

COURSE OUTLINE

YEAR 11 EARTH AND ENVIRONMENTAL SCIENCE ATAR: 2021

UNIT 1 AND UNIT 2

This course will run the two units, 1 and 2, concurrently. The student Semester 1 grade will therefore be an estimate.

Term	Week	Topic and key teaching points	Syllabus content	Pre reading resources	Assessment
1	1	<ul style="list-style-type: none"> Intro to EES Introduction to Investigations Scientific Reports Mind Maps Earth internally differentiated into a layered structure: 	Earth has internally differentiated into a layered structure: a solid metallic inner core, a liquid metallic outer core and a silicate mantle and crust; study of seismic waves and meteorites provides evidence for this theory		
1	2	<ul style="list-style-type: none"> Evidence for this theory <ul style="list-style-type: none"> - Seismic waves - Meteorite composition and structure <i>Sedimentary Rocks –</i> 	identify the following sedimentary rocks from physical samples, diagrams and photographs – <i>conglomerate, BIF breccia, sandstone, limestone, siltstone, shale, mudstone</i>	Pg 1-21	
1	3	<ul style="list-style-type: none"> Atmosphere and Water were derived from? <p>Current theories – emergence of life</p>	<ul style="list-style-type: none"> the atmosphere was derived from volcanic outgassing during cooling and differentiation of Earth, and its composition has been significantly modified by the actions of photosynthesising organisms the modern atmosphere has a layered structure characterised by changes in temp: the troposphere, stratosphere, mesosphere and thermosphere current theories state that life emerged under anoxic atmospheric conditions in an aqueous mixture of inorganic compounds, either in a shallow water setting as 	Pg 21-26	Task 1: Validation - Density

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			a result of a lightning strike or in an ocean floor setting due to hydrothermal activity		
1	4	<ul style="list-style-type: none"> Relative geological timescale <ul style="list-style-type: none"> Relative dating - Index fossils Stratigraphic Principles <p>Fossil evidence for life first appeared on Earth</p>	<ul style="list-style-type: none"> a relative geological timescale can be constructed using stratigraphic principles, including original horizontality, faunal succession, superposition, cross-cutting relationships, inclusions, unconformities and correlation fossil evidence indicates that life first appeared on Earth approximately 4 billion years ago. Index fossils enable correlation of rock strata for relative dating 	Pg 28 - 43 + Internet	
1	5	Absolute Dating using radioisotopes	<ul style="list-style-type: none"> precise dates can be assigned to points on the relative geological timescale using data derived from the decay of radioisotopes in rocks and minerals; this establishes an absolute timescale and places the age of the Earth at approximately 4.5 billion years 	Pg 43 - 55	Task 2: Test – Formation of Earth
1	6	<ul style="list-style-type: none"> Rock Cycle <ul style="list-style-type: none"> Types of rocks Processes 	<ul style="list-style-type: none"> rocks are composed of one or more minerals and are formed through igneous, sedimentary and metamorphic processes as part of the rock cycle 	Pg 60-61	Mass extinctions – hand task sheet Due 2 nd April
1	7	<ul style="list-style-type: none"> Sedimentary rocks <ul style="list-style-type: none"> Classification Composition, Texture 	<ul style="list-style-type: none"> some sedimentary rocks can be identified according to their composition and texture, including conglomerate, breccia, sandstone, limestone, siltstone, shale, mudstone 	Pg 89-97	Field trip: Sedimentary rocks, structures 26 th Mar Friday

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1	8	<ul style="list-style-type: none"> Sedimentary Structures <p>Compilation of field data and research reports</p>	<ul style="list-style-type: none"> simple sedimentary structures are used as evidence of past processes and are related to depositional environments, including the use of <i>cross-bedding</i>, <i>graded bedding</i> and <i>mud cracks</i> 	Pg 98 - 101	Task 3: Validation - Mass extinctions
1	9	<ul style="list-style-type: none"> Characteristics of past environments and communities <p>Principle of Uniformitarianism</p>	<ul style="list-style-type: none"> observation of present day processes can be used to infer past events and processes by applying the Principle of Uniformitarianism <i>Sediment layers, Peat bogs, Coral bleaching, sand-dunes, sea level rising</i> 	Pg 401-406 (EEES)	
2	1	<ul style="list-style-type: none"> Diversification and proliferation of living organisms - <i>Cambrian period</i> <p>Catastrophic collapse of ecosystems – mass extinction event end of <i>Cretaceous period</i></p>	<ul style="list-style-type: none"> diversification and proliferation of living organisms over time (including increases in marine animals in the Cambrian period), and the catastrophic collapse of ecosystems (including the mass extinction event at the end of the Cretaceous period) inferred from fossil record the characteristics of past environments and communities (including presence of water, nature of the substrate, organism assemblages) can be inferred from the sequence and internal textures of sedimentary rocks and enclosed fossils, including banded iron formations and Ediacara fauna 	Pg 391-401 (EEES)	Task 4: Validation - Field trip
2	2	<ul style="list-style-type: none"> Minerals properties <p>Moh's hardness</p>	<ul style="list-style-type: none"> minerals can be characterised by their colour, streak, lustre, transparency, cleavage, fracture, hardness (Moh's scale), magnetism, density 	Pg 68 - 87	Task 5: Test: Rocks, and Minerals identification test and Past Environments

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2	3	Hydrosphere	<ul style="list-style-type: none"> water is present on the surface of Earth as a result of volcanic outgassing and impact by icy bodies from space; water occurs in three phases (solid, liquid, gas) on Earth's surface the water cycle is an important component of Earth system processes 		Task 6: Investigation Soil Validation -Soils
2	4	<ul style="list-style-type: none"> Soil formation and composition Weathering Case Study - Water	<ul style="list-style-type: none"> soil formation requires interaction between atmospheric, geological, hydrological and biotic processes; soil is composed of rock and mineral particles, organic material, water, gases and living organisms in any one location, the characteristics (including temperature, surface water, substrate, organisms, available light) and interactions of the atmosphere, geosphere, hydrosphere and biosphere, give rise to unique and dynamic communities 	Pg 114-136	
2	5	Review			
2	6	Exam			Task 7: Exam – Unit 1
SEMESTER 2					

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2	7	<ul style="list-style-type: none"> Energy Rocks: <i>basalt, dolerite, gabbro, andesite, diorite, rhyolite, pegmatite, granite, pumice, tuff and obsidian</i> 	<ul style="list-style-type: none"> energy is neither created nor destroyed, but can be transformed from one form to another (for example, kinetic, gravitational, heat, light) and transferred between objects processes within and between Earth systems require energy that originates either from the Sun or the interior of Earth 	Energy - Internet reading Pg 138 - 148	
2	8	<ul style="list-style-type: none"> Earth Heat Budgets Greenhouse Effect 	<ul style="list-style-type: none"> most of the thermal radiation emitted from Earth's surface passes back out into space, but some is reflected or scattered by greenhouse gases toward Earth; this additional surface warming produces a phenomenon known as the naturally occurring Greenhouse Effect 	Research Internet	
2	9	<ul style="list-style-type: none"> Transfer of solar energy to Earth's surface Albedo 	<ul style="list-style-type: none"> the net transfer of solar energy to Earth's surface is influenced by its passage through the atmosphere, including impeded transfer of ultraviolet radiation to Earth's surface due to its interaction with atmospheric ozone, and by the physical characteristics of Earth's surface, including albedo 	Pg 138 - 153	

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2	10	<ul style="list-style-type: none"> Atmosphere and Atmospheric circulation Weather and Climate Movement of atmospheric air 	<ul style="list-style-type: none"> the movement of atmospheric air masses due to heating and cooling, and Earth's rotation and revolution, cause systematic atmospheric circulation 	Pg 153 – 155 Internet	Task 8: Validation Albedo Investigation Impact of surface Albedo
2	11	Catchup	<ul style="list-style-type: none"> Question bank Mindmaps 		
3	1	Global ocean conveyer model	<ul style="list-style-type: none"> the behaviour of the global oceans as a heat sink, and Earth's rotation and revolution, cause systematic ocean currents; these are described by the global ocean conveyer model 	Pg 155 - 161	Task 9: Validation - Earth's Climate System -
3	2	<ul style="list-style-type: none"> El Niño and La Niña Leeuwin Australian climate 	<ul style="list-style-type: none"> the interaction between Earth's atmosphere and oceans changes over time and can result in phenomena, including El Niño and La Niña 	Pg 186 - 200	
3	3	<ul style="list-style-type: none"> Plate tectonic due to Earth's heat and gravitational energy Reconsidering Convection Cells (<i>Read off internet</i>)	<ul style="list-style-type: none"> transfers and transformations of heat and gravitational energy in Earth's interior drive the movement of tectonic plates through processes, including mantle convection, plume formation and slab sinking 		

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3	4	Plate tectonic cont...		Pg 104 - 111	
3	5 and 6	<ul style="list-style-type: none"> Igneous rock formation processes Mapping 	<ul style="list-style-type: none"> igneous processes form different igneous rocks which can be identified based on texture and mineralogy, including basalt, dolerite, gabbro, andesite, diorite, rhyolite, pegmatite, granite, pumice, tuff and obsidian 	Pg 164 - 175	Task 10: Test – Igneous Rocks
3	7	<ul style="list-style-type: none"> Ecology and biodiversity Energy is stored, transferred and transformed energy and matter flow through the biotic and abiotic components of an ecosystem 	energy is stored, transferred and transformed in the carbon cycle; biological elements, including living and dead organisms, store energy over relatively short time scales, and geological components store energy for extended periods	Pg 175 - 184	
3	8 and 9	<ul style="list-style-type: none"> Biogeochemical cycling of matter, Carbon cycle Nitrogen cycle Hydrological cycle 	<ul style="list-style-type: none"> biogeochemical cycling of matter - nitrogen, involves the transfer and transformation of energy between the biosphere, geosphere, atmosphere and hydrosphere <p>thermal/light energy from the Sun drives important Earth processes - evaporation and photosynthesis</p>	Internet Pg 357-359, 362-382 (EEES)	Task 11: Validation – Field Trip
3	10	<ul style="list-style-type: none"> Photosynthesis human activities influence this flow 	photosynthesis is the principal mechanism for the transformation of energy from the Sun into energy forms that are useful for living things		



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4	1 - 2	Western Australian case study	energy and matter flow through the biotic and abiotic components of an ecosystem, and human activities influence this flow; applied to a Western Australian case study		Task 12: Test – Earth's Energy and Cycles
4	3 - 5	Revision			
4	6 - 7	Exam			Task 13: Exam: Unit 1 & Unit 2
4	8	Exam Feedback			