

Syllabus

Cambridge IGCSE Environmental Management
Syllabus code 0680
For examination in June and November 2011



UNIVERSITY *of* CAMBRIDGE
International Examinations

Note for Exams Officers: Before making Final Entries, please check availability of the codes for the components and options in the E3 booklet (titled "Procedures for the Submission of Entries") relevant to the exam session. Please note that component and option codes are subject to change.

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1. Introduction

1.1 Why choose Cambridge?

University of Cambridge International Examinations (CIE) is the world's largest provider of international qualifications. Around 1.5 million students from 150 countries enter Cambridge examinations every year. What makes educators around the world choose Cambridge?

Recognition

Cambridge IGCSE is internationally recognised by schools, universities and employers as equivalent to UK GCSE. Cambridge IGCSE is excellent preparation for A/AS Level, the Advanced International Certificate of Education (AICE), US Advanced Placement Programme and the International Baccalaureate (IB) Diploma. Learn more at www.cie.org.uk/recognition.

Support

CIE provides a world-class support service for teachers and exams officers. We offer a wide range of teacher materials to Centres, plus teacher training (online and face-to-face) and student support materials. Exams officers can trust in reliable, efficient administration of exams entry and excellent, personal support from CIE Customer Services. Learn more at www.cie.org.uk/teachers.

Excellence in education

Cambridge qualifications develop successful students. They not only build understanding and knowledge required for progression, but also learning and thinking skills that help students become independent learners and equip them for life.

Not-for-profit, part of the University of Cambridge

CIE is part of Cambridge Assessment, a not-for-profit organisation and part of the University of Cambridge. The needs of teachers and learners are at the core of what we do. CIE invests constantly in improving its qualifications and services. We draw upon education research in improving our qualifications.

1. Introduction

1.2 Why choose Cambridge IGCSE Environmental Management?

Cambridge IGCSE Environmental Management is accepted by universities and employers as proof of knowledge and understanding of issues concerning sustainable development and how the earth's resources are used. Students studying this syllabus:

- draw upon disciplines such as biology, earth science, geography, economics and anthropology;
- consider the interdependence of the earth's natural systems, and how people use natural resources;
- examine the impact of development on the environment considering issues such as environmental pollution and resource depletion;
- explore ways in which we may change the nature of future development to make it more sustainable.

Environmental Management is concerned not only with the impact of humankind on the planet but also with the patterns of human behaviour necessary to preserve and manage the environment in a self-sustaining way. Study is linked to the areas of new thinking in environmental management, environmental economics and the quest for alternative technologies. Classroom studies and optional coursework allow candidates to obtain a local as well as a global perspective.

Environmental Management recognises that human behaviour towards the environment is guided by the survival needs, perceptions and values of people. Underlying the syllabus there is a recognition that cultural, social and political attitudes directly influence the economy of nature. A core principle of the syllabus is that sustainability will only be achieved by changes in the ways in which people think and make decisions. A course in Environmental Management therefore calls upon young people to be participants in defining the future of their world.

1.3 Cambridge International Certificate of Education (ICE)

Cambridge ICE is the group award of the International General Certificate of Secondary Education (IGCSE). It requires the study of subjects drawn from the five different IGCSE subject groups. It gives schools the opportunity to benefit from offering a broad and balanced curriculum by recognising the achievements of students who pass examinations in at least seven subjects, including two languages, and one subject from each of the other subject groups.

The Cambridge portfolio of IGCSE qualifications provides a solid foundation for higher level courses such as GCE A and AS Levels and the International Baccalaureate Diploma as well as excellent preparation for employment.

1. Introduction

A wide range of IGCSE subjects is available and these are grouped into five curriculum areas. Environmental Management (0680) falls into either Group II, Humanities and Social Science or Group III, Science.

Learn more about ICE at www.cie.org.uk/qualifications/academic/middlesec/ice.

1.4 How can I find out more?

If you are already a Cambridge Centre

You can make entries for this qualification through your usual channels, e.g. CIE Direct. If you have any queries, please contact us at international@cie.org.uk.

If you are not a Cambridge Centre

You can find out how your organisation can become a Cambridge Centre. Email us at international@cie.org.uk. Learn more about the benefits of becoming a Cambridge Centre at www.cie.org.uk.

2. Assessment at a glance

Cambridge IGCSE Environmental Management Syllabus code 0680

This syllabus is available for examination in both the June and November sessions
All candidates take Papers 1 and 2 and then choose either Paper 3 or 4.

Paper 1	1 hour 30 minutes	Paper 2	1 hour 45 minutes
Six compulsory structured short-answer questions. 60 marks: 30% of total assessment		A number of compulsory structured questions, involving short-answer and free response, based on related source material concerning environmental issues of global impact. Candidates are expected to use case studies to illustrate issues of environmental management. 80 marks: 40% of total assessment	

Either

Paper 3 Coursework
All candidates entered for Paper 3 must submit coursework consisting of one project. This will be assessed by the school with external moderation by CIE. The project will consist of a maximum of 3,000 words in addition to relevant illustrative material. 60 marks: 30% of total assessment School-based assessment*

or

Paper 4 Alternative to coursework	1 hour 30 minutes
This paper primarily tests skills in Assessment Objectives B and C. Candidates are given data about an environmental problem which could provide the basis for a project. They will be required to identify issues raised by the data, and to indicate ways in which a project could be organised to identify a possible management strategy. 60 marks: 30% of total assessment	

* Teachers may not undertake school-based assessment of coursework without the written approval of CIE. This is normally given to teachers who satisfy CIE requirements concerning moderation and who have undertaken special training in assessment before entering candidates. CIE offers in-service training in the form of courses held at intervals in Cambridge and elsewhere and also via distance training. Please contact CIE for further details.

3. Syllabus aims and assessment

3.1 Aims

The aims are not listed in order of priority. Aims 7, 8 and 11 are intended as general course outcomes, but are not directly assessed in the examination.

The aims are to enable candidates to acquire:

1. knowledge of the functioning of the natural system which makes life possible on Earth;
2. an understanding that humankind is part of this system and depends on it;
3. an appreciation of the diverse influences of human activity on the natural system;
4. an awareness of the need for management and human responsibility to keep the system in a healthy condition if life as we know it is to continue;
5. an understanding of sustainable development and management to meet the needs of the present without compromising the ability of future generations to meet their own needs;
6. an understanding of how local environments contribute to the global environment;
7. a sensitivity to, and a sense of responsibility and concern for, the welfare of the environment and all other life forms which share this planet;
8. an awareness of their own values concerning environmental issues;
9. an awareness of the values of others;
10. a willingness to review their own attitudes in the light of new knowledge and experiences;
11. a sound basis for further study, personal development and participation in local and global environmental concerns.

3.2 Assessment objectives

Assessment objectives are relatively independent sets of skills and activities. In IGCSE Environmental Management, the three Assessment Objectives are skills-oriented rather than content-oriented.

A Knowledge with understanding

Candidates are expected to demonstrate knowledge and understanding of:

1. the wide range of processes contributing to
 - (a) the functioning of the Earth's natural, geophysical and ecological systems;
 - (b) human development within the natural system and the impact of human activity on the total environment;
2. the concept of environmental interdependence, and should be able to place local environmental questions in an international or global setting;

3. Syllabus aims and assessment

3. the implications of the unequal distribution of resources and of the unequal patterns of human development;
4. the concept and practice of sustainable development;
5. ways of reducing and repairing environmental damage.

These assessment objectives will mainly be covered in the **Resources and Development** elements of the syllabus.

B Enquiry, presentation and analysis

Candidates are expected to demonstrate the ability to:

6. select and use suitable basic techniques to
 - (a) observe, record and classify relevant primary data;
 - (b) extract and classify relevant secondary data from appropriate sources;
7. organise and present their findings
 - (a) in a logical and concise manner;
 - (b) in a clear and coherent form, using appropriate techniques including graphs, diagrams, maps and tables;
8. analyse data to
 - (a) recognise patterns and deduce relationships;
 - (b) draw reasoned conclusions;
9. plan and carry out an individual enquiry.

These assessment objectives will be covered throughout the syllabus.

C Evaluation, judgement and decision making

Candidates should be able to:

10. recognise that cultural, economic, social, and political factors influence the different ways in which people perceive, value, use and make decisions about the environment;
11. discuss and evaluate choices available to decision makers and the influences and constraints in which they operate;
12. recognise, analyse, discuss and evaluate strategies for sustainable development;
13. make reasoned judgements about environmental issues.

These assessment objectives will mainly be covered in the Impact and Management elements of the syllabus.

3. Syllabus aims and assessment

Assessment specification grid

Paper	Assessment Objective					
	A		B		C	
	Marks	%	Marks	%	Marks	%
1	24	12	18	9	18	9
2	24	12	32	16	24	12
3 or 4	12	6	24	12	24	12
Total	30		37		33	

4. Curriculum content

4.1 Themes

This syllabus is centred around the concept of: **sustainable development**. This may be defined as

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.'

Two concerns are fundamentally tied to the process of sustainable development of the Earth's resources:

- (i) The basic needs of humanity – for food, clothing, shelter and jobs – must be met.
- (ii) The limits to development are not absolute but are imposed by present states of technology and social organisation and by their impacts upon environmental resources and upon the biosphere's ability to absorb the effect of human activities. But technology and social organisation can be both managed and improved to make way for a new era of economic growth.

Underlying questions

Whatever particular issue is being studied, candidates should consider the following central questions:

- Can the resources involved – whether they are non-living, living or human – be defined as renewable or non-renewable in relation to the pace, scale and character of development?
- To what extent, and why, do people use and value the same natural resource in different ways?
- What dilemmas face individuals, communities and countries in their use and management of natural resources?
- How compatible and how viable are different economic approaches in tackling an environmental issue?
- What are the relative costs, advantages and disadvantages of different strategies for managing the environment?
- What are the factors influencing dispute and co-operation over the use of natural resources?
- What are the current and potential roles of the following:
 - international organisations,
 - national and local governments,
 - environmental organisations,
 - aid agencies,
 - industry and commerce,
 - community groups,
 - individuals?

These questions should be presented in an open-ended way. This syllabus does not prescribe solutions as to how environments should be managed. The relationship between environment and development is dynamic. Strategies have to be altered, adjusted and changed as new problems arise. The same solutions

4. Curriculum content

may not be applicable in all regions or cases. Candidates should be encouraged to look for and evaluate alternative solutions, rather than to expect or reproduce the 'right answer'. Candidates need to understand the role played by value judgements and be able to accept that other people in their own society and elsewhere may hold values different from their own.

Candidates should be able to show a basic knowledge and understanding of the processes listed under Resources and Development and give examples to illustrate their understanding. In discussing Impact and Management, they should be able to analyse, discuss and draw conclusions based on reasoned evidence. Teaching methods should encourage enquiry and discussion as much as possible and this should be based as far as possible on case studies, at an appropriate level. The emphasis should be on applying knowledge and understanding to international, national and local environmental problems to enable candidates to become involved in both current and future environmental management issues.

The syllabus matrix

The Environmental Management syllabus is organised as a matrix (see the diagram on the following page).

The syllabus is designed to emphasise that

- (a) life on Earth as we know it is an integrated and interdependent whole;
- (b) its future is endangered by the impact of human development on natural resources;
- (c) its survival for future generations will depend on concerted action to conserve and manage the environment as a self-sustaining resource base.

For each of the four spheres of the Earth's environment (lithosphere, hydrosphere, atmosphere and biosphere), the following aspects are considered.

1. **Resources:** How does the natural system work?
2. **Development:** How do people use natural resources?
3. **Impact:** How does development change the environment?
4. **Management:** How can the environment be developed sustainably?

The divisions between the four spheres should not be seen as rigid or exclusive. Many environmental issues, e.g. water pollution, soils/agriculture, etc., involve more than one sphere. Teachers should be aware of the links between different parts of the matrix and by using suitable cross references they should emphasise environmental interdependence. The syllabus does not prescribe a particular sequence of study.

About 35% of the teaching time should be devoted to the curriculum objectives on resources and development. These can be dealt with in a largely descriptive way to give students a basic knowledge and understanding of processes. This will provide the foundation for the analysis and discussion of impact and management, to which the remaining 65% of teaching time should be allocated.

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In this syllabus we give examples (in *italics*) to illustrate many of the objectives. These are not intended to be definitive or prescriptive; a range of factors influence any topic and we encourage teachers to adopt a similar range of teaching strategies.

The curriculum objectives should be covered by investigating specific examples and case studies from both the 'Developed' and the 'Developing World'.

The syllabus matrix

	Resources	Development	Impact	Management
Lithosphere	The lithosphere: structure and processes	Human activity and the lithosphere	Lithosphere in crisis	Action on the lithosphere
Hydrosphere	The water cycle The oceans	Human intervention in the water cycle Exploitation of the oceans	Water hazards The oceans at risk	Clean, safe, water strategies Managing the oceans
Atmosphere	The atmospheric system	Human activity and the atmosphere	Atmosphere in crisis Agriculture development consequences	Action on the atmosphere Managing agriculture
Biosphere	The ecosystem Elements of vegetation Elements of soil	The changing role of people in the environment Population growth Modification of vegetation and soils	Ecosystems at risk People in crisis Land at risk Agriculture: development consequences	Conservation of the ecosystem Population management Managing the land Managing agriculture

4. Curriculum content

RESOURCES



DEVELOPMENT

HOW DOES THE NATURAL SYSTEM WORK?

HOW DO PEOPLE USE NATURAL RESOURCES?

All candidates should have knowledge and understanding of:

1. Lithosphere: structure and processes

- 1.1 the structure of the Earth
core, mantle, crust
- 1.2 the types of rock
igneous, sedimentary, metamorphic
- 1.3 the distribution, types and reserves of major minerals
metal ores and fossil fuels (oil, gas, coal)
- 1.4 the formation of fossil fuels
- 1.5 the crust/tectonic cycle
plate tectonics, earth movements (folding, faulting, mountain building), earthquake zones, vulcanicity

2. Elements of soil

- 2.1 the formation and composition of soils
mineral and organic content, air, water, role of soil organisms, particle size (clay, silt, sand), soil texture
- 2.2 soil as a medium for growth and land use potential
nutrients, pH, pore space, aeration, drainage

All candidates should have knowledge and understanding of:

3. Human activity and the lithosphere

- 3.1 the methods of search and extraction of rocks, minerals and fossil fuels
- 3.2 the uses of rocks and minerals in industrial processes
- 3.3 types of energy production from fossil and nuclear fuels
- 3.4 the location of the main centres of mining and energy production in relation to major centres of population and industry
- 3.5 main supply and demand constraints in exploiting mineral resources
geological factors, depletion rates, climatic factors, transport, fluctuations of prices
- 3.6 the economic aspects and limitations of earthquake and volcanic zones
- 3.7 the implications of the patterns of global trade in minerals and energy
- 3.8 how industrial development is used to achieve social and economic goals

Lithosphere

4. Curriculum content



HOW DOES DEVELOPMENT CHANGE THE ENVIRONMENT?	HOW CAN THE ENVIRONMENT BE DEVELOPED SUSTAINABLY?
<p><i>All candidates should be able to analyse and discuss:</i></p>	<p><i>All candidates should be able to analyse and discuss:</i></p>
<p>4. Lithosphere in crisis</p>	<p>5. Action on the lithosphere</p>
<p>4.1 the impact of mineral exploitation on the environment and on human activity and health</p>	<p>5.1 conservation schemes for damaged environments <i>landscaping, restoration, reclamation, filtration, waste management</i></p>
<p>4.2 the global economic consequences of the over-exploitation and depletion of mineral and fossil fuel reserves</p>	<p>5.2 technologies and viability of alternative energy sources</p>
<p>4.3 the implications in social, economic and environmental terms of different types of energy production <i>fossil fuels compared with nuclear</i></p>	<p><i>solar, wind, wave, geothermal, hydro-electric, biomass</i></p>
<p>4.4 the impact of earthquakes, volcanic eruptions on human communities <i>damage, loss of life, danger to health in aftermath, economic dislocation</i></p>	<p>5.3 strategies for conservation and management of mineral and fossil fuel resources <i>increased efficiency in use, insulation, recycling, power from waste, new technology</i></p>
<p>4.5 the impact of industrial development on the environment and on human activity and health</p>	<p>5.4 strategies for managing the impacts of earthquakes and volcanic activity <i>planning site of settlement (land use zoning) and structure of buildings, disaster relief</i></p>
<p>4.6 causes and consequences of land pollution <i>salination, toxic waste, nuclear waste, domestic waste, harmful effects of pesticides and fertilisers; groundwater contamination, health risks.</i></p>	<p>5.5 industrial materials, technologies, and approaches which can contribute to solving environmental problems <i>monitoring, remedial action, recycling (processing wastes and industrial products at end of life), low waste technology (developing cleaner processes and products, conservation and efficiency)</i></p>

Lithosphere

4. Curriculum content



	HOW DOES THE NATURAL SYSTEM WORK?	HOW DO PEOPLE USE NATURAL RESOURCES?
Hydrosphere	<p><i>All candidates should have knowledge and understanding of:</i></p> <p>6. The water cycle</p> <p>6.1 how the water cycle operates</p> <p>6.2 how the natural availability of water varies from place to place</p> <p>6.3 the role of the water cycle within ecosystems</p> <p><i>links between rainfall, vegetation and soils (interception, infiltration, surface run-off)</i></p> <p>7. The oceans</p> <p>7.1 the role of the ocean as an environment for interdependent ecosystems</p> <p>7.2 the resource potential of the oceans</p> <p>7.3 the distribution of ocean currents and their effects</p> <p><i>on climate and on fisheries</i></p> <p>7.4 reversal of ocean currents, e.g. el Nino and its effects</p>	<p><i>All candidates should have knowledge and understanding of:</i></p> <p>8. Human intervention in the water cycle</p> <p>8.1 collection and control of water for a variety of uses</p> <p><i>water supply (storage, transfer, dams, reservoirs); industry and domestic use; waste disposal; power; agriculture (irrigation)</i></p> <p>8.2 competing demands for water</p> <p>8.3 mismatch between water supply and demand</p> <p>8.4 the ways in which processes operating within the water cycle affect development</p> <p><i>causes and effects of flooding and drought</i></p> <p>9. Exploitation of the oceans</p> <p>9.1 the environmental and human factors in the distribution and exploitation of the world's ocean fisheries</p> <p>9.2 factors that limit full exploitation of the ocean's potential resources</p>

4. Curriculum content



HOW DOES DEVELOPMENT CHANGE THE ENVIRONMENT?	HOW CAN THE ENVIRONMENT BE DEVELOPED SUSTAINABLY?
<p><i>All candidates should be able to analyse and discuss:</i></p>	<p><i>All candidates should be able to analyse and discuss:</i></p>
<p>10. Water hazards</p>	<p>12. Clean, safe water strategies</p>
<p>10.1 the causes and consequences of water pollution <i>impact on natural ecosystems, the physical environment, human activity and health</i></p>	<p>12.1 ways of improving water quantity, quality and access <i>pollution control, improved sanitation, distribution for more efficient water use, desalination</i></p>
<p>10.2 contrasts in availability of water in terms of quality, quantity and access <i>between urban and rural communities; between countries</i></p>	<p>12.2 strategies to control and eradicate water-related diseases <i>drugs, vector control and eradication, improved sanitation, clean water supply, chlorination</i></p>
<p>10.3 the cycle of water-related diseases, and their impact on human activities and development <i>water-based (bilharzia); water-borne (typhoid, cholera); water-bred (malaria)</i></p>	
<p>11. The oceans at risk</p>	<p>13. Managing the oceans</p>
<p>11.1 the implications of uncontrolled exploitation of marine resources <i>fishing, continental shelf and deep-sea mineral resources</i></p>	<p>13.1 strategies for the sustainable harvesting of ocean fisheries <i>net types and sizes, quotas, conservation laws, territoriality</i></p>
<p>11.2 causes of marine pollution and its impact on the marine ecosystem and on coastal zones <i>raw sewage, heavy metals, oil and plastics</i></p>	<p>13.2 marine pollution controls and remedial action <i>international co-operation and legislation, dealing with oil spills, managing raw sewage</i></p>

4. Curriculum content

RESOURCES



DEVELOPMENT

HOW DOES THE NATURAL SYSTEM WORK?

HOW DO PEOPLE USE NATURAL RESOURCES?

All candidates should have knowledge and understanding of:

14. The atmospheric system

- 14.1 the sun as an energy source; varying rates of surface insolation
- 14.2 the factors which contribute to solar heat balance of earth and atmosphere
radiation, absorption, reflection
- 14.3 the structure and composition of the atmosphere
importance of the ozone layer, oxygen, carbon dioxide and water vapour in the air
- 14.4 the balances which maintain the Earth's atmosphere as a mixture of gases
oxygen, carbon dioxide and nitrogen
- 14.5 how the elements of weather are measured, recorded, and interpreted
temperature, precipitation, atmospheric pressure, wind, sun
- 14.6 location of major climatic types and their main characteristics through interpretation of climatic graphs and maps
 - Tropical* - equatorial, savanna
 - Dry* - desert
 - Temperate* - cool interior
 - Cold* - tundra
- 14.7 'climatic hazards' (extremes of weather): causes and occurrence
cyclone, flood, drought

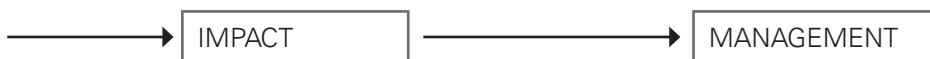
All candidates should have knowledge and understanding of:

15. Human activity and the atmosphere

- 15.1 water, solar and wind as power resources
- 15.2 use of the atmosphere as a dispersal medium for waste gases
smoke particles and exhaust fumes
- 15.3 the interaction between climate and human activity
shelter; farming affected by climate
- 15.4 the different types and systems of farming
croplands/grazing lands, intensive/extensive, subsistence/commercial
- 15.5 the environmental, technological, economic and social factors which influence the distribution of different types and systems of farming
- 15.6 new agricultural techniques which increase yields
irrigation, biological controls, the benefits of chemicals (fertilisers and pesticides), mechanisation, capital subsidies
- 15.7 the factors which influence the patterns of agricultural output and trade
North-South trade in commodities, cash crops vs food crops

Atmosphere

4. Curriculum content



HOW DOES DEVELOPMENT CHANGE THE ENVIRONMENT?	HOW CAN THE ENVIRONMENT BE DEVELOPED SUSTAINABLY?
<p><i>All candidates should be able to analyse and discuss:</i></p> <p>16. Atmosphere in crisis</p> <p>16.1 human activities which alter the composition of the atmosphere and climate <i>deforestation, burning of fossil fuels, industrial and vehicle emissions, use of CFCs</i></p> <p>16.2 causes of atmospheric pollution <i>carbon dioxide, CFCs, methane, sulphur and nitrogen oxides, lead</i></p> <p>16.3 damage to the ozone layer and links to atmospheric pollution</p> <p>16.4 the effects of pollution on atmospheric conditions <i>acid rain, the greenhouse effect, temperature inversion</i></p> <p>16.5 the implications of changes in the atmosphere and climate <i>effects on health, food production, water supply, ecosystems</i></p> <p>16.6 the impact of climatic hazards on human communities <i>damage, loss of life, danger to health in aftermath, loss of production</i></p> <p>17. Agriculture: consequences of development</p> <p>17.1 the impact of indiscriminate agricultural practices <i>overuse of pesticides and inorganic fertilisers, crops requiring irrigation, traditional crop varieties disappearing, overproduction and waste in developed countries, concentration of land in hands of fewer owners, environmental damage (pollution, soil erosion)</i></p> <p>17.2 the advantages and disadvantages of the 'green revolution'</p>	<p><i>All candidates should be able to analyse and discuss:</i></p> <p>18. Action on the atmosphere</p> <p>18.1 strategies to reduce atmospheric pollution and climatic change <i>CFC replacement, reduction of pollutant emissions, reforestation</i></p> <p>18.2 the need for international action and changing attitudes to deal with the causes and consequences of the damage to the atmosphere</p> <p>18.3 strategies to reduce the negative impact of climatic hazards <i>improved forecasting, appropriate settlement patterns and buildings, disaster relief</i></p> <p>19. Managing agriculture</p> <p>19.1 strategies for sustainable agriculture <i>plant breeding, integrated pest control, mixed cropping, gene banks, new crop strains, trickle drip irrigation, organic alternatives to inorganic fertilisers</i></p> <p>19.2 harvesting energy from living resources to provide power <i>biomass, biogas (methane), fuel from organic waste</i></p>

Atmosphere

4. Curriculum content

RESOURCES



DEVELOPMENT

HOW DOES THE NATURAL SYSTEM WORK?

HOW DO PEOPLE USE NATURAL RESOURCES?

All candidates should have knowledge and understanding of:

20. Biomes

20.1 the concept of an ecosystem

20.2 organisation within an ecosystem

population, community, habitat, niche

20.3 physical factors

temperature, humidity, water, salinity, light, pH, soils, nutrients, wind

20.4 relationships of living organisms

producers, consumers, food chains and webs, competition, predation, pollination, dispersal, vegetational succession

20.5 energy flow

photosynthesis, respiration, food chains, food webs

20.6 nutrient cycling

carbon and nitrogen cycle

20.7 resource potential

biodiversity as a genetic resource, and as a food base

21. Types of vegetation

21.1 the distribution and main characteristics of natural vegetation zones (biomes) and relationship to climatic zones

Forest - tropical rainforest, monsoon forest, taiga

Grassland - savanna

Desert - desert, tundra

All candidates should have knowledge and understanding of:

22. The changing role of people in the environment

22.1 how different types of human society use and value their natural environment

hunter-gatherer, nomadic pastoralist, farming, industrial, tourism

22.2 the increasing ability of humankind to create artificial environments as a result of economic and technological development and social and cultural change

e.g. in agriculture: domestication of plants and animals, modern agricultural methods, genetic engineering

23. Human population

23.1 population growth

rates of birth, death and fertility, life expectancy, infant mortality

23.2 population structure

population pyramids, young and ageing populations

23.3 migration

push/pull, urban/rural

23.4 the model of demographic transition and its limitations

24. Modification of vegetation and soils

24.1 factors influencing the clearance of natural vegetation over time

farming (crops, grazing), timber (fuel, building, furniture), paper (pulp), chemicals (gums, resins), settlement (towns, cities)

Biosphere

4. Curriculum content



HOW DOES DEVELOPMENT CHANGE THE ENVIRONMENT?	HOW CAN THE ENVIRONMENT BE DEVELOPED SUSTAINABLY?
<p><i>All candidates should be able to analyse and discuss:</i></p> <p>25. Ecosystems at risk</p> <p>25.1 habitat destruction, loss of biodiversity, genetic depletion</p> <p>25.2 the effect of loss of habitat on wildlife and on the food chain <i>draining of wetlands, impounding water, deforestation, intensive agricultural practices</i></p> <p>25.3 the impact of tourism</p> <p>26. People in crisis</p> <p>26.1 social, economic and environmental implications of population growth rates and structures</p> <p>26.2 measures of world poverty and the North-South divide <i>per capita incomes, inadequacy of housing, levels of disease and nutrition</i></p> <p>26.3 the implications of the cycle of poverty, as it effects individuals and communities, for the environment</p> <p>26.4 urbanisation <i>causes (push/pull factors), problems (housing, congestion, pollution, loss of agricultural land, provision of services)</i></p> <p>27. Land at risk</p> <p>27.1 causes and consequences of rapid and progressive deforestation <i>clearance for fuelwood, subsistence and cash crop farming, settlement, timber extraction and grazing; links with soil erosion and desertification, climate changes, effect on people (displacement, lack of fuel)</i></p> <p>27.2 causes and consequences of soil erosion and desertification <i>removal of vegetation, overgrazing, overcultivation, clearance of slopes, poor irrigation; food shortage and water shortage, displacement of people</i></p>	<p><i>All candidates should be able to analyse and discuss:</i></p> <p>28. Conservation of the ecosystem</p> <p>28.1 strategies for conservation of biodiversity and the genetic resource <i>sustainable harvesting of wild plant and animal species, national parks, wildlife reserves, world biosphere reserves, gene banks</i></p> <p>28.2 world conservation strategies and legislation <i>the work of organisations such as UNEP, IUCN, WWF, CITES</i></p> <p>29. Population management</p> <p>29.1 strategies for managing population growth <i>family planning, improved health and education, national policies</i></p> <p>29.2 strategies for managing the urban and rural environments <i>planning, environmental improvement, community participation</i></p> <p>29.3 strategies for overcoming world inequalities <i>improved trade and aid conditions, governmental and non-governmental aid, food aid</i></p> <p>29.4 managing tourism <i>National Parks, ecotourism</i></p> <p>30. Managing the land</p> <p>30.1 strategies for soil conservation <i>tree planting, terracing, contour ploughing, dry land farming, wind breaks, integrated rural development programmes, land reform, community participation</i></p> <p>30.2 sustainable forest management techniques <i>agro-forestry, community forestry, reforestation, sustainable harvesting of hardwoods, fuelwood planting, genetic engineering</i></p> <p>30.3 alternatives to deforestation <i>more efficient use of timber, recycling (paper/ timber), alternative materials to timber</i></p>

Biosphere

5. Coursework: guidance for centres

5.1 Introduction

Coursework in Environmental Management offers candidates the opportunity to apply their knowledge and skills in an individual project investigating an environmental issue in the local context.

Candidates must produce a project consisting of a **maximum** of 3,000 words in addition to relevant illustrative material, e.g. photographs, diagrams and maps. It is **essential** that the topic chosen leads to a project which is consistent with the aims and assessment objectives outlined in the syllabus.

In completing the project the candidate **must**:

1. identify a **local** environmental problem, which is specific, accessible and measurable;
2. analyse the Resources and Development aspects of the problem, as the setting for more detailed consideration of Impact and Management aspects;
3. collect and select data, which **must** include some primary data, and use a suitable range of research techniques, including some fieldwork;
4. carry out in-depth analysis of the data and attempt to draw some meaningful conclusions;
5. present their findings and conclusions in an orderly and reasoned way, supported by a suitable range of illustrative techniques.

The project **must** involve analysis, discussion and judgement and not merely description.

5.2 Producing the coursework

The investigation involved in the project should be carried out after candidates have done introductory work on research methods and acquired some knowledge and understanding of environmental problems, concepts and strategies. However, teachers should explain the nature of coursework requirements to the candidates early in the course. This will give candidates time, in consultation with the teacher, to:

1. identify a local topic in which they are interested;
2. identify the particular **environmental** problem involved, using the knowledge and skills developed in and out of the classroom;
3. explore the range of resources available to them to support their investigation;
4. develop a plan for implementation, allowing enough time to successfully complete the project. This should take into consideration the topic chosen and the resources available.

The project should be the candidate's own work. Teachers are allowed, through discussion and supervision of activities, to give assistance and guidance, particularly in the planning and preparation of the investigation and during data collection. However, the extent of guidance during data collection, analysis and the writing of the report must be taken into account when marks are awarded.

5. Coursework: guidance for centres

Teachers may give assistance by:

- (a) preparing candidates either individually or as part of a class (e.g. by making them aware of a range of local environmental problems, by explaining the scope of topics or the range of research methods available);
- (b) helping candidates to choose project topics (e.g. by preparing a list of suggested topics or discussing the implications and difficulties of the alternatives suggested by candidates, particularly in the light of available local resources);
- (c) suggesting possible strategies and encouraging new lines of enquiry;
- (d) suggesting ways to incorporate the aspects of Resources, Development, Impact and Management into their projects;
- (e) discussing problems and difficulties encountered;
- (f) supervising candidates in their investigative work;
- (g) explaining to candidates what is expected of them in terms of presentation and suggesting appropriate presentation techniques.

5.3 Coursework topic examples

These suggestions are intended only as **examples**. Topics will depend on specific circumstances, e.g. the school's local area and resources, the special interests and expertise of teachers, and (not least) the interests of candidates.

- How can industry X be managed to the benefit of the environment?
- How effective is the technology for preventing oil spills and/or reducing their impact on the ecosystem?
- Is solar energy a viable technology for producing energy in our locality?
- How can our school/community recycle more of its waste and/or use more recycled material?
- How can people be made more aware of the potential resource value of household waste?
- Can the local disused quarry at A be adapted for use as a conservation and recreation area?
- How can water storage and control in our region be improved to ensure a fair distribution of water supply?
- How can the quality of our tap water be improved?
- Are the marine and recreational resources of coastline Z maintained well enough to be sustained in their use for future generations?
- How can pollution of lake C be reduced and its water cleaned?
- What can be done to manage the tourist beach at Y sustainably?
- What can be done to reduce the effects of wind damage X on settlement Y?

5. Coursework: guidance for centres

- Under what weather conditions is air pollution from traffic most damaging and how can this damage be reduced?
- How can the effects of acid rain on forest B be reduced by action at different levels of society?
- Can our local zoo/botanical garden be regarded as a means of saving endangered species?
- How can hardwood forest Z best be managed to provide materials and to sustain itself?
- How can the local population of animal X be managed sustainably given available natural resources and their economic use?
- What strategies are available for controlling population growth in city Z?
- Is the replacement of existing ecosystems with plantations of X sustainable development?
- How can farming in area A be improved to prevent further soil erosion?
- Is intensive farming doing long-term damage to the local environment?
- Could crop wastes be used more efficiently in local agriculture and how can alternative uses be encouraged?

Candidates should be encouraged to select topics which have **particular interest for them**, with appropriate advice and guidance from their teacher. Alternatively candidates can select from a range of possible topics introduced by their teacher. Candidates from the same school may choose the same topic, and work together as a group. However, as individual members of the team they should have different responsibilities and aspects to investigate, so that each candidate's abilities can be assessed separately. Candidates working in groups must submit individual reports and indicate which parts of the project were carried out jointly and give the names of those students with whom this joint work was done. Schools are responsible for ensuring that candidates submit projects which are **their own** work.

5.4 The coursework report

The report should include the following:

- (a) title, contents page, a number of logically ordered sections, lists of sources, a bibliography and acknowledgements
(evidence of raw data in summary form should be included in an appendix, e.g. collated questionnaire responses: this is not counted in word total);
- (b) a clear title and a statement of the purpose and aims of the project
(this should be question- or problem-oriented or concerned to test a hypothesis, since this will provide a definite focus for the project. It should be fairly narrowly defined and limited in scope);
- (c) a description of the context (concise and relevant background information on the place and processes involved);

5. Coursework: guidance for centres

- (d) a description of the main research methods used to collect data and other resources and of how any practical activities were planned, showing how all these relate to the aims, purpose and background of the project
- (data which is gathered should be of a kind that can be easily presented without overgeneralisation. The research strategy should relate to the aim of the investigation. A range of research techniques should be considered e.g.
- (i) gathering and analysis of primary data
e.g. surveys, participant and non-participant observation, questionnaires, interviews, experiments, case studies
 - (ii) selection and analysis of secondary data
e.g. official and other statistics, published studies, media material, documents);
- (e) presentation of the main information, data and evidence discovered, to form a basis for the conclusions of the project;
- (f) an analysis and evaluation of the findings in relation to the initial aims of the project;
- (g) a reasoned conclusion, based upon the evidence, giving recommendations for sustainable development concerning the issue;
- (h) an evaluation of the project with reasoned judgements about its value and implications and the problems encountered, together with suggestions for improvements.

Candidates should be encouraged to produce their own maps, photographs and other suitable means of presentation. Photographs, tables of data, etc. from other sources, such as magazines, should not be copied and included in their original form; instead candidates should translate such data into a form of their own. Similarly, plagiarism from library, Internet or other sources is **not** acceptable as coursework.

Given the limit on number of words (3000) the following approximate balance is recommended.

Description of context	400 words
Data presentation and analysis	1300 words
Discussion and conclusions	1300 words

6. Coursework: assessment

6.1 Assessment criteria

The project will be assessed using the criteria below which are based on the assessment objectives listed earlier in the syllabus. Marking should be positive and candidates should be rewarded for their achievements rather than penalised for their failings.

A maximum of 6 marks are available for each of the criteria. Marks should be awarded for achievement as follows:

- 5–6 excellent,
- 3–4 competent,
- 1–2 some positive achievement,
- 0 no evidence of positive achievement for this criterion.

Assessment Objective A: Knowledge with understanding

1: Understanding the processes involved in the environmental problem

Marks available

- 5–6 Processes identified and fully explained using appropriate terminology
- 3–4 Processes identified and partially explained using appropriate terminology
- 1–2 Processes identified, with minimal explanation

2: Understanding the resource, development, impact and management aspects of the problem

Marks available

- 5–6 Aspects of the problem interrelated using appropriate terminology
- 3–4 Aspects interrelated without appropriate terminology.
- 1–2 Aspects identified

Assessment Objective B: The Investigation (data acquisition, analysis, presentation)

3: Data collection: using sources

Marks available

- 5–6 Wide range of sources used, including primary data
- 3–4 Limited range of sources used, including primary data
- 1–2 Limited range of sources used, without primary data.

6. Coursework: assessment

4: Data collection: using research techniques

Marks available

5–6 Wide range of appropriate techniques selected and used effectively

3–4 Range of appropriate techniques used

1–2 Limited range of techniques used

5: Presenting findings

Marks available

5–6 An appropriate range of presentation techniques used accurately

3–4 A range of appropriate presentation techniques used but with minor errors

1–2 Limited presentation techniques with basic level of accuracy and clarity

6: Analysing data

Marks available

5–6 Thorough interpretation, discerning patterns of cause and effect and recognising limitations of data

3–4 Valid, straightforward interpretation, discerning some patterns of cause and effect

1–2 Mainly descriptive, with limited interpretation

Assessment Objective C: Evaluation, judgement and decision making

7: Recognising values

Marks available

5–6 Recognition of the values of people involved, and some assessment of relative importance of possible factors influencing those values

3–4 Recognition of the values of people involved, and some assessment of possible factors influencing those values

1–2 Some recognition of the values of people involved

8: Evaluating choices

Marks available

5–6 Evaluation of choices open to decision-makers, and some assessment of relative importance of influences and constraints on those choices.

3–4 Evaluation of choices open to decision-makers, and some assessment of possible influences and constraints on those choices

1–2 Some appreciation of the choices open to decision-makers

6. Coursework: assessment

9: Evaluating strategies

Marks available

- 5–6 Thorough identification and explanation of a possible strategy for sustainable development, with some evaluation of its advantages and disadvantages
- 3–4 Identification and explanation of a possible strategy for sustainable development
- 1–2 Identification of a possible strategy for sustainable development, with limited explanation

10: Making reasoned judgements

Marks available

- 5–6 Judgements made about Impact and Management issues involved in the topic with explanation, and with some recognition of limiting factors
- 3–4 Judgements made about Impact and Management issues involved in the topic with explanation
- 1–2 Judgements made about Impact and Management issues involved in the topic, with limited explanation

6. Coursework: assessment

6.2 Pre-assessment monitoring of coursework topics

Centres preparing candidates for the Environmental Management examination for the first time must submit an outline of the types of coursework projects which candidates will undertake. This is to enable CIE to offer guidance and assistance. Precise details of each candidate's project are not required as it is appreciated that these may change in the light of the results of their investigation and/or other circumstances. Rather, CIE requires an outline of the general nature of the work to be undertaken and how coursework objectives will be satisfied.

This outline should be presented on one sheet of A4 paper, preferably using a copy of the form included in this syllabus, and submitted to CIE at least 8 months before the date of the examination. The outline should give an indication of the types of project which are proposed and list a few different projects as examples, with a brief statement of the purpose and the investigation strategies likely to be used for these projects. This must also explain how Impact and Management aspects will be incorporated. CIE will reply to Centres as quickly as possible to inform them of the suitability of the types of projects proposed.

The purpose of this exercise is provide advice and support. Once CIE is satisfied that the Centre is able to devise and support suitable coursework projects with students a coursework summary will not be required.

6.3 Moderation of coursework

Internal Moderation

If two or more teachers in a Centre are involved in internal assessment of coursework, the Centre must make sure that all candidates are assessed to a common standard.

External Moderation

CIE carries out the external moderation of internally assessed Coursework.

The internally moderated marks must reach CIE by the following deadlines:

- May/June examination: 30 April 2011
- November examination: 31 October 2011

Marks may be submitted either using MS1 mark sheets or using Cameo. Consult the Handbook for Centres for more information on both these methods.

On receiving internally moderated marks, CIE selects a sample of candidates whose work will be externally moderated. CIE will ask Centres to send the coursework of these candidates to CIE as soon as possible, together with Individual Candidate Record Cards and Coursework Assessment Summary Forms. Copies of these forms can be found at the back of this booklet.

6. Coursework: assessment

For more information about external moderation please consult the *Handbook for Centres* and the *Administrative Guide for Centres*.

For more advice on coursework in Environmental Management see *A Teacher's Guide to Environmental Management* which is available from CIE.

7. Appendix

7.1 Grade descriptions

The following grade descriptions are intended to give a general indication of the standards of achievement likely to have been achieved by candidates awarded Grades A, C and F.

Grade A

The candidate has demonstrated the ability to:

- understand the wide range of processes involved in the functioning of the Earth's resources, human development within the natural system, and the impact of human activity on the total environment;
- understand in detail the patterns of behaviour needed to manage the environment sustainably, in the context of environmental interdependence;
- plan and carry out individual environmental investigation, using a suitable range of techniques of data collection, analysis and presentation;
- apply the extensive understanding and investigative skills above in making reasoned and balanced judgements on environmental questions of a local and international character with an appreciation of the different value positions of, and the variety of influences and constraints on the decision makers concerned.

Grade C

The candidate has demonstrated the ability to:

- understand the main processes involved in the functioning of the Earth's resources, human development within the natural system, and the impact of human activity on the total environment;
- understand in general terms the patterns of behaviour needed to manage the environment sustainably, in the context of environmental interdependence;
- plan and carry out individual environmental investigation using suitable techniques of data collection, analysis and presentation;
- apply the understanding and investigative skills above in making reasoned and balanced judgements on environmental questions of a local and international character with an appreciation of the different value positions and some of the influences and constraints on the decision makers concerned.

7. Appendix

Grade F

The candidate has demonstrated the ability to:

- understand at a basic level the main processes involved in the functioning of the Earth's resources, human development within the natural system, and the impact of human activity on the total environment;
- understand in basic terms the patterns of behaviour needed to manage the environment sustainably, in the context of environmental interdependence and crisis;
- carry out individual environmental investigation, using basic techniques of data collection, analysis and presentation;
- apply the basic understanding and investigative skills above in discussing environmental questions of a local and international character, with an awareness that different value positions and constraints can exist.

ENVIRONMENTAL MANAGEMENT
Individual Candidate Record Card
IGCSE 0680

Please read the instructions printed overleaf and the General Coursework Regulations before completing this form.

Centre Number						Centre Name	June/November	2	0	1	1
Candidate Number						Candidate Name	Teaching Group/Set				

Title of Assignment			
Domain		Mark gained	Comment
A Knowledge with Understanding <div style="text-align: right;">(max 12)</div>	1		Marks to be transferred to the Coursework Assessment Summary Form
	2		
B Investigation <div style="text-align: right;">(max 24)</div>	3		
	4		
	5		
	6		
C Evaluation, Judgement and Decision Making <div style="text-align: right;">(max 24)</div>	7		
	8		
	9		
	10		
Total Mark (max 60)			
Amount of scaling if relevant		Internally Moderated Mark (max 60)	



INSTRUCTIONS FOR COMPLETING INDIVIDUAL CANDIDATE RECORD CARDS

1. Complete the information at the head of the form.
2. Mark the Coursework assignment for each candidate according to the mark scheme devised by the Centre for the Coursework unit. This mark should be developed using criteria comparable to that listed in the Syllabus booklet.
3. Enter marks and total marks in the appropriate spaces. Complete any other sections of the form required.
4. Ensure that the addition of marks is independently checked.
5. **It is essential that the marks of candidates from different teaching groups within each Centre are moderated internally.** This means that the marks awarded to all candidates within a Centre must be brought to a common standard by the teacher responsible for co-ordinating the internal assessment (i.e. the internal moderator), and a single valid and reliable set of marks should be produced which reflects the relative attainment of all the candidates in the Coursework component at the Centre. The outcome of internal moderation, in terms of the number of marks added to or subtracted from the initial total, must be clearly written in the box marked 'Amount of scaling if relevant'. If no scaling is necessary, please indicate by writing a zero in this box.
6. Transfer the marks to the Coursework Assessment Summary Form in accordance with the instructions given on that document.
7. Retain all Individual Candidate Record Cards and Coursework which **will be required for external moderation.** Further detailed instructions about external moderation will be sent in late March of the year of the June examination and early October of the year of the November examination. See also the instructions on the Coursework Assessment Summary Form.

Note: These Record Cards are to be used by teachers only for students who have undertaken Coursework as part of their IGCSE.

0680/03/CW/I/11

A. INSTRUCTIONS FOR COMPLETING COURSEWORK ASSESSMENT SUMMARY FORMS

1. Complete the information at the head of the form.
2. List the candidates in an order which will allow ease of transfer of information to a computer-printed Coursework mark sheet MS1 at a later stage (i.e. in candidate index number order, where this is known; see item B.1 below). Show the teaching group or set for each candidate. The initials of the teacher may be used to indicate group or set.
3. Transfer each candidate's marks from his or her Individual Candidate Record Card to this form as follows:
 - (a) Where there are columns for individual skills or assignments, enter the marks initially awarded (i.e. before internal moderation took place).
 - (b) In the column headed 'Total Mark', enter the total mark awarded before internal moderation took place.
 - (c) In the column headed 'Internally Moderated Mark', enter the total mark awarded after internal moderation took place.
4. Both the teacher completing the form and the internal moderator (or moderators) should check the form and complete and sign the bottom portion.

B. PROCEDURES FOR EXTERNAL MODERATION

1. University of Cambridge International Examinations (CIE) sends a computer-printed Coursework mark sheet MS1 to each centre (in late March for the June examination and in early October for the November examination) showing the names and index numbers of each candidate. Transfer the total internally moderated mark for each candidate from the Coursework Assessment Summary Form to the computer-printed Coursework mark sheet MS1.
2. The top copy of the computer-printed Coursework mark sheet MS1 must be despatched in the specially provided envelope to arrive as soon as possible at CIE but no later than 30 April for the June examination and 31 October for the November examination.
3. CIE will select a list of candidates whose work is required for external moderation. As soon as this list is received, send candidates' work with the corresponding Individual Candidate Record Cards, this Summary Form and the second copy of MS1, to reach CIE by 31 October.
4. If there are ten or fewer candidates, all the coursework that contributed to the final mark for all the candidates must be sent to CIE. Where there are more than ten candidates, CIE will select the candidates whose coursework is required.
5. Photocopies of the samples may be sent **but** candidates' original work, with marks and comments from the teacher, is preferred.
6.
 - (a) The pieces of work for each skill should **not** be stapled together, nor should individual sheets be enclosed in plastic wallets.
 - (b) Each piece of work should be clearly labelled with the skill being assessed, Centre name, candidate name, and index number and the mark awarded.
7. CIE reserves the right to ask for further samples of Coursework.

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
INTERNATIONAL GENERAL CERTIFICATE OF SECONDARY EDUCATION

ENVIRONMENTAL MANAGEMENT

Centre's Coursework Proposal

Centre Name: Centre Number

The examples of projects described below were developed for advisory purposes and may be amended when undertaken by individual candidates. Please outline between three and five possible projects.

Title	Related Area of Syllabus: IMPACT	Related Area of Syllabus: MANAGEMENT	Possible Methods
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