English for Ecology Students

Учебно-Методическое Пособие

English

for Ecology Students

Английский язык

для студентов-экологов

Учебно-методическое пособие
для студентов географического факультета БГУ

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Пособие состоит из пяти разделов, посвященных актуальным проблемам взаимоотношений человека с природой. В каждом тематическом разделе содержатся аутентичные тексты с заданиями для развития и совершенствования разных видов чтения.

Цель пособия – обучение студентов извлечению основной информации из текста, выработка умений и навыков реферирования текстов по специальности, а также развитие умений ведения дискуссий на профессиональные темы.

Предназначено для студентов географического факультета БГУ.

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ПРЕДИСЛОВИЕ

Учебно-методическое пособие «English for Ecology» предназначено для студентов, владеющих английским языком на среднем уровне (Intermediate level). В пособие включен материал, который изучается на профилирующих кафедрах географического факультета младших курсов. В нем рассматриваются такие темы, как «Экология: предмет и основные понятия», «Антропогенное воздействие на атмосферу», «Вода и источники ее загрязнения», «Деградация и загрязнение земель», «Охрана лесов и растительного мира») и другие. Тексты составлены на основе оригинальной американской и английской учебной и научной литературы. Основная цель пособия – расширение активного словарного запаса по специальности, развитие навыков чтения и профессиональной коммуникации на английском языке по актуальным проблемам взаимоотношений человека с природой.

По структуре пособие представляет собой пять разделов (Units), каждый из которых является цельным и завершенным. Раздел начинается с предваряющих вопросов, которые помогают прогнозировать содержание текста и тем самым настраивают и подготавливают студента к восприятию материала, подлежащего изучению. В свою очередь разделы состоят из аутентичных текстов с заданиями для разных видов чтения. Текст A, направленный на развитие изучающего чтения, предназначен для выработки умений и навыков извлекать полную информацию из текста, анализировать изложенные в нем факты, сравнивать их, обобщать и делать собственные выводы. Текст B и задания к нему предназначены для развития навыков ознакомительного вида чтения, что предполагает совершенствование умения студента находить и понимать основную информацию текста, умения отделить главное от второстепенного. Тексты C и D нацеливают студента на быстрый поиск основной тематической линии текста и формулирование его основной идеи. Наличие в разделе текстов, чтение каждого из которых имеет свою определенную цель, позволяет формировать у студента различные стратегии чтения. Данные умения являются важными и необходимыми в профессиональной деятельности будущего

специалиста. Во все разделы включены также тексты-диалоги, тексты для дополнительного чтения, снабженные словарем-минимумом тематической активной лексики. Система всех предлагаемых заданий и упражнений направлена в конечном итоге на выработку у студентов навыков и умений реферирования текстов по специальности, ведения дискуссий на профессиональные темы, а также на выработку переводческих навыков.

Пособие является частью учебно-методического комплекса по английскому языку по специальности «География». Может быть использовано также студентами заочного отделения и студентами других специальностей географического профиля.

Unit I

ECOLOGY AS A SCIENCE

READING MATERIAL

TEXT A

Task

a) Before reading the text try to discuss the following questions:

- When did the first living things appear on our planet?
- What is biosphere?

b) Now read the text, translate it and get ready to do the exercises after the text.

Life on the planet Earth. Biosphere

The Earth is about 4.6 billion years old. The first living cells emerged between 4 billion and 3.8 billion years ago. It is only for the last 50,000 years or so that man has been around on the scene[1]. For most of that time man made no more impact on the world than the birds building their nests, beavers[2] their dams or rabbits their warrens[3] .

What really set man apart from the other creatures was his invention of farming about 10,000 years ago when large, permanent settlements began to be established and man began to alter his surroundings, his environment, by his own deliberate efforts to make his life more secure and comfortable. This was followed by the development of the use of metals, the invention of writing, the beginnings of science, the growth of cities and towns and eventually, about 250 years ago, the start of industrialisation and the acceleration in population growth.

Although man is the most intelligent form of life on the planet and can change his surroundings in all sorts of ways, he is just as dependent upon the natural world as every other species, animal and plant, with whom he shares our planet. Man is not something special who can ignore and exist without nature because he is part of nature and if he fails to realise this the results could be disastrous – and not just for man.

Life on this planet exists in what is called the *biosphere* a thin layer which is the meeting place of land, air and water. Life only exists for a very short distance below the earth's surface and although life is to be found in the great ocean depths, this still takes us only 6 miles down. In the other direction only the hardiest of creatures can live at great heights in mountainous areas and virtually no life at all exists in the highest mountains, 5 to 5.5 miles above sea level.

At present biosphere includes vast numbers of plants, animals, and other life-forms of our planet, many of them are yet to be discovered. Biosphere is a relatively thin life-supporting layer around the Earth containing living organisms, which is strongly influenced in composition, structure and energetics by the living organisms. Part of the biosphere containing the highest concentration of living matter – the Earth's thin and fragile "film of life"[4] – varies from a few meters in deserts and tundra to a hundred meters in tropical, forest regions and oceans.

The biosphere is a complex system of energy use and material cycling. This system runs[5] on energy flowing into it from the Sun and it gives off energy (primarily as heat) to space.

We can divide the biosphere into two parts, living and nonliving, or biotic and abiotic. The biotic part[6] of the biosphere consisting of fauna and flora is known to be called biota. We can further divide the abiotic portion into three parts: the solid Earth or lithosphere, liquid water or hydrosphere, and the atmosphere.

The idea of biosphere originated rather casually[7] more than a century ago. The concept played little part in scientific thought, however, until it was developed by the Russian scientist V. I. Vernadsky. It is essentially his concept of the biosphere that we accept today.

Notes

[1] has been around on the scene – зд. существует на нашей планете
[2] beavers – бобры
[3] warrens – участки, где водятся кролики
[4] "film of life" – "оболочка жизни"
[5] runs – действует, функционирует
[6] the biotic part … is known to be called … – известно, что часть флоры и фауны данного района, называется ...
[7] casually – случайно

Word Study

Ex. 1. Read the international words correctly. Mind the stress.

a)			b)	c)	
air	metal		accept	acceleration	
atmosphere	matter		biota	concentration	
biosphere	meter		abiotic	composition	
billion	nature		biotic	energetics	
comfortable	natural		contain	idustria	
concept	ocean		direction	lisation	
complex	organism		exhist	population	
cycling	planet		idea	realize	

distance	portion	ignore
energy	region	intelligent
fauna	relatively	material
flora	sort	result
hydrosphere	special	
liquid	structure	
lithosphere	system	
	vary	
	virtually	

Ex. 2. Use your dictionary to complete the following table.

Verb	Noun	Adjective
	acceleration	
exist		
		special
originate		
	development	
establish		
	system	
invent		

Ex. 3. Match English phrases and their Russian equivalents.

1) the first living cells	a) поддерживающий жизнь слой
2) to make impact on the world	b) постоянные места поселений
3) the beginnings of science	c) цикличность развития материи
4) permanent settlements	d) выделять энергию
5) population growth	e) занятие сельским хозяйством
6) to alter the environment	f) часть природы
7) life-supporting layer	g) зарождение науки
8) material cycling	h) изменять окружающую среду
9) give off energy	i) рост населения
10) the invention of farming	j) первые живые клетки
11) part of nature	k) оказывать влияние на окружающий мир

Ex. 4. Identify the meaning of the given words as they occur in the word combinations and sentences below.

Area: mountainous areas; densely settled areas; area under crop; residential area, areas of inquiry (study); areal patterns. Geographic study is

concerned with location, with areal patterns, with the interrelationships of phenomena and with ties among areas.

Biota: biotic, abiotic. The biotic part of the biosphere, consisting of fauna and flora is called biota. The abiotic portion consists of lithosphere, hydrosphere and the atmosphere.

Creature: living creature; a lovely creature. Only the hardest of creatures can live at great heights in mountainous areas. Dickens created many wonderful characters in his novels. His behaviour created a bad impression. The creations of great works of science (art); the creations of poets; useful and creative work; creative personality. A creator is a person who creates.

Contain: Part of the biosphere contains the highest concentration of living matter. Nowadays there are fewer products containing chlorofluorocarbons.

Environment: environmental; environmental protection; environmental studies; environmental research; social environment; natural environment; man-made environment; human environment; environmentalist. The problems of environmental protection are of great importance now.

Emerge: The moon was emerging from behind the clouds. No new ideas emerged during the talks. Emergency: in case of emergency; an emergency exit. This door is used only in case of emergency. The life on Earth emerged between 4 billion and 3.8 billion years ago.

Exist: Does life exist on Mars? Lime exists in many soils. Existence: in existence. Do you believe in the existence of life on other planets?

Invent: When was television invented? Inventor, inventive, an inventive mind. Invention: the invention of the telephone, the many inventions of Edison.

Layer: surface layer; water layer; the atmosphere is divided into layers; upper layers of the atmosphere; life-supporting layer; layer-cake: Do you like a layer-cake "Napoleon"?

Support: to support a family; to support life; to support air pressure; to give support to; to speak in support of; supporter.

Originate: The idea of biosphere originated a century ago; origin: words of Latin origin, the origin of civilization; original: the original inhabitants of the country; an original thinker; an original mind; the original: to read books in the original. This is a copy. The original is in London.

Vary: to vary greatly; to vary from place to place. The highest concentration of living matter varies from a few metres in deserts and tundra to a hundred meters in tropical forest regions and oceans; varied: The climate in this country is as varied as its landscape; various: for various reasons; various types, at various times; variety: variety of species; a life full of variety;

variation: variation of temperature, seasonal variations; variable: variable winds, variable standards; variability: The most characteristic feature of Britain's weather is its variability.

Ex. 5. Say what attributes go well with the following words.

cell, creature, effort, result, layer, surface, depth, region.

Ex. 6. Pair the verbs in column A with a suitable phrase in column B. You must find a match for every word but there is not necessarily only one correct solution.

A	B
1. to establish	a) by Russian scientists
2. to make impact	b) energy
3. to accept	c) into two parts
4. to include	d) of flora and fauna
5. to be developed	e) at great heights
6. to give off	f) from a few meters to a hundred meters
7. to live	g) secure and comfortable
8. to divide	h) above sea level
9. to consist	i) vast numbers of plants
10. to make life	j) the concept
11. to be found	k) on the world
12. to vary	l) permanent settlements

Ex. 7. Write out the equivalents in pairs.

environment	stratum
impact	appear
be around	work out
layer	creation
disastrous	have in itself
emerge	living thing
creature	exist
originate	find out
concept	influence
invention	surroundings
discover	dangerous
develop	have as a beginning
contain	idea

Ex. 8. Match the verbs with their appropriate explanations.

1. to alter	a) to have within itself
2. to create	b) to appear; to come into view
3. to contain	c) to have as a beginning
4. to exist	d) to create or design smth. not existing before
5. to emerge	e) to make different, to change
6. to originate	f) to be, to continue living
7. to invent	g) to separate into parts or groups
8. to divide	h) to make smth. new

Ex. 9. Find words and phrases in the text that correspond to the definitions given below.

1. A thin layer which is the meeting place of land, air and water.
2. The envelope of air which surrounds the earth, consisting principally of a mixture of gases.
3. The solid crust of the Earth consisting of rocks and soils.
4. All the water of the earth in liquid and solid form.
5. The part of the biosphere consisting of living components (flora and fauna).
6. The portion of the biosphere consisting of the lithosphere, hydrosphere and the atmosphere.
7. The sum total of the conditions of the surrounding within which an organism, or group, or an object exists, including the natural conditions, the natural as modified by human activity and the artificial.

Ex. 10. Fill in the missing words in the sentences below. Choose from the following ones given in the box.

emerge, the solar system, ape-like-men, arrived, species, invented, concept, has been around, exists, permanent settlements, develop, alter

Planet Earth is 4,600 million years old

If we condense this inconceivable time-span into an understandable …(1) we can liken Earth to a person of 46 years of age.

Nothing is known about the first 7 years of this person's life, and whilst only scattered information …(2) about the middle span, we know that only at the age of 42 did the Earth begin to …(3) .

Dinosaurs and the great reptiles did not …(4) until one year ago, when the planet was 45. Mammals …(5) only 8 months ago; in the middle of last week manlike apes evolved into …(6), and at the weekend the last ice age enveloped the Earth.

Modern man …(7) for 4 hours. During the last hour Man …(8) agriculture. The industrial revolution began a minute ago.

During those sixty seconds of biological time, Modern Man has made a rubbish tip of Paradise.

When …(9) began to be established Man began to …(10) his surroundings, making his life more comfortable.

He has multiplied his numbers to plague proportions, caused the extinction of 500 …(11) of animals, ransacked the planet for fuels and now stands like a brutish infant, gloating over this meteoric rise to ascendancy, on the brink of a war to end all wars and of effectively destroying this oasis of life in …(12).

Ex. 11. Choose the best alternative to complete the following sentences.

1. The first … … emerged between 4 billion and 3.8 billion years ago.
   a) living things
   b) living cells
   c) living organisms
2. What really set man apart from the other creatures was his … .
   a) invention of writing
   b) use of metals
   c) invention of farming
3. To make his life more secure and comfortable man began … .
   a) to alter his environment
   b) to establish permanent settlements
   c) to develop science
4. Man is the most … form of life on the planet.
   a) permanent
   b) intelligent
   c) special
5. Life on this planet … in what is called the biosphere.
   a) emerges
   b) evolves
   c) exists
6. Man is … upon the natural world.
   a) sustainable
   b) responsible
   c) dependent
7. The biotic part of the biosphere consists of … .
   a) flora and fauna
   b) the solid Earth
   c) the liquid water

8. The idea of biosphere belongs to … .
   a) Ch. Darwin
   b) L. S. Vigotsky
   c) V. I. Vernadsky
9. Biosphere is a … layer around the Earth.
   a) thick life – supporting
   b) thin life – supporting
   c) non – living

Ex. 12. What preposition is missing? Choose from the following box but there is not necessarily only one possible choice.

in, for, to, of, on, nearby, among, with, around, without

Kunas: the world's greatest conservationists

Sounds like a true fairy tale but the Kunas are a small tribe of only 30,000 people who live …(1) a group of 360 islands, around Panama, in central America.

They have been awarded the Global 500 which is a prize given …(2) those who are defenders of nature. The World Wildlife Fund (WWF), a famous organization engaged …(3) the conservation of natural surroundings and other experts …(4) the world have great respect …(5) them.

Why do they deserve so much respect? Because they have succeeded …(6) creating harmony between man and nature and also because their life is based …(7) solidarity. They are considered to be the most democratic in all their thinking and actions.

The Kunas have great respect for the environment. The way in which they take care …(8) nature is very simple but effective. They believe …(9) conserving their forests. They use them but don't destroy them. They are very careful how they use water. They teach their children to respect nature. They have even fought people who wanted to build hotels and houses. Tourists are invited … (10) the condition that they respect the natural surroundings.

The Kunas take decisions all together. Helping one another forms part … (11) their tradition. For example, when a few young people wanted to cultivate some land, the whole village gave them a hand.

Moreover, the Kunas have good relationship …(12) the other people living …(13). This is because the only "arm" they are equipped …(14) is dialogue and exchanging ideas. In the past, other people tried to subject them but …(15) success. The reason …(16) this victory of the Kunas is their harmony …(17) people which is the fundamental rule of life.

Ex. 13. Spend a few minutes thinking about how you would translate the following sentences. Mind the emphatic construction "It is … that (who)".

1. It is only for the last 50,000 years or so that man has been around on the scene.
2. It was the invention of farming that set man apart from the other creatures.
3. It is due to the efforts to make life secure and comfortable that man began to alter his environment.
4. It was Isaac Newton who said that light is a combination of different colours.
5. It is only the hardiest of creatures that can live at great heights in mountainous areas.
6. It is man who can't exist without nature because he is part of it.
7. It is the activities of living matter that determine the structure, composition and energetics of the biosphere.
8. It is the industrial world economy that has caused present-day transformation of the environment.
9. It is Vernadsky's concept of the biosphere that is accepted today.
10. It is the process of deposition that produces sedimentary rocks.
11. It was Julius Caesar who laid the basis for a new calendar.

Ex. 14. Give the English equivalents.

Появляться; оказывать влияние; окружающая среда; выносливые, крепкие существа; вид; часть природы; зависеть от чего-либо; существовать; флора и фауна; живая материя; играть роль; научная мысль; понятие «биосфера»; состав и структура; использование энергии; тонкий слой, поддерживающий жизнь.

Ex. 15. Make up sentences using the following words. Mind the Word Order.

1. Emerged / Earth / on / ago / life / about / 4 billion years.
2. On / the / form / planet / is / the / intelligent / man / of / most / life.
3. Our / includes / vast / life forms / on / of / biosphere / numbers / planet.
4. Between / the / ecology / is / study / organisms / their / and / relationships / the / environment / of.
5. About / secure / began / 10,000 years ago / to make / to alter / man / life / environment / and / his / comfortable.
6. Can reach / of / lifetime / a / species / any / long / is / years / very / and / million.
7. Caused / by / to deal with / ecology / problems / has / activities / modern / human / environmental.
8. Biology / as / originally / ecology / treated / was / environmental.

Comprehension and Discussion

Ex. 1. Say whether the following statements are true or false. Argue them using the suggested phrases in the box.

Agreeing	Disagreeing
That's quite right That's true Yes, I agree I absolutely agree I'm of exactly the same opinion This is only partly true As far as I know	I don't agree Not really I disagree, I'm afraid I don't think that 's right I can't agree Surely not On the contrary It is absolutely wrong

1. The first living cells emerged 50,000 years ago.
2. Man made no more impact on the world than all the animals taken together.
3. What really set man apart from other creatures was making his life more secure and comfortable.
4. Man is the most intelligent form of life on the planet.
5. Man is something special who is not dependent upon the natural world.
6. Life on our planet exists in a thin layer on the surface of the earth.
7. Nobody can live at great heights in mountainous areas.
8. Biosphere includes all the living forms of our planet.
9. We can divide the biosphere into several parts.
10. The biosphere is a complex system of energy use and material cycling.
11. The concept of biosphere was developed by many Russian scientists.

Ex. 2. Complete the following sentences.

1. Man has been around on the scene for … .
2. The invention of farming set man … .
3. Man began to change … .
4. Man cannot … , because he is part of it.
5. Life on the planet exists … .
6. Only the hardest of creatures can … .
7. At present biosphere includes … .
8. Biosphere is … .
9. The system of energy use and material cycling runs on … .
10. The biotic part of the biosphere consists of … .

Ex. 3. Talk to one of your colleagues and find out

- when the first living cells emerged;
- what impact man made on the environment he lived in;

- what sort of reasons were that set man apart from other creatures;
- why man began to alter his surroundings;
- whether man is dependent upon the natural world;
- how he/she understands the term “biosphere”;
- whether he knows what biota is;
- what biosphere runs on;
- what parts the abiotic portion can be divided into;
- whether he knows how the concept “biosphere” developed

Ex. 4. Fill in the table showing different levels of biological organization in nature. Mind that the “higher” levels of life organization are from populations to biosphere.

Universe
↑
Galaxies
↑
……
↑
……
↑
……
↑
Biosphere
↑
……
↑
……
↑
……
↑
Organisms
↑
Organ systems
↑
Organs
↑
Tissues
↑
……
↑
……
↑
……
↑
Subatomic particles

Ex. 5. Speak on.

1. The emergence of living creatures on the planet: to be old, to emerge, the Earth, living cells, to make impact on.
2. The appearance of man and his activities: the invention of farming, to establish permanent settlements, to alter the environment, to make life secure and comfortable, the start of industrialization, the growth of cities, population growth.
3. Biosphere – a life-supporting layer around the Earth: to exist, to include, to vary from … to, to run on, energy use, material cycling, biota, abiotic, part, to divide, concept, originate, develop.

Ex. 6. Choose one of the following items and write an essay. Use additional material.

1. The origin of life on our planet.
2. Man as the most intelligent form of life.
3. What is biosphere?
4. The development of the concept "biosphere".

TEXT B

Task. **Read the text and get ready to discuss its main points.**

Ecology

Ecology is the study of the relationships between organisms and their environment.

Ecology emerged in the late 20th century as one of the most popular and most important aspects of biology.

The word ecology was coined by a German zoologist Ernst Haeckel, who applied the term *oekologie* to the "relation of the animal both to its organic as well as its inorganic environment". The word comes from the Greek *oikos,* meaning "household, home, or place to live". Thus ecology deals with the organism and its environment. The word environment includes both other organisms and physical surroundings. It involves relationships between individuals within a population and between individuals of different populations. These interactions between individuals, between populations, and between organisms and their environment form ecological systems, or ecosystems.

Modern ecology, however, is now focused on the concept of the ecosystem, a functional unit consisting of interacting organisms and all aspects of the environment in any specific area. It contains both the nonliving (abiotic) and living (biotic) components through which nutrients are cycled and energy flows.

Constant interactions between living organisms and their physical environment bind these components into a stable system.

The state of balance in any ecosystem is self-sustainable so that even slight imbalances are corrected before they become severe, irreparable and fatal. Particular concern of the ecologists is with "higher" levels of life organization: from populations to biosphere.

Ecology is a multidisciplinary science. Facts about ecological systems are drawn from biology, geology, chemistry, physics, history, physiology, anthropology, including various branches of geography: hydrology, soil science, geomorphology, biogeography, etc. Originally ecology was treated as environmental biology. Modern ecology has to deal with environmental problems caused by human activities.

The science of ecology has the following areas of study. They are plant and animal ecology, population ecology, community ecology, paleoecology.

A new term "social ecology" was introduced to show interaction of man, society and nature, close interdependence of social and natural factors.

Other ecological approaches concern specialized areas.

Systems ecology, concentrating on input and output analysis, has stimulated the rapid development of applied ecology, concerned with the application of ecological principles to the management of natural resources, agricultural production, and problems of environmental pollution.

In applied ecology, basic ecological principles are applied to the management of populations of crops and animals, so that yields can be increased and the impact of pests reduced. Applied ecologists also study the effect of humans on their environment and on the survival of other species. Theoretical ecologists provide simulations of particular practical problems (e.g., the effects of fishing on fish populations) and develop models of general ecological relevance.

Nowadays it is evident that some of the most pressing problems in the affairs of men-expanding populations, food scarcities, environmental pollution, and all the attendant sociological – and political problems – are to a great degree ecological.

Ex. 1. Here are the answers to some questions on the text. What are the questions?

1. Ecology deals with the organism and its environment. (What?)
2. Ecology emerged in the late 20th century as one of the most important aspects of biology (When?)
3. The word ecology was coined by a German zoologist Ernst Haeckel. (Who?)
4. The term "ecology" comes from the Greek language. (What language?)

5. Interactions between individuals, between populations and between organisms and their environment form ecological systems. (What?)
6. The state of balance in any ecosystem is self-sustainable so that even slight imbalances are corrected before they become severe, irreparable and fatal. (Why?)
7. Modern ecology has to deal with environmental problems caused by human activities. (What?)
8. Facts about ecological systems are drawn from biology, geology, chemistry, physics, including various branches of geography. (Where?)
9. The ecosystem is a functional unit consisting of interacting organisms and all aspects of the environment in any specific area. (What?)
10. Originally ecology was treated as environmental biology (How?)
11. The most pressing problems of men-expanding populations, food scarcities, environmental pollution are to a great degree ecological. (What kind of?)

Ex. 2. Complete the sentences.

1. Ecology is the study of … .
2. E. Haeckel applied the term "ecology" to … .
3. The word environment includes … .
4. Modern ecology is focused on … .
5. The state of balance in any ecosystem is .. .
6. Ecology is a multidisciplinary science drawing facts from … .
7. The science of ecology has such areas of study as … .
8. A term "social ecology" was introduced to … .
9. Applied ecologists study … .

Ex. 3. Match the following terms with their proper definitions.

1. Physiological ecology 2. Behavioral ecology 3. Population ecology 4. Community ecology 5. Paleoecology	a) the study of the ecology of fossil organisms b) the study of the organization and functioning of communities, which are assemblages of interacting populations of the species living within a particular area c) the study of the relationships between individual d) the study of the food-gathering techniques of individuals, the survival adaptations against predation and mating e) the study of the processes that affect the distribution and abundance of animal and plant populations

Ex. 4. Read the following text and subgroup the areas of study of ecology schematically.

Areas of study

Ecology developed along two lines: the study of plants and the study of animals. Plant ecology concerns the relationships of plants to other plants and their environment.

Animal ecology concerns the study of population dynamics, distribution, behaviour, and the interrelationships of animals and their environment. Because animals depend upon plants for food and shelter, animal ecology cannot be fully understood without a considerable background of plant ecology. This is particularly true in applied areas of ecology – wildlife and range management.

Both plant and animal ecology may be approached as the study of the interrelations of an individual organism with its environment, called autecology, or as the study of groups of organisms, called synecology.

Autecology, is usually concerned with the relationship of an organism to one or more variables such as humidity, light, salinity, or nutrient levels, it is easily quantified and lends itself to experimental design both in the field and the laboratory.

Important concepts developed by synecology are those concerned with nutrient cycling, energy budgets, and ecosystem development. Synecology may be subdivided according to environmental types, as terrestrial or aquatic. Terrestrial ecology, which may be further subdivided into forest, grassland, arctic, and desert ecology, concerns such aspects of terrestrial ecosystems as microclimate, soil chemistry, soil fauna, hydrologic cycles, ecogenetics, and productivity. Aquatic ecology, called limnology, is limited to freshwater stream ecology and lake ecology. The former concerns life in flowing waters; the latter, life in relatively still water. Marine ecology deals with life in the open sea and in estuaries.

The study of the geographic distribution of plants and animals is ecological plant and animal geography. The study of population growth, mortality, natality, competition, and predator-prey relations is population ecology. The study of the genetics and ecology of local races and distinct species is ecological genetics. The study of the behavioral responses of animals to their environment, and of social interactions as they affect population dynamics, is behavioral ecology. Investigations of interactions between the physical environment and the organism fall under ecoclimatology and physiological ecology. The study of groups of organisms is community ecology (though it is difficult to separate it from studies of bioenergetics, biogeochemical cycles, and trophic-dynamic aspects of the community or ecosystem ecology). That part of ecosystem ecology concerned with the analysis and understanding of the structure and function of ecosystems

by the use of applied mathematics, mathematical models, and computer programs is systems ecology.

Ex. 5. Using the information from the text, ex. 3 and ex. 4 get ready to speak on the topic "The subject of ecology and the areas of its study".

TEXT C

Task. **Read the text and say why only a very small part of the earth's surface is suitable for human beings. Explain why water and air pollution is a real menace for mankind. Give your arguments.**

The state of the global environment

Man can only live in comfort on a very small part of the earth's surface, about 70 per cent of which is water, and much of the land is too hot, too cold, too barren, too swampy or too high for human beings. In that small part where he can live comfortably, man has been very careless in looking after his heritage. Our modern lifestyle is destroying the fragile environment.

At last, however, man has begun to wake up to the consequences of his actions and started to take steps to prevent things getting out of hand. There are many examples of what has happened already to make people realize that something must be done.

Water Pollution

Because of poisonous waste from industry and untreated sewage being allowed to enter rivers, many rivers in different parts of the world are now dead through lack of oxygen in the water and no longer have any fish life. A third of all British rivers are in this condition. Lakes have been similarly affected: in Switzerland Lake Zurich is dead and so are many other Swiss lakes. In northern Italy nearly all the lakes are dead and in the USA Lake Erie is dying.

A growing pollution menace is that from oil escaping from damaged oil tankers. It is alarming to think that there are about 3500 oil tankers on the world's seas.

The importance of our oceans in the life process should never be forgotten: 70 per cent of our oxygen comes from the seas through the actions of tiny one-celled plants called diatoms and they cannot function in polluted water. Contaminating the oceans and seas is endangering the world's oxygen supplies.

Sewage and agricultural nitrate fertilizers are responsible for the blooms of algae, called red tides, now becoming more common. These deplete the water

of oxygen, producing what are known as `dead zones`; one such zone, of 4000km², has been found in the Gulf of Mexico, near the mouth of the Mississippi.

Many countries have joined together to improve the management of the 214 river basins that are shared by more than one country. These schemes are already improving water quality and management of the North American Great Lakes and of the European Rhine.

The UN Global Environment Monitoring System (GEMS), which is coordinated by UNEP, now includes 344 water-monitoring stations in 59 countries.

Air Pollution

Air pollution comes in many forms, but four pollutants are particularly important: the sulphur oxides, emitted mainly by power stations and industry; nitrogen oxides, emitted mainly by vehicles; and soot and dust, known technically as suspended particulate matter (SPM), found everywhere where fuels are burnt.

Some 60 per cent of the pollution is blamed on the exhausts of motor vehicles and a further 30 per cent is caused by industry. The car is an ecological disaster. It is now the world's number one polluter. From the beginning to the end of its life, one car produces an enormous quantity of pollution. The production of one car results in 1,500 kilos of waste, and 75 million metres of polluted air. Cars are partly responsible for the ever-increasing amount of poisonous lead being found in human beings.

In addition to being a health hazard (lung diseases, mentally retarded children and problems with the digestive system) air pollution causes millions of pounds worth o f damage through the corrosion of metal and the decay of stone and brick-work.

Ex. 1. Put the sentences in the logical order.

1. Lakes have been similarly affected.
2. They deplete water of oxygen, producing "dead zones".
3. In Northern Italy nearly all the lakes are dead.
4. Contaminating the oceans, seas and rivers is endangering the world's oxygen supplies.
5. A third of all British rivers have no longer any fish life.
6. Because of poisonous waste from industry and untreated sewage many rivers in the world are now dead through the lack of oxygen.
7. Sewage and agricultural nitrate fertilizers are responsible for the blooms of algae.
8. One such zone has been found near the mouth of the Mississippi.

Ex. 2. Complete the chart below.

The main sources of water pollution.	The main sources of air pollution

Ex. 3. Discuss in groups the problems raised in the text.

TEXT D

Task. **Read the text. Choose the one best alternative to each question following it. Answer all the questions on the basis of what is stated or implied in the text.**

Sustainable development

The state of the environment today has reached a crisis point, which stems largely from humankind's attempts at development – to make our lives more comfortable and more satisfying.

Development includes technological changes (such as the industrial revolution in the 19th century and today's electronic revolution), social changes (such as an increase in the division of labor and the separation of the home from the workplace) and economic changes (such as the change from subsistence farming to cash crops, the increase in taxation by central governments, etc.) All these changes are sometimes called progress.

Most realistic environmentalists today aim for sustainable development – that is, development that does not damage the environment and which, theoretically, could continue indefinitely. Sustainable development requires action on four levels: by individuals, local authorities, national governments and the international community.

What is the most important contribution an individual can make?

We can adopt lifestyles that emit less pollution, use less energy and create less waste. We should walk or bicycle rather than travel by car. We should insulate our houses and become less dependent on electrical labor-saving devices. We should avoid "disposable" paper and plastic products such as tableware handkerchiefs, etc. and we should recycle all our metal, glass and paper waste. As consumers, we should become less dependent on manufactured goods in general, since a high proportion of industrial pollution comes from the manufacture of short-lived consumer goods. We should buy "environmentally friendly" products such as unbleached toilet paper, organically-grown vegetables and unleaded gasoline.

Local authorities can promote sustainable development through better planning of towns and cities. Local authorities should discourage the use of

motor vehicles in towns by prohibiting cars in shopping districts, building public amenities within walking distance of residential areas, and creating bicycle paths instead of more roads. Trees and flowers in public parks make a town more pleasant and also help to counteract the greenhouse effect. Local authorities should provide recycling centers and other collection points for recyclable waste. They should also invest in the technology for disposing of human waste responsibly, rather than simply pouring raw sewage into the sea.

National governments can promote sustainable development through legislation, and through policies in agriculture, energy, transportation and trade.

National governments could impose the carbon tax, which makes individuals and industries pay for the carbon dioxide they produce, a tropical hardwood tax, a "polluter pays" tax.

National agricultural policies should encourage organic farming and discourage the use of fertilizers and pesticides. Central governments should fund more research into renewable energy sources, and stop subsidizing the nuclear power industry. Governments in developed countries should prohibit the export of toxic chemicals, obsolete technology and military weapons to developing countries, and discourage the import of cheap, useless consumer goods.

Many of the most complex problems of the environment today, demand collaboration between countries. The United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, 1992, produced a document known as Agenda 21, which is an international agreement for working toward sustainable development. It covers issues such as population control, food and agricultural policy, waste disposal and financial aid for conservation projects in developing countries.

1. According to the text what is the state of the environment today?
   a) it is under delicately balanced conditions;
   b) it has changed greatly;
   c) it has reached a crisis point;
   d) it has been damaged.

2. The word "stem from" is closest in meaning to:
   a) begin;
   b) originate;
   c) rise
   d) become

3. Which of the following can be inferred from the text about the term "sustainable development"?
   a) it includes technological changes;
   b) development that makes our life comfortable and satisfying;

c) it includes economic changes;
d) the development that does not damage the environment.

4. How many levels of action are required to achieve sustainable development?
a) five;
b) three;
c) four;
d) two.

5. According to this text what do these levels relate to?
a) They relate to the adoption of new lifestyles.
b) They relate to the promotion of passing new laws.
c) They relate to the combined efforts of the human society on the local and global scale.
d) They relate to the prohibition of the production of toxic chemicals.

6. Which of the following does the word combination "environmentally friendly" go with?
a) waste;
b) products;
c) amenities;
d) people.

7. According to the text what is the most important contribution an individual can make?
a) We should walk or travel by bicycle.
b) We should be less dependent on manufactured goods.
c) We should buy "environmentally friendly" products.
d) We should save energy, create less waste and emit less pollution.

Dialogue

Task 1. **Read the dialogue and say who the people talking might be to each other.**

1 – Why don't you begin by telling me something about yourself?
2 – What do you want to know?
1 – The usual – you know – something about your background and experience and anything personal.
2 – Well, I was born in Iowa and went to school there. My father is a chemist, and my mother is a biologist.
1 – Sounds as if you come from a professional family.

2 – That's right. One of my sisters is an ecologist and the other one teaches geography at a university.

1 – And what made you decide to get into geology?

2 – Oh, nothing in particular, I guess, I always liked collecting different stones and minerals and things like that.

1 – Now what about your experience? How long have you been working in this field?

2 – More than five years now.

1 – You've got a degree in mineralogy, haven't you?

2 – Just a Masters degree. After I did my degree, I began to specialize in ecology, dealing with a whole series of environmental issues.

1 – Sounds like an interesting field. By the way, could you explain me one thing? What's the difference between an environmentalist, an ecologist and a conservationist?

2 – Well, a conservationist is really someone who, in my mind, wants to keep things exactly as they are, and, as long as they can keep the world around them in the same familiar shape that they've always known it, then they're happy.

An environmentalist is someone who accepts that there's going to have to be change, but they want that change to be of such a kind that it doesn't destroy the earth's resources, or cause too much pollution, or anything else.

An ecologist is likely to look a lot deeper than that, into the economic and political systems that govern our lives, and to understand that there are going to have to be profound political and economic changes if we're going to preserve the environment.

So it's a sequence, if you like, or a hierarchy of depth, in terms of the extent to which one looks at the root causes of what's going wrong. And think that the ecological movement, or the green movement, as I call it, is more radical, because it goes right to the root of what's going wrong. You can actually be an environmentalist, and get away with thinking that the systems aren't going to change much. It's an illusion, but a lot of people do it.

1 – Oh, thank you very much.

Task 2. **Reproduce the dialogue: a) abridged; b) in the form of a monologue using the following verbs:**

to wonder, to know, to ask, to be interested in, to confirm, to want to know, to explain, to compare, to respond.

REVISION

Ex. 1. Put each of the following words or phrases in its correct place below.

sewage	enlightened	pesticides	sustainable
organic	acid rain	ecological	deforestation
disposal	herbicides	extinction	animal rights

The Environment

When industrialization began, little thought was given to its (a) … effects. Raw, untreated (b) … was allowed to pollute our seas and rivers. Animals were killed for profit to the point of (c) …. The loss of trees through uncontrolled (d) … caused erosion and unstable climate, (e) … was caused by the poisonous gases man sent into the atmosphere. Chemicals in (f) … killed animal life, (g) … destroyed plants. The balance of nature was disturbed.

It is only now that we are waking up to the problem. More natural, (h) … farming is advocated. Legislation controls the (i) … of waste products into our air and water. Wildlife organizations are becoming more militant in their fight for (j) … . Replanting policies in some parts of the world mean that our forests should in future be (k) … .

We can only hope that growing public awareness and (l) … legislation will produce a world which is safe for us and will provide a good quality of life for future generations.

Ex. 2. Transform the following sentences. Follow the model.

Model: The activities of living organisms influence the biosphere. <u>It is</u> the activities of living organisms <u>that</u> influence the biosphere.

1. Air pollution knows no boundaries.
2. Lead is among the most serious of all the pollutants.
3. The stability of a population as a system is achieved through continuous renewal of its elements.
4. The trees were the major source of food, fuel and shelter for man.
5. The activities of man literally changed the face of the earth.
6. The ancient Romans built their famous aqueducts to take the waste out of the city centre.
7. Smoke from plants, houses and the exhaust fumes from cars cause the pollution of the air.
8. Powerful technology multiplies destructive impact on the environment.
9. Poor sewage disposal has always caused diseases.

10. The shortage of clean water is one of the most urgent problems in the world today.
11. German zoologist E. Haeckel applied the term “oekologie” to the relation of the animal both to its organic and inorganic environment.

Ex. 3. Translate the text into Russian (in writing).

Air pollution

It is during the past 30 years or so that the people of the United States have begun to understand that air is a resource. It is the resource that can be managed for health and environmental quality.

Management of our air means gaining control over industrial emissions and the emissions from individual sources, such as cars, trucks, and temporary sources such as construction projects.

Pollution of the air by certain industrial processes, particularly by burning of coal, has been a concern for many years. However, it was not until thousands died because of air pollution, in such cities as London in the 1950s, that the first steps were taken to reduce the poisons that were routinely being emitted into the air we breathe.

Two major sources of harmful emissions became the targets for initial action: utilities and industries, and motor vehicles. Steps were first taken to clean up smokestack emissions around power plants and industrial complexes. Attention was then focused on the sulfur oxides emitted from utility, commercial, and industrial stacks. At the same time devices were developed to cut back on emissions from motor vehicles.

It took years and money, but progress was made during the 1960s and 1970s. The air is generally cleaner today than it was 20 years ago in much of the Nation.

Air quality management is a complex undertaking. It is complicated by the nature of air, and by the gases that are commonly considered its basic components. It is further complicated by the continual chemical changes that take place in the air as it moves from one location to another and by atmospheric forces. These changes can be beneficial, harmful, or of little or no consequence to the environment.

It is because of the potential health hazards associated with air pollution in large urban centers that special understanding of city air pollution is needed. This is especially true in the regions where large cities often occupy low-lying areas, and where long periods of air stagnation are common during the summer months. Sources of pollution are more abundant in major cities than in small towns or rural areas.

Ex. 4. Read the following newspaper article. Think what title can be given to it so as to draw the reader's attention. Discuss the main problem raised in it.

We are running out of space in which to discard our garbage, and our current methods of disposing of it are endangering the environment. One solution to this problem is recycling.

Recycling is the process of collecting used materials and remanufacturing them into new products instead of throwing them away. This process is important because it reduces the trash in overcrowded landfills, salvages materials that we can use to make new products, and saves our natural resources.

Used products may be converted or reutilized in a number of ways. Paper is reprocessed into new sheets, glass is cleaned and remolded, and plastic is melted and formed into new products such as carpet backing, fence posts, and drainage pipes.

Recycling is being done worldwide. Japan recycles 95 % of its bottles and 50 % of its aluminum; the United States recycles only 20 % of its bottles and 38 % of its aluminum. In Germany a new law requires product manufacturers to create ways of reusing their packaging material.

Helping to solve the garbage crisis is something everyone can do if they just remember the three Rs: "*reduce, reuse,* and *recycle*."

Ex. 5. Ask each other for an explanation of the following terms.

a) biosphere
b) biotic
c) ecology
d) environment
e) pollution

Ex. 6. Translate into English.

Понятие «биосфера»

Термин «биосфера» в научную литературу введен в 1875 году австрийским ученым-геологом Эдуардом Зюссом. К биосфере он отнес все то пространство атмосферы, гидросферы и литосферы, где встречаются живые организмы. Большинство процессов, которые меняли в ходе времени лик нашей планеты, рассматривались как чисто физические, химические или физико-химические явления (растворение, осаждение, выветривание, размыв и т. д.).

В 20-х годах XX столетия Владимир Иванович Вернадский использовал термин «биосфера» и создал науку с аналогичным названием. Его учение о биосфере произвело переворот во взглядах на глобальные природные явления, причины явлений, их эволюцию. Вернадский впервые создал учение о геологической роли живых организмов, показав, что деятельность живых существ является главным фактором преобразования земной

коры. Биосфера, по мнению ученого, состоит из семи взаимосвязанных веществ: живого, биогенного, косного, биокосного, радиоактивного, космического, рассеянных атомов. Везде в ее пределах встречаются либо само живое вещество, либо следы его биохимической деятельности. Всю совокупность организмов на планете Вернадский назвал живым веществом, характеризующимся суммарной массой, химическим составом и энергией.

В пределах биосферы практически каждый химический элемент проходит через цепочку живых организмов, включается в систему биохимических превращений. Так, весь кислород планеты – продукт фотосинтеза – обновляется через каждые 2000 лет, а все углекислоты – через 300 лет.

Таким образом, современная биосфера является итогом длительного исторического развития всего органического мира в его взаимодействии с неживой природой. В процессе этого развития в биосфере возникла сложная сеть взаимосвязанных процессов и явлений.

Благодаря взаимодействию абиотических и биотических факторов биосфера находится в постоянном движении и развитии. В результате техногенной деятельности человечества биосфера Земли коренным образом преобразуется и становится, по определению Вернадского, ноосферой – «сферой разума».

Additional reading

Ecology. Historical background

Ecology had no firm beginnings. It evolved from the natural history of the Greeks, particularly Theophrastus, a friend and associate of Aristotle. He first described the interrelationships between organisms and between organisms and their nonliving environment. Later foundations for modern ecology were laid in the early work of plant and animal physiologists.

In the early and mid-1900s two groups of botanists, one in Europe and the other in America, studied plant communities from two different points of view. The European botanists concerned themselves with the study of the composition, structure, and distribution of plant communities. The American botanists studied the development of plant communities, or succession. Both plant and animal ecology developed separately until American biologists emphasized the interrelation of both plant and animal communities as a biotic whole.

During the same period interest in population dynamics developed. The study of population dynamics received special impetus in the early 19th century, after Thomas Malthus called attention to the conflict between expanding populations and the capability of the earth to supply food. R. Pearl (1920), A. J. Lotka (1925), and V. Volterra (1926) developed mathematical foundations

for the study of populations, and these studies led to experiments on the interaction of predators and prey, competitive relationships between species, and the regulation of populations.

While some ecologists were studying the dynamics of communities and populations, others were concerned with energy-budgets. In 1920, August Thienemann, a German freshwater biologist, introduced the concept of trophic, or feeding, levels, by which the energy of food is transferred through a series of organisms, from green plants (the producers) up to several levels of animals (the consumers). An English animal ecologist, C. E. Elton (1927), further developed this approach with the concept of ecological niches and pyramids of numbers. Two American freshwater biologists, E. Birge and C. Juday, in the 1930s, in measuring the energy budgets of lakes, developed the idea of primary production, i.e., the rate at which food energy is generated, or fixed, by photosynthesis. Modern ecology came of age in 1942 with the development, by R. L. Lindeman of the United States, of the trophic-dynamic concept of ecology, which details the flow of energy through the ecosystem.

The study of both energy flow and nutrient cycling was stimulated by the development of new techniques – radioisotopes, microcalorimetry, computer science, and applied mathematics-that enabled ecologists to label, trace, and measure the movement of particular nutrients and energy through the ecosystems. These modern methods encouraged a new stage in the development of ecology-systems ecology, which is concerned with the structure and function of ecosystems.

Ecosystems function by maintaining a flow of energy and a cycling of materials through a series of steps of eating and being eaten, of utilization and conversion, called the food chain. Ecosystems tend toward maturity, or stability, and in doing so they pass from a less complex to a more complex state. This directional change is called succession. Whenever an ecosystem is used, and that exploitation is maintained – as when a pond is kept clear of encroaching plants or a woodland is grazed by domestic cattle – the maturity of the ecosystem is effectively postponed. The major functional unit of the ecosystem is the population. It occupies a certain functional niche, related to its role in energy flow and nutrient cycling. Both the environment and the amount of energy fixation in any given ecosystem are limited. When a population reaches the limits imposed by the ecosystem, its numbers must stabilize or, failing this, decline from disease, starvation, strife, low reproduction, or other behavioral and physiological reactions. Changes and fluctuations in the environment represent selective pressure upon the population to which it must adjust. The ecosystem has historical aspects: the present is related to the past and the future to the present. Thus the ecosystem is the one concept that unifies plant and animal ecology, population dynamics, behaviour, and evolution.

Methods in ecology

Ecological measurements probably never will be as precise or as subject to the same ease of analysis as measurements in physics, chemistry, or certain quantifiable areas of biology.

In spite of these problems, various aspects of the environment can be determined by physical and chemical means, ranging from simple chemical identifications and physical measurements to the use of sophisticated mechanical apparatus. The development of biostatistics and proper experimental design, and the improvements in methods of sampling, permit a quantified statistical approach to the study of ecology. Because of the extreme difficulties of controlling environmental variables in the field, studies involving the use of experimental design are largely confined to the laboratory and to controlled field experiments designed to test the effects of only one variable or several variables. The use of statistical procedures, and the application of computer science to mathematical models based on data obtained from the field, are providing new insights into population interactions and ecosystem function. Mathematical programming is becoming increasingly important in applied ecology, especially in the management of natural resources and agricultural problems having an ecological basis.

Controlled environmental chambers enable experimenters to maintain plants and animals under known conditions of light, temperature, humidity, and daylength so that the effects of each variable (or combination of variables) on the organism can be studied. Biotelemetry and other electronic tracking equipment, products of the space age, permit the rapid and nondestructive sampling of plant and animal populations. Such tools enable ecologists to follow from a distance the movements and behaviour of a free-ranging animal by radio signals beamed from a sender attached to the organism. Radioisotopes are used for tracing the pathways of nutrients through ecosystems, for determining the time and extent of transfer of energy and nutrients through the different components of the ecosystem, and for the determination of food chains. The use of laboratory microcosms – aquatic and soil micro-ecosystems, consisting of biotic and nonbiotic material from natural ecosystems, held under conditions similar to those found in the field – are useful in determining rates of nutrient cycling, ecosystem development, and other functional aspects of ecosystems. Microcosms enable the ecologist to duplicate experiments and to perform experimental manipulation on them.

Unit II

ECOLOGICAL PROBLEMS OF ATMOSPHERE

READING MATERIAL

TEXT A

Task

a) Before reading the text try to discuss the following questions:

- What is ozone layer depletion?
- What are the causes of greenhouse effect?

b) Now read the text, translate it and get ready to do the exercises after the text.

The ozone layer and the greenhouse effect

The atmosphere is the layer of gas that surrounds the earth. The composition of the atmosphere changes with the distance from the earth's surface. The layer near the surface – the troposphere – contains the air we breathe, which is 78 percent nitrogen (N2), 21 percent oxygen (O2), 0.03 percent carbon dioxide (CO2), and 1 percent inert gases such as argon. Water vapor, small particles of dust, and tiny quantities of other gases such as helium, ozone (O3), nitrous oxide (N2O), and methane (CH4), are also present. The stratosphere contains thin, cold air with less oxygen and no dust or water vapor. The ionosphere contains very thin air and electrically charged particles which reflect electromagnetic waves.

The lower part of the stratosphere contains a band of warm gas called the ozone layer (between 15 and 40 kilometers above sea level). Ozone absorbs very shortwave ultraviolet radiation – that is, the harmful, burning rays from the sun. These rays kill plants and cause burns, skin cancer, and cataracts in animals and man. The ozone layer protects us from these damaging effects. The man-made chemicals chlorofluorocarbons (CFCs) break up ozone molecules. CFCs occur in some aerosols (such as deodorants, hair sprays and cleaning fluids), expanded polystyrene (such as fast-food packaging) and the cooling mechanism of refrigerators. Most scientists now accept that CFCs are very bad for the environment. They have already caused a large hole in the ozone layer. CFCs also contribute to the greenhouse effect. Some environmentalists argue that governments should ban all production of CFCs immediately to prevent an irreversible environmental crisis.

An increase in the greenhouse effect may lead to global warming, with disastrous consequences.

The higher average temperatures produced by global warming could cause dramatic changes in the weather. Less rain might fall over large land masses. Central Africa, south Asia and some parts of the United States could risk severe drought and famine. More rain might fall in coastal areas and over the oceans; there might be more storms and hurricanes in the Pacific. A rise in the earth's average temperature of only one or two degrees would probably melt large expanses of ice in the Arctic and the Antarctic (the polar ice caps) and raise sea levels. Sea levels throughout the world are already rising by about two millimeters a year. If the polar ice caps melt, sea levels could rise by more than a meter over a few decades. Many heavily populated regions, such as Bangladesh, the Nile delta, the Netherlands and Indonesia, would be permanently flooded. Cities are often found on the coast where a river meets the sea, so many of the world's major population centers could become uninhabitable. About one billion people would lose their homes and become environmental refugees. Some islands, such as the Maldives in the Pacific, might disappear completely.

Carbon dioxide accounts for 55 percent of the greenhouse effect; CFCs account for 17 percent; methane for 15 percent and nitrous oxide for 5 percent. Carbon dioxide occurs naturally in the atmosphere. It is produced when animals and plants respire. But "natural" carbon dioxide forms only 0.03 percent of the atmosphere. Carbon dioxide is also produced when living things burn, so it is a by-product of industrial processes which use fossil fuels (coal, gas or oil), and motor vehicles which burn gasoline or diesel fuel. It is also produced when volcanoes erupt and when tropical rainforests are cleared by burning. Methane is also a "natural" gas, produced when living things decompose in the absence of oxygen. Methane in the atmosphere comes from rotting vegetation, particularly rice fields, and from cattle. It also comes from leaks in the extraction of natural gas. Methane in the atmosphere breaks down relatively quickly (in about 10 years, compared to over 100 years for carbon dioxide and CFCs), so it is a relatively minor environmental problem. However, some scientists believe that huge quantities of methane are trapped within the polar ice caps and will be released suddenly if the polar ice caps melt. This phenomenon would accelerate global warming. Nitrous oxide in the atmosphere comes from bacteria beneath the earth's surface, which convert nitrates in the soil to the gases nitrogen and nitrous oxide. The increased use of artificial fertilizers in recent years has increased the production of nitrous oxide. Levels of nitrous oxide in the air will continue to increase for many years, because there is already a large reservoir of artificial nitrates within the soil.

How can we stop the greenhouse effect from getting worse? The most important way is to reduce the emission of carbon dioxide by industry and motor vehicles.

We cannot see, hear, taste or smell the earth's atmosphere, but it provides vital oxygen, protects us from damaging solar radiation and stabilizes the earth's

climate. Pollution has already caused a large hole in the ozone layer and increased global warming. Some people do not believe that CFCs are harmful. They are ignoring the scientific evidence. Some people argue that the phenomenon of global warming has not yet been proven beyond doubt. It is difficult to prove that average temperatures throughout the world are half a degree higher than they were 50 years ago. But it is surely sensible to try to reduce emissions of greenhouse gases today, rather than wait for another 10 or 15 years until the phenomenon of global warming is absolutely certain. Reducing CFC production and greenhouse gas emission will cost money and compromise our comfortable lifestyle. But if we do not take action to protect the earth's atmosphere, it will soon become unable to protect us.

Word Study

Ex. 1. a) Read the following correctly Mind the stress.

nitrogen	carbon dioxide
oxygen	nitrous oxide
argon	chlorofluorocarbons
helium	sulphur dioxide
ozone	noxious gases
methane	carbon monoxide
nitrate	sulphurous gas

b) Read the chemical formulae according to the model:

Na CL [ˌen eɪ sɪ `el]

Cl; N_2; O_2; CO_2; O_3; N_2O; CH_4; $2H_2+O_2=2H_2O$

c) Read the decimal fractions according to the model:

0.125 (nought / zero) point one two five

0.25; 0.33; 0.03; 0.849

Ex. 2. These nouns are formed with the suffix –ion. Complete the chart with the original verbs. There is an example at the beginning.

Noun	Verb	Noun	Verb
pollution respiration acceleration emission decomposition contribution reflection respiration	pollute	absorption reduction abolition variation extraction production depletion eruption conservation	

Ex. 3. Match English phrases with their Russian equivalents.

1) thin air	a) полярные ледники
2) absorb ultraviolet radiation	b) выше на полградуса
3) chlorofluorocarbons	c) побочные продукты производства
4) contribute to the greenhouse effect	
5) irreversible environmental crisis	d) поглощать ультрафиолетовое излучение
6) disastrous consequences	
7) polar ice caps	e) искусственные удобрения
8) meet the sea	f) хлорофторуглероды
9) environmental refugee	g) ископаемое топливо
10) fossil fuel	h) сжатый воздух
11) half a degree higher	i) способствовать увеличению теплового эффекта
12) break down	
13) accelerate global warming	j) впадать в море
14) artificial fertilizers	k) разлагаться
15) by-product of industry	l) «экологические» беженцы
	m) катастрофические последствия
	n) ускорять глобальное потепление
	o) необратимая экологическая катастрофа

Ex. 4. Match the verbs with their appropriate explanations.

1. to emit	a. to separate into parts, decay
2. to absorb	b. to cover with a great quantity of water in a place that is usually dry
3. to release	c. to give off a gas
4. to occur	d. throw back light, f. e. that of the sun
5. to reflect	e. to take smth. in, f. e. heat, light
6. to flood	f. to exist, be found
7. to reduce	g. to make less, make smaller in size, number, degree, etc.
8. to decompose	h. to allow to go, set free, unfasten
9. to respire	i. to come to pieces, disintegrate
10. to break up	j. to keep safe from danger, guard
11. to protect	k. to breathe in and out
12. to accelerate	l. to increase the speed of

Ex. 5. Complete the collocates below by adding an appropriate noun. Some can combine with more than one noun.

Example: environmental effect (*changes, disaster, pollution, resources*).

warming, changes, rays, effect, disaster, consequences, energy, pollution, famine, fumes, fuels, layer, gases

1. global …
2. ozone …
3. nuclear …
4. natural …
5. air …
6. exhaust …
7. solar …
8. greenhouse …
9. fossil …
10. recycled …
11. harmful …
12. damaging …
13. disastrous …
14. dramatic …
15. severe …

Ex. 6. Pair the verbs in column A with a suitable phrase in column B. You must find a match for every word but there is not necessarily only one correct solution!

A	B
absorb	global warming
accelerate	in the absence of oxygen
break up	shortwave ultraviolet radiation
cause	waves
compromise	an irreversible environmental crisis
contain	disastrous consequences
contribute	burns, skin cancer
decompose	us from damaging effects
prevent	ozone molecules
protect	the greenhouse effect
reduce	the earth
reflect	severe drought and famine
risk	emissions of greenhouse gases
lead to	our life
surround	electrically charged particles

Ex. 7. Study the table below and write the plural of the following nouns.

crisis – crises phenomenon – phenomena bacterium – bacteria formula – formulae nucleus – nuclei

1. datum
2. antenna
3. analysis
4. medium
5. genius
6. basis
7. millennium
8. hypothesis
9. alga
10. criterion

Ex. 8. Write out the equivalents in pairs.

prevent	catastrophe
toxic	damaging
harmful	give off
artificial	stop
vehicle	means of transport
absorb	cut
emit	man-made
decompose	take in
reduce	bring about
cause	poisonous
crisis	break down

Ex. 9. Choose the best alternative to complete the following sentences.

1. Man-made contributions to the greenhouse effect can (rise / raise) average temperatures between 2 ^{o}F and 8 ^{o}F by the year 2050.
2. A direct release air pollutant is one that is emitted directly from a given source, such as the carbon monoxide or sulphur dioxide, all of which are (byproducts / emissions) of combustion.
3. Experience shows that environmental pollution also (leads / contributes) to immense economic losses.
4. The most promising way to solve the problem of clean air is to improve technology: (release / reduce) emissions into the atmosphere and make maximum use of waste.
5. The problem of radioactive pollution of the atmosphere (raised / arose) in 1945 after the atomic bombs were dropped on Hiroshima and Nagasaki.

6. There are more than 300 million motor (means / vehicles) in the world today. The automobile is a convenient (means / vehicle) of transport, but it has a negative (influence / affect) on the environment.
7. Temperature records show that, over the past 100 years, global mean temperature (has raised / risen) by 0.3–0.6 °C.
8. The main sources of these pollutants include (artificial / natural) air pollution from forest and grassland fires as well as (man-made / natural) emission from fossil-fuel burning.
9. Greenhouse gases in the atmosphere (trap / release) some of the solar radiation, maintaining the planet at temperatures that allow life to flourish.

Ex. 10. Fill in the gaps with any appropriate preposition.

1. Natural sources contribute … the depletion of the ozone layer, but not as much as human activity. Natural sources account … approximately 15–20 % of ozone damage.
2. The most important gas which leads … acidification is sulphur dioxide.
3. There is no direct observational evidence linking ozone depletion … higher incidence of skin cancer … human beings.
4. Ozone concentrations … the lower stratosphere over Antarctica will increase … 5–10 % by 2020.
5. Air pollution is a major environmental health problem affecting … the developing and the developed countries alike.
6. The ionosphere protects the biosphere … the harmful effect of cosmic radiation and influences … the reflection and absorption of radio waves.
7. Twelve European countries have agreed to reduce nitrogen oxide emissions … 30 % … 2010.

Ex. 11. How are these ideas expressed in the text?

1. Pollution being released or discharged into the air from natural or man-made sources. Pollutants may be released directly into the air from a structural device (i. e., chimney, exhaust pipe, smokestack) or indirectly (i. e., aerosol spraying).
2. Principal greenhouse gas emitted as a result of human activity (i. e., burning of fossil fuels).
3. Chemicals used in great quantities in industry, for refrigeration and air conditioning, and in consume products. In the stratosphere, they take part in chemical reactions that result in reduction of the ozone layer.
4. Continuous period of dry weather causing distress.
5. Extreme scarcity of food in a certain region.
6. Violent windstorm.

7. Material for producing heat or other forms of energy, e. g. wood, coal, oil, uranium.
8. Building with sides and roof of glass, used for growing plants that need protection from the weather.

Ex. 12. Choose someone to act as a President of the National Center for Atmospheric Research and answer the visitors' questions.

What (is / are)	the role of the atmosphere
Could you explain to me	the components of the atmosphere
Can you tell me about	the ozone layer depletion
What do you mean by	the causes of the ozone hole
Why	CFC_s
Where (do / does)	the greenhouse effect (causes and consequences)
	global warming and its disastrous consequences
	environmental refugees
	the carbon dioxide come from

Ex. 13. Speak on:

1. <u>The composition of the atmosphere:</u>

To surround the earth, to be divided into, a layer, to contain, to be present, electrically charged particles, to reflect waves.

2. <u>The ozone layer depletion:</u>

To absorb UV radiation, to cause burns, damaging effects, CFC_s, to contribute to the greenhouse effect, to occur in, to prevent an irreversible environmental crisis.

3. <u>The greenhouse effect:</u>

To account for, carbon dioxide, methane, nitrous oxide, to occur naturally, to be produced, to burn fossil fuels, decompose, leaks in the extraction, to come from, artificial fertilizers.

4. <u>The ways to prevent greenhouse effect:</u>

To reduce the emission, CFC_s, to cause a large hole, the use of fertilizers, carbon dioxide.

Comprehension and Discussion

Ex. 1. Say whether the following statements are true or false.

1. The air we breathe consists mainly of oxygen.
2. The air is thinner in the ionosphere than in the stratosphere.
3. Chlorofluorocarbons are the main factor in the greenhouse effect.
4. By breaking up ozone molecules, chlorofluorocarbons have caused a hole in the ozone layer.

5. Thirty countries have decided to phase out chlorofluorocarbons completely.
6. Nowadays there are fewer products containing chlorofluorocarbons.
7. Without the greenhouse effect the climate on the earth would be much colder.
8. The sun's energy reaches the earth as infra-red radiation.
9. Because of global warming there is now a risk of drought and famine in parts of Africa and Asia.
10. If there is a rise in temperature of one or two degrees, the sea level will rise about 2 millimeters a year.

Ex. 2. Summary Writing. The following paragraph describes the greenhouse effect but the verbs have been omitted. Rewrite the paragraph, putting the verbs in the correct form. You may have to use a verb more than once. The verbs you can use are: *to know, to reflect, to absorb, to arrive, to conserve, to occur, to be, to freeze, to transmit.*

The Greenhouse Effect

Another environmental problem is the greenhouse effect. Some gases … shortwave radiation but not longwave radiation. The sun's energy … as short-wave radiation; some of this … away in the clouds and upper atmosphere and some … into the ground. About 5 percent of the energy … off the earth's surface as longwave radiation. Certain gases in the upper troposphere—especially carbon dioxide, methane and CFCs – … this longwave radiation back to the earth. The glass in a greenhouse … heat by the same principle, so these gases … as "greenhouse gases". The greenhouse effect … very important; if it did not … at all, the temperature of the planet … 40 degrees lower and the oceans … .

Ex. 3. In a small group discuss the current problems associated with the ozone layer and the greenhouse effect and make notes of your main points. Then compare your notes with the points made by the author.

TEXT B

Task. **Read the text and discuss the main causes of air pollution.**

Air pollution

In the past, air pollution in industrialized countries caused a visible haze called smog. Smog is a mixture of different pollutants and water vapor in still, cold air. It occurs in unusual weather conditions when there is temperature inversion – that is, a layer of cold air close to the ground with a layer of warmer

air above it. In normal weather conditions, air near the ground is warmer than air higher up; warm air rises and the air circulates. With temperature inversion, the air does not circulate so pollutants become trapped close to the ground. When these pollutants combine with fog, they form a visible suspension in the air; this is known as smog. The main sources of sulphur dioxide and soot are fossil fuels, particularly coal. Oil, natural gas and hard, black coal produce much less sulphur dioxide than soft, brown coal. Sulphur dioxide is, incidentally, also emitted from volcanoes when they erupt; this "natural" sulphur dioxide can cause the same environmental problems as industrial emissions. Fortunately, volcanoes do not erupt very often!

Smog is very bad for health. Water vapor combines with sulphur dioxide to form sulphuric acid and with nitrogen monoxide to form nitric acid. These acids irritate the lungs. In the famous London smog of 1952, about 4,000 people died in two weeks from chest diseases such as bronchitis and pneumonia. In 1956, the British government introduced legislation against air pollution – the Clean Air Act. It became illegal to burn coal or wood in residential areas. People had to use smokeless fuel such as gas or electricity. The Clean Air Act also said that industries must build tall chimneys to release their waste high into the atmosphere. This was a short-sighted policy, because the industries were not required to improve their production processes. Industrial pollution in Britain did not decrease after the Clean Air Act; it was simply released into the upper atmosphere. Air pollution in the upper atmosphere does not cause smog, but it has other harmful effects. Sulphuric and nitric acids are carried long distances with air currents and become acid rain. Acid rain damages crops and forests, destroys aquatic life in lakes and rivers, and ruins buildings. The timber and fishing industries in Sweden have suffered badly because of acid rain originating in British factories and power stations. Trees have died, and lakes that were once full of plants and fish are now devoid of all life. In sandstone or limestone regions, certain chemicals within the rock will reduce the acidity of the water. This is called natural buffering. But if the lake lies on an insoluble or acidic rock such as granite, no natural buffering will occur and the acidity of the water will remain high. Scientists have tried to reduce the acidity of lakes artificially by adding chemicals to the water, but this intended remedy sometimes upsets the ecological balance even further. Acid rain destroys buildings by corroding metal and dissolving stone; some important historical monuments are being washed away by acid rain.

The ozone layer in the upper atmosphere protects us from solar radiation, but ozone at ground level is a major air pollutant. It causes chest disease, particularly asthma, and irritates the eyes and skin. Ozone at ground level comes from motor vehicles. Hydrocarbons and nitrogen oxides in vehicle exhausts combine with one another in sunlight to produce ozone. This photochemical smog is worst in

traffic-congested cities on hot, dry summer days, whereas sulphur-based smog occurs on cold, damp winter days. Photochemical smog is especially common when the vehicle engines are old and poorly maintained, as often occurs in developing countries. The toxic emissions from car exhausts can be reduced considerably by installing catalytic converters on the engines. These devices are now compulsory in new cars in many developed countries, but they are rarely found in developing countries.

Another toxic component of car exhaust fumes is lead**.** Until quite recently, all gasoline contained a lead-based compound which made the gasoline burn more smoothly. Lead is a very poisonous metal. Human beings cannot excrete lead, so it accumulates in the body. Even in tiny concentrations (25 milligrams per liter), it can cause headaches, abdominal pains, miscarriages and general tiredness. Lead is particularly toxic to growing brain cells. Lead pollution from car exhaust probably reduces the intelligence of children who live in crowded cities. Today, more and more cars are made to run on unleaded gasoline.

The air we breathe is no longer clean and pure. "Developments" that have made our lifestyle more comfortable (such as industrialization, urbanization and the use of private cars) all pollute the earth's atmosphere. Reducing air pollution should be a priority in all countries. Industries should invest in environmentally-friendly production methods. We should all use our cars less and buy vehicles that have catalytic converters and run on unleaded gasoline. Governments should legislate to reduce the levels of toxic emissions from cars, power stations, factories and domestic chimneys. Air pollution today is often invisible, but we should not ignore the danger it is causing to our own health, the health of our children and the health of the planet.

Ex. 1. Summary writing. The following paragraph summarizes the causes of air pollution. Put one word only in each of the blank spaces to complete the paragraph.

The main causes of air pollution

A number of factors contribute to … pollution. In particular the burning of brown … gives off sulphur dioxide and soot … in certain weather conditions can cause …. In addition, industrial waste released high the atmosphere can produce sulphuric and … acid, which are carried a long … and cause acid rain. At ground … there is also the problem of … exhausts producing ozone and giving off … .

Ex. 2. Here are the answers to some questions on the text. What are the questions?

1. Smog occurs in unusual weather conditions when there is temperature inversion. (What conditions?)

2. The main sources of sulphur dioxide and soot are fossil fuels. (What?)
3. In 1956 the British government introduced legislation against air pollution. (When?)
4. According to the Clean Air Act industries must build tall chimneys to release their waste high into the atmosphere. (Why?)
5. Acid rain damages crops and forests, destroys aquatic life in lakes and rivers, and ruins buildings. (What?)
6. In sandstone or limestone regions, certain chemicals within the rocks reduce the acidity of the water, causing what is called natural buffering. (What process?)
7. The ozone layer in the upper atmosphere protects us from solar radiation. (Disjunctive)
8. Ozone at ground level comes from motor vehicles. (Where … from?)
9. The toxic emissions from car exhausts can be reduced considerably by installing catalytic converters on the engines. (How?)
10. Another toxic component of car exhaust fumes is lead. (What?)
11. The air we breathe is no longer clean and pure. (Why?)
12. Air pollution today is often invisible. (General)

Ex. 3. Complete the sentences.

1. When the pollutants combine with fog, they …….
2. Sulphur dioxide is also emitted from …….
3. Sulphuric and nitric acids irritate …….
4. The Clean Air Act said …….
5. Acid rain damages …….
6. Trees have died and lakes are …….
7. Ozone at ground level is …….
8. Photochemical smog is worst in …….
9. The toxic emissions from car exhausts can be reduced by …….
10. The air we breathe is …….
11. Industries should invest in …….

Ex. 4. Divide the text into logical parts. Write down the key words to each passage.

Ex. 5. Discuss the following.

1. What is smog.
2. The Clean Air Act.
3. Acid rain.
4. The air we breathe.

TEXT C

Task. **Read the text and say what the main problem with air pollution consist in. Explain how people try to curb air pollution.**

Air Pollution and Acid Rains

A major problem with air pollution is that it does not obey national boundaries. The planet's wind cycles and currents can carry pollution hundreds of miles away from its original source. So Britain is a large contributor to air pollution in Sweden and creates more for Norway than Norway does itself. The pollutants[1] of the USA end up on the eastern coast of Canada.

Acid rain emerged as a concern in the 1960s with observations of dying lakes and forest damage in Northern Europe, the United States and Canada. It was one of the first environmental issues to demonstrate how the chief pollutants – oxides of sulphur and nitrogen – can be carried hundreds of miles by winds before being washed out of the atmosphere in rain, snow and fog.

As evidence grew of the links between air pollution and environmental damage, legislation to curb[2] emissions was put in place. The 1979 Geneva Convention on Long-Range Transboundary Air Pollution set targets for reduction of sulphur and nitrogen emissions in Europe that have largely been achieved. The 1970 and 1990 Clean Air Acts have led to similar improvements in the USA.

Many nations have adopted air quality standards to safeguard the public against the most common pollutants. These include sulphur dioxide[3], carbon monoxide, suspended particulate matter[4], ground-level ozone, nitrogen dioxide and lead – all of which are tied directly or indirectly to the combustion[5] of fossil fuels. Substantial investments in pollution control have lowered the levels of these pollutants in many cities of some developed countries. But poor air quality is still a major concern throughout the industrialised world.

Meanwhile, urban air pollution has worsened in most large cities in the developing world, a situation driven by population growth, industrialisation arid increased vehicle use. Despite pollution control effects, air quality has approached the dangerous levels, recorded in London in the 1950s, in such megacities as Delhi, Jakarta and Mexico City.

In some parts of Asia, such as Southeast China, Northeast India, Thailand and the Republic of Korea, and in the Pacific region acid rain is now emerging as a major problem. In the Asia region the use of sulphur-containing coal and oil is very high. In 1990 34 million metric tonnes of sulphur dioxide were emitted there, which is over 40 per cent more, than in North America. The effects are already being felt in the agriculture. In India wheat growing near a power plant suffered a 49-per cent reduction in yield. Other ecosystems are also beginning to suffer. Pines and oaks in acid rain-affected areas of the Republic of Korea showed significant declines in growth rates since 1970.

Many countries in the world are trying to solve the problem of air pollution in various ways, either by trying to burn fossil fuels[6] more cleanly or by fitting catalytic converters to their cars, so fewer poisonous gases are produced. In some countries, like Sweden for example, new power plants use a method called fluidised bed combustion, which cuts sulphur emission down by 80 per cent. In Germany sulphurous smoke is sprayed with lime to produce gypsum, which is then used for building roads. Developing technologies like this may raise the price of electricity a little, but will save millions of trees plants and animals and human health.

Notes

[1] pollutant (n) – загрязняющее вещество; Syn. contaminant
[2] curb (v) – сдерживать, обуздывать
[3] sulphur dioxide – двуокись серы
[4] suspended particulate matter – взвешенные в воздухе частицы
[5] combustion (n) – сгорание
[6] fossil fuel – ископаемое топливо

Ex. 1. Put the following sentences in the logical order.

1. It is carried hundreds of miles away from its original source.
2. These include sulphur dioxide, carbon monoxide, suspended particulate matter, ground-level ozone, nitrogen dioxide and lead.
3. Air pollution does not obey national boundaries.
4. It is exactly for this reason that many countries in the world are trying to solve the problem of air pollution in various ways.
5. Poor air quality is still a major concern in the industrialised world.
6. There are links between air pollution and environmental damage.
7. In this connection many nations have adopted air quality standards as regards the most common pollutants.
8. That's why legislation to curb emissions was put in place (the 1970 and 1990 Clean Air Acts, the 1979 Geneva Convention on Long-Range Trans-boundary Air Pollution).

Ex. 2. Fill in the table below showing the consequences of air pollution on the global scale, measures taken to combat air pollution and the countries involved in this process.

Pars of the world	Countries-contributors to air pollution	Countries / cities affected by air pollution	The main air pollutants and the conse-quences of the pollution	Measures taken to combat air pollution
European continent				

The Pacific region				
The Asia region				

Ex. 3. Discuss in groups the problem raised in the text.

TEXT D

Task. **Read the text. Choose the one best alternative to each question following it. Answer all the questions on the basis of what is stated or implied in the text.**

Atmospheric pollutants

1. Britain was the first nation to coin the term 'acid rain': it was used to describe worrying conditions in Manchester over 100 years ago. Today, Britain is still one of the nations that is most guilty of producing the atmospheric pollutants that cause acid rain. In 1986, Britain alone released 3,760,000 tonnes of sulphur dioxide into the air, which was more than any other western European nation. By the mid-1990s Britain was probably releasing more sulphur dioxide than Germany, France, Switzerland, Sweden, Denmark, Norway, Austria and the Netherlands put together. There is clear evidence that forests and watercourses, not only in Britain but also in other European countries, are badly affected by the acid rain we produce.

2. The introduction of smokeless fuels and the increase of apparently 'green', or environmentally responsible, attitudes within some industries have done little to reduce air pollution. Tall chimney stacks[1] simply spread pollutants more widely and new sources of pollution are constantly being created. It is a frightening fact that as a nation Britain did not plan to cut down significantly on industrial pollution until 1998.

3. With growing awareness of the environment and 'green' issues acid rain and its effects have finally become an internationally important issue and many nations have taken action to combat[2] it. 10 European countries have cut emissions of sulphur from power stations by 30 per cent; 11 more have undertaken to halve emissions and four others have said they will achieve a 65 per cent reduction. Great Britain is not amongst these nations. Japan has gone even further, and has instructed its power plants to reduce their nitrogen oxide emissions by 73 per cent.

4. Transport has also been targeted[3] as a source of pollution that can be curbed[4]. In the USA, where pollution levels are four times higher than in Britain,

devices fitted to cars remove 96 per cent of carbon monoxide and hydrocarbons from the exhaust, plus 75 per cent of the nitrogen oxides produced. The oil industry has also spent $400 million adapting oil refineries to produce unleaded petrol, and now one fifth of all cars can run on cheaper lead-free fuel without any modification.

Notes

[1] stack – дымовая труба
[2] to combat – сражаться, бороться
[3] has been targeted – рассматривается
[4] to curb – обуздывать, сдерживать

1. What does the author say about the term “acid rain”?
   a) Natural resources are badly affected by acid rain.
   b) Acid rain has become an internationally important issue.
   c) Britain was the first nation to coin the term “acid rain”.
   d) Atmospheric pollutants cause acid rain.
2. The word “coin” in paragraph 1 is closest in meaning to
   a) work out
   b) invent
   c) carry out
   d) develop.
3. According to the article, which of the countries is most guilty of producing atmospheric pollutants?
   a) Austria
   b) The Netherlands
   c) Great Britain
   d) Germany.
4. Which of the following is not true about water and forest resources?
   a) They are badly affected by the acid rain.
   b) They release tonnes of sulphur dioxide into the air.
   c) They are badly affected in Britain.
   d) They are also affected in other European countries.
5. The phrase “a frightening fact” in paragraph 2 is closest in meaning to
   a) dreadful fact
   b) dramatic fact
   c) negative aspect
   d) dangerous fact.

6. On what aspect does the author focus in paragraph 3?
   a) the harmful effects of acid rain
   b) the reduction of nitrogen oxide
   c) the international efforts to reduce harmful emissions
   d) the reduction of sulphur emissions.

7. According to the article, what effect has the introduction of smokeless fuels done?
   a) It has cut emissions of sulphur.
   b) It has done little to reduce air pollution.
   c) It has reduced nitrogen oxide.
   d) It has made the air we breathe clean.

8. It can be inferred from the article, that the sources of atmospheric pollution are not only industries but also
   a) chimney stacks
   b) watercourses
   c) environment
   d) transport

9. According to the article, what country has gone further in cutting emissions from power stations?
   a) Great Britain
   b) France
   c) the USA
   d) Japan

10. What conclusion can be drawn from the article?
   a) European countries have cut emissions of sulphur from power plants.
   b) Britain is not among the nations to cut emissions of sulphur from power plants.
   c) Many nations have taken action to combat atmospheric pollution.
   d) Japan has instructed its power plants to reduce their nitrogen oxide emissions.

REVISION

Ex. 1. The following paragraph describes the green house effect but the verbs have been omitted. Rewrite the paragraph, putting the verbs in the correct form (Tense and Voice). You may have to use a verb more than once. The verbs to use are: *to know, to reflect, to absorb, to arrive, to conserve, to occur, to be, to freeze, to transmit.*

The Greenhouse Effect

Another environmental problem is the greenhouse effect. Some gases …… shortwave radiation but not longwave radiation. The sun's energy …… as shortwave radiation; some of this …… away in the clouds and upper atmosphere and some …… into the ground. About 5 percent of the energy …… off the earth's surface as longwave radiation. Certain gases in the upper troposphere – especially carbon dioxide, methane and CFC_s – 6 …… this longwave radiation back to the earth. The glass in a greenhouse …… heat by the same principle, so these gases …… as "greenhouse gases". The greenhouse effect …… very important; if it did not …… at all, the temperature of the planet …… 40° lower and the ocean …… .

Ex. 2. Jumbled Words. Find the words from the Unit with the aid of the definitions.

1. to give off a gas TIME
2. to go down, to fall SEEDACRE
3. bad for you, damaging LURMFAH
4. poisonous COTIX
5. to join, come together BINCOME
6. things which pollute the air NATLOPLUTS
7. what water becomes when heated PARVO
8. another word for old DEERLYL

Ex. 3. Translate the text into Russian (in writing). Give the title to this text.

All rain is slightly acid, but "acid rain" is a term used today to describe three ways in which pollutants may be deposited. Rain and snow may carry acids; dissolved acids may be carried in mists, moistening surfaces with which the mist comes into contact; (possibly the most harmful of all) solid particles carried in dry air may adhere to surfaces.

In the 1960s, Swedish scientists became worried about the high concentration of sulfur in the air in Stockholm and the increasing acidification of lakes and groundwater; in the early 1970s damage to forests in West Germany was attributed to the deposition of acids. Over the following years, acid damage was reported from the northeastern United States, southeastern Canada, Czechoslovakia and other parts of Central Europe, the former Soviet Union and China.

Apart from the corrosion of mainly limestone buildings, common in many industrial cities, acid damage affects trees and lakes. Lake water is often rather acid, especially on peaty upland soils or where seawater sometimes intrudes. Elsewhere, certain substances, most commonly bicarbonate, held in solution in

the water tend to neutralize acids, a process known as "buffering". Many Scandinavian lakes are poorly buffered and so prone to acidification.

Salmon and trout cannot tolerate water that is even slightly acid and their disappearance may be the first sign that water is polluted. If the acidity continues to increase, one by one, the other groups offish disappear, first carps, and eventually the most tolerant of all, pike and eels. Invertebrates, too, disappear, one group at a time, until only a few plants and microorganisms remain.

Aluminum compounds formed under acid conditions may enter the water from surrounding land. They irritate the gills of fish and may kill them directly by asphyxiation; they replace some of the phosphorus nutrient taken up by plants and so kill them; they cause humates, compounds produced by the decomposition of organic material, to precipitate to the lake bed depriving the aquatic ecosystem of essential nutrients.

Ex. 4. Translate into English.

Воздействие человека на атмосферу

Атмосфера – сложная система, состоящая из воздуха, химических примесей и паров воды. Она – важнейший фактор метеорологического режима и условие для протекания физико-химических и биологических процессов в биосфере. Важнейшими свойствами атмосферы является ее способность к быстрому перемешиванию и перемещению на большие расстояния, а также связь с другими сферами и особенно океаном. Эти свойства обеспечивают глобальный характер атмосферных процессов.

Человек оказывает воздействие на различные параметры и свойства атмосферы, ее химический состав, тепловой режим, перемещение, радиоактивность и т.д. Она, как и вода, стала раньше, чем литосфера загрязняться человеком. Именно поэтому первые запретительные меры принимались против загрязнения воздуха и вод. Эти меры касались прежде всего заселенных мест. Так, В Англии еще в XVIII веке были введены ограничения на использование угля в виде топлива в крупных городах, например в Лондоне.

В результате человеческой деятельности в атмосферу попадают сотни веществ, которые становятся загрязнителями либо в результате того, что они чужды для атмосферы, либо по причине изменения концентрации свойственных атмосфере веществ, например CO_2. По объему выбросов химических веществ это соединение занимает первое место. Оно относится к долгоживущим и способно накапливаться в атмосфере.

Additional Reading

The Ozone Layer

At a height of about 10 to 50km, solar radiation with a wavelength between 4 and 400 nanometers, the "ultraviolet" (UV) waveband, provides energy to dissociate oxygen molecules (O_2), some of which re-form as ozone (O_3). The zone is unstable, breaks down, reforms as oxygen, and dissociates again. The effect is to absorb some of the UV radiation, and the ozone itself absorbs more.

The UV radiation that penetrates this layer of ozone reaches the surface. It causes suntans in pale-skinned humans and provides energy for the synthesis of vitamin D in human skin. Too much exposure to UV is believed to cause a mild form of skin cancer, and it can damage some plants. Because our exposure to UV is limited by the absorptive effect of the ozone layer, we are protected.

In the 1970s, it was feared that large fleets of supersonic passenger aircraft, flying at high altitude through the ozone layer, would deplete the ozone. Jet engines emit oxides of nitrogen, and these can react with the ozone to form stable compounds, so removing ozone faster than it could form. The large fleets failed to materialize, and it transpired that the amount of nitrogen oxides released by Concorde enhanced the ozone layer rather than depleting it.

Another fear was that nitrogen oxides might be released in large amounts as a result of the agricultural use of nitrogen-based fertilizers. Again, the threat was examined and dismissed. It has been suggested that the atmospheric explosion of nuclear weapons would release large amounts of nitrogen oxides and deplete the ozone layer, but atmospheric nuclear testing actually increased and thickened the ozone layer.

In the mid 1970s a new threat was identified, this time from "freons", chlorofluorocarbon (CFC) compounds used as propellants in aerosol cans, as refrigerants in freezers, refrigerators and air conditioners, and in the manufacture of plastic foams. CFCs are extremely stable chemically, but they are destroyed by UV radiation, to yield atoms of chlorine which form compounds with ozone. Estimates of the predicted extent of the ozone depletion from this cause within the next century have varied from between 2 and 16.2 percent. Several uses of CFCs have been banned in some countries and restricted in others; their use in aerosol cans was banned in 1978 in the United States. The dangers may, however be illusory. It is estimated that we release about 26,000 tonnes of CFCs a year, but about five million tonnes of a rather similar substance, chloromethane, is released each year by wood-rotting fungi, yet the ozone layer has survived.

The concentration of ozone in the ozone layer varies from day to day and season to season. Ozone production depends on sunlight, and ceases at night

and during the polar winter. The ozone layer is thickest over the poles during their summers, and thinnest over the equator. Most of the predicted depletion would take place over the poles during their winters, so any effect on organisms at the surface would, in any case, be either insignificant or small.

The Greenhouse Effect

Rather more than 40 percent of the radiation we receive from the Sun has a wavelength between 400 and 700 nanometers. It is shortwave radiation, and the Earth's atmosphere is transparent to it. The radiation warms the ground, which then radiates heat, but at longer wavelengths, of 800 to 4,000 nanometers. Most gases are transparent to this longwave radiation, but carbon dioxide is not. It absorbs any radiation with a wavelength of more than 1,000 nanometers, and is especially absorptive of radiation between about 1,200 and 1,800 nanometers.

When carbon dioxide absorbs radiation, its molecules move faster, which increases the probability and violence of collisions between molecules, with the result that much of the absorbed energy is expended in warming the air itself. Carbon dioxide acts as a heat trap[1], allowing radiation to pass inward but not outward, rather like the glass in a greenhouse. This warming is the "greenhouse effect" and if the amount of carbon dioxide in the atmosphere increases, we may expect the atmosphere to grow warmer.

If the atmosphere is warmer, more water will evaporate into it. Water vapor is also a "greenhouse gas", absorbing most strongly at wavelengths slightly longer than those at which carbon dioxide absorbs, and so thickening the thermal "blanket".

Carbon dioxide is released into the air whenever a carbon-containing substance, such as wood, peat, coal, natural gas or oil, is burned. It is also released from soils when forests are cleared. The amount of atmospheric carbon dioxide is increasing. Analysis of air trapped in the polar ice sheets at levels that can be dated has shown that in the fifteenth century the air contained about 270 parts of carbon dioxide to a million parts of other gases. In 1984 it contained 345 parts per million.

Other gases, including nitrous oxide, methane, and chlorofluorocarbons are released industrially or as a consequence of farming or forest clearance. The amount of them is small, but they, too absorb longwave radiation (nitrous oxide and methane at wavelengths of 700 to 1,300 nanometers) where carbon dioxide and water vapor are not strongly absorptive.

Climatologists believe they have detected a very slight increase, of less than one degree Celsius, in the average atmospheric temperature throughout the Northern Hemisphere. They cannot say whether this is due to the greenhouse effect, but it may be. In the United States, the Environmental Protection Agency

and the National Research Council have both predicted a gradual climatic warming, with temperatures by the year 2100 some 5 °C higher than they are now.

A slight warming might alter climates, making continental interiors drier and coastal areas wetter, but an increase of as much as 4 °C might trigger the melting of the polar icecaps. If they should melt, sea levels would rise by about 50m, enough to inundate the low-lying areas that contain many of the world's major cities.

An opposite effect, of cooling the Earth's surface, is predicted should there be a nuclear war.

Notes

[1] trap (n) – ловушка
(v) – захватывать, ловить

Carbon Dioxide

Carbon dioxide (CO_2) is one of the gases that make up the air we breathe. It enters the atmosphere as part of the carbon cycle. The main sources are the decomposition of organic matter by microorganisms, gas exchange in the oceans, deforestation, respiration by animals and the burning of coal and oil.

Over the last 100 years or so the amount of CO_2 in the world's atmosphere has increased due to the burning of fossil fuels from about 265 parts per million by volume (ppmv) in the early 19th century to 340 ppmv today. As well as the burning of fossil fuels, the large scale destruction of tropical rainforests in recent times is also putting more CO_2 into the atmosphere as the cut trees decompose – and stop converting CO_2.

The effects of this increased CO_2, and other gases such as methane and nitrous oxide which are also increasing in the atmosphere, has been called the 'Greenhouse Effect'. The consequence is an overall warming of the global climate. Already the average world temperature has risen by 1/2 °C since 1900. If the estimates for future build-up of CO_2 and other gases are realised then global temperatures could rise by up to some 4 °C some time in the next century. We can only guess at the possible consequences, but it seems that sea levels would rise as polar ice caps melt and climatic belts across the world would shift. The grain belt of the United States, for example, could become a desert.

Carbon dioxide is not the only atmospheric gas that is important to the heat budget and thus the global temperature. In the last few years it has been realised that the contribution of other gases to the greenhouse effect and global warming is already as important as CO_2. These other gases include methane and chlorofluorocarbons.

Methane is produced by microbes in swamps and rice paddies, and in the intestines of sheep, cattle and termites. It is also released into the atmosphere

when vegetation and fossil fuels are burned. In the last 20 years atmospheric concentrations of methane have been increasing.

The amount of CO_2 being put into the world's atmosphere, mostly from the burning of fossil fuels, has more than doubled in the last 30 years. Although the increase has slowed in the 1990s, it is expected to rise again in the next decades.

Acidification

Acid in rain is not a new phenomenon; all rainfall has a natural acidity, but pollution in the atmosphere increases this acidity more than a thousand times. And acid rain not only affects habitats when it falls as rain; acidity can also be present, and be just as damaging, in snow, hail, cloud, fog, mist, or even airborne dust.

Burning coal and oil releases the gases sulphur dioxide and nitrogen oxide into the atmosphere. Today we mine and burn fossil fuels in enormous quantities to generate electricity, heat our homes and power our factories. Unfortunately, burning coal and oil releases huge amounts of pollutants into the air. Taller chimneys only spread them farther afield over the countryside. Fumes from motor vehicles add more nitrogen oxides as well as hydrocarbons to this chemical cocktail. Sunlight acts on the nitrogen oxide and hydrocarbons to create other pollutants such as ozone.

In turn, these pollutants react with the sulphur and nitrogen oxides to form sulphuric and nitric acid in the tiny droplets of water that go to make up clouds. In this form the acids are carried on the wind to fall as acid rain, often great distances away.

Today, in spite of growing environmental awareness, large-scale industrialization is increasing all around the world – and so is the damage caused by acid rain.

Over one million square kilometres of Europe's forests have suffered from the effects of acid rain, with conifers suffering the most. Sulphur dioxide from the burning of fossil fuels kills many trees, but pollution from traffic also has a terrible effect, leaving trees too sick to ever recover. In addition to this, acid rain washes vital nutrients out of the soil, weakening the trees.

Even slight damage to mature tree caused by pollution can be enough to kill it because it reduces the tree frost-hardiness and its resistance to fungi and death pests. Furthermore, American studies indicate that even where forests are showing none of the easily visible external signs of acid rain damage, pollution is nevertheless limiting their growth.

Unit III

THE WATER

READING MATERIAL

TEXT A

Task

a) Before reading the text try to discuss the following questions:

- How much water do you think you use every day?
- Where does the water for your house and town come from?

b) Now read the text, translate it and get ready to do exercises after it.

The Importance of Water for Life

There is no life without water. Although it is possible to survive for more than a month without food, it is not possible to live more than a few days without water. Without water man soon perishes[1]. But not all water helps him to survive: if it is contaminated, then also he may die before this time.

"Man and his life has in fact been described as a question of water and little else"[2]. The air surrounding him contains enormous quantities of water in the form of vapour. The surface of the earth is 70 % water.

Water is far more important to the human body than carbohydrates, proteins, vitamins, minerals and fats all combined. It transports nutrients throughout the body, gets rid of wastes[3] helps chemicals in the body to react with one another and provides part of the lubricating fluid[4] round the joints of the body as well as the eyes. In addition and perhaps most important in many ways, water acts as an air-conditioner and a universal solvent as well as providing lubrication along the digestive tract[5]. About 65 % of our body weight consists of water. All body tissues are at least 70 % water while our blood comprises almost all water and almost 25 % of our bones take the form of water. Expressed in terms of actual quantities, the minute cells[6] which help to form our bodies contain about 28 liters of fluid and are surrounded by a further 14 liters of fluid. In addition, we all have about 4.5 liters of blood in our body. Thus, approximately 45 liters of all our body fluid is in the form of water.

An average adult drinks up to three liters of water a day. Ironically, this intake is often in the form of tea, coffee and soft drinks, which actually act as diuretics, reducing the body's water content. Most of the things we eat, how-

ever, comprise at least 65 % water. A lettuce, for example, contains 94 % water, a potato 80 % water, rice 75 % and meat 70 %.

There is no risk of drinking too much water as the body can easily dispose of the water which it does not need. This is done through excretion, exhalation and perspiration. There is, however, a danger caused by drinking insufficient water, and, by far the most common problem in hot weather is dehydration. Moreover, people who go on diets can also suffer from dehydration. Severe dieting reduces the amount of water the body needs in order to function efficiently. The body then tries to regain the amount of water which it has missed. Hence the person who is dieting puts back the weight he or she has lost. If, on the other hand, someone drinks more water and eats less food, their stomach will still feel full and they will thus consume less food, resulting in a loss of weight.

Although some people have claimed that drinking water can slow down the aging process of the skin, there is no evidence of this. Certainly, drinking insufficient water will result in water being taken from the skin tissue to supply to blood circulation and other vital functions of the body. This process itself will cause the skin to wrinkle. So far, we have been concerned chiefly with the amount of water we use for drinking purposes. Each person uses about 150 liters of water a day for domestic above purposes. In addition, everyone is indirectly dependent on water in many ways – without even realizing it. For example, we use water whenever we switch on the television! Water is even used to produce electricity and drive all kinds of machinery in addition to its more obvious uses in agriculture, drainage, fire fighting, etc.

Notes

[1] perish – погибать, умирать
[2] a question of water and little else – вопрос о воде и еще кое о чем
[3] get rid of wastes – избавляться от отходов
[4] lubricating fluid – смазывающая жидкость
[5] digestive tract – желудочно-кишечный тракт
[6] the minute cells – мелкие клетки

Word Study

Ex. 1. Read the international words correctly mind the stress.

carbohydrate	dehydration	result
protein	diet	process
vitamin	function	circulation
chemical	efficiently	electricity
produce	machinery	agriculture

Ex. 2. Memorize the following pairs of derivatives.

N→Adj	V→N
importance – important	survive – survival
chemistry – chemical	contaminate – contamination
universe – universal	provide – provision
insufficiency – insufficient	add – addition
efficiency – efficient	solve – solvent
evidence – evident	circulate – circulation
	produce – production

Ex. 3. Match English and Russian equivalents.

1. to perish	a. потребление
2. to survive	b. избавляться
3. to contaminate	c. обезвоживание
4. to transport	d. функционировать эффективно
5. to get rid of wastes	e. выжить
6. digestive tract	f. содержать
7. to comprise	g. мелкие клетки
8. minute cells	h. погибать
9. intake	i. переносить, перемещать
10. lubricating fluid	j. приводить к
11. to reduce	k. домашний
12. the body's water content	l. сокращать
13. to dispose of	m. процесс старения кожи
14. insufficient water	n. избавляться от отходов
15. dehydration	o. смазывающая жидкость
16. to function efficiently	p. кожная ткань
17. to regain	q. желудочно-кишечный тракт
18. to result in	r. загрязнять
19. to consume	s. содержание воды в теле
20. the aging process of the skin	t. недостаточное количество воды
	u. вновь приобретать, получить обратно
21. the skin tissue	v. потреблять
22. domestic	

Ex. 4. Translate into Russian the following words, word combinations and sentences.

Contaminate – contaminated, contamination, the contamination of water supply

Consume – consumer, to consume less food

Comprise – our blood comprises almost all water. This dictionary comprises about 60000 words.
Content – the body's water content, the contents of a book, form and contents.
Digestive – digest, this food digest well, to digest the events, digester, digestibility, digestible, digestive tract. Have you digested everything that is important in the book?
Dispose – disposal, disposable, disposition. The body can easily dispose of the water which is doesn't need. My report is at your disposal.
Drainage – drainage-basing, drain. The water will soon drain away *(off)*. Land must be well drained for some crops.
Nutrients-nutriment, nutrition, nutritious, nutritive. Water transports nutrients through the body.
Reduce – reduced, reduction, reduce the body's water content, reduce weight, reduce prices, reduce temperature, great reductions in prices.
Solve – solvent, the solvent action of water, a universal solvent.
Tissue – all body tissues are at least 70 % water.
Waste — get rid of wastes, waste land.

Ex. 5. Add nouns to the following adjectives to form noun phrases.

Adjectives: 1. vital, 2. common, 3. severe, 4. average, 5. universal, 6. digestive, 7. minute, 8. enormous, 9. human, 10. obvious.
Nouns: a. adult, b. cells, c. uses, d. functions, e. dieting, f. solvent, g. quantities, h. problem, i. body, j. tract.

Ex. 6. Translate the following word combinations.

drinking insufficient river underground hot fresh ground	water	water	content use resources supply shortage transport way

Ex. 7. Try to guess the meaning of the word in bold in each of the following sentences.

1. Something is wrong with your **circulation** if your feet feel cold.
2. Fortunately, the huge field had several **drainage** channels which prevented it from flooding.
3. Put a little oil or other **lubrication** here in the engine to prevent it squeaking.

4. There are a lot of valuable **nutrients** in the soil and so it is possible to grow many different kinds of plants.
5. Oil is our most important **resource** as the country has no mineral deposits at all.
6. Water won't get rid of the grease mark. Use petrol or a similar solvent to dissolve it.
7. An effective strategy for distributing and using water is now vital for the world.
8. His digestive **tract** seems to be blocked, and his body is not taking in food properly.

Now match the meanings of the eight words to the following definitions.

a. a substance or fluid which helps something to work smoothly without rubbing, etc.
b. a liquid which can turn a solid substance into another liquid (i.e., by dissolving it).
c. a tube, etc., along which something passes from one part of the body to another
d. a useful supply of something, possession(s) (especially of a country).
e. a substance or food, etc., which provides what is needed for life and growth
f. the movement of something from one place to another, the flow of blood round the body
g. pipe, ditches, etc., for allowing water to flow away
h. a plan for dealing with something successfully

Ex. 8. Complete each blank with the correct form of the word shown above each paragraph. The words you need to complete the blanks are defined below.

1. contaminate

Radiation leaking from the nuclear power station has already[1] … the surrounding countryside.
Unfortunately, the[2] … is now in danger of spreading far and wide.
Worse still, there are other[3] … beside radiation.

contaminate	*(v)* to make impure, dangerous, poisonous (usually by something else which is impure, etc.)
contamination	*(n)* the act of making impure, dangerous, poisonous, etc.
contaminant	*(n)* a substance which makes other things impure, dangerous, poisonous, etc.

2. digest

If you eat too quickly, you won't[1] … your food properly. I'm not surprised that you're having trouble with your[2] … if you hurry all your meals in this way. And don't drink too much water while you're eating, or your body's[3] … juices will not function efficiently.

digest *(v)*	to change food in the stomach so that the body can use it
digestion *(n)*	the ability to change food in the stomach so that the body can use it
digestive *(adj)*	concerned with the digestion of food

3. environment

Jonathan Green is a keen[1] … and is now studying the[2] … effects of cutting down large areas of forest in the country. He believes in ensuring that people guard against damaging their[3] … through ignorance or greed.

environment *(n)*	the natural conditions or surroundings in which people live
environmental *(adj)*	concerned with natural conditions or surroundings
environmentalist *(n)*	someone who is keen to prevent the environment from being damaged

4. pollute

The … of the island's beaches makes them not only unpleasant to use but also unsafe. Even large area of the sea have been … by chemicals and industrial waste. Moreover, … are constantly being released into the air which we breathe.

pollute *(v)*	to make dangerously impure or unfit to use
pollution *(n)*	the action of making dangerously impure or unfit to use
pollutant *(n)*	a substance which pollutes, a waste product of an industrial process

Ex. 9. Pair the verbs in column A with a suitable phrase in column B.

A	**B**
1. to contain	a. the weight
2. to transport	b. an air-conditioner
3. to get rid of	c. less food
4. to provide	d. almost all water
5. to go on	e. enormous quantities of water
6. to reduce	f. lubrications along the digestive tract
7. to put back	g. wastes
8. to supply to	h. diets
9. to consume	i. nutrients throughout the body
10. to act as	j. blood circulation
11. to survive	k. without food
12. to comprise	l. the body's water content

Ex. 10. Match the verbs with their appropriate explanations.

1. to reduce	a. to carry from one place to another
2. to contaminate	b. to change food in the stomach
3. to consume	c. to get back to
4. to solve	d. to make smaller in size, make less
5. to survive	e. to eat or drink
6. to waste	f. to give or provide
7. to transport	g. to have or hold
8. to regain	h. to continue to live or exist
9. to contain	i. to make dirty
10. to supply	j. to find the answer to
11. to digest	k. to get rid of
12. to dispose	l. to use without a good purpose

Ex. 11. Complete the following sentences by writing a preposition. A good dictionary can help you to find a suitable preposition to use.

1. Without water, there is little chance … of … anyone surviving for more than a few days.
2. About 65 % of our body consists … water.
3. Expressed in terms of quantities, our body comprises … over 45 % water.
4. Drinking water is almost always beneficial … one's health.
5. It also helps chemicals in our body to react … one another.
6. Water is much better … you than any other drink.
7. In fact, it is rarely dangerous … anyone to drink too much water.
8. Insufficient water will result … dehydration of the body.
9. People who suffer … dehydration lack energy and eventually die.
10. It is therefore very important to be aware of this when you go … a diet.

Ex. 12. Give English equivalents for the following Russian ones.

Недостаточное количество воды, функционировать эффективно, желудочно-кишечный тракт, смазывающая жидкость, избавляться от отходов, содержание воды в теле, приводить к потере веса, потреблять меньше пищи, питательные вещества, кожная ткань, загрязнять, обезвоживание, мелкие клетки, содержать воду, процесс старения кожи, выжить, сокращать количество воды.

Comprehension and Discussion

Ex. 1. Choose the correct answer for the following sentences about the text.

1. It is not possible to live more than a few days without ….
   a) clothes
   b) food

c) water
d) books

2. Water helps to ….
a) send chemicals to the eyes
b) lubricate the eyes
c) transport nutrients to the eyes
d) dispose of waste fluid in the eyes

3. Water acts as an air conditioner for our body because it ….
a) keeps the body cool
b) cleans the body's tissues
c) dissolves waste, etc., in the body
d) provides lubrication to help us digest food

4. Water forms ….
a) one half of our bodies
b) two-thirds of our bodies
c) three-quarters of our bodies
d) four-fifths of our bodies

5. The amount of blood contained in our bodies is ….
a) 4.5 liters
b) 14 liters
c) 28 liters
d) 45 liters

6. Potatoes contain less water than ….
a) lettuces
b) people
c) animals
d) rice

7. Too strict a diet can lead to ….
a) perspiration
b) loss of weight
c) dehydration
d) improved health

8. Drinking too little water ….
a) will help you to look younger
b) can cause your skin to age
c) will not alter the appearance of your skin
d) may increase your blood circulation

9. The smallest amount of water in the home is used for ….
   a) cooking and washing up
   b) flushing toilets
   c) drinking
   d) washing clothes

10. About four times more water is used for baths and showers than for ….
   a) drinking
   b) cooking and washing up
   c) washing clothes
   d) flushing toilets

Ex. 2. Put the following points in the order which they were treated in the text.

a. Amount of water in the human body
b. Results of not drinking enough water
c. Importance of water for survival
d. Use of water in the home
e. Amount of water in food
f. Importance of water for the body.

1_____2_____3_____4_____5_____6_____

Are each of the points listed above treated in separate paragraphs? If not, discuss why not?

Ex. 3. Complete the following sentences given in the text.

1. Not all water helps man to ….
2. The air surrounding man contains ….
3. Water transports ….
4. Water acts as ….
5. Our blood comprises ….
6. An average adult drinks up ….
7. The body can easily dispose of ….
8. People who go on diets can ….
9. Severe dieting reduces ….
10. Drinking insufficient water will result in ….
11. The person who is dieting puts back ….
12. Water is even used to ….

Ex. 4. Look at the following way of intensifying adjectives:

so + adjective / adverb + **that** clause
such a + (adj +) countable noun + **that** clause
such + (adj +) uncountable noun + **that** clause

Rewrite each of the following pairs of sentences using the intensifiers introduced above. The first has been done as an example.

1. The situation is becoming very bad. Environmentalists feel it may be necessary to shock the world into saving water.
   The situation is becoming so bad that environmentalists feel it may be necessary to shock the world into saving water.
2. The oil crisis became a serious threat to the lives of everyone in the developed countries. It made people conscious of the importance of saving oil.
3. Water is very important for our bodies. We cannot survive more than a few days without it.
4. Some people follow a very strict diet. Their bodies become dehydrated.
5. Other people drink a very small amount of water. Their skin wrinkles and they begin to look older.
6. It is possible to drink a lot. Your stomach will feel full and you will no longer be hungry.
7. The water in many developing countries is very polluted. Fifteen out of every 1,000 children do not reach the age of five.
8. The world's population is increasing very rapidly. It is expected to grow to 8,000 million in thirty years.
9. There will be a very rapid increase in population. Insufficient water will be available for everyone.
10. The reserves of water under the earth's surface are very deep. They cannot be obtained economically.
11. There will be very fierce competition for what little water is available. The stability of the world may be threatened.
12. Rivers are usually very important for a nation. Recently a certain country threatened to destroy any dams built on its main river before the river reached that country.

Ex. 5. Answer the following questions.

1. Can you live without water? Why?
2. Is water important to be human body?
3. How much water do you think you use every day?
4. Where does the water in your tap come from?
5. Where do we use water?

6. Do you think everyone should pay for the water they use? Should it be free?
7. Is there sometimes a storage of water in your town?

Ex. 6. Write a report on the following topic "The Importance of Water for my Life".

TEXT B

Task. **Read the text and get ready to discuss its main points.**

The Shortage of Clean Water

One of the most urgent environmental problems in the world today is the storage of clean water. There are large differences in per capita water consumption between different countries.

A comfortable lifestyle (with flush toilets, washing machines and public swimming pools) uses a lot of water. A lavish[1] lifestyle (with automatic car-washmachines, Jacuzzis and backyard swimming pools) uses many times more. The average Kenyan uses five liters of water a day; the average American uses 1,000. More and more people in the world are adopting a Western lifestyle. So even if population growth stops, the water shortage will get worse.

Access to clean drinking water is a basic human right. But acid rain, industrial pollution and sewage dumping[2] have made many sources of water undrinkable. Lakes, reservoirs and even entire seas have become vast pools of poison. Lake Baikal in Russia is one of the largest lakes in the world. It is also one of the most beautiful. The local people call it the Holy Sea. It contains a rich variety of animals and plants, including 1,300 rare species that do not exist anywhere else in the world. But they are being destroyed by the massive volumes of industrial effluent[3] which pour into the lake every day. Until very recently, environmental standards in the former Soviet states were much lower than in the West. Even where laws existed, the government did not have the power to enforce them. Most industries simply ignored the regulations. In the past few years, glasnost has given people greater freedom of speech. They are now free to protest about the pollution. Some factories are now disposing of their waste more responsibly. But many others still pour untreated industrial waste into the Holy Sea.

The Mediterranean Sea occupies 1 percent of the world's water surface. But it is the dumping-ground for 50 percent of all marine pollution. Sixteen countries border on the Mediterranean. Almost all of them regularly dump shiploads of industrial waste a few miles off shore. Sewage effluents pour into the sea only

meters from popular bathing beaches. In 1975, the United Nations Environment Program brought together these 16 countries and drew up the Mediterranean Action Plan. The countries agreed to stop dumping from ships and to reduce sewage pollution. Few, if any, of them have kept their word. In the 1950s, Japanese factories dumped waste containing mercury into the sea at Minamata Bay. Shellfish became contaminated with this very toxic heavy metal. Over 2,000 people developed brain damage and 40 of them died. These tragic examples should teach us that the ocean is neither a garbage can nor a toilet.

Sewage is a rich source of micronutrients, which are essential for the growth of plants and animals. Sewage sludge[5] and fertilizers washed off the land, increase the concentration of micronutrients (particularly nitrates) in the sea to dangerous levels. Plankton (tiny plants that float near the surface of the water) become so numerous that they cut out the light to deeper parts of the sea. This endangers[6] plants that grow on the sea bed, which need the sun's light for photosynthesis. Seaweed is also very sensitive to changes in the level of micronutrients in coastal waters. One or two species of algae (seaweed) can outgrow all the other species. Overgrowth of algae can cause slimy, smelly, ugly deposits on beaches. Occasionally algae produce poisonous toxins that can kill fish or cause skin rashes swimmers.

We condemn[8] deliberate pollution of the water supply by industrial waste and sewage dumping. But we are usually impressed by "developments" such as huge dams, dikes and irrigation schemes. These are often magnificent feats of civil engineering. They cost a lot of money and use modern materials and equipment. We often assume that the people who plan and build these systems know what effect they will have on the environment. In fact, many dams and irrigation schemes have been environmental disasters. Three quarters of the world's water is used to irrigate crops, so inefficient or extravagant irrigation schemes can cripple[9] a region's water supply. The Aral Sea in Russia was once the fourth-biggest lake in the world. It is now less than half the size it was in 1965. Badly-planned irrigation schemes have taken water from the rivers that fed the Aral Sea. In addition, overuse of pesticides on the cotton crops nearby has polluted the water with toxic chemicals. In some cases, major water diversion projects began because a new technology became available and governments wanted to demonstrate their new-found power over nature. Dams can also be a direct political tool. Rivers often flow through one country to get to another, so the first country can potentially control the flow of water into the second. Turkey has recently built several dams across the river Euphrates, and has already used these dams to restrict the water flowing through to Iraq and Syria. It has also signed an agreement to sell water to Israel.

"Development" projects can also make soil erosion worse. Forests and grasslands in a river valley soak up[10] water after heavy rains and slowly release

it back into streams and rivers. This prevents the valley from becoming dry and dusty in the months without rain. In addition vegetation also prevents erosion by holding the particles of soil together. If there is no vegetation, the soil crumbles away[11] and is washed into the rivers as silt. Rivers become clogged with sediment. Lakes change from clear, blue pools into thick, muddy puddles. The destruction of rainforests, and intensive farming practices (such as heavy grazing of cattle and excessive plowing with powerful machines) both increase soil erosion. Because of deforestation and modern farming methods, the sediment load of the Yellow River in China is 1.6 billion metric tons per year, and that of the Ganges is 1.455 billion metric tons. The traditional farming methods used by primitive communities may seem inefficient, but the sediment loss from these methods is tiny.

The best things in life are free. But because water is free, we often take it for granted. A few years ago, people thought that the supply of clean water in the world was limitless. Today, many water supplies have been ruined by pollution and sewage. Others have dried up because we have diverted the water for hydroelectricity or badly-planned irrigation projects. The destruction of forests and grasslands has increased soil erosion. Clean water is now scarce, and we are at last beginning to respect this precious resource. Like other environmental resources, the clean water that remains is the property of our children and grandchildren. For their sake, we must fight to protect what is left of the water supply.

Notes

[1] lavish – расточительный
[2] sewage dumping – сброс сточных вод
[3] effluent – сток
[4] untreated – необработанный
[5] sludge – густая грязь, тина, ил
[6] endanger – подвергать опасности
[7] rash – сыпь
[8] condemn – осуждать
[9] cripple – приводить в негодность, наносить вред
[10] soak up – пропитываться, впитываться
[11] crumble away – распадаться, разрушаться, гибнуть

Ex. 1. In a small group discuss the reasons why there is a shortage of water in the world nowadays and make a list of your reasons. Then compare your list with Table 1.

Table 1. Causes of the world water shortage.

Increase in water consumption
Population growth
Increase in per capita consumption

Pollution of water supplies Acid rain Industrial waste Sewage
Decrease in water reserves Dams Irrigation schemes Intensive farming Deforestation

Ex. 2. Using Table 1 write a paragraph summarizing the reasons why there is a shortage of water in the world.

The reasons for the shortage of water in the world

Factors affecting the demand for water and factors affecting the supply have meant that nowadays there is a shortage …… . The demand has increased because …… as more and more countries have adopted a western lifestyle. As regards the supply of good quality water, this has been reduced by …… . There is also less water available in reserves on account of …… .

Ex. 3. Here are the answers. What are the questions?

1. Acid rain, industrial pollution and sewage dumping have made many sources of water undrinkable. (What?)
2. The Mediterranean Sea is the dumping ground for 50 per cent of all marine pollution. (What?)
3. The United Nations Environment Program drew up the Mediterranean Action Plan to stop dumping from ships and to reduce sewage pollution. (What for?)
4. Sewage sludge and fertilizers washed off the land increase the concentration of micronutrients in the sea to dangerous levels. (To what levels?)
5. Many dams and irrigation schemes have been environmental disasters. (What?)
6. If there is no vegetation, the soil crumbles away and is washed into the rivers as silt. (When?)
7. The destruction of rainforests and intensive farming practices increase soil erosion. (What?)
8. Today, many water supplies have been ruined by pollution and Sewage. (By what?)

Ex. 4. Translate the following text into English.

Уже есть проекты транспортировки айсбергов из Антарктиды в район Аравийского полуострова. Арабские шейхи готовы вкладывать в это деньги. И им хватает нефтедолларов на опреснение морской воды, а это дорогие технологии. Значит, могут заняться и доставкой айсбергов. Кстати, из Гренландии в Канаду давно уже налажена их транспортировка – для получения питьевой воды. Но это отнюдь не решение всех проблем.

Радикальная перестройка всего мирового хозяйства неизбежна. И она будет идти по трем направлениям.

Первое – это водосбережение, применение таких технологий, которые позволят на единицу выпускаемой продукции затрачивать меньше воды. Все это потребует новых капитальных вложений, но другого выхода нет. Второе – охрана гидроресурсов. Придется сокращать сбросы, применять более глубокую очистку использованной воды и т. д. И третье направление касается водоемких производств. Они будут перемещаться туда, где расположены большие источники пресной воды.

TEXT C

Task. **Suggest your own title for the text.**

Ever since man progressed from a hunting to an agricultural society, with the corresponding development of stable communities, the phenomenon of water pollution has been his constant companion. As agricultural methods improved, a smaller percentage of the population produced all the food needed; larger communities and diverse secondary industries developed and grew into the present modern society. Concurrent with this growth, however, was the increasing percentage of waste materials and the problems of disposal. When the total volume of waste from a community was relatively small, the easiest method of disposal was to “throw it away”, usually into the nearest receptacle. Since man cannot exist without water, community development and city growth centered in areas where the water supplies were adequate and continuous. Initially this meant development in river valleys, and thus the nearest receptacle for wastes was the river.

The term “pollution” has been variously defined by many people, but if it may be described here as “the detrimental effects on a localized ecological structure by the addition of the waste products of a society”, then it is apparent that the first noticeable pollution problems should have involved the supply of drinking water.

It is in this particular area that the question of pollution takes on a new meaning. Is a body of water polluted when it directly affects man, or should it

be classified as polluted when the ecological structure is first upset? The hydrosphere is a dynamic system containing physiochemical and biological equilibria, and there is no doubt that a normally active waterway has a large capacity to assimilate wastes. However, in many areas this capacity is now being reached or exceeded so that many waterways are becoming increasingly contaminated. Before this contamination becomes readily noticeable however, equilibria are changed and the Ecological structure may be seriously affected. Some examples of water systems where the effects of becoming increasingly apparent are the Adriatic, Baltic, and Mediterranean seas; the Thames, Rhine, and Seine rivers; and the Great Lakes in America and Canada. But dynamic systems have a regeneration, and with careful planning even the most seriously polluted water-ways may be brought back into full use. An example of river regeneration on a large scale is the successful attempt to restore the Thames estuary.

Ex. 1. Write down the key words for each passage.

Ex. 2. Discuss the main points of the text with your groupmate. Use the following prompts:

1. What is … about?
2. In what way is the term "pollution" defined?
3. How can you describe … ?
4. What is the hydrosphere?
5. In what water systems are the effects of pollution becoming apparent?

TEXT D

Task. **Read the text about the serious shortage of drinking water throughout the world and get ready to do the exercises after it.**

The Threat of a Worldwide Water Shortage

"Water, which is essential for life, costs nothing. On the other hand, diamonds, which are essential for nothing, cost a lot." Unfortunately, the world has changed considerably since an eighteenth century economist made this remark. What was true over two hundred years ago is certainly no longer true now. In a number of countries people pay as much for water in their homes as they do for electricity.

What is still true, however, is the remark made by Benjamin Franklin at the same time as the previous observation was made. "When the well's dry, we know the worth of water," he observed. Like health, we ignore water when we

have it – unless there are floods, of course. Once there is a threat to our water supply, however, water can quickly become the only thing that matters. We know only too well that, without water, there can be no life.

The situation is now becoming so bad that environmentalists feel it may be necessary to shock the world into saving water in a similar way to the shock caused by the oil crisis in the 1970s. At that time, the oil crisis became such a serious threat to the lives of everyone in the developed countries that it made people conscious of the importance of saving oil and provided powerful encouragement for governments to look for other forms of energy. The result undoubtedly was of major benefit to energy conservation.

There is now no longer an unlimited supply of fresh water. If all the earth's water could be poured into a gallon jug, the fresh water which would be available for everyone would amount to slightly more than one tablespoon – less than half of one percent of the total water in the jug. About 97 percent of the planet's water is seawater. Another 2 percent is locked in icecaps and glaciers. There are also reserves of fresh water under the earth's surface but these are too deep for us to use economically. Unfortunately, competition is growing fiercely for what little water is available. It may be a matter of time before that competition becomes a conflict. To make matters worse, the world's population is increasing so rapidly that it is expected to grow in thirty years to approximately 8,000 million – an increase of 60 %. Moreover, in many developed countries throughout the world, flush lavatories and washing machines mean the average person now uses 300 liters of water a day compared with 50 at the beginning of the century.

At the other extreme, according to the World Health Organization, one quarter of the world's present population still lacks safe drinking water and proper sanitation. Most live in the southern hemisphere, where supplies of fresh water are put in jeopardy[1] through dirty industrial practices, poor irrigation and erosion. It is estimated that diarrhea caused by polluted water will kill 15 out of every 1,000 children born in developing countries before they reach the age of five. Cases of cholera have risen to levels unheard of in the past. Contamination is responsible for 80 percent of diseases and 33 percent of deaths in these countries.

The social stability of the world is no longer threatened by global wars, the Cold War, etc. However, the supply of water could soon become the chief threat to such stability. There is already evidence of this happening, especially in Africa. Recently the Egyptian government threatened to destroy any dams built on the Nile if they considered the dams would affect their supply of fresh water. What is required immediately is an awareness of the true value of water and the formation of sensible water conservation strategies. It is also of vital importance, to have a consensus on how best to use shared water resources for

the benefit of all the countries in the world as well as an examination of the best methods of the distribution of the world's water.

Notes

[1] jeopardy – опасность, риск

Ex. 1. Match 1 – 10 to a – j to form complete sentences.

1. We only appreciate the importance of water ...
2. The water crisis is now so bad ...
3. The amount of fresh water available for everyone now ...
4. 97 per sent is sea water ...
5. The fresh water below the surface of the earth ...
6. The water shortage is made more serious ...
7. Polluted water in developing countries ...
8. There will soon be keen competition ...
9. Countries must reach an agreement on ...
10. If there is no such agreement...

a. ... for what little water is available.
b. ...why another 2 per sent consist of ice.
c. ... the social stability of the world will be threatened.
d. ... that the world must be shocked into taking action.
e. ... is responsible for large numbers of deaths and illness.
f. ... how to use and distribute the world's water
g. ... when we do not have any
h. ... is too deep to obtain at a reasonable cost
i. ... because the world's population is increasing at a rapid rate.
j. ... is less than one per cent of the total water in the world.

Ex. 2. The following newspaper report contains much of the same information as that in the previous text. However, one additional important problem has been included. Scan the text to find out what this problem is.

Possible Water Shortage

1. The world needs to be shocked into saving water, a United Nations conference was told yesterday.
2. A disaster like the oil crisis of the 1970s would help to spur conservation in the face of growing demand and pollution problems, delegates were told.
3. If not, conflict would result as countries fought for dwindling supplies, the International Conference on Water and the Environment heard in Dublin.
4. "The oil shock of the early 1970s has had a major impact on energy conservation," said Dr. Ramachandran, director of the week long

conference. “Perhaps what is needed to stimulate more sensible water conservation strategies is an equivalent water shock.”

5. The Dublin summit, he said, had the authority and the ammunition to administer that shock.
6. He was addressing delegates from 156 countries and members of 24 U.N. organizations considering a strategy for drinking water.
7. “There is now no longer an unlimited supply of fresh water, and international competition for it is growing. As demand grows, the competition will grow more fierce, more violent,” he said.
8. “With no clear consensus on how best to use shared water resources for the benefit of all states, that competition will become conflict.”
9. One quarter of the world’s population still lacks safe water and sanitation, according to the World Health Organization.
10. And the earth’s population is expected to grow by 60 percent within 30 years to 8,000 million.
11. Most of the extra mouths will be in the southern hemisphere where supplies are already jeopardized by poor irrigation, dirty industrial practices and erosion.
12. Dr. Hiroshi Nakajima, Director General of the WHO, said cases of cholera had risen to levels unheard of in modern times.
13. “Safe water and sanitation are the foundation for health, and health is the foundation for global development,” he said.
14. Fifteen out of every 1,000 children born in developing countries will die before they reach the age of five from diarrhea caused by polluted water.
15. “Water is going to the dominant world issue into the next century,” said Mr. Clive Wicks, a senior conservationist at the World Wide Fund for Nature.
16. “It is no longer Communism threatening the social stability of the world, but it could become the supply of water. There is already evidence. The Egyptian government has said that it will destroy any dams built on the Nile which affect their supply.”
17. In developing countries, contamination is responsible for 80 percent of diseases and 33 percent of deaths. Concern over nitrate and pesticide pollution is growing in Europe, especially as large sums of money are now being spent on treating pesticide residues.
18. Throughout Europe, flush lavatories and washing machines mean the average person now uses 70 gallons of water a day compared with 11 at the turn of the century.
19. The summit is likely to call for cleaner technology and cuts in intensive farming to reduce fertilizers and pesticides.

Ex. 3. Read the newspaper report once again and answer the following questions.

1. What are the two chief reasons for the weather crisis?
2. What could the result be if the crisis is ignored?
3. What conference did Dr. Ramachandran preside over?
4. How many people are without safe water and sanitation?
5. In what part of the world will most of the increase in the world's population occur?
6. What happens to 1,5 per cent of children is developing countries?
7. Why may there be a demand to reduce intensive farming?
8. What evidence is there that serious water shortage has recently affected health?

Ex. 4. Can you express in your own words the meaning of each of the following sentences from the newspaper report? Write one sentence for each.

1. A disaster like the oil crisis of the 1970s would help to spur conservation in the face of growing demand and pollution problems.
2. With no clear consensus on how best to use shared water resources for the benefit of all states, that competition will become conflict.
3. The Dublin summit had the authority and the ammunition to administer that shock.
4. Safe water and sanitation are the foundation for health.
5. Water is going to become the dominant issue into the next century.
6. The summit is likely to call for cleaner technology and cuts in intensive farming.

Ex. 5. Complete the following notes about the newspaper report by answering the questions in brackets.

1. U.N. Conference.
(What conference is being held, for whom and for what purpose?)
2. Need to shock world into saving water.
(What comparison is made?)
(What may happen between countries if there is not enough water?)
3. Problem will be made worse.
(What about the world's population?)
(What about the present situation in developing countries?)
4. Problem also made worse by developed countries.
(What about pollution there, etc.?)
5. Likely action to be taken.
(What three recommendations may be made by the Conference?)

Ex. 6. Now write a summary of the newspaper report, using the points listed in Ex. 5 together with the notes you have made.

Polylogue

Task 1. **Read the following polylogue and guess where this conversation might take place.**

DJ: Great to have you on the show today, Gordon.
Gordon: Nice to be here.
DJ: You're going to answer some questions about water...
Gordon: Yes, that's right.
DJ: Well, here's your first question on line 2 – Shirley: what's your question?
Shirley: Hello. Is it true that we have less water today than 1000 years ago?
Gordon: Well, no. We've got the same amount of water that we've always had. You see, it's constantly recycled.
DJ: Does that answer your question, Shirley?
Shirley: Yes, thank you?
DJ: Hmm. OK, another caller on line 1. Yes, Marianne.
Marianne: How many countries don't get enough rain?
Gordon: Well, about 80 countries in the world – that's about 40 % of the world's population – have water shortages at some time in the year.
Marianne: But is there enough rain in the world?
Gordon: Oh yes, but the problem is that different countries get different amounts of rain. Iceland and parts of Canada for example get a lot of rain but countries like Australia get very little.
DJ: A caller now on line 3. Yes, Oliver.
Oliver: What about the countries that have very little rain? Where do they get their water from?
Gordon: Well, usually they use underground water supplies. The problem is that these supplies are getting smaller, and the populations are getting bigger. For example, so much water has been pumped out from underground in Mexico City and Beijing that the cities are slowly sinking.
DJ: Thank you, Oliver. Yes, another caller: Anton.
Anton: Can't we take the salt out of the sea and use the sea water?
Gordon: Yes, we can. Desalination plants have been used in Middle East countries and in California for some time now. The problem is that they're very expensive and they also use a lot of energy.
Anton: Mm, thank you.

DJ: I think we've got time for one more quick question. Yes, line 2 again: Jeff.

Jeff: Can we build more dams to stop water flowing into the sea?

Gordon: Well, yes. About 36,000 large dams have been built around the world now. One big problem with dams, however, is that mosquitoes can breed in them. For example, since the Aswan Dam was constructed on the Nile, many people have become ill.

Jeff: Oh, right.

Gordon: Yes, and dams also destroy the local ecosystem of plants and animals, and people often have to move from their villages when the dam is built.

DJ: Thanks, Gordon. Let's have some more music. Here's a song all about water!

Task 2. **Say if these statements are true or false. Check your answers according to the polylogue.**

1. We have less water today than 1000 years ago.
2. The world doesn't get enough rain for its needs.
3. Some large cities are sinking because there is too much water.
4. It is very expensive to take salt out of sea water.
5. Dams can cause many health problems.

Task 3. What does Gordon say about the problems with each type of water supply? Make some notes about each problem.

Underground water supplies.
Desalination plants.
Dams.

Task 4. Try to sum up the information from the polylogue, which you have read in the form of a monologue.

REVISION

Ex. 1. Fill in the text with the appropriate word from the box.

pollution, clean, consumption, drinking water, environment, drain, reducing, consumes, waste, pollute, seawater, function

When you ask for a glass of water with your meal in a restaurant, you don't expect to pay for it, do you? To millions of people in our world that glass of clean ..... is a luxury they cannot afford.

Ninety-seven percent of the earth's water is …….Two percent of the remainder is locked up in icecaps and glaciers.

So what do we do with the tiny fraction left to us? Why, we waste and …… it, of course! We spend billions trying to …… it up and then fight over what remains!

There are over 5,000 staff on the Royal site and if everyone was given a share of the site water consumption, they would need space for 56 gallons (254 litres) every day. The cost to the Royal is £250,000 every year. Believe it or not, six years ago our …… was over twice what it is now. I don't believe for a minute that each of us …… 448 pints of water every day, so where does it go? The answer most certainly is down the ……. Hospitals need lots of water to …… but much of it is wasted. Ask yourself the next time you leave a tap running, "do I need to …… as much water as I do?" Don't forget, the water in your tap had to be pumped to a high pressure at great electrical expense. By …… waste you also save energy, reduce water and air …… and help create a better …… for everyone. Your conscience should tell you it is the right thing to do. Set an example now.

Ex. 2. Translate the text into Russian (in writing) and answer the questions following it.

Water in Britain

The average amount of water used by each person in Britain is over 40 gallons a day – for washing clothes and dishes and bodies and cars, watering gardens, flushing toilets and, of course, drinking. On top of this industry and agriculture use up an enormous quantity of water. For example, it can take 44,000 gallons of water to produce one ton of steel, 70 gallons of water to refine one gallon of petrol, and 44 gallons of water to brew one pint of beer.

Between 1900 and 1970, consumption of water went up 20 times, although the British population went up over the same period by just 50 per cent. In other words, each person in Britain used 10 times as much water every day in 1970 as in 1900. This rate of increase in the amount of water used by each individual plus the needs of the millions of more people being added to the population, is going to mean that by the end of the century we will need twice as much water as at present.

By 2005 the amount of water used per head of the population could well be over 80 gallons a day. Considering that enough rain falls in Britain to give the present population 900 gallons per head per day, there might seem to be no great problem. However, although the average rainfall in the country is some 36" a year, about 15" of this is lost through evaporation and about another 15 flows down to the sea, leaving only about 6" to be stored.

Storing increasing amounts of water to deal with rising demand is a difficult problem. Reservoirs – the well-established method of storing water – have to be built in the mountainous north and west of Britain where most of the rain falls – in some areas as much as 100" a year. The water must then be distributed to parts of the country where most people live – mainly the Midlands and the south and east of the country.

Not only does the construction of reservoirs often cause the drowning of good farming land which is obviously important for food production, but it can ruin the scenic value of an area and cause the dispersion of communities and families who have lived in an area for many years. It is not surprising, therefore, that decisions to build reservoirs in places like the Lake District, central Wales and Devon cause a great deal of opposition from local people.

Building reservoirs is not the only solution to our growing water shortage. Suggestions have been put forward for constructing coastal barrages or dams across estuaries like the Wash, the Dee and Morcombe Bay to provide new lakes of fresh water. Another possibility involves converting salt sea water into fresh water, by the process called "desalination". It is expensive but may become essential in the future.

Further supplies of water could come from re-using sewage by purifying it and making it safe for consumption again. In fact, this process is already going on and it is likely that the water drunk by a person from a tap in say, London, will already have been used by a number of other people further up the Thames.

Considerable amounts of water come from natural reservoirs underground. There is certain to be more drilling to find further supplies of such water. Although we are quite able to maintain a sufficient supply of water for our needs in the future by using all the methods outlined, the cost of a water supply is going to increase.

Up to now water has been cheap in Britain but the costs of building dams, buying land, building works to treat sea water and the providing of other schemes to ensure our water supply are expensive. There will be other "costs" too in the disruption of people's lives when their homes or farms are in the way.

Questions:

1. How much water is used by each person in Britain a day?
2. What does the rate of increase in using of water show?
3. How much water is given by rainfalls to the Britain's population?
4. What is the well-established method of storing water?
5. Why are people in the Lake district aware of the building of reservoirs?
6. How can sea water become fresh?

7. What is the other method to further supplies of water?
8. How can all those factors influence the cost of water in Britain?

Ex. 3. Translate the following text into English.

Довольно простые расчеты позволяют предсказать, в какой момент наступит глобальный водный кризис.

В мире растет население (и будет расти примерно еще полвека), и почти такими же темпами – общее потребление воды. А объемы экономически доступной воды, наоборот, сокращаются. И если мы изобразим эти тенденции двумя графиками, то как раз в 2025–2030 годах кривые пересекутся. То есть почти половина населения окажется в таких условиях, когда воды не будет хватать для удовлетворения элементарных потребностей.

Загрязнения водоемов и массовые нарушения экологических норм на водосборах могут ускорить процесс сокращения водных запасов.

Все современные технологии прокачивают воду через системы и ежегодно загрязняют примерно половину доступной пресной воды. Кроме того, допускаются просчеты при орошении полей, утечки в водопроводах. В результате воды становится меньше, и ресурсы уже не воспроизводятся в полной мере.

Человек сам уничтожает природные механизмы восстановления воды. Радикально меняется гидрорежим при вырубке леса, при строительстве карьеров и дорог.

Разные отрасли хозяйства требуют разного количества воды. К самым водоемким относятся энергетика (в том числе тепловая и атомная), металлургия, сельское хозяйство и химия полимеров.

В глобальный кризис окажутся втянуты прежде всего значительная часть Африки, Ближний Восток, Южная и Юго-Восточная Азия. Несмотря на наличие крупных рек, дефицит воды начнут испытывать и две самые населенные страны мира – Китай и Индия.

Additional Reading

The Baltic Sea basin

Environmental problems have their roots in the use of natural resources. Forests, fields and mountains form the basis for agriculture, forestry, and industrial production, which, in the end give rise to environmental impact. Behind these, there are roads of the development of societies and economic and political decisions. It is thus important to get an understanding of these aspects to get a grip on the environmental situation.

Even if many environmental problems are the same all over the world, each area also has its specific challenges to deal with.

Although the environment has gone through negative developments, let us start by recognizing that the Baltic basin is a corner of the world where the resources are plentiful, the population limited and the societies developed, in comparison to other areas. We have good potential to take care of our environment.

The drainage area, the basin or catchment area, of the Baltic Sea is the entire land area from which water flows into the Baltic Sea. The Baltic basin, with some 85 million inhabitants, covers the whole or parts of 14 countries, and accounts for a large part of Northern Europe, 15 % of all of Europe. It is an area where east meets west and north meets south. The dramatic political changes in 1989–91, when the iron curtain which went right through the middle of the region for 50 years, was removed, characterize the region politically and create a platform for present developments.

It might seem strange to focus on such a heterogeneous area as the Baltic region, but there are several reasons why a drainage basin is a natural unit for the study of the environment. The flow of water defines an area in a more relevant way than e.g. political or national borders. In the end most pollutants dissolve in water and are carried and disseminated by the water stream. In this way, in fact much impact is limited to the region. The Baltic basin is a good example of an "ecogeographical region", a natural unit for environmental issues.

A basin also naturally has much common history. For hundreds of years, waterways provided the only easy way of travelling and ships connected the coasts rather than roads of the inland. This is reflected in the history of the Baltic region. Today, it is rather common interests and responsibilities that link the countries in a region to each other. Paramount are efforts to create international security, which address not only the absence of war but a secure life in a deeper sense, including environmental security. Environmental cooperation is part of the efforts to develop a Baltic security community. The Baltic region has fortunately been an area of environmental cooperation since the 1970's.

The Baltic Sea basin is one out of six major basins on the European continent, and about sixty in the world as a whole. In Europe the others are the North Sea, the Mediterranean Sea, the Black Sea, the Caspian Sea and the smaller White Sea/ Barents Sea basins. Even if these are very different, a study of the environment of one or the other basin would have much in common.

Distribution of pollutants by wind and rain is also relevant. In particular, the Baltic region receives many air-borne pollutants from Western Europe, and

exports some to Russia and Ukraine. Through the atmosphere, we also become part of the global environment with both responsibilities and just requirements.

Eutrophication of the Baltic Sea

It is often stated that during the 1900s there has been a fourfold increase in the load of N, and an eight-fold increase in the load of P (Larsson et al., 1985) to the Baltic Sea. Most of the increase has likely occurred since 1950. Although there are indications that such an increase may have occurred, it must be kept in mind that quantitative estimates of long-term changes in the loading of nutrients are uncertain. During 1970–1993 the total annual riverine loads of N and P discharged into the Baltic Sea were fairly constant, with inter-annual variation correlated to freshwater runoff.

The input of nutrients to the Baltic Sea occurs along four pathways, namely through riverine runoff, direct emissions from industries and urban areas on the coast, atmospheric deposition on the sea surface, and through N_2 fixation. Seepage of ground water is also a possible way by which nutrients can enter the sea, but this input is regarded as playing a small role for the flux of N and negligible in the transport of P. Fish farms may locally be of importance, e.g. in the archipelago of Finland. There may be other minor inputs, e.g. from ships.

The riverine runoff of N and P exceeds in size those of direct discharges, atmospheric deposition, and N_2 fixation. During the period of 1980–1993, the average annual river transports of N and P to the Baltic Sea were estimated to be 830,000 and 41,000 tonnes, respectively. The six largest river basins, namely the Neva, Narva, Daugava, Neman, Vistula, and Oder River Basins contributed with about 50 % of the load of both Tot-N and Tot-P.

Direct emissions into the sea from about 20 million people living in areas along the coast of the Baltic Sea amounts to a substantial volume of nutrients. Estimated coastal point-source pollution of nutrients are about 95,000 tonnes per year of N and 12,500 tonnes per year of P.

Atmospheric deposition of N is primarily composed of nitrate from combustion of fossil fuels and exhaust from motor vehicles, and ammonium from agriculture, particularly from livestock farming. The origin of P in this context is less important, although combustion of organic matter, sea-spray, and wind erosion of soils are the dominating sources. The nitrogen atmospheric deposition to the Baltic Sea increased during the 20th century and was about 330,000 tonnes per year in the middle of the 1980s. Since then it decreased to about 250,000 tonnes per year in the middle of the 1990s. There is a clear gradient between different basins: from 1,000 mg N/m^2.yr in the southern Baltic to less than 200 mg N/m^2.yr in the Bothnian Bay. For P investigations propose a range of 5,500–6,000 tonnes per year.

N_2 fixation by blue-green algae, properly called cyanobacteria, where nitrogen gas is transformed into bioavailable N, has been estimated to contribute 180,000 to 430,000 tonnes per year to the Baltic Sea proper (Larsson et al., 2001). In other sub basins N_2 fixation is regarded as insignificant.

The Physiological Basis for Eutrophication – Limiting Nutrients

Eutrophication occurs when plants, or in general autotrophs, in the presence of a surplus of nutrients, grow and reproduce through photosynthesis, in which they produce organic compounds from carbon dioxide and water.

Algae and other green plants consist mainly of carbon, hydrogen, and oxygen (often more than 98 % of the fresh-weight). The sources of these elements are, as mentioned, carbon dioxide and water. Several other elements or nutrients are also necessary in larger amounts such as some metals – calcium, magnesium, potassium – the metalloid silicon, and the non-metals sulphur, nitrogen, and phosphorus. These are often called *macro-nutrients.* Other elements needed in only very small amounts are the trace metals, principally copper, iron, and zinc, as well as the non-metals boron, manganese, and selenium, and these are therefore called *micro-nutrients* or trace elements.

A shortage of an essential nutrient will limit plant growth. In aquatic environments nitrogen and/or phosphorus are the elements which most often play the key roles as limiting nutrients. In phytoplancton organic matter there are on the average 16 nitrogen atoms for one phosphorus, called the *Redfield value.* It roughly describes the algal consumption pattern of these elements. An indication of the most limiting nutrient may be obtained by comparing this ratio with the corresponding ratio between nitrogen and phosphorus concentration in surface waters.

Shortage of a nutrient may limit primary production in three ways:

- the growth rate of an individual algal population
- net primary production or net biomass accumulation
- net production of the ecosystem

Limitation of net primary production or net biomass accumulation is the concept most often applied to nutrient limitation in aquatic ecosystems. Knowledge of which nutrient is most limiting for algal growth is of central importance for water management.

Several different methods are used to estimate the most limiting nutrient:

- *Nutrient supply ratios* by comparing: the external input ratios of nitrogen to phosphorus, and these ratios in surface waters with the corresponding ratio of these elements in algal cells (16:1, as was mentioned earlier), an indication of the most limiting nutrient may be obtained.
- *Nutrient enrichment tests*. Addition of extra nutrients to algal cultures or natural plankton communities may demonstrate which nutrient momentarily limits further algal growth.
- *Quantitative determination of alkaline phosphates.* These enzymes split off phosphate from organic phosphorus compounds. Their presence may demonstrate that phosphorus is a limiting nutrient. A combination of these approaches will give the most valid information.

Eutrophication in Lake and Marine Environments

The general consequences of increased input of plant nutrients to a water body are:

- increased nutrient concentrations in the recipient water;
- increased primary production as increased phytoplankton biomass, and increased growth of filamentous algae;
- subsequent physical, chemical, and biological changes, e.g. decreased light penetration, oxygen deficiency, and fish kill.

Oligotrophic, nutrient-poor water contains small amounts of nutrients available to plant, especially of phosphorus. This results in a low primary production, low biomass of phytoplankton, and high penetration of light. Submersed macrophytes can grow deep in the lake, and this environment favours the growth of salmonide fishes. The bottom sediment layer grows slowly.

Increased input of nutrients may rapidly change the environment in the lake. Some phytoplankton species can be stimulated and will start to grow rapidly, supplanting most other species. By developing large algal biomass these species, often cyanobacteria, drastically reduce the light penetration into the water. Light will no longer support photosynthesis in deeper parts in the lake, which means that the former submersed meadows of macrophytes will disappear. The composition of fauna may change – salmonides are replaced by whitefish, and the bottom sediment layer grows more quickly, due to increased sedimentation of organic material. During the 1960's, it became obvious that man-made eutrophication was causing an increasing and undesirable degradation of water quality in lakes and reservoirs. The growing problem of toxic bacteria blooms of cyanobacteria has been of special concern. Interfering with beneficial uses of waters, this deterioration has also caused significant economic losses, which during the 1970's

motivated comprehensive studies for increasing knowledge of how to control eutrophication. Since the mid-1970's noxious and sometimes toxic algal blooms, anoxic conditions, and fish kills have been increasingly reported in marine areas.

Eutrophication may alter the recreational value of surface waters and impair activities such as fishing, swimming, etc. resulting in both social impacts and economic losses. In the Baltic Sea the massive increase of reed belts along the coasts and in shallow bays illustrates this. If marine eutrophication cannot be stopped, it may severely damage the production of fish and shellfish, with severe consequences for society.

Unit IV

SOIL

READING MATERIAL

TEXT A

Task

a) Before reading the text try to discuss the following questions:

- What do you think have been the effects of using pesticides and artificial fertilizers in modern farming?
- What causes erosion of the top layers of the soil?

b) Now read the text and get ready to do the exercises after it.

Soil

Soil forms over thousands of years from the weathering[1] of rock. There are three types of weathering: physical weathering (where temperature changes cause the rock to expand and contract until it shatters into pieces), chemical weathering (where carbon dioxide and water form a weak acid that dissolves rocks such as limestone) and biological weathering (where the rock is broken down by the action of living things such as plant roots and bacteria). The top layer of the soil (topsoil) is rich in humus – a dark, fibrous material formed from decaying organic matter. Humus contains micronutrients such as nitrogen[2], minerals such as iron, and microorganisms that break down the organic matter. Humus absorbs moisture and binds the inorganic particles together. The quality (or fertility) of soil depends on the amount of humus in it – the organic content. Good quality topsoil is dark, moist and crumbly. The middle layer of the soil contains less organic material, but it is rich in minerals because these get washed down with the rain. The lower layer (subsoil) is made of inorganic material, similar to the parent rock which originally formed the soil. All living things are made of protein, which contains nitrogen. Without nitrogen, plants and animals cannot grow, because they cannot build new tissue. Traditional farming methods rotate cereal crops (which remove nitrogen from the soil) with leguminous plants[3] (which replace the nitrogen). Intensive farming methods, where cereals are grown every year, tend to deplete the soil of nitrogen. Repeated cropping and overgrazing[4] (that is putting too many cattle on a small area of grassland) cause erosion of the top layers of the soil. The essential nitrates are removed

with the topsoil so the nitrogen cycle, which is crucial to the balance of nature, is broken.

The earth is losing 24 billion metric tons of topsoil every year through intensive farming methods and deforestation[5]. The end stage of this loss of topsoil is desertification[6], where all the organic and mineral content of the soil has disappeared, leaving only poor quality subsoil, which cannot support plant growth. About 20 million hectares of productive land become barren[7] every year because of soil erosion. Thirty percent of the world's land surface is threatened with desertification Another hazard of intensive farming is salinization[8], which is caused by perennial irrigation (that is, irrigation year after year without a break) in arid climates. All soil contains some salt, which is washed away when it rains. Where rainfall is minimal, the salt content of the soil is very high. Evaporation from reservoirs and irrigation channels increases the salinity of the water. When a new irrigation scheme raises the water table, salt from the soil dissolves in the water and rises to the surface. Unless the area is left fallow and unirrigated for a season so that the salty water can drain away, the land will become permanently salinized and unable to support plant life.

The quality of soil can be improved by adding fertilizers. Organic fertilizers are made from animal and plant material such as compost (rotting plant matter) or manure[9] (animal excreta) which return essential micronutrients such as nitrates, phosphates and potash to the soil. Artificial (inorganic) fertilizers are manufactured compounds that contain high concentrations of these micronutrients; they are much more powerful than natural organic fertilizers. But they cause environmental damage by a process called eutrophication[10]. Excess nitrogen is washed out of the soil with the run-off after it rains. It passes into rivers and lakes, and encourages the growth of algae[11] (seaweed) in the water and of wild plants on nearby land. Overgrowth of algae upsets the balance of nature in lakes and seas. Overcrowding on the banks causes the plants to rot and die. The air becomes contaminated with nitrous oxide which contributes to the greenhouse effect. Like nitrates, phosphates and potash are taken up by growing plants and returned to the soil in animal excreta. The phosphates and potash in artificial fertilizers must be extracted from rocks by mining, but these mineral resources will not last forever. If we continue to damp animal and human waste into the sea instead of using it to fertilize the soil, our entire reserves of these precious minerals will be lost at the bottom of the oceans. Artificial fertilizers add a few selected micronutrients, but because they cause rapid plant

growth they deplete the soil of other nutrients. Plants grown in artificial fertilizers are often tasteless and have a low nutritional value. They may be contaminated with chemical residues from the fertilizer manufacturing process. For both environmental and health reasons, many consumers today prefer to buy organic vegetables – that is, vegetables grown without any artificial fertilizers.

Notes

[1] weathering – выветривание, эрозия
[2] nitrogen – азот
[3] leguminous plant – растение из семейства бобовых
[4] overgrazing – выбивание пастбища (скотом), чрезмерное стравливание пастбища
[5] deforestation – обезлесение, вырубка леса
[6] desertification – опустынивание
[7] to become barren – стать неплодородной (о земле)
[8] salinization – засоление (почв)
[9] manure – навоз, удобрение
[10] eutrophication – эвтрофикация (обогащение естественных водоемов неорганическими веществами, способствующими росту растений и водорослей)
[11] alga (pl. algae) – водоросль

Word Study

Ex. 1. Read the international words correctly. Mind the stress.

type	reservoir
physical	phosphate
temperature	biological
chemical	bacteria
fibrous	organic
humus	microorganism
mineral	originally
protein	intensive
method	erosion
cycle	productive
balance	irrigation
ton	reserve
scheme	

Ex. 2. Memorize the following pairs of derivatives.

N → Adj	**V → N**
salinity – saline	irrigate – irrigation
minimum – minimal	evaporate – evaporation
salt – salty	fertilize – fertilizer
environment – environmental	grow – growth
product – productive	deplete – depletion
biology – biological	
origin – original	
fibre – fibrous	

Ex. 3. Match English phrases and their Russian equivalents.

1. weathering of rock	a. чередовать культуры
2. to shatters into pieces	b. истощать почву
3. to dissolve rocks	c. нарушать цикл
4. plant roots	d. интенсивное земледелие
5. to absorb moisture	e. наносить ущерб окружающей среде
6. fertility of soil	f. выветривание породы
7. to get washed down with the rain	g. корни растений
8. to rotate crops	h. вымываться дождем
9. to deplete the soil	i. разрушать породы
10. to break the cycle	j. впитывать влагу
11. intensive farming	k. плодородие почвы
12. to cause environmental damage	l. расколоться на кусочки

Ex. 4. Translate into Russian the following words, word combinations and sentences.

Form – The rain formed large pools on the lawn. The clouds formed a veil over the mountain-top. Clouds are forming on the hills.

Rock – Rock decay, rock excavation, rock exposure.

Dissolve – Dissolve in water. Snow dissolves in the sun.

Soil – Poor soil, rich soil, unbroken (virgin) soil, Sandy (clayey, alluvial) soil, alkali soils, permanently frozen soil, poor quality subsoil.

Moisture – Moisture of plants, moisture equivalent, moisture recorder.

Land – Rich land, good land, fat land, boggy land, clayey land, cultivated land, stony land, good wheat land.

Arid – Arid zone, arid climate, arid desert.

Irrigation – Irrigation engineering, irrigation canal, irrigation farming, irrigation plant, irrigation station, irrigation water.

Fallow – To lie fallow, to lay land fallow, virgin and fallow lands.
Waste – Waste disposal, waste utilization.
Reason – The reason of eclipses. What is the reason of the tides? What is the reason of the dew?
Europhication – anthropogenous eutrophication, cultural eutrophication, managed eutrophication, eutrophication of waters.

Ex. 5. Identify the meaning of the words as they occur in the sentences below.

1. Rain is the most common precipitation form.
2. Air mass thunderstorms may form under conditions of high relative humidity and warm surface temperatures.
3. We may determine the relative age of different rock formations by fossil remains.
4. The earth in its early formative stage was much smaller than it is now.
5. Wind forms lake basins both through erosion and deposition.
6. In general, the shore forms of seas and lakes are similar.
7. Waste products serve for the manufacture of chemicals.
8. When the ice wastes away the moraines are deposited.

Ex. 6. Add nouns to the following adjectives to form noun phrases:

Adjectives	animal (human), chemical, biological, productive, intensive, poor quality, low nutritional, organic and mineral, artificial, mineral, organic
Nouns	farming methods, content, subsoil, land, fertilizers, resources, waste, value, residues, weathering

Ex. 7. Pair the verbs in column A with a suitable phrase in column B.

A	**B**
to encourage	the organic matter
to contribute	the inorganic particles together
to break down	the rock to expand and contract
to buy	rocks
to deplete	new tissue
to bind	nitrogen from soil
to cause	plant growth
to dump	to the greenhouse effect
to dissolve	animal and human waste into the sea
to support	the soil of other nutrients
to build	organic vegetables
to remove	the growth of algal

Ex. 8. Write out the equivalents in pairs.

hazard	join (unite)
decay	whole
break down	necessary
absorb	development
similar to	become better
remove	go bad
deplete	become useless
essential	take in (suck in)
crucial	take off or away
growth	use up
arid	decisive
add	dry
entire	like (of the same sort)
improve	danger

Ex. 9. Match the words with their appropriate explanations.

1. rock	a. not able to produce crops
2. expand	b. varying the crops grown each year on the same land to avoid exhausting the soil
3. contract	
4. decay	c. having not enough rainfall to support plants
5. bind	d. continuing throughout the whole year
6. fertile	e. solid stony part of the earth's crust
7. similar	f. make or become larger
8. remove	g. lose power; go bad
9. rotation (of crops)	h. tie or fasten
10. barren	i. producing much
11. perennial	j. like; of the same sort
12. arid (of climate)	k. make or become smaller or shorter
	l. take off or away (from the place occupied)

Ex. 10. How are these ideas expressed in the text.

1. Soil forms over thousands of years from the weathering of rock.
2. The fertility of soil depends on the amount of humus in it.
3. Farming methods influence the fertility of soil.
4. Hazards of intensive farming.
5. Fertilizers improve the quality of soil.

Ex. 11. Fill in the missing words in the sentences below. Choose from the following putting the verbs in the right tense and voice.

try	fall	cost	wash	kill
introduce	accelerate	grow	cause	have
increase (3)	deplete	absorb (2)	associate	reduce
secrete	accumulate	use	fail	make
suit				

1. Organic vegetables … also … without pesticides.
2. Pesticides … … by the crops and … into the rivers and the sea.
3. Some pesticides … in the human body and … … in breast milk.
4. Some pesticides may … cancer, miscarriage or even birth defects.
5. Intensive farming of high-yield strains … usually … with heavy use of both fertilizers and pesticides.
6. Organic farming methods … usually … these high-yield strains.
7. Intensive farming methods which successfully … crop yields in temperate zones often … in tropical climates.
8. Tropical heat … microorganisms, so tropical soil … a lower organic content.
9. This … its capacity to ... water and … it particularly vulnerable to erosion.
10. In general, tropical regions … more … to subsistence farming than to the large-scale, intensive production of cash crops.
11. If the people … to introduce intensive farming methods, yield may … temporarily, but they eventually … still further and soil erosion … .
12. Intensive farming techniques … crop yield in the short term but … the quality of the soil in the long term, particularly in tropical regions.
13. Intensive farming is yet another example of the "live now, pay later" philosophy that may ultimately … us the earth.

Ex. 12. Choose the best alternative to complete the following sentences.

1. The top layer of the soil is rich in … .
   a) clay b) limestone c) humus
2. The quality of soil depends on the … of humus in it.
   a) weathering b) amount c) types
3. The middle layer of the soil … less organic material.
   a) contain b) changes c) absorbs
4. The lower layer is made of inorganic material, … to the parent rock.
   a) contrary b) similar c) like
5. Without nitrogen plants and animals cannot … .
   a) form b) bind c) grow

6. Repeated cropping and overgrazing cause … of the top layer of the soil.
   a) weathering b) erosion c) moisture
7. The end stage of the loss of topsoil is … .
   a) desertification b) erosion c) weathering
8. Salinization is caused by perennial … in arid climates.
   a) farming b) irrigation c) evaporation
9. The quality of soil can be … by adding fertilizers.
   a) damaged b) increased c) improved
10. Artificial fertilizers cause environmental … by a process called eutrophication.
   a) effect b) damage c) growth

Ex. 13. Which preposition has been blacked out in the following article?

Protection of the Soil against Erosion

Soil erosion is the destruction and wearing … … the soil … water or wind. A layer … soil formed … the course … 100 or 200 years may be destroyed … a few days … heavy rain or dust storms. The soil is rapidly destroyed but forms only … a very lengthy period. That is why it is so vitally important to protect the soil.

Soil erosion … water is widespread and most destructive. It occurs … slopes and is due … improper working … the land.

Soil erosion … water is bad … agriculture … all respects. Grain harvests … strongly eroded soils are half those … uneroded soils.

Fighting any kind … soil erosion always requires a set … anti-erosion measures. No one measure alone is effective.

Soil erosion … wind is characteristic mostly … open, dry, diffused soils. It may arise … any field … sparse vegetation.

… wind erosion, the wind usually blows small bits … soil … the surface. When the wind grows stronger, these bits not only roll … the surface … the field but are even thrown … the air … distances … 3 to 4 metres.

A cloud … dust raised and driven … a field where the soil is destroyed … the wind is called a dust storm.

Sometimes, the wind may erode … to 5 cm … soil … a field. … natural conditions, it takes 250 … 300 years to restore one cm … soil. Soil loss is thus irretrievable.

Measures … wind erosion include: firstly, protection … fields … the wind; and secondly, retention … moisture … soil, because moist soil is firmer, plants grow quicker and more thickly … it, preventing the wind … destroying the soil.

Mud and stone streams (avalanches) … the mountains are a form … soil erosion which occurs … great speed due … to steep slopes and narrow gorges. Beginning unexpectedly … small mountain streams, the streams … foaming water, mud and stones move down … the speed … a train bringing death and destruction. They bury sections … railways and motor roads, houses, entire towns, and fertile lands, turning the latter … heaps … dried mud.

Ex. 14. Translate the following into Russian.

Man has been growing crops for 10,000 years. Until about 1960, increased demand for food was met simply by using more land to grow crops. As the population grew, farmers extended the area of land that they cultivated. From 1960 to 1980, increased demand for food was met mainly by increasing the productivity of the land. Farmers used techniques such as irrigation (which brings water to dry soil), terracing (which allows cultivation on steep hillsides) and fallowing (where fields lie uncultivated on alternate years to replenish the soil) to grow crops on previously unproductive land. The 1960s and 70s were also the decades of so-called "miracle strains" of rice and other staple crops, which produced a much higher yield per hectare. The availability of cheap nitrogen fertilizer also helped to increase productivity between 1960 and 1980. Fifteen years ago, we were becoming complacent about our ability to feed the world's population. But over the past 10 years, food productivity has reached a plateau, and has even begun to fall. There is little new land available for cultivation. High-yield strains of rice and cereals have already replaced standard strains in most places. The promise of even more efficient strains through genetic engineering has not yet been fulfilled, and scientists are increasingly pessimistic about whether further improvements are possible. In some cases, increases in productivity have been a false economy. Continuous cropping of cereals reduces the quality of the soil and increases soil erosion. The world is losing millions of tons of topsoil every year through intensive farming methods. The productivity of these exhausted soils will soon begin to fall.

A crisis is looming. Over the past 40 years, world demand for food has tripled. World population is still rising at a rate of 93 million people every year. But food production cannot increase indefinitely. Per capita grain production reached a peak in 1985 and is now declining. In 1987, world reserves of grain were sufficient to last for 101 days; by 1989 they would only last 54 days. The '"grain mountains" of surplus cereals produced by high-technology farming in Western Europe will be a short-lived phenomenon. In the next few years, demand for food will exceed supply. Many countries in the world are already desperately short of food. For years, countries such as Sudan and Ethiopia have fluctuated between meager subsistence and overt famine. Three factors can push a country into famine: drought, civil war and pestilence (such as a plague of locusts). But

these things are not the causes of the food shortage, since they cause famine only when food reserves are already at a critically low level. Children with severe malnutrition – the starvation diseases marasmus and kwashiorkor – are uncommon even in the poorest countries. But mild nutritional deficiency is very common. A quarter of all children in the developing world suffer from mild to moderate malnutrition. Fifty to seventy percent have mild vitamin B deficiency. These children are teetering on the edge of starvation.

Ex. 15. Give the English equivalents.

Многолетняя ирригация (орошение), сухой климат, растворять в воде, угрожать, поддерживать жизнь растений, стать неплодородной (о земле), опустынивание, обезлесение, верхний слой почвы, углекислый газ, выветривание (эрозия) породы, температурные изменения, засоление (почв), чрезмерное стравливание пастбища, истощать (почвы), впитывать влагу, известняк, оставаться под паром (о пахотной земле), чередовать культуры, интенсивное земледелие, разрушать породы, плодородие почвы.

Comprehension and Discussion

Ex. 1. Say whether the following statements are true or false. Justify your answers with the information from the text. For the statements you consider to be false provide the correct information. Here are the possible openings for you: really (sure); absolutely so; it can't be denied; it can be easily proved; that is only partly true; as far as I remember; as far as I know (have learnt) from the contents; this is generally believed to be true; this is believed by some to be true.

1. Artificial fertilizers cause environmental damage.
2. Too much nitrogen causes too much growth of seaweed and wild plants nearby.
3. The plants do not rot and do not die.
4. The essential nitrates are removed with the topsoil, so the nitrogen cycle is broken.
5. The air becomes contaminated with nitrous oxide, but this does not lead to greenhouse effect.

Ex. 2. Which phrase on the right completes each sentences beginning on the left? Do you strongly agree or disagree with any of the statement?

1. There are three types of weathering: …	a) … support plant growth
2. The quality of soil depends …	b) … perennial irrigation
	c) … adding fertilizers

3. All living things are made …	d) … erosion of the top layers of the soil
4. Plants and animals cannot grow without …	e) … deplete the soil of nitrogen
5. Traditional farming methods rotate …	f) … cereal crops with leguminous plants
6. Intensive farming methods tend to …	g) … nitrogen
7. Repeated cropping and overgrazing cause …	h) … of protein
8. Poor quality subsoil cannot …	i) … on the amount of humus in it
9. Salinization is caused by …	j) … physical, chemical, biological weathering
10. The quality of soil can be improved by …	

Ex. 3. Choose someone as a scientist and answer the students' questions.

What is (are)	the end stage of the loss of topsoil.
Could you explain to me	why productive land becomes barren.
Can you tell me about	the process of desertification.
What do you mean by	what perennial irrigation causes.
Why	what increases the salinity of the water.
How	the quality of soil can be improved.

Ex. 4. Speak on.

1. The weathering of rock. (to form; to cause the rock to expand and contract; to shatter into pieces; to form a weak acid; to dissolve rocks; to break down; to be formed from decaying organic matter; to contain; to absorb moisture; to bind inorganic particles together; to depend on)
2. Farming methods. (to rotate cereal crops; to deplete the soil; to cause erosion; to remove; to be crucial; deforestation; desertification; poor quality subsoil; to support plant growth; to become barren; to be threatened with; salinization; perennial irrigation; arid climates; to increase the salinity of water; to be left fallow; to support plant life)
3. How to improve the quality of soil. (to add fertilizers; to return micronutrients to the soil; to contain; artificial fertilizers; natural organic fertilizers; to cause environmental damage; to encourage the growth of algae; to upset the balance of nature)
4. What contributed to the greenhouse effect. (to rot; to die; to become contaminated with nitrous oxide)
5. Plants can be tasteless. (to add a few selected micronutrients; to cause rapid plant growth; to deplete the soil; to have a low nutritional value; to buy organic vegetables).

Ex. 5. Read the text. Get ready to give extensive answers to the questions.

1. What is the effect of pesticides on increasing crop yields?
2. Why do intensive farming methods often fail in tropical climates?
3. What does fertile soil contain?

Organic vegetables are also grown without pesticides. These chemicals kill insects and other pests but they are poisonous to many other living things as well – including man. Pesticides are absorbed by the crops and washed into the rivers and the sea. They often become concentrated by the food chain. Some pesticides accumulate in the human body and are secreted in breast milk. About 20,000 people in the world including many children, die each year from accidentally drinking or inhaling pesticides. Some pesticides may cause cancer, miscarriage or even birth defects. The effect of pesticides on increasing crop yields is often transient. Some pests become resistant to the chemicals. The pesticides might destroy the pest's natural predators, so the farmer soon sees a paradoxical increase in the pest population. The so-called "miracle strains" of high-yield cereal crops are particularly vulnerable to pests. The farmer must use higher concentrations of pesticides each year to control the problem. Intensive farming of high-yield strains is usually associated with heavy use of both fertilizers and pesticides. Organic farming methods do not usually use these high-yield strains.

Intensive farming methods which successfully increase crop yields in temperate zones often fail in tropical climates. There are several reasons for this. First, tropical countries usually have poor soil. Tropical heat kills microorganisms, so tropical soil has a lower organic content. This reduces its capacity to absorb water and makes it particularly vulnerable to erosion. When rain comes in the tropics, it usually arrives in a huge deluge after several months of no rain at all. The sandy topsoil is easily washed away, leaving soil of even poorer quality beneath. Second, there are more pests. In temperate areas, the cold winter kills off many of the weeds, fungi, insects and other pests. In tropical zones, there is no cold season. The pests thrive in the constant heat and frequently cause failure of crops. They spread easily from one field to another, so they cause particular damage when a single crop is grown intensively on a vast area of land. In general, tropical regions are more suited to subsistence farming (where a variety of small-scale crops is grown) than to the large-scale, intensive production of cash crops. Third, livestock in the tropics is heavily infested with parasites – that is, small organisms such as tapeworms which live in the intestines of pigs and cattle. The parasites use up precious micronutrients and so the animals grow up small and weak. The yield from both arable and cattle farming in tropical regions is usually one-quarter to one-third that of temperate regions. If the people try to introduce intensive farming methods, yields may increase temporarily, but they eventually fall still further and soil erosion accelerates.

A handful of soil looks inert and uninteresting. But good quality, fertile soil contains all the basic building blocks of life. Beneath the thin layer of soil lies a planet as lifeless as the moon. Intensive farming techniques increase crop yield in the short term but deplete the quality of the soil in the long term, particularly in tropical regions. At best, crop yields fall and at worst, the soil becomes ecologically bankrupt and unable to sustain crops at all. Intensive farming is yet another example of the "live now, pay later" philosophy that may ultimately cost us the earth.

Ex. 6. Choose one of the following items and write an essay. Use additional material.

1. The effects of using pesticides and artificial fertilizers in modern farming.
2. Hazards of intensive farming.
3. The process of eutrophication.
4. The greenhouse effect.
5. The effects of intensive farming in temperate zones (in tropical climates).

TEXT B

Task. **Read the text and get ready to discuss its main points.**

Protection of the Soil Against Erosion

Soil erosion is the destruction and wearing away of the soil by water or wind. A layer of soil formed in the course of 100 or 200 years may be destroyed in a few days by heavy rain or dust storms. The soil is rapidly destroyed but forms only over a very lengthy period. That is why it is so vitally important to protect the soil.

Soil erosion by water is widespread and most destructive. It occurs on slopes and is due to improper working of the land.

Soil erosion by water is bad for agriculture in all respects. Grain harvests on strongly eroded soils are half those on uneroded soils.

Fighting any kind of soil erosion always requires a set of anti-erosion measures. No one measure alone is effective.

Soil erosion by wind is characteristic mostly of open, dry, diffused soils. It may arise on any field with sparse vegetation.

In wind erosion, the wind usually blows small bits of soil over the surface. When the wind grows stronger, these bits not only roll over the surface of the field but are even thrown into the air for distances of 3 to 4 metres.

A cloud of dust raised and driven over a field where the soil is destroyed by the wind is called a dust storm. Sometimes, the wind may erode 1 to 5 cm of soil

from a field. In natural conditions, it takes 250 to 300 years to restore one cm of soil. Soil loss is thus irretrievable.

Measures against wind erosion include: firstly, protection of fields against the wind; and secondly, retention of moisture in the soil, because moist soil is firmer, plants grow quicker and more thickly on it, preventing the wind from destroying the soil.

Mud and stone streams (avalanches) in the mountains are a form of soil erosion which, occurs at great speed due to steep slopes and narrow gorges. Beginning unexpectedly in small mountain streams, the streams of foaming water, mud and stones move down with the speed of a train bringing death and destruction. They bury sections of railways and motor roads, houses, entire towns, and fertile lands, turning the latter into heaps of dried mud.

Mud and stone streams caused by human activities occur when the latter are incorrectly conducted in the mountains, such as mining enterprises dumping waste on steep slopes. Strong rain erodes these waste piles and disrupts the unstable balance of the loose waste masses. Dozens or even hundreds of thousands of cubic metres of soil and stones are driven by the water down mountain rivers. It is not surprising that avalanches due to human activities occur much more often than natural ones.

The second cause of mud and stone streams of human origin is incorrect exploitation of plant resources and excessive cattle, grazing in the mountains. If forests are cut down in the mountains or cattle graze for too long on denuded slopes, the soil becomes unstable.

The best way of fighting mud arid stone streams is to plant forests in river valleys where they occur, prohibit the random felling of trees on mountain slopes, the disorderly dumping of refuse ore by mining enterprises, and the destruction of rock by explosions. Cattle grazing should be strictly regulated in the mountains, and banned completely in places where the danger of mud and stone streams is particularly great. At the same time, permanent hydraulic works – drainage canals, check dams and so on should be set up in river valleys.

The process of bank erosion is of particular interest in terms of soil conservation as is the washing away of soil during floods in the flood land and depositing of sand and silt in the flood land and river bed.

It is most important to preserve the rich floodland soils. Floodland meadows are the most fertile soil.

Protective forestation. There are two main types of protective forest belts: water regulating and wind breaking. The first type is intended to protect the soil from water erosion. These belts are planted across slopes.

Wind breaking forest belts are quite different. Their purpose is to reduce wind speed on the fields between the belts.

None of the anti-erosion measures and hydraulic works can be effective without protective forest belts. In the places where the forest belt system has been created with due account for the direction of the most harmful winds, crops and soil are not harmed by the wind and harvests are higher as a rule.

These belts should also be considered as the habitat of wild animals, recreation sites and in terms of their aesthetic value.

Ex. 1. Complete the following sentences.

1. Fighting soil erosion requires …
2. Grain harvests on strongly eroded soils are …
3. Soil erosion by wind is characteristic …
4. Measures against wind erosion include …
5. Avalanches in the mountains occur at great speed due to …
6. Avalanches due to human activities occur …
7. The best way of fighting mud and stone streams is to …

Ex. 2. Here are the answers. What are the questions?

1. The soil forms only over a lengthy period. (How long?)
2. Soil erosion occurs on slopes and is due to improper working of the land. (Due to what?)
3. Soil erosion by wind may arise on any field with sparse vegetation. (Where?)
4. Because moist soil is firmer, plants grow quicker and more thickly on it, preventing the wind from destroying the soil. (Why?)
5. The soil becomes unstable, if forests are cut down in the mountains or cattle graze for too long on denuded slopes. (Under what conditions?)
6. The best way of fighting mud and stone streams is to plant forests in river valleys, prohibit the random felling of trees on mountain slopes, the destruction of rock by explosions. (What?)
7. Floodland meadows are the most fertile soil? (What?)
8. There are two main types of protective forest belts: water regulating and wind breaking. (What?)
9. The purpose of wind breaking forest belts is to reduce wind speed on the fields between the belts. (What?)
10. In the places where the forest belt system has been created with due account for the direction of the most harmful winds, crops and soil are not harmed by the wind. (Where?)

Ex. 3. Expand on the following.

1. Soil erosion is the destruction and wearing away of the soil by water or wind.

2. Soil erosion by water is bad for agriculture.
3. Soil erosion by wind is characteristic mostly of open, dry, diffused soils.
4. Mud and stone streams are often caused by human activities.

Ex. 4. Discuss the following.

1. Fighting soil erosion.
2. Measures against wind erosion.
3. Causes of mud and stone streams.
4. The process of bank erosion.
5. Protective forestation.

TEXT C

Task. **Read the text and say by what the soil may be polluted. Explain according to what soils are classified.**

Protection of the Soil Against Pollution

The most widespread substances polluting the soil from the atmosphere are nitric and sulfur oxides. They enter the soil together with precipitation, raise soil acidity and significantly lower fertility.

Higher concentrations of heavy metals in the soil around industrial enterprises deplete the local flora, with the more sensitive species disappearing.

It is a difficult problem to restore the fertility of soil polluted by heavy metals. The main measure, and a cardinal solution to the problem is to improve technology so that waste is not released into the environment. Sometimes various chemical substances are introduced into the soil to neutralize the effect of soil pollutants, and so on.

The soil may be polluted when fertilizer and pesticides are incorrectly used, and also by the waste of livestock breeding complexes.

Until recent times, animal wastes were utilized as a valuable economic source of nutrients for crop production. Since World War II, commercial fertilizers have become the preferred source for supplementing nutrients in the soil because of their relatively low cost, ease of handling, ease of storing and ready availability. It is imperative that ways are found to utilize agricultural wastes to improve soils and provide added / fertility for plant growth.

Soils vary greatly in their physical and chemical properties and are classified according to these properties.

An understanding of these properties provides information needed to determine the suitability of soils for land disposal of wastes. The engineer ‘may find the advice of a soil scientist valuable when attempting to locate soils for waste disposal.

The chemical conditions existing in soils determine the reaction of soil, which may be acid, neutral or alkaline. This reaction in turn determines the availability or solubility or certain elements as well as the response of microorganisms and higher plants.

There is a natural tendency for soils to become acid in humid climates where sufficient rainfall occurs to leach bases from the surface layers. Hydrogen and aluminium become dominant in the exchange complex and the soil is acid in reaction. When soil colloids are dominated by calcium and magnesium on their adsorptive surfaces, the soil is neutral or alkaline in reaction. This condition occurs in limed soils or low rainfall areas.

The soil chemical properties determine the capacity of the soil to break down the complex waste materials added in varying amounts. These properties are also influenced by the application of wastes.

In the past several years, interest in land disposal of domestic wastewaters has increased. This increase arises from a widespread desire to conserve water by recycling. Also, it is thought that land disposal of wastewater would minimize water pollution problems attributed to the presence of large amounts of chemical constituents that can cause significant water quality deterioration in water-based disposal systems. Additional interest in land disposal has been created by the possibility that nutrients present in domestic wastewaters, such as nitrogen and phosphorus, can be recycled to the land where they could then serve as fertilizer for terrestrial plants. Land application of domestic wastewaters is potentially an ecologically sound practice; however, a number of potential problems associated with such a practice could result in environmental degradation.

Ex. 1. Complete the chart below.

The ways of polluting the soil	Classification of soils	Conservation of water

Ex. 2. What problems can be discussed with the help of the following groups of words?

1. widespread substances, to raise soil acidity, to lower fertility, to deplete the local flora, to release waste into the environment, to neutralize the effect of soil pollutants;
2. properties of soils, to determine the suitability of soils for land disposal of wastes, to locate soils for wastes, to locate soils for waste disposal;
3. to become acid, to occur, to become dominant, limed soils, low rainfall areas;
4. to conserve water, land disposal, to minimize water pollution problems, to cause water quality deterioration, to recycle, to serve as fertilizer, to result in environmental degradation

TEXT D

Task. **Read the text and get ready to do the exercises after it.**

Desertification

Desertification is the process which turns productive into non- productive desert as a result of poor land-management. Desertification occurs mainly in semi-arid areas (average annual rainfall less than 600 mm) bordering on deserts. About one third of the world's land surface is arid or semi-arid. It is predicted that global warming will increase the area of desert climates by 17 % in the next century.

Desertification became well known in the 1930's, when parts of the Great Plains in the United States turned into the "Dust Bowl" as a result of drought and poor practices in farming, although the term itself was not used until almost 1950. During the dust bowl period, millions of people were forced to abandon their farms and lively-hoods. Greatly improved methods of agriculture and land and water management in the Great Plains have prevented that disaster from recurring, but desertification presently affects millions of people in almost every continent. By 1973, the drought that began in 1968 in the Sahel of West Africa and the land-use practices there had caused the deaths of more than 100,000 people and 12 million cattle, as well as the disruption of social organizations from villages to the national level.

WHAT CAUSES DESERTIFICATION?

Overgrazing is the major cause of desertification worldwide. Plants of semi-arid areas are adapted to being eaten by sparsely scattered, large, grazing mammals which move in response to the patchy rainfall common to these regions. Early human pastoralists living in semi-arid areas copied this natural system. They moved their small groups of domestic animals in response to food and water availability. Such regular stock movement prevented overgrazing of the fragile plant cover.

In modern times, the use of fences has prevented domestic and wild animals from moving in response to food availability, and overgrazing has often resulted. However, when used correctly, fencing is a valuable tool of good veld management. The use of boreholes and windmills also allows livestock to stay all-year round in areas formerly grazed only during the rains when seasonal pans held water. Where not correctly planned and managed, provision of drinking water has contributed to the massive advance of deserts in recent years as animals gather around waterholes and overgraze the area.

Cultivation of marginal lands, lands on which there is a high risk of crop failure and a very low economic return, for example, some parts of South Africa where maize is grown.

Destruction of vegetation in arid regions, often for fuelwood.

Poor grazing management after accidental burning of semi-arid vegetation.

Incorrect irrigation practices in arid areas can cause salinization, (the build up of salts in the soil) which can prevent plant growth.

When the practices described above coincide with drought, the rate of desertification increases dramatically.

Increasing human population and poverty contribute to desertification as poor people may be forced to overuse their environment in the short term, without the ability to plan for the long term effects of their actions. Where livestock has a social importance beyond food, people might be reluctant to reduce their stock numbers,

WHAT ARE THE EFFECTS OF DESERTIFICATION?

Desertification reduces the ability of land to support life, affecting wild species, domestic animals, agricultural crops and people. The reduction in plant cover that accompanies desertification leads to accelerated soil erosion by wind and water.

South Africa loses approximately 300–400 million tonnes of topsoil every year. As vegetation cover and soil layer are reduced, rain drop impact and run-off increases.

Water is lost off the land instead of soaking into the soil to provide moisture for plants. Even long-lived plants that would normally survive droughts die. A reduction in plant cover also results in a reduction in the quantity of humus and plant nutrients in the soil, and plant production drops further. As protective plant cover disappears, floods become more frequent and more severe. Desertification is self-reinforcing, i.e. once the process has started, conditions are set for continual deterioration.

Ex. 1. Choose the best alternative to each question.

1. Which of the following does the text mainly discuss?
   a) classification of soils
   b) causes of desertification
   c) chemical properties of soils
   d) the effect of soil pollutants

2. According to the text in what areas does desertification mainly occur?
   a) clayey soil
   b) permanently frozen soil

c) semi-arid areas
d) poor quality subsoil

3. The word “occur” is closest in meaning to:
a) move
b) use
c) result
d) happen

4. According to the text what will global warning increase?
a) the area of desert climates
b) drought
c) semi-arid areas
d) marginal lands

5. According to the text when did desertification become known?
a) in the 1950’s
b) in the 1930’s
c) in the 1940’s
d) in the 1960’s

6. According to the text what is the major cause of desertification?
a) rainfall
b) dry climate
c) overgrazing
d) strong winds

7. According to the text what is a valuable tool of good veld management?
a) irrigation
b) water management
c) forest belts
d) fencing

8. According to the text what can cause salinization?
a) incorrect irrigation practices
b) poverty
c) increasing human population
d) provision of drinking water

9. According to the text what does desertification reduce?
a) drought
b) flooding
c) salinization
d) the ability of land to support life

10. According to the text what does the reduction in plant cover lead to?
    a) global warning
    b) advance of deserts
    c) accelerated soil erosion
    d) vegetation

Dialogue

Discussing the process of desertification.

Task 1. **Read the dialogue and reproduce it**
a) abridged;
b) in the form of a monologue

Student: Will you explain what the term "desertification" means?

Prof. Belov: It is the process which turns productive into non-productive desert as a result of poor land-management. It occurs mainly in semi-arid areas bordering on deserts.

Student: Yes, we know that one third of the world's land surface is arid or semi-arid. And it is predicted that global warning will increase the area of desert climates by 17 %. But what causes desertification?

Prof. Belov: The major cause of desertification worldwide is overgrazing. Provision of drinking water to animals has contributed to the massive advance of deserts in recent years as animals gather around waterholes and overgraze the area. We can also mention such factors as cultivation of marginal lands, destruction of vegetation in arid regions, often for fuel wood, poor grazing management after accidental burning of semi-arid vegetation, incorrect irrigation practices in arid areas. Increasing human population and poverty contribute to desertification as poor people may be forced to overuse their environment in the short tern.

Student: How can desertification be halted?

Prof. Belov: The number of animals must be reduced, allowing plants to regrow. Soil conditions must be made favourable, for plant growth, for example mulching. Mulch reduces evaporation, suppresses weed growth, enriches soil as it rots, and prevents runoff and hence erosion. However, the only realistic large-scale approach is to prevent desertification through good land management in semi-arid areas.

Student: As I understand, desertification often occurs over many generations, on a very large scale and so it is difficult for individuals to take action.

Prof. Belov: You are right. Desertification may intensify a general climatic trend toward greater aridity, or it may initiate a change in local climate. I think it is necessary to take part in the activities of conservation groups.

More efficient use of existing water resources and control of salinization are also effective tools for improving arid lands.

New ways are being sought to use surface water resources such as rain water harvesting or irrigating with seasonal runoff from adjacent highlands.

Research on the reclamation of deserts is focusing on discovering proper crop rotation to protect the fragile soil, on understanding how sand-fixing plants can be adapted to local environments, and on how grazing lands and water resources can be developed effectively without being overused.

Task 2. **Translate into English.**

Опустынивание – одно из проявлений глобальных изменений природы в прошлом, настоящем и будущем. Термин "опустынивание" введен в научное обращение с середины XX века для объяснения эволюции гумидных и субгумидных ландшафтов в тропической Африке в результате изменения климата и деятельности человека.

Последующая систематизация накопленных наблюдений за процессами опустынивания показала, что воздействие климатического фактора на опустынивание осуществляется параллельно с антропогенным. Это обстоятельство нашло отражение в новом определении опустынивания.

Термин "климатическое опустынивание" ("desertification climatique") был предложен в 1940-х годах XX века французским исследователем А. Обревилем (Aubreville, 1949) – одновременно с термином "опустынивание" – для обозначения климатического фактора опустынивания саванн по отношению к антропогенному.

Современное опустынивание развивается в последние десятилетия в условиях глобального потепления. Уменьшение или уничтожение биологического потенциала земли может привести к возникновению условий, аналогичных условиям пустыни.

Большинство ученых считают, что образование пустынь связано с вырубкой лесов и неразумным использованием пастбищ.

Опустынивание стало сопровождать человека со времени его перехода к ведению примитивного хозяйства. Три основных процесса способство-

вали этому: эрозия почв, вынос химических элементов с урожаем, вторичное засоление почв при поливном земледелии.

Конечный результат такого явления – массовая гибель скота, голод, высокая смертность населения. Опустынивание, таким образом, превратилось в крупную эколого-социальную катастрофу. В целом в мире ежегодно около 20 млн га земель превращается в пустыни.

REVISION

Ex. 1. Fill in the text with the appropriate word from the box.

die, salinization, waste, damage, salts, crust, evaporates, ground, surface, soil, layer, dryness, lands, crops.

To Save the Soil from Salinization

The chief culprits of … are sodium and magnesium … . They are found deep in the … but along the capillaries, which abound in any … , they are gradually drown with the salt liquor to the … . The water then … and the salt settles. Thus with every passing year it accumulates in the arable … , forming a sparkling … on the surface. And the plants begin to … – not of ordinary drought, but of what is known as physiological … . Try and slake the thirst with salt water.

In consequence, arable … degenerate into … lands, incapable of yielding … . Thus salt inflicts colossal … on agriculture.

Ex. 2. Translate the text into Russian and answer the questions following it.

Rational use of Land Resources

The rational use of land resources includes not only the conservation measures but also actual use of the land. It is very, important that plough-land be protected against inefficient use for civil and industrial construction, against dumping with builders' refuse, and urban and village dumps. Nearly half the new land assigned for urban development, airports, roads, etc. is assigned at the expense of ploughed land and pastures.

Recultivation of Land

Efforts are being undertaken throughout the world to recultivate the lands spoiled by industry. Recultivation develops along the following lines depending on the subsequent use to be made of the land:

1. Agriculture ploughland, meadows, pastures and perennial crops.
2. Forestry: reforestation for exploitation and special purposes (soil conservation, sanitary purposes, water protection and so on).

3. Water economy (reservoirs, fish and waterfowl ponds and so forth).
4. Recreation: parks, swimming pools, beaches and the like.
5. Architecture and urban planning: planting of trees and shrubs, and lawns, making of ponds in depressions near housing.

In all cases, recultivation is carried, out in two stages: the technical stage constitutes the process of constructing the land areas, and the biological stage aimed at putting the land to use.

The technical stage should include the levelling of open-cut mines and pits, chemical improvement (when the rock is phytotoxic), and covering the rock with a layer of fertile soil. The fertile soil layer is of decisive importance in securing plant growth. That is why it is vital not to destroy the top soil on the areas to be mined or on construction sites.

The biological stage includes the growing of greenery: the restoration of forests or agricultural fields, the planning of parks, the breeding of fish in ponds and so on. In sparsely populated areas, recultivation is carried out by planting forests more often. Thai is because forest plants are less demanding on the environmental conditions than agricultural crops. When forests are planted, the surface does not have to be so carefully levelled and the layer of fertile soil does not have to be so thick. This makes the work simpler and less costly.

Agricultural recultivation is usually carried out in agrarian areas with dense population, fertile soils and where the shortage of land is particularly felt.

Questions:

1. What does the rational use of land resources include?
2. Is it necessary to protect ploughland against inefficient use for civil and industrial construction?
3. How does recultivation of the lands develop?
4. In how many stages is it carried out?
5. What kind of process does the technical stage constitute?
6. What is the biological stage aimed at?
7. What should the technical stage include?
8. What does the biological stage include?
9. How is recultivation carried out in sparsely populated areas? Why?
10. In what areas is agricultural recultivation usually carried out?

Ex. 3. Translate the text in to Russian (in writing).

How can desertification be halted?

To halt desertification the number of animals on the land must be reduced, allowing plants to regrow. Soil conditions must be made favourable for plant growth by, for example, mulching. Mulch (a layer of straw, leaves or sawdust covering the soil) reduces evaporation, suppresses weed growth, enriches soil as

it rots, and prevents runoff and hence erosion. Reseeding may be necessary in badly degraded areas. Mulching and reseeding are expensive practices. However, the only realistic large-scale approach is to prevent desertification through good land management in semi-arid areas.

WHAT YOU CAN DO?

Desertification often occurs over many generations, on a very large scale and so it is difficult for individuals to take action. Desertification may intensify a general climatic trend toward greater aridity, or it may initiate a change in local climate. Some ideas for combatting this problem include:

- Take part in the activities of conservation groups.
- Bring overgrazing and land mismanagement to the attention of the Directorate of Resource Conservation .

More efficient use of existing water resources and control of salinization are other effective tools for improving arid lands. New ways are being sought to use surface-water resources such as rain water harvesting or irrigating with seasonal runoff from adjacent highlands. New ways are also being sought to find and tap groundwater resources and to develop more effective ways of irrigating arid and semiarid lands. Research on the reclamation of deserts also is focusing on discovering proper crop rotation to protect the fragile soil, on understanding how sand-fixing plants can be adapted to local environments, and on how grazing lands and water resources can be developed effectively without being overused.

If we are to stop and reverse the degradation of arid and semiarid lands, we must understand how and why the rates of climate change, population growth, and food.

Ex. 4. Translate the text into English.

С воздействием человека на почвы связано разрушение естественных ландшафтов, обеднение видового разнообразия, резкое снижение устойчивости экосистем, их продуктивности и биомассы.

Фактором накопления и сохранения энергии в почвах выступает прежде всего специфическое органическое вещество – гумус и живые организмы. Любое сокращение их содержания в почвах не только снижает плодородие, но и уменьшает способность саморегулирования, устойчивости.

Под эрозией почв понимают их разрушение в результате действия воды или ветра.

Различают водную и ветровую эрозии. В первом случае в качестве разрушающей силы выступает текущая вода, во втором – движение воздуха.

Меры борьбы с водной и ветровой эрозией в ряде случаев совпадают.

1. При вырубках леса очень важно сохранять молодое поколение леса, а также кустарниковый и травяной покров.

2. На пастбищах эрозионные процессы нередко вызываются перевыпасом (скотосбоем). Основной путь исключения неблагоприятных явлений – соблюдение норм выпаса и рекреационных нагрузок.

3. Для защиты пахотных земель наиболее действенны следующие мероприятия:

- соблюдение севооборотов;
- исключение из обработки легкоранимых песчаных и супесчаных почв;
- чередование небольших полей с естественными ландшафтами;
- создание полезащитных полос;
- внесение органических удобрений;
- использование техники с малым удельным давлением на почву.

Причины истощения земель различны. Это отчуждение питательных веществ с урожаем, потеря гумуса, ухудшение водного режима и других свойств почв.

Наиболее экологичным методом возврата веществ в почву является внесение органических удобрений, предоставление отдыха почвам через парование и другие методы.

Минеральные удобрения способны оказывать отрицательное воздействие на растения, качество растительной продукции и на организмы, ее потребляющие.

Additional Reading

Food and Famine

The food shortage in the Third World has been aggravated by the change in land use from subsistence farming to the production of cash crops for export. A few entrepreneurs take over large areas of land and drive the small peasant farmers out of business. Money comes into the country, but it does not create wealth for the people who need it. It goes into the pockets of a few business people. In an export-led Third World economy, the rich usually get richer while the poor get closer to starvation. The rich nations' love of meat has led directly to malnutrition and environmental damage in the Third World. In the 1970s and '80s, the demand for cheap beef increased as the US. hamburger industry grew. Many Third World farmers started producing cattle feed instead of grain for human consumption. In the poorest countries of the world, where the local population could barely get enough to eat, valuable farmland was used to fatten cows for export. (A further tragic consequence of the demand for cheap beef was the destruction of rainforests). In most countries, eating dead animals is a

symbol of a civilized and sophisticated lifestyle. People in rich countries eat meat two or three times a day, and many people in poor countries wish they could do the same. Meat is considered a "quality" food. But in reality it is an inefficient way to feed the population. Animals only convert one-tenth of what they eat into protein, so the production of meat requires much more land than the production of cereals, soya beans or other vegetables for human consumption. Two-thirds of all the grain produced in the world goes to feed livestock. A change in people's attitude to food, so that meat ceases to be a status symbol, could reduce meat consumption significantly. Millions of hectares of land would be freed for more productive use.

Western countries, which have contributed greatly to the food shortage in the Third World, like to offer "food aid" to the poorer countries. They send huge quantities of grain to countries where there is overt or imminent famine. But food aid sometimes brings more problems than it solves. Distributing the food, and converting it to a form that can be eaten, can pose major problems. The surplus of wheat flour in Europe and North America is no use to a country devastated by famine and civil war. The people do not have the transportation system to distribute the flour or the tools to make it into bread. Dried skimmed milk, which is a by-product of the butter industry, is a useful and nutritious food. But it must first be mixed with vegetable oil to make a balanced meal, otherwise it will not be absorbed by undernourished children, in the past, sacks of dried skimmed milk dumped at the frontier of a starving country have become as hard as concrete while waiting for supplies of oil to mix with the milk. Badly-planned food aid programs are a waste of time and resources. There is another reason why food aid is becoming unpopular. It is, at best, a short-term strategy for dealing with an emergency. It can stifle the initiative of the local people and create a culture of dependency. It does nothing to solve the long-term shortage of food.

There are no easy solutions to the world food crisis. But three strategies will help to ease the problem. First, population growth must be controlled. Second, the short-term economic gains of intensive farming must be sacrificed and replaced with conservation-oriented methods that replenish the soil and improve long-term productivity. Third, we must encourage the people in developing countries to become self-sufficient in food production. This will be difficult because the economies of these countries are now heavily dependent on their cash crops. Business people will say that changing back to small-scale subsistence farming will be a step backward. Consumers in the rich countries, who now enjoy the luxury of cheap cash crops from the Third World, may protest. But if we care about feeding the world's poor, we must be prepared to change our own greedy lifestyles rather than simply dumping our surplus food on populations who cannot use it.

Acidification of the Soil

The critical load, the ability of the soil to resist (its buffering capacity) is sooner or later used up and it becomes acidified. The following may be said to be the worst effects:

Plant nutrients are leached out. The ability of plants to take up nutrients diminishes when the availability of base cations in the soil, such as magnesium, calcium, and potassium, is reduced. Forest growth can be affected, and some sensitive plant species possibly eliminated. It is estimated that the content of easily available base cations in the soil of southern Sweden is declining at a rate of 1–2 per cent per annum.

Poisonous metals are freed. Aluminium ions, which are poisonous to plants' root systems, are freed through the weathering of the soil at lower pH-values. As the soil becomes more acid, the mobility of many heavy metals also increases. In acidified soil, it is likely that uptake by the plants of cadmium, zinc, manganese, and nickel, to mention a few is increased.

Phosphates become bound. Plants also suffer indirectly when the concentrations of dissolved aluminium increase. Aluminium ions have the ability to bind phosphate, which is an important nutrient, and make it less easily available. The effect of an insufficiency of phosphate is moreover heightened when the process of decomposition becomes slowed down in the soil as a result of acidification. Some other important nutrients besides phosphate, such as molybdenum, boron, and selenium, also become less easily available to plants when the soil is acidified.

Up to the early 1980s, most soil scientists believed it to be hardly likely that the soil would be affected by acidification. There are parts of Europe where the soil has a large content of easily weathered minerals, enabling it to accept relatively great amounts of acid without becoming acidified. But where the soil minerals weather less easily, as in Scandinavia, the resistance to acidification is low. The amount of acidic deposition that the various types of soil can accept without becoming acidified (the so-called critical loads), varies in Europe. Continuous sampling in southern Sweden has shown that the pH value of the soil has decreased by 0.3 to 1.0 units in only a few decades. The drop has not only taken place in the upper layers, but also far down into the mineral soil. The store of base cations available to plants has on the average been halved in forty years.

While sulphur is responsible for most of the soil acidification caused by air pollutants, nitrogen compounds also contribute, but in a more complicated manner. To put it simply, there will be a net acidifying effect only to the extent that the nitrogen is not taken up by the plants but leached out. An obvious conclusion is that the acidifying effect of nitrogen increases if the vegetation fails to take up as much as is deposited. The resulting state, known as nitrogen

saturation, can be reached at quite a low load. As a result of saturation, relatively large leakages of nitrogen have been noted from forest land in the Netherlands, northern Germany, Denmark, and south-western Sweden.

The nitrogen that is leached out of the soil ends up in streams and lakes, where it eventually leads to biological changes. Some finds its way to the sea, where the eutrophication effect is still greater, causing algal blooms, oxygen depletion, and lifeless depths. About a third of the nitrogen entering the Baltic Sea and its Kattegat and Skagerrak approaches is estimated to come in the form of air pollutants falling directly onto the water.

Damaged environment – how long will it last?

Man has influenced the environment in three very different ways: a dramatic reshaping of the landscape to create efficient agriculture and urban life; a major interference in the biogeochemical cycles of carbon, nitrogen, phosphorus and metals changing the physics and chemistry of the environment through increased nutrient flows, acidification, global warming, and increased UV radiation; thousands of chemicals, foreign to the planet and its life forms, have been used extensively in the environment, some of them deliberately to poison life.

The pollution chain is the way that pollutants take from production into the environment over air and water. Some chemicals are easily taken up by life forms, they are bio-available, they may accumulate in organs and tissues, stay in the food chains as they migrate from prey to predator, even from the mother to the child. Many of them also end up in man.

Chemicals have special effects on ecosystems. An ecosystem might be completely disrupted if one key species is badly damaged, and prey-predator relationships are changed. Typically ecosystems hit by pollution lose diversity and biomass. At the same time environments that are less diverse, both as landscapes and as ecosystems, are more vulnerable to environmental impacts.

Compared to the 1950's and 1960's, when the threat from chemical pollution was first grasped seriously, much has happened. Many chemicals have been banned and new chemicals have been designed so they do not accumulate in ecosystems. But old chemicals still leak from the society into the environment, and new threats are continuously discovered. Lately pollutants that influence the sexual differentiation in animals, the so called endocrine disruptors, have been creating a new scene, a chemical panorama that seems more threatening than before. It is discussed whether endocrine disruptors, also called hormono-mimetic pollutants, can reach man and threaten his reproduction.

Environmental impacts interact in several ways, either to reinforce one another or sometimes dampen each other. Landscape changes make the environment more or less susceptible for eutrophication and acidification. For example a modernised monotonous production landscape enhances

eutrophication since the factors that reduce nitrogen and phosphorus flows are absent. In the same time an ecosystem that has relatively few species is less able to withstand the impact of pollution and changes in general, e.g. the Baltic Sea ecosystem. The environment is more or less robust, that is more or less able to withstand impact. An environment that has changed but is able to go back to its original status after an impact has ceased, is called resilient.

Some of the impacts that man has had on the environment will last very long. Changes in infrastructure, roads, buildings etc, will last perhaps to the next ice age, that is many tens of thousands of years. Also landscape changes, e.g. deforestation and drainage, may be very long lasting. Forests will take hundreds of years to be more natural and a “virgin” forest will probably take a thousand years to establish itself. A chemical impact will only last as long as the chemical survives. However changes in the biogeochemical cycles will take hundreds or thousands of years for global impacts to adjust even if mechanisms are available.

Finally some changes are irreversible. To this category belongs for example the extinction of biological species. Even if we will in the long run be able to manage the environment to stop the continued degradation, it is already clear that our children will live in an environment that is a little less rich and a little less diverse than ours.

Unit V

SAVING THE FOREST

READING MATERIAL

TEXT A

Task

a) Before reading the passage discuss these points with a partner.

- What role do forests play in man's life?
- What types of forests are there on the earth's land surface?
- What is happening to the world's forest resources?

b) Now read the text, translate it and get ready to do the exercises after the text.

Rage against the Dying of the forests

The air, water and soil are not the only victims of man's forcible intrusion. The purity of the air and the preservation of bodies of water and soil largely depend on the conservation of forests.

Forests – boreal, coniferous, temperate and tropical rainforests – cover 30 % of the earth's land surface. They are one of the Earth's best assets. They absorb carbon dioxide and exhale oxygen, acting as the lungs of our planet, control (moderate) the climate, prevent soil erosion, reduce flood risk and serve as genetic banks for a wondrous diversity of plant and animal life.

Let us look at what is now happening to the humankind's most valuable possession. At the close of the 20th century the world finds itself undergoing the most rapid and complete deforestation it has ever experienced under the human hand. The world's forestry resources are shrinking at an alarming rate. Population increase has led communities to dilate outwards by clearing forests, as growth of cities often means expansion into timbered areas and croplands. More and more forests are turning into houses and the fuel to heat these houses. Land is becoming increasingly scarce, and as a result, forests are being destroyed.

Unfortunately, today the forest is viewed only as a source of raw materials for various branches of economy. Apparently, there is no sphere of human activity or industry which does not need timber. Despite the success registered by chemistry and the advent of new synthetic materials, there is a steady growth in the world consumption of wood products.

Well, the forests have always been generous with their riches – so far as they are able. But they are not limitless. They are being exhausted and the habitats of

innumerable other species of both flora and fauna are destroyed as a side effect.

Deforestation is provoked by a number of factors. But it is not only the deliberate felling of trees which is reducing the world's tree cover; trees are also disappearing because of pollution. Acid rain kills plants and trees. In California in the USA, for example, over a million trees are dead or dying because of smog from the big cities affecting them. In Scandinavia many trees similarly affected by sulphuric acid emissions from power stations and factories in Britain being blown across the North Sea. Nearly half of all trees in Germany are diseased. Polluted streams poison the forest from the inside. Dust, accumulated on leaves, interferes with the process of photosynthesis. Trash, which people leave in the forest, hurts forest inhabitants. Yet logging remains the primary cause of forest destruction.

The most hazardous thing about deforestation is that forestry appears to be an irrecoverable natural resource. Replanting doesn't guarantee survival. Without the shady canopy of big trees and the moist forest floor to nourish them, nursery seedlings are bound to die on parched clearcuts. So when industry claims planting ten seedlings for one tree cut, it means absolutely nothing for the forest. A hundred-year-old tree cannot be replaced by ten seedlings.

Steady loss of natural forest leads to the loss of animal habitat and decline in animal diversity and abundance. A complex product of the centuries of evolution, forests may be gone forever. It means that the humanity must apply all its efforts now, until it is too late. Taught by the results of our negligence, we have finally come to realize that man must look after the world, or there will be no world to look after.

Word Study

Ex. 1. Pronounce the following chemical substances correctly. Mind the stress.

acid	nitric
oxide	sulphur
dioxide	sulphuric
carbon	methane
oxygen	ozone
nitrogen	

Ex. 2. Write the adverbs of the adjectives in the list in the correct box.

-ly	-l → -ly	-ic → -ally	consonant + -ily

Apparent, original, systematic, increasing, approximate, dramatic, similar, easy, large, fortunate, environmental, vital, particular, hopeful, deliberate.

Ex. 3. Use your dictionary and complete the following table.

Verb	Noun	Adjective
consume		
		possessive
erode		
	reduction	
		emissive
destruct		
		applicable
	evolution	
conserve		
		expansive
expand		
prevent		
	completion	

Ex. 4. Match English phrases and their Russian equivalents.

1) absorb carbon dioxide
2) exhale oxygen
3) wondrous diversity
4) raw material
5) deliberate felling of trees
6) diseased trees
7) hurt forest inhabitants
8) irrecoverable natural resources
9) shady canopy
10) nursery seedlings
11) animal abundance
12) scarce land
13) timbered areas
14) croplands
15) Europe's "green lungs"

a) преднамеренная вырубка лесов
b) «зеленые легкие» Европы
c) наносить вред обитателям леса
d) лесные участки
e) тенистая крона
f) выделять кислород
g) сельскохозяйственные угодья
h) изобилие животных
i) недостаток земельных участков
j) поглощать углекислый газ
k) больные деревья
l) саженцы
m) удивительное многообразие
n) сырье
o) невосполнимые природные ресурсы

Ex. 5. Translate into Russian the following words, word combinations and sentences.

Habitat*:* human habitat, natural habitat, wildlife habitat; habitant; habitable zone; to inhabit; inhabitable; inhabitable; inhabitant; inhabited locality; uninhabited ice caps.

Forest*:* boreal forest, coniferous forest, deciduous forest, temperate forest, tropical rainforest, forest inhabitants; forester; forestry, agroforestry; deforestation; deforested land. Large scale deforestation intensifies the greenhouse effect. Reforestation.

Diverse*:* Wondrous diversity diversifies agriculture.

North America contains some of the most diverse and endangered forests on Earth. Maintaining biodiversity by conserving the rainforests is one of the greatest priorities for environmentalists.

Emit*:* emit (give off, release) gases into the atmosphere, emit poisonous substances; harmful emissions, industrial emissions. Sulphur dioxide is emitted from volcanoes when they erupt.

Timber*:* timber industry, timber trade, timber company, timber area. Wood prepared for use in building is called timber. They put a hundred acres of land under timber. Non-timber forest products. Sustainable timber extraction (replace as many trees as were cut down).

Wood*:* Tables are usually made of wood. Put some more wood on the fire. Wooden goods, a wooden leg, a wood of beech, walk in the woods; wood-cutter, woodland scenery, wood-pecker.

Ex. 6. Add nouns to the following adjectives to form noun phrases:

Adjectives*:* Rapid, scarce, raw, boreal, shady, steady, toxic, synthetic, deliberate, coniferous, sulphuric, alarming, irrecoverable, complete, wondrous, valuable, primary, limitless, commercial, harmful.

Nouns: Loss, forest, diversity, acid, possession, resource, canopy, felling, growth, deforestation, land, material riches, rate emissions, logging, cause.

Ex. 7. Pair the verbs in column A with a suitable phrase in column B. You must find a match for every word but there is not necessarily only one correct solution.

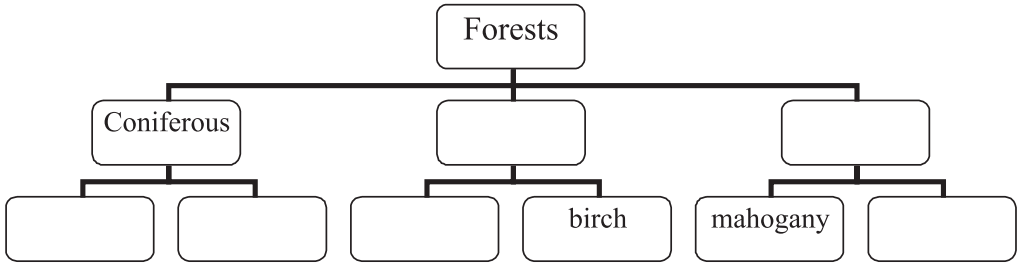
A	**B**
provoke	nursery seedlings
absorb	soil erosion
moderate	flood risk
experience	the world's tree cover
shrink	destructive consequences
exhale	carbon dioxide

A	B
prevent	the habitats of innumerable species
reduce	tropical rainforests
plant	under the human hand
depend on	oxygen
destroy	climate
apply	at an alarming rate
consume	efforts
	theoretical knowledge
	the conservation of forests
	summer and winter extremes
	wood products
	deforestation

Ex. 8. Write out the equivalents in pairs.

take in	diversity
habitat	decline
clear	asset
control	emission
give out	absorb
reason	rate
variety	poisonous
possession	moderate
reduce	shrink
speed	cause
decrease	exhale
toxic	fell
discharge	environment

Ex. 9. Find words in the text to complete the diagram.



Ex. 10. Find words and phrases in the text that correspond to the definitions given below.

1. Breathing organs in the chest of man and other animals.
2. Large area of land covered with trees.
3. Young plant newly grown from a seed.

4. A group of animals, plants or microorganisms that share a common genetic structure.
5. Area of land covered with growing trees (not so extensive as a forest).
6. State of becoming less in amount or importance.
7. Wood prepared for use in building.
8. Many different forms.

Ex. 11. Fill the spaces with any prepositions.

1. The threat of extinction affects … almost every species on earth, down … the tiniest microbe.
2. The balance of nature within rainforest ecosystem depend … the complex interaction between million of species of living organisms.
3. The wood is used … the local people … firewood.
4. … the close of 20 century one million of rainforest species were extinct.
5. The loss … forests would cause a decline … the world's supply … oxygen.
6. Uncontrolled exploitation of forests … commercial purposes leads … soil erosion brings … floods, fires and acid rains.
7. One … four chemicals or medicines found … the chemist's contain compounds derived … rainforest species.
8. Satellite images of the Brazilian Amazon show that the forest cover has been lost … an alarming rate.

Ex. 12. Fill in the missing words in the sentences below. Choose from the following putting the verbs in the right tense.

dam	destroy	encourage	flood	in danger
international	medicine	protect	supply	reduce
fuel	wood	slow	down	

Tropical forests have (1)… us with very many sorts of plants for food, (2)… and industry. They could probably supply many more. They also (3)… (4)… and drought, keep water lean, and (5)… the Greenhouse Effect. Bu the tropical forests (6)… to make room for things like farms, ranches, mines and hydroelectric (7)… About 20 million hectares are lost each year – an area more than twice the size of Austria. WWF is working to (8)… and save the forests that are (9)…, to plant new trees for (10)… and to slow down the Greenhouse Effect; and to (11)… governments to think about the forests and their importance when giving (12)… aid.

Ex. 13. Give the English equivalents.

Поглощать углекислый газ; преднамеренная вырубка лесов; наносить вред обитателям леса; сокращаться с устрашающей скоростью; выбросы,

содержащие серную кислоту; воздействовать на естественную среду обитания; разнообразие растительного и животного мира; легкие планеты; самая большая ценность (2); потребление; бесчисленные виды растений; причины сокращения лесов; прилагать усилие; уменьшать вероятность наводнений; потеря лесов; приводить к; зависеть от; предотвращать эрозию почвы; высаживать саженцы; крона деревьев; смягчать климат; хвойные леса; строевой (промышленный) лес; древесина; сырье; в конце XX века; халатность; невосполнимые природные ресурсы; вызывать (провоцировать); испытывать; под влиянием человека; истощаться; больные деревья; изобилие растений; участки земли, засаженные деревьями (6).

Comprehension and discussion

Ex. 1. Say if these statements are true or false. Argue them using the suggested phrases in the box.

Agreeing	Disagreeing
That's quite right. That's true. Yes, I (absolutely, partly) agree … I'm of exactly the same opinion. It can be easily proved. That is only partly true.	I don't agree. Not really. I disagree, I'm afraid … That's wrong. I don't think that's right. I can't agree. Surely not.

1. Deforestation affects air, soil and water objects.
2. The world's forestry resources are disappearing alarmingly.
3. The forest couldn't be saved even if people take more care of it.
4. The riches of the forest are limited and are being exhausted through Man's greed and stupidity.
5. Man defends his reasons for destroying forests with short-term economic arguments.
6. Deforestation does not cause flooding and erosion.
7. As the world's forests are being reduced, the amount of oxygen in the air is increasing all the time.
8. Deforestation is provoked by logging.

Ex. 2. Complete the following sentences.

1. Trees are one of the Earth's best assets because they absorb … they provide …
2. The world's forestry resources …

3. The largest cause of the destruction of rainforests is …
4. People cut down trees for …
5. Many trees in Europe …
6. Today the forest is viewed only as …
7. The most hazardous thing about deforestation is …
8. Steady loss of natural forest leads to …
9. Man must look after the world, or …

Ex. 3. A reporter is interviewing someone from the World Wildlife Fund (WWF). Give answers to the questions. Reproduce the dialogue.

Why should we save the trees?

What is happening to the world's tree cover?

What are the burning reasons that drive men to destroy our monumental inheritance?

So, logging remains the primary cause of forest destruction. But why are people cutting down trees?

What is the most hazardous thing about deforestation?

If the present trend of destroying forests continues, how long do you think it will take to destroy them all?

What do you think should be done?

Ex. 4. Speak on:

1. The importance of trees:
   Forest (tree) cover, to absorb carbon dioxide, to exhale oxygen, to control, soil erosion, to reduce flood risk, wondrous diversity, to provide a home, to be extinct, species.

2. The causes of deforestation:
   to be provoked by, commercial logging, creation of cropland, fuel, to be diseased, sulphuric acid emissions, to affect, acid rains, to make luxury furniture, throwaway goods.

3. The consequences of deforestation.
   Irrecoverable natural resource, replanting, to lead to, loss, habitate, decline (in), warming of the oceans, to magnify greenhouse effect, erosion and flooding.

Ex. 5. Write a project on "How would you go about preserving the forest in your country?"

Paragraph 1:
What is the nature of the problem? What personal experiences have you had which illustrate it?

Paragraph 2:
Who is responsible for the problem? Who is responsible for solving it? (e.g. consider individuals or companies on the one hand, and the authorities or ordinary people on the other) What do they do that causes the problem? Could it be avoided without much expense?

Paragraph 3:
How would you deal with offenders? (e.g. individuals or companies) Would you educate them? Persuade them? Make laws? Fine them? (if so, how much?) Or would you punish them in other ways?

Paragraph 4:
What do you think would be the result of your proposals being carried out? What do you think will happen if they are not?

TEXT B

Task. **Read the text and get ready to discuss its main points.**

Why are people cutting?

The tropical rainforests are rapidly being cut down. The forests of West Africa have almost disappeared over the past 40 years, 4 million hectares are lost each year. Cote d'Ivoire has lost 90 % of its original forest and woodlands. The forest cover of Brazil has been lost at an average annual rate of about 19,000 km^2 over the last 20 years. According to the most conservative estimate, all the rainforests in the world will be gone in less than a century unless the rate of felling slows down. A more realistic estimate is 30 years.

So, what are the burning reasons that drive men to destroy these unique forests?

The commonest cause of tree felling is commercial logging. Most of the trees from the rainforests are sold to the timber industry of industrialized countries. Tropical hardwoods such as mahogany are strong, attractive and hardwearing. They are used in rich countries to make luxury furniture, doors and window frames. But much of the wood is not made into durable products. It is made into cheap, throwaway goods, i. e. paper or chopsticks. The destruction of rainforests for the timber trade sometimes involves political corruption. In

many developing countries a person must get a license from the government before he can cut down trees. Government officials give out these licenses to members of their own families or in return for "favors" from business people.

The multinational timber companies often make roads deep into the forests so that they can drag the logs away. They may only cut down a few trees themselves, but their roads make the forests accessible to local farmers. These farmers cut down trees to create new cropland, or even simply for fuel. It is a great tragedy that large areas of the Amazon forests have been wasted as firewood!

Tree felling for firewood is also a problem in the temperate forests. Over 85 % of all the wood cut in the Third World is used for fuel. Wood provides more energy in the developing world today than the total energy from fossil fuels, nuclear fuels and alternative energy sources.

The largest cause of the destruction of rainforests is probably the creation of grazing land to feed cattle. The growth of the fast food industry in the 1970s created a demand for cheap beef for making hamburgers. In the late 1970s, in return for a large loan from the international banks, the Costa Rican government removed thousands of hectares of rainforest by the infamous slash-and-burn technique to provide grazing land for export cattle. Other countries soon saw the profit they could make from cattle farming and began to cut down their own rainforests. According to one estimate, half of the world's rainforests have already been cut down to make space for the meat industry, and approximately half a metric ton of vegetation is destroyed for every hamburger eaten.

Indeed, man has learnt to put wood to effective and diversified use. But will he be able to protect our monumental inheritance?

Ex. 1. Complete the information in the table to summarise the points presented in the text.

Causes of Deforestation	Examples
1. Commercial logging	
2. Related Activities	Damage to other trees as logs are howled through the forest
3. Shifting Cultivation	
4. Domestic Use	

Ex. 2. Answer the following questions on the basis of what is stated or implied in the text.

1. If the present trend of destroying the rainforest continues, how long do you think it will take to destroy them all? (Prove the answer with examples.)

2. What is the commonest cause of tree felling?
3. What does the phrase “commercial logging” imply?
4. Why don’t governments of developing countries do something to save the trees?
5. Road building is directly responsible for steady loss of forests, isn’t it?
6. Are temperate forests subject to destruction?
7. Why don’t some countries use alternative sources of energy?
8. What cause of forest destruction is viewed as the most serious?
9. How do you understand “slash-and burn technique”?
10. Will man be able to protect our monumental inheritance?

Ex. 3. Explain and expand on the following.

1. Protecting forests is the only key to our survival on the planet.
2. Deforestation produces environmental refugees.
3. Trees play an important role in stabilizing climate.
4. Forests provide one of nature’s principle means of water management.
5. Forestry management has a potential impact on climatic change.

TEXT C

Task. **Read the text and suggest your own title for it.**

Why do we need to conserve the rainforests? First, because the rainforests are the lungs of the world. They take in carbon dioxide and give out oxygen by photosynthesis.

The loss of vegetation in the rainforests magnifies the greenhouse effect. We are producing more and more carbon dioxide from burning fossil fuels. The capacity of the rainforests to absorb this environmentally toxic gas is becoming ever more crucial. Second, the rainforests are the world’s most important means of storing water. The trees soak up water in the rainy season and slowly release it into the ground and rivers. This protects the fragile soil from the potentially devastating effects of tropical storms. The rainforests supply water to the rivers during the dry season. If they did not do this, many rivers would disappear in the dry season and become raging torrents in the rainy season, flooding the nearby fields and washing away the soil.

Third, the rainforests control the climate. Seventy-five percent of the rain that falls on the tropical rainforests enters the trees from the soil by transpiration and then evaporates from the surface of the leaves. (The other 25 percent of the rainwater stays in the soil and enters the rivers as run-off). These two processes are known together as “evapotranspiration.” The heat energy required to evaporate the water from the forests cools the equatorial regions. The clouds

formed by the water vapor also cool the land by reflecting solar radiation back into space. These clouds are carried to cooler parts of the earth by natural convection, where they release warm rain which raises the temperature in these areas. If the rainforests disappear, so will the rain. Without the rainforests, the temperature difference between the tropics and the temperate zones would be far greater. Fourth, the rainforests are a reservoir of micronutrients. Tropical rainforests usually grow on poor soil. Most of the essential nutrients are stored not in the soil but within the trees themselves. The roots of the trees, which make up about 60 percent of their mass, do not grow deep into the soil. They spread out and form a thick network a few meters beneath the surface. These shallow roots absorb free nutrients released from the thick layer of decaying vegetation on the forest floor. Recycling of these nutrients is crucial to the survival of the ecosystem that the rainforests support. When the trees are cut down, vital nutrients are washed away with the run-off and a whole ecosystem quickly dies.

Fifth, the rainforests, and the ecosystems that they support, are an important source of raw materials for many different industries. They supply us with hundreds of useful products.

One very important benefit is the supply of medicinal plants. About 80 percent of all traditional herbal medicines and 25 percent of modern Western medicines are extracted from plants that grow in the rainforests. We do not know how many more important medicines are lying undiscovered within the rainforests.

Loss of plant species within the rainforests will mean that many lifesaving drugs will never be discovered. One last – and very important – reason for conserving the rainforests is that they are the home of several million people, who still live in primitive tribal societies within the forests. We have both a moral and a scientific duty to protect the homelands of these unique and fascinating societies. The tribal people are more than an anthropological curiosity. They are the key to the living resources of the rainforests.

Ex. 1. Put the following sentences in logical order.

1. The tropical rainforests provide habitat for primitive tribes.
2. Erosion and flooding tend to follow deforestation.
3. The rainforests act as the lungs of the planet.
4. When the trees are cut down thoughtlessly vital nutrients are washed away.
5. The rainforests moderate temperature extremes.
6. These forests are important source of raw materials.
7. The consequence is that less carbon dioxide is being absorbed which leads to a global warming.

8. The rain will disappear with the rainforests.
9. The rainforests are the world's most important means of storing water.
10. The world's forests are being reduced, the amount of carbon dioxide in the air is increasing as more and more fuel is being burned.

Ex. 2. Rearrange and write out the four sentences so that they form a summary of the points given in the text.

1. Moreover, one other benefit relates to the supply of many raw materials, products and medicinal plants.
2. Finally, the homes of millions of people are to be found in the rainforests and this homeland should be protected for moral and scientific reasons.
3. They act as the lungs and watersheds of the world; they control the climate and are a reservoir of micronutrients.
4. There are a number of reasons why the rainforests should be conserved.

Ex. 3. Divide the text into logical parts, pick out the key words and retell the text using these words.

TEXT D

Task. **Read the text. Chose the one best alternative to each question following it. Answer all questions on the basis of what stated or implied in the text.**

Saving the rainforests

What can we do to conserve what is left of the rainforest? One important step is to reduce the demand for new hardwood products. Governments could do this by putting a high tax on these products. The revenue from a tropical hardwood tax could fund conservation projects. So far, governments have been reluctant to introduce a tax on hardwood. Like all new taxes, it would make the government unpopular!

The demand for hardwood in the West is falling even without a tropical hardwood tax. Many environmentally-conscious people today refuse to buy goods that are made from tropical hardwoods. Some timber companies now concentrate on selling softwoods such as pine and beech instead. Other companies recycle hardwood by taking apart old furniture.

Restricting the activities of the timber trade will not, on its own, save the rainforests. We must also address the other causes of deforestation – lack of alternative fuel, the need to create grazing land for cattle and the widespread public ignorance about the ecological importance of the rainforests. In 1987, several international organizations launched the Tropical Forest Action Plan, a

five-year plan to invest money in forestry, conservation and agricultural projects. Their aims were: to plant new hardwood forests, particularly in vital watershed zones; to provide alternative firewood supplies from fast-growing soft wood trees (such as eucalyptus), to promote the practice of **agroforestry** (in which cattle graze within the forests so that farmers do not need to cut down trees); and to encourage research into conservation and forestry in the developing countries.

The Tropical Forest Action Plan has made some progress toward reforestation. But environmentalists have criticized such projects for spending most of their money on building ugly plantations of fast-growing trees all of the same species. They spend only a small fraction of their funds on conserving the existing forests or on research. Their ultimate aim is to grow hardwood trees as a renewable cash crop, rather than to conserve the rainforests and the great diversity of plant and animal life within them. It takes about 150 years for a hardwood tree to reach maturity, but it takes many centuries for the full rainforest ecosystem to become established. According to critics such projects are not worth the recycled paper they are printed on conservation costs money. The developing countries cannot afford to forgo the immediate revenue that they can earn by selling timber or raising cattle. But they could, and should, try to develop the economic potential of the rich resources that grow beneath the trees – the **non-timber forest products**. The medicinal plants in the rainforests have great scientific potential, but they also have enormous economic value. Harvesting medicinal herbs for the pharmaceutical industry is potentially more profitable for the developing countries than selling timber or raising cattle on the deforested land.

The plight of the disappearing tropical rainforests is one of the most urgent environmental crises in the world today.

Conserving the rainforests is an ecological imperative that demands personal sacrifices from all people. But the fight to save the rainforests has hardly begun.

1. Which of the following does that text mainly discuss?
   a) the demand for hardwood products.
   b) The rainforests could be saved if people take more care of them.
   c) The effective ways to conserve the unique ecosystem.
   d) The tropical rainforests are disappearing and the TFAP needs money to preserve them.

2. The word “imperative” is closest in meaning to
   a) necessity
   b) task

c) aim
d) purpose

3. What conclusion can be made about reforestation?
a) Replanting does not guarantee survival.
b) The amount of reforestation is still less than deforestation.
c) Reforestation is not worth speaking about.
d) More money should be spent on reforestation.

4. The author would probable characterize the fight for the rainforests as
a) impossible
b) certain
c) ineffective
d) promising

5. Which of the following is not true
a) a mature tree can not be replaced by 12 seedlings,
b) Many people do not want to buy hardwood products.
c) Developing countries can benefit from growing medicinal.
d) Developing countries invest money into conservation and forestry.

6. The word “plight” is closest in meaning to
a) problem
b) condition
c) position
d) question

7. All of the following are ways to save the rainforest except
a) harvesting medicinal herbs
b) hardwood and paper recycling
c) launching environmentally – friendly projects
d) providing alternative energy sources

8. All of the following are synonyms of the word “forgo” except
a) refuse
b) decompose
c) decline
d) retract

Ex. 1. Discuss in groups the problems raised in the text.

REVISION

Ex. 1. Use the information from the text to complete the following article with the best form of the verbs in brackets.

The Vanishing Forests Creep Back

The tide of fortune may at last be turning for the world's battered forests. A United Nations study shows that they (cut down) at a slower rate and, in some areas, (become) more extensive.

The study published by the UN Food and agriculture Organisation (FAO) found that the rate of global deforestation (slow down) in the five years to the end of 2005. In Europe and – for the first time – in North America there (be) more trees than 5 years earlier.

The FAO's assistant director-general for forestry said there (be) doubts about the precision of the statistical methods used. Even if the figures (be) right, they (mean) that in just 5 years the world (lose) an area of woodland twice the size of Italy.

"That is still a very high rate." he (stress). "We (be) optimistic that we (go) in the right direction. In Europe, the stock of natural and artificial woodland (grow) since 1990s. But we still (have) a long way to go."

The main threats to European forest (be) now fires, which (rob) the Mediterranean countries of thousands of hectares every year and pollution.

The Chernobyl nuclear disaster alone (contaminate) 7 million hectares of woodland in Ukraine, Belarus and Russia.

The most encouraging news (come) from the United States where after two centuries of almost continuous decline, the area covered by forest (stabilise) in the early 2000s.

Throughout the developing world, however, the picture (remain) sombre. Satellite images of the Brazil Amazon show that the forest cover (lose) at ever-increasing rate of about 19,000 square km annually over the last 20 years. The deforestation in Africa (reach) already critical point.

Ex. 2. Make complete sentences out of the following notes, putting the verbs in brackets in the right tense. Then arrange the sentences into one paragraph. Make sure that the paragraph make sense, and that the sentences follow each other logically.

- Oxygen / for / trees / homes / and / animals (provide)
- To / governments / new / plant / many / trees / fortunately (start)

- forest / steadily / the / since / cover / of / then / stock / (grow)
- At / fires / however / and / because / logging / of / an / trees / rate / alarming / uncontrolled / (disappear)

Ex. 3. Here is an article about deforestation. Discuss with a partner the best way to translate the words in the tables.

The tropical rain forest in Amazonia, Southeast Asia and Africa are being destroyed (1) … of 42 million acres per year. This (2) … is caused by (3) … , cattle ranching, the building of (4) … and highways, and mining.

The forest is a natural recycler, (5) … and protector of our planet. It recycles carbon, nitrogen … and (6) … , helps determine temperature and (7) … , supports the most (8) … ecosystem in the world.

(9) … is endangering this ecosystem, and could (10) … at least ¼ of all (11) … on earth to vanish in the next 25 years. The (12) … of rain forest means the (13) … of many indigenous people who (14) … those areas. Protecting all the forest is one key to our (15) … on this planet.

1. с ужасающей скоростью
2. уничтожение
3. подсечно-огневой тип с/х
4. плотин
5. кормилец
6. кислород
7. выпадение осадков
8. разнообразный
9. обезлесение
10. порождать
11. виды
12. потеря
13. гибель людей
14. населяют
15. выживание

Ex. 4. Translate the following into English.

a)

1. Деревья поглощают из воздуха углекислый газ и выделяют кислород, выполняют функцию легких планеты.
2. Уникальное разнообразие дикой природы обеспечивает людей 50 % всех медикаментов.
3. Тропические леса уничтожают техникой, называемой «руби и сжигай». Это означает, что лучшие деревья вырубают и продают, а остальные сжигают.
4. Самыми распространенными причинами вырубок являются очищение земельных участков от леса для создания новых поселений, а также промышленные рубки.

5. Количество и качество тропических лесов планеты уменьшаются и ухудшаются с устрашающей скоростью.
6. Уничтожение тропических лесов приводит к увеличению выбросов углекислого газа в атмосферу и, как следствие, усилению парникового эффекта, а также, к сокращению генетического и видового биоразнообразия.
7. Тропические леса занимают 7 % площади суши. Общая площадь тропических лесов составляла когда-то 1,6 млдр гектар. Сейчас она сократилась до 800 млн гектар и продолжает сокращаться с устрашающей скоростью 17–20 млн гектар в год.

b) Леса в тропиках вырубают по нескольким причинам. Во-первых, расчистка леса под пашни и пастбища. Потребность в новых пахотных землях и пастбищах довольно быстро растет уже в течение нескольких десятилетий. Тому есть множество причин: 1) именно в тропических странах самый большой ежегодный прирост населения; 2) почвы тропических лесов крайне неплодородны и полностью истощаются за несколько лет, т. к. возделывания земли в развивающихся странах идет по примитивному подсечно-огневому типу; 3) почвы тропических лесов, лишенные древесного покрова быстро эродируют.

Во-вторых, промышленные рубки для экспорта древесины в развитые страны. Спрос на древесину тропических деревьев огромен и возрос с 50-х годов в 15 раз.

В-третьих, заготовка топлива. В развивающихся странах 1/3 ежегодно вырубаемого леса идет на топливо.

Ex. 5. Translate the text into Russian (using a dictionary).

The Black Forest's geographical expanse hasn't changed. Located in the south-western corner of Germany, it is still 160 kilometers high (north-south) and between 20 kilometers wide.

But the forest itself is growing. The percentage of the region covered by woods is inching upwards. To date, the 500 million or so trees in the Black Forest account for over 75 % of its land surface. The cause: many of the thousands of individual woods making up the Forest are being allowed to fill in and out.

This bit of good news comes with another. According to recent report on the state of its forests the percentage of ailing and dying trees in the Black Forest is continuing its slow decline from the alarming heights reached in the early '80s.

This improvement is largely attributable to the clean air policies instituted by Germany's federal and state governments in response to the country's crisis of the forests. These have reduced the levels of such 'traditional' tree-killers as sulfur dioxide, but not, unfortunately, of ozone – one of today's growing threat to the forests.

However, the growth of the Black Forest – or even its physical survival – are not exclusively the products of recent policies, but rather also of those first taken at the end of the 18th century.

All throughout the previous two centuries, men had been swarming up from Freiburg, Basel and other Rhine valley cities, and clear-cutting the forested mountain slopes rising above them. Confronted with the sight of vast stretches of denuded landscapes, the local rulers, whose ranks were led by the Grand Duke of Baden, put an end to the unrestricted logging. In a series of edicts, they decreed that the amount of wood taken out of the Forest could not exceed the forest's ability to replace it.

Made at the behest of Napoleon, these edicts represented one of the world's first formulations of the principle of sustainability. To make sure that the edicts didn't remain printed words, the rulers zoned the Forest into areas of no and controlled logging. They then appointed foresters to enforce their decrees.

The Forest quickly recovered, changing along the way. The new forest had a predominance of dark conifers, rather than deciduous trees, with this especially holding true in the heights of the Forest, which rises to nearly 1500 meters. The change darkened the forest's "black" hue.

Expanded and extended, these conservation methods have protected the Black Forest over the last two centuries from the onslaught of civilization.

Additional Reading

Forest Reserves of the World

EU (*with new members*)

With the awareness of the importance of the forest areas in the European Union reforestation programs were implemented. Although the number of forests in Europe is growing and the area covered by forests is increasing, Western Europe's old-growth forests and those forests which are rich in plants and animals have virtually disappeared. Many parts of western and central Europe have been stripped of their forest cover with only tiny remnants left of certain forest types. The rest has been used intensively for many centuries. In Western Eu-

rope, less than two per cent of the remaining forests are old-growth or half-natural. Beyond the actions of reforestation there has been an inevitable decline in forest quality, and wildlife. The main problems for the forests in Europe are the increasing use for infrastructure buildings. Although forest protection has a big impact on the political decision making process.

Russia

The special type of original forest in Russia is the so called Taiga. Within the huge areas of the eastern part of Russia the natural stile is in competition to other nations in a moderate state. Because of the hard living conditions in the Taiga men till now had great impact on the natural situation. In some areas the number of deforestation cases especially off illegal logging in virgin forests is increasing. The Russian wood is used for exportation to the European Union and to Japan. Today the Russian Federation can be proud of the fact, that it contains the world's largely intact tracts of undisturbed forest. The number of deforested areas in total has during 1960 to 1990 not increased. In the case of forest the Russian Federation is likely to be in the state of a Sustainable Development. Beyond this in Siberia new protected areas were declared in 1998.

USA

North America contains some of the most diverse and endangered forests on Earth. But many forests in North America have been converted into plantations. The loss of biodiversity was one of the consequences. 95 to 97 per cent of the former old-growth forests in the U.S. have been logged since the arrival of the European Settlers. Comparable losses have occurred in the old-growth red and white pine forests of southern Ontario. The coastal rainforest in the U.S. are also under threat from unsustainable logging. Beyond the deforestation there are big economical interests. The forest situation is dominated by economical thinking and plantations. Although there are Non Governmental Organizations which want to preserve and to prevent from logging the old-growth forests.

Japan

40 % of the former Japanese Natural Forest is still alive, because the forest is located on the mountains. The mountains build a very big part of the Japanese

Surface of the nation. The urbanization areas are mostly located near the coast. The main forest regions are very difficult to reach and to explore. Rice plantations have already reached the forest frontier. Especially there is a contradiction between the rice planters and the forest preservers.

Forest area in Japan accounts for around 70 % of total national land area. That in the world 31.3 %. But virgin forest accounts for about only 20 % and the rest is afforestation. The forest area per capita (0.20 ha) in Japan is smaller than that in the world (0.77 ha). The problems in forest management are that the forestry population is decreasing and aging.

Japan imports about 80 % of consumption of wood. Around 50 % of the amount of lumber product in south-east Asia are exported to Japan. The Government and Japanese private enterprises plant trees in the world. But the amount of the afforestation are little than deforestation by Japan.

China

Many of the forests in China are under immediate threat from uncontrolled forest fires, the unsustainable logging of hardwood timber, the pressures of the population explosion and the growing demand for wood products. China has announced an ambitious Natural Forest Conservation Action Plan to preserve and maintain the biological diversity of its forest. If the deforestation in China continues in that rapid way it is possible, that the forest resources in China till 2050 will be gone. With the growing awareness of the importance of forests China tried to restrict its forest areas within the planting of 7 million hectares in the 80s.

The Ministry of Forestry retains responsibility for coordinating protection of all protected areas located on forest land (estimated to be 90 % of the total). The Ministry of Forestry functions as an economic ministry operating at state level below the planning and economic commissions. It administers nature reserves, forest parks and “forest farms” (through the Forest Department) covering 50 million ha.

In order to promote forest tourism, the Ministry of Forestry invested over Yuan RMB 40 million in creating forest parks during the period 1980–1986. Forest tourism has attracted over 10 million visitors, and yielded visible economic benefits.

Brazil

Satellite images of the Brazilian Amazon show that the forest cover has been lost at an average annual rate of about 19.000 square kilometers over the last 20 years: The total accumulated deforestation up to 1996 was equivalent to an area slightly larger than Spain out of an original forest about the size of Western Europe. But still Brazil is one of the countries with the largely intact tracts of undisturbed forest. The whole Amazon Forest accounts for 30 per cent of the remaining tropical forest in the world. As in other different South American countries the awareness of the deforestation problem in Brazil increased. An increasing number of national Brazilian and international Non Governmental Organizations tried to put pressure on the Brazilian Government. In 1998 the Brazilian Government declared four new protected forest areas. A forest report of the WWF showed that over 50 % of the protected areas are "Paper Parks" existing only on the paper without any infrastructure for preservation and protection.

Sub-Saharan Africa

The situation in Africa concerning the rainforest must be differentiated. The deforestation has reached already a huge amount of square kilometres. On one hand the trees are used to export the raw material to European states as an economical factor. On the other hand the wood is used for cooking and heating. This action caused already degradation and the increasing of deserts. Africa is home to 20 per cent of the world's remaining tropical rain forests. Four million hectares are lost each year. This is the result of unsustainable logging, forest clearance for agriculture to feed the growing number of people in the region, mineral .oil extraction and uncontrollable forest fires. The biodiversity of that region is in danger. The population pressure in the states with forest areas will continue.

Belarus

Forests cover 2/5 of Belarus. Although not subject to deforestation, Belarus has relatively few large forest tracks. Forests are scattered all over the country. The exceptionally large forest areas are known as "pushchas". The largest of those are Belovezhskaya Pushcha and Nalibokskaya Pushcha. Belarusian forests are remarkably diverse. Pine and fir merge into oak and birch forests and groves

populated by linden, ash and cherry trees. These forests represent a unique ecosystem, uniting coniferous forests, typical of Eastern Europe, with deciduous woods of the Western European type. Coniferous forests constitute 64 % of the wooded area. Beloveshskaya Pushcha is the most mature forest area in Belarus, and among the oldest in Europe. Its trees are 120–200 years old on average, with some as old as 350–500 years.

The Last Chance to Save Indonesia's Forest Riches

Indonesia's once vast tropical rainforests and its spectacular coral reefs make it the richest country on earth in biological diversity. But the country's forests are under assault like never before.

Relentlessly, illegal or uncontrolled logging surges across the archipelago. The situation grows worse each day, particularly as decentralization opens the way for localized corruption and a breakdown in law enforcement.

Indonesia is at the epicenter of the global deforestation crisis sweeping across the tropics. Between 1985 and 1997, the country lost some 50 million acres of forest. In the three years since, another 12 million acres or more may have been lost.

Scientists predict that if current deforestation trends continue, lowland rain forests will become extinct in Sumatra by 2005 and in Kalimantan soon after 2010.

The biological, social and economic implications are incalculable. A recent reminder of the grim consequences occurred just last year on the Indonesian island of Nias, where a landslide that killed at least 60 people was attributed to local deforestation. Perhaps the best symbol of this crisis is the orangutan.

The orangutan's current population is estimated at less than 30,000 today, mostly as a result of logging and forest conversion for plantations.

Many experts now predict the extinction of the orangutan in the wild in our lifetimes if drastic changes are not immediately made. As the world loses the orangutan, it also loses Indonesia's irreplaceable old-growth forests and the extensive ecosystem services and wealth they could provide for future generations.

Indonesian Government can show wisdom and vision by embracing a national campaign to save Indonesia's threatened forests.

First, it should stand up to the corruption that pervades the logging sector.

Second, it must end the onslaught in Indonesia's national parks. If the destruction can be stemmed there, larger corridors of protected forests can be rebuilt.

Third, it can foster a broad alliance of nongovernmental groups, dedicated public servants and ordinary citizens to conserve the nation's forests.

Finally, it must link forest management and conservation efforts with broader national goals, including infrastructure development such as road and dam building, health and population programs, and decentralization planning and administration.

This is the endgame for Indonesia's precious biodiversity. The Government must act quickly if Indonesia is going to save its forests. By doing so the Government can use its final opportunity to protect its magnificent natural resources.

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English for Ecology Students

Английский язык для студентов-экологов

Учебно-методическое пособие для студентов географического факультета БГУ

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