Министерство образования Республики Беларусь

БЕЛОРУССКИЙ ГОСУДАРСТВЕННЫЙ
ТЕХНОЛОГИЧЕСКИЙ УНИВЕРСИТЕТ

Кафедра иностранных языков

АНГЛИЙСКИЙ ЯЗЫК

Тексты и упражнения
для студентов
2 курса специальности Т.15.06

В 2-х частях
Часть 1

Минск 2003

ВВЕДЕНИЕ

Настоящее пособие составлено в соответствии с действующей программой по английскому языку для неязыковых вузов и предназначено для студентов 2 курса специальности «Охрана окружающей среды и рациональное использование природных ресурсов».

Цель пособия заключается в том, чтобы дать студентам возможность ознакомиться со спецификой оригинальной литературы по избранной специальности, научиться читать и понимать ее, развить навыки самостоятельной работы над иностранной литературой и умение побеседовать на английском языке по тематике охрана окружающей среды.

Все тексты подобраны из оригинальных источников, изданных в Великобритании и США. При отборе текстов авторы старались реализовать такие принципы, как информативная значимость текстов, языковая доступность, а также принцип нарастания сложности материала.

В подобных текстах по специальности содержится информация, полезная как для общей, так и для профессиональной подготовки студентов.

Пособие состоит из текстов, снабженных предтекстовыми и послетекстовыми упражнениями. Целью предтекстовых упражнений является снятие лексико-грамматических трудностей, что помогает реализовать главную цель чтения как процесса получения информации.

Все дополнительные тексты для письменных переводов носят познавательный характер, предназначены для аудиторной и внеаудиторной работы.

Пособие будет способствовать расширению общего кругозора студентов, выработке навыков ведения диалога и монологических высказываний на английском языке, активизации их лексического запаса.

UNIT 1. ECOLOGY

Exercise 1. Read and memorize the following words:
interplay [ˈintəplei] – взаимодействие; interconnection [ˌintəkə ˈnekʃ(ə)n] – взаимосвязь; household [ˈhaus(h)ould] – семья, дом, (домашнее) хозяйство; to give rise to – вызывать, быть источником; obvious [ˈɔbviəs] – очевидный, явный; to interfere (with) [ˌintəˈfiə] – мешать, вредить, вмешиваться, вторгаться; dictum pl. dicta [ˈ diktəm] – авторитетное мнение; to override (overode, overidden) – отвергать, не принимать во внимание; to overtake [ˌouvəˈteik] – догонять, обгонять; despoliation [dispouli'eiʃn] – грабеж, расхищение; to support [səˈpo:t] – поддерживать, помогать; frontier [ˈfrʌntjə] – граница, рубеж; to merge [mə :dʒ] – сливать(ся), соединять(ся); humidity [hju'miditi] – влажность; effect [i'fekt] – результат, действие, влияние; pollution [pəˈlju:ʃ(ə)n] – загрязнение; pollute [pə ˈl(j)u:t] – загрязнять; contaminate [kən'tæmineit] – загрязнять, заражать; devastate [ˈdevə steit] – опустошать, разорять; persist [pə ˈsist] – упорствовать, оставаться, сохраняться; exist [ig'zist] – жить, существовать; affect [ə'fekt] – воздействовать; boundary [ˈbaud(ə)ri] – граница; nutrient [ˈnju:triənt] – питательный.
Exercise 2. Read and translate the following international words. Use a dictionary if necessary:
basis [ˈbeisis] n, effect [i ˈfekt] n, activity n, routine [ru:ˈti:n] n, intelligent [in'telidʒənt] n, autocracy [ɔ:'t krə si] n, intensity n, conglomeration [kə ŋglə mə ˈreiʃ (ə)n] n, manipulate n, logic [lodʒik] n, planetary [ˈ plænə təri] n, position [pə ˈziʃ(ə)n] n, coordinate [ko(u)'ɔ dnit] n, economy n, session [ˈseʃ(ə)n] n, rational [ˈræʃənl] a, resources [ri'so :siz] pl n, rationalization [ræʃnə l(a)i'zeiʃ(ə)n] n, catastrophy [kəˈtæstrɔfi] n, deputy [ˈdepjutɪ] n, symptom [ˈsimptəm] n, paralysed [ˈpærəlaizd] a, permanent [ˈpə :mənənt] a, register [ˈredʒistə] v, toxic [ˈ tɔksik] a, official [əˈfiʃ(ə)l] a, company [ˈkʌmpə ni] n, epidemic n.
Exercise 3. Read the text and say:
a) how the term "ecology" arose, b)what ecology deals with.

Ecology

All living beings exist within a complex interplay of organisms and environment, including both living and non-living elements. What must man, as the most powerful species within that interplay understand about how organisms affect each other? What must we know about the balance of nature in order to deal intelligently with the effects of our activities? Is it possible to manipulate the environment successfully?

Can man ever learn to live contentedly within the fragile networks of the planet Earth? What will happen if he doesn't?

The whole of nature can be compared to be a complex household in which everyone has a specific job, including the nonliving structure of the building itself. This concept has given rise to the word "ecology" from the Greek word "oikos" (house). The term was first introduced by the German biologist E. Haekel in 1870, and since the late 1960s it has become a subject of international interest.

We have begun to realize that man, as the dominant species on this planet, has more influence over nature than any other living creature, and that his influence is increasing all the time. Recently it has become obvious that the power of our interfering with nature, of overriding its dicta and altering its routines, has overtaken our understanding of how nature works. The result is despoliation of our own home, the planet Earth.

The plant and animal populations of a particular area, including each individual of the various communities that exist there, together with the nonliving environment which supports them, make up an ecosystem. This is a useful working unit for study because it shows its own internal patterns of relationships, but the boundaries are not always easy to define. One ecosystem merges into another just as the activities of one species merge into those of another. The important point is that an ecosystem includes all the organisms in it, from the bacteria in the soil to the birds and insects in the air, as well as all the factors of the nonliving environment – nutrients, temperature, wind, relative

humidity, light intensity, soil type, geographical position and so on. Each of these factors has some effect on the living organisms and some also have an effect on each other. Ecology studies the complex interrelations between living organisms, on the one hand, and the living organisms and the environment, on the other hand.

Exercise 4. Answer the following questions:

1. What can the whole of nature be compared to? 2. What does the term "ecology" mean? 3. Who was the first to introduce the term? 4. Since what time has ecology become a subject of international interest? 5. What is the dominant species of our planet? 6. What is the result of man's increasing interference with nature? 7. What is ecosystem? 8. What does it include and study?

Exercise 5. Find in the right-hand column synonyms to the words in the left-hand column:

Make up v, obvious a, boundary n, merge v, pollution n, pollute v, exist v, affect v, realize v, effect n, begin v, include v.	Result n, understand v, influence v, live v, contaminate v, fuse v, frontier n, apparent a, contamination n, build v, involve v, start v.

Exercise 6. Translate the following sentences give the functions of the Infinitive.

1. Ecology is to study plants, animals in relation to their environment.
2. Every plant and animal of an ecosystem has a definite role to play to maintain an overall balance in the system.
3. The initiative of "Green Peace" movement caused the world public to pay special attention to the problem of environmental protection.
4. We ought to protect the environment.
5. It is necessary to teach ecology at school.
6. Man-made pollution is too serious not to be paid attention to.
7. To improve his living conditions man began to invent different technologies.
8. Where is the work to be done?

Exercise 7. Translate the sentences paying attention to the preposition "for".

for (предлог) – для, в течение

for (союз) – поскольку, т.к.,ибо

1. For many centuries the problem of air pollution has not been paid attention to.
2. We ought to protect our nature for it is in danger of human activity.
3. Industrial enterprises must use filters for exhaust gases to be purified.
4. They investigated carbon monoxide and sulphur oxide for the reason of their toxic properties.
5. The experiment lasted for three hours.

Exercise 8. Translate the sentences into English:

1. Экология многодисциплинарная наука (multidisciplinary), основанная на биологии, физике, химии, геологии и многих других науках.
2. Взаимодействие человека с природой имеет глобальный и постоянный характер.
3. Человек всегда воздействовал на окружающую среду и изменял ее.
4. Природные экосистемы – это сложные саморегулирующие системы, успешно противостоящие (resistant) внешнему воздействию.
5. Взаимодействие сообществ живых организмов с их неживым окружением связывает (bind) компоненты экосистемы в единое целое (organic unity).
6. Каждый вид приспособлен (adapt) к физическим и химическим условиям своего обитания (habitat), таким как t, количество света, pH воды и т.д.
7. Искусственное загрязнение часто изменяет окружающую среду, в которой сообщество организмов живет и нарушает ее хрупкое равновесие.

Exercise 9. Read and translate the text, answer the following questions.

1. What is an ecosystem? 2. Which systems are, as a rule, more stress resistant – complex or simple? 3. What is a characteristic property of any stable ecosystem?

An ecosystem is a natural organic whole of a biologic community and its nonliving environment. Constant interactions between living organisms, say, plants, bacteria, and animals and their physical environment in any ecosystem are the pathways by which matter and energy are distributed. The most important thing is that these interactions bind the living and nonliving components together into a stable system. Many opposing forces operate within the ecosystem which may lead to imbalances or disruptions but normally the ecosystem is stabilized due to its self-compensating properties. The state of balance in any ecosystem is self-sustainable so that even slight imbalances are corrected before they become severe, irreparable, and fatal. Any stable natural ecosystem consists of a great number of various species, from minute living things like viruses or bacteria to giants like whales or sequoias, each playing a unique role in relation to the whole system.

Exercise 10. Agree or disagree with the statements given below.

1. Ecology is a linguistic science.
2. More attention ought to be paid to Ecology.
3. Ecological problems are not very important now.
4. All the ecological problems can't be ever solved.
5. Scientists are not worried about any of the ecological problems at present.

UNIT 2. ENVIRONMENT AND SCIENCE

Exercise 1. Read and memorize the following words:

domestic [dəˈmestik] – внутренний; exchange [iksˈtʃeindʒ] – обмен, менять, обменивать; expand [iksˈpænd] – расширять; environment [inˈvaiə rə nmə nt] – окружающая среда; refuse [ˈrefju:s] – отходы; wastes [weists] – выбросы, отходы; reproduce – восстанавливать; decrease [diˈkri:s] – уменьшаться, снижаться; impair [imˈpɛə] – ухудшаться; exert [igˈzə :t] – оказывать; noxious [ˈnokʃə s] – вредный, пагубный,

отравленный; admit [ə d'mit] – отмечать; interaction [,intərækʃə n] – взаимодействие; contemporary [kə n'tempr,ri] – современный; elaborate [i'læ b ə reit] – разрабатывать; false [fɔ:ls] – ошибочный; ecosystem ['ekousistə m] – экосистема; sufficient [sə 'fiʃə nt] – достаточный; evidence ['evidə ns] – свидетельство; execution ['eksikju:ʃ n] – проведение; yield-capacity – урожай; pest [pest] – вредитель; anticipated – ожидаемый; excessive [ik'sesiv] – избыточный; perish – гибель; unforeseen ['ʌnfɔ'si:n] – непредвиденный; selfpurify [self'pjuərifai] – самоочищаться; consequence ['kɔnsikwəns] – последствие; equilibrium [,i:kwi'libri ə m] – равновесие; interference [,intə'fiərəns] – вмешательство; damage ['dəmidʒ] – вред, разрушение; huge [hju:dʒ] – огромный; amount [ə'maunt] – количество; household ['haushould] – бытовой; harmful ['hɑ:mful] – вредный; foreign ['fɔriŋ] – чужеродный; respect [ris'pekt] – отношение; withstand [wið'stænd] – противостоять.

Exercise 2. Read and translate the following international words: energy ['enə dʒi], manifest ['mænifest], natural ['nætʃrə l], utilization [,ju:tilai'zeiʃ n], biology [bai'ɔ lə dʒ i], interpretation [in,tə:pri'teiʃ n], methodology [,meθə'dɔlə dʒi], social ['souʃə l], analogous [ə'næləgəs].

Exercise 3. Find in the right-hand column equivalents to the words in the left-hand column:

at the same time, therefore, at first glance, nowadays, nevertheless, as well as, as a result, present-day, for instance, because of, humankind, anticipated, measure.	Современный, например, из-за, следовательно, с первого взгляда, в то же время, в наши дни, тем не менее, в результате, так же как (на ряду), человечество, мера, предполагаемый.

Exercise 4. Read and translate the text:

Environment and Science

The exchange of substances and energy is continuously growing nowadays, in the expanded utilization of natural resources and the increase of domestic refuse and industrial

wastes which are returned into the environment, drastically forces man's overall impact on nature.

At the same time, the ability of nature to reproduce intensively used resources and to self-purify from the wastes is limited.

Therefore, old and rapidly developing industrial regions are running short of natural resources the reproduction of which is being decreased and the quality of which is impaired: pollutants are accumulating in the environment which exerts a noxious influence on living organisms, including man.

It should be admitted that the total sum of problems of the interaction of society with nature under the conditions of contemporary scientific and technological progress has been insufficiently elaborated.

At first glance such a statement may seem false, since many natural sciences have long been dealing with various aspects of the environment, in particular, the study of the impact of society's economic activity on the environment.

Nevertheless, the actual causes of unfavorable changes in the natural environment and the essence of the impact of technological factors on natural ecosystems have been studied insufficiently.

Evidence of all of this is the fact that the realization of large technological measures (mining, building, hydroengineering, etc.), execution of extensive land reclamation work, introduction of chemical processes into agriculture necessary for increasing yield-capacity and fighting pests as well as significant positive effects often yield unexpected and unpleasant results.

Modern industrial production creates new materials and wastes which are non-existent in nature and in many respects foreign to living organisms by their physical and chemical structure. The human body is not yet prepared, in terms of its evolution, to withstand the impact of new chemical substances, new energy types, and various physical radiation.

As a result, the actual economic effect of a certain project often turns out to be lower than the anticipated one, while

excessive air and water pollution and perishing of forests and farmlands, losses of fisheries and many other unfavorable changes in the environment make it necessary to carry out new, previously unforeseen measures.

Exercise 5. Answer the following questions:

1. What is the reason of growing exchange of substances and energy nowadays? 2. What is the reaction of nature to human activity? 3. What can you tell about the ability of nature to reproduce intensively used resources? 4. Why is the quantity of natural resources decreasing all the time? 5. Why is the quality of them impaired? 6. How has the total sum of problems of the interference of society with nature been elaborated? 7. What do you understand under the expression "large technological measures"? 8. What are the results of the realization of technological measures? 9. Does the actual economic effect of a certain project always turn out to be higher or lower than anticipated one and why? 10. What is the interplay of new compounds with living organisms? 11. What is the reaction of the human body to new materials?

Exercise 6. Find the pairs of synonyms:

emit, increase, mankind, use, grow, influence, noxious, impact, harmful, cause, release, utilize, reason, fight, struggle, humankind.

Exercise 7. Translate the following words into Russian. Mind the prefix-non: non-waste, non-returnable, non-essential, non-freezing, non-metal, non-resistant, non-condensable, non-organic, non-standard, non-renewable.

Exercise 8. Translate the following sentences paying attention to the compound preposition.

1. According to World Health Organization 40000 chemical agents used by mankind are harmful for the human organism.
2. By means of this device we can carry out more operations in shorter time.
3. In order to protect the surface from heat and cold it was covered with special substances.

4. In spite of factory filters air was polluted.
5. In addition to the oral examination you will be given a written test.
6. What book can you give me instead of that one?
7. The problem of pollution goes back as far as Industrial Revolution.

Exercise 9. Find the sentences with complex object and translate them.

1. Everybody knows D.I.Mendeleyev to formulate the Periodic Law.
2. At present time scientists consider 109 substances to be elements.
3. We know our transport to be the cause of air pollution.
4. I tried to make him understand that domestic refuse and industrial wastes grow from year to year.

Exercise 10. Translate from Russian into English:

1. Загрязнение окружающей среды достигает угрожающих размеров.
2. Отходы современной технологии пагубно влияют на окружающую среду и ее обитателей.
3. Рост гигантских городов сопровождается быстрым развитием производства, которое является причиной загрязнения окружающей среды.
4. Экологически чистые продукты, промышленность и транспорт необходимы для восстановления и очистки окружающей среды.
5. Сегодня окружающая среда коренным образом (radically) преобразована в результате деятельности человека.
6. Около 60% природных экосистем суши в той или иной степени разрушено в результате с/х, промышленной и других видов деятельности человека.

Exercise 11. Read the text and explain its title.

Environment and Safety

Local, regional and global environmental changes and the increasing shortage of vital resources like freshwater, fossil fuels

and fertile soil is a growing factor in the emergence of armed conflicts, especially in and between developing countries. The permanent loss of the very foundations of life, such as

- inhabitable land, due to rising sea levels,
- agriculturally productive land, due to soil erosion,
- adequate drinking-water reserves, due to prolonged periods of drought

can lead to social problems and violent conflicts both within and between states. When entire peoples are forced to leave their homes because the land is no longer able to feed them or because the logging of rainforests left them with no game to hunt, they are hardly likely to be received with open arms by the inhabitants of more fertile regions. Or when one country in need of more drinking-water decides to create a reservoir by damming the only river supplying the entire region, the neighbours dependent on that source will not stand by and let it happen.

No wonder, then, more attention is being paid to the issue of "ecological security".

Exercise 12. Speak on the topic "Ecology".

UNIT 3. POLLUTION

Exercise 1. Read and memorize the following words:

create [kri'eit] – создавать, возникать; destroy [dis'troi] – разрушать, исчезать; transform [trənsˈfɔ:m] – переходить, превращаться; unavoidable [ʌnəvɔidəbəl] – неизбежно; clean up [kli:n] – очищать; impossibility [imposibiliti] – неизбежность; particulates [pəˈtikjulits] – в форме частиц; soot [sut] – сажа; chimney [ˈtʃɪ mni] – труба; contaminate [kən't æmineit] – загрязнять; rubbish [ˈrʌbiʃ] – мусор, отбросы; sewage [ˈsju: idʒ] – сточные воды; dump [dʌmp] – сбрасывать, сгружать; deposit [di'pɔzit] – класть, положить; charge [tʃa:dʒ] – заряжать; solid – твердый; shift [ʃift] – переходить; fossil fuel [ˈfɔsil ˈfjuəl] – ископаемое топливо; thermal [ˈθə :mə l] – тепловой, термический, горячий; result in – выливаться в, приводить к; maintain [men'tein] – поддерживать, сохранять, тех.обслуживать.

Exercise 2. Read the names of the chemical elements. Translate them into Russian:
carbon ['ka:bən], hydrogen ['hajdrədʒ(ə)n], oxygen ['ɔksi dʒ(ə) ,n], nitrogen ['naitridʒən], sulphur ['sʌlfər].
Exercise 3. Read the text and say:
a) what the term "pollution" means,
b) what main sources of pollution are mentioned in this text.

Pollution

To maintain his standards of living 21st century man employs technology to produce an enormous variety of goods and services. Technology needs energy and water. But energy and water can be neither created nor destroyed, only transformed. And since everything must go somewhere the transformations which are part of production processes cause pollution in some form or other – this is unavoidable. So talk of cleaning up the environment and pollution-free cars, products or industries is a scientific impossibility.

For example, we can collect particulates (such as smoke, dust, soot) from factory chimneys by means of filters, but these solid wastes will then contaminate our water or soil. Similarly, we can collect rubbish, and remove solid waste from sewage, but they must then be either burned (causing air pollution), dumped into our rivers, lakes and oceans (water pollution) or deposited on the land (soil pollution, and water pollution if they run away).

Another example is air pollution from cars. We can reduce air pollution from petrol – and diesel-propelled cars by changing over to electric cars. But electric cars would need to have their batteries recharged almost every night, and so we should need to increase the number of power plants to generate the extra electricity required. And an increase in the number of power plants that use fossil fuels would result in increased air pollution (from sulphur oxides, nitrogen oxide and smoke), increased water pollution (from heat), and increased land pollution (from mining). We can shift to nuclear power, which is not dependent on fossil fuels. But nuclear power increases thermal pollution of the water

and adds the danger of releasing radioactive substances into the environment.

Exercise 4. Find in the right-hand column synonyms to the words in the left-hand column:

Employ v, produce v, enormous a, for example, by means of, increase v, realize v, pollution n, require v, collect v, environment n, evolution n, pollutant n, reason n	Great a, use v, with the help of, gather v, demand v, manufacture v, development n, surrounding n, waste n, cause n, raise v, understand v, contamination n, for instance

Exercise 5. Answer the following questions:

1. Why does man employ technology? 2. What are the requirements of technology? 3. What is the reason of pollution? 4. Why is talk of cleaning up the environment a scientific impossibility? 5. What devices are used to collect particulates from factory chimneys? 6. What do we have to do with rubbish? 7. How is it possible to reduce air pollution from petrol – and diesel-propelled cars? 8. What is it necessary to be done to generate the extra electricity? 9. Why does an increase of power plants result in increased air pollution, water pollution and land pollution?

Exercise 6. Use the necessary preposition. Translate the following sentences into Russian. Remember the translation of the word "result":

to result – получать
to result from – происходить из, являться результатом
to result in – давать, приводить к чему-либо

1. This discovery resulted ... the great work done by Cavendish. 2. Passing an electric spark through the mixture resulted ... the explosive combination. 3. The experiment confirmed that a new substance had resulted. 4. The change of pressure results ... the change of volume. 5. The result in either case is the same. 6. The adoption of a new term resulted ... the need to describe this phenomenon more completely. 7. The final result, after thousands of years was coal: a material containing a high percentage of Ca.

Exercise 7. Find the sentences with Complex Subject and translate them:

1. A huge amount of industrial and household wastes is known to be discharged into the environment.
2. Before man's economic activity upset the environment's dynamic equilibrium the consequences of this activity were insignificant or were observed locally.
3. Today man's interference in natural processes is reported to be felt on regional and global scale.
4. Every year over 250000 new chemical compounds are supposed to be synthesized in the world, of which about 300 are sure to be utilized in production and may enter the environment.

Exercise 8. Translate the following sentences paying attention to the compound conjunctions:

1. The sun gives us both light and heat, it gives us energy as well.
2. Our students know neither English, nor Russian.
3. The longer I think of your plan, the more I like it.
4. As far as the application of computer is concerned its range is very wide.
5. So far the problem remained unsolved.
6. As to the advantages of this method they leave no doubt.

Exercise 9. Read the following chemical terms.

mercury ['mə :kju:ri] – ртуть; methyl ['meθi l] – метил; sulfate ['sʌlfeit] – сульфат; plastics – пластмассы; acetaldehyde [,æsi'tældihaid] – уксусный альдегид, ацетальдегид; methyl mercury – метилртуть; mercuric sulfate – сульфат ртути.

Exercise 10. Translate the following sentences into English:

1. Все виды загрязнения видоизменяют окружающую среду, в которой сообщество организмов живет, и нарушают ее хрупкое равновесие.
2. В первобытном обществе, основанном на охоте и добыче пищи, человек вписывался в природу очень хорошо: он ел корни и ягоды, ловил животных для пищи.
3. Человек, как известно, является частью природы.

4. Загрязнение, помимо нарушения экосистем, дает многочисленные неблагоприятные результаты.
5. Люди стали серьезно нарушать баланс в природе только тогда, когда стали практиковать фермерство и содержать многочисленные стада травоядных животных.
6. Чтобы облегчить свой образ жизни, человек стал изобретать различные виды технологии, которые имели вредные побочные эффекты на окружающую среду.
7. Если человек будет продолжать загрязнять окружающую среду и дальше, он в конце концов заставит исчезнуть многих животных по очереди.
8. Чтобы сохранить окружающую среду для будущих поколений здоровой, люди должны изобрести безотходную технологию или подвергать отходы переработке для повторного использования.

Exercise 11. Read and translate the text without the help of dictionaries. Entitle it.

One of the most dramatic examples of modern pollution, showing the devastating effect of industrial processes, was the situation at Minamata Bay, Japan.

In the 1950s one of the basic products of chemical industry was acetaldehyde, a chemical in great demand for its usefulness in making plastics. The standard production process involved the use of mercuric sulfate as a catalyst and resulted in effluent (outflow) which was allowed to enter the bay.

The first signs of trouble were in 1953 when local cats began to go bekserk – some even drowned after throwing themselves into the sea. Soon afterwards early symptoms appeared in people – paralyzed hands, dilated pupils, and even severe cases of brain damage.

It was established, 10 years later, that the acetaldehyde process resulted in the formation of an extremely toxic compound, methyl mercury, hundreds of tons of which were accumulating in the waters of Minamata Bay and in the bodies of its fish.

Exercise 12. Translate the following sentences into Russian, paying attention to the Passive Voice:

1. Hundreds of tons of the toxic compound were accumulated in the waters of the bay and in the bodies of its fish. 2. The waters of the bay were contaminated with methyl mercury. 3. The court actions were brought against the chemical company. 4. The court actions were strongly resisted by the company. 5. The company was forced to pay compensation to the families of the victims. 6. 500 cases of mercury poisoning were registered in 1970s.

Exercise 13. Read and translate the text. Answer the following questions:

1. What is pollution? 2. What are the sources of pollution? 3. What are the effects of pollution? 4. How can pollutants get into the environment ?

Any addition to air, water, soil, or food that threatens the health, survival capability, or activities of humans or living organisms is called pollution. Most pollutants are solid, liquid, or gaseous by-products or wastes produced when a resource is extracted, processed, made into products, and used. Pollution can also take the form of unwanted energy emissions, such as excessive heat, noise, or radiation.

Pollutants can enter the environment naturally or through human activities. Most natural pollution is dispersed over a large area and diluted or broken down to harmless levels by natural processes. By contrast, most serious pollution from human activities occurs in or near urban and industrial areas, where pollutants are concentrated in small volumes of air, water, and soil. Industrialized agriculture is also a major source of pollution.

Some pollutants contaminate the areas where they are produced. Others are carried by winds or flowing water to other areas. Pollution does not respect state or national boundaries.

Unwanted effects of pollutants are (1) disruption of life support systems, (2) damage to plant and animal species, (3) damage to human health, (4) damage to property, and (5) nuisance effects such as noise and unpleasant smells, tastes, and sights.

Three factors determine how severe the effects of a pollutant will be. One is its chemical nature – how active and harmful it is to living organisms. Another is its concentration – the amount per volume unit of air, water, soil, or body weight.

A third factor is a pollutant's persistence – how long it stays in the air, water, soil or body.

Exercise 14. Speak on the topic "The environmental pollution".

UNIT 4. AIR POLLUTION

Exercise 1. Read and memorize the following words:

poison ['pɔɪzn] – отравлять; tiny [taini] – малое количество; measure ['meʒə] – измерять; volume ['voljum] – объем; compare [kəm'pɛə] – сравнить; vary ['vɛəri] – отличаться; area ['ɛərɪə] – площадь, пространство; breath [bri:ð] – дышать, вдыхать; lungs [lʌŋz] – легкие; suffer ['sʌfə] – страдать; suggest [sə'dʒest] – полагать; fume [fju:m] – дым; pl.fumes – выхлопные газы; cumulative ['kju:mjulətɪv] – кумулятивный, накопленный; available [ə'veiləbl] – имеющийся в наличии; treat [tri:t] – обрабатывать; lead [led] – свинец; dislodge [dis'lodʒ] – вытеснять; garbage ['ga:bidʒ] – мусор, отбросы; lichen ['laikən] –лишайник.

Exercise 2. Read and translate the following international words:

affect [ə'fekt], assimilate [ə'simileit], atmosphere ['æ tməsfiə], filter [filtə], period ['piə riəd], principle ['prinsipl], resource [ri'sɔ:s], separation [ˌsepə'reiʃn], ventilation, chemical ['kemikəl], cubic [kju:bik].

Exercise 3. Give the initial forms of the following words. Translate them:

pollutes, known, invisible, normally, found, measuring, breathing, most, closer, connection, produces, smokeless, used, factories, treated.

Exercise 4. Form nouns adding the suffixes a)-tion, b)-ment and c)-ity to the given verbs and adjectives and translate them:

to pollute, to measure, to connect, to develop, to inform, to direct, active, dense, able, complex, to found, to reduce, to move, to inspect, to compensate.

Exercise 5. Read and translate the text. Say:

1. What main sources of pollutants are mentioned in this text.
2. How the level of pollution can be measured.
3. What effects air pollution has.

Air Pollution

What is air pollution?

If smoke pollutes the air, it is easy to see. This is because it contains black particles of carbon which are known as soot. Other pollutants are invisible gases like sulfur dioxide and carbon monoxide. You can't see them, so the air might look clean, but they can poison you.

Not all invisible gases are poisonous, but they can still be pollutants – carbon dioxide is one example. Air pollution can be due to many different pollutants. In each case it means that the air contains some chemical which is not normally found there. In other words air pollution is addition of harmful substances to the atmosphere resulting in damage to the environment, human health and quality of life. One of many forms of pollution air pollution occurs inside homes, schools, and offices, in cities, across continents, and even globally.

Sources of Air Pollutants

Most air pollution comes from one human activity: burning fossil fuels–natural gas, coal, and oil–for power industrial processes and motor vehicles. Among the harmful chemical compounds this burning puts into the atmosphere are carbon dioxide, carbon monoxide, nitrogen oxides, sulfur dioxide, and tiny solid particles–including lead from gasoline additives called–particulates.

When fuels are incompletely burned, various chemicals called volatile organic chemicals (VOCs) also enter the air. Pollutants also come from other sources. For instance, decomposing garbage in landfills and solid waste disposal sites emit methane gas, and many household products give off VOCs.

Some of air pollutants come from natural sources. For example, forest fires emit particulates and VOCs into the atmosphere.

Ultrafine dust particles, dislodged by soil erosion when water and weather loosen layers of soil, increase airborne particulate levels. Volcanoes give off sulfur dioxide and large amounts of pulverized lava rock known as volcanic ash. A big volcanic eruption can darken the sky over a wide region and affect the earth's entire atmosphere.

Unlike pollutants from human activity, however, naturally occurring pollutants tend to remain in the atmosphere for a short time and do not lead to permanent atmospheric change.

How Much Pollution is There?

Often there only needs to be a tiny amount of a pollutant to make the air polluted. The level of pollution is found by measuring the mass of pollutant present in a standard volume of air. The mass of the pollutant is measured in microgrammes (mg) – one millionth of a gramme. The standard volume of air is one cubic metre. To learn how much pollution is coming from specific sources, measurements are also taken at industrial smokestacks and automobile tailpipes.

These measurements can be used to compare one area with other. The amount of air pollution can vary quite a lot from area to area.

Air Pollution and Health

You are continually breathing air into your lungs. This means your lungs are the most likely part of your body to suffer from the effects of air pollution.

It is known that the closer you get to the city, the greater the amount of sulfur dioxide pollution in the air. Poisonous pollutants mercury and cadmium from industrial sources, lead from car fumes can get from your lungs into your blood.

These pollutants build up slowly until they reach poisonous levels. They are called cumulative poisons. Air pollution makes people sick – it causes breathing problems and promotes cancer – and it harms plants, animals, and the ecosystems in which they live. Some air pollutants return to earth in the form of acid rain and snow, which corrode statues and buildings, damage crops and

forests, and make lakes and streams unsuitable for fish and other plant and animal life.

Prevention is the Only Cure!

Nowadays, the amount of smoke produced when burning fuels can be greatly reduced. For example, natural gas is a smokeless fuel used in many homes and factories. Solid fuels are also available which produce very little smoke. This is because they have to be treated in a special way. There is also lead-free petrol on sale. Although it is cheap to produce, it cannot be used in all types of cars. So industries should invest environmentally friendly production methods. We should 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.

Exercise 6. Answer the following questions:

1. What does smoke contain? 2. How are particles of carbon called? 3. What invisible gases do you know? 4. Are all invisible gases poisonous? 5. How is the level of pollution found? 6. In what units is the mass of pollutant measured? 7. What is the standard volume of air? 8. How can the amount of air pollution vary? 9. Why do our lungs suffer most of all from the effects of air pollution? 10. What poisonous pollutant do car fumes contain? 11. What kind of fuels produce little smoke?

Exercise 7. Translate the sentences paying attention to the meaning of the word "cause":

cause n – причина; v – вызывать, причинять

cause + инфинитив – заставлять

1. Carbon monoxide causes the air pollution. 2. Automobile exhaust gases are the cause of increasing CO concentration in the air. 3. Industrial activity is known to cause noticeable effect on a global scale. 4. At high concentration sulfur oxides are the causes of vegetation disbalance. 5. The initiative of "Green Peace"

movement caused the world public to pay special attention to the problem of environmental protection.

Exercise 8. The following paragraph summarizes the answer to the question "What causes 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 ... acids, which are carried a long ... and cause acid rain. At ground ... there is also the problem of ... exhausts producing ozone and giving off ... .

(coal, smog, air, into, which, hydrocarbons, nitric, distance, vehicle, level).

Exercise 9. Transform the sentences like in the model.

MODEL: Plants trap sunlight and utilize it in biochemical reactions.

Plants trap sunlight utilizing it in biochemical reactions.

1. Human activities affect the environment and radically change it.
2. Photosynthetic reactions transform radiant energy and result in organic substances.
3. Ecology is a branch of natural science. It deals with interplay within biosphere.
4. The ozone layer absorbs ultraviolet rays. It protects life on Earth.
5. Organic substances consist of molecules. Molecules contain carbon.

Exercise 10. **Read and memorize:**

The air you are breathing may contain particles or gases that can damage your health. But how can you tell? In Tokyo, the pollution is so bad that there are large electronic scoreboards in public areas. These scoreboards show people the amount of pollution in the air they are breathing.

There are simpler, natural ways of detecting pollution. Plants called lichens can show how much pollution there is in the air. Bushy lichens need really clean air. They are easily poisoned by just a small amount of sulphur dioxide. If you have this lichen growing near you the air will probably be very clean.

Exercise 11. Memorize the sources and the amounts of the major air pollutants made by human activities all over the world. Use these facts in your topic.

Pollutant gas	Artificial sources	Amount produced throughout the world millions of tonnes	Natural sources
Carbon monoxide (CO)	Burning of fuels	300	Forest fires, biological processes
Sulphur dioxide (SO_2)	Burning of coal and oil, roasting of sulphide ores	145	Volcanoes
Hydrocarbons	Vehicle exhausts, chemical processes	88	Biological processes
Nitrogen oxides (NO, NO_2)	Vehicle exhausts, burning of fuels	50	Bacterial action in soils, electrical storms, (lightning, flash)
Ammonia (NH_3)	Waste treatment	4	Biological decay
Hydrogen sulphide (H_2S)	Chemical processes, sewage treatment	3	Volcanoes, biological decay

Exercise 12. Read the following text . Entitle it.

Environmentalists and scientists have been urging world governments to cut carbon dioxide emissions drastically. They also want to see massive replanting of forests and woodlands.

Both of these things are possible and will even be helpful to national economies. For instance, much energy from fossil fuel burning is wasted – fuel that is not burned properly. If buildings were properly insulated, public transport made more efficient , if waste heat from power plants was used to heat greenhouses or homes, if coal was burned so that more energy was extracted from it, most nations could not only cut carbon dioxide output considerably, they could also save enormous sums of money.

Tree planting too has benefits. About a quarter of the carbon dioxide created by people comes from clearing and burning forests. Growing trees soak up carbon dioxide. Trees are also sources of food, building materials, fibres and medicines.

Exercise 13. Translate these sentences into English.

1. Вероятно, самым важным природным источником загрязнения воздуха является деятельность вулканов, которые выбрасывают огромное количество пепла и токсичных веществ.
2. Смог образуется при сжигании угля, когда дым смешивается с влагой в воздухе.
3. Загрязнение воздуха такими веществами, как CO, SO_2 и NO_2 вредно влияет на здоровье детей и взрослых, вызывая такие заболевания, как астма, экзема, хронический бронхит и даже рак легких и крови.
4. Загрязнители воздуха вредно влияют как на живую, так и на неживую материю.
5. Чтобы сократить загрязнение воздуха и предотвратить образование кислотных дождей, в Англии было запрещено отапливать дома углем.
6. Чтобы сократить загрязнение воздуха в ваших домах, не следует пользоваться освежителями воздуха, различными аэрозолями. Курить можно только вне жилых помещений.

Exercise 14. Read the text and entitle it .

Indoor Air Pollution

Pollution is perhaps most harmful at an often unrecognized site–inside the homes and buildings where we spend most of our time. Indoor pollutants include tobacco smoke; radon, an invisible radioactive gas that enters homes from the ground in some regions; and chemicals released from synthetic carpets and furniture, pesticides, and household cleaners. When disturbed, asbestos, a nonflammable material once commonly used in insulation, sheds airborne fibers that can produce a lung disease called asbestosis.

Pollutants may accumulate to reach much higher levels than they do outside, where natural air currents disperse them. Indoor air levels of many pollutants may be 2 to 5 times, and occasionally more than 100 times, higher than outdoor levels. These levels of indoor air pollutants are especially harmful because people spend as much as 90 percent of their time living, working, and playing indoors. Inefficient or improperly vented heaters are particularly dangerous.

Exercise 15. Speak on the topic "Air Pollution".

UNIT 5. URBANIZATION

Exercise 1. Read and memorize the following words:

duodenal ulcer [dju;ou'dr;nl'ʌ lsə] – язва 12-перстной кишки; nightmare ['naɪtmɛə] – кошмар; neurose [njuə'rousɪ : z] – невроз; conurbations [kɔnə:beɪʃ(ə)n] – большой город с пригородом.

Exercise 2. Read the names of cities:

Rio de Janeiro ['ri:oudeʤə'nɪə rou], Shanghai [ʃæŋ'haɪ], Tokyo ['toukjou], Cairo ['kaɪərou], Buenos Aires [bweneɔs-'aɪɒr i z].

Exercise 3. Read and translate the text.

Urbanization

The scale of urbanization could have been called unprecedented before now. But at present its pace is such that demographers have begun to talk about hyperurbanization. Today there are about 2,600 cities in the world with a population of over 100,000 compared to 360 at the beginning of this century. The number of cities whose population exceeds one million has grown

more than 10-fold. And they continue to grow, forming conurbation. The biggest are New York, London, Tokyo and Shanghai.

Scientists maintain that such conurbation as Mexico City (over 30 million inhabitants), San Paolo (over 25 million) and Rio de Janeiro, Cairo and Buenos Aires (up to 20 million) will become a nightmare of the not-so-distant future. It is expected that within the next two decades their territories will more than double and treble, giving rise to economic, social and ecological difficulties which can scarcely be imagined.

That is not all. Conurbations of conurbations have already emerged, the biggest being in the United States:Boswash (Boston–Washington), Chippits (Chicago–Pittsburgh), and Sansan (San Francisco–San Diego). Presumably, some 150 million Americans will live in these three megalopolises alone by the year 2000. And in the early 21st century there may be more than 160 such giant conurbations. Some experts believe that whole city-continents may develop.

The city environment is known to exert an influence on practically everything: soil, lakes, rivers, seas, forests, the animal words and, of course, the health and behavior of people. Man in a large city is isolated from nature and finds himself in an environment full of negative factors: great population density, an accelerated pace of life, noise vibration, and polluted air and water. Hence, the growing incidence of cardiovascular diseases, stomach and duodenal ulcers, neuroses and cancer.

Large cities in the former USSR are also growing. Incidentally, there are more of them here than in any country – 280 (as against 170 in Japan, 160 in the United States, 155 in India and 130 in China). According to our demographic forecasts, by the year 2000, 20 conurbations had appeared in the country.

Exercise 4. Write out of the text the sentences giving an idea of the largest cities of the world.

Exercise 5. Write out of the text the sentences characterizing the environment of large cities.

Exercise 6. Speak on the text.

Exercise 7. Discussion. In the 20 century cities grow very quickly. People from villages move to towns and cities. But still some people living in cities dream of having a house in the country. Is it better to live in a big city or in the country? Read the following pros and cons. Think of some more.

It is better to live in a big city	It is better to live in the country
For	For
1. Numerous cultural centers. 2. Various sport facilities. 3. Many professions to take.	1. Fresh air and beautiful nature. 2. One can have a lot of physical activity, working in the garden, etc. 3. Actors even theatres sometimes give their performances just in the place you live.
Against	Against
1. You suffer from noise and air pollution. 2. You have to cover too long distances every day. 3. You are always in a hurry.	1. It takes a lot of time to get to town. 2. You have to get early in the morning. 3. In summer you are very busy working in the fields, gardens.

Exercise 8. Speak about the environment in your own place (city, town or country).

UNIT 6. AEROSOLS

Exercise 1. Read and memorize the following words:

ray [rei] – луч; reach [ri:tʃ] – достигать; aerosol [‘ɛə rə soul] – аэрозоль; propellant [prə pelə nt] – пропеллент; compound [‘kɔ mpaund] – соединение, состав; nonflammable [‘nɔn’flæmə bl] – невоспламеняющий; safe – безопасный; coolant – охладитель; fridge air conditioning unit – кондиционер; foam – пена; label – прикреплять ярлык, этикетку; anticipate [æ n’tisipeit] –

ожидать; alternative [o: l'tə nətiv] – альтернатива; destroy – разрушать; butane ['bju:tein] – бутан; disadvantage [ˌdisəd'va:ntidʒ] – недостаток; research [ri 'sə:tʃ] научное исследование; solution – решение; generation – поколение; use up – истощать; abuse [ə'bju:z] – злоупотреблять.

Exercise 2. Form nouns adding suffixes a) -tion; b) -ment:
produce, react, develop, generate, insulate, recommend, formulate, require, replace, anticipate, describe, graduate, collect, evaporate, separate, regulate.

Exercise 3. Form adverbs adding the suffix -ly and translate them:
actual, main, annual, special, direct, wide, usual, natural, recent, easy, careful, harmful, close, excellent, rapid, safe.

Exercise 4. Find Russian equivalents:

Called, purified, found, used, recommended, developed, done, selected, reduced, released, absorbed	Очищенный, развитый, использованный, сделанный, обнаруженный, отобранный, сокращенный, поглощенный, высвобожденный, рекомендованный, названный

Exercise 5. Read and translate the text:

Aerosols

Concern has been expressed about whether the use of certain types of aerosol propellants breaks down ozone in the Earth's atmosphere, and about what effects this might have.

The atmosphere

Atmosphere is the word used to describe the gases that surround the Earth (and any other planet). Earth's atmosphere contains many different gases. Nearly four fifths of it is nitrogen, about a fifth is oxygen and the rest (about 1%) is made up of carbon dioxide, water vapor and other gases.

Some of the oxygen is in a form called ozone, a pale-blue gas. People often refer to as "ozone layer". Actually, ozone can be found throughout the atmosphere, but mainly in the stratosphere, 20–25 km above our heads. As you know, the sun sends out heat and light. It also sends out other radiation, including ultra-violet

rays. These are the rays that give us suntans and help the body develop vitamin D. It is believed that, in large quantities, they can also cause some skin cancers. It is known that the ozone in the atmosphere does cut down the quantity of these ultra-violet rays reaching the Earth.

Aerosols and the Atmosphere

When you use an aerosol both the product and the propellant come out. Until recently many aerosol propellants contained chemical compounds called CFCs (chlorofluorocarbons). These are non-toxic, inert and nonflammable compounds (they aren't poisonous, they don't easily react with other chemicals and they don't catch fire) making them very safe to use.

Scientists believe that some types of CFCs use up the ozone in the atmosphere which, for example, could have harmful personal and ecological effects. CFCs in the atmosphere come from other products as well as aerosols. They are used as coolants in fridges and air conditioning units, and also in food packaging (like hamburger boxes), furniture foam, insulation foam and cleaning electronics in manufacture.

What is being done?

In Great Britain in May 1988, it was recommended that all aerosols would be labelled if they didn't contain CFCs. Also, it was anticipated the number of aerosols in the UK using CFCs would be down to 10% or fewer – and these would only be for vital medical and industrial uses.

A lot of researches are being done to develop alternatives to CFCs, and also other types of CFCs which don't destroy ozone. Some alternatives have been developed, like hydrocarbons such as butane, though these can have disadvantages for example they may be more flammable. Replacement of CFCs with alternatives requires very careful researches to ensure that quality and safety are maintained.

Another solution is to develop a new generation of chemicals that don't have harmful effect on ozone. Much research is being done to develop such products.

Exercise 6. Answer the following questions on the text:
1. What does the word "atmosphere" mean? 2. What main gases compose the atmosphere? 3. Where can ozone be found? 4. What is the function of the ozone in the atmosphere? 5. What are the characteristics of chloroflurocarbons (CFCs)? 6. Where are CFCs used? 7. What recommendations are taken in Great Britain (concerning aerosols)? 8. What is the main disadvantage of CFCs? 9. What alternatives to CFCs have been developed?
Exercise 7. Read and memorize the world-famous abbreviations:

The Global Environment Monitoring System (GEMS) operates worldwide networks to monitor both air and water quality under the auspices of the World Health Organization (WHO) and the United Nations Environment Programme (UNEP). Together with the UN Food and Agriculture Organization (FAO), WHO and UNEP also monitor food contamination throughout the world. Since 1974, WHO and UNEP have collaborated on the operation of that portion of GEMS called GEMS/Air, which monitors air quality in urban areas. The coordination center for GEMS was established within UNEP in 1975.

Exercise 8. 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. CFCs are the main factor in the greenhouse effect.
4. By breaking up ozone molecules, CFCs have caused a hole in the ozone layer.
5. Thirty countries have decided to phase out CFCs completely.
6. Nowadays there are fewer products containing CFCs.
7. Without the greenhouse effect the climate on the earth would be much colder.
8. The sun's energy reaches 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 by about 2 millimeters a year.

Exercise 9. Translate into English:

1. Тропосфера – слой около поверхности земли, содержащий воздух, которым мы дышим. Он состоит из 78% N , 21% O_2, CO_2 , 1% инертных газов, таких как аргон.
2. Стратосфера содержит холодный воздух с небольшим количеством O_2 без пыли и водяных паров.
3. CFCs – химические вещества, которые разрушают молекулы озона, вызывая дыру в озоновом слое.
4. Вредные обжигающие лучи солнца, не прошедшие через озоновый слой, убивают деревья, вызывают ожоги, рак кожи, катаракту у животных и людей.
5. Озоновый слой защищает нас от вредного воздействия солнечных лучей.

Exercise 10. Read and memorize:

Aerosols – Use and Abuse

The aerosols industry is always concerned about the safe use of aerosols, so BAMA (the British Aerosols Manufacturers Association (BAMA) is the organization that is made up of companies who make aerosols and things that go into them), with the support of the Government, produced a Code of Practice on safety.

Collect some aerosol cans and have a look at the safety notes and warnings on them.

Whether or not you have been able to find an aerosol here is the kind of safety notice you might find on all of the cans: Pressurized container; protect from sunlight and do not expose to temperatures exceeding 50° C.

Do not pierce or burn even after use.

Do not spray on a naked flame, or any incandescent material.

When aerosols are used according to the instruction they are quite safe, but you should by now realize that if you don't handle them properly accidents might happen.

If you haven't already thought about it, why should you keep an aerosol out of direct sunlight?

What might happen if the temperature does go over 50° C?

Why mustn't you make a hole in the can, even after it's been used?

The gases in some aerosols can have harmful effects, and may even cause death, if they are deliberately misused.

Consistent abuse of substances has caused permanent damage to organs like the brain. Currently one hundred young people die each year from substance abuse.

Do you know of any other products that can be dangerous in this way?

What should you do if you know of someone who misuses such products?

Exercise 11. Speak on the topic "Aerosols".

UNIT 7. ACID RAIN

Exercise 1. Read and memorize the following words:

issue ['isju:] – вопрос; local ['loukəl] – местный; urban ['ə:bn] – городской; phenomenon [fɪ'nɔmɪnən] – явление; responsible [rɪs'pɔnsəbl] – ответственный; acidification [ə,sɪdɪfɪ'keɪʃ(ə)n] – окисление; loss [los] – потеря, утрата; link [liŋk] – связывать; similar ['similə] – подобный; emerge [ɪ'mə:dʒ] – появляться; sulfuric [sʌl'fjuərik] – серный; sulphide ['sʌlfaid] – сульфид; volcano [vɔl'keinou] – вулкан; decay [di'kei] – гниение; oxide ['oksaid] – окись; nitrogen ['naitridʒən] – азот; salmon ['sæmən] – лосось; extinct [iks'tiŋ(k)t] – вымерший, исчезнувший; trout [traut] – форель; speed up ['spi:d ʌp] – ускорять; corrode [kə'roud] – подвергаться действию коррозии; taste [teist] – вкус; foul [faul] – плохой, испорченный; drought [draut] – засуха; pest – сельскохозяйственный вредитель; release [ri'li:s] – выпускать, освобождать; flue-gas ['flu:gæs] – топочные газы; desulphurization [di:'sʌlfju:rai'zeiʃ(ə)n] – десульфуризация, обессеривание; limestone ['laimstoun] – известняк; plaster board ['pla:stə bo:d] – штукатурная плита; burner [bə:nə:] – камера сгорания; catalytic [,kæ tə′litik] – каталитический; renewable [ri'nju: ə b ə l] sources – возобновляемые источники; slake [sleik] – гасить (известь); m.p.h. – mile per hour – миля в час.

Exercise 2. Find in the right-hand column synonyms to the words in the left-hand column:

Issue, amount, damage, enter, decay, produce, affect, difficult, power plant, build, fewer, clean	Injury, come into, problem, quantity, rot, influence, hard, manufacture, construct, power station, pure, less

Exercise 3. Find in the right-hand column antonyms to the words in the left-hand column:

Significant, valuable, appear, affected, speed up, disagree, contaminated, fewer, regularly	Disappear, unaffected, invaluable, insignificant, pure, more, slow, agree, irregularly

Exercise 4. Read and translate the text. Say how acid rain is formed:

Atmosphere receives oxides of carbon, sulfur and nitrogen, hydrocarbons etc. from natural and man-made sources on the ground. Some of the emissions come down and are deposited dry.

Sunlight stimulates formation of photo oxidants. These slowly convert sulphur and nitrogen oxides into sulphuric and nitric acid.

Sulphur and nitrogen oxides, photo-oxidants, and other gases including ammonia, dissolve in cloud droplets. The products are acids, sulphates and nitrates. Acid rain contains dissolved sulphates and nitrates.

Exercise 5. Read and translate the text. Pay special attention to the problems of natural and artificial sources of acid rains, their effects and the ways of their prevention.

Acid Rain

Acid rain is one of the major environmental issues of our time. Unlike the local problem of urban air pollution acid rain is a truly international phenomenon. It has been held responsible for acidification and loss of fish in many lakes and streams in Scandinavia, and has been linked with the spread of damage across large areas of Germany's forests. A lot of reports of similar damage are emerging from some other parts of Europe. The strengths of different acids can be compared using a special scale

called the pH scale. Vinegar has pH number of about 5. Distilled water is not at all acidic – it is neutral, with a pH of 7.

The pH of unpolluted rain is naturally about 5.0 because of dissolved gases including carbon dioxide. The pH of acid rain is lower than this, in the range 2 to 5.

Coal and oil contain sulphur. When these fuels are burned, the sulphur turns to sulphur dioxide. Sulphur dioxide reacts in the air and in clouds to form sulphuric acid. Sulphuric acid makes rainwater acid.

Some important metal ores are sulphides, such as copper and lead sulphides. SO_2 is formed when the metals are extracted from these ores.

Some sulphur dioxide enters the air naturally from volcanoes and the decay of dead plants. But in Europe about 90 per cent of SO_2 in the air comes from artificial sources.

Power stations release about two-thirds of SO_2 given off into the air in Britain. Most of the rest comes from industry.

Sulphur can be removed from oil before it is burned. It is more difficult to remove the sulphur from coal.

A process called "flue-gas desulphurization" can remove SO_2 from the waste gases from power stations. Limestone is used to neutralize the sulphur dioxide.

Fitting a flue gas desulphurization plant would cost about 200 million pounds for a big power station. It would also cost about 30 million a year to run.

Cutting down SO_2 from all power stations could add about 10 per cent to electricity prices.

The process for removing SO_2 from power station flue gases uses limestone and produces calcium sulphate in a form which can be used to make plaster board for the building industry.

Burning fuels in power stations produces oxides of nitrogen. Oxides of nitrogen help cause acid rain.

Power stations release into the air about 40 per cent of the nitrogen dioxide emitted in Britain. Most of the rest comes from motor vehicles.

The Central Electricity Generating Board are experimenting with new burners in power stations. The burners cut the production of oxides of nitrogen by a third.

Burning fuels in vehicle engines produces oxides of nitrogen. Oxides of nitrogen help cause acid rain.

Motor vehicles release into the air about 40 per cent of the oxides of nitrogen given off in Britain.

Lower speed limits would help reduce the amount of oxides of nitrogen in vehicle exhausts. The percentage of nitrogen oxides in car exhausts falls from 0.11 per cent at 70 mph to 0.03 per cent at 30 mph.

Catalytic converters can be fitted to cars. The catalysts cut down the amount of nitrogen oxides in the exhaust gases. Lead compounds stop the catalysts working.

Cars with converters have to run on lead-free petrol which costs more than ordinary petrol.

A catalytic converter costs about £ 500. It has to be replaced after the car has travelled 50 000 miles.

How can acid rains be prevented? The best way to prevent acid rain is to stop the gases which cause it from escaping into the air. In power stations, this is now done by passing all the waste gases through an alkaline solution. This is called scrubbing and removes the gases which cause acid rain. Car exhausts can be fitted with converters which change nitrogen dioxide (one cause of acid rain) into harmless nitrogen.

We can cut down air pollution by using less energy. Saving energy means less fuel needs to be burned. Less coal will be burnt in power stations if we use less electricity.

Nuclear power stations do not burn coal or other fuels so they do not emit oxides of nitrogen and sulphur.

Developing wind power, solar power and hydroelectric power and other renewable sources of energy will produce electricity without adding to the acid rain problem.

There would be fewer vehicles on the roads if more people used public transport.

ожидать; alternative [o: l'tə nətiv] – альтернатива; destroy – разрушать; butane ['bju:tein] – бутан; disadvantage [ˌdisəd'va:ntidʒ] – недостаток; research [ri 'sə:tʃ] научное исследование; solution – решение; generation – поколение; use up – истощать; abuse [ə'bju:z] – злоупотреблять.

Exercise 2. Form nouns adding suffixes a) -tion; b) -ment:
produce, react, develop, generate, insulate, recommend, formulate, require, replace, anticipate, describe, graduate, collect, evaporate, separate, regulate.

Exercise 3. Form adverbs adding the suffix -ly and translate them: actual, main, annual, special, direct, wide, usual, natural, recent, easy, careful, harmful, close, excellent, rapid, safe.

Exercise 4. Find Russian equivalents:

Called, purified, found, used, recommended, developed, done, selected, reduced, released, absorbed	Очищенный, развитый, использованный, сделанный, обнаруженный, отобранный, сокращенный, поглощенный, высвобожденный, рекомендованный, названный

Exercise 5. Read and translate the text:

Aerosols

Concern has been expressed about whether the use of certain types of aerosol propellants breaks down ozone in the Earth's atmosphere, and about what effects this might have.

The atmosphere

Atmosphere is the word used to describe the gases that surround the Earth (and any other planet). Earth's atmosphere contains many different gases. Nearly four fifths of it is nitrogen, about a fifth is oxygen and the rest (about 1%) is made up of carbon dioxide, water vapor and other gases.

Some of the oxygen is in a form called ozone, a pale-blue gas. People often refer to as "ozone layer". Actually, ozone can be found throughout the atmosphere, but mainly in the stratosphere, 20–25 km above our heads. As you know, the sun sends out heat and light. It also sends out other radiation, including ultra-violet

rays. These are the rays that give us suntans and help the body develop vitamin D. It is believed that, in large quantities, they can also cause some skin cancers. It is known that the ozone in the atmosphere does cut down the quantity of these ultra-violet rays reaching the Earth.

Aerosols and the Atmosphere

When you use an aerosol both the product and the propellant come out. Until recently many aerosol propellants contained chemical compounds called CFCs (chlorofluorocarbons). These are non-toxic, inert and nonflammable compounds (they aren't poisonous, they don't easily react with other chemicals and they don't catch fire) making them very safe to use.

Scientists believe that some types of CFCs use up the ozone in the atmosphere which, for example, could have harmful personal and ecological effects. CFCs in the atmosphere come from other products as well as aerosols. They are used as coolants in fridges and air conditioning units, and also in food packaging (like hamburger boxes), furniture foam, insulation foam and cleaning electronics in manufacture.

What is being done?

In Great Britain in May 1988, it was recommended that all aerosols would be labelled if they didn't contain CFCs. Also, it was anticipated the number of aerosols in the UK using CFCs would be down to 10% or fewer – and these would only be for vital medical and industrial uses.

A lot of researches are being done to develop alternatives to CFCs, and also other types of CFCs which don't destroy ozone. Some alternatives have been developed, like hydrocarbons such as butane, though these can have disadvantages for example they may be more flammable. Replacement of CFCs with alternatives requires very careful researches to ensure that quality and safety are maintained.

Another solution is to develop a new generation of chemicals that don't have harmful effect on ozone. Much research is being done to develop such products.

Exercise 6. Answer the following questions on the text:
1. What does the word "atmosphere" mean? 2. What main gases compose the atmosphere? 3. Where can ozone be found? 4. What is the function of the ozone in the atmosphere? 5. What are the characteristics of chloroflurocarbons (CFCs)? 6. Where are CFCs used? 7. What recommendations are taken in Great Britain (concerning aerosols)? 8. What is the main disadvantage of CFCs? 9. What alternatives to CFCs have been developed?
Exercise 7. Read and memorize the world-famous abbreviations:

The Global Environment Monitoring System (GEMS) operates worldwide networks to monitor both air and water quality under the auspices of the World Health Organization (WHO) and the United Nations Environment Programme (UNEP). Together with the UN Food and Agriculture Organization (FAO), WHO and UNEP also monitor food contamination throughout the world. Since 1974, WHO and UNEP have collaborated on the operation of that portion of GEMS called GEMS/Air, which monitors air quality in urban areas. The coordination center for GEMS was established within UNEP in 1975.

Exercise 8. 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. CFCs are the main factor in the greenhouse effect.
4. By breaking up ozone molecules, CFCs have caused a hole in the ozone layer.
5. Thirty countries have decided to phase out CFCs completely.
6. Nowadays there are fewer products containing CFCs.
7. Without the greenhouse effect the climate on the earth would be much colder.
8. The sun's energy reaches 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 by about 2 millimeters a year.

Exercise 9. Translate into English:

1. Тропосфера – слой около поверхности земли, содержащий воздух, которым мы дышим. Он состоит из 78% N , 21% O_2, CO_2 , 1% инертных газов, таких как аргон.
2. Стратосфера содержит холодный воздух с небольшим количеством O_2 без пыли и водяных паров.
3. CFCs – химические вещества, которые разрушают молекулы озона, вызывая дыру в озоновом слое.
4. Вредные обжигающие лучи солнца, не прошедшие через озоновый слой, убивают деревья, вызывают ожоги, рак кожи, катаракту у животных и людей.
5. Озоновый слой защищает нас от вредного воздействия солнечных лучей.

Exercise 10. Read and memorize:

Aerosols – Use and Abuse

The aerosols industry is always concerned about the safe use of aerosols, so BAMA (the British Aerosols Manufacturers Association (BAMA) is the organization that is made up of companies who make aerosols and things that go into them), with the support of the Government, produced a Code of Practice on safety.

Collect some aerosol cans and have a look at the safety notes and warnings on them.

Whether or not you have been able to find an aerosol here is the kind of safety notice you might find on all of the cans:
Pressurized container; protect from sunlight and do not expose to temperatures exceeding 50° C.

Do not pierce or burn even after use.

Do not spray on a naked flame, or any incandescent material.

When aerosols are used according to the instruction they are quite safe, but you should by now realize that if you don't handle them properly accidents might happen.

If you haven't already thought about it, why should you keep an aerosol out of direct sunlight?

What might happen if the temperature does go over 50° C?

Why mustn't you make a hole in the can, even after it's been used?

The gases in some aerosols can have harmful effects, and may even cause death, if they are deliberately misused.

Consistent abuse of substances has caused permanent damage to organs like the brain. Currently one hundred young people die each year from substance abuse.

Do you know of any other products that can be dangerous in this way?

What should you do if you know of someone who misuses such products?

Exercise 11. Speak on the topic "Aerosols".

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A catalytic converter costs about £ 500. It has to be replaced after the car has travelled 50 000 miles.

How can acid rains be prevented? The best way to prevent acid rain is to stop the gases which cause it from escaping into the air. In power stations, this is now done by passing all the waste gases through an alkaline solution. This is called scrubbing and removes the gases which cause acid rain. Car exhausts can be fitted with converters which change nitrogen dioxide (one cause of acid rain) into harmless nitrogen.

We can cut down air pollution by using less energy. Saving energy means less fuel needs to be burned. Less coal will be burnt in power stations if we use less electricity.

Nuclear power stations do not burn coal or other fuels so they do not emit oxides of nitrogen and sulphur.

Developing wind power, solar power and hydroelectric power and other renewable sources of energy will produce electricity without adding to the acid rain problem.

There would be fewer vehicles on the roads if more people used public transport.

There would be fewer vehicles on the roads if more goods were transported by rail.

Limestone is calcium carbonate. Calcium carbonate does not dissolve in pure water but it neutralizes acids.

Limestone can be converted to calcium hydroxide slaked lime.

Powdered lime can be spread on the soil to neutralize acidity. Farmers have used lime to control the pH of the soil for centuries.

Adding limestone to lakes neutralizes the acidity.

Some experts believe that the cheapest way to reduce the acidity of lakes is to dose them with limestone. Liming will cost less then changing power stations to cut down the sulphur dioxide they give off. The cost of liming lakes in Sweden is around 25 million per year.

Liming has to be repeated regularly because lakes soon become acid again if liming stops.

These methods of limiting air pollution are quite effective, but may make electricity and cars more expensive.

A choice may have to be made – either to save money or else to help to save the environment.

Exercise 6. Answer the following questions:

1. What are the natural sources of SO_2? 2. What are the artificial sources of SO_2? 3. Are the main sources of SO_2 in Europe natural or artificial? 4. Why does SO_2 make rainwater acid? 5. Which gases, other than SO_2, help cause acid rain? Where do these gases come from? 6. How does acid rain affect living things in lakes? 7. How does acid rain affect things made from steel? 8. How can air pollution from power stations be cut down? 9. They say we could cut down air pollution by using other methods for generating electricity. Why? 10. How can air pollution from motor vehicles be cut down? 11. What are the problems involved in dealing with pollution from motor vehicles? 12. They say we could cut down acid rain by finding ways of burning less fuel. What are the problems involved in doing this? How is it possible to neutralize the acids?

Exercise 7. Translate into English:

1. Транспорт является основным поставщиком NO_2.
2. Оксиды азота способствуют образованию кислотных дождей.
3. Живые организмы в озерах и реках могут погибнуть, если pH воды упадет ниже 5.
4. В Норвегии породы арктического лосося почти погибли, а большая часть форели исчезла совсем.
5. При сжигании угля и нефти сера, которую они содержат, превращается в SO_2, вызывающий кислотный дождь.
6. SO_2 реагирует в воздухе с другими загрязнителями и водой, образуя H_2SO_4, которая окисляет дождевую воду.
7. Кислотные дожди пагубно влияют как на живые, так и на неживые элементы окружающей среды.
8. Следует предпринимать особые и срочные меры по предотвращению образования кислотных дождей.

Exercise 8. Read and translate the text. Entitle it. Speak about the effect of acid rains.

The vinegar, you put on your fish and chips tastes bitter. It is a weak acid – a chemical which turns indicator paper red. But you don't just find weak acids in vinegar bottles – you can find them in the air too!

Once there was a rainstorm in the USA with rain that was 1000 times more acidic than vinegar. This type of rain is known as acid rain.

Every time you switch on the TV, you are helping to produce acid rain. The electricity you use is produced in power stations by burning fuels such as coal and oil. Travelling in cars or buses causes acid rain too. This is because of the fuel burnt in the engine.

When the environment can't neutralize acid rain, damage occurs to forests, crops, lanes and fish. Toxic metals such as copper and lead can also be leached from water pipes into drinking water. Acid rain speeds up the corrosion of metals. Water supplies in part of Scandinavia are now acid enough to corrode metals. They become contaminated with dissolved metals

such as copper, zinc and cadmium. This makes the water taste foul and may be harmful to health.

Some metals such as iron and zinc are used on the outside of many buildings. These metals are affected by acid rain – they lose their shine and become weak and brittle.

Acid rain makes some toxic elements, such as aluminum more soluble. High Al concentrations in soil can prevent the uptake and use of nutrients by plants. It also accelerates soil weathering and removal of nutrients.

If acid rain eats away at stone and rock, what must it be doing to living things? Large amounts of acid can kill. When acid rain falls, it collects in rivers and lakes, making the water acidic. All the living things in some lakes have been killed by acid rain. The small animals and plants in the water die first. Then the fish die too – and so do all the animals, which feed on them.

Trees also suffer from the effects of acid rain. In Europe, large areas of forest are dead or dying as a result of acid rain. Some scientists say that this is due to acid rain. Other experts disagree and say that the damage is done by drought, disease or pests. Others think that different types of air pollution may be killing the trees.

Scientific studies indicate that there is a link between this pollution and respirator problems in sensitive populations such as children and asthmatics.

What are the socioeconomic consequences of acidification?

1. Lower productivity in fisheries, forestry and agriculture translates to lower profits and fewer jobs for some important industries.
2. Acid deposition causes accelerated corrosion, fracturing and discoloration of buildings, structures and monuments.

Exercise 9. Translate the following text into Russian. Use a dictionary. Entitle the text. Memorize the facts.

a) Humans are bringing about another global-scale change in the atmosphere: the increase in what are called greenhouse gases. Like glass in a greenhouse, these gases admit the sun's light but

tend to reflect back downward the heat that is radiated from the ground below, trapping heat in the earth's atmosphere. This process is known as the greenhouse effect.

The greenhouse effect may soon become the greatest problem in the world. It is as much a problem of agriculture as industry, as much as problem of ice caps as jungles.

It is caused by people, but it is not like other kinds of atmospheric pollution such as acid rain, photochemical smog, or the hole in the ozone layer. We can reduce or stop those by single decisions – for example, to clean up the discharges from factories and cars, or to ban CFCs.

But the greenhouse effect involves everything in the world from pole to pole, from the deepest ocean trench to the outer edges of the atmosphere.

The main natural greenhouse gases are carbon dioxide, methane, nitrous oxide and water vapour. All of these exist naturally in small quantities in the atmosphere. Without them the world would be 30 degrees colder. Human life would never have begun. Without water vapour there would be no rain, and without carbon dioxide there would be no green plants and so no oxygen.

But since the industrial revolution more than two centuries ago, we have been burning more coal and oil and methane and felling more forests. We have also created an entirely artificial greenhouse group of gases, the CFCs, which are 20,000 times more effective than carbon dioxide at trapping heat. We now dump 24 billion tonnes of carbon dioxide into the atmosphere every year. This is making the world warmer.

в) Temperatures are expected to increase by at least 1.3° C by 2030, and 3° C by the year 2070.

Sea levels could rise by 1m or more. For every metre that sea levels rise, about 100 m to 300 m of shoreline are to risk from coastal erosion.

A 1° C change in temperature is the same as moving south or north for between 100 Km and 300 Km, or moving uphill or downhill 150 m.

There are enough reserves of fossil fuels in the ground to increase CO_2 in the atmosphere by five or even ten times.

Exercise 10. The following paragraph describes the greenhouse but the verbs: to know, to reflect, to absorb, to arrive, to conserve, to occur, to be, to freeze, to transmit, effect have been omitted. You may have to use a verb more than once.

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

Exercise 11. Speak on the topic: "What can we do about it ...".

CHP – Combined Heat and Power means using any excess of energy produced by factories to heat local houses. At present most excess heat is just wasted.(Is the last statement right or false?)

Renewables. More windmills (and other renewable energy devices) mean less oil and coal being burned for energy. This means less greenhouse gases produced. (What is your point of view?)

Tree planting. Trees absorb a great deal of CO_2 from the environment. Woods actually clean up the atmosphere. (What can you tell about tree planting in the region where you live?)

Insulation. Better insulated houses need less energy to keep warm; this means burning less coal and oil to heat them (Does this problem exist in your house?)

Public transport. Vehicles produce a great deal of CO_2. More buses on the roads means fewer cars (i.e. more people in a bus) and so fewer polluting engines around. (What do you think about

it?)

Exercise 12. Speak on the topic " Acid Rain".

UNIT 8. WATER POLLUTION

Exercise 1. Read and memorize the following words:

stream [stri:m] – поток; bay [bei] – бухта, залив; moderately ['mɔdəritli] – умеренно; survive [sə'vaiv] – выжить; load [loud] – насыщать; shellfish ['ʃelfiʃ] – моллюск; ingest [in'dʒest] – глотать, проглатывать; exposure [iks'pouʒə] – подвергание какому-л. воздействию; degrade [di'greid] – ухудшать; lubrication [lu:bri'keiʃn] – смазка; spill [spil] – проливание, разливание (жидкости); leaky ['li:ki] – имеющий течь; leak [li:k] – пропускать воду, давать течь; feather ['feðə] – оперение; runoff ['rʌn' ɔf] – сток; biodegradable [baiodeg'reidibl] – разлагаемый микроорганизмами; lavishly ['læ vi ʃ li] – чрезмерно; treat [tri:t] – обрабатывать, подвергать действию (with); tissue ['tisju:] – ткань; reproductive [ri:prə'dʌ ktiv] – репродуктивный, воспроизводительный; exhaust [ig'zɔ :st] – выхлоп; in turn [tə:n] – в свою очередь; ignitable [ig'naitəbl] – воспламеняющийся; flammable ['flæ m ə bl] – огнеопасный; contribute [kon'trib j u:t] – содействовать, способствовать; nutrient ['nju:triənt] – питательное вещество; promote [prə'mout] – способствовать; sediment ['sedimənt] – осадок, отложение; removal [ri'mu:v ə l] – устранение, удаление; eutrophication [ju:trafi'kei ʃə n] – заболачивание; drive away ['draivə'wei] – прогонять; in place of [in'pleis'ɔ v] – вместо; deplete [di'pli:t] – уменьшать; истощать; discharge [dis'tʃa:dʒ] – спуск, сток, слив; pour out [pɔ :] – литься, выливаться; sewage ['sju:idʒ] – сточные воды; нечистоты; sewer ['sjuə] – сточная труба, коллектор, канализационная труба; pasture ['pa:stʃə] – выгон, пастбище, выпас; feedlot ['fi:dlot] – загон для откорма скота; overboard ['ouvəbɔ:d] – за бортом; harm [ha:m] – причинять вред; наносить ущерб; mammal ['mæ mə l] – млекопитающее; drown [draun] – тонуть; encourage [in'kʌridʒ] – поощрять, поддерживать; streamside ['stri:msaid] tree – приречное дерево; undisturbed [' ʌndis't ə :bd] – не-

потревоженный, нетронутый; trap [træp] – задерживать; slope ['sloup] – наклон; buildup ['bildʌp] – накопление.

Exercise 2. Read and translate the following international words: chemicals, n; pesticide, n; herbicide, n; reproductive, a; category, n; tank, n; collect, v; absorb, v; result, n/v; reactive, a; corrosive, a; organism, n; erosion, n; introduce, v; eutrophication, n; number, n/v; natural, a; thermal, a; biological, a; accelerate, v; process, n; activity, n; municipal, a; federal grant; protect, v; vegetation, n

Exercise 3. Read, translate and memorize:

Pollutant, n – pollute, v – polluted, a – polluter, n polluting, n – pollution, n

Leak, v – leakage, n – leakiness, n – leaking, n – leakless, a – leak-proof, a – leaky, a

Harm, v – harmed, a – harmful, a – harmfully, adv – harmless, a – harmlessness, n

Derive, v – derivation, n – derivative, a – derived, a

Exercise 4. Find Russian equivalents:

set of hazards; rainwater runoff; nonbiodegradable chemicals; reproductive problems; water supplies; disease-causing organisms; discharge source; outfall pipes; residential community; city sewer; littoral zone life; sediment build-up.	городской коллектор; накопление осадков; организмы, являющиеся причиной заболеваний; дренажный коллектор; прибрежная жизнь; населенный пункт; неразлагающиеся химикаты; источник слива; дождевой сток; проблемы воспроизводства; водные запасы; ряд опасностей.

Exercise 5. Read the text, translate it:

Water Pollution

Water pollution is contamination of streams, lakes, underground water, bays, or oceans by substances harmful to living things. Water is necessary to life on earth. All organisms contain it; some live in it; some drink it. Plants and animals

require water that is moderately pure, and they cannot survive if their water is loaded with toxic chemicals or harmful microorganisms. Pollution makes streams, lakes, and coastal waters unpleasant to look at, to smell, and to swim in. Fish and shellfish harvested from polluted waters may be unsafe to eat. People who ingest polluted water can become ill, and, with prolonged exposure, may develop cancers or bear children with birth defects.

Major Types of Pollutants

The major water pollutants are chemical, biological, or physical materials that degrade water quality. Pollutants can be classed into eight categories, each of which presents its own set of hazards.

Petroleum Products

Oil and chemicals derived from oil are used for fuel, lubrication, plastics manufacturing, and many other purposes. These petroleum products get into water mainly by means of accidental spills from ships, tanker trucks, pipelines, and leaky underground storage tanks. Many petroleum products are poisonous if ingested by animals, and spilled oil damages the feathers of birds or the fur of animals, often causing death. In addition, spilled oil may be contaminated with other harmful substances.

Pesticides and Herbicides

Chemicals used to kill unwanted animals and plants may be collected by rainwater runoff and carried into streams, especially if these substances are applied too lavishly. Some of these chemicals are biodegradable and quickly decay into harmless or less harmful forms, while others are non-biodegradable and remain dangerous for a long time.

When animals consume plants that have been treated with certain non-biodegradable chemicals, these chemicals are absorbed into the tissues or organs of the animals. Animals at the top of food chains may as a result of these chemical concentrations, suffer cancers, reproductive problems, and die.

Heavy Metals

Heavy metals, such as copper, lead, mercury, and selenium, get into water from many sources, including industries, automobile exhaust, mines, and even natural soil. Like pesticides, heavy metals become more concentrated as animals feed on plants and are consumed in turn by other animals. When they reach high levels in the body, heavy metals can be immediately poisonous, or can result in long-term health problems similar to those caused by pesticides and herbicides.

Hazardous Wastes

Hazardous wastes are chemical wastes that are either toxic (poisonous), reactive (capable of producing explosive or toxic gases), corrosive (capable of corroding steel), or ignitable (flammable). If improperly treated or stored, hazardous wastes can pollute water supplies. They can get into the environment through oil spills and can reach toxic levels as organisms eat one another.

Excess Organic Matter Fertilizers and other nutrients used to promote plant growth on farms and in gardens may find their way into water.

Sediment, soil particles carried to a stream, lake, or ocean, can also be a pollutant if it is present in large enough amounts. Soil erosion produced by the removal of trees near waterways, or carried by rainwater can damage a stream or lake by introducing too much nutrient matter. This leads to eutrophication.

Infectious Organisms

Many disease-causing organisms that are present in small numbers in most natural waters are considered pollutants when found in drinking water.

Thermal Pollution

Water is often taken from rivers, lakes, or the ocean for use as a coolant in factories and power plants. The water is usually returned to the source warmer than when it was taken. Even small temperature changes in a body of water can drive away the fish and other species that were originally present, and attract other

species in place of them. Thermal pollution can accelerate biological processes in plants and animals or deplete oxygen levels in water. The result may be fish and other wildlife deaths near the discharge source. Thermal pollution can also be caused by the removal of trees and vegetation that shade and cool streams.

Sources of Water Pollutants

Water pollutants result from many human activities. Pollutants from industrial sources may pour out from the outfall pipes of factories or may leak from pipelines and underground storage tanks. Polluted water may flow from mines where the water has leached through mineral-rich rocks or has been contaminated by the chemicals used in processing the ores. Cities and other residential communities contribute mostly sewage, with traces of household chemicals mixed in. Sometimes industries discharge pollutants into city sewers, increasing the variety of pollutants in municipal areas. Pollutants from such agricultural sources as farms, pastures, feedlots, and ranches contribute animal wastes, agricultural chemicals, and sediment from erosion

Sewage and food waste discarded from ships on the open sea do little harm, but plastics thrown overboard can kill birds or marine animals.

Oil spills often occur through accidents. Oil in coastal waters kills littoral zone life and harms birds and marine mammals by causing feathers and fur to lose their natural waterproof quality, which causes the animals to drown or die of cold.

Controls

There are different laws, which authorized generous federal grants to help states build water treatment plants that remove pollutants, principally sewage, from wastewater before it is discharged. Industries are treating their waste and also changing their manufacturing processes so that less waste is produced. Farmers and foresters are encouraged to protect streams by leaving streamside trees and vegetation undisturbed; this practice stabilizes banks and traps sediment coming down the slope,

preventing sediment build-up in water.

Exercise 6. Answer the following questions on the text:

1. What is water pollution? 2. Why is water necessary to everybody? 3. What damage can pollution cause? 4. What are the major water pollutants? 5. Why are petroleum products harmful? 6. Why are non-biodegradable chemicals more dangerous than biodegradable ones? 7. How do heavy metals get into water? 8. What wastes are known as hazardous ones? 9. Why are organic fertilizers used on farms and in gardens? 10. What leads to eutrophication? 11. When are disease-causing organisms considered to be pollutants? 12. What can cause thermal pollution? 13. What sources of water pollutants do you know? 14. Is it possible to avoid water pollution?

Exercise 7. Find in the right hand column synonyms to the words in the left-hand column:

1. contamination, 2. harmful, 3. degrade, 4. purpose, 5. poisonous, 6. damage, 7. runoff, 8. decay, 9. dangerous, 10. waste, 11. ignitable, 12. coolant, 13. deplete, 14. leak, 15. sewage, 16. outfall pipe, 17. coastal waters	1. injurious, 2. refrigerant, 3. manufacturing water, 4. decrease, 5. pollution, 6. aim, 7. littoral waters, 8. make worse, 9. percolate, 10. sewer, 11. perilous, 12. toxic, 13. flowing off, 14. harm (injury), 15. flammable, 16. scrap, 17. disintegration

Exercise 8. Translate from English into Russian:

for irrigating crops, for cooling industrial processes, leisure industries, a dumping ground, a water pollutant, to float on the surface, a layer of oil, to clog, to wreck water desalination plants, affected coastlines, a dispersant method, a boom and skimmer method, to scoop off, a sinking method, to get washed ashore, a shore cleaning.

Exercise 9. Read and memorize:

waste (effluent, residuary, sewage) water – сточные воды (отработанные); water basin (chest, pond) – бассейн для сбора воды; pollutants purifier (cleaner, clarifier, filter, collector) –

очиститель (загрязнителей).

Exercise 10. Find Russian equivalents:

distilled water – дистиллируя воду, дистиллированная вода; treated pollutants – обработанные загрязнители, обрабатывая загрязнители; removed particles – удаленные частицы, удаляя частицы; installed clarifiers – устанавливая осветители, установленные осветители; contaminated sources – загрязняя источники, загрязненные источники; eliminated discharges – удаленные выбросы, удаляя выбросы.

Exercise 11. Read and translate the text. Entitle it. Answer the following questions:

Why is oil pollution at sea very harmful to sea-birds? What are the main ways to clean up the water? What does the dispersant method consist of? How does the boom and skimmer method operate? What are the advantages and disadvantages of the sinking method? What is the last -stop measure?

Water is probably one of the most important resources we have. People can survive without food for several weeks, but without water we would die in less than one week. On a slightly less dramatic note, millions of litres of water are needed every day worldwide for washing, irrigating crops, and cooling industrial processes, not to mention leisure industries such as swimming pools and water sports centres. Despite our dependence on water, we use it as a dumping ground for all sorts of waste, and do very little to protect the water supplies we have.

There are several threats to our water resources. Oil is a major water pollutant.

It is lighter than water and floats on the surface. Oil pollution at sea is very harmful to sea birds. When sea-birds dive into polluted sea-water to catch fish they become coated in a layer of oil. The oil clogs their feathers so that they cannot fly. The damaged feathers can no longer keep the birds warm and many die from the cold. Others are poisoned by the oil because swallow it as they try to clean themselves. Oil spills kill thousands of seabirds and can wreck water desalination plants and industrial

plants drawing their water from affected coastlines. However, oil can get into the sea from many other sources, and cause just as much damage.

There are four ways to clean up the water. The dispersant method needs a few days before the oil clears. It is efficient but expensive. The detergents may poison fish and other animals and plants.

The boom and skimmer method gathers the oil up using a long barrier called a boom. A skimmer then scoops the oil off the surface into a suitable container.

The sinking method is quick and protects birds and beaches. However the oil pollutes the sea-bed and may even get washed ashore.

Shore cleaning is a last-stop measure. The sea has already been polluted and detergents and mechanical shovels are used to clean the beach.

Exercise 12. Translate into English:

Загрязнение воды

Загрязнение рек и озер, ручьев и заливов, подземных и грунтовых вод, морей и океанов вредными веществами называется загрязнением воды. Ни человек, ни животное не могут выжить без чистой воды. Вода – это, вероятно, один из самых важных ресурсов, которыми обладает человечество.

Загрязняющие воду агенты могут быть разделены на восемь категорий. Это нефть и нефтепродукты; пестициды и гербициды; тяжелые металлы; вредные отходы; излишки органических удобрений; осадочные породы; организмы, способные вызвать инфекцию; тепловое загрязнение. Человеческая деятельность является самым главным источником загрязнения воды. Загрязняющие агенты могут попадать в воду из городских канализационных труб, шахт, дренажных коллекторов, ферм и так далее. Очень опасными загрязнителями являются нефть и нефтепродукты. Нефть причиняет огромный вред не только животному и растительному миру морей и океанов, но также и животному, и растительному

миру прибрежной зоны.

Есть множество способов для предотвращения загрязнения воды.

Exercise 13. Speak on the topic "Water pollution".

APPENDIX

WHAT YOU CAN DO TO HELP PROTECT THE OZONE LAYER

- Don't buy products containing CFCs, carbon tetrachloride, or methyl chloroform. Read labels and seek out substitutes for these products.
- Don't buy CFC-containing polystyrene foam insulation. Types of insulation that don't contain CFCs are extended polystyrene, , fiberglass, rock wool, cellulose, and perlite.
- Don't buy halon fire extinguishers. Instead, buy those using dry chemicals. If you already have a halon extinguisher, store it until a halon-reclaiming program is developed.
- Stop using all aerosol spray products, except in some necessary medical sprays. Even those not using CFCs emit hydrocarbons or other propellant chemicals into the air. Use roll-on and hand-pump products instead.
- Pressure legislators to ban all uses of CFCs, halons, methyl bromide, carbon tetrachloride, and methyl chloroform by 1995 (with no loopholes).
- Pressure legislators not to exempt the military and space programs from any phaseout of ozone-depleting chemicals.
- Buy new refrigerators and freezers that use vacuum insulation (as in Thermos bottles) instead of rigid-foam insulation and that use helium as a coolant
- If you junk a car, refrigerator, freezer, or air conditioner, make sure the coolant is removed and kept safely for reuse or destruction.
- Pressure legislators to require labels on all products containing or requiring CFCs, halon, or other ozone-depleting chemicals for their manufacture. Products using HCFCs should not be labeled as ozone or environmentally friendly.

- Have car and home air conditioners checked regularly for CFC leaks, and repair them.
- If you buy a car with an air conditioner, look for one that doesn't use CFCs. These should be available on some models in 1994 and on most models by 1995.
- Pressure legislators to establish a fund to help LDCs switch from ozone-depleting chemicals to safe substitutes.

WHAT YOU CAN DO TO REDUCE WASTE AND SAVE MONEY

- Buy less by asking yourself whether you really need a particular item. Instead of shopping until you drop, see if you can drop some of your shopping.
- Buy things that last, keep them as long as possible, and then have them repaired if possible.
- Buy things that are reusable or recyclable, and be sure to reuse and recycle them.
- Buy beverages in refillable glass containers instead of cans or throwaway bottles.
- Use plastic or metal lunch boxes and metal or plastic garbage containers without throwaway plastic liners.
- Wrap sandwiches in biodegradable wax paper or put them in reusable plastic containers; and store food in the refrigerator in reusable containers instead of aluminum foil or plastic wrap.
- Use rechargeable batteries.
- Carry groceries and other items in a reusable basket, a canvas or string bag, or a small cart. Ideally, stores would not provide paper or plastic bags, or would charge for them, as is done in the Netherlands.
- Skip the bag when you buy only a quart of milk, a loaf of bread, or anything you can carry out with your hands.
- Use sponges and washable cloth napkins, dish towels, and handkerchiefs instead of paper ones.
- Don't use throwaway paper and plastic plates and cups, eating utensils, razors, pens, lighters, and other disposable items when reusable or refillable versions are available.

- Avoid red or yellow packaging, the kind most likely to contain toxic cadmium and lead.
- Buy recycled goods, especially those made by primary recycling, and then recycle them.
- Recycle all newspaper, glass, and aluminum, and any other items accepted for recycling in your community.
- If you plan to build a house, consider building a highly energy efficient and less costly structure built mostly from discarded tires, aluminum cans, bottles, and clay.
- Avoid using throwaway plastic items.
- Reduce the amount of junk mail you get. Of the junk mail you do receive, recycle as much of the paper as possible.
- Push for mandatory trash separation and recycling programs in your community and schools.
- Support legislation that would ban the transport of garbage from one state or country to another. This would promote recycling, reuse, and waste reduction, as well as make individuals more responsible for and aware of the wastes they produce.
- Push for use of washable, reusable dishes and silverware in school and business cafeterias.
- Ask stores, communities, and colleges to install reverse vending machines that give you cash for each reusable or recyclable container you put in.
- Buy food items in large economy size cans or packages or in bulk to reduce packaging.
- Buy products in concentrated form whenever possible.
- Choose items that have the least packaging or, better yet, no packaging ("nude products").
- Don't buy helium-filled balloons, and urge elected officials and administrators to ban balloon releases except for atmospheric research and monitoring. Mass releases of helium balloons are now banned in Florida.
- Compost your yard and food wastes and pressure local officials to set up a community composting program.

- Share, barter, trade, or donate items you no longer need.
- Pressure managers of businesses and schools to set up recycling systems and to buy products made from recycled materials.
- Photocopy and write on both sides of the page.
- Don't litter.

WHAT YOU CAN DO ABOUT AIR POLLUTION

To reduce your exposure to indoor air pollutants:

- Test for radon and taking corrective measures as needed.
- Install air-to-air heat exchangers or regularly ventilate your house by opening windows.
- Test indoor air for formaldehyde at the beginning of the winter heating season when the house is closed up.
- Don't buy synthetic wall-to-wall carpeting, furniture, and other products containing formaldehyde; use "low-emitting formaldehyde" or non-formaldehyde building materials.
- Reduce indoor levels of formaldehyde and several other toxic gases by using houseplants. Examples are the spider or airplane plant (the most effective), philodendron (especially the elephant-ear species), chrysanthemum and Gerbera daisy. About 20 plants can help clean the air in a typical home. Plants should be potted with a mixture of soil and granular charcoal (which absorbs organic air pollutants).
- Test your house or workplace for asbestos fiber levels if it was built before 1980. If airborne asbestos levels are too high, hire an independent consultant to advise you on what to do. Don't buy a pre-1980 house without having its indoor air tested for asbestos.
- Attach whole-house electrostatic air cleaners and charcoal filters to central heating and air conditioning equipment. Humidifiers, however, can load indoor air with bacteria, mildew, and viruses.
- Change air filters regularly, clean air conditioning systems, and empty dehumidifier water trays frequently.
- Don't store gasoline, solvents, or other volatile hazardous

chemicals inside a home or attached garage.

- Don't use commercial room deodorizers or air fresheners.
- Don't use aerosol spray products.
- Don't smoke. If you must smoke, do it outside or in a closed room vented to the outside.
- Have people take off their shoes when entering your house. This greatly reduces indoor levels of toxic lead dust and pesticides picked up by shoe bottoms, which transfer them to floors and especially to indoor carpets.
- Make sure that wood-burning stores, fireplaces, and kerosene- and gas-burning heaters are properly, installed, vented, and maintained.

HOW TO SAVE WATER AND MONEY

- For existing toilets, reduce the amount of water used per flush by putting a tall plastic container weighted with a few stones into each tank, or buy and insert a toilet dam. Ask school officials to install toilet dams.
- Install water-saving toilets that use no more than 6 liters per flush.
- Consider flushing toilets only when necessary, using the advice found on a bathroom wall in a drought-stricken area: "If it's yellow, let it mellow – if it's brown, flush it down".
- Install water-saving shower heads and flow restrictors on all faucets.
- Check frequently for water leaks in toilets and pipes and repair them promptly. A pinhole-sized leak can waste up to 640 liters per month. A toilet must be leaking more than 940 liters a day before you can hear the leak. To test for toilet leaks, add some water-soluble dye to the water in the tank but don't flush. If you have a leak, some color will show up in the bowl's water within a few minutes.
- Don't keep water running while brushing teeth, shaving, or washing.
- Try to wash only full loads; use the short cycle and fill the machine to the lowest possible water level.

- When buying a new washer, choose one that uses the least amount of water and fills up to different levels for loads of different sizes. Front-loading clothes washers use less water and energy than comparable top-loading models.
- Try to use an automatic dishwasher only for full loads; use the short cycle and let dishes air-dry to save energy and money.
- When washing many dishes by hand, don't let the faucet run. Instead, use one filled dishpan or sink for washing and another for rinsing.
- Keep a reusable Jug of water in the refrigerator rather than running water from a tap until it gets cold enough to drink.
- Don't use a garbage disposal system – a large user of water. Instead, compost your food wastes.
- Wash your car from a bucket of soapy water and use the hose only for rinsing. Use a commercial car wash that recycles its water.
- Sweep walks and driveways instead of hosing them off.
- Reduce evaporation losses by watering lawns and gardens in the early morning or in the evening, rather than in the heat of midday or when windy. Better yet, landscape with native plants adapted to local average annual precipitation so that watering is unnecessary.
- Use drip irrigation systems and mulch on home gardens to improve irrigation efficiency and reduce evaporation.
- To irrigate plants, install a system to capture rain-water or collect, filter, and reuse normally wasted gray water from bathtubs, showers, sinks, and the clothes washer.

WHAT YOU CAN DO ABOUT WATER POLLUTION

- **Use and waste less water.**
- **Use less harmful substances instead of commercial chemicals for most household cleaners.**
- **Use low-phosphate, phosphate-free, biodegradable dish-washing liquid, laundry detergent, and shampoo.**
- **Don't use water fresheners in toilets.**
- **Use manure or compost instead of commercial inorganic**

high by most hearing specialists), but *only to the extent feasible.* Compliance is limited and enforcement is lax because the law does not specify what is feasible.

By contrast, Europeans have developed quieter jackhammers, pile drivers, and air compressors costing little more than their noisy counterparts. Most European countries also require that small sheds and tents be used to muffle construction noise. Some countries quiet the clanging of garbage collection by using rubberized collection trucks. Subway cars in Montreal and Mexico City have rubberized wheels to reduce noise. In France cars must have separate highway and city horns, the latter much quieter than the former. What do you think should be done to reduce noise pollution?

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Подписано в печать 1.10.2002.Формат 60x84 1/16.
Бумага офсетная. Усл.печ.л. 3,6. Усл.кр.-отт. 3,6.
Уч.-изд.л.3,1.
Тираж 100 экз. Заказ 451.
Учреждение образования
«Белорусский государственный технологический университет». Лицензия ЛВ № 276 от 15.04.98.
220050. Минск, Свердлова, 13а.
Отпечатано на ротапринте Белорусского государственного технологического университета.
220050. Минск, Свердлова, 13.