Ormiston Meridian Academy

[OAT] Ormiston Academies Trust AN OAT ACADEMY

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Subject: Science — Year 10 Curriculum Map 2024 - 25

Week Commencing	Topic (including links to additional resources)	Assessment Window
Staff INSET 02/09 Students Return 03/09	NB: P1 and C1 have been taught at the end of Y9 2023-24 **Health and Reproduction 3 (B2)** • Explain the terms cell, tissue, organ, organ system and organism, and be able to give examples of each. • Have an understanding of the size and scale of cells, tissues, organs, organ systems and organisms. • Describe the main systems in the human body and their functions • Describe the functions of the digestive system to digest and absorb foods.	
09/09/2024	• Identify the positions of the main organs on a diagram of the digestive system. • Know that food molecules must be small and soluble in order to be absorbed into the blood. • Describe the functions of the organs in the system • Explain how the small intestine is adapted for its function • Define the terms 'catalyst' and 'enzyme'. • Describe the properties of enzymes. • Explain why enzymes are specific and are denatured by high temperatures and extremes of pH.	
16/09/2024	• Use the lock and key theory and collision theory to explain enzyme action • Carry out a safe, controlled investigation to measure the rate of the catalase under different conditions. • Draw a diagram of the apparatus and write a method. Identify variables. Present and analyse the results: calculate rates of reaction using raw data and graphs. • Draw conclusions and give explanations for the results • Explain why foods need to be digested into small, soluble molecules.	
23/09/2024	• Describe the three types of enzymes involved in digestion, including the names of the substrates, products and where the enzymes are produced. • Explain how bile helps in the digestion of fats. • Interpret graphs to determine the optimum temperature or pH for an enzyme • Calculate the rate of enzyme controlled reactions. • Interpret the results from enzyme controlled reactions • Describe the functions of the heart and circulatory system • Describe and label a diagram of the heart showing four chambers, vena cava, pulmonary artery, pulmonary vein and aorta. • Describe the flow of blood from the body, through the heart and lungs and back to the body. • Explain how the heart is adapted for its function.	

	• Describe the heart as a double pump and explain why this is efficient. • Describe the function of the pacemaker cells and coronary arteries. • Label the main structures in the gas exchange system – trachea, bronchi, alveoli and capillary network around alveoli. • Explain how the alveoli are adapted for efficient gas exchange • Explain how the blood vessels are adapted for their function.	
30/09/2024	• Describe problems associated with the heart and explain how they can be treated. • Evaluate the use of drugs, mechanical devices and transplants to treat heart problems, including religious and ethical issues. • Describe the four main components of blood. • Explain how each component is adapted for its function. • Identify pictures of the different blood cells. • Explain how diet, stress and life situations can affect physical and mental health. • Give examples of communicable and non-communicable diseases. • Describe examples of how diseases may interact. • Describe the effects of diet, smoking, alcohol and exercise on health. • Explain how and why the Government encourages people to lead a healthy lifestyle. • Give risk factors associated with cardiovascular disease, Type 2 diabetes, lung diseases and cancers • Describe some causes of cancer, eg viruses, smoking, alcohol, carcinogens and ionising radiation. • Describe the difference between benign and malignant tumours. • Explain how cancer may spread from one site in the body to form a secondary tumour in another part of the body. • Label the main organs of a plant and describe their functions. • Identify the tissues in a leaf and describe their functions. Relate the structure of each tissue to its function in photosynthesis. • Explain why there are more stomata on the lower surface of a leaf. • Describe the role of stomata and guard cells to control water loss and gas exchange.	
07/10/2024	• Describe the organs that make up the plant transport system. • Describe the role of xylem, phloem and root hair cells and explain how they are adapted for their functions. • Define the terms ‘transpiration’ and ‘translocation’. • Define the term ‘active transport’. • Describe where active transport occurs in humans and plants and what is transported. • Explain why active transport requires energy. • Explain how active transport enables cells to absorb ions from very dilute solutions. • Explain the relationship between active transport and oxygen supply and numbers of mitochondria in cells.	Learning Checkpoint
14/10/2024	**Matter 5 (C2)** • What is meant by bonding, and why do bonds form? • What is ionic bonding? • What is a giant ionic substance, and what are their properties? • What is covalent bonding? • What is a simple covalent substance, and what properties do they (generally) have? • What is a giant covalent substance, and what properties do they have?	
21/10/2024		Achievement Round 1
October Half Term		

04/11/2024		Achievement Round 1
11/11/2024	**Matter 5 (C2)** • What is meant by bonding, and why do bonds form? • What is ionic bonding? • What is a giant ionic substance, and what are their properties? • What is covalent bonding? • What is a simple covalent substance, and what properties do they (generally) have? • What is a giant covalent substance, and what properties do they have?	
18/11/2024	• What is metallic bonding? • How does the structure of a metal link to the properties of a metal? • Investigation (optional) into different metals. • What are the properties of metals? • What are common uses of metals and how do their properties link to these uses? • How do you determine the type of bonding in a substance? • Investigation into different substances.	
25/11/2024	• What are nanoparticles/ what is nanoscience? • How do nanoparticles differ in size to atoms? • What are some potential uses of nanoscience? • What are nanoparticles/ what is nanoscience? • How do nanoparticles differ in size to atoms? • What are some potential uses of nanoscience? • What is the structure of diamond? • What is the structure of graphite? • What is the structure of a fullerene?	Learning Checkpoint
02/12/2024	**Electricity 3 (P2)** • draw and interpret circuit diagrams. • recall and apply this equation. *charge f low = current × time Q =It* charge flow, Q, in coulombs, C current, *I*, in amperes, A (amp is acceptable for ampere) time, *t*, in seconds, s • recall and apply this equation. Current, potential difference or resistance can be calculated using the equation: *potential di f f erence = current × resistance V=IR* potential difference, *V*, in volts, V current, *I*, in amperes, A (amp is acceptable for ampere) resistance, *R*, in ohms, Ω	

	Required practical activity 15: use circuit diagrams to set up and check appropriate circuits to investigate the factors affecting the resistance of electrical circuits. This should include: • the length of a wire at constant temperature • combinations of resistors in series and parallel. • explain that, for some resistors, the value of *R* remains constant but that in others it can change as the current changes. • explain the design and use of a circuit to measure the resistance of a component by measuring the current through, and potential difference across, the component	
09/12/2024	**Electricity 3 (P2)** • draw and interpret circuit diagrams. • recall and apply this equation. *charge f low = current × time Q =It* charge flow, *Q*, in coulombs, C current, *I*, in amperes, A (amp is acceptable for ampere) time, *t*, in seconds, s recall and apply this equation. Current, potential difference or resistance can be calculated using the equation: *potential di f f erence = current × resistance V=IR* potential difference, *V*, in volts, V current, *I*, in amperes, A (amp is acceptable for ampere) resistance, *R*, in ohms, Ω **Required practical activity 15:** use circuit diagrams to set up and check appropriate circuits to investigate the factors affecting the resistance of electrical circuits. This should include: • the length of a wire at constant temperature • combinations of resistors in series and parallel. • explain that, for some resistors, the value of *R* remains constant but that in others it can change as the current changes. • explain the design and use of a circuit to measure the resistance of a component by measuring the current through, and potential difference across, the component • draw an appropriate circuit diagram using correct circuit symbols.	

	Required practical activity 16: use circuit diagrams to construct appropriate circuits to investigate the I–V characteristics of a variety of circuit elements, including a filament lamp, a diode and a resistor at constant temperature. use this equation: *Rtotal* = *R*1 + *R*2 resistance, *R*, in ohms, Ω • use circuit diagrams to construct and check series and parallel circuits that include a variety of common circuit components • describe the difference between series and parallel circuits • explain qualitatively why adding resistors in series increases the total resistance whilst adding resistors in parallel decreases the total resistance • explain the design and use of dc series circuits for measurement and testing purposes • calculate the currents, potential differences and resistances in dc series circuits • solve problems for circuits which include resistors in series using the concept of equivalent resistance.	
16/12/2024	**Domestic uses and safety** • explain the difference between direct and alternating potential difference. • Explain that a live wire may be dangerous even when a switch in the mains circuit is open • Explain the dangers of providing any connection between the live wire and earth. **Energy transfers** • explain how the power transfer in any circuit device is related to the potential difference across it and the current through it, and to the energy changes over time: *power* = *potential difference* × *current P=VI* *power* = current 2 × *resistance P* = *I*2 *R* **The National Grid** • explain why the National Grid system is an efficient way to transfer energy. • Higher tier only: • select and use the equation: potential difference across primary coil x current in primary coil = potential difference across secondary coil x current in secondary coil	Learning Checkpoint

Christmas Break		
06/01/2025	**Health and reproduction 4 (B3)** • Define the term pathogen and state the four main groups of pathogen. • Explain how pathogens can be spread to plants or animals and cause infection. • Describe the main differences between bacteria and viruses. • Explain how the spread of disease can be reduced or prevented. • Describe the symptoms, mode of transmission, prevention and treatment for measles, HIV and AIDS, salmonella and gonorrhoea.	
13/01/2025		
20/01/2025	• Describe colds and flu as viral diseases. • Describe athlete's foot as a fungal disease. • Describe the life cycle of the malarial protist. • Describe the symptoms, mode of transmission, prevention and treatment for malaria • Describe the body's first line defences • Explain how microbes make us feel ill and how viruses damage cells. • Explain how the immune system defends against disease • Describe what white blood cells do. • Explain why antibodies are specific for one pathogen/ antigen.	
27/01/2025	• Describe what a vaccine contains. • Explain how vaccines prevent disease. • Explain the idea of 'herd immunity'. • Explain how antibiotics treat only bacterial diseases and how this has saved lives. • Describe the problems associated with antibiotic resistance • Explain the difficulty in developing drugs that kill viruses without damaging body tissues.	
03/02/2025	• Explain how the immune system defends against disease • Describe what white blood cells do. • Explain why antibodies are specific for one pathogen/ antigen. • Describe what a vaccine contains. • Explain how vaccines prevent disease. • Explain the idea of 'herd immunity'. • Explain how antibiotics treat only bacterial diseases and how this has saved lives. • Describe the problems associated with antibiotic resistance • Explain the difficulty in developing drugs that kill viruses without damaging body tissues. • Describe the problems associated with antibiotic resistance • Explain the difficulty in developing drugs that kill viruses without damaging body tissues.	Learning Checkpoint
10/02/2025		Achievement Round 2
February Half Term		
24/02/2025		Achievement Round 2
03/03/2025	**Photosynthesis and Respiration 3 (B4)** • describe photosynthesis as an endothermic reaction in which energy is transferred from the environment to the chloroplasts by light. • describe photosynthesis as an endothermic	

	• reaction in which energy is transferred from the environment to the chloroplasts by light. • describe cellular respiration as an • exothermic reaction which is continuously occurring in living cells. • compare the processes of aerobic and • anaerobic respiration with regard to the need for oxygen, the differing • products and the relative amounts of energy transferred. • Describe how exercise causes the human body to react due to the increased demand for energy. • explain the importance of sugars, amino acids, fatty acids and glycerol in the synthesis and breakdown of carbohydrates, proteins and lipids.	
10/03/2025	**Photosynthesis and Respiration 3 (B4)** • describe photosynthesis as an endothermic reaction in which energy is transferred from the environment to the chloroplasts by light. • describe photosynthesis as an endothermic • reaction in which energy is transferred from the environment to the chloroplasts by light. • describe cellular respiration as an • exothermic reaction which is continuously occurring in living cells. • compare the processes of aerobic and • anaerobic respiration with regard to the need for oxygen, the differing products and the relative amounts of energy transferred. • Describe how exercise causes the human body to react due to the increased demand for energy. • explain the importance of sugars, amino acids, fatty acids and glycerol in the synthesis and breakdown of carbohydrates, proteins and lipids.	
17/03/2025	• explain that homeostasis is the regulation of the internal conditions of a cell or organism to maintain optimum conditions for function in response to internal and external changes. • explain how the structure of the nervous system is adapted to its functions. • extract and interpret data from graphs, charts and tables, about the functioning of the nervous system. • translate information about reaction times • between numerical and graphical forms.	Learning Checkpoint
24/03/2023	**Matter 6 (C3)** • understand the use of the multipliers in equations in normal script before a formula and in subscript within a formula. • calculate the percentage by mass in a compound given the relative formula mass and the relative atomic masses. • explain any observed changes in mass • in non-enclosed systems during a chemical reaction given the balanced symbol equation for the reaction and explain these changes in terms of the particle model. • represent the distribution of results and make estimations of uncertainty • use the range of a set of measurements about the mean as a measure of uncertainty • calculate the mass of solute in a given volume of solution of known concentration in terms of mass per given volume of solution	Learning Checkpoint
31/03/2025	**Matter 9 (P4)** • relate differences between isotopes to differences in conventional representations of their identities, charges and masses. • describe why the new evidence from the scattering experiment led to a change in the atomic model • describe the difference between the plum pudding model of the atom and the nuclear model of the atom. • apply their knowledge to the uses of radiation and evaluate the best sources of radiation to use in a given situation.	

	• use the names and symbols of common nuclei and particles to write balanced equations that show single alpha (α) and beta (β) decay	
07/04/2025	• explain the concept of half-life and how it is related to the random nature of radioactive decay • determine the half-life of a radioactive MS 4a isotope from given information • calculate the net decline, (HT only) MS 1c, 3d expressed as a ratio, in a radioactive emission after a given number of half-lives. • compare the hazards associated with WS 1.5 contamination and irradiation • understand that it is important for the findings of studies into the effects of radiation on humans to be published and shared with other scientists so that the findings can be checked by peer review.	Learning Checkpoint
Easter Break		
28/04/2025	**Reactions 4 (C4)** • explain reduction and oxidation in terms of loss or gain of oxygen. • recall and describe the reactions, if any, of potassium, sodium, lithium, calcium, magnesium, zinc, iron and copper with water or dilute acids and where appropriate, to place these metals in order of reactivity • explain how the reactivity of metals with water or dilute acids is related to the tendency of the metal to form its positive ion • deduce an order of reactivity of metals based on experimental results • interpret or evaluate specific metal extraction processes when given appropriate information • identify the substances which are oxidised or reduced in terms of gain or loss of oxygen.	
05/05/25	• predict products from given reactants • use the formulae of common ions to deduce the formulae of salts. • describe how to make pure, dry samples of named soluble salts from information provided. • describe the use of universal indicator or a wide range • indicator to measure the approximate pH of a solution • use the pH scale to identify acidic or alkaline solutions. • predict the products of the electrolysis of binary ionic compounds in the molten state. • explain why a mixture is used as the electrolyte • explain why the positive electrode must be continually • replaced. • predict the products of the electrolysis of aqueous solutions containing a single ionic compound.	Learning Checkpoint
12/05/2025	**Forces and Space 4 (P5)** • recall that scalar quantities have magnitude only, whereas vector quantities have magnitude and direction. • describe the interaction between pairs • of objects which produce a force on each object. The forces to be represented as vectors. • Students should be able to recall and apply this equation: • weight = mass × gravitational field strength • W = m g • d recognise and be able to use the symbol for proportionality, ∝ • calculate the resultant of two forces that act in a straight line. • use free body diagrams to describe qualitatively examples where several forces lead to a resultant force on an object, including balanced forces when the resultant force is zero. • recall and apply this equation: • work done = force × distance	

	• W = F s • describe the energy transfer involved when work is done. • convert between newton-metres and joules.	
19/05/2025	• give examples of the forces involved in stretching, bending or compressing an object • explain why, to change the shape of an object (by stretching, bending or compressing), more than one force has to be applied – this is limited to stationary objects only • describe the difference between elastic deformation and inelastic deformation caused by stretching forces.	
May Half Term		
02/06/2025	• Students should be able to recall and apply this equation: • force = spring constant × extension • F = k e • describe the difference between a linear and non-linear • relationship between force and extension • calculate a spring constant in linear cases • interpret data from an investigation of the relationship between force and extension calculate work done in stretching (or compressing) a spring • (up to the limit of proportionality) using the equation: • elastic potential energy = 0.5 × spring constant × extension 2 • calculate relevant values of stored energy and energy transfers.	
09/06/2025		Year 10 Mock Exams
16/06/2025		Year 10 Mock Exams
23/06/2025		Year 10 Mock Exams
30/06/2025		Year 10 Mock Exams
07/07/2025	• express a displacement in terms of both the magnitude and direction. • recall typical values of speed for a person walking, running and cycling as well as the typical values of speed for different types of transportation systems. • make measurements of distance and time and then calculate speeds of objects using the equation: • distance travelled = speed x time • calculate average speed for non-uniform motion. • explain the vector–scalar distinction as it applies to displacement, distance, velocity and speed. • draw distance–time graphs from measurements and extract and interpret lines and slopes of distance–time graphs, translating information between graphical and numerical form. • estimate the magnitude of everyday accelerations. • draw velocity–time graphs from measurements and interpret lines and slopes to determine acceleration	
14/07/2025	• apply Newton's First Law to explain the motion of objects moving with a uniform velocity and objects where the speed and/or direction changes. • explain that: inertial mass is a measure of how difficult it is to change the velocity of an object • inertial mass is defined as the ratio of force over acceleration.	

	• estimate the speed, accelerations and forces involved in large accelerations for everyday road transport. • estimate the speed, accelerations and forces involved in large accelerations for everyday road transport. • Apply Newton's Third Law to examples of equilibrium situations.	
21/07/2025	• explain methods used to measure human reaction times and recall typical results • interpret and evaluate measurements from simple methods to measure the different reaction times of students • evaluate the effect of various factors on thinking distance based on given data. • explain the factors which affect the distance required for road transport vehicles to come to rest in emergencies, and the implications for safety • estimate how the distance required for road vehicles to stop in an emergency varies over a range of typical speeds. • explain the dangers caused by large decelerations • use the concept of momentum as a model to describe and explain examples of momentum in an event, such as a collision. NB: P1 and C1 have been taught at the end of Y9 2023-24	Learning Checkpoint