

Dawood Public School
Course Outline 2020-21
Cambridge O Level Environmental Management 5014
Grade IX

Syllabus

The syllabus is divided into nine topics which have been designed to develop an understanding of both the natural and the human environment:

1. Rocks and minerals and their exploitation
2. Energy and the environment
3. Agriculture and the environment
4. Water and its management
5. Oceans and fisheries
6. Managing natural hazards
7. The atmosphere and human activities
8. Human population
9. Natural ecosystems and human activities

Assessment at a glance

Component	Weighting
Paper 1 Theory 1 hour 30 minutes The paper will consist of two sections: Section A Short-answer and structured questions. (15 marks) Section B Short-answer and extended response questions based on related source material (35 marks) Total for Paper 1 50 marks	50%

Component	Weighting
Paper 2 Management in Context 1 hour 30 minutes A written paper consisting of short-answer, data processing and analysis, and extended response questions based on source material. Candidates will be expected to make use of information from the source material to help illustrate issues of environmental management. Total for Paper 2 50 marks	50%

Syllabus aims

The aims below describe the educational purposes of a course in Environmental Management for the Cambridge O Level examination. They are not listed in order of priority.

The aims are to enable candidates to acquire:

- Knowledge of natural systems which make life possible on Earth.
- An understanding that humans are part of these systems and depend on them.
- An appreciation of the diverse influences of human activity on natural systems.
- An awareness of the need to manage natural systems.
- An understanding of sustainable development to meet the needs of the present, without compromising the ability of future generations to meet their own needs.
- A sense of responsibility and concern for the welfare of the environment and all organisms.
- An awareness of their own values concerning environmental issues.
- An awareness of the values of others.
- A willingness to review their own attitudes in the light of new knowledge and experiences.
- A sound basis for further study, personal development and participation in local and global environmental concerns.

Assessment objectives

AO1 Knowledge and understanding

AO2 Information handling and analysis

AO3 Investigation skills and making judgements

AO1 Knowledge and understanding

Candidates should be able to demonstrate knowledge and understanding, in familiar and unfamiliar contexts, of:

1. phenomena, facts, definitions, concepts and theories
2. vocabulary, terminology and conventions
3. technological applications with their social, economic and environmental implications.

AO2 Information handling and analysis

Candidates should be able, in words or using other forms of presentation (e.g. graphical or numerical), in familiar and unfamiliar contexts, to:

1. locate, select, organise and present information from a variety of sources
2. translate information and evidence from one form to another
3. manipulate numerical data
4. interpret and evaluate data, report trends and draw inferences.

AO3 Investigation skills and making judgements

Candidates should be able, in familiar and unfamiliar contexts, to:

1. plan investigations
2. identify limitations of methods and suggest possible improvements
3. present reasoned explanations for phenomena, patterns and relationships
4. make reasoned judgements and reach conclusions based on qualitative and quantitative information.

MONTHLY COURSE DISTRIBUTION

Month	Contents
August	Chapter 1 Rocks and minerals and their exploitation <ul style="list-style-type: none"> ➤ Unit 1.1 Formation of Rocks ➤ Unit 1.2 Extraction of rocks and minerals from the Earth ➤ Unit 1.3 Impact of rock and mineral extraction
September	Chapter 1 (continued) <ul style="list-style-type: none"> ➤ Unit 1.4 Managing the impact of rock and mineral extraction ➤ Unit 1.5 Sustainable use of rocks and minerals
	Chapter 2 Energy and Environment <ul style="list-style-type: none"> ➤ Unit 2.1 Fossil fuel formation ➤ Unit 2.2 Energy resources and the generation of electricity
October	Chapter 2 (continued) <ul style="list-style-type: none"> ➤ Unit 2.3 Energy demand ➤ Unit 2.4 Conservation and management of energy resources ➤ Unit 2.5 Impact of oil pollution
November	Chapter 2 (continued) <ul style="list-style-type: none"> ➤ Unit 2.6 Management of oil pollution
	Revision for Mid Year Examination
December	MIDYEAR EXAMINATION
January	Chapter 3 Agriculture and the environment <ul style="list-style-type: none"> ➤ Unit 3.1 Soil composition ➤ Unit 3.2 Soils for plant growth
February	Chapter 3 (continued) <ul style="list-style-type: none"> ➤ Unit 3.3 Agriculture types ➤ Unit 3.4 Increasing agricultural yields
March	Chapter 3 (continued) <ul style="list-style-type: none"> ➤ Unit 3.5 Impact of agriculture ➤ Unit 3.6 Causes and impacts of soil erosion
April	Chapter 3 (continued) <ul style="list-style-type: none"> ➤ Unit 3.7 Managing soil erosion ➤ Unit 3.8 Sustainable agriculture
	Revision for Final Examination
May	FINAL EXAMINATION

SYLLABUS CONTENT

Chapter 1: Rocks and Minerals and their Exploitation	
1.1 Formation of rocks	<ul style="list-style-type: none"> • Describe and interpret the rock cycle. • State and explain the formation and characteristics of named igneous, sedimentary and metamorphic rocks. <ul style="list-style-type: none"> ➤ igneous: granite and basalt ➤ sedimentary: limestone, sandstone and shale ➤ metamorphic: marble and slate
1.2 Extraction of rocks and minerals from the Earth	<ul style="list-style-type: none"> • Describe the following methods of extraction of rocks and minerals from the Earth: <ul style="list-style-type: none"> ➤ surface mining: opencast / open-pit / open-cut / strip mining ➤ subsurface mining: deep mining / shaft mining • Discuss the factors that affect the decision to extract rocks and minerals. <ul style="list-style-type: none"> ➤ exploration ➤ geology ➤ accessibility ➤ environmental impact assessment ➤ supply and demand
1.3 Impact of rock and mineral extraction	<ul style="list-style-type: none"> • Describe and explain the environmental, economic and social impacts of rock and mineral extraction. <ul style="list-style-type: none"> ➤ loss of habitat ➤ noise, water, land, air, visual pollution ➤ management of waste ➤ employment opportunities ➤ improvements in local / national economy ➤ improvements in facilities and infrastructure
1.4 Managing the impact of rock and mineral extraction	<ul style="list-style-type: none"> • Describe and evaluate strategies for restoring landscapes damaged by rock and mineral extraction. <ul style="list-style-type: none"> ➤ safe disposal of mining waste ➤ land restoration: soil improvement, bioremediation, tree planting ➤ making lakes and nature reserves ➤ using as landfill sites
1.5 Sustainable use of rocks and minerals	<p>Define sustainable resource and sustainable development. Describe and evaluate strategies for the sustainable use of rocks and minerals.</p> <ul style="list-style-type: none"> ➤ increased efficiency of the extraction of rocks and minerals ➤ increased efficiency of the use of rocks and minerals ➤ the need to recycle rocks and minerals ➤ legislation

<p>Case study</p> <p>Study the development, impact and management of a mine including land restoration after the mine has closed.</p>	
<p>Chapter 2: Energy and the Environment</p>	
<p>2.1 Fossil fuel formation</p>	<ul style="list-style-type: none"> Describe the formation of the following fossil fuels: <ul style="list-style-type: none"> ➤ coal ➤ oil ➤ gas
<p>2.2 Energy resources and the generation of electricity</p> <p>Non-renewable energy resources:</p> <ul style="list-style-type: none"> fossil fuels nuclear power using uranium <p>Renewable energy resources:</p> <ul style="list-style-type: none"> biofuels (bioethanol, biogas and wood) geothermal power, hydro-electric power, tidal power, wave power, solar power, wind power 	<ul style="list-style-type: none"> Classify the following energy resources as non-renewable or renewable: <ul style="list-style-type: none"> ➤ fossil fuels ➤ nuclear power ➤ biofuels ➤ geothermal power ➤ hydro-electric power ➤ tidal power ➤ wave power ➤ solar power ➤ wind power Describe how each of these energy resources is used to generate electricity. Describe the environmental, economic and social advantages and disadvantages of each of these energy resources.
<p>2.3 Energy demand</p>	<ul style="list-style-type: none"> Describe and explain the factors affecting the demand for energy. <ul style="list-style-type: none"> ➤ domestic demand ➤ industrial demand ➤ transport ➤ personal and national wealth ➤ climate
<p>2.4 Conservation and management of energy resources</p>	<ul style="list-style-type: none"> Describe and explain strategies for the efficient management of energy resources. <ul style="list-style-type: none"> ➤ reducing consumption, such as using insulation, turning electrical devices off and using energy efficient devices and vehicles ➤ energy from waste cooking oil ➤ exploiting existing energy sources ➤ education of people for energy conservation ➤ transport policies

	<ul style="list-style-type: none"> ➤ fracking • Research and development of new energy resources.
<p>2.5 Impact of oil pollution</p> <p>Causes:</p> <ul style="list-style-type: none"> • off-shore oil extraction • pipelines and shipping <p>Impacts on ecosystems:</p> <ul style="list-style-type: none"> • birds • marine mammals • coral reefs • beaches 	<ul style="list-style-type: none"> • Describe the causes and impacts of oil pollution on marine and coastal ecosystems
<p>2.6 Management of oil pollution</p>	<ul style="list-style-type: none"> • Discuss strategies for reducing oil spills in marine and coastal ecosystems. <ul style="list-style-type: none"> ➤ MARPOL (International Convention for the Prevention of Pollution from Ships) • Discuss strategies for minimising the impacts of oil spills on the marine and coastal ecosystems <ul style="list-style-type: none"> ➤ double-hulled oil tankers ➤ dealing with oil spills (booms, detergent sprays, skimmers)
<p>Case study</p> <p>Study the impact and management of an oil pollution event.</p>	
<p>Chapter 3: Agriculture and the Environment</p>	
<p>3.1 Soil composition</p> <p>Composition of soil:</p> <ul style="list-style-type: none"> • mineral particles • organic content (living plants, animals, microorganisms and their dead remains) • air • water <p>Particle size:</p> <ul style="list-style-type: none"> • sand • silt • clay 	<ul style="list-style-type: none"> • Describe and explain the composition of soils.

3.2 Soils for plant growth	<ul style="list-style-type: none"> Describe soils as a medium for plant growth. <ul style="list-style-type: none"> ➤ Mineral ions: <ul style="list-style-type: none"> ○ nitrogen as nitrate ions (NO_3^-) ○ phosphorus as phosphate ions (PO_4^{3-}), potassium as potassium ions (K^+) Describe the differences between a sandy and clay soil in terms of: <ul style="list-style-type: none"> ➤ organic content ➤ pH ➤ air content ➤ water content ➤ drainage ➤ ease of cultivation
3.3 Agriculture types	<ul style="list-style-type: none"> Describe the different types of agriculture: <ul style="list-style-type: none"> ➤ arable, pastoral and mixed ➤ subsistence and commercial
3.4 Increasing agricultural yields	<p>Describe techniques used to increase agricultural yields.</p> <ul style="list-style-type: none"> ➤ rotation ➤ fertilisers ➤ irrigation ➤ insect control (insecticide and biological control), weed control (herbicide), fungi control (fungicide) ➤ mechanisation ➤ selective breeding of animals and plants ➤ genetically modified organisms ➤ controlled environments: greenhouses and hydroponics
3.5 Impact of agriculture	<ul style="list-style-type: none"> Describe and explain the impact of agricultural practices on the environment and people. <ul style="list-style-type: none"> ➤ overuse of insecticides and herbicides ➤ overuse of fertilisers ➤ mismanagement of irrigation ➤ causing salinisation and waterlogging ➤ overproduction and waste ➤ exhaustion of mineral ion content ➤ soil erosion ➤ cash crops replacing food crops
3.6 Causes and impacts of soil erosion	<ul style="list-style-type: none"> Describe the causes of soil erosion <ul style="list-style-type: none"> ➤ removal of natural vegetation by over cultivation and overgrazing Describe and explain the impacts of soil erosion <ul style="list-style-type: none"> ➤ water and wind erosion ➤ loss of habitats ➤ desertification

	<ul style="list-style-type: none"> ➤ silting of rivers ➤ displacement of people ➤ malnutrition and famine
3.7 Managing soil erosion	<ul style="list-style-type: none"> • Describe and explain strategies to reduce soil erosion <ul style="list-style-type: none"> ➤ terracing ➤ contour ploughing ➤ bunds ➤ wind breaks ➤ maintaining vegetation cover ➤ addition of organic matter to improve soil structure ➤ planting trees, mixed cropping ➤ intercropping and crop rotation
3.8 Sustainable agriculture	<ul style="list-style-type: none"> • Describe and explain strategies for sustainable agriculture <ul style="list-style-type: none"> ➤ organic fertiliser (crop residue, manure) ➤ managed grazing (livestock rotation) ➤ crop rotation ➤ use of pest resistant and drought resistant varieties of crops ➤ trickle drip irrigation ➤ rainwater harvesting
<p>Case study</p> <p>Study an example where agriculture has had severe environmental consequences including soil erosion and strategies for the conservation of the soil.</p>	