Cliff Park
ORMISTON ACADEMY

Progression Grid 2023: Science

Pre Year 7	
The main focus of KS2 (lower years) is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out. At KS 2 (upper years), students should be deepening their understanding of a wide variety of scientific ideas involving more abstract ideas and continuing to develop working Scientifically skills through the scientific content included in the Programme of Study.	**Intent** **Students learn science because it provides them with transferable academic, practical and analytical skills which can be used throughout life. It allows students to make informed decisions as well as opening doors to higher education and beyond.** **Knowledge and content are delivered thematically which builds upon the main skills and principles within the main scientific disciplines at KS3. At KS4, students are taught through subject specialisms in order to develop a wider appreciation of the knowledge, content and skills underpinning each scientific discipline.** **Departmental values – respect, integrity, courteous, honest, motivated, polite/punctual/perseverance.**

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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 7						
Topic/Focus	Working Scientifically (WS) Forces (FOR) Cells (CE)		Reproduction (Repro) Particles (PA) Space (SP)		Separation Techniques (ST) Acids and Alkalis (AA) Microbes & Disease (MD) Healthy Lifestyle (HL)	
Sequencing	Working scientifically is our introductory unit. This introduces all students to scientific safety and methodology which is used and developed over 5 years. We continue this development of skills over the key stage with assessed practical. Forces begins our introduction to physics at KS3. It continues to develop working scientifically skills as well as introducing and developing the key concepts of forces from KS2. This also supports DT in their delivery of the Maritime Curriculum as well as being able to immediately utilise Working Scientifically skills. Cells is the building block of biology teaching and introduces the key concepts of organism development.		Reproduction develops the concepts of puberty and plant reproduction which supports PSHE and builds upon MRS GREN as covered in Cells. Particles is the basis upon which physics and chemistry are built. This introduces these concepts which are refined and developed throughout the scientific career. Space builds upon initial work carried out at KS2, but also develops the work covered in Forces as it develops concepts from that unit.		Separation techniques build upon work done in the first term, developing and applying work from Particles and Working Scientifically, as well as developing key chemical knowledge. Acids and alkalis introduce students to basic chemistry concepts and reinforces working scientifically skills and skills introduced in Separating Techniques. Healthy Lifestyle builds upon the initial work covered in Cells, looking at the impact of our lifestyle on our body. It also supports the work of PHSE by covering oral hygiene. Microbes builds upon key knowledge from Cells but introduces students to bacteria and viruses which is necessary for KS4. This tends to be the final topic of the year.	
Extended Learning	Homework activity per unit		Homework activity per unit		Homework activity per unit	
Formal Assessment	WS – Assessed Practical FOR – Assessed Practical CE – Test		Repro – Test PA - Test FOR & SP - Test		ST – Assessed Practical ST & AA – Test HL – Test	

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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 8						
Topic	Energy (ENE) Reproduction and Birth (Repro) Metals & Materials (MM)		Respiration & Digestion (RD) Electricity & Magnetism (EM) Natural Resources (NR)		Motion (MOT) Plants & Photosynthesis (PP) Earth & Atmosphere (EA)	
Sequencing	Energy is a key concept within KS3 physics. It develops concepts such as energy stores and applies concepts using work covered in Particles. It also continues the development of Working Scientifically skills as it contains an Assessed Practical. Reproduction & birth builds upon concepts covered in year 7, giving students a second opportunity to access sex education as well as developing key concepts surrounding reproduction. Metals builds on work from KS2 and uses some of the concepts introduced in Y7. It develops further the chemical nature of scientific study. Materials looks at the properties of different materials which building upon the key properties of metals introduced in the first half of the unit.		Respiration and digestion are two key features of MRS GREN which was introduced in Cell. This unit develops those key concepts of organisation introduced in Cells and begins the introduction of understanding how key organ systems work and interact. Electricity and Magnetism builds upon KS2 content and continues to reinforce and develop working scientifically skills. It covers electrical circuits which develops and understanding of key knowledge for future study and builds the relationship between electricity and magnetism in the development and use of electromagnets, with this being the main assessed practical. Natural Resources is our main unit which links into the Maritime Curriculum. It builds upon the concepts introduced in Energy, looking at how electricity is generated and why it needs to be generated in a more sustainable way, in terms of global warming, making links to local offshore industry.		Motion builds upon the key ideas covered in Y7 Forces. It also begins to introduce key mathematical concepts as well as continuing to build working scientifically skills. Earth and Atmosphere is continuing to develop working scientifically skills. It looks at the structure of the Earth and considers the impact of pollutants upon the Earth. This unit contains cross-curricular fieldwork links with CEFAS and Geography. Plans & photosynthesis builds upon the work in Y7 on plant cells and reinforces the concept of MRS GREN in a plant. It looks at the concept of photosynthesis in detail in preparation for Y9.	
Extended Learning	Homework activity per unit		Homework activity per unit		Homework activity per unit	
Formal Assessment	ENE – Assessed Practical Repro – Test MM – Test		EM – Assessed Practical + Test RD – Test		MOT – Assessed Practical + Test EA & NR – Test PP– Assessed activity	

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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 9						
Topic/Focus B - 3h/fortnight C - 2h/fortnight P - 3h/fortnight	B - Cells and Microscopy (CAM) C - Intro to Chemistry (Intro) P - Sound (SL)	B - Cells and Microscopy (CAM) C – Intro to Chemistry (Intro) P - Light (SL)	B - Respiration (Resp) C - Chemical Analysis (CA) P - Electricity & Energy (EE)	B - Variation (VAR) C - Chemical Analysis (CA) P - Electricity & Energy (EE)	B - Plants & Ecosystems (PE) C - Atomic Structure (AS)/Bonding & Formula (BF) P - Forces (FOR), Pressure (PA)	B – Transport in Cells (TIC 1) C – Types of Reaction (TR) P - States of Matter (SoM)
Sequencing	B – CAM develops the work done at KS3 and starts to develop concepts from a GCSE perspective. The unit looks at the development of the cell and organisation. The microscopy work develops that done in Y7 and incorporates the GCSE RP. C – this begins with a basic recap of basic KS3 chemistry concepts including a development of gas tests. It also develops the key concepts of elements, mixtures and compounds started in Y8 and begins to develop the concept of chemical formulae. Separation techniques are revisited with a greater emphasis on explaining these techniques in preparation for KS4. P - Sound develops the concept of wave theory and shows the cross-over between physics and biology with work on hearing. Light continues to develop and build upon the concepts introduced in Sound and reinforces work on basic wave theory.		B – Respiration covers a key process within the body. this unit builds upon the work done in CAM and builds upon work covered in Y8. This unit also continues to develop Working Scientifically skills and starts to show the links required within biological systems. Variation also builds upon CAM and takes a more detailed look at the nucleus, the key terminology surrounding genetic material and how genetics plays a part in our development. We also consider the nature of science through the development of DNA as well as considering key issues facing society. C - CA builds upon previous teaching in terms of particle theory and mixtures. It covers a KS3 concept in chromatography in a more detailed way and introduces the mathematical work required for GCSE. P - EE builds upon the work in Y8 developing further key ideas surrounding electricity and energy and develops the concepts of efficiency and paying for electricity whilst developing key maths skills and continuing to work on working scientifically skills.		B – Plants & Ecosystems completes the KS3 PoS for biology. It builds upon the work covered in Y8 and develops the concepts of feeding relationships within an ecosystem and starts to develop these concepts at a more advanced level in preparation for GCSE. This also allows students to be given the opportunity to be introduced to basic sampling techniques. TIC builds upon work covered in CAM at the start of the year and builds upon the concept of transport into cells looking at the key concept of diffusion and continues to develop the working scientifically skills in preparation for Y10. C – AS Introduces more complex ideas about the atom as the building block of matter and starts to introduce more conceptual ideas in preparation for Y10. TR finishes the KS3 PoS identifying key types of reactions. It builds upon the work covered in Y7 and Y8 and builds to develop the reactivity series and other key reactions which students need for KS4. It also allows us to use the work taught in the previous unit on equations. P – Forces completes the KS3 PoS in this area and acts as is a foundation unit for GCSE. It allows for specialists to check and reinforce the key concepts from Y7 and Y8 and ensure any misconceptions are identified and rectified. The concepts are also developed to incorporate some of the key terminology	

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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
					and concepts required at KS4. Pressure completes the KS3 PoS. It builds upon the work on weight in Forces and continues to develop the mathematical work. This unit would allow more able students to begin to utilise changing the subject of equations which is required for the work on density and beyond in KS4. States of Matter begins key GCSE work linking together the ideas of particles from a physics perspective. It develops the key concept of density in a more complex way introducing the key components needed for GCSE.	
Extended Learning	Homework activity per unit		Homework activity per unit		Homework activity per unit	
Formal Assessment	Autumn 2 – 3 x 20-minute tests in biology, chemistry and physics based upon prior learning.		EE – Assessed Practical Spring 2 - 3 x 20-minute test in biology, chemistry and physics based upon prior learning.		TR – Assessed Practical Summer 2 – 3 x 20-minute test in biology, chemistry and physics based upon prior learning.	

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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 10						
Qualification: Trilogy						
Topic/Focus B - 3h/fortnight C - 3h/fortnight P - 3h/fortnight	B – TIC 2 C – Atomic Structure (AS)/Bonding and Formula (BF) P - Atomic Structure (ATM)	B – Respiration & Exercise C - Reaction of Metals (RM) P - Newton's Law of Motion (NLM)	B - Enzyme 1/Digestion (ENZ 2) C - Structures and Bonding (SB), Quantitative Chemistry (QC) P - Change of State (CoS)	B – Circulation, breathing & Respiration (CBR) C - Energy Changes (BB) P - Using Energy (UE)	B - Plant Structure and Photosynthesis 1 (PSP 1) C – Acids, Bases and Salts (ABS) P - Using Energy (UE)	B - Adaptations, interdependence and competition (AIC), Disease & Immunity (DIM 1) C - Periodic Table (PT) P - Road Safety (RDS)
Sequencing	B - builds on Y9 and develops further the concepts of transport into cells. This unit contains work on osmosis and active transport and contains a major RP. Respiration & Exercise builds upon the basic work started in Y9 and develops the concepts further which can then be used throughout the biology units in Y10. C – Atomic structure covers the basic structure of the atom which is the building block for work on bonding and formula. BF builds upon the atomic structure and develops the production of compounds and how this is shown through equations. RM builds upon the reactivity series work covered in TR at the end of Y9 and reinforces bonding and equation work. P- ATM builds upon work done in Y9 and shares some content with chemistry, so is a useful reminder of key content covered in Y9 through a different scenario. This is also more abstract so content from other area is beneficial here. NLM is covered here to ensure the main forces concepts are in place for future learning eg RDS. It builds upon the concepts covered in KS3 with the greater detail needed at KS4. RP is contained here, as the maths level increases.		B - Enzyme 1 is needed in 2223 to cover the basic enzyme work. Digestion builds on enzyme work and transport to look at another key process. CBR introduces the circulatory and breathing systems. The unti incorporates work on non-communicable diseases and brings the work back to the concept of respiration covered at the start of Y10. C – QC introduces the basic mathematical concepts and introduces higher tier students to mole calculations. SB allows a recap of chemical bonding and is a major unit looking at the structure and properties of key structures. Energy changes looks at exothermic and endothermic reactions in greater detail and reinforces working scientifically skills through RP. Also introduces more mathematical concepts for higher tier. P - COS builds on the work done in Y9 on SoM. The maths content is now of higher level, so we carry out his unit here so as students are ready to access the increased maths content. UE is conceptually challenging, and the data handling and formula work is mathematically challenging so is left until late in Y10. This is a major physics unit and contains many concepts so this spans over a term to allow for development and practice of these concepts.		B - PSP 1 builds on the work covered in KS3. It looks at key concepts of photosynthesis as well as reinforcing work covered on organisation of organisms, introducing various plant tissues and containing a key RP. AIC contains development of ecological sampling techniques within the summer term which is a key RP for paper 2 and links key ecological concepts relating to plants. DIM 1 is an introductory unit looking at pathogens and the main way disease is spread. Students also learn about the pathogenic diseases in readiness for Y11. C – ABS reinforces work on pH scale covered in Y9. It contains a large amount of practical work an reinforces the separation techniques used in Y9. It also introduces key definitions of acids and alkalis which are needed for PT unit. It also begins to use half ionic equations for HT students. Periodic Table builds upon prior work including atomic structure, properties of structures and reactivity. P - RDS builds on Newton's Laws of Motion. Conceptually this is difficult and deals with issues such as RTA casualties so not suitable for younger children. This is also done late in the year to ensure the maths ability is great enough for the majority to cope with the complexities of the equation work.	
Extended Learning	Homework activity per unit		Homework activity per unit		Homework activity per unit	

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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Formal Assessment	Assessment task at end of each unit. Autumn 2 - 1h assessment consisting of 1 x 20' test in biology, chemistry and physics based upon prior learning from both Y9 and Y10. This is not tiered. Tests kept in folders and data used to review groupings/intervention strategies.		Assessment task at end of each unit. Spring 2- 1h assessment consisting of 1 x 20' test in biology, chemistry and physics based upon prior learning from both Y9 and Y10 – tiered. Tests kept in folders and data used to review groupings/intervention strategies.		Assessment task at end of each topic. Y10 exams – 3 x 1h papers Tests kept in folders and data used to review groupings/intervention strategies.	

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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 11						
Qualification: AQA Trilogy						
Topic/Focus B - 3h/fortnight C - 3h/fortnight P - 3h/fortnight	B – Plant structure and photosynthesis 2 (PSP 2), Disease & Immunity 2 (DIM 2) C - Periodic Table (PT), Rate of Reaction (RoR) P - Mains Electricity (ME), Current and voltage (IV)	B - Genetics, variation and evolution (GVE), C - Oil (OIL) P - Road Safety (RDS)	B - Nervous System (NS), Hormonal Control (HC) C - Atmospheric Chemistry (AC), Water (WAT) P - Waves (WAV)	B - Humans and the Environment (HIE) C - Equilibrium (EQM), Electrolysis (LYS) P - Magnetism and Electromagnetism (MAG), Motors (MOT)		
Sequencing	B – PSP 2 builds upon concepts covered in Y9 and Y10 and further develops the concepts of transpiration within the plant. DIM2 builds upon the work in Y10 and covers the way in which the body responds to pathogenic disease. GVE contains a lot of ethical concepts and requires a high degree of maturity for this to be covered effectively. It is a large concept and allows us time to develop these key concepts for paper 2. C – Periodic Table (PT) builds upon prior work including atomic structure, properties of structures and reactivity. RoR builds on key particle theory concepts covered previously. It also introduces key higher tier concepts relating to graphical work. This is a major unit as it contains three RP's. Oil is an important unit as it reinforces covalent bonding and builds upon separating techniques covered in Y9. This unit also contains content on atmospheric pollution and global climate change, which is the cornerstone of this paper. it also links together challenging concepts, e.g., LCA's, sustainability and global climate change. P – ME builds upon the first unit in Y11 on electricity. It is reliant on some knowledge of real life and has some abstract ideas, so this is left until Y11 as it requires an increased level of maturity. It links		B - NS is a major physiological unit which requires prior knowledge from Cells and TIC. It also develops a more sequential approach to biology questions and contains a RP. HC utilises a number of key concepts from previous units and builds upon work covered in NS. This unit introduces key higher tier concepts which are distinct within the biology syllabus. HIE is a unit which looks at the environmental impact upon ecosystems ensuring all the ecological and environmental aspects of the specification are reviewed and covered. C - AC looks at the evolution of the atmosphere and the impact of global climate change on this. It is a very short unit which links closely to the work covered in OIL. Water also brings together key concepts covered in previous units and covers the final RP, so allowing other mathematical concepts to be revisited. Both LYS and EQM are very challenging for Foundation Tier students, so they are left towards the end to provide a vehicle for revision and allows for increased academic maturity. EQM also must be taken much further at higher tier and requires a high degree of higher-level thinking to be able to fully appreciate this work. P – Waves builds upon work started in Y9. It is a very abstract unit, and the maths skills are also		

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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	closely with IV and these units cover the electricity aspects of the GCSE and are required for further study of motors and electromagnets. The conceptual and terminology requirements build on work covered in the previous units. The RP is a major one with many facets. RDS builds on Newton's Laws of Motion. Conceptually this is difficult and deals with issues such as RTA casualties so not suitable for younger children. Due to staff issues, this was not completed in Y10. However, it will provide a solid platform to revisit key work on Forces in preparation for the mocks. There is a high degree of maths work in this unit which requires maths ability great enough for the majority to cope with the complexities of the equation work.		challenging, which is why this unit is in Y11. This involves quite a complex RP which requires skills and mathematical concepts from previous years. Magnetism is the final unit for foundation tier and allows many working scientifically concepts to be covered before the exam. It builds upon the electricity work covered at the start of Y11. Motors is the final higher tier concept which relies on students having covered electricity and magnetism in advance.			
Extended Learning	Homework activity per unit		Homework activity per unit			
Formal Assessment	Assessment task at end of each topic. September - 1h assessment consisting of 1 x 20' test in biology, chemistry and physics based upon prior learning from both Y9 and Y10. Tests kept in folders and data used to review groupings/intervention strategies	Mock exam - data benchmarked to previous exam series and used to inform tier choice. Tests kept in folders and data used to review groupings/intervention strategies.	Assessment task at end of each topic.	Mock exam - data benchmarked to previous exam series and used to inform tier choice. Tests kept in folders and data used to review groupings/intervention strategies.		

Post Year 11	
Further Education/training in: 'A' level sciences or Level 3 scientific qualifications	Employment in: NHS, engineering, offshore work, teaching - science subjects have skills which are transferable to many aspects of work.