SUBJECT: Curriculum Overview

Year 13

Half Term	Topic studied	What will I learn?	How will I be assessed?	
Year 13 Autumn	1- Bude write up completing 2- Engineering Geology 3 – Geohazards	1. Water 2. Metallic mineral mining 3. Energy exploration 4. Constructing for the future 5. Reducing risk 6. Seismic hazard 7. Predict, Plan, Protect 8. Case study 9. Shrinking Earth – Clay 10. Rocks on the move – Mass movement	Exam questions from Paper 1, 2,3 PAG 2 – Earthquake mapping task – Mercalli PAG 8 – Porosity and permeability testing PAG 9 – Geophysical interpretation of data from WGC sink hole. PAG 10 – Investigating Geological sources - Bude	**Earth materials and resources** • [how the presence of fluids in rocks and sediments -water, oil and gas is controlled by porosity and permeability, and why the presence and behaviour of these fluids is important to hydrogeology, economic geology, engineering geology and geohazard analysis • how the flow of fluids in rocks can be modeled using Darcy's Law (appendix two - 3.3) • the characteristics of subsurface geology which control the flow of groundwater (hydrogeology) including confined and unconfined aquifers, aquicludes, aquitards, the water table, piezometric surfaces and recharge zones • the controls on groundwater quality which result from geochemistry (carbonates and sulfates), aquifer filtration, residence time and sources of pollution • geological resources and the igneous, hydrothermal or sedimentary processes that form them • the use of both geophysical and geochemical techniques in the exploration for geological resources • the extraction of geological resources and storage of waste products, including the use of planning for extraction/storage to be economic, and for environmental sustainability • the impact of ground conditions on existing and proposed constructions or excavations (engineering geology), including: • how the strength of rocks and sediments are changed by weathering, fracture density, geological structures and pore water • how existing data sets and ground investigations are integrated in a geotechnical site assessment • the limitations and utility of geohazards risk analysis, including: • an understanding of geological processes, and the characteristics of rocks and sediments which contribute to the potential geohazard • the

				synthesis and summary of geological data sets and the communication of this information for the use of non-specialists 8 • probability and return period (appendix two 2.3), and the ability to communicate these appropriately to non-specialists **Non Core - Geohazards**: • the factors which affect the impact of earthquakes, and how geology and civil engineering can reduce the impact of future seismic events • the effectiveness and limitations of probabilistic forecasting and deterministic predictions of geohazards • the causes and effects of geohazards in the British Isles, including shrinking and swelling clays, landslides, subsidence and significant tsunamis in the recent geological past • the application of engineering geology and the impact of major civil engineering activities on the natural environment • the role of geological understanding in the management and remediation of contaminated land and groundwater such as former industrial brownfield sites **Non Core - Critical resources**: • the impacts of increased water demand and climate variability (extreme weather events) on a regional groundwater basin • how fossil fuel reserves, including shale gas, shale oil and coal bed methane, are identified, the extractive technologies and the potential for carbon capture and storage (sequestration) • geothermal energy resources in the British Isles and their potential use for ground source heat and cooling • critical elements, for example Rare Earth Element, current mining and potential developments, including the formation of critical element ores, extraction technology and geological challenges to securing sources of critical elements • the quarrying of bulk minerals in the British Isles, including environmental impact of geological factors, extraction planning, and the national and local economic benefits 1
Year 13 Spring	4- Evolution of life 5– Basin Analysis	1. Changing planet 2. Age of man 3. Major fossil assemblages 4. Dinosaurs 5. Mass extinctions – cause and outcome 6. Fossil preservation 7. Konservat – lagerstatten (Jurassic and Cambrian) 8. Welsh and Jurassic Basins	Year 13 Mock Exam – Exam resources from OCR materials Exam questions from Paper 1, 2,3 PAG 5 – Identifying fossils / Micro fossils under microscope PAG 11 and 12 – Basin posters – research of a key geological setting	**Evolution of the Earth** • [how the Earth has changed through geological time (with particular focus on the Phanerozoic Eon) including long-term changes to the global climate, composition of the atmosphere, sea level and distribution of the continents • how evidence for these changes is interpreted from both the geological record (palaeoenvironments) and the geochemistry of the rocks, including isotope studies • the importance of the Anthropocene to illustrate the application of geochronological processes, and the lack of consensus for the epoch1] • how geological events can be placed in relative and numerical time scales, including: • the use of geochronological principles to place geological events in the geological column in relative time sequences • the use of radioactive decay rates ([appendix two - 3.5]) to give a numerical age based on the presence of radionuclides in minerals 1 A proposed epoch that began when human activities changed the Earth's surface environment on a scale comparable with the major events of the geological past that are used to mark the geological time scale. 7 • [how the evolution of life on Earth, displayed in the fossil record, is used

				as evidence to investigate long term gradual change and short term catastrophic events] • the application of macro [and micro] fossils in relative dating [and correlation] • [the Wilson cycle model and how it can provide an outline framework to understand these long term changes in context **Non Core - The stratigraphy of the British Isles** Specifications offering this option must require students to develop and apply their knowledge and understanding of the core content to include: • the stratigraphy of the British Isles, including the adjacent continental shelf, in the time period 1000 Ma to 2.6 Ma 9 • the assembly of the lithotectonic terranes that underlie British Isles during three orogenic events • the application of remote sensing and subsurface data to study the Palaeozoic and Neoproterozoic geology of the British Isles • the application of evidence to support the theory that the latitude of the British Isles has changed through the period specified • the global tectonic context over the specified time period and its impact on the geological history of the British Isles **Non Core - Basin analysis**: • the application of field geology to understanding the palaeoenvironments and geological history of a case study basin • the application of geophysical data to interpret the structural history of the case study basin • the integration of borehole data with geophysical data into the basin model • the application of palaeontology to the interpretation of palaeoenvironments and the use of zone fossils in the basin • the application of basin analysis for economic prospecting in the case study basin]
Year 13 Summer	6 – Exam preparation and revision		Exam questions from Paper 1, 2,3	