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ГОСУДАРСТВЕННОЕ ОБРАЗОВАТЕЛЬНОЕ УЧРЕЖДЕНИЕ
ВЫСШЕГО ПРОФЕССИОНАЛЬНОГО ОБРАЗОВАНИЯ
РОССИЙСКИЙ ГОСУДАРСТВЕННЫЙ ГИДРОМЕТЕОРОЛОГИЧЕСКИЙ УНИВЕРСИТЕТ

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THINK ECOLOGICALLY
Textbook for PR Students

РГГМУ
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УДК

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Учебное пособие предназначено для студентов специальности «Связи с общественностью в сфере экологии», изучающих английский язык.

Пособие содержит ряд текстов, освещающих такие экологические проблемы, как загрязнение атмосферы, глобальное потепление, проблему мусора. В пособие включены учебные задания, целью которых является научить студентов читать, писать и говорить на профессиональные темы, а также выполнять практические профессиональные задачи (написание различного рода PR-текстов, поиск и анализ информации на англоязычных Интернет-сайтах, подготовка и проведение презентации и др.).

The textbook is for PR students who specialize in the sphere of ecology.

It covers a number of important ecological issues such as air pollution, global warming, and waste management. The exercises included in the textbook are intended to develop students' reading, writing and speaking skills. The textbook also contains a range of tasks that can help future PR specialists acquire certain professional practical skills (e.g.: writing a press-release, finding, processing and summarizing information, writing a report, etc.)

Something funny is going on with the weather
Mr. Miliband, Environment secretary, UK

The world is at its warmest
NASA

If all countries consume energy
in the same way as those in
Western Europe do, humanity will
need three more planets to survive.
Minister for Sustainable Development of Sweden

1. Climate Change and Global Warming

1.1. The Greenhouse Effect

Before you read the article, answer the questions.

1. What do you know about the current changes in weather patterns?
2. Do you know what these changes are due to?
3. Can they influence people's life? How?

The Greenhouse Effect

Earth has warmed by about 0.6 degrees C over the past 100 years. But why? And how? Well, scientists are not exactly sure. The Earth could be getting warmer on its own, but many of the world's leading climate ***scientists*** think that things people do are helping to make the Earth warmer.

Life on earth is made possible by energy from the sun. As we know, approximately 70 percent of this energy ***reaches*** the earth's ***surface***. Then it is ***reflected*** in the form of ***infra-red*** radiation. Greenhouse gases (***water vapour***, carbon dioxide, ozone, methane and a few other gases) ***trap*** infra-red radiation in the atmosphere and keep the planet's surface 30 degrees C warmer than it otherwise would be. They act somewhat like the glass panels of a greenhouse.

For over the past 200 years, the burning of ***fossil fuels***, such as ***coal*** and ***oil***, and ***deforestation*** have ***caused*** the concentrations of heat-trapping "greenhouse gases" to ***increase significantly*** in our atmosphere. But, as the concentrations of these gases continue to increase in the atmosphere, the Earth's temperature is ***climbing*** above past levels. This

is called the "***enhanced*** greenhouse effect". ***According to*** NOAA (National Oceanic and Atmospheric Administration, USA) and NASA ***data***, the Earth's ***average*** surface temperature has increased by about 0.6 degrees C since 1900. The warmest global average temperatures have all ***occurred*** within the past 15 years, with the warmest two years being 1998 and 2005. Most of the warming in recent decades is likely the result of human activities. Other aspects of the climate are also changing such as ***rainfall patterns***, ***snow and ice cover***, sea level, and the ***duration*** of seasons. Scientists predict that the average global temperature will rise by 1.4 to 5.8 degrees C by the year 2100. Even a little extra warming may cause problems for humans, plants, and animals.

Adapted from http://www.epa.gov

Comprehension check.

1. What fossil fuels have been named in the text?
2. What greenhouse gases do you know? What is their role in the greenhouse effect?
3. Why is the greenhouse effect important for life on earth?
4. What is the "enhanced greenhouse effect"? What are its consequences?

1. Make a similar table in your copybook. Complete the table with the ***bold*** words from the text. The first one has been done for you.

	Part of speech	I can guess the meaning	I have to look it up in a dictionary	Definition or translation
Scientist	*noun*	+		учёный
.....				

What kinds of words are generally easy to guess?

What kinds of words is it very important to check with a dictionary in order to be absolutely certain about their meaning?

Look at LEARN BOX 1.1. in the appendix at the end of the book. Learn the terms listed there.

2. Which word in each group cannot be used with the word (phrase) in the box? Why?

1. Average; fossil; global **Temperature** Increases; climbs; warms; rises

2. **Greenhouse gases act like** a blanket, a refrigerator, the glass panels of a greenhouse

3. TRAP radiation; a mouse; heat; temperature

4. Temperature; data; wind; rainfall; weather patterns

3. Word formation. Complete the chart. Mark the word stress. Highlight the word suffixes.

Part of speech:	Part of speech:
reflect	
radiate	
	action
	occurrence
increase	

4. Fill in the gaps in the sentences with the most appropriate word, (a), (b), (c) or (d).

1. Earth's surface ..... radiation from the sun.

(a) emits (b) reflects (c) responds (d) enhances

2. Greenhouse gases ..... infra-red radiation in the atmosphere.

(a) increase (b) reflect (c) trap (d) stop

3. The concentrations of greenhouse gases ..... due to the burning of fossil fuels.

(a) enhance (b) fall (c) increase (d) decrease

4. The ..... global temperature is expected to rise by 1.4 to 5.8 degrees C by the year 2100.

(a) medium (b) middle (c) average (d) estimated

5. A temperature increase of 0.6 degrees C ..... last century.

(a) enhanced (b) existed (c) rose (d) occurred

5. Look at the questions in the pre-reading task. Prepare a short talk on climate change based on the questions.

1.2. Greenhouse Gases

Pre-reading task.

1. Look at the words and phrases in the box. What do they mean?

significant amount	*increase*	*absorb*	*emission*
the Industrial Revolution	*approximately*		*according to*
due to	*current rate*		

2. What greenhouse gases do you know?

Greenhouse Gases

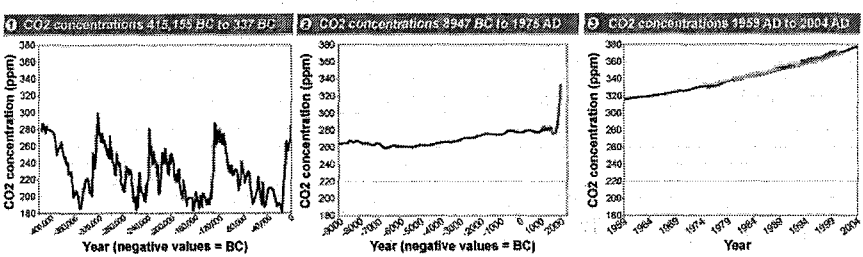
Any gas that absorbs infra-red radiation in the atmosphere is called a greenhouse gas. Greenhouse gases include water vapour, carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), ozone (O3), and some other gases. Since the Industrial Revolution humans have added a significant amount of greenhouse gases in the atmosphere by burning fossil fuels, cutting down forests and other activities.

1. Changes in the atmospheric concentration of carbon dioxide.

Figure 1 represents a record of CO2 concentrations from about 420,000 years ago to the present. Carbon dioxide concentrations in the atmosphere increased from approximately 280 parts per million (ppm) in pre-industrial times to 379 ppm in 2005 according to the National Oceanic and Atmospheric Administration's (NOAA) 2005 State of the Climate Report[23]. So, there was a 35 percent increase in CO2 concentration. Almost all of the increase is due to human activities. The current rate of increase in CO2 concentrations is about 1.8ppm/year.

Adapted from http://www.epa.gov

Figure 1: Atmospheric Concentrations of Carbon Dioxide in Geologic Time and in Recent Years



from: www.ncdc.noaa.gov/oa/climate/research/2005.html

1. Comprehension check.

1. In the graphs, find and mark the period of time when a significant increase in CO2 concentration occurred.

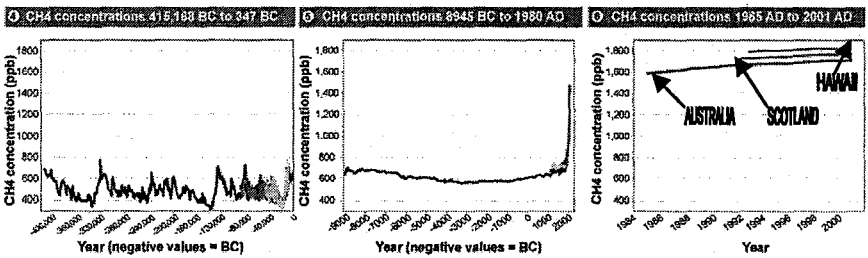
2. How can we calculate the current rate of increase in CO2 concentrations using the graph?

Vocabulary task. Find the words and phrases in the text that have a meaning similar to those below.

Trap; but; destroying forests; burning oil, coal and gas; considerable amount; because of; rise; present.

2. Changes in the atmospheric concentration of Methane.

Figure 2: Atmospheric Concentrations of Methane in Geologic Time and in Recent Years



from: www.ncdc.noaa.gov/oa/climate/research/2005.html

TASK. 1. Look at LEARN BOX 1.2. in the appendix at the end of the book.

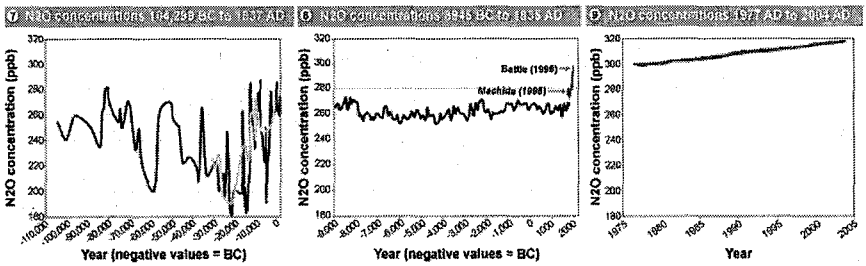
2. Look at Figure 2. Then complete the sentencese below to produce a report on changes in CH2 concentrations. Use the expressions from the first extract. You will have to do some calculations to fill in some of the gaps.

Figure 2 ..... a record of CH4 concentrations from about 425,000 BC to 2001 AD. ..... to the National Oceanic and Atmospheric Administration's (NOAA) 2005 State of the Climate Report, methane concentrations ..... ***sharply*** from ....ppb to .....ppb during the most of the 20th century. ***At present*** they are .....% above pre-industrial levels. In recent decades, current ..... of .....has slowed .....

Vocabulary task. What words could be used instead of ***sharply*** and ***at present.***

3. Changes in the atmospheric concentration of Nitrous Oxide

Figure 3: Atmospheric Concentrations of Nitrous Oxide in Geologic Time and in Recent Years



from: www.ncdc.noaa.gov/oa/climate/research/2005.html

TASK. Look at Figure 3. Write a short report on changes in Nitrous Oxide concentrations.

1.3. The effects of Climate Change

Pre- reading task.

1. Add at least two more words to each group.

Rain, storm

Dry period, desertification

Breeze, wind

Which of the weather events listed above could have a positive effect? Which of them do we see as disasters?

2. What do the following words mean? ***Increase, rise, reduce, occur, consequences, impact, quality, quantity.***

The effects of Climate Change

The minimum warming ***forecast*** for the next 100 years is more than twice the 0.6 degree C increase that has occurred since 1900. That earlier increase is already having marked consequences, which means that future climate impacts could be catastrophic.

Extreme weather events (heat waves, cold waves, rainstorms, floods, strong winds, ***droughts***, etc), as predicted by computer models, will be ***striking*** more often. Also, they can be expected to ***intensify.*** Sea levels already have risen by 10 to 20 cm over pre-industrial averages and

are certain to ***climb*** farther. As a result, salt-water ***intrusion*** from rising sea levels will reduce the quality and quantity of ***freshwater supplies***. A future of more severe storms and ***floods*** along the world's increasingly crowded ***coastlines*** is likely, and will be a bad combination even under the minimum scenarios forecast.

Mid-continental areas -- such as the United States' "grain belt" and large areas of Asia -- are likely to dry. Where dry land agriculture depends on rain, as in sub-Saharan Africa, ***crop yields*** will decrease dramatically even with minimal increases in temperature. Such changes could result in ***food shortages*** and ***famines***.

Most of the world's ***endangered species*** -- some 25 per cent of ***mammals*** and 12 per cent of birds -- may ***become extinct*** over the next few decades due to the changes in the environment.

Extreme temperatures can directly lead to deaths, while climate-related changes in ecological systems, such as changes in the range of infective parasites, can indirectly affect the incidence of serious infectious diseases, for example, malaria. In addition, warm temperatures can increase air and water ***pollution***, which in turn ***harms*** human health.

Adapted from http://www.epa.gov.

1. Make a similar table in your copybook. Complete the table with the ***bold*** words from the text. The first one has been done for you.

	Part of speech	I can guess the meaning	I have to look it up in a dictionary	Definition or translation
Forecast	*noun*			Prediction based on some information

2. Connecting cause and effect.

Look at the sentences below. What is the cause of droughts? What is the consequence of the fact that dry regions lose moisture? Underline the word that is used to connect the cause and the consequence in each sentence.

Dry regions tend to lose still more moisture if the weather is warmer. This leads to droughts and desertification.

Look back at the text. Find and highlight other words and phrases used for the same purpose.

LEARN BOX 1.3.2. in the appendix at the end of the book lists the ways of connecting cause and effect.

3. Practice. Look at the chart below. It considers some of the projected changes in extreme events and their effects. Write eight sentences relating the facts from the left column with their effects from the right.

Example: ***A warmer climate will result in an increase in cooling demand.***
There will be fewer cold days. Consequently, heating demand will decrease.

Projected Change	Projected Effects
Higher maximum temperatures; more hot days and heat waves over nearly all land areas	• Increase in heat-related deaths particularly among older adults • Increased risk of damage to some crops
Higher minimum temperatures; fewer cold days, frost days, and cold waves over nearly all land areas	• Decrease in cold-related deaths • Decreased risk of damage to some crops and increased risk to others • Reduced heating demand
Dry regions tend to lose still more moisture if the weather is warmer.	• Decrease in water resource quantity and quality • Droughts and desertification. • Increased risk of forest fire
Increase in tropical cyclone (e.g. tropical storms and hurricanes) rainfall and peak winds over some areas	• Increased risks to human life, risk of infectious disease epidemics and other risks • Increased coastal erosion and damage to coastal buildings and infrastructure • Increased damage to coastal ecosystems

4. Fill in the gaps with prepositions. Then memorize the expressions in LEARN BOX 1.3.1.

1. the consequences _____ the changes.
2. changes _____ climate.
3. reduction _____ crop yields.
4. Dry land agriculture depends _____ rain.
5. increase _____ temperature.
6. Such changes could result _____ disruptions _____ food supply.
7. Due _____ the changes _____ the environment ...

5. Fill in the gaps in the following sentences.

1. Endangered species may become .....(adj).
2. Further increase _____ temperature will have very serious ..... (noun).
3. Extreme weather ..... (noun) are expected to intensify.
4. Sea ..... (noun) are expected to rise.
5. In some countries droughts result _____ food ..... and .....
6. General reduction _____ crop ..... (noun) is predicted.

6. Rewrite the sentences using the words in brackets. Look at LEARN BOX 1.3.3. on page 79.

1. It is possible that the global temperature will climb 1.4 to 5.8 degrees C.
(may) _____
2. The consequences are likely to vary from disruptive to catastrophic. (may well) _____
3. Scientists expect that extreme weather events will intensify.
(are expected) _____
4. Sea levels will definitely climb farther. (are certain) _____

7. Speaking.

Prepare a short talk on the projected consequences of climate change based on the article. This should include a short introduction and some examples of what the projected changes in climate can result in. Use the expressions from LEARN BOX 1.3.2. and LEARN BOX 1.3.3.

1.4. Sea Level Rise

1. Before you read the article, answer the questions.
   What factors leading to the rise in sea levels can you name? What are its possible consequences?

2. Is there a difference between the expressions in each pair? Explain why.
   1. ***result in; result from.***
   2. ***to be caused by; to be due to.***
   3. ***an expansion; a rise.***
   4. ***measure (noun); measurement.***
   5. ***may; may well. (forecasting the future)***
   6. ***to be expected to rise; to be predicted to rise.***

Sea levels are rising worldwide. In the last century, according to IPCC data (2001), sea level rose approximately by 15 to 20 cm worldwide, though sea level has not risen ***uniformly*** from region to region. Although this process is not determined only by climate, a significant ***amount*** of sea level rise has likely resulted from the observed warming of the atmosphere and the oceans. The main factors driving the past century's sea level rise include:

- The ***expansion*** of ocean water caused by warmer ocean temperatures (contributing approximately 3-7 cm).
- The ***melting*** of mountain ***glaciers*** and ice caps (contributing approximately 2-4 cm).

Other factors may also be responsible for part of the historic rise in sea level, including the ***pumping*** of ground water for human use and the melting of polar ice sheets ***in response*** to the warming that has occurred since the last ice age.

Higher temperatures are expected to further raise sea level. The IPCC estimates that the global average sea level will rise between 0.3 and 2.9 feet (0.09 to 0.88 meters) in the next century (IPCC, 2001).

Rising sea level leads to ***loss*** in ***wetlands*** and other low-lying lands. Wetlands provide ***habitat*** for many species, serve as the basis for many communities' ***income***, and protect local areas from flooding. As the sea rises, the outer ***boundary*** of these wetlands will ***erode***, and new wetlands will form inland as previously dry areas are flooded by the higher water levels. The amount of newly created wetlands, however, could be much smaller than the lost area of wetlands – especially in developed areas

protected with ***bulkheads***, and other structures that keep new wetlands from forming inland. The IPCC suggests that during the next century, sea level rise could ***convert*** as much as 22% of the world's coastal wetlands to open water. (IPCC, 2001).

Furthermore, sea level rise ***intensifies*** flooding, and increases the ***salinity*** of rivers, bays, and ***groundwater tables***. Some ***property owners*** and state and local governments have to take ***measures*** to prepare for the consequences of rising sea level.

Adapted from http://www.epa.gov.

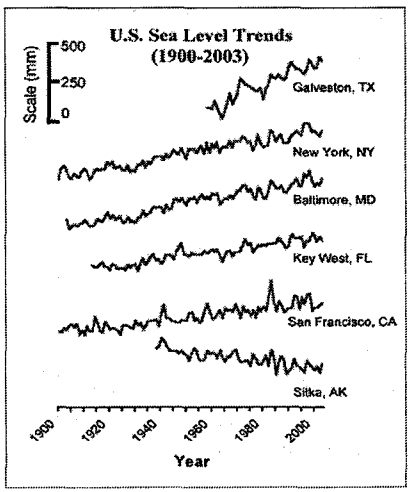
1. Comprehension check. List the factors leading to sea level rise and its effects.

2. Make a vocabulary table in your copybook. Complete the table with the ***bold*** words from the text.

3. Fill in the gaps in the sentences using the following phrases: *has been caused..., leads..., may be responsible..., has likely resulted....* Remember that in each sentence only one of the given phrases is possible. Pay attention to the underlined prepositions.
   1. A significant amount of sea level rise ..... from the observed warming of the atmosphere and the oceans.
   2. The expansion of ocean water ..... by warmer ocean temperatures.
   3. Other factors ..... for part of the historic rise in sea level.
   4. Rising sea level ..... to loss in wetlands and other low-lying lands.

4. Rephrase the sentences from exercise 3 using the words and phrases in brackets. Be careful not to change the meaning of the sentences.
   1. (has likely resulted in) _____
   2. (has resulted from) _____
   3. (may have been caused by) _____
   4. (is responsible for) _____

5. Look at the last paragraph of the article. What are '*furthermore*' and '*additionally*' used for? Do you know other words like these? Write a paragraph about the effects of sea level rise using the words you have listed. Use also some of the expressions from 3 and 4.
Now look at LEARN BOX 1.4.1 on p.79. Memorise the words.



6. Fill in the gaps in the sentences below.
   1. Figure 1 ..... U.S. Sea Level Trends.
   2. According ..... the data, in Galveston, TX, sea level ..... by 30 cm from 1960 to 2002.

Look at LEARN BOX 1.2 in the appendix at the end of the book.

7. Look at Figure 1. Choose four cities and write a report describing sea level trends in these cities. Do not forget to refer to the source of the data that your report is based on.

Figure 1. U.S. Sea Level Trends
Source: *Monthly and Annual Mean Sea Level Station Files* from the *Permanent Service for Mean Sea Level (PSMSL)* at the Proudman Oceanographic Laboratory

1.5. Reducing Greenhouse Gas Emissions
The United Nations Framework Convention on Climate Change and the Kyoto Protocol

Find the following information in the text as quickly as you can.

1. What does IPCC stand for?
2. What is its role?
3. What does UNFCCC stand for?
4. What did the members of the Convention agree to do?
5. What is the Kyoto Protocol?
6. When did it enter into force?
7. How often are inventories produced?

Scientific ***research*** has shown that the global climate change we have seen over the last 50 years is very likely the result of human activity. The way we ***consume*** energy and the way we produce it ***poses*** definite threats to the world we live in. It is vital to reduce greenhouse gas emissions so that climate change slows and people have more time to ***switch*** to environmentally friendly energy generation technologies.

The ***development*** and ***application*** of more efficient energy generation technologies is one of the possible strategies for cutting emissions along with the ***introduction*** of higher standards of energy ***efficiency*** for ***electrical appliances***, lighting, heating and air conditioning systems, buildings, cars, etc. Another strategy is using alternative energy sources with low or zero emission levels, such as solar and wind energy, hydroelectric power, biomass, etc. Besides, ***expanding*** forests, we can slow the rate of global warming because green plants take carbon dioxide out of the atmosphere, ***release*** oxygen and ***store*** carbon in a safe way.

Recognizing the problem is the first step in ***addressing*** it. In 1990 the Intergovernmental Panel on Climate Change (IPCC), whose ***purpose*** is to ***compile***, ***assess***, and publish information related to climate change, issued the first assessment report. The report stated that it is humane activities that are the major cause of global warming, and ***urged*** the governments to introduce strong measures to combat climate change. The IPCC is also ***looked to*** as the ***official advisory body*** to the world's governments on the state of the science of the climate change issue. For example, the IPCC organized the development of internationally accepted methods for producing national greenhouse gas emission inventories (reports).

The United Nations Framework Convention on Climate Change, which was ***signed*** by 165 states in 1994, is a document which sets a ***framework*** for international ***efforts*** to slow global warming and to develop strategies to adapt to its consequences. The governments who have ***ratified*** the Convention are ***committed*** to produce annual ***inventories*** of greenhouse gas emissions and Climate action reports. An inventory of greenhouse gas emissions represents the nation's emission figures, provides an overview of ***emission trends***, and discusses primary ***drivers for*** changes in emissions. A climate action report provides a broad overview of all greenhouse gas emission sources, and reviews national policies to limit emissions.

The Kyoto Protocol is the second international ***treaty*** on climate change, which was ***adopted*** on 16 February 2005. The ***pact*** sets greenhouse gas emission targets for Industrialized nations who ratify it. They are committed to reduce worldwide emissions of six greenhouse gases (collectively) by an average of 5.2% below their 1990 levels by the period 2008-2012. Developing countries do not have to cut emissions seeing that such a commitment would make their economical situation worse, but they are encouraged to carry out inventories.

1. ON LINE. Read about UNEP.

www.unrussia.ru/rus/un_agencies/UNEP.php is the Russian site of the organization.

2. Make a vocabulary table in your copybook. Complete the table with the ***bold*** words from the text.
3. Fill in the gaps in the sentences.
    1. 189 countries ..... the United Nations Framework ..... on Climate .....
    2. The Kyoto ..... was ..... in 2005.
    3. This is a pact that sets emission ..... for Industrialized nations.
    4. Under the Kyoto ..... countries produce ..... and ..... annually.
    5. The countries that ..... the Protocol are committed to ..... emissions by an average of 5.2% below their 1990 levels by the period 2008-2012.

REVISION

1. ON LINE. The Kyoto Protocol.

Visit www.bbc.co.uk/climate/policies/ and find the answers to the questions below.

1. What is the aim of the United Nations Framework Convention on Climate Change?
2. How many states have signed up to the Convention?
3. When was the Kyoto Protocol drawn up?
4. Does it have legal force?
5. What will the Industrialized countries that sign up to the Protocol have to do?

6. When did Russia ratify the Protocol?
7. What is the USA policy on the Kyoto Protocol?
8. What measures have the US government taken to tackle the problem of climate change?
9. What is the UK policy on the Kyoto Protocol?
10. What is being done in the UK to reduce air pollution?

2. Vocabulary and reading.

Look at some extracts from a glossary. All the entries have been replaced by xxxxxxxxxxxxxxxx. Restore them.

1. **xxxxxxxxxxxx** Energy derived from nontraditional sources (e.g., solar, hydroelectric, wind).

2. **xxxxxxxxxxxxxxxx**

The gaseous envelope surrounding the Earth. The dry **xxxxxxxxxxxxxxxx** consists almost entirely of nitrogen (78.1% volume mixing ratio) and oxygen (20.9% volume mixing ratio), together with a number of trace gases, such as argon (0.93% volume mixing ratio), helium, radiatively active greenhouse gases such as carbon dioxide (0.035% volume mixing ratio), and ozone. In addition the **xxxxxxxxxxxxxxxx** contains water vapor, whose amount is highly variable but typically 1% volume mixing ratio. The **xxxxxxxxxxxxxxxx** also contains clouds and aerosols.

3. **xxxxxxxxxxxxxxxx**

A naturally occurring gas, and also a by-product of burning fossil fuels and biomass, as well as land-use changes and other industrial processes. It is the principal anthropogenic greenhouse gas.

4. **xxxxxxxxxxxxxxxx**

xxxxxxxxxxxxxxxx in a narrow sense is usually defined as the "average weather," or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands of years. These quantities are most often surface variables such as temperature, precipitation, and wind.

5. **xxxxxxxxxxxxxxxx** Amount of a chemical in a particular volume or weight of air, water, soil, or other medium.

6. **xxxxxxxxxxxxxxxx**

Those practices or processes that result in the conversion of forested lands for non-forest uses. This is often cited as one of the major causes of the enhanced greenhouse effect for two reasons: 1) the burning or decomposition of the wood releases carbon dioxide; and 2) trees that removed carbon dioxide from the atmosphere in the process of photosynthesis are no longer present.

7. **xxxxxxxxxxxxxxxx**

Land degradation in arid, semi-arid, and dry sub-humid areas resulting from various factors, including climatic variations and human activities.

Adapted from http://www.epa.gov.

3. READING

Here are some extracts from four articles. Read them quickly and choose the best headline for each one. Here are three extra headlines.

a) AIR QUALITY
b) UK PLANNING LAW ON CLIMATE CHANGE
c) GLOBAL WARMING THREAT TO BRITAIN
d) EU ENVIRONMENT MINISTERS WANT CLEANER, QUIETER AND MORE FUEL EFFICIENT VEHICLES
e) 'BUSINESS INTERESTS'
f) UK UNLIKELY TO MEET AIR POLLUTION OBJECTIVES
g) RUSSIA RATIFIES KYOTO PROTOCOL

1. xxxxxxxxxxxxxxxxxx

According to a joint report from The Energy Saving Trust and the UK Climate Impacts Programme the problem of global warming could cost Britain £200 billion in property and infrastructure damage from flooding and coastal erosion.

Forecasting The Future reveals the changing climate in the UK now and over the rest of this century, which could damage the environment. The report explains that, without a change in how we consume energy, the UK could see spiralling climate change costs by 2050.

Source: http://www.manchesteronline.co.uk 25th October 2004. ©

2. xxxxxxxxxxxxxxxx

A leading expert on air quality, Professor Mike Pilling has said that the UK is unlikely to meet objectives on reducing air pollution. He high-

lighted that levels of nitrogen dioxide, small particles and ozone were too high to meet official targets for 2005 and 2010. Professor Pilling of the Air Quality Strategy Group was addressing participants at the BA Festival of Science in Exeter. He suggested that this would result in further damage to health. At present, thousands of deaths in the UK are attributable to air pollution, particularly amongst the elderly.

London is the most likely city to show excess levels of nitrogen dioxide and particulate matter. *Source: http://news.bbc.co.uk/ (Sept. 7th 2004).* ©

3. xxxxxxxxxxxxxxxxxxxxx

The EU environment ministers have agreed that they would like the European Commission to propose extra measures to make road traffic cleaner, quieter and more fuel efficient at a meeting in October 2004. The Ministers said that these measures were vital if Member States are to achieve the compulsory European environmental objectives and meet standards for air pollution, noise and carbon dioxide emissions. Their main concern was that increasing levels of road traffic were placing greater pressures on the environment and on the health of European cities and populations.

Source: www.edie.news.net (Oct 22 2004) ©

4. xxxxxxxxxxxxxxxxxxxxxxxx

Environmentalists have said that the Russian parliament's ratification of the Kyoto Protocol on climate change is a huge step forward. Russia's lower house, the State Duma, voted 334-73 to approve the treaty, meaning enough nations have signed up to bring it officially into force.

The protocol still has to pass through Russia's upper parliament and be signed into law by President Vladimir Putin. Both further stages should be a formality meaning the Kyoto protocol could get final approval from Russia within the month.

Source: http://news.bbc.co.uk 22nd October 2004; ©

4. READING. Read the articles and answer the questions.

1. A leading expert on air quality, Professor Mike Pilling has said that the UK is unlikely to meet objectives on reducing air pollution. In particular he highlighted that levels of nitrogen dioxide, small particles and ozone were too high to meet official targets for 2005 and 2010. Professor Pilling of the Air Quality Strategy Group was addressing partici-

pants at the BA Festival of Science in Exeter. He suggested that this would result in further damage to health. At present, thousands of deaths in the UK are attributable to air pollution, particularly amongst the elderly.

London is the most likely city to show excess levels of nitrogen dioxide and particulate matter. Professor Pilling highlighted that a major cause of this excess will be derived from motor vehicles but that this was not the only source. Particulate matter or 'dust' arises from many processes both natural and from human sources. Professor Pilling also focused on the global nature of air pollution, explaining that some pollutants are reaching the UK from America making the air pollution an intercontinental problem. This is not a new idea, since it has long been known that acidic pollutants are transported many thousands of kilometers.

Source: http://news.bbc.co.uk/ (Sept. 7th 2004). ©

1. What does Professor Pilling say about health problems caused by air pollution?
2. In which city does this problem appear to be the most serious?
3. What is the main source of air pollution?
4. What does Professor Pilling say about the global nature of air pollution?

2. According to a joint report from The Energy Saving Trust and the UK Climate Impacts Programme the problem of global warming could cost Britain £200 billion in property and infrastructure damage from flooding and coastal erosion over this timescale.

Forecasting The Future reveals the changing climate in the UK now and over the rest of this century, which could damage the environment. The report explains that, without a step change in how we consume energy and in adapting the way we live, the UK could see spiralling climate change costs by 2050.

- Around £200 billion of assets, including more than two million homes would be at risk from flooding and coastal erosion.
- Wind damage to buildings could result in annual insurance claims of £800 million.
- The national bill for subsidence, exacerbated by weather extremes, could top £600 million per year.

The picture is also bleak for Britain's ecology. Daffodils, bluebells and crocuses appear to be particularly at risk from warmer winter temperatures. Cod may have to be replaced with tuna, as dwindling cod stocks are further affected by warmer seas. Spruce plantations could die as they no longer have sufficient cold spells in the winter to allow them to grow in the spring. This would hit the Christmas tree trade.

Source: http://www.manchesteronline.co.uk 25th October 2004. ©

1. What two natural hazards to property due to the sea level rise are mentioned in the article?
2. What is another cause of possible damage to property?
3. What is the estimated cost of this damage?
4. What ecological issue is mentioned at the end of the article?

5. Writing a summary

Choose one of the articles from exercise 4. Write a summary of the article.

USEFUL LANGUAGE

The article is entitled ... / the title of the article is ...
The article is about ...
The article considers the effects of ...
The article refers to the study/ research / survey / report / ... official figures
The article reflects the views of ...(smb) on ... (smth)
The research shows that .../ the results imply that ...
... is important because ...
The conclusion is that ...

An example of a summary is given below.

The article is entitled 'Arctic Regional Sea Ice to Decline 40 Percent before 2050'. The article reports the results of a new study by NOAA scientists, which show that sea-ice cover of the Arctic Ocean will decline. This will have a negative effect on marine ecosystems, and a feedback effect on the larger climate system, because water without ice will absorb still more warmth.

6. Continue the following sentences in the best possible way.

1. Before the industrial revolution the concentration of greenhouse .....
2. Burning fossil fuels and deforestation result in .....
3. If people replanted the forests they cut down, ...
4. Industrialized countries .....
5. As global temperatures climb, ...
6. If the current emission trends continue, ...
7. Sea level rise is a serious problem because coastal areas .....

7. Fill in the gaps in the following text

The ..... temperature of the earth's surface has ..... by 0.74 degrees C since the late 1800s. It is expected to ..... by another 1.8° C to 4° C by the year 2100.

The main reasons for the ..... are the ..... of fossil fuels such as .....and ..... , and the cutting down of forests. As a result, the amount of "..... gases", such as ....., ...,and ..... has increased. "..... gases ..... infra-red radiation in the atmosphere, making the Earth's climate warm up. This has a number of serious .....

Recent severe storms, floods, and droughts are one of the effects of these changes.

Crop yields are expected to ..... in most tropical and subtropical regions if the temperature increases. Drying of certain areas, such ..... central Asia, the African Sahel, and the Great Plains of the United States, is expected. Disruptions in food ..... are expected if this happens. Besides, the range of ....., for example, malaria may expand.

The average sea ..... rose by 10 to 20 cm during the 20th century, which is mainly the result of global ..... Higher temperatures make ocean water ..... Becides, ... glaciers and ice caps add more water. Sea ..... rise is a real threat to coastal ..... Damage to property, land loss, extinction of some animals and plants are some of the effects of sea ..... rise.

8. Render the following into English.

Глобальное потепление климата

Парниковые газы (углекислый газ, водяной пар, метан и некоторые другие) задерживают тепло в атмосфере, действуя как стёкла теплиц. Это явление называют парниковым эффектом. С увеличением концентрации парниковых газов всё больше исходящего от поверхности земли излучения задерживается в атмосфере. Это ведёт к росту температуры.

До 1850 года концентрация углекислого газа составляла около 280 частей на миллион. К концу XX века эта цифра возросла примерно до 345, а к середине XXI прогнозируется концентрация порядка 400-600 частей на миллион. Содержание углекислого газа увеличивается в результате сжигания древесины и ископаемого топлива – угля, нефти и природного газа. Кроме того, с уничтожением лесов остаётся всё меньше растений, поглощающих этот газ из воздуха.

Что случится, если количество углекислого газа продолжит расти? Существует мнение, что удвоение содержание этого газа может привести к повышению средних температур на 5.8 градусов Цельсия, что будет иметь серьёзные последствия для населения всей планеты.

Рост уровня Мирового океана является одним из последствий глобального потепления и представляет серьёзную угрозу для жителей прибрежных территорий, а также для большого числа растений и животных, обитающих там.

Наиболее ощутимыми последствия глобального потепления будут в засушливых регионах. Опустынивание, засухи, перебои с продовольствием, сокращение ресурсов питьевой воды, голод и болезни и в настоящее время являются серьёзной проблемой для многих стран с жарким климатом. А в результате изменения климата ситуация значительно ухудшится.

Useful language

to trap infra-red radiation; to act like glass panels; the greenhouse effect; to increase; to rise; the Earth's surface; parts per million; to forecast; fossil fuel; to destroy forests; to absorb CO2; serious consequences; sea level rise; drought; desertification; disruptions in food supply; famine

9. Render the text into English.

Глобальное потепление климата

Глобальное потепление климата является следствием увеличения атмосферных концентраций углекислого газа и других «парниковых газов», задерживающих инфракрасное излучение. «Парниковые газы» выделяются при сжигании угля, нефти, природного газа, при вырубке и сжигании лесов. Учёные предсказывают прирост средних температур от 1.8 до 5.8 градусов Цельсия к 2100 году. Последствия глобального потепления климата – это повышение уровня Мирового океана, более частые и интенсивные наводнения, ураганы, шторма, засухи, сокращение урожаев зерновых в жарких и засушливых регионах, опустынивание земель. Вымирание отдельных видов животных и растений или сужение ареалов их обитания также связано с изменением климата.

В настоящее время уже невозможно игнорировать эту проблему. А для её решения потребуются совместные усилия всех стран, особенно тех, которые в силу высокого уровня развития промышленности ответственны за наибольшие объёмы выбросов загрязняющих веществ в атмосферу. Перед ними стоит сложная задача сокращения этих выбросов, а также разработка стратегий, которые позволили бы адаптироваться к уже неизбежным последствиям глобального потепления. Страны, подписавшие рамочную конвенцию по глобальным климатическим изменениям и, позже, Киотский протокол, приняли на себя обязательство к 2012 г. сократить выбросы парниковых газов в атмосферу на 5.2% от объёма выбросов, зарегистрированного в 1990 г. Для этого потребуется разработка и внедрение энергосберегающих технологий, переход к более эффективным технологиям производства электроэнергии на основе традиционных угля, нефти и газа, а также переход на альтернативные источники энергии, такие, как солнечная энергия, энергия ветра, гидроэлектроэнергия. ЮНЕП является организацией, координирующей усилия правительств разных стран, направленные на борьбу с глобальным потеплением. Эта организация собирает, анализирует и публикует результаты научных исследований во всех областях, имеющих отношение к глобальному потеплению, его последствиям, а также разрабатывает возможные способы решения этой проблемы.

Useful language

To be committed to ……., crop yields, droughts, to become extinct, greenhouse gas emissions, effort, alternative sources of energy

10. Render the text into English.

Подъём уровня Мирового океана

Одним из наиболее серьёзных последствий глобального потепления климата является повышение уровня Мирового океана. В среднем уровень Мирового океана поднялся на 15-20см за последние 100 лет, а в будущем прогнозируется более интенсивное повышение: по некоторым сценариям – до 80 см. При таком развитии событий многим прибрежным территориям грозит затопление, что нанесёт ощутимый экономический ущерб. Кроме того, это приведёт к сокращению ресурсов пресной воды, к заболачиванию плодородных территорий, сокращению ареала обитания и численности многих биологических видов.

Два явления, приводящие к повышению уровня Мирового океана, связаны с глобальным потеплением. Первое – это расширение воды в океане из-за повышения его температуры. Второе – это таяние ледников в горах, сокращение ледяного покрова в Арктике, Антарктике и Гренландии, а также таяние айсбергов. По данным ЮНЕП, в Арктике потепление происходит в два раза быстрее, чем в среднем по планете. Площадь и толщина льда быстро сокращаются. Это представляет угрозу для многих арктических видов, так как они не смогут приспособиться к таким стремительным изменениям. Кроме того, таяние ледников ускорит глобальное потепление потому, что тёмная поверхность воды поглощает тепло, тогда, как ледники отражают солнечные лучи.

Существует версия, что океан в некоторой степени замедлит процесс изменения климата. Учёные заметили, что вода в океанах обладает способностью поглощать углекислый газ из атмосферы. Однако, повышение концентрации углерода в морях и океанах приведёт к катастрофическим последствиям для обитающих там биологических видов.

Useful language

Coastal areas; freshwater supplies; habitat; ice cover depletion; ocean water expansion; species; to adapt to changes; to reflect; to absorb.

2. Air pollution. Acid Rain. Ozone

2.1. Acid Rain

Before you read the text, answer the following questions:

1. Have you read any articles about air pollution?
2. How do air pollutants affect human health?

Acid Rain

Acid rain is rain that has been made ***acidic*** by certain ***pollutants*** in the air. Acid rain is a type of ***acid deposition***, which can ***occur*** in many forms. Wet acid deposition is rain, snow, or fog that has become more acidic than normal. Dry deposition is another form of acid deposition, and this is when gases in the atmosphere and ***dust particles*** become acidic. Both wet and dry deposition can be carried by the wind, sometimes for very long distances. Acid deposition in wet and dry forms falls on buildings, cars, and trees and can make lakes acidic. Acid deposition in dry form can be ***inhaled*** by people and can cause health problems.

What is Acidity?

Acidic and ***basic*** are two ways that we describe ***chemical compounds***. Acidity is ***measured*** using a ***pH scale***. A pH scale runs from zero (the most acidic) to 14 (the most basic). A ***substance*** that is neither basic nor acidic is called "neutral", and this has a pH of 7.

Scientists discovered, and have ***confirmed***, that ***sulfur dioxide*** (SO2) and ***nitrogen oxides*** (NOx) are the primary causes of acid rain. These substances can rise very high into the atmosphere, where they mix and ***react*** with water, oxygen, and other chemicals to form more acidic pollutants, known as acid rain.

Human activities are the main cause of acid rain. ***Power plants emit*** the majority of sulfur dioxide and much of the nitrogen oxides when they burn fossil fuels to produce electricity. In addition, the ***exhaust*** from cars, trucks, and buses releases nitrogen oxides and sulfur dioxide into the air. These pollutants cause acid rain.

Although some rain is naturally acidic, with a pH level of around 5.0, human activities have made it worse. Normal precipitation - such as rain, or snow—reacts with basic chemicals or non-acidic materials that can be found in air, soils, bedrock, lakes, and streams. These reactions usually neutralize natural acids. However, if precipitation becomes too

acidic, these materials may not be able to neutralize all of the acids. Over time, these neutralizing materials can be washed away by acid rain. ***Damage*** to crops, trees, lakes, rivers, and animals can result.

The pollutants that cause acid rain (sulfur dioxide (SO2) and nitrogen oxides (NOx)) damage human health. These gases interact in the atmosphere to form fine sulfate and nitrate particles that can be transported long distances by winds and inhaled deep into people's ***lungs***. Scientific studies have identified a relationship between high levels of fine particles and increased illness and death from heart and ***lung disorders***, such as asthma and bronchitis.

Adapted from: www.epa.gov

1. Comprehension check. Answer the following questions.
   1. What are the wet and dry forms of acid rain?
   2. What does pH scale measure?
   3. What compounds cause acid rain?
   4. What are the main sources of these compounds?
   5. How does acid rain affect human health?
2. Make a vocabulary table in your copybook. Complete the table with the ***bold*** words from the text. Then look at LEARN BOX 2.1. in the appendix at the end of the book.
3. Fill in the gaps in the following sentences. The part of speech is specified where necessary.
   1. Acid rain, snow, fog are called acid .....(noun).
   2. Another word for *breathe in* is .....
   3. A ..... is used for measuring acidity.
   4. Sulfur dioxide (SO2) and nitrogen oxides (NOx) are .....(noun).
   5. One of the sources of sulfur dioxide (SO2) and nitrogen oxides (NOx) is .....(noun) from cars, trucks, and buses.
   6. However, this is .... that release the majority of sulfur dioxide and much of the nitrogen oxides when they burn fossil fuels, such as coal, to produce .....
   7. Acid rain causes .... such as asthma and bronchitis.
4. Match a word from the left column with a word from the right one to make phrases.

acid	exhaust
chemical	plants
car	scale
power	compound
pH	deposition

5. Fill in the gaps in the sentences using phrases from exercise 3.
   1. The main sources of air pollution are _____ _____ and _____ _____ .
   2. _____ _____ is used to measure acidity.
   3. Sulfur dioxide (SO2) and nitrogen oxides (NOx) are _____ _____ .
   4. _____ _____ can cause damage to crops, trees, lakes, rivers, and animals.

2.2. Effects of Acid Rain: Lakes & Streams

The ecological effects of acid rain are most clearly seen in water environments, such as streams, lakes, and ***marshes.*** Most lakes and streams have a pH between 6 and 8, although some lakes are naturally acidic even without the effects of acid rain. Lakes and streams become acidic (pH value goes down) when the water itself and its ***surrounding soil*** cannot ***buffer*** the acid rain enough to neutralize it. In areas where ***buffering capacity*** is low, acid rain also ***releases*** aluminum from soils into lakes and streams; aluminum is highly ***toxic*** to many species.

Acid rain causes a lot of effects that ***harm*** or kill individual fish, completely ***eliminate*** fish species from a waterbody. As acid rain flows through soils, aluminum is released from soils into lakes and streams. So, as pH in a lake or stream decreases, aluminum levels increase. Both low pH (high acidity) and high aluminum level cause chronic stress that may kill individual fish or lead to lower body weight and smaller size, which makes fish less able to ***compete*** for food and ***habitat.***

Some types of plants and animals are able to ***tolerate*** acidic waters. Others, however, are ***acid-sensitive*** and will die as the pH becomes low. Generally, the young of most species are more sensitive to ***environmental conditions*** than adults. At pH 5, most fish eggs cannot ***hatch.*** At lower pH levels, some adult fish die. Some acid lakes have no fish.

1. Comprehension check. Answer the following questions.
   1. What pH do most lakes and streams have?

2. What is buffering capacity? Why is it important?
3. How does acidity of water affect organisms living in it?

2. Make a vocabulary table in your copybook. Complete the table with the ***bold*** words from the text.

3. Fill in the gaps in the following sentences. The part of speech is specified where necessary.
   1. Acid rain ..... (verb) aluminum from soils into lakes and streams.
   2. Aluminum is highly .....(adjective) to many species of aquatic organisms.
   3. As water becomes more acidic, pH .....
   4. In acidic waters the numbers of fish and other aquatic plants and animals .....
   5. Buffering capacity is the ability of soil to ..... acidity.

4. Fill in the gaps in the sentences with the prepositions: *From, to, for, at, into, down, to.*
   1. ..... pH 5, most fish eggs cannot hatch.
   2. Aluminum is released ..... soils ..... the lakes.
   3. As lakes and streams become more acidic, pH value goes.....
   4. Both low pH and increased aluminum levels are directly toxic ..... fish.
   5. Smaller size fish are less able to compete ..... food and habitat.
   6. Generally, the young of most species are more sensitive ..... environmental conditions than adults.

2.3. Effects of Acid Rain: Forests

Over the years, scientists, foresters, and others have watched some forests grow more slowly. In extreme cases, individual trees or ***entire*** areas of the forest simply die off without an ***obvious*** reason.

Researchers now know that acid rain causes ***slower growth***, ***injury***, or death of forests. Of course, acid rain is not the only cause of such conditions. Other things that add stress, such as air pollutants, insects, disease, drought, or very cold weather also ***harm*** trees and plants.

A spring rain in the forest washes ***leaves*** and falls through the trees to the forest floor below. Some ***trickles*** over the ground and runs into a

stream, river, or lake, and some of the water ***soaks*** into the soil. That soil may neutralize some or all of the acidity of the acid rainwater. This ability is called buffering capacity, and without it, soils become more acidic. Differences in soil buffering capacity are an important reason why some areas that ***receive*** acid rain show a lot of damage, while other areas that receive about the same amount of acid rain do not appear to be harmed at all.

Scientists know that acidic water ***dissolves*** the ***nutrients*** and helpful minerals in the soil and then washes them away before trees and other plants can use them to grow. At the same time, acid rain causes the ***release*** of substances that are toxic to trees and plants, such as aluminum, into the soil. Scientists believe that this combination of loss of soil nutrients and increase of toxic aluminum may be one way that acid rain harms trees.

However, trees can be damaged by acid rain even if the soil is well buffered. Forests in high mountain regions are often ***exposed to*** greater amounts of acid than other forests because they ***tend to be surrounded*** by acidic clouds and fog that are more acidic than rainfall. Scientists believe that when leaves are frequently bathed in this acid fog, essential nutrients in their leaves are ***stripped away***.

Acid rain can harm other plants in the same way it harms trees. However, food crops are not usually seriously affected because farmers frequently add ***fertilizers*** to the soil to ***replace*** nutrients that have washed away. They may also add crushed ***limestone*** to the soil. Limestone increases the ability of the soil to act as a buffer against acidity.

Adapted from: www.epa.gov

1. Explain briefly how acid rain harms forests. What do people do to protect food crops from the effects of acid rain?

2. Make a table in your copybook. Complete the table with the ***bold*** words from the text.

3. Fill the gaps with prepositions.
   1. Other things that add stress, such ..... air pollutants, insects, disease, drought, or very cold weather also harm trees and plants.

2. .....the same time, acid rain causes the release ..... substances that are toxic .....trees and plants, such .....aluminum, ... the soil.
3. Limestone increases the ability of the soil to act ..... a buffer against acidity.

4. Fill the gaps.
   1. Some soils tend .... more acidic than others because _____.
   2. Some forests appear .... more damaged than the others _____.

5. Complete the table.

Verb	*Noun*
Affect	
Grow	
Be able	
Die	
Injure	
Harm	
Tend	
Lose	

6. Rewrite the sentences using a noun instead of the underlined verb
   1. Acid rain makes trees grow more slowly.
   2. Sometimes trees die because of acid rain.
   3. Soils that are not able to buffer acidity loose important nutrients.
   4. Plants are injured due to the fact that soils lose nutrients.
   5. Acid rain does not affect food crops that seriously.

7. GRAMMAR. The Present Simple Passive. Look at the pairs of sentences, A and B. Which sentences use passive.
   1. A. Air pollution causes lung disorders such as asthma and bronchitis.
      B. Lung disorders such as asthma and bronchitis are caused by air pollution.
   2. A. Asthma is caused by air pollution.
      B. Air pollution causes asthma.

8. Rewrite the following sentences using passive.

1. They use a pH scale to measure acidity.
2. They call acid rain, snow and fog acid deposition.
3. Acid rain releases aluminum.
4. Acidic water dissolves nutrients in soil.
5. They add lime to soil to neutralize the effects of acid rain.

2.4. What can be done

Almost all of the electricity that powers modern life comes from burning fossil fuels like coal, natural gas, and oil. Acid deposition is caused by two pollutants – sulfur dioxide (SO2) and nitrogen oxides (NOx), which are emitted into the atmosphere when these fuels are burned.

There are several options for reducing SO2 emissions, including using coal containing less ***sulfur***, washing the coal, and using ***devices*** called ***scrubbers*** to chemically ***remove*** the SO2 from the gases leaving the ***smokestack***. Power plants can also ***switch*** fuels; for example burning natural gas creates much less SO2 than burning coal. Certain ***approaches*** will also have additional ***benefits*** of reducing other pollutants such as ***mercury*** and carbon dioxide. Finally, power plants can use technologies that don't burn fossil fuels. Similar to scrubbers on power plants, ***catalytic converters*** reduce NOx emissions from cars.

There are other sources of electricity besides fossil fuels. They include: nuclear power, hydropower, wind energy, geothermal energy, and solar energy. Of these, nuclear and hydropower are used most widely; wind, solar, and geothermal energy have not yet been used on a large scale.

There are also alternative energies available to ***power*** automobiles, including natural gas powered vehicles, battery-powered cars, fuel cells, and combinations of alternative and gasoline powered vehicles.

Acid deposition ***penetrates*** deeply into the fabric of an ecosystem, changing the chemistry of the soil as well as the chemistry of the streams and ***narrowing***, sometimes to nothing, the space where certain plants and animals can survive. Because there are so many changes, it takes many years for ecosystems to ***recover*** from acid deposition, even after emissions are reduced and the rain becomes normal again. For example, chronically acidified lakes, streams, forests, and soils can take years to decades or even centuries (in the case of soils) to ***heal.***

However, there are some things that people do to bring back lakes and streams more quickly. Limestone or lime (a naturally-occurring basic compound) can be added to acidic lakes to "cancel out" the acidity. This process, called liming, has been used ***extensively*** in Norway and Sweden. Liming tends to be expensive, has to be done repeatedly to keep the water from returning to its acidic condition, and is considered a short-term ***remedy*** in only specific areas rather than an effort to reduce or prevent pollution.

Adapted from: www.epa.gov

1. Comprehension check.
    1. Make a list of actions that can be taken to solve the problem of air pollution?
    2. What is called 'a short term remedy'? Why is it used? Why is its use limited?
2. Make a table in your copybook. Complete the table with the ***bold*** words from the text.
3. Complete the following sentences and phrases using one word in each gap.
    1. To find a ..... to the problem.
    2. Acid rain causes damage to the .....
    3. To control air .....
    4. Burning fossil .....
    5. Catalytic ..... reduce NOx emissions from cars.
    6. Battery-..... cars.
    7. ..... deposition changes the chemistry of the soil as well as the chemistry of the streams.
    8. Sulfur ..... (SO2).

4. Find pairs of words. Explain your choice. Example: *vehicles - cars*

Heal	carbon dioxide
cancel out	cars
basic	recover
basic	eliminate
CO2	acidic
vehicles	lime

5. Fill in the gaps using the passive forms of the verbs in brackets.

1. Acid deposition _____ (cause) by two pollutants - sulfur dioxide (SO2) and nitrogen oxides (NOx), which _____ (emit) into the atmosphere, when fossil fuels _____ (burn).
2. Nuclear and hydropower _____ (use) most widely.
3. Liming _____ (consider) a short-term remedy.
4. NOx emissions from cars _____ (reduce) by catalytic converters.

2.5. Ozone

Ozone is very ***rare*** in our atmosphere. On average, there are three molecules of ozone for every 10 million air molecules. ***In spite of*** this small ***amount***, ozone plays a ***vital*** role in the atmosphere.

Ozone is mainly found in two regions of the Earth's atmosphere. Most ozone (about 90%) ***resides*** in a layer that begins between 10 and 17 kilometers above the Earth's surface and ***extends*** up to about 30 miles (50 kilometers). This region of the atmosphere is called the stratosphere. The ozone in this region is commonly known as ***the ozone layer***. The ***remaining*** ozone is in the lower region of the atmosphere, which is called the troposphere.

The ozone molecules in the upper atmosphere (stratosphere) and the lower atmosphere (troposphere) are chemically identical. They all consist of three oxygen atoms and have the chemical formula O3. However, they have very different roles in the atmosphere and very different effects on humans and other living beings. Stratospheric ozone (sometimes called "good ozone") ***absorbs*** most of the biologically damaging ultraviolet sunlight (called UV-B). Without the ***filtering action*** of the ozone layer, more of the Sun's UV-B radiation would ***reach*** the Earth's surface. Many experimental studies of plants and animals and clinical studies of humans have shown the harmful effects of UV-B radiation.

At the Earth's surface, ozone ***displays*** its harmful side (it is often called "bad ozone"). Because ozone reacts with other molecules, high levels of ozone are toxic to living systems. It has damaging effects on crop production, forest growth, and human health. Near-surface ozone is a key component of "smog," a familiar problem in the atmosphere of many cities around the world. Higher amounts of surface-level ozone are ***observed*** in ***rural areas*** as well.

Ozone is not usually emitted directly into the air, but at ground level is ***created*** by a chemical reaction between oxides of nitrogen (NOx) and

volatile organic compounds (VOC) in the presence of sunlight. Motor ***vehicle*** exhaust and industrial emissions contain NOx and VOC that help form ozone.

Adapted from: www.noaa.gov.

1. Answer the questions.
    1. What is referred to as 'good ozone'? Why?
    2. What is referred to as 'bad ozone'? Why?
    3. What are the sources of 'bad ozone'?
    4. Why isn't it a good idea to go for a walk in the city centre when it is hot and sunny?

2. Make a table in your copybook. Complete the table with the ***bold*** words from the text.

3. Fill in the gaps in the sentences.
    1. Stratospheric ozone _____ ultra-violet radiation from the Sun.
    2. Ultra-violet radiation from the Sun has a _____ effect on plants, animals and people.
    3. Ground-level ozone _____ human health, forests and crops.
    4. Motor vehicle exhaust and industrial emissions are responsible for ground-level _____.
    5. "_____" is a familiar problem in the atmosphere of many cities around the world.

2.6. The ozone layer depletion

Before you read the article, answer the questions.

1. Explain what role stratospheric ozone plays.
2. What will happen if the stratosphere loses a significant amount of ozone?

In the stratosphere, the region of the atmosphere between about 10 and 50 kilometers above the Earth's surface, ozone (O3) plays a vital role by absorbing harmful ultraviolet radiation from the sun. Stratospheric ozone is ***threatened*** by some of the human-made gases that have been released into the atmosphere, including those known as chlorofluorocarbons (CFCs). Once CFCs were widely used in spray cans, ***refrigerants***, electronics ***cleaning agents***, etc. They are ***chemically inert***, non-toxic,

and they do not ***dissolve*** in water. However, they are ***resistant*** to ***removal*** in the lower atmosphere.

CFCs survive until, after 1-2 years, they reach the stratosphere and are broken down by ultraviolet radiation. The chlorine atoms within them are released and directly attack ozone. In the process of destroying ozone, the chlorine atoms are ***regenerated*** and begin to attack other ozone molecules... and so on, for thousands of cycles before the chlorine atoms are removed from the stratosphere by other processes.

Over some parts of Antarctica, up to 60% of the total overhead amount of ozone (known as the column ozone) is ***depleted*** during Antarctic spring (September-November). This ***phenomenon*** is known as the Antarctic ***ozone hole***. In the Arctic Polar Regions, similar processes occur. That have also led to significant chemical depletion of the column ozone during late winter and spring in 7 out of the last 11 years. The ozone loss from January through late March has been typically 20–25%. Smaller, but still significant, stratospheric decreases have been seen at other, more-populated regions of the Earth. Increases in surface UV-B radiation have been observed in association with local decreases in stratospheric ozone, from both ground-based and satellite-borne instruments.

If the ozone layer is depleted, more of this UV-B radiation reaches the surface of the earth. Increased ***exposure to UV-B*** has harmful effects on plants and animals, including humans.

Due to ***regulations*** on the production and use of certain ozone-destroying chlorinated ***compounds***, which ***went into effect*** in January 1996, the atmospheric concentration of some of these man-made substances has begun to decrease. It is ***predicted*** that the ***recovery*** of the Antarctic Ozone Hole can begin at the beginning of the 21st century. But because of the slow rate of ***healing***, it is expected that complete ***recovery*** of the Antarctic ozone layer will not occur until the year 2050 or later.

Adapted from: www.noaa.gov

1. Make a table in your copybook. Complete the table with the ***bold*** words from the text.

2. Fill in the gaps in the sentences.

1. CFCs are the primary cause of ozone layer _____
2. These gases are chemically _____ and therefore resistant to removal in the lower atmosphere.

3. The chlorine atoms within them are released by ultraviolet radiation and _____ ozone.
4. The ozone loss over some parts of Antarctica is known as _____ _____.
5. Increased exposure to UV-B has harmful _____ on plants and animals
6. Due to regulations on the production and use of ____, the atmospheric concentration of some of these man-made substances has begun to decrease.

REVISION

1. Look at the following definitions. What words are defined?

1. xxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxx The process by which acidic particles, gases, and precipitation leave the atmosphere. More commonly referred to as acid rain. xxxxxxxxxxxxxxxxxxxxx has two components: wet and dry.

2. xxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxx The result of sulfur dioxide (SO_2) and nitrogen oxides (NO_x) reacting in the atmosphere with water and returning to earth as rain, fog, or snow.

3. xxxxxxxxxxxxxxxxxxxxx A metal that is toxic to trees and fish.

4. xxxxxxxxxxxxxxxx xxxxxxxxxxxxxxx The resistance of water or soil to changes in acidity.

5. xxxxxxxxxxxxxxxxxxxxx A scale that denotes how acidic or basic a substance is. Pure water has a xxxxxxxxxxxxxxxxx of 7.0 and is neither acidic nor basic.

6. xxxxxxxxxxxxxxxxxxx The combination of gases that is released from an automobile.

7. xxxxxxxxxxx xxxxxxxxxxx Substances found below the surface of the earth that can be burned to create energy. The three primary xxxxxxxxxx xxxxxxxxx are coal, oil, and natural gas

2. Word Search

All of the words that are listed below are hidden in the collection of scrambled letters. Find as many words as possible. Look very carefully through – the words can go forwards, backwards, up and down. Find the words:

ACIDIC, EXHAUST, BUFFER, SOIL, BASIC, LIME, NUTRIENT, POLLUTANT, LUNGS, FOSSIL

O	P	T	Q	W	R	N	M	Z	C
B	A	S	I	S	O	L	I	N	B
A	B	U	P	O	L	L	U	U	U
F	A	A	C	I	D	I	C	T	F
F	L	H	U	L	I	M	E	R	F
E	I	X	G	S	A	C	C	I	E
T	S	E	P	G	F	I	N	E	R
O	S	U	O	N	T	S	M	N	R
P	O	L	L	U	T	A	N	T	K
O	F	O	S	L	N	B	U	P	L

3. Fill in the gaps in the following sentences.

1. A solution is _____ when it has a pH higher than 7.0.

2. A solution is _____ when it has a pH lower than 7.0.

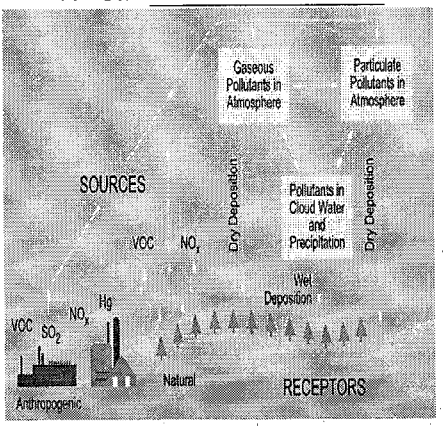
3. _____ capacity is the ability of _____ to neutralize acidity.

4. Acid rain dissolves and washes away important _____ that are necessary for the healthy growth of plants.

5. _____ is used by farmers to lessen the effects of acid rain.

6. Ground-level ozone can cause _____ disorders in people.

7. Car _____ is one of the sources of air _____.



4. Describe the scheme below.

Useful language.

I'm going to explain …

Look at the picture …

Let's consider how acid rain forms.

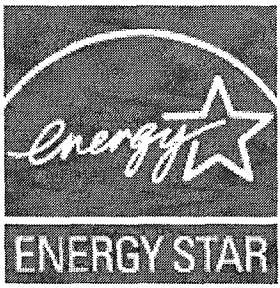
This scheme shows/ represents / displays……;

This is a scheme of ……

On the left there are …

Look at the bottom left-hand/ top right-hand corner of the picture.
There are .....
The main pollutants are marked .....
The arrow marked ..... represents .....

5. READING AND SPEAKING



Have you ever seen this label? Where? What does it mean?

Look at the answer on p. 81.

Now read about ENERGY STAR. Answer the questions below.

1. Who introduced the ENERGY STAR program?
2. Discuss how this program tries to solve the problem of air pollution.
3. Given a choice, would you prefer to buy a product with this label? Why?

EPA introduced the Energy Star program in 1992 as a voluntary market-based partnership to reduce greenhouse gas emissions. Today the program offers businesses and consumers energy-efficient solutions to save energy, money and helps protect the environment.

Energy Star was created by the federal government to recognize energy-efficient products. It's most widely known for the Energy Star label given to dishwashers and other household appliances. But the system has been expanded to include everything from cell-phone chargers to new-home construction.

Results are already adding up. Americans, with the help of ENERGY STAR, saved enough energy in 2006 alone to avoid greenhouse gas emissions equivalent to those from 25 million cars – all while saving $14 billion on their electricity bills.

For the Home

ENERGY STAR helps you make the energy efficient choice.

- If looking for new household products, look for ones that have earned the ENERGY STAR. They meet strict energy efficiency guidelines set by the EPA and US Department of Energy.

- If looking for a new home, look for one that has earned the ENERGY STAR.
- If looking to make larger improvements to your home, EPA offers resources to help you reduce your energy bills and improve home comfort.

Adapted from http://www.energystar.gov

Voluntary – добровольный
Partnership – сотрудничество
Efficiency – эффективность
Solution – решение
Recognize – официально признавать
Label – знак, ярлык
Household appliances – бытовая техника
Expand – расширять, распространять
Charger – зарядное устройство
New-home construction – строительство домов
Avoid – избегать
Improvement – улучшение

6. Read the following press releases from http://www.energystar.gov.

Choose the best summary for each press release from the following list. There are two extra summaries.

a). The United States and the countries of the European Community today renewed their agreement on the energy efficiency of office equipment products using the government's Energy Star label.

b). EPA announces new computer efficiency requirements.

c). One more product has been added to the list of products certificated by ENERGY STAR.

d). Another country has agreed to cooperate with ENERGY STAR in order to improve its energy efficiency standards. ENERGY STAR label will appear on many of its products including monitors, fax machines, televisions, etc.

e). A number of companies will be given an award for their achievements in energy conservation.

1. Release date: 03/21/2007

(Washington, D.C. – March 21, 2007) EPA and DOE will present the 2007 Energy Star Awards tonight to more than 80 businesses and organizations for their achievements in reducing greenhouse gas emissions through energy efficiency. This year's winners, chosen from the 9000-plus participating partners, include The Home Depot, PepsiCo, McDonalds, Food Lion, Ford Motor Company, Marriott International Inc., Astoria Homes and 3M.

2. Release date: 03/20/2007

(Washington, D.C. – March 20, 2007) EPA and the China Standard Certification Center (CSC) have agreed to work toward harmonizing information on their respective energy-efficiency labels for consumer electronics and office equipment.

"EPA and CSC agree that saving energy, saving money, and protecting the environment just make sense," said Bill Wehrum, EPA acting assistant administrator for Air and Radiation. EPA has a long history of cooperation with China on clean air and clean energy issues, including voluntary energy efficiency labeling. With EPA's assistance on certification development, CSC has added 10 product categories to their certification and labeling program since 2001, including computers, monitors, televisions, office copiers, fax machines and external power supplies.

3. Release date: 01/31/2007

In anticipation of the conversion to digital television signals in February 2009, EPA is announcing new ENERGY STAR specifications for energy-efficient, digital-to-analog converter boxes, or DTAs. These new specifications are expected to cut the energy use of a DTA by over 70 percent. It is estimated that Americans will purchase 22 million DTAs to continue to receive over-the-air broadcasts after the February 18, 2009 conversion from analog to digital broadcasts. If all DTAs met the ENERGY STAR specification, Americans could save 13 billion kWh and $1 billion in energy costs, and reduce the greenhouse gas emissions equivalent to those of more than 1 million cars.

conversion – переход

digital-to-analog converter – цифро-аналоговый преобразователь

7. Read the press releases again. Imagine you are a journalist who is going to write an article based on each of the press releases. Think of a title for each article.

The original headlines are given in the appendix at the end of the book.

8. VOCABULARY TASKS

1. Match a word from the left column with a word or a phrase from the right to make phrases.

decrease	solution
energy-efficient	greenhouse gas emissions
protect	appliances
reduce	the environment
household	money in energy costs
ENERGY STAR	energy use
save	the Energy Star program
introduce	electronics

2. Fill in the gaps in the sentences.

1. EPA ..... the Energy Star program in 1992.
2. Today the program offers businesses and consumers energy-..... solutions to save energy.
3. Labeling helps decrease energy ..... and reduce greenhouse gas .....
4. These new specifications are expected to ..... the energy use of a DTA by over 70 percent.
5. Americans would ..... 13 billion kWh and $1 billion in energy costs.

Look at **LEARN BOX 2.3.** in the appendix at the end of the book.

9. PR WRITING

Look at the press releases in exercise 6 again. What information has been omitted? Why is it important to include information of this kind?

Read the information in the appendix at the end of the book.

Write a press release entitled: **EPA Announces New Computer Efficiency Requirements.**

Before you begin writing, look at the list below and at the press releases above to decide which release you could take as a model. Use the following facts:

- Computers were the first product to qualify for EPA's Energy Star in 1992.
- New specifications - from July 20, 2007.
- 180 million computers in use in the USA
- They consume nearly 58 billion kWh per year (about 2 percent of annual U.S. electricity consumption).
- Expected cut in energy costs: more than $1.8 billion over the next 5 years.
- These new modifications are expected to prevent greenhouse gas emissions equal to the annual emissions of 2.7 million cars.
- Stephen L. Johnson (EPA Administrator): "As the driver of America's technology revolution, the innovative spirit of the computer industry is now powering our energy revolution. Through Energy Star, President Bush and EPA are brightening our nation's future, and I applaud these leaders for developing energy efficient computers that are good for our environment and good for our wallets."

From http://www.energystar.gov

10. PRESENTATION.

You are going to make a presentation considering the causes and effects of acid rain.Your teacher will give you some images to use and some instructions.

11. Translate the following into English:

1. Выбросы загрязняющих веществ в атмосферу.
2. Сжигание ископаемого топлива.
3. Двуокись серы, оксиды азота.
4. Основными источниками загрязнения атмосферы являются электростанции и транспорт.
5. Способность почвы нейтрализовывать кислоту.
6. Экосистемы
7. Выхлопные газы
8. Алюминий токсичен для растений.
9. Почва

10. Кислотный дождь растворяет и вымывает питательные вещества.

12. Render the text into English.

Кислотные дожди

Причиной кислотных дождей является загрязнение атмосферы диоксидом серы и оксидами азота. Эти вещества выбрасываются в атмосферу при сжигании всех видов ископаемого топлива. Основными источниками этих выбросов являются электростанции, транспорт, а также промышленные предприятия. Диоксид серы и оксиды азота при взаимодействии с капельками воды в облаках приводят к выпадению кислотных дождей, загрязняющих реки и озёра и ведущих к гибели лесов.

Кислотные дожди, включающие серную и азотную кислоту, попадая в водоёмы, наносят ущерб водным экосистемам. При повышенной кислотности воды многие организмы погибают.

Вода с повышенным уровнем кислотности, попадая в почву, растворяет и вымывает из почвы необходимые растениям питательные вещества. Кроме того, концентрация алюминия, который токсичен для растений, в таких почвах всегда повышена. Эти два фактора могут стать причиной гибели лесов на значительных территориях там, где почва не способна нейтрализовать кислоту.

Диоксид серы и оксиды азота в результате определённых химических реакций в атмосфере образуют такие химические соединения, которые наносят вред здоровью людей. Попадая в лёгкие, они становятся причиной заболеваний сердца и лёгких.

Существует ряд способов сокращения объёмов выбросов в атмосферу диоксида серы и оксидов азота. Во-первых, возможно применение угля с пониженным содержанием серы. Во-вторых, установка специальных устройств для улавливания диоксида серы и оксидов азота в трубах и использование катализаторов на транспорте.

13. Translate the following into English:

1. озоновый слой
2. поглощать ультрафиолетовые лучи
3. хлор- и фторсодержащие углеводороды (ХФУ)
4. аэрозольные баллончики

5. эти газы химически инертны и нерастворимы в воде.
6. дыра в озоновом слое

14. Render the text into English.

Озоновые дыры

Озоновый слой в стратосфере защищает нас поглощая ультрафиолетовые солнечные лучи. Однако широкое применение во всём мире хлор- и фторсодержащих углеводородов (ХФУ), используемых в аэрозольных баллончиках и холодильниках, а также многих видах бытовой химии, привело к тому, что озоновый слой начал разрушаться. Механизм действия ХФУ следующий. Эти газы химически инертны, то есть не вступают в химические реакции с другими веществами, и нерастворимы в воде. Это означает, что эти, на первый взгляд совершенно безвредные газы, устойчивы к разрушению и могут существовать в атмосфере длительное время. Они поднимаются в верхние слои атмосферы и там под воздействием солнечного света начинают разрушаться, освобождая атомы хлора. Атомы хлора разрушают озон. Они имеют способность к регенерации, что означает, что они будут «атаковать» озон снова и снова.

В 1985 году исследователи Антарктиды сообщили, что над частью южного полушария образовалась дыра в озоновом слое. В 1995 году появились сообщения о появлении озоновой дыры над Арктикой и частью Северной Европы. Если это произойдёт и в других местах, поверхность земли будет подвергаться воздействию ульрафиолетового излучения, вредного для всех живых организмов, включая человека.

С января 1996 года официально ограничено производство и использование ХФУ, вследствие чего концентрация этих газов в атмосфере сократилась. Однако, в связи с длительным жизненным циклом ХФУ и атомов хлора, их воздействие на озоновый слой будет ощущаться ещё достаточно длительное время.

15. Translate the following into English: загрязняющие вещества; индустриализация; нижние слои атмосферы; двуокись серы и оксиды азота; загрязнение атмосферы.

16. Render the text into English.

Загрязнение атмосферы

В результате всемирной индустриализации за последние 200 лет в атмосферу поступило колоссальное количество продуктов сжигания ископаемого топлива (угля, нефти, газа). После появления автомобилей количество вредных газов, выбрасываемых в атмосферу, резко возросло и продолжает расти с ростом количества автомобилей. Прогресс в области сельского хозяйства, увеличение сельскохозяйственных территорий также вносят свой вклад в загрязнение воздуха. Некоторые широко применяемые в сельском хозяйстве технологии являются причиной выбросов оксидов азота и метана.

По оценкам более миллиарда людей (около одной пятой населения Земли) дышат сегодня воздухом, сильно заражённым вредными газами. В основном речь идёт об озоне (O3), сульфатах и нитратах. Сульфаты и нитраты являются продуктами химических реакций, в которые вступают диоксид серы и оксиды азота. Озон в нижних слоях атмосферы образуется в результате реакций, в которые вступают оксиды азота под воздействием солнечных лучей. Основными источниками оксидов азота являются промышленные выбросы и выхлопы автомобилей. Загрязнение воздуха стало причиной резкого увеличения количества заболеваний сердца и лёгких, особенно у пожилых людей и детей. По статистике в 2000 году каждый седьмой ребёнок и подросток в возрасте до 18 лет в Соединённом Королевстве страдал от астмы. Загрязняющие вещества в воздухе многократно обостряют симптомы этого заболевания и, возможно, являются его причиной.

3. Alternative energy

3.1. What is alternative energy?

1. Why is it important to use less fossil fuel?
2. What can people do to save energy?
3. What renewable energy sources do you know?

What is alternative energy?

Energy is the **vital** aspect of our economy and day-to-day lives. However, burning fossil fuels to **satisfy** our **demand** for energy, we have released enough greenhouse gases into the atmosphere to **trigger** serious

changes in the environment. There is now a scientific consensus that climate change is real (see: http://Unfccc.int/2860.php) and **poses** a serious **threat** to the environment. Effects of climate change will make global problems such as drought, desertification, famine, sea level rise, natural disasters, and **decline** in people's health much worse. Apart from climate change, there are other kinds of environmental **damage** caused by the use of fossil fuels, such as **air pollution** and acid rain with all their **impact** on human health and on water and forest ecosystems.

Nowadays many countries **realize** that it is important to take some **measures** to reduce greenhouse gas emissions. This can be **achieved** by generating energy from sources that emit low or even zero levels of greenhouse gases. In other words, we need to find ways to **replace** fossil fuels by clean natural energy sources (**inexhaustible** energy sources), such as energy from the wind, the sun, and waves.

Renewable energy can be collected and **converted** into more useful forms of energy, for example into electrical energy. The most important question, however, is how to do it effectively. The latest **development** in some renewable energy technologies makes it possible to achieve **satisfactory** levels of **efficiency**. One example is wind turbines, which convert the kinetic energy of the wind into electrical energy. However, some renewable energy sources are not used to their full potential because we do not have **sufficient** technology and **expertise**. One of them is **wave** and **tidal power**.

The following parts or the article will **consider** some of the currently **available** inexhaustible energy sources. The article will describe how they work, their state of development, and their potential. Furthermore, it will give some examples of what is being done to ***promote*** the use of renewable sources. The alternative energy sources used at present are the following: solar power, wind, wave and tidal energy.

All the factual information, data, ***media publications*** used in this chapter are from http://www.dti.gov.uk/index.html, http://www.est.org.uk and http://www.bwea.com.

1. Answer the questions.
    1. Why is it necessary to use renewable energy?
    2. Which global problems will be made worse due to climate change?
    3. What kinds of renewable energy sources have been mentioned in the text?

4. Explain why we cannot generate all energy from renewable energy sources.
5. Do you think that the proportion of renewable energy in electricity production will rise in the future? What makes you think so? Do you expect a sharp or a slow increase?

2. Make a table in your copybook. Complete the table with the ***bold*** words from the text.

3. In each group of the words on the left cross out the word (words) that does not make sense if used with the phrase on the right.

1. Inexhaustible
   Fossil
   Alternative
   Renewable

sources of energy

2. Generate
   Produce
   Save
   Use
   Provide
   Convert
   Lessen
   Extract
   Demand for
   Wind

energy

3. Emit
   Provide
   Release
   Burn

greenhouse gases

4. Use
   Generate
   Burn

fossil fuels

4. Which words have a positive meaning?

Threat	Decline
Damage	Satisfactory
Efficiency	Expertise
Effect	

5. Explain the difference between the words in each pair.

1. Damage, effect 2. Effect, affect 3. Threat, threaten
4. Demand (v), provide 5. Collect, convert 6. Solution, decision
7. Development, invention 8. Advertise, promote

6. Complete the sentences using the words from exercise 5.

1. There are two s_____ to the problem of greenhouse gases emissions: more efficient procedures for burning fossil fuels and generating energy from renewable energy sources.
2. The use of fossil fuels a_____ the planet's climate system.
3. The government has made a d_____ to sign the Kyoto Protocol.
4. At present fossil fuels are used by power plants to p_____ electrical energy.
5. Acid rain d _____ water and forest ecosystems.
6. Greenhouse gases in a certain proportion have a positive e_____. Without the greenhouse _____, the Earth would not be warm enough for humans to live.
7. Wind turbines c_____ wind power into electricity.
8. It is important to p_____ the use of renewable energy.

3.2. Renewable energy sources. Solar energy

There are three main ways of using the sun's energy.

Passive solar design. New energy-efficient ***approach*** to ***construction*** means that buildings ***capture*** as much of the sun's light and heat as possible and lose little heat. Consequently, the demand for electricity is reduced considerably. So are ***energy costs*** for buildings.

Solar water heating. ***Water collectors*** are usually ***installed*** on the roof of a building so that the sun heats the water that is used for household needs. ***Well-insulated*** water tanks can ***store*** the heated water for

some period of time. According to the UK Department for Trade and Industry (DTI) (see: http://www.dti.gov.uk/index.html, 2007), around 10,000 solar thermal systems are installed in the UK every year, and there are now over 100,000 systems ***in operation.***

Solar ***photovoltaic*** (PV) panels collect solar radiation and convert it into electricity. They can be installed on a building's roof or walls. This kind of energy cannot be generated at night. Besides, on a cloudy day the ***output*** is very low. This is why batteries are used to store the electricity. There is another problem. The cost of this technology is high. In the future, as PV technology develops and the costs are reduced, photovoltaics will become ***cost-competitive***. According to the figures published by DTI, UK, in 2003, total ***capacity*** for solar photovoltaics (pv) in the UK was approximately 6 megawatts, which is claimed to be a small proportion of its potential. The Major Photovoltaics Demonstration Programme (PVMDP) ***launched*** in the UK has given ***grant funding*** to a number of people and organisations that install solar panels.

1. Answer the questions:

1. How can we reduce the demand for ***artificial*** light and heating?
2. Explain how each of the following is used.

Solar photovoltaic (PV) panels, Water collectors, Batteries.

3. What are the disadvantages of solar energy?
4. What programme mentioned in the last paragraph involves grant funding? Why, do you think, the government has launched this programme?

2. Fill in the gaps in the sentences. The first letters of the missing words are given.

1. The application of special design principles for buildings r_____ the demand for artificial light, heating and ventilation.
2. Solar photovoltaic (PV) panels c..... daylight into electricity.
3. Solar energy is only g..... by photovoltaic panels during the day.
4. Batteries can be used to s..... electricity.
5. Passive solar design can r..... energy costs for buildings.
6. Solar PV panels can be i..... on a building's roof or walls.

3. Complete the chart.

Noun	Verb
Application	
Demand	
	Convert
Collector	
Installation	
	Insulate
	Reduce
Emission	

4. Fill in the gaps using the words from the chart.

Efficient design principles are _____ to buildings so that they _____ less electricity for heating, lighting and ventilation.

The Sun's energy is _____ into electricity by solar photovoltaic panels.

Usually water _____ are _____ on the roof of a building.

The _____ of inexhaustible sources of energy makes it possible to _____ greenhouse gas emissions.

The _____ of environment-friendly energy technologies can help cut carbon dioxide _____.

5. In which word the underlined sound is pronounced differently? Where is the word stress?

1. Install demand department plant
2. Installation Insulate capacity generate
3. Reduce reduction funding cut
4. Insulate use (noun) use (verb) reduce
5. Environment dioxide lighting emissions
6. Wind (ветер) tidal emit system
7. Wave blade install installation
8. Inexhaustible source output

3.3. Renewable energy sources. Wind, wave and tidal energy

Before you read the article, answer the questions.

1. Have you ever seen a windmill? What source of energy is used to power a windmill? How is it used? Can you draw a scheme of a windmill? How many ***blades*** does a traditional windmill have?
2. Do you think this kind of energy is cost-effective when it is used to produce electricity?
3. What difficulties might arise?

Wind energy

Wind is an inexhaustible source of energy that has already been used for hundreds of years.

Wind turbines are used to convert the power of wind into electricity. The main parts of a wind turbine are the blades (there are usually three), the ***shaft***, which ***revolves*** when the blades turn round, and the generator. ***The latter*** converts the mechanical energy of the revolving shaft into electrical energy. At present, this is one of the most developed and ***cost-effective*** renewable energy technologies.

The disadvantage of this technology is that the ***output depends on*** the weather conditions. In other words, no wind, no energy. There are two ways to ***solve*** this problem. First, batteries can be used to store electricity. Second, wind farms can be located in different parts of the country and connected to the ***main electricity grid***.

Recently, in addition to ***onshore*** wind turbines (those that are situated on land), a number of ***offshore*** wind systems have been introduced. Offshore wind farms are just beginning to be developed. Offshore wind has enormous potential because it is usually much stronger and more ***consistent*** than onshore wind. However, the ***delivery*** and installation of offshore wind turbines require much more ***complicated*** and expensive equipment.

Wave and tidal energy

Wave power can be converted into electricity by wave power machines, which are installed in the ocean either near the shoreline or at greater ***depths***. The potential of this source, which is predicted to be able to provide as much renewable energy as the wind industry, appears to be

highly attractive. However, the current level of technology does not enable us to use it effectively. The construction, ***assembly*** and ***maintenance*** costs of wave power devices mean that they are not ***economically viable***, which makes their large-scale use impossible at this stage. DTI has published information about two wave power devices in the UK (see: http://www.dti.gov.uk/index.html, 2007). The total capacity of these machines is 1.25 megawatts.

Tidal power can also be used to produce electricity. It can be exploited in places where the ***tidal range*** is sufficiently great. The advantages of this source of energy are its ***reliability*** and ***predictability***. The disadvantage is its cost. So, there are few tidal turbines installed. DTI reports only one tidal power station currently supported under the DTI's Technology Programme. It is planned to be completed by 2010.

1. Answer the following questions.
   1. Explain how a wind turbine operates.
   2. What are the technical difficulties with this form of power generation?
   3. Why is offshore wind power generation especially challenging.
   4. Are there any efficient wave or tidal technologies available?
   5. What potential does wave energy have?
   6. What factors make the use of wave power machines difficult?

2. Make a table in your copybook. Complete the table with the ***bold*** words from the text.

3. Look at the words in the box on the left. Which of them can be used with each of the words on the right. What do these phrases mean?

Inehxaustible	wind
renewable	onshore
mechanical	
electrical	electricity

Source of energy
Turbine
Power
Grid

4. Match a word from the left with a word from the right.

solve	turbines
develop	technology

have	a problem
install	technology
cost-effective	potential

5. Fill in the gaps in the sentences using the words from exercise 4.
   1. Offshore wind turbines have enormous _____.
   2. It is more technologically challenging and costly to _____ offshore turbines.
   3. Wind energy is a highly developed and cost-effective _____.
   4. To _____ the problem of climate change it is necessary to reduce emissions from power plants.
   5. Wind turbines can be _____ offshore.
6. Fill in the gaps with the best alternative (a), (b), (c), or (d).
   1. Waves have the potential to ..... an unlimited source of renewable energy.
      (a) produce (b) involve (c) provide (d) prove
   2. Wave energy can be extracted and ..... into electricity by wave power machines.
      (a) converted (b) made (c) become (d) exploited
   3. Wave power machines are ..... in the ocean.
      (a) utilised (b) put (c) insulated (d) installed
   4. An economically ..... wave power machine will need to generate power over a wide range of wave sizes.
      (a) able (b) effective (c) viable (d) capable
   5. The ..... of wave technology is currently at the same level as the wind industry was 10 years ago.
      (a) situation (b) development (c) production (d) invention

3.4. Hydroelectric and geothermal power

Hydroelectric power is an inexhaustible source of energy. Hydroelectric plants located by rivers or streams, lakes generate electricity from the energy of flowing water. Hydroelectric turbines, which are rotated by water, drive a generator. The generator converts the mechanical energy of the turbines into electricity. The most modern hydroelectric plants are highly efficient. However, hydroelectric power plants can be ***harmful*** to the water ecosystems in the areas where they are built. This limits the use of this energy source.

According to DTI (http://www.dti.gov.uk/index.html, 2007), the UK currently generates about 0.8 per cent of its electricity from hydroelectric schemes – most of which are large-scale schemes (systems producing more than 20 megawatts) found in the Scottish Highlands.

Geothermal energy is the energy from ***hot springs***, underground hot water reservoirs, geysers and ***hot mud steams***. In certain geological areas it is used directly to heat houses. Alternatively, the energy of hot water from under the ground can drive turbines to produce electricity.

1. Comprehension check.
   1. Explain how water power is converted into electrical energy.
   2. What limits hydroelectric power plants construction?

2. Vocabulary work. Check the meaning of these words. ***Harmful, hot springs, hot mud steams***.

3. What do the following things have in common? What is the difference between them?
   a) Reservoir, lake.
   b) Watermill, Hydroelectric power plant.

4. Fill in the gaps with the best alternative (a), (b), (c), or (d).
   1. Water power is now mainly used to ..... electricity.
   (a) generate (b) supply (c) provide (d) use
   2. A generator ..... the mechanical energy into electrical energy.
   (a) generates (b) converts (c) makes (d) supplies
   3. Hydroelectric systems can be .....to the main electricity grid.
   (a) contributed (b) connected (c) combined (d) contained
   4. Existing hydroelectric technology is .....
   (a) efficient (b) effective (c) convenient (d) applicable
   5. However, hydroelectric power plants have a negative .....on the water ecosystems in the areas where they are built.
   (a) affect (b) effect (c) consequence (d) disadvantage

3.5. Nuclear energy

A nuclear power plant ***operates*** basically the same way as a fossil fuel plant, with one difference: the fuel. The process that produces the ***heat*** in a nuclear plant is ***splitting*** of uranium atoms. That heat ***boils*** water to make the steam that turns the turbine generator, just as in a fossil

fuel plant. The part of the plant where the heat is produced is called the ***reactor core.***

Nuclear plants use a certain kind of uranium, U-235, as fuel, because it is easy to split U-235 atoms apart.

Nuclear generated electricity does not emit carbon dioxide into the atmosphere. However, nuclear power generation has ***wastes***: spent (used) fuels, other radioactive waste, and heat.

Spent fuels and other radioactive wastes are the ***principal environmental concern*** for nuclear power. Most nuclear waste is low-level radioactive waste. It consists of ***tools, protective clothing, disposable*** items that have been ***contaminated*** with small amounts of radioactive particles. According to special regulation, these materials must ***be disposed of*** so that they will not come in contact with the outside environment.

On the other hand, the spent fuel is highly radioactive and, therefore, dangerous. It must be ***stored*** in specially designed pools or in ***concrete*** or ***steel*** containers with air cooling. These containers are designed to ***ensure*** that radiation cannot enter the ***outer*** environment.

In 2004, the United States had 99.2 million kilowatts of nuclear capacity, more than any other nation in the world. France ranked second, third was Japan, and fourth was Germany. International growth in commercial nuclear power has slowed, but several countries have ambitious nuclear construction programs. While no nuclear reactors have been ordered in the United States since 1978, China, India, Russia, and South Korea and other countries have brought new reactors into service during the latter part of the twentieth century.

From (http://www.eia.doe.gov/)

1. Are the sentences true or false? Correct the false sentences.
    1. There is no difference between a fossil fuel power plant and a nuclear power plant.
    2. Nuclear generated electricity does not emit carbon dioxide into the atmosphere.
    3. Nuclear plants use all kinds of uranium.
    4. Nuclear power generation causes no environmental problems.
    5. Used uranium isn't radioactive.
2. What are the advantages and disadvantages of nuclear energy?
3. What is the principal environmental concern for nuclear power?

4. Relatively recent acts of terrorism have heightened public concern for the industry. Why?

5. Make a table in your copybook. Complete the table with the ***bold*** words from the text.

6. Write the following phrases into the chart below.

Nuclear power plants	Fossil fuel power plants

concrete or steel containers with air cooling for spent fuel
to worry about the safety
burning fossil fuels
splitting U-235 atoms
greenhouse gas emissions
to dispose of radioactive waste
reactor core
the enhanced greenhouse effect

7. Fill in the gaps.

1. Nuclear power plants do not _____ greenhouse gases.
2. Safety on nuclear power plants is the major public _____.
3. Spent fuel must be _____ in concrete or steel _____ with air cooling.
4. These containers are designed to ensure that radiation cannot enter the outer _____.

8. PR SAMPLE ANALYSIS. Reputation management.

1. Look at the text about nuclear energy again. Answer the following questions:

1. What can be the reason for negative attitude towards nuclear power stations?

2. How will the public feel if they don't get any objective information about nuclear power stations? Choose the best answer (answers).

a. People will forget all about this matter soon.

b. People will think that this 'evil' industry is extremely dangerous, because nuclear power plants tend to explode for no obvious reason.

c. People will think that power plants dispose of their nuclear waste, as they like nobody cares about safety.

3. How can ordinary people get information about nuclear power generation industry?

2. Read the following short extracts from the site of Energy Information Administration (USA) (http://www.eia.doe.gov/).

Answer the questions:

1. What steps have been taken to improve the reputation of the industry? Why?

2. What facts are highlighted? While reading the extracts, pay special attention to the words **in bold**. Why are they important?

1. Nuclear Safety and Security: Nuclear Safety received attention long before the terrorist attacks on September 11th heightened public interest. **The U.S. Nuclear Regulatory Commission (NRC) conducts oversight of the nuclear industry.** All of the **licensed** U.S. commercial reactors are required to have a dome to protect the reactor from external damage and to prevent the release of radiation. The Nuclear Energy Institute (NEI) worked with several nuclear power plants to produce a **Nuclear Plant Security Video** to inform the public about how plants are protected.

Oversight – надзор; Dome – купол

2. "The use of nuclear power in the United States today prevents the emission of greenhouse gases equivalent to that of **136 million cars**– which is the total of all passenger cars on the road today.

– Christine Todd Whitman, Former Environmental Protection Agency Administrator

Air & Waste Management Association 100th Annual Conference, June 28, 2007

3. "It's very clear to me that ... in today's environment of concern for climate change and concern for clean air ... nuclear energy satisfies both those concerns.

– Patrick Moore, Co-founder, **Greenpeace**, Co-chair, Clean and Safe Energy Coalition

E&ETV, "OnPoint", April 23, 2007

3. Look at the PR sample and some questions from you teacher. Analyze and discuss the sample.

4. ON LINE. Visit one of the following sites of power generation companies.

http://www.stpnoc.com/

http://www.nmcco.com

http://www.entergy-nuclear.com

What approaches are employed for creating a positive image of the company?

You can find the full list of at http://www.eia.doe.gov. Find their Nuclear Generation page.

Alternatively, visit the site of World Nuclear Association.

http://www.wna-waste-management.org

Prepare a presentation to report on your findings.

9. PR TASK

W&F Energy Group is a company that operates a number of power plants, one of which is hydroelectric. The company has planned the construction of another hydroelectric plant. The company has started building a dam on the Rocota River. The local government has approved the site of the construction. However, a green organization is protesting against the construction. They say that the dam will spoil one of the greatest places of natural beauty, that it will damage the river ecosystem, and that some rare fish will disappear from the river. There have been a number of publications against the power plant. The locals have started expressing concern about the project.

You work for W&F Energy Group as a PR manager. Your task is to plan and organize a PR campaign to prevent a crisis situation.

In addition to other actions you have to create the plant's website. Its goal is to inform the public, businesses and journalists on the benefits of the plant.

Design the company's home page. Use the PR samples from tasks 3 and 4 as models.

USEFUL TIPS

- Who is the target audience? There can be at least three groups of people interested in your site.
- In the centre of the upper part of the page you should place the company's mission statement. Think what information you need to include in the statement.
- Plan the content of the information pages. Each information page must be easily accessed from the home page. So, there must be buttons with clear short titles.
- Think where to place the company's logo.
- Will you use a photo (photos)? What kind? Think of the captions. People tend to remember captions better than texts.

Construction – сооружение
Site – 1) место; 2) сайт в Интернете
Dam – плотина
Content – содержание
Buttons – кнопки
Captions – подписи
Spoil – испортить
Matter – вопрос, тема
Target audience – целевая аудитория

REVISION

1. VOCABULARY. Match a word from the left column with a word from the right. There can be a number of combinations.

Fossil	change
Source	of energy
Climate	sources of energy
Renewable	fuel
Energy	gases
Air	generation
Greenhouse	sources of energy
Non-renewable	pollution

2. Complete the following texts using the phrases from exercise 1.

A. The use of _____ (1), which are at present the main _____ (2), releases _____(3) into the atmosphere. This has resulted in _____(4) and _____(5). These problems pose a serious threat to the world we live in. An obvious solution is to base our _____(6) on _____(7), which emit low or even zero levels of greenhouse gases.

B. _____ (1) such as coal, natural gas and oil are at present the main_____ (2) used by industry and consumers all over the world. These _____(3) impact land, water, and air across geographical scales, and are directly responsible for large proportions of the emissions of _____ (4) (CO_2, NOX, SO_2 , non-methane VOC (volatile organic compounds), and CH_4 (methane) emissions). Combating _____(5) will require that energy be produced by cleaner and more efficient technologies, be used more efficiently and with greater conservation, and be generated from _____(6).

3. Write a short review of two economically viable inexhaustible sources of energy. In your own words, explain how they work and consider the advantages and disadvantages of each one.

You can use the following clue words and phrases:

Passive solar design; photovoltaic panels; solar water heating; to reduce heating costs; to convert the energy of the sun into electricity; cost-effective; wind turbines; a generator; connected to the main electricity grid; rivers, lakes, man-made high-level reservoirs; the flow of water.

8. CASE STUDY. PR campaign.

A. Read the article quickly. What do the following phrases mean?

2. To launch a campaign
3. To improve someone's environmental reputation
4. Eco-nuisance
5. Pumping out greenhouse gases
6. Silent
7. In-flight video
8. Pamphlet

9. We must aim high.

B. Read the article and answer the questions below.

1. What is IATA?
2. What kind of crisis is IATA facing at the moment? What are the reasons of the crisis?
3. What steps have been taken to resolve the situation?
4. What actions will be taken in the future?
5. Could you suggest any further measures to help IATA restore its reputation?

The world's airline industry is to launch a media campaign to improve its environmental reputation.

The International Air Transport Association (IATA) says the industry has been unfairly called an eco-nuisance for pumping out greenhouse gases that contribute to global warming.

IATA director-general Giovanni Bisignani said: "We have been silent in our success and now we have a reputation crisis."

The industry is to launch a short in-flight video and pamphlet as part of the campaign.

At IATA's annual meeting in Vancouver, Mr Bisignani told delegates: "Climate change is a real concern for our customers and a political priority for many governments.

We must aim high. Air transport must become an industry that does not pollute."

We will not achieve this overnight, but potential building blocks for a carbon-free future are here"

 From: http://www.est.org.uk

9. Translate the following expressions into English.

Источники энергии: ископаемое топливо; повышение концентрации парниковых газов; изменение климата; природные катастрофы; засуха; опустынивание; подъём уровня Мирового океана; альтернативные источники энергии, не загрязняющие окружающую среду; ветровые турбины; солнечные батареи; преобразование энергии солнечных лучей в электричество; энергия приливов и отливов.

10. Render the text in English.

ИСТОЧНИКИ ЭНЕРГИИ

Использование в качестве основного источника энергии ископаемого топлива (угля, нефти, газа) привело к значительному повышению концентрации парниковых газов в атмосфере. Это явилось причиной начала глобального потепления климата, в результате которого обострились такие проблемы как засухи и опустынивание, наводнения и подъём уровня Мирового океана, природные катастрофы. С изменением климата связывают ухудшение здоровья людей и разрушение природных экосистем.

Осознание того факта, что глобальное потепление является реальной угрозой для планеты и ставит под сомнение возможность комфортного существования человечества, заставило правительства многих стран активно искать решение этой проблемы. Принимается во внимание и то, что традиционные источники сырья для энергетики исчерпаемы, и поэтому цены на нефть, газ и уголь будут в перспективе расти.

Одним из решений является переход к более эффективным технологиям производства электроэнергии из ископаемого топлива и более экономное расходование этой энергии. Кроме того, необходимо использовать альтернативные источники энергии, не загрязняющие окружающую среду. В настоящее время освоено несколько таких источников. Наиболее развиты технологии производства электроэнергии с использованием энергии падающей воды (гидроэлектроэнергетика), ветра и солнечной энергии.

10. Render the text in English.

АЛЬТЕРНАТИВНЫЕ ИСТОЧНИКИ ЭНЕРГИИ

В настоящее время освоено несколько альтернативных источников энергии. Наиболее развиты технологии производства электроэнергии с использованием энергии падающей воды (гидроэлектроэнергетика), ветра и солнечной энергии.

Гидроэлектростанции, получившие достаточно широкое применение, не являются абсолютно безвредными для окружающей среды, так как наносят ущерб экосистемам тех рек, близ которых строятся. Технологии преобразования ветровой энергии в электри-

ческую посредством ветровых турбин и генераторов находятся на достаточно высокой ступени развития. Трудность состоит только в том, что ветер, достаточно сильный для вращения турбин, бывает не всегда. Возможно размещение турбин в море, на некотором расстоянии от берега, где более сильный и постоянный ветер означал бы большую производительность и в перспективе достаточно высокую экономическую эффективность установок. Этот путь более сложный технологически, более затратный. Однако испытания в этой области проводятся и определённые успехи достигнуты.

Солнечная энергия также используется достаточно активно. Для нагрева воды устанавливаются специальные коллекторы, обычно на крышах зданий. Солнечные батареи используются для преобразования энергии солнечных лучей в электричество. Однако, как и в случае с ветром, производительность таких установок, между прочим, достаточно дорогих, зависит от капризов погоды.

Существуют и другие способы получения «чистой» энергии. В некоторых странах используются геотермальные источники. Биотопливо также считается одной из потенциальных альтернатив традиционному топливу. Рассматривается возможность использования энергии приливов и отливов.

12. Translate the following expressions into English. Render the text in English.

управляемая ядерная реакция; цепная реакция расщепления ядра; уран-235; отработанное топливо; специальные бетонные или стальные контейнеры; система охлаждения; АЭС (атомные электростанции); хранение отходов этого производства.

ЯДЕРНАЯ ЭНЕРГИЯ

Впервые управляемую ядерную реакцию осуществила группа учёных под руководством Энрико Ферми. Это произошло в Чикаго в 1942 году. Девять лет спустя был создан первый экспериментальный ядерный реактор. В ядерном реакторе происходит цепная реакция расщепления ядра, скорость которой строго контролируется. При этом выделяется огромное количество тепловой энергии. Эта энергия превращает воду в пар, который вращает лопасти турбин парогенератора, вырабатывающего электроэнергию.

В качестве топлива на атомных электростанциях используется уран-235. В результате ядерной реакции кусок урана выделяет энергии в 2 млн. раз больше, чем образуется при сгорании такого же по весу куска угля. Топливо в реакторе работает от 3 до 5 лет. Однако, и после этого оно радиоактивно, а значит, является опасным. Отработанное топливо хранится в специальных бетонных или стальных контейнерах, оборудованных системой охлаждения.

Опыт работы атомных электростанций показал их экономичность и экологическую чистоту. АЭС не используют ископаемое топливо, а значит, не являются источниками выбросов парниковых и других токсичных газов. Однако, вполне обоснованная тревога вызвана рискованностью ядерного производства и хранения отходов этого производства.

На сегодняшний день (октябрь 2007 г.) во всем мире работает 439 атомных электростанций, на которых производится 15,2 процента мировой электроэнергии. Все ядерные реакторы сосредоточены в 30 странах мира. В России работают 10 АЭС общей мощностью 23242 МВт.

4. Waste management

4.1. Introduction

1. Linguistic IQ test

Which meaning (meanings) is not correct?

1. Mercury
    1. древнеримский бог Меркурий
    2. древнеегипетский бог
    3. ртуть
    4. Меркурий, планета Солнечной системы
2. Hazardous
    1. харизматичный, обладающий обаянием
    2. азартный
    3. токсичный
    4. опасный
3. Landfill
    1. приземление
    2. высадка растений

3. мусорная свалка
4. закапывание отходов

4. Trash
1. мусор
2. чепуха
3. «трэш», жанр кинематографии
4. авария

5. Garbage
1. мусор
2. гараж (помещение для хранения ненужных вещей)
3. чепуха
4. Garbage - название рок группы

2. QUIZ. In pairs answer the questions.

1. Mercury should be carefully cleaned up and disposed of when you
a. visit another planet
b. break a thermometer
c. turn lead into gold
d. deliver messages quickly

2. What's not safe to throw out in your trash?
a. vacuum cleaner bags
b. plastic bags
c. old toys
d. household hazardous waste

3. What type of trash takes up the most space in US landfills?
a. plastic
b. metal
c. paper
d. yard cuttings

4. What's the number one trash item found on beaches?
a. cigarette filters
b. plastic bottles
c. seaweed (водоросли)
d. food bags

5. What is the most environmentally friendly way to dispose of garbage?

a. recycling
b. composting
c. using less stuff
d. landfilling

6. Which symbol means recycling?

a. 
b. 
c.
d.

3. Write the following words and phrases into the chart below. Some of them may belong to more than one category.

Recycling
Source reduction
Evaporate
Landfilling
Special care
Improper disposal
Marine debris collectors
Vapour
Spill
To prevent waste generation
Pose a threat
Remove
Composting
Liquid

Words associated with ***Mercury***	Words associated with ***hazardous waste***	Words associated with ***marine debris***	Words associated with ***garbage disposal***

4. Speaking. Work in pairs, A and B.

Student A: look at the answers to the quiz at the end of the chapter before the revision section. Read the answers to the questions 1-3 and the comments given there.

Student B: look at the answers to the quiz at the end of the chapter before the revision section. Read the answers to the questions 4-6 and the comments given there.

Exchange information.

5. Pronunciation. In which word the underlined letter or combination of letters is pronounced differently? Where is the word stress?

1. RECYCLE ENVIRONMENT TOXIC PESTICIDES
2. DISPOSAL SOURCE CAUTION CAUSE
3. NEWSPAPER BATTERY WASTE ESCAVATE VAPOUR
4. COMBUSTION BURNING REDUCTION
5. HAZARDOUS GARBAGE TRASH PACKAGING

6. Match a word or a phrase from the left with a phrase from the right to make sentences.

Mercury	WASTE DISPOSAL
Hazardous waste	ARE HAZARDOUS WASTE
Batteries	IS HARMFUL TO THE
Old newspapers	ENVIRONMENT
Landfilling is a method of	IS TOXIC
	SHOULD BE RECYCLED

7. Vocabulary.

Generation of municipal waste ▶ *municipal waste generation*
Disposal of hazardous waste ▶ _____
Collectors of marine debris ▶ _____
Prevention of waste generation ▶ _____
Trends in waste generation ▶ _____
Practices of waste management ▶ _____

4.2. Municipal Solid Waste (MSW)

MSW (municipal solid waste)—more commonly known as trash or garbage—***consists*** of everyday ***items*** such as product packaging, grass clippings, furniture, clothing, bottles, food scraps, newspapers, appliances, paint, and batteries.

Several ***MSW management practices,*** such as source reduction, recycling, and composting, are used to reduce the ***amount*** of waste going to landfills and ***combustors***.

Source reduction involves changing the design, ***manufacture***, or use of products and materials to reduce the amount and toxicity of what gets ***thrown away***. Source reduction has many environmental ***benefits***. It reduces pollutants, saves energy, ***conserves*** resources, and reduces the need for new landfills and combustors.

Recycling means that some materials are sorted, collected, and ***processed*** and then manufactured, sold, and bought as new products. Paper, glass, plastic, and metals can be recycled. Recycling prevents the emission of many greenhouse gases and water pollutants, saves energy, ***supplies*** valuable ***raw materials*** to industry, creates jobs, stimulates the development of greener technologies and reduces the need for new landfills and combustors.

Composting decomposes organic waste, such as food scraps and yard clippings, with microorganisms (mainly bacteria).

Other practices address those materials that require disposal. ***Landfills*** are engineered areas where waste is placed into the land. Landfills usually have ***liner systems*** to prevent groundwater ***contamination***. According to the U.S. Environmental Protection Agency, many of the country's landfills have been closed for one or both of these two reasons:

- They were full
- They were contaminating groundwater.

Combustion is another MSW practice that has helped reduce the amount of landfill space needed. Burning MSW can generate energy. However, it may release toxins into the air and create ***ash*** that requires disposal in hazardous-waste landfills. That takes us back to our starting point: Cities are ***running out of*** places to put their trash.

2. Make a vocabulary table in your copybook. Complete the table with the ***bold*** words from the text.

3. Prepare a short talk on the following topics. Use the words from the boxes below. Add two more words or phrases to each group. When you begin speaking, do not look at the boxes.

1. The main problem of big cities.
2. Environmentally friendly SMW disposal practices.
3. Be careful! Hazardous waste.

topic 1

generate waste
packaging
run out of landfills
groundwater contamination

dispose of
1. _____
2. _____

topic 2

recycling
source reduction
environmental benefits
reduce pollutants

conserve resources
1. _____
2. _____

topic 3

toxic
pollute the environment
pose threat to human health

1. _____
2. _____

Exercise 2. QUIZ ANSWERS. Student A

1. The answer is b. When liquid mercury is spilled, it begins to evaporate. Mercury vapour in the air is **very toxic!** Any amount spilled must be treated with extreme caution and cleaned up or removed immediately and very carefully.

Liquid – жидкость, Spill – проливать, Evaporate – испаряться, Vapour – пар, Remove – удалять

2. The answer is d. Products, such as paints, cleaners, oils, batteries, and pesticides, that contain potentially hazardous ingredients require special care when you dispose of them. Improper disposal of

these wastes can pollute the environment and pose threat to human health.

Special care – особая осторожность, Improper – неправильный

3. The answer is c. The trash most commonly found in municipal landfills is old paper—on average, it accounts for more than 40 percent of a landfill's contents. Newspapers, which can be recycled, can take up as much as 13 percent of the space in US landfills. Research has shown that, when excavated from a landfill, newspapers from the 1960s can be readable.

Take up – занимать (например, место), Excavate – выкапывать

Exercise 2. QUIZ ANSWERS. Student B

4. The correct answer is a. From 1996 to 2000, international marine debris collectors found over 6 million cigarette filters on beaches, followed by over 3 million food bags.

Debris - мусор

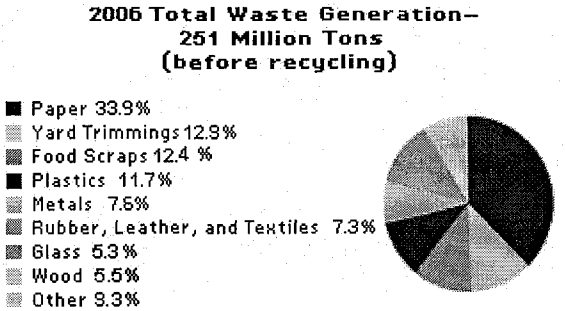
5. The answer is c. Source reduction is a basic solution to the garbage problem: using less material means less waste at the end. Source reduction actually prevents the generation of waste. Recycling (or reusing) and composting are the next best options because they reduce the amount of waste going to landfills. These methods let materials be used again when possible. Landfilling is the last option.

Solution – решение, Prevent – предотвращать, Landfill –свалка мусора

6. The answer is c. The national symbol for "recycle" is three arrows of equal size in a circle. The three arrows mean Reduce, Reuse, and Recycle. Once waste is created, recycling, which includes composting, is one of the most effective methods of waste disposal.

REVISION

1. WRITING. Look at figure 1 and figure 2. What do they represent? What is the source of the data? Write a report on municipal waste generation trends.



Yard trimmings – отходы растительного происхождения
food scarps – пищевые отходы
rubber – резина
leather – кожа
textiles - текстиль
wood - древесина

Figure 1. USA Municipal Solid Waste Generation Figures. Source: EPA

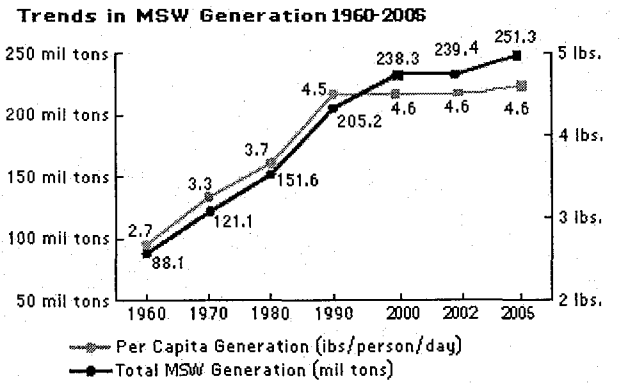


Figure 2. USA Municipal Solid Waste Generation Trends. Source: EPA

2. PR sample. Public Service Announcement.

1. What do the following words and phrases mean?

Throw something away
To be done with something = to finish something
A can of cola
Bin
Melt
Community
I'm gonna = I'm going to

Average

I Wanna Thank You = I want to thank you

Neighborhood

2. Read the following radio announcements. They are a part of a national PR campaign launched by EPA (USA). Read the three announcements quickly. What is the goal of the campaign?

Read the information in INFO BOX on p. 82.

3. In pairs act out one of the announcements.

4. Answer the questions below.

1. What is the objective of the announcements? Choose from the list below.

- to inform;
- to warn people not to do something;
- to urge people to do something.

2. Who is the target audience?

3. In your opinion, which announcement sounds the most appealing?

4. Which announcement sounds the most informative?

5. Which one, do you think is the most effective? Why?

5. In groups discuss the announcements and choose the best one.

USEFUL LANGUAGE

..... sounds really interesting/appealing/impressive

there are a few amazing/surprising facts in .....

the figures in ..... are really worring

I was surprised to hear that .....

I think, people will remember ..... because of the music/voices/new information/the celebrity speaking on the issue/interesting slogan .....

I was really impressed by .....

..... explains what happens to garbage when .....

..... sounds rather boring

I don't find ..... very interesting

---

1. Earth Day

EPA – EARTH DAY – RADIO: "Ask Your Children" (30 sec)

SOUND EFFECTS: schoolyard sounds
MOM: If you're done with that cola, how about we throw away the can?
CHILD: Not here mom, let's look for recycling on our way home.
MOM: OK. What are we looking for?
CHILD: A bin with a circle of arrows on it. We learned about it in school today. When you recycle a can, the aluminum gets melted down and makes more cans.
MOM: You're my best teacher!
CHILD: Look mom... the circle of arrows! That's a recycling bin!
CHILD: Happy Earth Day mom!
ANNOUNCER: Recycling conserves natural resources.
To learn more about recycling, visit www.epa.gov.

2. **"This is Our Neighborhood. Recycle"** EPA;

Presented by Shauntay Hinton, Miss USA 2002, (30 sec)

SHAUNTAY: Hi. This is Shauntay Hinton. Do you have 30 seconds to talk about how we can help our community? Did you know that the average person throws away more than four pounds of garbage a day? That's a phone book every day. When I heard that, I said - I'm gonna recycle everything I can. I mean, recycling one ton of paper saves about 20 trees. The energy saved from each recycled aluminum can will run a TV for three hours. I recycle and I'm asking you to do the same.

ANNOUNCER: For more information on recycling, contact the US Environmental Protection Agency.

SHAUNTAY: This is our neighborhood. Recycle.

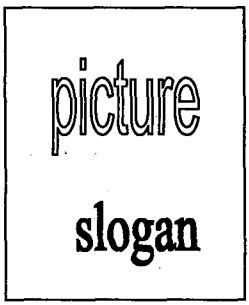
3. **EPA – RECYCLE – RADIO:** Mighty Clouds of Joy

"I Wanna Thank You" (30 sec)

MUSIC: "I Wanna Thank You"
JOE: Hi. This is Joe Ligon with my good friend Richard from the Mighty Clouds of Joy. Let's talk about something important. Recycling.
RICHARD: Did you know the average person throws away four pounds of garbage a day? Problem is, it's not all garbage.
JOE: When we heard that, we decided to recycle everything we can. Glass bottles, aluminum cans, paper.

RICHARD: In fact, recycling one ton of paper saves 20 trees. And we've got something to say to everybody who recycles.
MUSIC: Chorus from "I Wanna Thank You"
ANNOUNCER: For more information on recycling, contact the US Environmental Protection Agency.
JOE/RICHARD: This is our neighborhood. Recycle.

4. Your teacher will give you a picture. Your task will be to create a public announcement to place in the Internet.



The text of the announcement should include:

- background information on the issue
- what you ask people to do to help solve the problem
- what will be the environmental and other benefits

5. Discuss the other students' announcements.

6. Give English equivalents.

пищевые отходы; бытовые отходы; промышленные отходы; радиоактивные отходы; токсичные вещества; мусоросжигательные заводы; токсины; загрязнять; промышленное сырьё; мусорные свалки; захоронение отходов; почвы и грунтовые воды

7. Render the text into English.

Мусорные свалки

В процессе эволюции наибольших «успехов» цивилизация добилась в производстве мусора. Человечество непрерывно производит огромное количество разного хлама, металлолома, стекла, бумаги, пластика, пищевых отходов. Значительная часть бытовых и промышленных отходов опасна для окружающей среды и здоровья человека. Это радиоактивные отходы, ртуть и токсичные вещества.

Ежегодно человечество производит около 150 млрд. тонн твёрдых, жидких и газообразных отходов. Мусоросжигательные заводы

значительно сокращают объём твёрдых бытовых отходов. Однако, они выбрасывают в атмосферу парниковые газы и токсины. Оставшиеся отходы отправляются на специально оборудованные мусорные свалки. Захоронение отходов требует значительных площадей и загрязняет почвы и грунтовые воды.

Одним из путей решения проблемы мусора является сокращение потребления материалов на стадии производства товаров, а также их продажи. Изменение дизайна и внедрение технологий, позволяющих экономить сырьё и энергию, позволит сократить ущерб, который промышленность наносит окружающей среде.

Многие города в странах Западной Европы переходят на более высокий уровень переработки мусора, при котором отходы одного производства становятся сырьём для другого. Например, в Калунборге (Дания), газообразные отходы нефтеперерабатывающего предприятия служат топливом для электростанции, а избыточное тепло последней идёт на подогрев прудов рыбоводческого хозяйства; другие компании используют продукты сжигания мусора (waste combustion by-products) для производства бетона (concrete).

Бытовые отходы на Западе подвергаются сортировке. Жители складывают отходы разного типа (например, бумагу, пластиковую упаковку, стекло) в разные баки. Эти материалы идут на переработку и служат сырьём для промышленного производства.

APPENDIX

LEARN BOX 1.1. BASIC GLOBAL WARMING TERMS 1

Greenhouse effect
Greenhouse gases
Infra-red radiation
Carbon dioxide
Carbon dioxide emissions
Methane
Nitrous oxide
Average global temperature
Water vapour

LEARN BOX 1.2. WRITING A REPORT. USEFUL LANGUAGE

Figure 1 represents .....(just rewrite the headline of figure 1)
According to .....(the name of the organization that published the data)
..... record shows that .....
Increase/grow/rise – расти, увеличиваться
Decrease/fall – падать, уменьшаться
Average – средний
Approximately – приблизительно
Over the period from ..... to .....
Considerably/sharply/significantly/dramatically – значительно
Slightly – незначительно
The current rate of growth/increase/rise/fall/decrease

LEARN BOX 1.3.1 WAYS TO TALK ABOUT CHANGES

Changes in smth.	Fall in smth.
Reductions in smth.	Cut in smth.
Increase in smth.	Decrease in smth.
Disruptions in smth.	Shifts in smth.
Growth in smth.	

LEARN BOX 1.3.2 CONNECTING CAUSE (X, N) AND EFFECT (Y, M)*

X results in Y. Y results from X. X leads to Y. X causes Y. N. Consequently M.	N. As a result M. Y is due to X. X is responsible for Y. N. Therefore M.

*X and Y can be nouns or phrases; N and M are sentences.

LEARN BOX 1.3.3. Forecasting the future

Something may happen (see level may rise father)
Something may well happen (see level may well rise father)
Something is certain to happen (see level is certain to rise father)
Something is predicted to happen (see level is predicted to rise father)
Something is expected to happen (see level is expected to rise father)

LEARN BOX 1.4.1. LINKING WORDS

Furthermore
Moreover
Besides
Apart from that
Additionally
Firstly..., secondly..., thirdly...

LEARN BOX 1.4.2. GLOBAL WARMING BASIC TERMS 2.

Fossil fuels
Sea level rise
Drought
Deforestation
Desertification
Crop yields
Endangered species
Become extinct
Floods

LEARN BOX 1.5. WRITING A SUMMARY

The article is entitled ...
The title of the article is ...
The article is about ...
The article reports the results of
The article considers the effects
The article refers to the study/ research
The article gives an insight into
The article is devoted to ...
The research shows that ...
The results imply that ...
The conclusion is that

LEARN BOX 2.1. ACID RAIN BASIC TERMS.

Air pollution
Pollutants
Acid deposition
PH scale
Acidic
Sulfur dioxide (SO2)
Nitrogen oxides (NOx)
Car exhaust
Power plant
Burning fossil fuels
Lung disorders
Toxic
Acid-sensitive species
Nutrients

LEARN BOX 2.2. OZONE BASIC TERMS

The ozone layer depletion
Absorb ultraviolet radiation
Motor vehicle exhaust
The ozone hole
Chlorofluorocarbons (CFCs)
Chemically inert

LEARN BOX 2.3. ENERGY EFFICIENCY BASIC TEARMS.

To solve a problem
Energy efficiency
Requirements
Reduce emissions
Energy consumption
Certification of products
Household electronics
Electrical appliances

ENERGY STAR ≈ a government-supported program helping businesses and individuals protect the environment through energy efficiency. Electronics and appliances such as computers, refrigerators, washers, and air conditioners carrying the ENERGY STAR label are guaranteed to be energy efficient. For more on this program, visit http://www.energystar.gov/.

Exercise 7. HEADLINES.

WIND ENERGY COULD CREATE 76,000 BRITISH JOBS
Honda Promotes Greener Driving Techniques
World Oil Stocks are to Deplete

Exercise 9. PR WRITING

In all of the press releases the following information is missing.

1. The name of the person to contact
2. Contact telephone number and e-mail address
3. The Internet address of the organization that issued the release

It is necessary to specify whom reporters may ask to supply any additional or background information. The Internet address of the organization should be included in case a reporter would like to get some background information.

Example
Contact Elisabeth Prizm
Elisabeth.prizm@uwex.uwc.edu
608-352-9675
for more information visit http://www.energystar.gov

INFO BOX

EPA COMPAIGN TARGET

The goal is to help people understand how everyday activities - be it reading a newspaper, eating lunch, drinking a bottle of water, or mailing a package - affect our environment. The materials we use and the actions we take in our daily lives each affect the environment in some way. By committing ourselves to producing less waste, reusing and recycling more materials, buying more recycled and recyclable products, and reducing toxic chemicals in products and waste, we conserve energy and preserve natural resources. The national goal is to increase recycling of the total annual MSW produced to 35 percent by 2008. (from www.epa.gov)

GLOSSARY

1. GLOBAL WARMING

absorb [əb´so:b] (v)	поглощать, абсорбировать
advisory body	консультативный орган (организация)
biosphere [´baɪəsfɪə]	биосфера (область обитания живых организмов на земле)
endangered species	находящиеся под угрозой исчезновения виды
extinct [ɪk´stɪŋkt] (adj)	вымерший, исчезнувший
carbon dioxide (CO2) [´ka:bən daɪ´oksaɪd]	углекислый газ
coal and oil [kəʊl], [ɔɪl]	уголь и нефть
coastline	побережье
consequence [´konsɪkwəns]	последствие
crop yield [krop ji:ld]	урожай зерновых
data	данные
deforestation	обезлесивание, гибель лесов
desertification	опустынивание
destroying forests	уничтожение лесов
disruptions	перебои, нарушение
drought [draʊt]	засуха
duration of seasons	длительность времён года
expansion	расширение
famine	голод
flood	наводнение
food shortage	нехватка продуктов питания
forecast	прогноз
fossil fuel	ископаемое топливо
freshwater supplies	источники пресной питьевой воды
glacier	ледник
greenhouse effect	парниковый эффект
greenhouse gas emissions	выбросы парниковых газов
groundwater tables	грунтовые воды
habitat	место или среда обитания
hurricane	ураган
impact	влияние
income	доход
infectious disease	инфекционное заболевание
influence	влиять
issue	проблема
mammals	млекопитающие
methane (CH4)	метан
moisture	влага
nitrous oxide (N2O) [ˌnaɪtrəs ´oksaɪd]	оксид азота
ozone	озон
pollution	загрязнение
salinity	содержание соли, солёность

salt-water intrusion	проникновение солёной воды (в источники пресной)
scientific research	научные исследования
sea level rise	повышение уровня Мирового океана
snow and ice cover	снежный и ледяной покров
summary	резюме, краткое изложение
The United Nations Framework Convention on Climate Change	Рамочная конвенция ООН по изменению климата
trend (n)	тенденция
water vapour	водяной пар
weather pattern	метеорологическая модель
wetland	сильно увлажнённые земли

2. AIR POLLUTION

Acid deposition	кислотные осадки
Acidic	кислотный
Basic	щелочной
Buffer	нейтрализовать
Capacity	способность
Catalytic converter	катализатор
Chemical compound	химическое соединение
Chemically inert	инертные
Chlorofluorocarbons (CFCs)	хлор- и фторсодержащие углеводороды (ХФУ)
Dissolve	растворяться
Dust particles	частицы пыли
Efficiency	эффективность
Emit	выбрасывать, выделять, испускать
Exhaust	выхлопные газы
Fertilizers	удобрения
Habitat	место или среда обитания
Limestone, lime	известь
Lung disorders	заболевания лёгких
Nitrogen oxide	оксид азота
Nutrients	питательные вещества
Phenomenon	явление
Pollutant	загрязняющее вещество
Scrubber	газоочиститель
Substance	вещество
Sulfur dioxide	сернистый ангидрит, диоксид серы
The ozone layer	озоновый слой
The ozone layer depletion	разрушение озонового слоя
Ozone hole	озоновая дыра
vehicle	транспортное средство

3. ALTERNATIVE ENERGY

Air pollution	загрязнение воздуха
Capacity	производительность
Contaminated with radioactive particles	зараженный радиоактивными частицами
Dam	плотина
Damage	вред, ущерб
Decline in people's health	ухудшение здоровья людей

Desertification	опустынивание
Dispose of ...	избавляться от .....
Drought	засуха
Efficiency	эффективность
Famine	голод
Geothermal energy	геотермальная энергия
Greenhouse gas emissions	выбросы парниковых газов
Hot springs	геотермальные источники
Hydroelectric plants	гидроэлектростанции
Impact	влияние
Inexhaustible energy sources	неисчерпаемые источники энергии
Measure	мера
Media publications	публикации в средствах массовой информации
Natural disasters	природные катастрофы
Nuclear power plant	атомная электростанция
Reactor core	активная зона реактора
Solar photovoltaic panels	устройства для преобразования световой энергии в электроэнергию
Splitting of uranium atom	расщепление атома урана
To take measures	принимать меры
Turbine	турбина
Tidal power	энергия приливов и отливов
Tidal range	разница между уровнями прилива и отлива
Waste	отходы
Wave power	энергия волн

4. WASTE MANAGEMENT

Ash	пепел
Combust	сжигать
Conserve	сберегать
Consumption	потребление
Contamination	загрязнение, заражение
Decompose	разлагать
Dispose of	избавляться
Emit	выбрасывать, выделять
Food scraps	пищевые отходы
Garbage	мусор
Hazardous waste	опасные отходы
Issue	проблема
Landfill	мусорная свалка, яма для захоронения отходов
Mercury	ртуть
Municipal waste (household waste)	Бытовые отходы
Packaging	упаковка
Public service announcement	Социальная реклама
Raw materials	сырьё
Recycling	переработка отходов
Release	выделять, испускать
Target audience	целевая аудитория
Throw away	выбрасывать
Toxicity	токсичность

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