | Produced | pH | | | | | | | | | | | | | | | | | | | 9) For each graph, describe *and* explain the trend shown on the graph.  **A. Effect of pH on enzyme action** At very low and very high pH levels the enzyme activity is _____. At the _____ pH the enzyme activity is at its highest. This is because all enzymes work within a narrow ___ range. At pH levels above or below this pH the enzyme becomes _____ and no longer breaks down its _____. **B. Effect of temperature on enzyme activity** As the temperature increases, the enzyme activity _____. This is because the substrates gain more _____ energy and they collide more often with the enzymes. When the temperature increases above ___ ^0C the enzyme activity _____. This is because above this temperature the enzyme becomes _____, which means that the specific shape of the _____ site breaks down and the substrate will no longer fit into the enzyme. 

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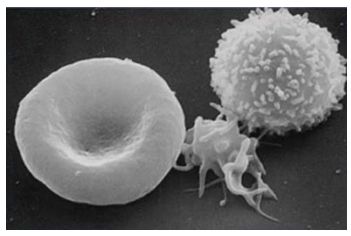
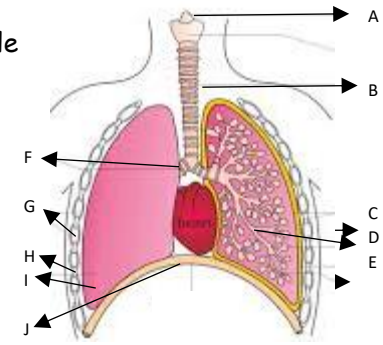
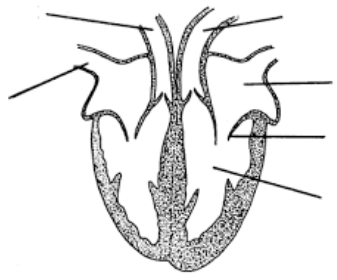
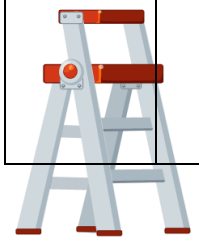
50%	**1.1. Describe the purpose of cellular respiration, recalling the word & symbol equation for aerobic respiration** **1.2. Explain how the body responds to exercise in terms of heart rate, breathing rate and breath volume** **1.4. Explain what is meant by the term 'oxygen debt'** **2.6. Describe the composition of blood and know the functions of each of the components** **2.9. Describe what a 'stent', 'statin', 'mechanical/biological valve replacement', 'pacemaker' and 'transplant' are** **3.4. Describe the causal mechanisms of some risk factors for non-communicable diseases**	1. Write a definition for aerobic respiration and give the word and symbol equation (balanced!). 2. Ms. Emeny wants to know why her heart and breathing rate increase both during *and* after she exercises. Write her an email to explain why. Use the following words: **heart rate, breathing rate, exercise, aerobic respiration, oxygen, glucose, energy, anaerobic respiration, lactic acid, oxygen debt.** 3. Firstly, label the diagram to show each part of the blood tissue. Next, annotate the diagram to show the function of each part that you have labelled. Use these key words: **red blood cell, white blood cell, plasma, platelets, oxygen, haemoglobin, pathogens, destroy, dissolved, nutrients, carbon dioxide, blood clotting, scab.**  4. Match the following treatment to its purpose: Treatment / Purpose a. stent — 1. a small device fitted into the body to take over the generation of electrical impulses and re-start the heart beat if the heart stops b. statin — 2. the heart is completely replaced by one from another animal when it stops working c. mechanical/biological valve replacement — 3. a small mesh device fitted into the arteries to keep them open d. pacemaker — 4. a drug which lowers cholesterol in the blood e. transplant — 5. faulty valves are replaced by ones from a donor or are artificially made 5. Match the risk factor to the disease that it can help to cause: Disease: cardiovascular disease; type 2 diabetes; brain and liver function; lung disease and lung cancer; cancers; foetal damage Risk factors: Smoking, Fatty diet, Sugary diet, Obesity, Alcohol, Pollution, Smoking whilst pregnant, Drinking alcohol whilst pregnant, Drug use when pregnant, Carcinogens
40%	**1.8. Label the structure and describe the function of the human lungs (including how they are adapted for gaseous exchange)** **2.1. Describe the structure and function of the human heart** **2.2. Describe the roles of the four blood vessels associated with the heart** **2.3. Describe the 3 different types of blood vessel in the body and their structure** **2.8. Describe coronary heart disease** **4.1. Define 'metabolism'**	1. Label the diagram of the lungs and add to each label one sentence describing the role of that structure: **trachea, bronchi, bronchioles, alveoli, lung, diaphragm, intercostal muscles, ribcage, thorax**  2. Label the diagram of the human heart and add one sentence to each label to describe its role: **left atrium, left ventricle, right atrium, right ventricle, septum, vena cava, pulmonary artery, aorta, pulmonary vein, valves**  3. Complete the table to show the descriptions of each of the three main blood vessels: Artery / Vein / Capillary carries blood away from heart; carries blood back to the heart; thick walls; thin walls; wide lumen; elastic walls; contains valves; blood is under high pressure; blood is under low pressure; takes blood to the cells 4. Write the steps which take place to cause a heart attack using the following key words: **coronary artery, blockage, reduced blood, less oxygen, cardiac muscles cells, die, heart attack** 5. Fill in the blanks to give the definition for the word metabolism using these words (**breaking, chemical, making, cells**): Metabolism is the _____ chemical reactions which take place inside all living _____. This includes _____ down substances and _____ new substances.



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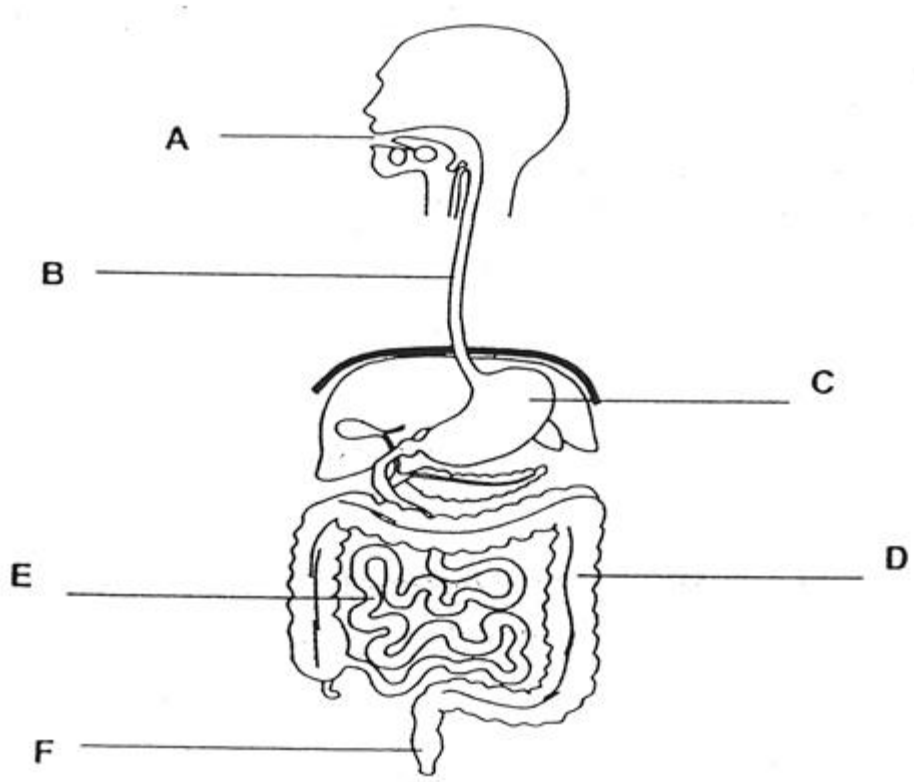
40%	**4.2. Describe what the digestive system is** **6.1. Define 'diffusion' and give examples of diffusion in plants and animals (gas exchange and urea in the kidney)**	6. Label the diagram of the digestive system and annotate the diagram to give one sentence describing what each part does:  7. Choose the correct definition for diffusion. **A. Diffusion is the movement of particles from an area of low concentration to an area of high concentration through a non-permeable membrane.** **B. Diffusion is the net (overall) movement of particles from an area of high concentration to an area of low concentration.** **C. Diffusion is the movement of water only from an area of high concentration to an area of low concentration.** 8. Give five examples of where diffusion takes place in animals and plants.

Key Terms

Lipase Amylase Protease Bile Digestion Amino Acids Lipids Fatty Acids

Glycerol Bile Starch Sugars Carbohydrates Proteins Mouth

Stomach Small Intestine Large Intestine Stomach Pancreas Gall Bladder

Rectum Anus Liver Kidneys* Antidiuretic hormone* Permeable

Lumen Artery Vein Capillary Diffusion Correlation Surface area Volume

Concentration Area Atrium Ventricle Valve Cardiac output Stroke Volume

Biconcave Statin Stent Aerobic Anaerobic Microorganism Fermentation

Lactic acid Oxygen Debt Product Reactant Catalyst Diaphragm Acidic

Bronchus Bronchiole Alveolus Heart attack Coronary Heart Disease Plasma Alkaline

**Triple science only*