Ormiston **Meridian** Academy

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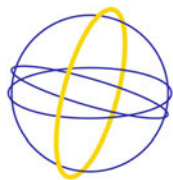**Principal:** Mrs C Stanyer

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Subject Science (Trilogy)	**Year 11**	
		Curriculum Map 2022 -2023

Week Commencing	Topic (including links to additional resources)	Assessment Window
STAFF INSET 05/09 Y7 DAY 06/09 ALL STUDENT IN 07/09	**Forces and Space 4 (P5)** • describe the interaction between pairs of objects which produce a force on each object. • recall and apply this equation: weight = mass × gravitational field strength $W = m\,g$	
12/09/2022	• 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 (moved along the line of action of the force) $W = F\,s$ • describe the energy transfer involved when work is done. • convert between newton-metres and joules. • 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	
19/09/2022	• 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 $E_e = \tfrac{1}{2}\,k\,e^2$ • calculate relevant values of stored energy and energy transfers.	

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	- 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. - Use the equation: distance travelled = s peed × time s = v t distance travelled = speed × time s = v t - 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. - determine speed from a distance–time graph.	
26/09/2022	- Recall and use the equation: acceleration = change in velocity time taken/time taken - estimate the magnitude of everyday accelerations. - draw velocity–time graphs from measurements and interpret lines and slopes to determine acceleration - apply the equation: $$(final\ velocity)^2 - (initial\ velocity)^2 = 2 \times acceleration \times distance$$ $$\left[v^2 - u^2 = 2\,a\,s \right]$$ - 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. - Recall and apply the equation: Resultant force- mass x acceleration F= m a - estimate the speed, accelerations and forces involved in large accelerations for everyday road transport. - apply Newton's Third Law to examples of equilibrium situations. - 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 - 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.	

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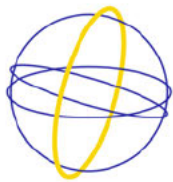**Principal**: Mrs C Stanyer

	• use the concept of momentum as a model to describe and explain examples of momentum in an event, such as a collision.	
03/10/2022	**Health and Reproduction 4 (B5)** • 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. • explain how the various structures in a reflex arc – including the sensory neurone, synapse relay neurone and motor neurone – relate to their function • 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. • describe the principles of hormonal coordination and control by the human endocrine system. • identify the position of the following on a diagram of the human body: • pituitary gland • pancreas • thyroid • adrenal gland • ovary • testes • explain how insulin controls blood glucose (sugar) levels in the body. • compare Type 1 and Type 2 diabetes and explain how they can be treated • extract information and interpret data from graphs that show the effect of insulin in blood glucose levels in both people with diabetes and people without diabetes	
10/10/2022	• describe the roles of hormones in human reproduction, including the menstrual cycle • evaluate the different hormonal and non-hormonal methods of contraception. **Reactions 6 (C6)** • calculate the mean rate of a reaction from given information about the quantity of a reactant used or the quantity of a product formed and the time taken • draw, and interpret, graphs showing the quantity of product formed or quantity of reactant used up against time • draw tangents to the curves on these graphs and use the slope of the tangent as a measure of the rate of reaction • recall how changing factors affects the rate of chemical reactions • predict and explain using collision theory the effects of changing conditions of concentration, pressure and temperature on the rate of a reaction	

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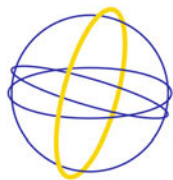
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17/10/2022	• predict and explain the effects of changes in the size of pieces of a reacting solid in terms of surface area to volume ratio • use simple ideas about proportionality when using collision theory to explain the effect of a factor on the rate of a reaction. • identify catalysts in reactions from their effect on the rate of reaction and because they are not included in the chemical equation for the reaction. • explain catalytic action in terms of activation energy	
October Half Term		

31/10/2022	**Variation and Inheritance (B6)**
	• understand that meiosis leads to non-identical cells being formed while mitosis leads to identical cells being formed
	• explain how meiosis halves the number of chromosomes in gametes and fertilisation restores the full number of chromosomes
	• describe the structure of DNA and define genome.
	• discuss the importance of understanding the human genome. This is limited to the:
	    • search for genes linked to different types of disease
	    • understanding and treatment of inherited disorders
	    • use in tracing human migration patterns from the past.
	• explain the terms:
	• gamete
	• chromosome
	• gene
	• allele
	• dominant
	• recessive
	• homozygous
	• heterozygous
	• genotype
	• phenotype	

7/11/2022		AR1
14/11/2022		AR1
21/11/2022	• understand the concept of probability in predicting the results of a single gene cross, but recall that most phenotype features are the result of multiple genes rather than single gene inheritance. • use direct proportion and simple ratios to express the outcome of a genetic cross	

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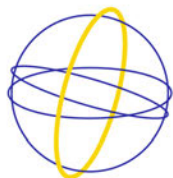**Principal:** Mrs C Stanyer

	- complete a Punnett square diagram and extract and interpret information from genetic crosses and family trees. - make informed judgements about the economic, social and ethical issues concerning embryo screening, given appropriate information - carry out a genetic cross to show sex inheritance understand and use direct proportion and simple ratios in genetic crosses - describe simply how the genome and its interaction with the environment influence the development of the phenotype of an organism - state that there is usually extensive genetic variation within a population of a species - recall that all variants arise from mutations and that: most have no effect on the phenotype; some influence phenotype; very few determine phenotype. - describe evolution as a change in the inherited characteristics of a population over time through a process of natural selection which may result in the formation of a new species - explain how evolution occurs through natural selection of variants that give rise to phenotypes best suited to their environment	
g	- explain the impact of selective breeding of food plants and domesticated animals - describe genetic engineering as a process which involves modifying the genome of an organism by introducing a gene from another organism to give a desired characteristic - explain the potential benefits and risks of genetic engineering in agriculture and in medicine and that some people have objections - describe the evidence for evolution including fossils and antibiotic resistance in bacteria - extract and interpret information from charts, graphs and tables such as evolutionary trees. - describe factors which may contribute to the extinction of a species - use information given to show understanding of the Linnaean system **The Earth 3 (C7)** - recognise substances as alkanes given their formulae in these forms - explain how fractional distillation works in terms of evaporation and condensation - recall how boiling point, viscosity and flammability change with increasing molecular size - write balanced equations for the complete combustion of hydrocarbons with a given formula - describe in general terms the conditions used for catalytic cracking and steam cracking	

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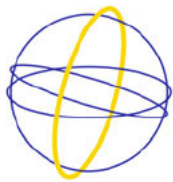|		
5/12/2022	- recall the colour change when bromine water reacts with an alkene. - balance chemical equations as examples of cracking given the formulae of the reactants and products - give examples to illustrate the usefulness of cracking - explain how modern life depends on the uses of hydrocarbons **Matter 7 (P3)** - Recall and use the equation: $$density = \frac{mass}{volume}$$ $$\left[\ \rho = \frac{m}{V}\ \right]$$ - recognise/draw simple diagrams to model the difference between solids, liquids and gases - explain the differences in density between the different states of matter in terms of the arrangement of atoms or molecules - describe how, when substances change state (melt, freeze, boil, evaporate, condense or sublimate), mass is conserved - apply this equation, which is given on the Physics equation sheet, to calculate the energy change involved when the temperature of a material changes $$change\ in\ thermal\ energy\ = mass\ \times specific\ heat\ capacity\ \times temperature\ change$$ $$[\Delta E\ = m\ c\ \Delta \theta]$$ change in thermal energy, ΔE, in joules, J mass, m, in kilograms, kg - interpret heating and cooling graphs that include changes of state - explain how the motion of the molecules in a gas is related to both its temperature and its pressure - explain qualitatively the relation between the temperature of a gas and its pressure at constant volume	

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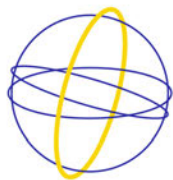|		
12/12/2022	**Matter 8 (C8)** • use melting point and boiling point data to distinguish pure from impure substances • identify formulations given appropriate information • explain how paper chromatography separates mixtures • suggest how chromatographic methods can be used for distinguishing pure substances from impure substances • interpret chromatograms and determine Rf values from chromatograms • describe the test for the gases; carbon dioxide, oxygen and hydrogen	
Christmas Break		
02/01/2023	**Matter 9 (P4)** • relate differences between isotopes to differences in conventional representations of their identities, charges and masses • show an understanding of why and describe how scientific methods and theories develop over time • **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 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 • 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 isotope from given information • compare the hazards associated with contamination and irradiation	

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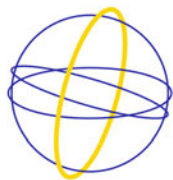
	Energy 5 (P3b) • Recall and apply this equation $energy\ for\ a\ change\ of\ state\ = mass\ \times specific\ latent\ heat$ $[\ E\ = m\,L\ ]$ energy, E, in joules, J mass, m, in kilograms, kg specific latent heat, L, in joules per kilogram, J/kg Specific latent heat of fusion – change of state from solid to liquid • interpret heating and cooling graphs that include changes of state. • distinguish between specific heat capacity and specific latent heat • explain how the motion of the molecules in a gas is related to both its temperature and its pressure • explain qualitatively the relation between the temperature of a gas and its pressure at constant volume	
9/01/2023	**Ecology 2 (B7)** • Describe different levels of organisation in an ecosystem from individual organisms to the whole ecosystem • Describe the importance of interdependence and competition in a community • suggest the factors for which organisms are competing in a given habitat • suggest how organisms are adapted to the conditions in which they live • extract and interpret information from charts, graphs and tables relating to the interaction of organisms within a community. • explain how a change in an abiotic factor would affect a given community given appropriate data or context. • explain how a change in a biotic factor might affect a given community given appropriate data or context • explain how organisms are adapted to live in their natural environment, given appropriate information • understand that photosynthetic organisms are the producers of biomass for life on Earth	
16/01/2023	• understand the terms mean, mode and median • calculate arithmetic means	

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	• plot and draw appropriate graphs selecting appropriate scales for the axes. • recall that many different materials cycle through the abiotic and biotic components of an ecosystem • explain the importance of the carbon and water cycles to living organisms • recall that many different materials cycle through the abiotic and biotic components of an ecosystem • explain the importance of the carbon and water cycles to living organisms • Explain how waste, deforestation and global warming have an impact on biodiversity • Understand the conflict between the need for cheap available compost to increase food production and the need to conserve peat bogs and peatlands as habitats for biodiversity and to reduce carbon dioxide emissions • Evaluate the environmental implications of deforestation • Understand that the scientific consensus about global warming and climate change is based on systematic reviews of thousands of peer reviewed publications • Evaluate given information about methods that can be used to tackle problems caused by human impacts on the environment. Explain and evaluate the conflicting pressures on maintaining biodiversity given appropriate information	
23/01/2023	**Electricity 4 (P7)** • Describe the attraction and repulsion between unlike and like poles for permanent magnets • Describe the difference between permanent and induced magnets. • describe how to plot the magnetic field pattern of a magnet using a compass • draw the magnetic field pattern of a bar magnet showing how strength and direction change from one point to another explain how the behaviour of a magnetic compass is related to evidence that the core of the Earth must be magnetic	
30/01/2023	• describe how the magnetic effect of a current can be demonstrated • draw the magnetic field pattern for a straight wire carrying a current and for a solenoid (showing the direction of the field) • explain how a solenoid arrangement can increase the magnetic effect of the current. **The Earth 4 (C9)** • interpret evidence and evaluate different theories about the Earth's early atmosphere • describe the main changes in the atmosphere over time and some of the likely causes of these changes • describe and explain the formation of deposits of limestone, coal, crude oil and natural gas	

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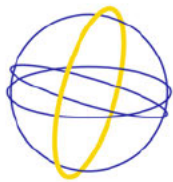
6/02/2023	- describe the greenhouse effect in terms of the interaction of short and long wavelength radiation with matter - recall two human activities that increase the amounts of each of the greenhouse gases carbon dioxide and methane. - evaluate the quality of evidence in a report about global climate change given appropriate information - describe uncertainties in the evidence base - recognise the importance of peer review of results and of communicating results to a wide range of audiences. - describe briefly four potential effects of global climate change discuss the scale, risk and environmental implications of global climate change - describe actions to reduce emissions of carbon dioxide and methane - give reasons why actions may be limited - describe how carbon monoxide, soot (carbon particles), sulfur dioxide and oxides of nitrogen are produced by burning fuels	
13/02/2023	- predict the products of combustion of a fuel given appropriate information about the composition of the fuel and the conditions in which it is used - describe and explain the problems caused by increased amounts of these pollutants in the air	
February Half Term		
27/02/2023		AR2
6/03/2023		AR2
13/03/2023	**The Earth 5 (C10)** - state examples of natural products that are supplemented or replaced by agricultural and synthetic products - distinguish between finite and renewable resources given appropriate information - distinguish between potable water and pure water - describe the differences in treatment of ground water and salty water - give reasons for the steps used to produce potable water - comment on the relative ease of obtaining potable water from waste, ground and salt water	

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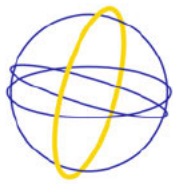**Principal:** Mrs C Stanyer

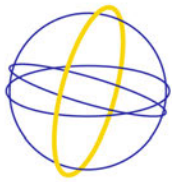|		
	• carry out simple comparative LCAs for shopping bags made from plastic and paper • evaluate ways of reducing the use of limited resources, given appropriate information	
20/03/2023	Exam Preparation	
27/03/2023	Exam Preparation	
Easter		
17/04/2023	Exam Preparation	
24/04/23	Exam Preparation	
1/05/2023	Exam Preparation	
8/05/2023		GCSE
15/05/23		GCSE
22/05/23		GCSE
May Half Term		
05/06/2023		GCSE
12/06/2023		GCSE

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19/06/2023		GCSE