

CURRICULUM MAP: Combined/Triple Science Year 10 Long Term Plan 2019 - 2020

EXAM BOARD: Edexcel – Biology



At Oriol, we teach the Pearson Edexcel GCSE (9-1) Combined Sciences 2-Year route split into the 3 different disciplines (Biology, Chemistry & Physics) that are taught alongside each other by specialist teachers within that area of study allowing crossing-over of ideas, concepts and principles throughout the students' academic journey at GCSE level. The Pearson Edexcel Level 1/Level 2 GCSE (9–1) in Combined Science consists of six externally examined papers. These are available at foundation tier and higher tier containing a mixture of different question styles, including multiple-choice questions, short answer questions, calculations and extended open-response questions. GCSE study in the sciences provides the foundation for understanding the material world. Scientific understanding is changing our lives and is vital to the world's future prosperity. All students should learn essential aspects of the knowledge, methods, processes and uses of science. They should gain appreciation of how the complex and diverse phenomena of the natural world can be described in terms of a small number of key ideas that relate to the sciences and that are both inter-linked and of universal application.

| | Autumn Term 1 Weeks: 8 | Autumn Term 2 Weeks: 7 | Spring Term 1 Weeks: 6 | Spring Term 2 Weeks: 6 | Summer Term 1 Weeks: 5 | Summer Term 2 Weeks: 7 |
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| Key Concepts | CB1. Key Concepts in Biology | CB2. Cells & Control | CB3. Genetics | CB4. Natural Selection & Genetic Modification | CB5. Health, Disease & Development of Medicines | Revision & Catch Up |
| Themes | This unit introduces some of the central ideas in biology, including ideas about cells, microscopy, enzymes, nutrition, diffusion, osmosis and active transport | This unit introduces how plants and animals develop from single cells the size of full stops to become complex organisms made of many different types of cells, which all need to be controlled and coordinated | This unit introduces you to DNA code that produces our features and the processes that allow features to be passed on from parents to their offspring | This unit introduces you to how organisms are changed genetically by natural selection and by humans | This unit will help you define health, learn about some pathogens and the diseases they cause, medicines and about the immune system. | Revision techniques and exam techniques Study of examiner reports, how to use mark schemes and common misconceptions |
| The Learning Journey (Previous KS3 & KS4 Learning) | Microscopy. Cellular differences. Specialised cells. Enzymes & Digestion. Diffusion. | Cellular division. Structure of plant & animal cells. Nervous system helps to co-ordinate actions. | Environmental & inherited variation. Fertilisation & reproduction. Cellular structure (nucleus & chromosomes). | Organisms change over time (evolution). Charles Darwin came up with a theory to explain this. | Imbalances in diet lead to obesity & deficiencies. Recreational drugs can affect behaviour, health and life processes. CB1: Structure of bacteria. Use of microscope. | CB1-5: All topics. |

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| <p>Maths Focus</p> | <p>Demonstrate an understanding of number, size and scale and the quantitative relationship between units</p> <p>Use estimations and explain when they should be used</p> <p>Carry out rate calculations for chemical reactions Calculate with numbers written in standard form</p> <p>Plot, draw and interpret appropriate graphs</p> <p>Translate information between numerical and graphical forms</p> <p>Construct and interpret frequency tables and diagrams, bar charts and histograms</p> <p>Use a scatter diagram to identify a correlation between two variables</p> <p>Understand and use simple compound measures such as the rate of a reaction</p> | <p>Use estimations and explain when they should be used.</p> <p>Use percentiles and calculate percentage gain and loss of mass.</p> <p>Translate information between numerical and graphical forms.</p> <p>Use a scatter diagram to identify a correlation between two variables.</p> <p>Extract and interpret information from graphs, charts and tables.</p> <p>Understand and use percentiles</p> | <p>Use estimations and explain when they should be used</p> <p>Translate information between numerical and graphical forms</p> <p>Extract and interpret information from graphs, charts and tables</p> <p>Understand and use direct proportions and simple ratios in genetic crosses</p> <p>Understand and use the concept of probability in predicting the outcome of genetic crosses</p> <p>Calculate arithmetic means</p> | <p>Use estimations and explain when they should be used</p> <p>Translate information between numerical and graphical forms</p> <p>Extract and interpret information from graphs, charts and tables</p> <p>Understand and use direct proportions and simple ratios in genetic crosses</p> <p>Understand and use the concept of probability in predicting the outcome of genetic crosses</p> <p>Calculate arithmetic means</p> | <p>Plot, draw and interpret appropriate graphs</p> <p>Construct and interpret frequency tables and diagrams, bar charts and histograms</p> <p>Understand the principles of sampling as applied to scientific data</p> <p>Use a scatter diagram to identify a correlation between two variables</p> <p>Calculate cross-sectional areas of bacterial cultures and clear agar jelly using $n r^2$</p> | |
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| | <p>Calculate the percentage gain and loss of mass</p> <p>Calculate arithmetic means</p> <p>Carry out rate calculations</p> | | | | | |
| Core Practical Skills | <p>1.6 Investigate biological specimens using microscopes, including magnification calculations and labelled scientific drawings from observations.</p> <p>1.10 Investigate the effect of pH on enzyme activity.</p> | 1.16 Investigate osmosis in potatoes | | | | |
| Spiritual, Moral, Social and Cultural theme (SMSC) Fundamental British Values (FBV) | Spiritual & Social through presentations and practical work | Spiritual & Social through presentations and practical work | Spiritual & Social through presentations and practical work | Spiritual & Social through presentations and practical work | Spiritual & Social through presentations and practical work | Spiritual & Social through presentations and practical work |
| Key Assessment Focuses, Suggested Assessments and Feedback Week | <p>EOU (Key Concepts of Biology)</p> <p>'Book DIRT' Feedback</p> <p>'Assessment DIRT' Feedback</p> | <p>EOU (Cells & Control) Summative Assessment</p> <p>'Assessment DIRT' Feedback</p> | <p>EOU (Genetics) Summative Assessment</p> <p>'Book DIRT' Feedback</p> <p>'Assessment DIRT' Feedback</p> | <p>EOU (Natural Selection) Summative Assessment</p> <p>'Assessment DIRT' Feedback</p> | <p>EOU (Health & Disease) Summative Assessment</p> <p>'Book DIRT' Feedback</p> <p>'Assessment DIRT' Feedback</p> | <p>Year 10 PPE</p> <p>'Assessment DIRT' Feedback</p> |

An 'Assessment DIRT' will also be completed after each assessment where students identify strengths and areas for improvement using their PLC documents and will attempt to turn their PLC statement into a question and complete the answer.
Students will self-assess their work with purple highlighters.

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| Special Events | | | | | Science Week | Year 10 PPE |
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CURRICULUM MAP: Combined/Triple Science Year 10 Long Term Plan 2019 - 2020

EXAM BOARD: Edexcel – Chemistry



At Oriell, we teach the Pearson Edexcel GCSE (9-1) Combined Sciences 2-Year route split into the 3 different disciplines (Biology, Chemistry & Physics) that are taught alongside each other by specialist teachers within that area of study allowing crossing-over of ideas, concepts and principles throughout the students' academic journey at GCSE level. The Pearson Edexcel Level 1/Level 2 GCSE (9–1) in Combined Science consists of six externally examined papers. These are available at foundation tier and higher tier containing a mixture of different question styles, including multiple-choice questions, short answer questions, calculations and extended open-response questions. GCSE study in the sciences provides the foundation for understanding the material world. Scientific understanding is changing our lives and is vital to the world's future prosperity. All students should learn essential aspects of the knowledge, methods, processes and uses of science. They should gain appreciation of how the complex and diverse phenomena of the natural world can be described in terms of a small number of key ideas that relate to the sciences and that are both inter-linked and of universal application.

| | Autumn Term 1 Weeks: 8 | Autumn Term 2 Weeks: 7 | Spring Term 1 Weeks: 6 | Spring Term 2 Weeks: 6 | Summer Term 1 Weeks: 5 | Summer Term 2 Weeks: 7 |
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| Key Concepts | CC1. States of Matter / CC2. Methods of Separating & Purifying Substances | CC3. Atomic Structure / CC4. The Periodic Table | CC5. Ionic Bonding / CC6. Covalent Bonding / CC7. Types of Substance | CC8. Acids & Alkalis / CC9. Calculations Involving Mass | CC11. Obtaining & Using Metals / CC12. Reversible Reactions & Equilibria | Revision & Catch Up |
| Themes | This unit introduces how materials can be separated from one another using their properties. | These units introduce you to atoms, their structure and to the periodic table. | These units help us understand how bonds being formed and broken is essential in helping us explain even the simplest physical change or chemical reaction. | This unit helps you explore the nature of acidic and alkaline solutions, and their most important reactions, properties and uses. This unit will help you to use relative atomic masses to calculate relative formula masses of elements and compounds, calculate the concentration of a solution and work out empirical and | This unit introduces you to reactivity, oxidation & reduction, different ways in which metals can be extracted, advantages of recycling metals, factors involving a life cycle of a product, electrolysis, about equilibria in chemical reactions and the Haber process. | Revision techniques and exam techniques Study of examiner reports, how to use mark schemes and common misconceptions |

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| | | | | molecular formulae of compounds | | |
| The Learning Journey (<i>Previous KS3 & KS4 Learning</i>) | <p>Particle arrangement in different states. Mixtures & pure substances. Separation techniques; chromatography, filtration & distillation.</p> | <p>Particle models. Dalton's ideas of atoms. The Periodic Table arrangement.</p> | <p>Particle model. Dalton's ideas of atoms. The Periodic Table arrangement.</p> | <p>Solubility, solvents & solutes. Common international hazard symbols. Common acids, alkalis & neutral solutions. Indicators. Simple neutralisation. Representation of elements & compounds using symbols. Conservation of mass. Chemical reactions using equations.</p> | <p>Oxidation & displacement reactions. Reactivity series.</p> <p><i>CC4/5/8: Anions & Cations. Balanced chemical reactions. The Periodic Table.</i></p> | <p><i>CC1-12: All topics.</i></p> |

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| <p>Maths Focus</p> | <p>Translate information between diagrammatic and numerical forms</p> <p>Interpret charts</p> | <p>Relate size and scale of atoms to objects in the physical world</p> <p>Estimate size and scale of atoms</p> | <p>Represent three dimensional shapes in two dimensions and vice versa when looking at chemical structures</p> <p>Relate size and scale of atoms to objects in the physical world</p> <p>Estimate size and scale of atoms</p> <p>Represent three dimensional shapes in two dimensions and vice versa when looking at chemical structures, e.g. allotropes of carbon</p> <p>Translate information between diagrammatic and numerical forms</p> | <p>Arithmetic computation and ratio when determining empirical formulae, balancing equations</p> <p>Arithmetic computation, ratio, percentage and multistep calculations permeates quantitative chemistry</p> <p>Calculations with numbers written in standard form when using the Avogadro constant</p> <p>Change the subject of a mathematical equation</p> <p>Provide answers to an appropriate number of significant figures</p> <p>Convert units where appropriate particularly from mass to moles</p> | | |
| <p>Core Practical Skills</p> | <p>2.11 Investigate the composition of inks</p> | | | <p>3.6 Investigate the change in pH on adding powdered</p> | <p>3.31 Investigate the electrolysis of copper</p> | |

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| | using simple distillation and paper chromatography | | | calcium hydroxide/calcium oxide to a fixed volume of dilute hydrochloric acid 3.17 Investigate the preparation of pure, dry hydrated copper sulfate crystals starting from copper oxide including the use of a water bath | sulfate solution with inert electrodes and copper electrodes | |
| Spiritual, Moral, Social and Cultural theme (SMSC) Fundamental British Values (FBV) | Spiritual & Social through presentations and practical work | Spiritual & Social through presentations and practical work | Spiritual & Social through presentations and practical work | Spiritual & Social through presentations and practical work | Spiritual & Social through presentations and practical work | Spiritual & Social through presentations and practical work |
| Key Assessment Focuses, Suggested Assessments and Feedback Week | EOU (States of Matter / Separation Techniques) 'Book DIRT' Feedback 'Assessment DIRT' Feedback | EOU (Atomic Structure / Periodic Table) Summative Assessment 'Assessment DIRT' Feedback | EOU (Bonding & Substances) Summative Assessment 'Book DIRT' Feedback 'Assessment DIRT' Feedback | EOU (Acids & Alkalis) Summative Assessment 'Assessment DIRT' Feedback | EOU (Calculations of Mass etc) Summative Assessment 'Book DIRT' Feedback 'Assessment DIRT' Feedback | Year 10 PPE 'Assessment DIRT' Feedback |
| | An 'Assessment DIRT' will also be completed after each assessment where students identify strengths and areas for improvement using their PLC documents and will attempt to turn their PLC statement into a question and complete the answer. Students will self-assess their work with purple highlighters. | | | | | |
| Special Events | | | | | Science Week | Year 10 PPE |

CURRICULUM MAP: Combined/Triple Science Year 10 Long Term Plan 2019 - 2020

EXAM BOARD: Edexcel – Physics



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| Key Concepts | CP1/2. Motion & Forces | CP3. Conservation of Energy | CP4. Waves | CP5. Light & Electromagnetic Spectrum | CP6. Radioactivity | Revision & Catch Up |
| Themes | This unit introduces quantities that have directions (such as forces), how to calculate speed and acceleration, and how to represent changes in distance moved and speed on graphs, introduces Newton's Laws of Motion, how to calculate momentum, and how the government can work out what the speed limit should be on different roads. | This unit introduces the ways in which energy can be transferred and stored, how to reduce energy transfers, and renewable and non-renewable resources. | This unit introduces student to wave's characteristics and how they transfer energy and information. | This unit will help you learn about the electromagnetic spectrum, harmful effects of waves from this spectrum and that light is part of this family of waves which all have some properties in common. | This unit looks at the structure of atoms, types of radiation and their effect on atoms, and the dangers of radioactive substances and sources. | Revision techniques and exam techniques Study of examiner reports, how to use mark schemes and common misconceptions |
| The Learning Journey (Previous KS3 & KS4 Learning) | Balanced & unbalanced forces. Resultant force. | Temperature. Conduction, convection & radiation. | Light waves. Sound waves. Hearing sounds. | Light transfers energy. Colours. | Particle model. Atomic structure. | CP1-6: All topics. |

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| | How speed, distance and time related. Distance-time graphs. Gravity. | Energy transfer through heating. Energy conservation. Energy stores & transfers. | Light absorption, reflection and refraction. Different colours of light. | Reflection & absorption. | | |
| Maths Focus | <p>Make calculations using ratios and proportional reasoning to convert units and to compute rates.</p> <p>Relate changes and differences in motion to appropriate distance-time, and velocity-time graphs, and interpret lines and slopes.</p> <p>Interpret enclosed areas in velocity-time graphs.</p> <p>Apply formulae relating distance, time and speed, for uniform motion, and for motion with uniform acceleration, and calculate average speed for non-uniform motion.</p> | <p>Make calculations using ratios and proportional reasoning to convert units and to compute rates.</p> <p>Calculate relevant values of stored energy and energy transfers; convert between newton-metres and joules.</p> <p>Make calculations of the energy changes associated with changes in a system, recalling or selecting the relevant equations for mechanical, electrical, and thermal processes; thereby express in quantitative form and on a common scale the overall redistribution of energy in the system.</p> | <p>Make calculations using ratios and proportional reasoning to convert units and to compute rates.</p> <p>Apply formulae relating velocity, frequency and wavelength.</p> | <p>Make calculations using ratios and proportional reasoning to convert units and to compute rates.</p> <p>Apply the relationships between frequency and wavelength across the electromagnetic Spectrum.</p> | <p>Make calculations using ratios and proportional reasoning to convert units and to compute rates.</p> <p>Balance equations representing alpha-, beta- or gamma-radiations in terms of the masses and charges of the atoms involved.</p> <p>Calculate the net decline, expressed as a ratio, in a radioactive emission after a given number of half-lives</p> | |
| Core Practical Skills | 2.19 Investigate the relationship between force, mass and acceleration by varying the masses added to trolleys | | 4.17 Investigate the suitability of equipment to measure the speed, frequency and wavelength of a wave in a solid and a fluid | 5.9 Investigate refraction in rectangular glass blocks in terms of the interaction of electromagnetic waves with matter | | |

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