SUBJECT: Curriculum Overview

Year 12

Half Term	Topic studied	What will I learn?	How will I be assessed?	National Curriculum Map
Year 12 Autumn	1- How do rocks form? 2-Igneous Processes	1. Minerals identification – specimen and thin section 2. Structure of minerals 3. Rock forming mineral group 1. Intro to the rock cycle 2. What are igneous rocks 3. Identify igneous rock groups 4. Chemistry of igneous rocks 5. Extrusive and intrusive igneous rocks 6. Bowens reactionary series 7. Volcanic products	Exam questions from Paper 1, 2,3 PAG 1 – Identifying minerals using characteristics PAG 3 – Using Salol to investigate crystal growth PAG 1 – Geology on the streets of Hertford homework	**Elements, minerals and rocks** • the bulk composition of the Earth and how it is inferred from meteorite evidence (chondrites) • the geochemical classification of elements by Goldschmidt's system and the processes which partition each geochemical group between the Earth's atmosphere and hydrosphere, crust, mantle and core • the chemical nature of minerals as naturally occurring elements and inorganic compounds, and how their crystalline structure and composition may be expressed as a chemical formula • the diagnostic physical properties of minerals in hand specimens - colour, lustre, shape, streak, cleavage/fracture, density and hardness • how the crystalline structure of silicate minerals are built up from silicon-oxygen tetrahedral to form frameworks, sheets or chains. [The substitution of elements for others in the crystal structure of a mineral, and olivine and plagioclase feldspar as examples of solid solution series] • the diagnostic properties of rocks - colour, composition, grain/crystal size and grain/crystal shape, and sorting/texture and the evidence in rocks -mixtures of one or more minerals- for the igneous, metamorphic or sedimentary processes that formed the rock. **Internal processes**: igneous and metamorphic rocks • the generation of magma by partial melting in different tectonic contexts including interplate and intraplate settings • [the geological processes -assimilation, differentiation and fractionationwhich cause magma composition to evolve and be modified] • the petrology of intrusive igneous activity including igneous bodies and rocks • the petrology of volcanic rocks including the surface expressions of igneous activity •

				the nature of volcanic hazards and controlling factors including the composition and properties of the magma
Year 12 Spring	3- Sedimentary Rocks and environments 4 –Metamorphic Rocks 5- Geological Time 6- Fossil preservation	1. Weathering and erosion 2. Sedimentary rock classification 3. Structures and facies 4. Graphic logs 5. Environments of ice, water, wind, deserts and oceans 6. Banded Iron Formations 7. Identification of sedimentary rocks 8. Contact and regional metamorphism 9. Barrovian zones and index minerals 10. Identifying metamorphic rock 11. The Geological Column 12. Dating techniques (absolute and relative) 13. Fossil preservation	Exam questions from Paper 1, 2,3 PAG 4 – Sieving PAG 5 – Identifying fossils / Micro fossils under microscope PAG 7 - Metamorphic aureole demonstration and write up assessment.	**Internal processes**: igneous and metamorphic rocks The mineralogy and texture of metamorphic rocks, and how these can be used to reconstruct their history and infer the composition of the parent rock and the conditions at metamorphism -temperature, pressure, [directed stress and time] • the characteristics of rock deformation -brittle and plastic- and how these relate to permanent strain and tectonic stresses • [how the composition of the parent rock and conditions at the time of rock deformation -strain rate, temperature and pressure- determine the nature of that rock deformation] **Surface processes**: sedimentary environments and sedimentary rocks • how uniformitarianism and the rock cycle model developed over time, including ideas of catastrophism, mass extinctions, and changing conditions and rates of processes through geological time including the contributions of James Hutton and William Smith • an understanding of what facies associations are and why facies are the basic unit of sedimentary geology • how uniformitarianism is applied to enable the interpretation of ancient sedimentary facies by analogy with modern sedimentary sequences and processes, including: • the mechanical, chemical and biological processes which form sediments and sedimentary rocks • [how sedimentary processes which are infrequent and/or difficult to observe, for example turbidity currents, can be understood and explained using scientific models • applying Walther's Law to extend interpretation from two-dimensional data, for example, borehole logs, cliff sections, to three-dimensions] • the nature of fossil evidence (the preserved remains of living organisms or traces of those organisms) and the use of fossils as palaeoenvironmental indicators • the characteristic composition and texture of modern sediments and ancient sedimentary rocks, and how the processes of weathering, erosion and deposition form these characteristic compositions and textures the processes of diagenesis and lithification, and how they modify the texture of sedimentary rocks, including the growth of cements, recrystallization of minerals, and how mechanical/chemical compaction change the porosity and permeability of rocks
Year 12 Summer	7- Earth Structure 8- Plate tectonics 9 – Structural Geology 10 - Cornwall Prep	1. Our Solar system 2. Internal structure of the Earth 3. What do earthquakes tell us 4. Earth's Heat 5. Magnetic Earth 6. Plate Theory 7. Why do plates move	Exam questions from Paper 1, 2,3 **PAG 10 – Geevor Tin mine** **PAG 12 – Bude formation** **PAG – Logging in Bude** **– Cornwall field trip and Fieldwork skills write up**	**Earth structure** • the Earth's internal geological processes resulting from the transfer of energy derived from radioactive decay within the Earth and released as heat of formation by the Earth • the layered structures of the Earth, and how they are defined by the chemical and the rheological properties of the layers, including the direct and indirect evidence for these models, including geophysical measurements - gravity, seismicity, geomagnetism and conductivity - and mantle xenolith **Non-core knowledge and understanding** Planetary geology Specifications offering this option must require students to develop

		8. What happens at convergent and divergent plate margins 9. Hotspots and their significance 10. What is Dip And Strike 11. Folding 12. Faulting 13. How to interpret geological maps	Year 12 Exam – Exam resources from OCR materials	and apply their knowledge and understanding of the core content to include: • the formation and accretion of the terrestrial planets, including the Moon, Venus and Mars, giant planets and dwarf planets • the application of remote sensing data for studying the geology of the terrestrial planets • the formation of the Earth Moon system • the differentiation and evolution of the crust, mantle and cores of the terrestrial planets • the role of early life in the Archean and Paleoproterozoic (4.6 to 1.8 Ga) and the Great Oxidation Even **Global tectonics** • the framework of plate tectonics including: subduction zones, lithospheric plates (cold thermal boundary) and mantle plumes, the active limbs of convection cells; [and how mid oceanic ridges are formed] • how the detail of plate tectonics can be interpreted from evidence, including: • the direct measurement of relative movement of points on different plates using global positioning systems (GPS) • the global distribution of geological features including volcanic zones, orogenic belts, palaeoecology and palaeoenvironments • earthquake seismology and seismic tomography • geomagnetic and geoelectrical data including ocean floor magnetic anomalies • how plate movement causes tensional, compressive and shear dominated tectonic environments, which can lead to rock deformation as a result of tectonic or gravity induced stresses • how the plate tectonics paradigm developed over time, including continental drift, active mantle convection carrying passive tectonic plates (mantle drag), slab pull and ridge push **Fieldwork:** Meets the minimum requirements of two days of fieldwork at AS, and four days of fieldwork for A level. Fieldwork time for students to develop practical skills (appendix 1d) which will be assessed indirectly in exams. The additional fieldwork days at A level is required for students to develop proficiency in all the relevant requirements of appendices 1b & 1c, and then to demonstrate their competence in practical field geology. Specifications must require students to: • undertake fieldwork in different contexts: virtual fieldwork, local fieldwork outside the classroom and fieldwork on unfamiliar outcrop geology • experience and develop competency in the skills and techniques contained in appendix one 12 • apply knowledge and concepts to identify and understand field observations • be given opportunities to develop increasing independence in their application of the investigative and practical skills and techniques in appendix one over the A level course through progression from scaffolded to unscaffolded tasks and from familiar contexts to unfamiliar outcrop geology