

**RRC
Trainer Pack
Sample**

NEBOSH

Environmental Management Certificate

Unit EMC1: Environmental Management

Unit EMC2: Assessing Environmental Aspects
and Associated Impacts

NEBOSH

Environmental Management

Certificate

Unit EMC1

Sample Contents

INTRODUCTION

EMC1 SAMPLE - Element 1: Foundations in Environmental Management

- Lesson plan
- PowerPoint slides
- Study text chapter

SAMPLE - Full list of study text contents for Unit EMC1

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NEBOSH Environmental Management Certificate Unit EMC1

Introduction to the RRC Sample Resource Pack

RRC's Trainer Packs have been designed to include all the resources you need to deliver the NEBOSH Environmental Management Certificate course. The full pack - of which this is a sample - includes the following resources:

- An electronic copy of the RRC study text (course notes) for the course, supplied for use by the tutor as reference only.
- Daily lesson plans (MS Word) - a suggested breakdown of how the detailed subjects specified in the qualification syllabus will be covered on each day of the course.
- Slides (MS PowerPoint) - full colour slides addressing the subjects specified in, and following the structure of, the qualification syllabus.

Some third-party resources may be suggested in the Lesson Plans, or in the notes to the slides - for example, video footage, further reading, etc. These are not essential and they are not included as part of the licensed Trainer Pack - it is up to the tutor to source the suggested material, should he or she wish to do so.

This 'Sample Trainer Pack' contains a selection of pages from the lesson plan, a number of corresponding slides, and the relevant pages from the study text. These pages and slides are representative of the presentation, design and language of the full materials.

For more information, please contact RRC's customer advisers on 020 8944 3100 or e-mail info@rrc.co.uk

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Environmental Management Certificate Unit EMC1

Sample Classroom Lesson Plan

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NEBOSH Environmental Management Certificate

EMC1/2 (2021 syllabus) Full Course (5-Day Delivery)

This lesson plan is based on the requirements of the NEBOSH Environmental Management Certificate Specification and is designed as a guide for tutors in planning their teaching of the course.

The lesson plan is based on 5 days of teaching with teaching time of between 6.5 and 7.5 hours per day. Where the teaching time allocated does not match the NEBOSH recommended hours, clear guidance is given as to the required “Directed Study” to ensure the NEBOSH taught hours are met. This is in addition to Private Study.

The lesson plan can be easily adapted for other delivery structures, extending the number of days or delivering in shorter sessions.

The duration is based on NEBOSH Guidance and reflects the recommended teaching times. Whilst NEBOSH expect Lesson Plans that comply with the recommended study hours, in practice individual sessions can be shortened and extended depending on the experience, pre-knowledge and English language skills of the students in a particular group.

Lesson Plan Front Sheet

Tutor:	Course Title and Topic: NEBOSH Environmental Management Certificate EMC1/2
Venue:	Date & Time:
Number of Adult Learners:	Knowledge/Ability assumed: This 5-day course has been developed to fulfil the requirements of Unit EMC1 and Unit EMC2 of the 2021 syllabus version of the NEBOSH Environmental Management Certificate. It is likely that some students will have practical experience of some of the issues covered in the course. Others are likely to have little or no knowledge of the subject matter. In the introduction at the start of the course, the individual students' present knowledge level should be assessed.
Course Duration: Minimum 34 Taught Hours + Directed Study	
Lesson Aims - <i>the aims of the session are to:</i> As per NEBOSH syllabus guide	
Objectives (learning outcomes) - <i>by the end of the session students should be able to:</i> As per NEBOSH syllabus guide, stated at the start of each element on slides.	
Brief reasoning for the way the lesson has been planned: The following are guidelines on how the course should be taught. Different tutors obviously have different styles and experiences and these should be taken into account when delivering the course. To keep the students interested, a variety of different methods should be used and the tutor should not rely solely on slides.	
Any constraints: <ul style="list-style-type: none"> • The course will require students to undertake some research. • They will require at least some access to the Internet resources for this purpose. 	
Equipment/Aids to be used: <ul style="list-style-type: none"> • Computer (with Internet and sound capability), data projector, flip charts/whiteboard. • Use of PPT presentations. Though PPT slides exist for most (if not all) subjects covered, they should be used judiciously rather than exclusively. • Internet access. • Students are provided with a set of printed course notes. • Tasks are stated on PPT slides (these are, with a few exceptions, short activities to assist students' learning; tutor's decision on how they should be delivered, e.g. class discussion, student group work, and student solo work). • Prepared Workshop sheets are available for most elements of the course (these are usually more in-depth learning activities than tasks). • Questions set for directed study may constitute study questions and exam skills questions in textbook, RRC mock exam questions or other relevant questions - tutor to make the decision. 	

EMC1/2 Day 1

7.5 Taught Hours

0.5 Directed Study Hours

DURATION (MINS)	CONTENT AND TUTOR ACTIVITY	AIDS AND EQUIPMENT	STUDENT ACTIVITY
20	Introduction to the course - Overview and aims Note: Students to be given a copy of the textbook if not already received	Flip Chart	Listening
90	ELEMENT 1: FOUNDATIONS IN ENVIRONMENTAL MANAGEMENT 1.1. The Scope and Nature of Environmental Management <ul style="list-style-type: none"> - Learning outcomes E1 - Definition of the environment - The multidisciplinary nature of environmental management - Size of the environmental problem - International Waste Trade case study W1 Local and Global Impacts Workshop	Slides Flip Chart Internet Resources	Listening and contributing to discussions and exercises
15	MORNING BREAK		
120	1.2. The Ethical, Legal and Financial Reasons for Maintaining and Promoting Environmental Management <ul style="list-style-type: none"> - Benefits of good environmental management - Rights and expectations - Outcomes of incidents - Case Study: Minamata Bay Incident - Actions and implications of pressure groups - Legal issues and other requirements - Environmental reporting - International law, EU law & national law, Brexit - Exercise - Moral, Ethical, Legal and Economic Reasons Create a table on flip chart paper with each Reasons heading and populate the table with student responses - Direct/indirect costs - Insurance - Legal and economic penalties - Voluntary standards 	Slides Flip Chart Internet	Listening and contributing to discussions and exercises
30	LUNCH BREAK		

120	<p>1.3. Supporting Sustainable Development</p> <ul style="list-style-type: none"> - Define the term 'Sustainability' and identify its importance - Develop an example of an unsustainable situation (e.g. overfishing) and compare with a sustainable solution (e.g. use of renewable energy) taking into account social, economic and environmental indicators - Work through slides to develop the concept, e.g. environmental protection, social issues, corporate social responsibility (CSR), business case and SDGs. <p>1.4. The Role of National Governments and International Bodies in Formulating a Framework for the Regulation of Environmental Management</p> <ul style="list-style-type: none"> - International law: climate change, ozone depletion, Basel Convention and Oskar - Importance of local legislation - BAT and BPEO - show example of BAT from a guidance note from Environment Agency website www.gov.uk/government/collections/technical-guidance-for-regulated-industry-sectors-environmental-permitting - Role of enforcement agencies (Regulators) - outline key roles and consequences of non-compliance (e.g. notices & prosecution) 	<p>Slides Flip Chart Internet</p>	<p>Listening and contributing to discussions</p>
15	AFTERNOON BREAK		

90	ELEMENT 2: ENVIRONMENTAL MANAGEMENT SYSTEMS 2.1. Reasons for Implementing an Environmental Management System (EMS) <ul style="list-style-type: none"> - Learning outcomes and contents for Element 2 - Reasons for implementing an EMS – e.g. demonstrate management commitment, pollution prevention, framework for objectives and targets, common principles, interested parties pressure, CSR - Group Discussion Discuss with students why they think organisations develop EMSs to recognised standards and write results on flip chart 2.2. The Key Features and Appropriate Content of an Effective EMS <ul style="list-style-type: none"> - Initial environmental review - Context of the organisation - Leadership - W2 Policy Workshop - Planning 	Slides Flip Chart Resources	Listening and contributing to discussions and exercises
10	End of session summary and close		

EMC1/2 Day 1 - Self-reflection

Assessment of Learning - how will I tell whether learning has taken place? By:

- Continuous assessment through Q&A and discussions
- Assessment through participation in workshops

Directed Private Study Set:

- Time: Element 1.4 - 30 mins.
- Set a relevant question(s) for homework.
- Self-revision of key principles from element(s) covered today.
- Students to look at websites identified in course notes under 'More...' sections.

Lesson Evaluation - how did the lesson go? Any changes? Etc.

NEBOSH Environmental Management Certificate Unit EMC1 Sample PowerPoint Slides

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What is “The Environment”?

Everything that surrounds us:

- The physical resources of the Earth.
- Living resources (animal and plant life).
- Human populations.

Definition

“Surroundings in which an organisation operates, including air, water, land, natural resources, flora, fauna, humans and their interrelationships.”

Surroundings can extend from within an organisation to the local, regional and global system.”

ISO 14001:2015

Multidisciplinary Nature

- Geology.
- Hydrogeology.
- Town and country planning.
- Public health.
- Sociology, etc.

Barriers

- Complexity.
- Conflicts with other priorities (e.g. commercial and financial).
- Behavioural issues.

Complexity

- Organisations may have many environmental issues.
- Expertise is needed in a number of different subject areas.
- Deciding on priorities can be difficult.
- Understanding of how changes of processes affect business is important.

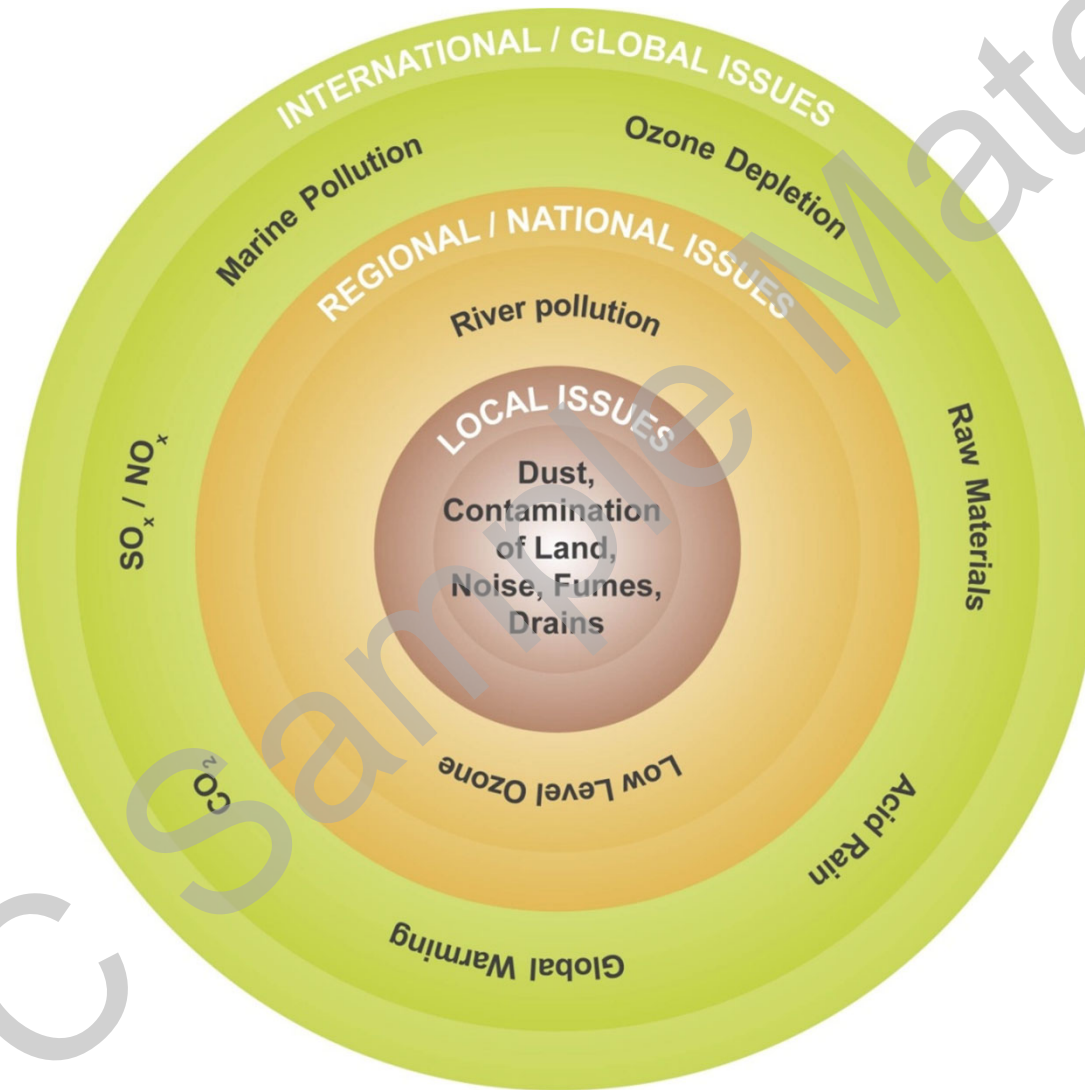
Conflicting Demands

- Demands can conflict, e.g. H&S and environment.
- For example, cement-manufacturing processes can create large amounts of dust within buildings:
 - To protect the workers, the dust should be ventilated to atmosphere.
 - May cause a significant environmental impact on the surrounding area.
 - Solution needs to be found that protects both workers and the environment.

Behavioural Issues

- Most difficult change to achieve.
- Difficult to change quickly.
- Changing behaviour patterns.
- Must provide people with good reasons to change.

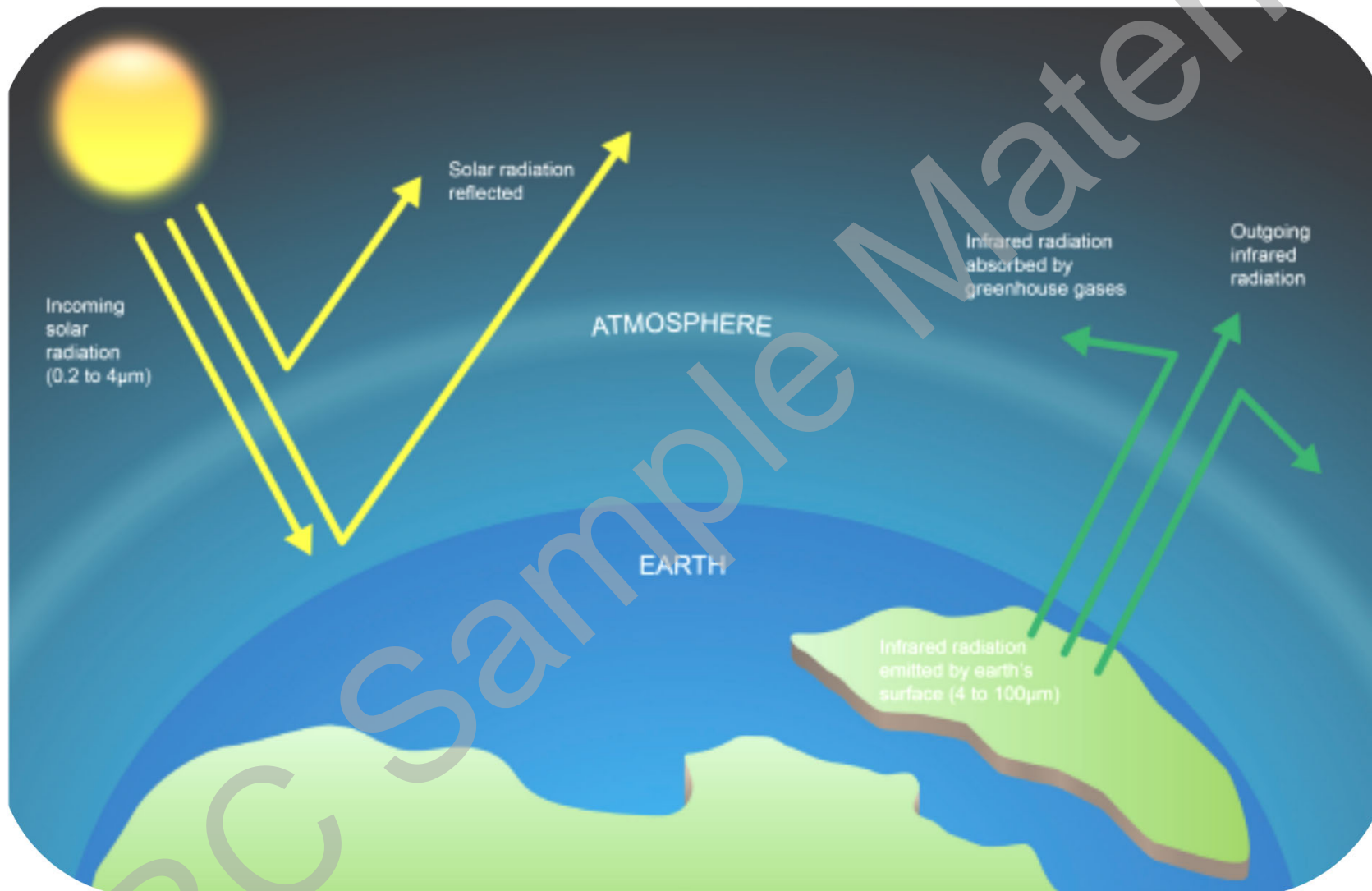
Relationship Between Local, National and International Environmental Issues



Local Effects of Pollution

- Poor air quality due to high levels of vehicle traffic (e.g. low level ozone).
- Contaminated land from industrial processes where spills or accidents occurred.
- Water pollution from accidental spillages, such as road traffic accidents.
- Noise, odour, light (nuisance issues).
- Waste disposal – spread of disease, pests, etc.

Greenhouse Effect



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Unit EMC2: Assessing Environmental Aspects
and Associated Impacts

The Scope and Nature of Environmental Management

IN THIS SECTION...

- Understanding and managing the environment requires knowledge of many topics, including geography, geology, hydrogeology, planning, public health, sociology, pollution and pollution controls.
- Barriers to good environmental management are:
 - The complex nature of the environment.
 - Conflicting demands in an organisation.
 - Difficulties in changing people's behaviour.
- Environmental impacts can be local, national or regional; and international or global.
- Some key environmental issues include:
 - Local pollution from noise, waste, lighting and odour.
 - Carbon emissions and climate change.
 - Loss of biodiversity.
 - Air pollution causing poor air quality.
 - Release of pollutants causing the protective ozone layer in the stratosphere to become depleted.
 - Land grabbing.
 - Use of fossil fuels.
 - Inappropriate disposal of waste.
 - Impacts occurring from poor agricultural practices.

Definition of the Environment

The 'environment' is everything that surrounds us. This encompasses:

- the physical resources of the Earth, including the atmosphere, water, the land and raw materials;
- the living resources of animal and plant life; and
- human populations.

Environmental management is concerned with understanding these elements and how they interrelate. The international environmental management system standard **ISO 14001:2015** defines the environment accordingly as:

"The surroundings in which an organisation operates, including air, water, land, natural resources, flora, fauna, humans and their interrelationships."

Surroundings can extend from within an organisation to the local, regional and global system."

(Source: **ISO 14001:2015**)

DEFINITIONS**NATURAL RESOURCES**

Land or raw materials that occur naturally in the environment.

FLORA

Plant life.

FAUNA

Animal life.

ENVIRONMENTAL MEDIA

Air, land and water.

The Multidisciplinary Nature of Environmental Management

DEFINITIONS**GEOLOGY**

Study of the physical materials that make up the Earth.

HYDROGEOLOGY

Study of the movement of groundwater in the soil and rocks.

SOCIOLOGY

Study of human social activity.

Environmental management clearly has a very broad scope. One of the fascinations of studying the environment is the breadth of topics and disciplines that are involved. Environmental management typically involves concepts from scientific and technical disciplines, e.g. physics, chemistry, biology, geology and engineering, but it also has social and political dimensions, e.g. town and country planning, public health and legislation.

In studying an environmental course such as this, you will be given a general, but not specialist, understanding of a wide variety of topics included in these disciplines.

Barriers to Good Standards of Environmental Management

Many organisations of all types and sizes successfully manage their environmental impacts. But we need to recognise at the outset that the broad scope of environmental management poses a number of barriers to good environmental management, for example:

- **Complexity**

Organisations are complex, with numerous environmental impacts, such as waste generation and disposal, energy use, emissions to air, or discharges to water. Deciding which impacts to address and how to achieve improvements requires background knowledge of environmental impacts, how they interact, and options for improvement. An understanding of how changes of process or procedure can affect the business is also important.

- **Competing and Conflicting Demands**

Organisations need to operate in an efficient and effective manner to deliver the right product or service to their customers, on time, and at a competitive price. Commercial companies need to make a profit in order to survive. Individual people in an organisation may be driven by financial, rather than environmental, pressures.

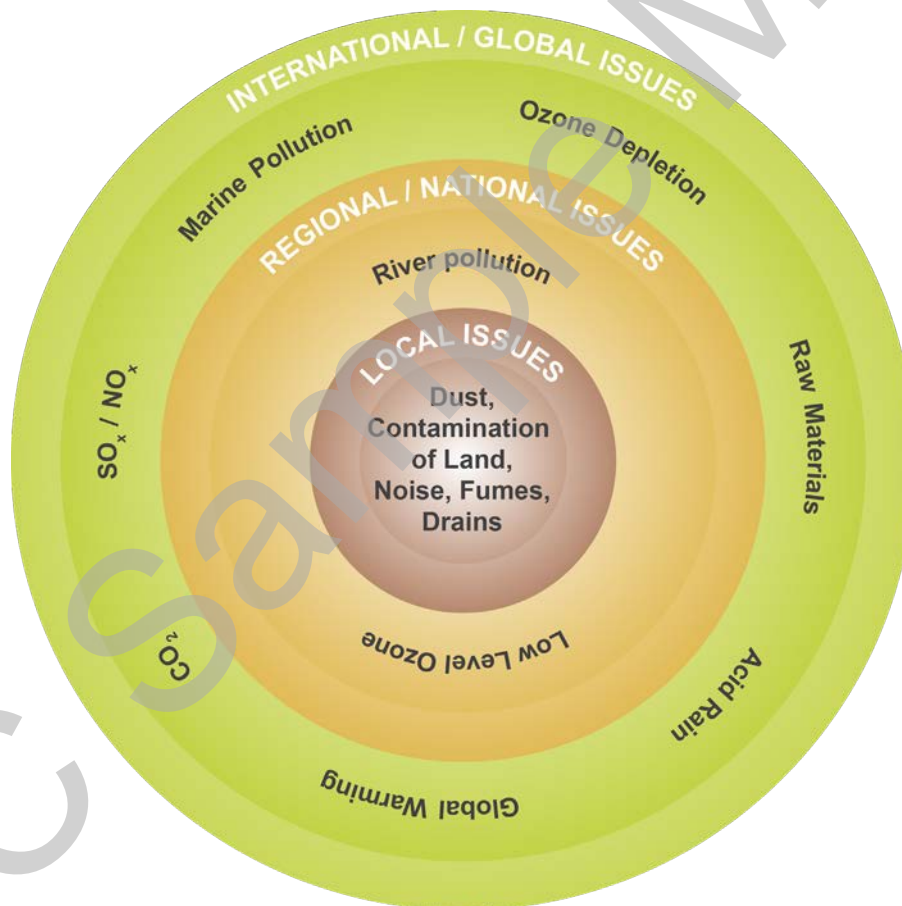
All organisations need to comply with applicable legislation. There is often conflict between environment and health and safety. For example, to protect workers from high dust levels in the workplace, dust is ventilated to the atmosphere. If not controlled, this may cause an environmental problem, with plants being covered in dust, or a nuisance being caused to nearby residents.

- **Behavioural Issues**

Changing the way people behave in any given situation is one of the most difficult things to achieve. In recent years, the cost of fuel and generally running a car has increased significantly, yet people are still unwilling to give up car ownership and use. This is in spite of significant publicity regarding the negative environmental impact of car use, from contributing to climate change to decreasing local air-quality standards. This is no different from attitudes in the workplace; if we are to be successful in changing behaviour patterns, we must be prepared for it to take time and we must provide people with good reasons to change.

Size of the Environmental Problem

We have seen that the environment covers a wide range of issues and disciplines. When we think about our own organisations, we need to recognise that we can contribute to local, regional and global environmental issues. The following figure illustrates this.



Relationship between local, national and international environmental issues

The various sections of this course cover the main environmental issues in some depth, but let's begin by taking an overview of some of the key local, regional and global environmental concerns that society is dealing with today.

Local Effects of Pollution

These can include:

- Poor air quality due to the pollution caused by high levels of vehicle traffic or local industrial processes. For example, vehicles emit a mixture of gases and particulate material that can cause harm to the environment and damage human health. Oxides of sulphur and nitrogen are often referred to as SO_x and NO_x respectively. NO_x can react with atmospheric gases, in the presence of sunlight, to produce harmful low-level ozone.
- Contaminated land from industrial processes where spills or accidents have occurred, leaving ground contaminated with pollutants such as heavy metals (cadmium, lead, etc.).
- Water pollution from accidental spillages from industry.

Pollution by noise, odour and light is becoming an increasing problem and all of these types of pollution are often controlled through legislation. Operating conditions may also be imposed on businesses located in sensitive areas under planning law, or through industrial environmental permits.

Waste is often heavily regulated, e.g. under the **Waste Framework Directive (2008/98/EC)** in the European Union. This is because unregulated and uncontrolled disposal of waste can lead to the spread of disease through contact with the waste itself, or an increase in numbers of vermin species, such as rats, which aid the spread of disease. Waste can also contaminate land and water.



High volume of traffic, even at night

Carbon Emissions and Climate Change

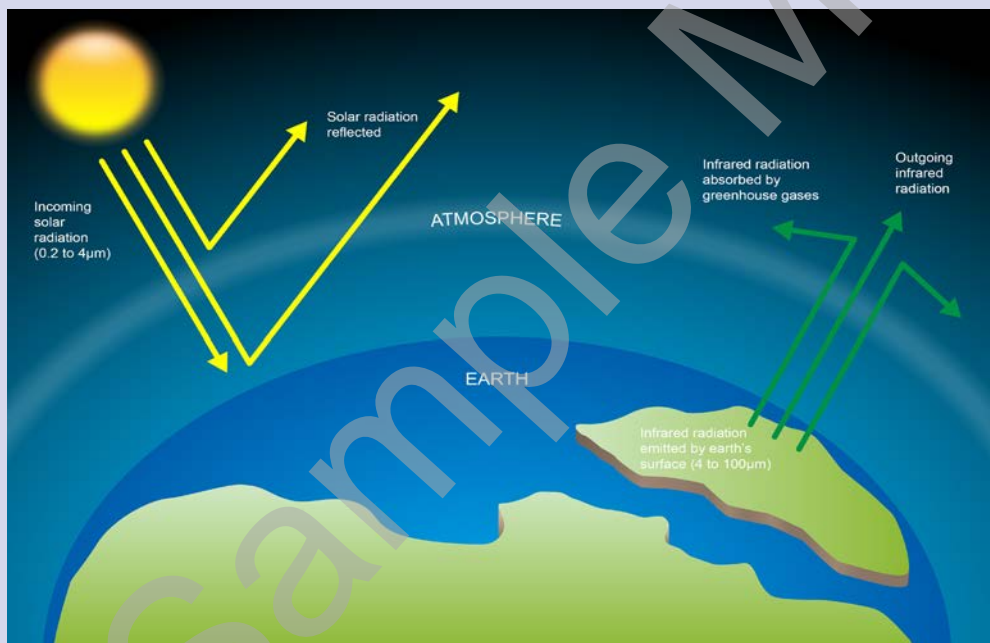
TOPIC FOCUS

Global Climate Change

The first decade of the 21st century was the warmest on record and measurements over the last 150 years show that the temperature of the atmosphere has increased by around one degree Celsius. This phenomenon is commonly known as climate change.

There is now strong evidence that climate change is related to pollution of the atmosphere, through the mechanism known as the 'greenhouse effect'.

What is the greenhouse effect? It is actually a natural phenomenon. The Sun irradiates the Earth with energy and as the Earth warms, it emits energy back into space as infrared radiation. Some of this radiation is absorbed by greenhouse gases that occur naturally in the atmosphere (primarily water vapour, carbon dioxide and methane); the effect of this is to reduce heat loss from the Earth. Were it not for the greenhouse effect the temperature of the Earth would be well below zero degrees Celsius.



The greenhouse effect

The problem is that burning fossil fuels (e.g. coal, oil, gas, petrol, diesel), which account for more than 85% of the world's energy consumption, releases large quantities of carbon dioxide into the atmosphere. Levels of carbon dioxide in the atmosphere have consequently increased significantly during the past 50 years.

Enhanced levels of carbon dioxide in the atmosphere are now believed to be artificially increasing the greenhouse effect, leading to climate change.

What is so alarming about a warmer planet?

- Sea levels will rise - primarily through the melting of the polar ice caps. This could result in widespread coastal flooding.
- Climate change - the warming of the Earth is likely to trigger changes in the Earth's climate. This could potentially have very serious consequences. For example, major food-producing areas might begin to suffer droughts, reducing our ability to feed ourselves. There are also likely to be more extreme and disruptive weather events, such as high winds and floods.



The main man-made sources of carbon dioxide emissions and the greenhouse effect (reproduced courtesy of Scottish Power)

MORE...

Further information on the science behind climate change can be found in the Intergovernmental Panel on Climate Change (IPCC) *Fifth assessment report – climate change 2013: The physical science basis*, available at:

www.ipcc.ch/report/ar5/wg1

To reduce fossil-fuel burning (mainly power stations and road vehicles), we must:

- **Reduce energy consumption**, e.g. by improved insulation, double-glazing, attention to heating and ventilation, turning lights off.
- **Increase efficiency of energy use**, e.g. through best practice in the operation of plant and processes, use of fuel-efficient vehicles (diesels give about 30% better performance than petrol-driven vehicles but generally emit more air pollutants to atmosphere).
- **Use alternative energy sources**: e.g. wind, water, or nuclear energy.
- **Burn fuels which release less carbon dioxide**: natural gas (methane) produces more than twice as much energy (per kg), and carbon dioxide makes up only 75% of the combustion products compared with coal.

Climate Change Greenhouse Gas Management Hierarchy

The IEMA publication, *Pathways to net zero: using the IEMA GHG management hierarchy*, advocates the use of a hierarchy of control for greenhouse gas emissions. The hierarchy is as follows:



GHG management hierarchy

Source: Based on *Pathways to net zero: using the IEMA GHG management hierarchy*, IEMA, 2020

Biodiversity Loss

Biodiversity is simply diversity, or variety, of plants, animals and other living things in a particular area or region. Diversity within the natural environment is important.

The Earth's biological resources are vital to economic and social development because they:

- Provide us with sustainable materials.
- Maintain the quality of our air, soils, waters and climate.
- Contribute to our health and enjoyment of life.

Estimates of global species diversity vary enormously, as it is difficult to estimate how many species there may be in less well-explored habitats, such as untouched rainforests. Rainforest areas that have been sampled have shown a very high level of biodiversity.

Extinction is a fact of life. However, species are now becoming extinct at an alarming rate, almost entirely as a direct result of human activities. Previous mass extinctions evident in the geological record are thought to have been brought about mainly by massive climatic or environmental shifts. Predictions and estimates of future species losses abound. One such estimate calculates that a quarter of all species on Earth are likely to be extinct, or on the way to extinction, within 30 years.

Air Pollution and Ground-Level Ozone

The main causes of air pollutants are vehicle exhaust emissions and industrial activities. Vehicles emit a mixture of gases and particulate material that can cause harm to the environment and damage human health. Oxides of sulphur and nitrogen are often referred to as SO_x and NO_x respectively. NO_x can react with atmospheric gases, in the presence of sunlight, to produce harmful low-level ozone. While we need ozone in the stratosphere part of the atmosphere, at low altitudes where people live it is a poisonous gas. These same SO_x and NO_x gases can also combine with moisture in the atmosphere to produce dilute sulphuric or nitric acid (falling as so-called 'acid rain'), which causes damage to buildings, especially many older buildings that are made from materials such as marble and limestone.

Air Pollution and the Ozone Layer

Life on Earth is protected from the damaging effects of ultraviolet radiation by a layer of ozone molecules (O_3) in the lower stratosphere, between 15 and 25 km above the Earth's surface. Ozone absorbs ultraviolet radiation, one of the major causes of skin cancers. Certain chemicals (ozone depleters) can destroy the ozone layer.

Although ozone has been depleted in other regions, ozone depletion is most dramatic over the polar regions, due to particular upper atmospheric conditions, and a continent-sized hole has developed over Antarctica.

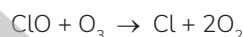
Most ozone depleters are chemically-stable compounds containing the halogen elements chlorine or bromine. These compounds have typically been used as refrigerant gases, as propellants for aerosol sprays, as foam-blowing agents, as solvents and in fire-fighting systems, e.g. chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), carbon tetrachloride, trichloroethane, halons.

These ozone-depleting compounds are very stable and if they are released by human activities they can persist unchanged in the atmosphere until they drift upwards to reach the ozone layer in the stratosphere. At this altitude, the compounds are exposed to higher levels of UV radiation, which liberates charged chlorine and bromine atoms from the parent molecules. These charged atoms are known as 'free radicals' and are highly reactive. Chlorine and bromine free radicals are able to react with, and break down, ozone molecules in a variety of ways, for example:

A chlorine-free radical reacts with ozone to produce chlorine monoxide and molecular oxygen:

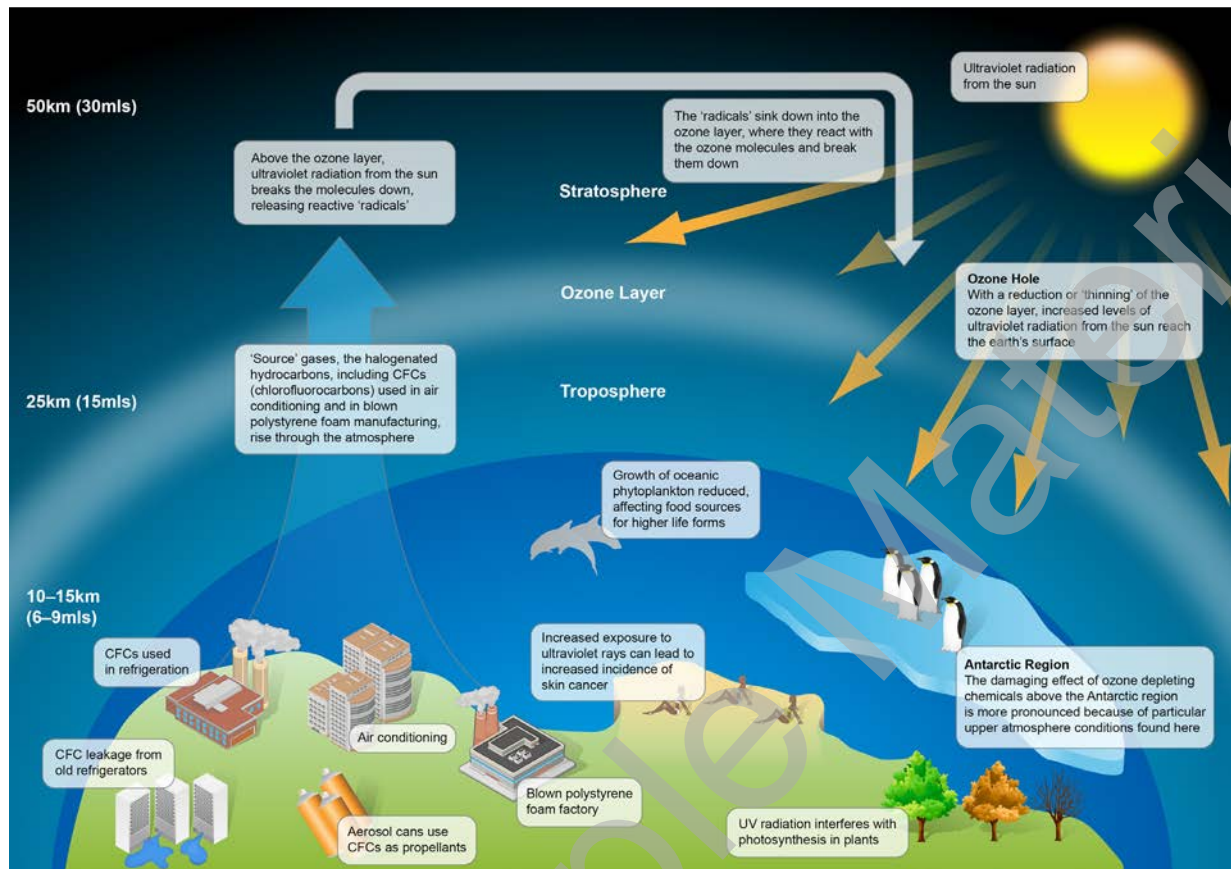


The chlorine monoxide so formed may then react to break down more ozone:



International agreements (especially the Montreal Protocol (see later in this element)) are in place to curb the production and use of ozone depleters.

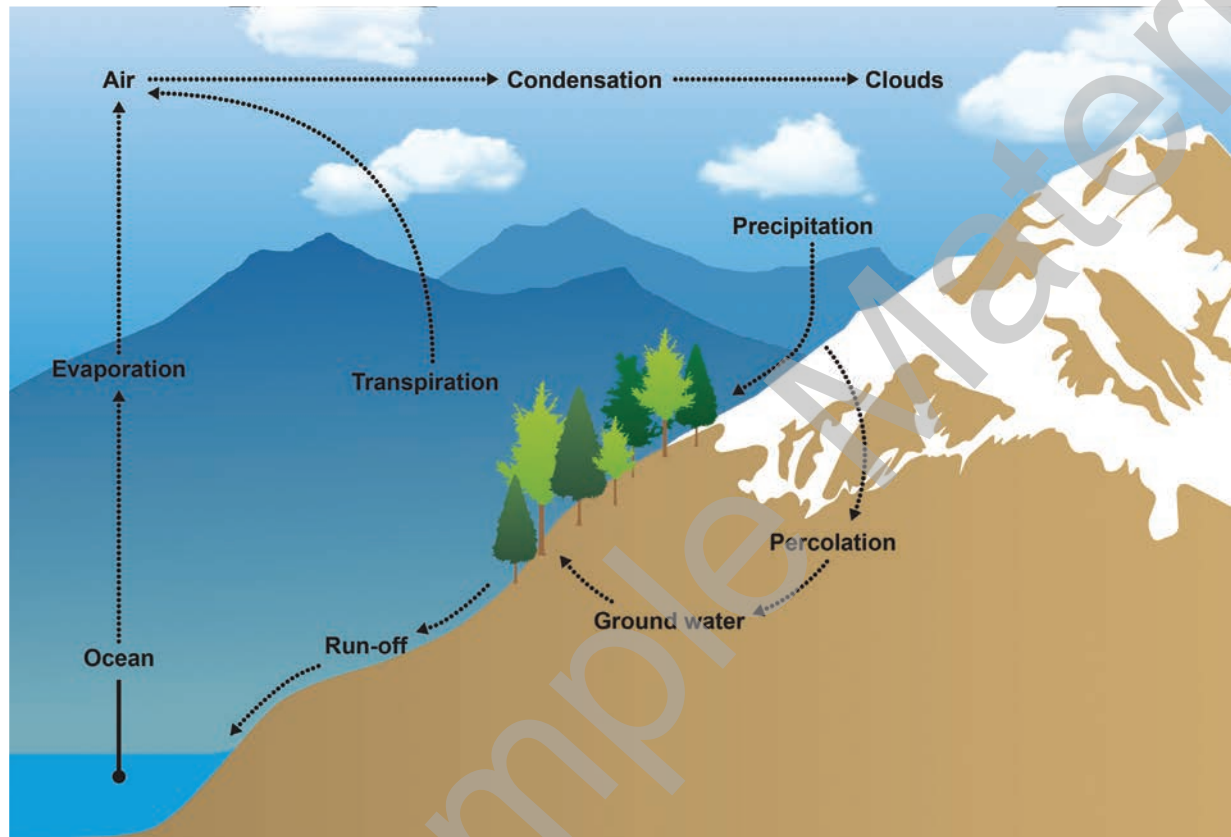
Unfortunately, even if all ozone-depleters were banned today, the chlorine molecules already in the atmosphere would continue to affect stratospheric ozone levels for at least a century.



Depletion of the ozone layer

Water Resources

Water is an essential resource and is recycled naturally in the environment through the hydrological cycle, as shown in the figure below. The demand for water is increasing due to the increase in population and in the amount of water used by individuals; this is especially the case in developed countries, where water is seen as a plentiful and cheap resource.



Natural hydrological cycle

Because of this cycle, there can be an accumulation of pollutants through water catchments, making prevention of pollution particularly important.

DEFINITION

WATER CATCHMENTS

Areas of land that drain water from rain, snow, etc., into a single water body, such as a river and its tributaries.

Water can be polluted:

- Directly, by discharges to rivers and lakes (point sources).
- Indirectly, through:
 - Run-off from land, particularly contaminated land.
 - Deposition of airborne pollutants (non-point sources) into watercourses.

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Element 1: Foundations in Environmental Management

The Scope and Nature of Environmental Management	1-3
Definition of the Environment	1-3
The Multidisciplinary Nature of Environmental Management	1-4
Size of the Environmental Problem	1-5
The Ethical, Legal and Financial Reasons for Maintaining and Promoting Environmental Management	1-19
Rights and Expectations of Internal and External Interested Parties (Local Residents, Indigenous People, Supply Chain, Customers and Workers)	1-20
Outcomes of Incidents	1-21
The Actions and Implications of Pressure Groups	1-21
Overview of Compliance Issues	1-22
The Business Case for Environmental Management	1-24
Supporting Sustainable Development	1-28
Definition of Sustainability	1-28
Importance of Sustainable Development	1-28
The Business Case for Sustainable Development	1-31
Role of the United Nations' Sustainable Development Goals (SDGs)	1-32
The Role of National Governments and International Bodies in Formulating a Framework for the Regulation of Environmental Management	1-34
International Law	1-34
The Importance of Knowing and Understanding Local Legislation	1-39
Meaning of BAT and BPEO	1-39
The Role of Enforcement Agencies (Regulators) and Consequences of Non-Compliance	1-39
Summary	1-41
Exam Skills	1-42

Element 2: Environmental Management Systems

Reasons for Implementing an Environmental Management System (EMS)	2-3
Introduction to Environmental Management Systems	2-3
The Key Features and Appropriate Content of an Effective EMS	2-6
Introduction to ISO 14001	2-6
ISO 14001	2-6
Initial Environmental Review	2-7
Context of the Organisation	2-8
Leadership	2-9
Planning	2-10
Support	2-14
Operation	2-16
Performance Evaluation	2-17
Improvement	2-27
Eco-Management and Audit Scheme (EMAS)	2-27
Benefits and Limitations of Introducing a Formal EMS into the Workplace	2-29
Benefits of Introducing a Formal EMS into an Organisation	2-29
Limitations of Introducing a Formal EMS into an Organisation	2-31
Summary	2-33
Exam Skills	2-34

Element 3: Assessing Environmental Aspects and Impacts

Reasons for Carrying Out Environmental Aspect and Impact Assessments	3-3
Why Identify Environmental Impacts?	3-3
Aims and Objectives of Impact Assessment	3-3
Life-Cycle Analysis (Cradle-to-Grave Concept)	3-6
Types of Environmental Impact	3-9
Direct and Indirect Impacts	3-9
Cumulative Impacts	3-9
Positive and Negative Effects	3-9
Nature and Key Sources of Environmental Information	3-12
Internal to the Organisation	3-12
External to the Organisation	3-13
Identifying Environmental Aspects and Associated Impacts	3-14
Implementing an EMS	3-14
Identifying Environmental Aspects	3-14
Determining Associated Environmental Impacts	3-15
Specific Impacts	3-17
Identifying Receptors at Risk	3-18
Identification and Evaluation of Aspects and Impacts	3-18
Risk and Opportunities	3-23
Recording Significant Aspects and Impacts	3-24
Reviewing	3-24
Summary	3-25
Exam Skills	3-26

Element 4: Planning for and Dealing with Environmental Emergencies

The Importance of Environmental Emergency Planning	4-3
The Effects of Unplanned Incidents on the Environment	4-3
General Duty or Responsibility Not to Pollute	4-3
Requirement of the Environmental Management System	4-3
Need for Prompt Action to Protect People, the Environment and Organisational Assets	4-4
Immediate Risks	4-4
Long-Term Risks	4-4
Emergency Preparedness and Response	4-5
Recognising Risk Situations and Action to Take	4-5
Emergency Response Plans	4-7
Information and Training for Internal and External Interested Parties	4-9
Review and Continual Improvement of Emergency Response Plans	4-12
Summary	4-13
Exam Skills	4-14

Element 5: Control of Emissions to Air

Air Quality Standards	5-3
Why are there Air Quality Standards?	5-3
Meaning and Uses of ppm and mg/m ³	5-3
The Potential Effects of Poor Air Quality	5-3
The Role of Air Quality Standards	5-4
Main Types of Emissions to Atmosphere	5-5
Types of Emission and their Hazards	5-5
Sources of Air Pollution	5-6
Common Pollutants	5-8
Control Measures to Reduce Emissions	5-12
Controlling Air Pollution	5-12
Control Hierarchy	5-12
Examples of Technology	5-13
Unit EMC2: Environmental Practical Application	5-25
Summary	5-26
Exam Skills	5-27

Element 6: Control of Environmental Noise

Sources and Effects of Environmental Noise	6-3
The Characteristics of Noise which Lead to it Being a Nuisance	6-3
The Effects of Noise	6-4
Legal Considerations	6-5
Common Sources of Environmental Noise	6-5
Methods for the Control of Environmental Noise	6-8
Monitoring Requirements and Arrangements	6-8
Basic Noise Control Techniques	6-8
Management (Procedural) Controls	6-11
Practical Measures for Noise Control	6-11
Summary	6-12
Exam Skills	6-13

Element 7: Control of Contamination of Water Sources

Importance of the Quality of Water for Life	7-3
The Meaning of Safe Drinking Water, Groundwater, Surface Water	7-3
The Water Cycle	7-5
Water for Agriculture and Industry	7-7
The Potential Effects of Water Pollution to the Environment	7-7
Over-Abstraction	7-8
Desalination	7-8
Water Conservation	7-8
The Potential Effects of Pollution on Water Quality	7-9
Main Issues and Impacts of Ocean Pollution	7-9
Main Sources of Water Pollution	7-11
Controlling Sources of Water Pollution	7-11
Main Control Measures Available to Reduce Contamination of Water Sources	7-17
Control Hierarchy	7-17
Monitoring Water Quality	7-18
Control Methods	7-18
Controls for Storage and Spillage	7-20
Controls for Wastewater	7-26
Practical Measures for Water Pollution Control	7-28
Difficulties in Maintaining Equipment in Some Locations or Environments	7-28
Summary	7-29
Exam Skills	7-30

Element 8: Control of Waste and Land Use

Waste Types	8-3
The Waste Framework Directive	8-3
Definition of Waste	8-3
Inert Waste	8-4
Hazardous Waste	8-4
Non-Hazardous Waste	8-5
Clinical Waste	8-5
Radioactive Waste	8-6
Waste Types Subject to Specific Legal Requirements	8-6
Types of Waste	8-6
Minimising Waste	8-8
Impacts from Waste	8-8
Waste - a Worldwide Problem	8-8
The Business Case for Minimising Waste	8-9
The Waste Hierarchy	8-10
Applying the Waste Hierarchy at Every Stage	8-11
Managing Waste	8-13
What is the Waste Chain?	8-13
Recognition of the Key Steps	8-13
Responsible Waste Management	8-13
Benefits, Limitations and Barriers to Re-Use and Recycling	8-14
On-Site Separation and Storage including Segregation, Identification and Labelling	8-15
Transportation including Transfer to an Authorised Person and Required Regulatory Documentation	8-16
Differing Legal Requirements for Waste	8-17
Disposal	8-18
Producer Responsibility	8-18
Packaging Waste	8-18
Electrical and Electronic Waste	8-18
Waste from Construction Projects	8-20
Outlets Available for Waste	8-21
Circular Economy	8-21
Landfill and Incineration as Ultimate Disposal Routes	8-22
Other Treatment or Disposal Routes	8-25
Global Waste Trade	8-26
Export Costs and the Impact of Export, Landfill and Aggregate Taxes	8-26
Risks Associated with Contaminated Land	8-28
The Potential Effects of Contaminated Land on the Environment	8-28
Contaminated Land Liabilities	8-29
Summary	8-31
Exam Skills	8-32

Element 9: Sources and Use of Energy Efficiency

Use of Fossil Fuels	9-3
Examples of Fossil Fuels	9-3
Benefits and Limitations of their Use as an Energy Source	9-6
Carbon Offsetting	9-7
Renewable Sources of Energy	9-9
Fossil Fuel Alternatives	9-9
Benefits and Limitations of the Use of Alternative Energy Sources	9-14
Energy Supply in Remote Locations and Developing Countries	9-16
On-Site Energy Generation and Storage	9-16
Benefits and Limitations of Using Emerging Technologies for Energy	9-16
Energy Efficiency	9-17
Benefits of Energy Efficiency	9-17
Energy Monitoring	9-17
Control Measures Available to Increase Energy Efficiency	9-18
Fuel Choice for Transport and the Optimisation of Vehicle Use	9-21
Summary	9-24
Exam Skills	9-25

Final Reminders

Unit EMC2: Practical Assessment

Suggested Answers