

Subject: Science

	Term 1	Term 2	Term 3	Notes
Year 7	7A Cells 7G Particle Model of solid, liquid, gas 7K Forces and their effects	7F Simple Reactions 7I Energy Resources 7B Reproduction 7J Electrical Circuits 7E Acids and Alkalis	7D Variation and Classification 7C Environment and Feeding Relationships 8D Ecological Relationships	During Year 7 students will take part in a number of science thinking skills lessons co-developed by GSHS science department. Click here for further details. Click here for link to Key Stage 3 National Curriculum
Year 8	8A Food and Digestion 8E Atoms and Elements 8I Heating and Cooling 8C Microbes and Disease	8K Light 8L Sound 8B Respiration	8F Compounds and mixtures Open Enquiry	During Year 8 students will build on the science thinking skills lessons and develop their open enquiry skills. Click here for link to Key Stage 3 National Curriculum
Year 9	Reactivity of metals Electricity and Energy Inheritance Photosynthesis Forces Acids and Alkalis Displacement	Cells, tissues, organs Separation techniques Bonding Kinetic theory Radiation	Transport in plants Plant and Animal Cells Bonding part II Electromagnetic Spectrum Thinking Scientifically	At the start of the Spring term year 9 students will be assessed on all knowledge and understanding from key stage 3 (years 7-9).

Year 10	<p>Biology Topic 1: Key Concepts in Biology Topic 2: Cells and Control Topic 3: Genetics Part I Topic 4: Natural Selection Topic 5: Health, disease and medicine</p> <p>Chemistry Atomic Structure and mass number Atomic mass and Isotopes Electronic arrangement, Periodic table and Mendeleev Simple ionic structures and lattice Simple covalent bonding and structures States of matter and separating substances Filtration and crystallisation Core practical 1 – chromatography and simple distillation Drinking water</p> <p>Physics Vectors and scalars Distance/time graphs Acceleration Velocity/time graphs Resultant forces Newton’s First law Circular</p>	<p>Biology Topic 3: Genetics Part II Topic 4: Natural Selection Topic 5: Health, disease and medicine Part I</p> <p>Chemistry Properties of ionic substances macro covalent molecules Metals and metallic bonding Bonding models pH scales and acids Core practical 2 – copper sulphate preparation</p> <p>Synoptic assessment Relative mass and mole equations Alkalis and balancing equations Core practical 3 – pH change</p> <p>Physics Energy efficiency Keeping warm Non-renewable resources Renewable resources Describing waves CP4b: Wave velocity Electromagnetic waves The electromagnetic spectrum Using the long wavelengths Using the short wavelengths</p>	<p>EXTERNAL EXAMINATION</p> <p>Biology Topic 5: Health, disease and medicine Part II Topic 6 – Plant structures and their functions</p> <p>Chemistry neutralisation Acids and metals Electrolysis and OILRIG Products of electrolysis products of electrolysis Core practical 4 – electrolysis of copper sulphate</p> <p>Physics Atomic models Inside atoms Electrons and orbits: Background radiation Types of radiation : Radioactive decay Half-life: Dangers of radioactivity Work and power Objects affecting each other</p>	<p>EDEXCEL SCIENCE</p>
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	<p>Mass and weight Newton's Second Law CP2e: Newton's Third Law Stopping distances Momentum CP2h: Crash hazards Energy stores and transfers Stored energies</p>	EM radiation dangers		
Year 11 Additional	<p>Animals & plant cells Specialised cells Diffusion Tissues, organs & systems Diffusion Photosynthesis Limiting factors Maximising glucose Organisms in their environment Measuring distribution</p> <p>Atomic Structure and Mass Number Ionic Bonding Ionic Compounds and Properties Covalent Bonding Properties of Covalent Bonding Simple Molecules and Giant Covalent Molecules Metallic Bonding Polymers Nanoparticles and Smart Materials</p>	<p>Enzyme action Factors affecting enzyme action Enzymes-digestion Enzymes-industry Aerobic respiration Anaerobic respiration Mitosis Meiosis Stem cells</p> <p>Moles Compounds and balancing equations Percentage Yield and atom economy Calculations Practice Paper Chromatography GC/MS Rates of Reaction and Collision Theory Reversible reactions and Equilibrium Endothermic and Exothermic Reactions Summary Activities Acids and Alkalis</p>	<p>Chromosomes, genes & DNA Inheritance & inherited disorders Extinction Evolution</p> <p>Neutralisation and Precipitation Ions and Electrolysis Industrial Electrolysis</p> <p>Physics How does radiation affect me? How did Fission cause the Fukushima disaster? Is Fusion the future? Fusion and stars</p> <p>EXAMS</p>	Additional Science (4408)

	<p>R.A.M / R.F.M Percentage Composition</p> <p>Physics Speed and D-T graphs Acceleration Acceleration and V-T graphs Terminal Velocity Forces and motion F=ma and W=mg Terminal Velocity and top speed of vehicles Braking and Stopping Distance Work Done Elastic potential Energy and Hooke's Law Power and Kinetic Energy</p>	<p>Making Salts</p> <p>Physics Gravitational Energy Momentum Static Electricity and Charge Current and Voltage and Ohm's Law I-V plots and components and LEDs Circuits Mains Theory Mains and safety Power and Energy in Electricity Atomic structure and Rutherford scattering Alpha Beta Gamma Half-life</p>		
Year 11 Triple	<p>Animals & plant cells/ Specialised cells Diffusion/ Tissues, organs & systems Photosynthesis and limiting factors Maximising glucose/ Organisms in their environment Measuring distribution Enzyme action Enzyme action/Enzymes in digestion Enzymes-industry/ Aerobic respiration Anaerobic respiration Meiosis and mitosis</p>	<p>Osmosis/active transport/ sport drinks The lungs Exchange and transpiration The heart and circulatory system Transport in plants Homeostasis/ the kidney Dialysis and kidney transplant Controlling body temp Controlling blood glucose</p> <p>Chemistry Reversible reactions and Equilibrium Endothermic and Exothermic Reactions Energy in Reactions including Hydrogen</p>	<p>Population/land & water pollution Air pollution/deforestation Biofuels & biogas/ food production Sustainable food/ environmental issues</p> <p>Purifying Water Alcohols Carboxylic acids and Esters</p> <p>Physics Alpha Beta Gamma Background and half-life Fission Fusion and stars</p>	<p>Biology (4401) Chemistry (4402) Physics (4403)</p>

	<p>Stem cells/ Chromosomes, genes & DNA Inheritance & inherited disorders Fossils/Extinction/ Evolution</p> <p>Atomic Structure and Mass Number Ionic Bonding, Compounds and Properties Covalent Bonding and Properties Metallic Bonding Polymers Nanoparticles and Smart Materials R.A.M / R.F.M and percentage composition Percentage Composition Moles and Reacting masses and Yields Empirical Formulae Paper Chromatography, GCMS Rates of Reaction and Collision Theory Analysis Titrations</p> <p>Physics Forces and motion Work Done Elastic and Kinetic Energy Power and Kinetic and Gravitational Energy Momentum</p>	<p>Haber Process Acids and Alkalis Making Salts Neutralisation and Precipitation Ions and Electrolysis Industrial Electrolysis Periodic Table Gp1 and Gp 7 Hard and Soft Water</p> <p>Physics Circuits Power and Energy in Electricity Mains Mains Transformers Motors Lenses The eye Endoscopes X-rays Ultrasound Atomic structure and Rutherford scattering</p>	<p>EXAMS</p>	
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	<p>Centre of Mass Moments and stability The Pendulum Circular Motion Pressure and Hydraulics Static Electricity and Charge Current and Voltage Ohms law I-V plots and components and LEDs</p>			
Year 12 Biology	<p>3.1.1 Monomers and polymers 3.1.2 Carbohydrates 3.1.3 Lipids 3.1.4 Proteins 3.1.5 Nucleic acids are important information-carrying molecules 3.1.6 ATP 3.1.7 Water 3.3.1 Surface area to volume ratio 3.3.2 Gas exchange 3.3.3 Digestion and absorption 3.3.4 Mass transport</p>	<p>3.1.8 Inorganic ions 3.2.1 Cell structure 3.2.2 All cells arise from other cells 3.2.3 Transport across cell membranes Part I 3.4.1 DNA, genes and chromosomes 3.4.2 DNA and protein synthesis 3.4.3 Genetic diversity can arise as a result of mutation or during meiosis 3.4.4 Genetic diversity and adaptation 3.4.5 Species and taxonomy</p>	<p>3.2.3 Transport across cell membranes Part II 3.2.4 Cell recognition and the immune system 3.4.6 Biodiversity within a community 3.4.7 Investigating diversity</p>	<p>Click below for links to resources and the specification. Biology AS/A2</p>
Year 13 Biology	<p>3.5.1 Photosynthesis 3.5.2 Respiration 3.5.3 Energy and ecosystems 3.5.4 Nutrient cycles 3.6.1.1 Survival and response 3.6.1.2 Receptors 3.6.1.3 Control of heart rate 3.6.2.1 Nerve impulses 3.6.2.2 Synaptic transmission</p>	<p>3.6.4.1 Principles of homeostasis and negative feedback 3.6.4.2 Control of blood glucose concentration 3.6.4.3 Control of blood water potential 3.8.1 Alteration of the sequence of bases in DNA can alter the structure 3.8.2 Gene expression is controlled by a number of features</p>	<p>3.8.3 Using genome projects 3.8.4 Gene technologies</p>	<p>Click below for links to resources and the specification. Biology AS/A2</p>

	<p>3.6.3 Skeletal muscles are stimulated to contract by nerves and act as</p> <p>3.7.1 Inheritance</p> <p>3.7.2 Populations</p> <p>3.7.3 Evolution may lead to speciation</p> <p>3.7.4 Populations in ecosystems</p>			
Year 12 Chemistry	<p>MODULE 1</p> <p>1.1 ATOMIC STRUCTURE</p> <ul style="list-style-type: none"> • atomic symbols • ram, rmm and mass spectra • electronic configuration • ionisation energies <p>1.2 AMOUNT OF SUBSTANCE</p> <ul style="list-style-type: none"> • using moles and reacting masses • solutions • ideal gas equation • empirical and molecular formulae • ionic equations <p>1.3 BONDING</p> <ul style="list-style-type: none"> • dot-cross diagrams • electronegativity • molecular shapes • structure and bonding <p>1.4 PERIODICITY</p> <ul style="list-style-type: none"> • trends in Period 3 <p>1.5 INTRODUCTION TO ORGANIC CHEMISTRY</p>	<p>MODULE 2</p> <p>2.1 ENERGETICS</p> <ul style="list-style-type: none"> • measuring enthalpy changes click here • mean bond enthalpies click here • Hess' Law <p>2.2 KINETICS</p> <p>2.3 EQUILIBRIA</p> <p>2.4 REDOX REACTIONS</p> <p>2.5 GROUP VII, THE HALOGENS</p> <ul style="list-style-type: none"> • Reactions of halogens and halide ions <p>2.6 Group 2, the alkaline earth metals</p> <ul style="list-style-type: none"> • trends in Group II <p>2.7 EXTRACTION OF METALS</p> <ul style="list-style-type: none"> • Extraction of Iron • Extraction of Aluminium and Titanium <p>MODULE 3 ISA (Coursework)</p>	<p>MODULE 2 continued</p> <p>2.8 HALOALKANES</p> <ul style="list-style-type: none"> • Chlorination of alkanes • Reactions of chloroalkanes <p>2.9 ALKENES</p> <ul style="list-style-type: none"> • E-Z isomerism • addition reactions of alkenes <p>2.10 ALCOHOLS</p> <p>2.11 ANALYTICAL TECHNIQUES</p> <p>EXAMS</p>	<p>Click below for links to resources and the specification.</p> <p>Chemistry A level Specification</p>

	<ul style="list-style-type: none"> • Formulae and Structures • Nomenclature • Isomerism <p>1.6 ALKANES</p> <ul style="list-style-type: none"> • Fractional Distillation, Cracking and Combustion 			
Year 13 Chemistry	<p>3.4.2 Equilibria</p> <ul style="list-style-type: none"> • Equilibrium Constant • Qualitative effects of changes in temperature and concentration <p>3.4.3 Acids and Bases</p> <ul style="list-style-type: none"> • Bronsted-Lowry acid-base equilibria • Definition and determination of pH • The ionic product of water • Weak acids and weak • K_a for weak acids • Buffers <p>3.4.5 Compounds containing the carbonyl group</p> <ul style="list-style-type: none"> • Aldehydes and Ketones: Oxidation and reduction • Aldehydes and Ketones: Reaction with HCN • Carboxylic acids & esters • Acylation • 3.4.11 Structure Determination 	<p>3.5.1 Thermodynamics</p> <ul style="list-style-type: none"> • Enthalpy Changes • Born Haber cycles • Mean bond enthalpies • Calculating entropy changes • Free energy change <p>3.5.4 Transition Metals</p> <ul style="list-style-type: none"> • General properties • Complex Formation: Ligands • Complex Formation: Co-ordination number • Complex Shape • Formation of coloured ions • Variable oxidation states • Catalysis: Heterogeneous • Catalysis: Homogeneous <p>3.5.5 Reactions of Inorganic Compounds</p> <ul style="list-style-type: none"> • Lewis acids and bases • Metal-aqua ions • Acidity and hydrolysis reactions • Substitution Reactions <p>MODULE 6</p>	<p>3.5.2 Periodicity</p> <ul style="list-style-type: none"> • Reactions of period 3 Period 3 oxides: Structure and bonding • Period 3 oxides <p>3.5.3 Redox Equilibria</p> <ul style="list-style-type: none"> • Redox equations • Electrode • Electrochemical series <p>EXAMS</p>	<p>Click below for links to resources and the specification.</p> <p>Chemistry A level Specification</p>

	<ul style="list-style-type: none"> • Mass Spectrometry • IR Spectroscopy • NMR • Chromatography <p>3.4.6 Aromatics</p> <ul style="list-style-type: none"> • Delocalisation stability • Electrophilic substitution • Nitration <p>Friedel- Crafts</p> <p>3.4.7 Amines</p> <ul style="list-style-type: none"> • Base properties • Nucleophilic properties • Preparation of amines <p>3.4.8 Amino Acids</p> <ul style="list-style-type: none"> • Acid base properties (Formation of zwitterions) • The structure of amino acids, dipeptides, polypeptides and proteins <p>3.4.9 Polymers</p> <ul style="list-style-type: none"> • Addition polymers • Condensation polymers • Biodegradability of polymers • Disposal of polymers (Advantages and disadvantages) <p>3.4.10 Organic Synthesis and Analysis</p>	ISA (Coursework)		
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	<ul style="list-style-type: none"> Target molecules and reaction schemes 			
Year 12 Physics	2.1 Physical quantities and units 2.2 Making measurements and analysing data 2.3 Nature of quantities 3.1 Motion 3.2 Forces in action 4.1 Charge and current 4.2 Energy, power and resistance 4.3 Electrical circuits	3.3 Work, energy and power 3.4 Materials 4.4 Waves	3.5 Momentum 4.5 Quantum physics Breadth in physics 70 marks 1 hour 30 minutes written paper Depth in physics 70 marks 1 hour 30 minutes written paper	Click below for links to resources and the specification. Physics A - H158
Year 13 Physics	5.1 Thermal physics 5.2 Circular motion 5.3 Oscillations 6.1 Capacitors 6.2 Electric fields 6.3 Electromagnetism	5.4 Gravitational fields 5.5 Astrophysics and cosmology 6.4 Nuclear and particle physics 6.5 Medical imaging	Modelling physics 100 marks 2 hours 15 minutes written paper Exploring physics 100 marks 2 hours 15 minutes written paper Unified physics 70 marks 1 hour 30 minutes written paper	Click below for links to resources and the specification. Physics A - H558