

AQA GCSE Biology (8461) Year 9 statements— Assessment Statements

Topics 4.1 Cell Biology and 4.2 Organisation | Knowledge and skills across four attainment levels

Strong	Confident	Developing	Emerging
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Topic 4.1: Cell Biology

AQA spec refs: 4.1.1 Cell structure · 4.1.2 Cell division · 4.1.3 Transport in cells | Required practicals: RP1 (microscopy), RP2 (antibiotic zones), RP3 (osmosis)

Knowledge

Strong	Evaluate the differences between eukaryotic and prokaryotic cells with precision, including plasmid structure; explain how sub-cellular structures are adapted to their functions; use the magnification formula accurately and express values in standard form using correct prefixes; explain the full cell cycle including DNA replication and mitosis; evaluate the therapeutic and ethical implications of stem cell use including therapeutic cloning; and explain diffusion, osmosis and active transport in terms of concentration gradients, energy requirements and exchange surface adaptations, including calculations of surface area to volume ratio. (HT: explain how the effectiveness of exchange surfaces is increased.)
Confident	Describe and explain the differences between animal, plant and bacterial cells, including the roles of organelles; carry out magnification calculations including rearranging the formula for image size and actual size; explain cell differentiation and why most animal cells differentiate early whilst many plant cells retain this ability; describe the three stages of the cell cycle and explain the role of mitosis in growth and repair; explain the role of stem cells in embryos, adult bone marrow and plant meristems; describe diffusion, osmosis and active transport, explaining the factors that affect the rate of each; and calculate and compare surface area to volume ratios to explain the need for exchange surfaces in multicellular organisms.
Developing	Identify and describe the functions of organelles in animal, plant and bacterial cells; calculate magnification using the formula (magnification = image size / actual size) and convert between units using prefixes; describe the differences between light and electron microscopes in terms of magnification and resolution; describe the stages of the cell cycle including what happens during mitosis; describe what stem cells are and give examples of their uses; describe diffusion, osmosis and active transport and state the direction of movement for each; and calculate simple surface area to volume ratios.
Emerging	Name the organelles found in animal and plant cells and state their functions; state the magnification formula and use it with given values; state that electron microscopes have greater magnification and resolution than light microscopes; state that mitosis produces two identical cells for growth and repair; state what a stem cell is and give one example of its use; and state that diffusion is movement from high to low concentration, osmosis involves water movement through a partially permeable membrane, and active transport requires energy.

Skills

Strong	Use a light microscope to observe, draw and label a prepared slide with correct proportions and an accurate magnification scale; calculate magnification, image size and actual size, expressing answers in standard form where appropriate; plan and carry out the osmosis investigation (RP3), processing results to calculate percentage change in mass and plotting an appropriate graph; and evaluate the reliability and validity of the method, suggesting improvements. (RP2: calculate zones of inhibition using pi r squared and compare the effectiveness of antibiotics.)
Confident	Use a light microscope correctly to observe and produce a labelled scientific drawing of plant and animal cells with a magnification scale (RP1); carry out magnification calculations rearranging the formula as needed; in the osmosis investigation (RP3), calculate percentage change in mass, plot a graph and describe the relationship between concentration and mass change; and describe what the results show about water movement.
Developing	Use a light microscope to observe a prepared slide and produce a labelled drawing with an attempt at a magnification scale (RP1); carry out magnification calculations using the formula with given values; in the osmosis investigation (RP3), record results in a table, calculate the change in mass and plot the data; and describe the trend shown by the results.
Emerging	Use a light microscope to focus on a prepared slide and identify key structures (RP1); state the magnification formula and use it when all values are given; record results from the osmosis investigation in a table; and state whether plant tissue gained or lost mass in different solutions.

Topic 4.2: Organisation

AQA spec refs: 4.2.1 Principles of organisation · 4.2.2 Animal tissues, organs and organ systems · 4.2.3 Plant tissues, organs and systems | Required practicals: RP4 (food tests), RP5 (amylase and pH)

Knowledge

Strong	Explain the hierarchical organisation from cells to organ systems and relate this to size and scale; explain enzyme action using the lock and key model and evaluate how temperature and pH affect enzyme activity in terms of active site shape; explain the roles of amylase, proteases and lipases and the role of bile in digestion; explain the structure and function of the heart including the double circulatory system, pacemaker and blood vessels; explain how coronary heart disease develops and evaluate the advantages and disadvantages of treatments including stents, statins, valve replacement and transplant; explain the interactions between communicable and non-communicable diseases; evaluate lifestyle risk factors for cancer and cardiovascular disease using data; and explain the structure and functions of plant tissues (xylem, phloem, meristem, mesophyll), the role of stomata and guard cells, and the factors affecting transpiration rate. (HT: translocation through phloem; therapeutic cloning links.)
Confident	Describe the four levels of organisation (cell, tissue, organ, organ system) with examples; describe enzyme action using the lock and key model and explain the effect of temperature and pH on enzyme activity; describe the sites of production and action of amylase, protease and lipase, and explain the role of bile; describe the structure of the heart and explain how blood flows through the double circulatory system; describe the structure and function of arteries, veins and capillaries and relate structure to function; explain what coronary heart disease is and describe treatments including stents, statins and transplants; explain how lifestyle factors including diet, alcohol and smoking affect the risk of non-communicable diseases; describe the structure of plant tissues and explain transpiration, including the factors that affect its rate; and explain how root hair cells, xylem and phloem are adapted to their functions.
Developing	Name the four levels of organisation and give an example of each; describe how enzymes work using the lock and key model and state what happens to enzyme activity when temperature or pH changes; name the enzymes that digest carbohydrates, proteins and fats and state where they are produced; describe the structure of the heart and the path of blood through the circulatory system; name the three types of blood vessel and describe their structure and function; describe what coronary heart disease is and name some treatments; state the lifestyle factors that increase the risk of non-communicable diseases; name the tissues found in a leaf and describe their functions; and describe transpiration and state the factors that affect it.
Emerging	State the hierarchy of organisation: cell, tissue, organ, organ system; state that enzymes are biological catalysts with an active site and that high temperature denatures them; name the enzymes that digest starch, protein and fat; name the chambers and main vessels of the heart; name the three types of blood vessel; state what coronary heart disease is; state that smoking, poor diet and lack of exercise increase disease risk; name the tissues found in a leaf; and state that transpiration is the movement of water through a plant.

Skills

Strong	Carry out RP4 food tests (Benedict's, iodine, Biuret, ethanol emulsion) and explain what a positive result indicates at a molecular level; in RP5, measure the time for amylase to digest starch at different pH values using iodine solution, calculate the rate of reaction, plot the results and explain the trend with reference to enzyme active site shape; translate disease incidence data between graphical and numerical forms; use scatter diagrams to identify and comment on correlations between risk factors and disease, distinguishing correlation from causation.
Confident	Correctly carry out RP4 food tests and identify the nutrient present from the result; in RP5, record the time taken for starch to be fully digested at different pH values, calculate the rate of reaction (1/time), plot the results and describe the trend in terms of enzyme activity and pH; extract and interpret data from graphs and tables about risk factors and disease incidence; and use a scatter diagram to identify a correlation between two variables.
Developing	Carry out the Benedict's, iodine and Biuret tests (RP4) and state what a positive result looks like for each; in RP5, record the time for starch digestion at different pH values, plot the results and describe the trend; read and extract information from a graph or table about disease risk factors; and state whether a scatter diagram shows a positive, negative or no correlation.
Emerging	State the colour change for a positive result in the Benedict's, iodine and Biuret tests (RP4); record results from RP5 in a table and state at which pH amylase worked fastest; read a value from a graph or table about disease risk; and state what a scatter diagram is used to show.