МИНИСТЕРСТВО НАУКИ И ВЫСШЕГО ОБРАЗОВАНИЯ РОССИЙСКОЙ ФЕДЕРАЦИИ

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«ПЕРМСКИЙ ГОСУДАРСТВЕННЫЙ
НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ УНИВЕРСИТЕТ»

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*Допущено методическим советом
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учебного пособия для студентов, обучающихся
по направлению подготовки бакалавров
«Экология и природопользование»*

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Цель пособия – реализация компетентностного подхода к обучению студентов и формирование следующих компетенций:

- обладать готовностью к коммуникации в устной и письменной форме на русском и иностранном языках для решения задач профессиональной деятельности;
- готовность к коммуникации и представлению результатов в устной и письменной форме на русском и иностранном языках при решении задач профессиональной деятельности;
- способность свободно пользоваться русским и иностранными языками как средством делового общения.

В учебное пособие включены аутентичные профессионально-ориентированные тексты и разработаны задания по различным видам чтения, аудирования и письма, а также лексике и грамматике английского языка для отработки явлений, встречающихся в аутентичной научной литературе по экологии на английском языке.

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UNIT 1
ECOLOGY AS A SCIENCE

READING SKILLS (1)

1. **Look at the title of the text 1. What do you expect to read?**
2. **Check the pronunciation of the highlighted words in the text with the help of your electronic dictionary and discuss their Russian equivalents with your partner.**

TEXT 1

ECOLOGY AS A SCIENCE

The word *Ecology* comes from the Greek *oikos,* which means *home*, place where we live. The origin of **ecology** lies in the **natural history** studies of the Greeks, particularly the **philosopher** and scientist Theophrastus. In 1869, Ernst Haeckel, the German **zoologist**, invented the **term** *ecology* and applied it to the relation of the animal with its **organic** and **inorganic** environment.

The **modern** definition of ecology describes it as a scientific **discipline** that is concerned with the relationship between **organisms** and their past, present and future environments, both living and non-living. The science represents a body of knowledge about the world and all its parts, but it is also a **method** for finding new **information**. Thus, ecological science is the scientific study of the **distribution** and abundance of living organisms and how it is affected by the **interaction** between the organisms and their environment.

The word *environment* refers to everything around us: the air, the water and the land as well as plants, animals and **microorganisms** that inhabit them. The environment of an organism includes **physical** properties, which can be described as the **sum** of **local abiotic factors** such as **solar energy, climate,** soil as well as other organisms sharing the habitat.

Ecology is usually considered a branch of **biology**, the **general** science that studies living organisms, but all living things can be studied at different levels: from **proteins** and **nucleic** acids in **biochemistry** and **molecular** biology, to cells in cellular biology, to **individuals** in **botany, zoology** and other similar disciplines, and finally to **populations, communities,** and **ecosystems**, to the **biosphere** as a whole. The latter strata are the **principal subjects** of ecological enquiries. As ecology is a **multi-disciplinary** science and **focuses** on the higher levels of the **organization** of life on the Earth it draws heavily on many other branches of science, especially **geology, geography, meteorology,** pedology**, chemistry, physics,** etc.

As a scientific discipline, ecology does not dictate what is right or wrong. However, ecological knowledge such as the **quantification** of biodiversity and population **dynamics** provides a scientific **basis** for expressing the aims of environmentalism and evaluating its goals and policies. Anyway, a holistic view of nature is stressed both in ecology and environmentalism.

3 Read again and say which science:

1) Studies populations, communities and ecosystems?
2) Deals with plant life?
3) Treats of living organisms and vital processes?
4) Is concerned with biotic and abiotic factors of the environment?
5) Studies animal life?
6) Considers the structure, properties of substances and the reactions that change them into other substances in living organisms?
7) Deals with distribution and abundance of living organisms in their environment?

VOCABULARY DEVELOPMENT

1. Choose the appropriate word given in the brackets. Give the Russian equivalents to the following sentences.

A Ecologists are interested in where animals and plants live and how they (interconnect/interact) with each other.

B Charles Darwin`s (theory/practice) of evolution developed from his (observations/relations) while recording the natural history of animals and plants.

C The (relationship/friendship) between man and nature has become one of the (major/minor) problems facing civilization/environment today.

D The near (extinction/preservation) of common (species/types) led to the beginning of the conservation (movement/improvement).

2. In one minute, write as many phrases as you can with the words «*ecological/ecology*». Make sentences using them.

3. Fill in: *Physical; Distribution; Natural; Abiotic; Evaluating; Population; Abundance; Holistic; Scientific; Inorganic; Cellular.*

1 ……properties
2 ……view
3 ……disciplines
4 ……goals

5 ……environment
6 ……of organisms
7 ……factors
8 ……biology
9 ……dynamics
10 ……of plants
11 ……history

WORD FORMATION

Study the theory box.

! To form adjectives from nouns, we use **–able, –ful, –al, –ary, –ical, –ous (**comfort – comfort**able,** care – care**ful**, agriculture – agricultur**al**, revolution – revolution**ary**, scandal – scandal**ous).**

! To form adverbs from adjectives, we use **–ly (**careless – carelessly**)**

! To form abstract nouns from verbs, we use **–ment, –ation (**develop – develop**ment**, demonstrate – demonstr**ation).**

! To form abstract adjectives from nouns, we use – **ical (**ecology – ecolog**ical).**

4. Form adjectives, adverbs or nouns from the words in brackets and complete the gaps in the sentences.

Theory in ecology consists of principles used to construct models. Unlike 1…… (Evolution) theory, ecology has no 2……. (General) accepted 3…….. (Globe) principals. Modern ecology includes a number of sub-disciplines such as 4…….. (Populate) ecology, 5…… (Conserve) ecology, ecosystem ecology, 6…….. (Physiology) ecology, 7……. (Evolution) ecology, and many others. The 8…….. (Theory) practice of ecology consists in the 9…….. (Construct) of models of the 10…… (Interact) of living systems with their environment including other living systems. These models are then tested in the laboratory and the field consisting of data 11…….. (Collect) that need not to be inspired by any theory.

WRITING AND SPEAKING SKILLS

Complete the beginnings of the sentences with the information from the text 1 in a written form. Use them as a plan for making a report on ecology as a science.

1 Ernst Haeckel, who invented the word *ecology,* applied the term to…….
2 The modern definition of ecology is concerned with……
3 The science represents a body of…….
4 The science is the study of ……..
5 The word environment means everything around us: ……
6 Ecology is a branch of…….
7 Ecology focuses on……..
8 The ecological science is related to …….

USEFUL VOCABULARY

Abundance (n) изобилие, множество
Affect (v) воздействовать
Apply (v) применять
Biodiversity (n) биоразнообразие
Definition (n) определение
Distribution (n) распространение
Enquiry (n) вопрос, запрос
Environment (n) окружающая среда
Evaluate (v) оценивать
Holistic (adj) целостный
Origin (n) происхождение
Pedology (n) почвоведение
Relationship (n) отношение
Soil (n) почва

READING SKILLS (2)

TEXT 2

Read some Russian students` opinions to learn about the most urgent environmental problems in the world.

1. Seventy percent of the earth is covered by oceans. Oceans are vital to life on earth. They provide homes for millions of plants and animals. They provide people with food and help regulate the climate. But the **bummer** thing is, our oceans are currently **a big dumping ground** for tons of **toxic waste and sewage**.

   (Anna, 20, Moscow)
2. Every year the earth loses 20 million acres of tropical rain forests. Only half of the world`s original tropical forests still stand. More than 200 million people depend on the tropical forests for **shelter** and food. The **extinction of the rain forests** means the possible extinction of thousands of **species** that live there.

   (Alexander, 19, Novosibirsk)
3. Our water quality is scandalously low. Most big cities **pour** their waste into seas and rivers. For a long time people did not **realize the danger**. The first alarm came from Japan. Some sixty people died because they had eaten polluted fish. The Baltic is a special case. As many as 250 rivers run into the Baltic and there are hundreds of factories on these rivers and millions of people live along them. Seven industrial countries surround the Baltic. Quite a lot of big cities lie on its coast. All of this **combined with** the active navigation of the sea affects the state of the water and the **shore line flora and fauna**.

   (Larisa, 20, St. Petersburg)
4. Pollution is one of the **burning issues** of the day. Millions of chimneys, cars, buses, trucks all over the world **exhaust fumes** and **harmful substances** into the atmosphere. These **poisonous** substances pollute air, land, water, birds and animals. Every year the atmosphere is polluted by 1000 tons of industrial dust and other harmful substances.

   (Olga, 19, Perm)

1. A Read the texts and say who describes:

a) Pollution of water in the seas
b) Poisoning the atmosphere

c) Extinction of rain forests
d) State of our oceans

B Explain the words/phrases in bold.

SPEAKING SKILLS

1. **Imagine you are a radio presenter. Choose one of the topics from the exercise above and present it to the group.**

2. **Say what damage people have done to nature by treating the environment so carelessly. Begin each time with the words:**

- By treating the environment so carelessly people…

3. **Read the quotation and say how you understand it.**

*The nation that destroys its soil destroys itself***.** (Franklin D. Roosevelt)

GRAMMAR EXERCISES
REVISION OF PRESENT SIMPLE, PROGRESSIVE, PERFECT TENSES

1. **Use *to be* or *to have* in the present simple tense.**
   1. Ecosystems ……several structured interrelationships.
   2. Ecology ……. a science which studies the relationship between all forms of life on the planet and the environment.
   3. The ideal place in the home for growing orchids ……a bright window, free from drafts.
   4. Air pollution ……a chemical, physical or biological agent that modifies the atmosphere.
   5. Here …… another ecological term that ……important to note.
   6. This problem ……..different from global warming because you …… the actual depletion of the ozone layer.
   7. Nature conservation in Britain ……..a long history.
   8. Ecology terms ……. often important to understand at any age.
   9. Global warming and ozone depletion ……two of the largest ecology problems.
   10. Ecological problems …… a direct effect on you, and every person.

2. **Put the verbs in brackets into the present simple, present progressive or present perfect.**
   1. Since ancient time nature ……. (Serve) man giving everything he needs: air to breathe, food to eat, water to drink.
   2. The idea of home …….. (Include) our whole planet, its population, nature, animals, birds, fish, insects, and other living beings.

3. Cars with their engines …….. (Become) the main source of pollution in the industrial countries.
4. Animal ecology …… (Study) population dynamics, its distribution, and the interrelations of animals and their environment.
5. The negative influence on nature …….. (Increase) every year.
6. Environmental changes …… (Affect) all the living organisms.
7. Human action …… (Transform/already) between one-third and one-half of the entire land surface on the earth.
8. Ecology …… (Emphasize) the interaction between every organism with other organisms and with the natural resources in the environment.
9. Animals…….. (Depend) on plants for food, so animal ecology …….. (Include) plant ecology.
10. Nowadays people …….. (Cut down) trees at alarmingly high rate.
11. Populations …….. (Increase) and natural resources …… (Run) thin.

WHAT HAVE YOU LEARNED IN THIS UNIT?

Evaluate your progress on each of the items. Use the following symbols: S – satisfied with progress, D – still developing

Professional Communication

1 You`ve read and learned about ecology as a science, its past and present, its interdependence on other branches of science and can make a report on it.
2 You`ve read and learned opinions of some other students about the most urgent environmental problems and can discuss a lot of others.

General Language Skills

1 You`ve improved your comprehension of new materials.
2 You`ve enriched your vocabulary on the topic
3 You`ve practiced your grammar on present tenses and can better understand how to use them.

UNIT 2
ACID RAIN

READING SKILLS (1)

1. **Look at the title of the text «Acid Rain». What do you expect to read?**
2. **Check the pronunciation of the highlighted words in the text with the help of your electronic dictionary and discuss their Russian equivalents with your partner.**

ACID RAIN

A One of the most **serious** pollution **problems** is acid rain. First, **factories** and plants send **gases** and **chemicals** into the air. There they **mix** and are carried for hundreds of **miles** by the wind. Finally they fall back to earth when it rains. **Chemicals** acidify rain, which, in turn, kills fish and trees. It slowly destroys buildings as well. The chemicals and gases from power **stations** and road traffic are called **emissions.** Acid rain also comes from **sulphur contained** in coal and oil. When fossil fuel is burnt, sulphur dioxide is formed. Then it is oxidized by **reaction** with oxygen and sulphur dioxide is produced, which **combines** with water in the air to **form** droplets of sulphuric acid, a major **component** of acid rain. Nitrogen monoxide from exhaust fumes of cars and **industry** is also oxidized in the air and mixes with water to form nitric acid. Sulphuric and nitric acids are carried long **distances** with air currents and fall as acid rain.

B Carbon dioxide emissions can be declined by using **special** equipment. Another approach is to switch some power **generation** from coal to gas. The famous London`s **smogs** are now the thing of the past. Since the 1950s clean air **zones** have been introduced and factories and houses have **stopp**ed burning coal, but smokeless fuel instead. Sulphur dioxide is also emitted from **volcano** eruptions. This **natural** sulphur dioxide can cause the same environmental **problems** as industrial emissions. Fortunately, they happen not so often.

C For centuries, acid from air pollution has contributed to deterioration of buildings and **monuments**. A lot of buildings of **historic** and **artistic** importance are under threat of destroying due to **effect** of acid rain. Acid rain can impoverish wild life habitat, for example: changes in number of insect larvae in streams can **affect** the **population** of insect-eating birds, which may badly **result** in the survival of rear species. By increasing the acidity of surface waters, acid rain can kill fish and other fresh water life. Besides mineral acids, rainwater can **contain** other dangerous substances.

D The effects of acid rain **vary** enormously according to the type of soil on which it falls. Alkaline soils based on limestone can **neutralize** large amounts of acid, whereas peat or **granite** soils have very little ability to do so. The ability of some **chemicals** within the rock to reduce the acidity of the water is called **buffering**. But if the lake lies on an insoluble or acidic rock such as granite, no natural buffering will occur and the acidity of the water will remain high. Scientists have tried to reduce the acidity of lakes artificially by adding chemicals to the water, but this sometimes upsets the ecological **balance** even further.

3. Read again and say which paragraph A, B, C or D describes:

a) Acid rain effects on the environment
b) Acidity ability of some soils
c) Acid rain chemical composition
d) Ways of reducing acid rain pollution

VOCABULARY DEVELOPMENT

1. Read and remember how to use the following words and word combinations. Learn them by heart and get ready to write a terminological dictation.

Environment, environmental: clean and healthy environment, the protection of the environment, to improve the environment, environmental protection.

Damage, to damage: ecological damage, to damage nature by changing the ecological conditions.

Substance: harmful substances, poisonous substances, chemical substances; to be polluted with harmful substances.

To pollute, pollution: to pollute air, water and soil; polluted water; air, water soil and noise pollution; the danger of pollution; to overcome the problem of pollution; to be polluted with acid rain, garbage, industrial waste.

Exhaust, to exhaust: exhaust fume, to exhaust the subject.

To emit, emission: to emit dangerous chemicals into the atmosphere; harmful emissions, industrial emissions.

Pure, purity: pure water, pure air, to preserve the purity of air and water. The purity of soil largely depends on the preservation of forests.

Consequence: the consequences of releasing toxic chemicals into the atmosphere.

To reduce: to reduce speed, to reduce price, to reduce the amount of waste in the air, to reduce noise in big cities.

2. **Read the following names of chemical elements and compounds. Write their chemical formulas:**

Carbon dioxide – двуокись углерода, углекислый газ –CO_2
Oxygen – кислород ……..
Sulphur – сера …….
Sulphur dioxide – двуокись серы …….
Sulphuric acid – серная кислота …….
Nitrogen – азот ……..
Nitrogen monoxide – одноокись азота …….
Nitric acid – азотная кислота ……..
Calcium carbonate – карбонат кальция ……..

3. **Complete the gaps in the following sentences with the appropriate words:**
Acidify, destroy, exhaust, decline, emissions, deterioration, emit, impoverish, ability, occur.

1. Some factories and plants ……..poisonous substances into the atmosphere.
2. It is possible to …….carbon dioxide ……...by using an alternative approach and special equipment.
3. Sulphuric acid and nitric acid are the main components of acid rain, which …….water, air and soil.
4. Acid rain can lead to …….of buildings and monuments.
5. If natural buffering …….s, the acidity of the water will decline.
6. Industrial dust and ……..fume pollute air, land, water, birds and animals.
7. Some chemicals, such as calcium carbonate, have got the ……..to reduce the acidity of the water.
8. The emissions that cause acid rain……the world around us.
9. Acid rain can ……wildlife habitats.

WORD FORMATION

Study the theory box.

! To form negative adjectives from nouns, we use the suffix **–less (**care – care**less**, thought – thought**less).**

! To form negative adjectives from nouns, we use prefixes – **un-, il-, dis-, in-, ir-, mis-, im- (**usual – **un**usual, logical – **il**logical, content – **dis**content, advisable –

inadvisable, responsible – **ir**responsible, informed – **mis**informed, possible – **im**possible **).**

4. Form negative adjectives from the following words. Open the brackets and complete the gaps in the sentences.

Soluble, saturated, vertebrates, necessary, direct, dependent, legal, pure, like, known, responsible, leaded.

1) These plants receive ……..sunlight in the morning and afternoon.
2) The problem was so serious that people often became ill when they drank ……..water.
3) ……some other materials, glass can also be reused commercially.
4) Microscopy revealed the previously ……world of microorganisms.
5) Humans cannot regard themselves as …….on the natural world.
6) The fabric is processed without ……toxic chemicals.
7) Most ……in the Silurian period had either an external or internal skeleton, such as trilobites.
8) ……..fats are liquids at room temperature.
9) It is very important to create more protected national parks to stop …….hunting.
10) Using ……petrol by cars in big cities may reduce air pollution.
11) The lake lying on a ……..rock, will remain its water highly acidified.
12) Most of environmental problems are created by the …….treatment of the human towards nature.

LISTENING

1. Read the following statements about acid rain and try to guess the answers. Listen to the tape and choose the correct word.

1. Acid rain is mostly found in **South America/North America** and Europe.
2. Harmful **chemicals/poisons** are released into the air and mix with water in clouds to produce acid rain.
3. Acid rain causes great damage to the plant and animal life in **parks and zoos/lakes and streams.**
4. Acid rain can slowly eat away the **debris/stone** on the outside walls of buildings.
5. Governments are forcing power stations to **reduce/increase** the amounts of poisonous fumes that they release into the atmosphere.
6. We can help by using less **oxygen/electricity.**

7. If we used public transport more often, the atmosphere wouldn`t become so **polluted/affected** by car exhaust fumes.
8. If we all make an effort, we can help to decrease the **strength/threat** of acid rain.

(Based on Enterprise 4, by Virginia Evans and Jenny Dooley)

2. **Listen again and answer the questions:**

- What is acid rain?
- What damage can be caused by acid rain?
- How can the problem be solved?

GRAMMAR EXERCISES
PASSIVE VOICE (PRESENT AND PAST SIMPLE)

Study the grammar box.

! The Passive is used when it is not important or relevant to mention who performs/performed an action **(the agent)** and when the action is more important than the agent, or where the agent is not known.

! We use the Present Passive to talk about actions or processes in general.
*Industrial emissions **are oxidized** in the air. – **Positive***
Are** industrial emissions **oxidized** in the air? – **Question
*The chemicals of this kind **are not oxidized** in the air. – **Negative***

! We use the Past Passive to talk about actions or processes that happened at a specific point in the past.
*The building **was damaged** by acid rain. – **Positive***
Was** the building **damaged** by acid rain? – **Question
*The monument **was not damaged** by acid rain. – **Negative***

1. **Put the verbs into the correct passive form.**

1) Paper **…….. (**Use**)** in different forms – from newspapers and magazines to milk cartons.
2) Our local beach **…… (**Pollute**)** with oil last summer.
3) Harmful chemicals **…….. (**Release**)** into the air and then **…… (**Mix**)** with the water in clouds.
4) When fossil fuel **…… (**Burn**),** sulphur dioxide **…… (**Form**).**
5) Sulphuric and nitric acids **……. (**Carry**)** long distances with air currents.
6) The trees in these plantations **…… (**Use**)** only for making paper.
7) Sulphur dioxide …… **(**Emit**)** from volcano when they erupt.
8) Large amounts of carbon dioxide ……. (Release) by the local paper-making factory last week.

9) The highest levels of air pollution in parts of Eastern Europe ……. (Know**)** to have caused serious health problems.
10) Clean air zones **……. (**Introduce) in Great Britain in the 1950s.

2. Change the following sentences, active to passive or passive to active.

1 Acid rain **places** additional stress on trees.
Additional stress ……on the trees by acid rain.
2 Rainwater……other dangerous substances.
Other dangerous substances **are contained** in the rainwater.
3 Scientists **add** some chemicals to reduce the acidity of water artificially.
Some chemicals…….to reduce the acidity of water artificially.
4 The World Wildlife Federation…….. other environmental organizations.
Other environmental organizations **are supported** by the World Federation.
5 People **pour** dangerous chemicals from factories into oceans.
Dangerous chemicals from factories…….into oceans.
6 Scientific farming ……the soil.
The soil **is conserved** by scientific farming.
7 The German biologist Ernst Haeckel **introduced** the term *ecology.*
The term *ecology*…….by the German biologist Ernst Haeckel.

3. **Change the questions from the passive into the active in the questionnaire. Give the answers and check them with your partner.**

1) Who was the term *ecolog*y invented by?
2) What is usually considered by scientists as a branch of biology?
3) What is produced by power stations and road traffic?
4) What has been destroyed by acid rain in most cities and towns?
5) How many industrial countries is the Baltic Sea surrounded by?
6) What are the people provided with due to the oceans on the earth?
7) What is added to the water by the specialists to reduce the acidity in lakes?
8) What is the word *environment* referred to?
9) Why is fish and other fresh water life killed by acid rain in some rivers and lakes?
10) What kind of knowledge is the ecological science represented by?

WRITING AND SPEAKING SKILLS

1. **Complete the beginnings of the sentences with the information from the text «Acid Rain» in a written form. Use them as a plan for making a report about the composition of acid rain and the damage caused by it.**

- Acid rain comes from……..
- Acid rain is a mixture of ……..which are carried long…….
- Emissions of carbon dioxide can be declined by using …….
- Acid rain can kill……
- Acid rain can destroy……..
- Acid rain can impoverish ……..
- Natural buffering of lakes occurs……
- To reduce the acidity of water, scientists add ……, but this upsets ……

2. **Read this part of an email which you have received from a friend who is interested in some green issues, such as acid rain. Why is Alice writing about it?**

…….and smog is found all over the district we live in, and people are getting so used to polluted air that it`s very difficult for them to breathe anything else. Anyway, people are rushing from here to there, always busy, too busy to notice or even care about what is dying before their eyes.

And my junior brother is seriously ill with the asthma as a consequence of upsetting the environmental balance in our city.

Well, the main reason for the bad ecological situation is a great number of plants and factories concentrated in one area, the so called industrial zone, so acid rain is a usual thing in our life.

I know that you have just made a report on acid rains at the student scientific conference. Is acid rain really so dangerous? I don`t know what to do. Can you give me some advice, please?

All the best

Alice

Study the theory box.

! ***SHOULD/SHOULDN`T –*** is used to give advice and to offer the opinion.

Animals **should be protected** from hunters in zoos.

Atmosphere **shouldn`t be polluted** so much with car exhaust fume.

3. **Write an email in reply. Encourage your friend. Advise Alice to follow some of these recommendations. Use *should/shouldn`t in the reply.* Ask 2 – 3 questions about her brother`s health.**

Use the following ideas for writing:

- To take part in public environmental campaigns;
- To remove ecologically harmful factories and plants from the city;
- To promote Greenpeace work in your district;
- To reduce the amounts of waste in the air;
- To install special effective systems to reduce the amount of harmful chemical waste in the air.
- To move into another place of living

WHAT HAVE YOU LEARNED IN THIS UNIT?

Evaluate your progress on each of the items. Use the following symbols: S – satisfied with progress, D – still developing

Professional Communication

1. You`ve listened, read and learned about acid rain, its formation, its harmful effect on the environment, some ways of reducing acid rain pollution.
2. You can make a report on acid rain and discuss it with your partners.
3. You`ve practiced in writing a terminological dictation.
4. You have learned how to write an email reply in English, how to give advice.

General Language Skills

4. You`ve improved your comprehension of new materials: passive voice in grammar. You`ve developed your listening skills.
5. You`ve enriched your vocabulary on the topic and have memorized a lot of/few/several new words.

UNIT 3
WILDLIFE AND ENVIRONMENT

READING 1

1. **Read the title of the text. What do you expect to read?**

Check the pronunciation of the highlighted words in the text with the help of your electronic dictionary and discuss their Russian equivalents with your partner.

WILDLIFE PRESERVATION

A Nature and its wilderness have become essential to our very survival. The areas of wilderness help clean our water by **protecting** watersheds; they **filter pollutants** from our air. They are also living **laboratories** for **medical** and scientific research. Many prescription drugs, for instance, are made from **natural substances** which can be found on **public** lands. And, of course, wilderness areas **provide** necessary habitat for threatened species and other human havens of **recreation** and beauty.

B The United States established the world`s first **national park**, Wyoming`s Yellowstone, in 1872, and has steadily added land to national forests, parks and wildlife **refuges** throughout the 20th and 21st centuries. Today, the **federal** government **manages** about 300 **million hectares** of public land, some reserved for multiple uses, such as forestry and recreation, but much of it preserved only as parks and wilderness.

C The United States **administer** another 30 million of parks and recreation areas, including the glowing desert landscape of **California**`s Ariza Borrego Desert State Park. In recent years, **private organizations**, such as The Nature **Conservancy** have worked to purchase and protect valuable natural habitats throughout the country. At present there are more than 50 National Parks in the United States. Nevertheless, the first national park was set up in **England** and **Wales**, which covers 9 **per cent** of the **total** land area.

D Scientists believe that at least one **unique** life form disappears from our planet every day. Only 67,000 wild tigers remain. **Tigers** are hunted and killed for their body parts, which are used in oriental **medicines**. **Chimps** and other **primates** are on the verge of extinction, primarily due to the **destruction** of **tropical** rainforests, which are home to 90 per cent of primates.

E Fewer than 2,000of black rhinos remain in the wild. That`s a 95 per cent decline since the last century. Most are killed for their horns, which are ground into powder for medical purposes in **Asia**. In the last twenty years, half the African

elephants have been killed off. The Asian elephant **population** has shrunk even more. Elephants are killed for their ivory tusks, most of which are used for making jewelry. The list of the endangered species is very long. The greatest task for **conservationists** is to educate people and change their destructive attitudes towards nature.

2. **Scan the extracts for information to answer the following questions.**

- Why are elephants killed by the human?
- What is the name of the National Park established in 1872?
- What was the first country that set up the national park?
- What is the private environmental organization called?
- What kind of habitat did the Nature Conservancy purchase?
- In what medicines are tigers` body parts used?
- Where does the human find living laboratory for medical and scientific research?
- What is the number of the black rhino population remained in the wild?

USEFUL VOCABULARY

Add (v) – добавлять
Attitude (n) – отношение
Desert (n) – пустыня
For instance – for example
Glowing (adj.) – горячий, раскаленный
Haven (n) – приют, убежище
Horns (n) – рога
Ivory (n) – слоновая кость
Jewelry (n) – драгоценности, ювелирные изделия
Multiple (adj.) – многочисленный
Nevertheless (adv.)– тем не менее
Oriental (adj.) – восточный
Purchase (v) – приобретать, покупать
Primarily (adv.) – главным образом
Recreation (n) – развлечение, отдых
Refuge (n) – убежище
Research (n) – исследование
Rhino (n) – носорог
Set up (v) – основывать, открывать
Shrink (v) – сокращать, сжимать
Survival (n) – выживание

Threatened species – endangered species
Verge (n) – край
Watershed (n) – водораздел
Wilderness (n) – девственная природа

VOCABULARY DEVELOPMENT

1. **Match the word in column A with the word in column B. Read and learn by heart the collocations formed. Get ready to write a terminological dictation.**

A	**B**
Medical	areas
Destructive	laboratories
Ivory	research
Oriental	substances
Unique	species
Valuable	refuges
Private	uses
Glowing	organizations
Multiple	landscapes
Wildlife	purposes
Threatened	attitude
Natural	jewelry
Scientific	habitats
Living	life forms
Wilderness	medicines

.

2. **Complete the gaps in the following paragraphs using the appropriate collocations from the exercise above.**

A Experts say that there are up to 16,000 1) thr ……. in the world. In most cases the 2) destr……of the human towards the 3) uniq……. leads to disappearance of their 4) wild……. throughout the world. Do you know that in the last 500 years, 844 species have died out?

B The loggerhead sea turtle is under threat. Humans cause terrible damage to the eggs, because tourists have disturbed the 5) wild…… of this species. Some people are trying to make a difference. The 6) priv…….of Greece

including 500 volunteers from all over the world come to save the 7) val……..of the loggerhead sea turtle.

Study the theory box.

! Expressing contrast

Clauses of concession (придаточные уступительные) are introduced by:

- **Despite/in spite of + noun/-ing form** *e.g.* ***Despite*** *the fact that monkeys are wild animals, they are easily trained.* ***In spite of*** *the fact that monkeys are wild animals, they are easily trained.*
- **While/whereas/however/but + clause** *e.g. Monkeys are wild animals* ***whereas*** *they are easily trained. Monkeys are wild animals* ***but*** *they are easily trained.*
- **Although + clause** *e.g.* ***Although*** *monkeys are wild animals, they are easily*
- **Though + clause** *e.g.****Though*** *monkeys are wild animals, they are easily trained. Monkeys are wild animals, they are easily trained* ***though.***

! Joining ideas – to add information we can use: **furthermore, moreover, also, as well as, etc.**

READING SKILLS (2)

1. **Read the text «From the History of National Parks» paying attention to the joining and contrasting words. Do they help express the ideas in the text logically?**

FROM THE HISTORY OF NATIONAL PARKS

The national parks of England and Wales are areas of relatively undeveloped landscape. **Despite** the name, national parks in England and Wales are quite different from those in many other countries, where national parks are owned and managed by the government as a protected community resource, **whereas** in England and Wales a national park can include settlements and land which remains largely in private ownership.

There are 12 national parks in England and Wales. Each park is operated by its own National Park Authority with two main purposes: to conserve and enhance the natural beauty and to promote opportunities for the understanding and enjoyment of the park by the public.

Before the 19th century, relatively wild, remote areas were often seen as uncivilized and dangerous. **However**, by the early 19th century romantic poets, such

as Byron wrote about the inspirational beauty of the untamed countryside. The idea for the formation of national parks was first proposed in the USA in the 1860s, where National Parks were set up to protect wilderness areas.

This model has been used in many countries since, **but** not in the United Kingdom. **Therefore,** Britain lacks natural areas of wilderness**. Furthermore**, those areas of natural beauty so cherished by the romantic poets were often only managed by human activity, usually agriculture.

In spite of this fact the National Park Authorities attract 110 million visitors each year. **Although** recreation and tourism bring many benefits to the area, it also brings a number of problems such as litter, damage to farmland, erosion, disturbance to wildlife, etc.

2. **Read the following words and remember to pronounce the letter Ii as the sound /ai/:**

Despite, quite, private, wild, uncivilized, idea, wilderness, united, in spite, wildlife.

3. **Join the sentences using the words in brackets.**

1. Dogs are domesticated. Wolves are wild. (**Whereas)**
2. He doesn`t approve of killing animals. He likes eating meat. (**Though)**
3. There has been an anti-litter campaign. People still drop litter in the streets. **(Despite**)
4. Whales are mammals. Crocodiles are reptiles. **(Whereas)**
5. Many people warned him that the river was polluted. He swam in it. (**In spite of the fact)**
6. They tried hard to save the whale. It died. **(However)**
7. Elephants are social animals. They are very intelligent. (**As well as)**
8. Cats are independent animals. They are amusing**. (Both/and)**
9. Dogs are friendly. They are loyal. **(Not only/also)**
10. This washing powder is efficient. It is environmentally friendly. **(Moreover**)

SPEAKING SKILLS

1. **Consult different reference books and sites in the Internet to find out some more information about national parks in other countries, *e.g.* (http://www.defra.gov.uk./wildlife-countryside/issues/landscap/natparks/index.htm).**

2. **Continue the lists given below.**

Canada:

- The Wood Buffalo National Park
- …….
- …….

USA:

- The Yellowstone National Park
- The Grand Canyon
- **…….**
- **…….**

Russia:

- **…….....**
- **……..**
- **…….**

England and Wales:

- **S**hotover Country Park
- **…….**
- **…….**

3. **Choose one of the national parks from exercise 2. Collect the material with your partners (in groups of 3-4 students) and make a presentation on it. You are to cover the following items:**

- The location of the national park;
- The reason for setting up the national park;
- The endangered or rare species in it;
- The description of the species;
- The type of nature in it;
- The conservation programs working in the national park ;
- The results of the work organized in the national park.

DEVELOPMENT OF GRAMMAR SKILLS
PAST SIMPLE AND PRESENT PERFECT TENSES

Study the grammar box.

PAST SIMPLE

! We use the Past Simple to talk about an action that happened at a particular point in the past. We often use past time expressions such as *yesterday, last week, and in + month/season/year.*

They **organized** a new campaign dedicated to the conservation of rare or endangered wildlife **in June**.

! Many verbs have an irregular Past Simple form, which has to be learnt separately:
Be – **was, were** fall – **fell** have – **had** take – **took** catch – **caught**

PRESENT PERFECT

! We use the Present Perfect to talk about an action that happened during a period of time from the past to the present. It is not important exactly when they occurred. ! We often use time expressions such as *this year/month/week, today or before.*
I **haven`t been** to a national park **before**.
It also describes a past action that has a result in the present.
We **have lost** more than one-quarter of the planet`s birds.

! We can use Present Perfect with ***for, since, yet, ever, never.***
For + period of time, to say how long a period of time lasted: for eight months, for two years, etc.
Since + point in a time, to say when a period of time started: since 2 o`clock, since 1993, since yesterday, etc.
Yet, to talk about things that we expect to happen; is used in negative sentences and in questions.
Ever is used in questions to mean at some time in a person` life.
Never is used in negative statements to mean not at any time in a person`s life.

GRAMMAR EXERCISES

1. Use the verbs given in the brackets in the Past Simple Tense.

1. The students …….. (Find) extremely important information about the Wildlife Conservation Society in the Internet last week.
2. England and Wales …… (Establish) the world`s first national park last century.
3. The research satellite ……not…….. (Provide) important data on the condition of the stratospheric ozone.
4. Worldwide cooperative action ……. (Begin) with data collection and scientific analysis in 1991.
5. They ……not…… (Discuss) some ideas about how to organize ecological education of different age groups at the meeting last month.
6. Yesterday we …….. (Arrange) a display of the posters on the world national parks and ……..select the best.
7. Most animal habitats ……. (Disappear) in this area some time ago, because the local authorities ……..not……. (Protect) them by the law.

8. The extinction of dinosaurs …… (Occur) millions of years ago.
9. Last century there …… (Be) many problems which …….. (Threaten) our environment.
10. The sky still brown with dust……. (Begin) to turn pale blue, the wind …… (Cease) its roar and peace once again …… (Spread) throughout the land.

2. Use the verbs given in the brackets in the Present Perfect Tense.

1. They …… …… (Set up) centers like the Chengdu Research Base to preserve the panda population.
2. For the last two decades human action …….. …… (Transform) between one-third and one-half on the entire land surface on the earth.
3. This is due to the city`s clean air program, which …… ……. (Make) the area smokeless and clean.
4. It`s known that they ……not…… (Begin) the Smoke Control Campaign yet.
5. In recent years, a lot of green organizations …… …… (Work) to protect valuable natural habitats throughout the country.
6. As a result, the Chinese government …….. …… (Decide) to protect 28 natural habitats.
7. As commerce and trade …….. ……. (Spread) dramatically in recent years, city residents consume resources not from the local areas but from around the world.
8. The winds of democracy that are blowing across the continents of the world ……. …….. (Bring) political and economic freedoms to millions of people.
9. We …….never……. (Take part) in public environmental campaigns, but we`d love to.
10. ……..he ever…….. (Think) about the consequences of his support of that political party?

3. Open the brackets in the following sentences and use the verbs in the correct form: the Past Simple or Present Perfect.

1. The new air quality standards, like the Clean Air Act in the USA…….. (reduce) the presence of some pollutants.
2. Rabbits probably …….. (originate) in Spain and southern France, but ……. (spread) to other western European countries, for their value as food and fur producers.
3. We …….. (postpone) the Conservation Society meeting this week, because the director is in Africa.

4. The Black Rat …….. (reach) Europe in ships in the thirteenth century and ……. (bring) with it the fleas which ……. (cause) plagues such as the Black Death.
5. Although the population growth …….. (slow), the absolute number of people continues to increase – by one billion every 13 years.
6. A society for the protection of the European Bisons…… (collect) them together and ……. (breed) from them, so that today the numbers …… (increase) to over eight hundred.
7. Today most developing countries with rapid population growth …….. (face) the need to improve their standards of living.
8. The European form of the Brown Bear is a woodland animal which once …… (occur) all over Europe.
9. In the last 50 years we ……. (lose) 300,000 species.
10. Between 1876 and 1929 the American Eastern Grey Squirrel …….. (appear) in England and since that time ……. (spread) into many other areas in Britain.

WHAT HAVE YOU LEARNED IN THIS UNIT?

Evaluate your progress on each of the items. Use the following symbols: S – satisfied with progress; D – still developing.

Professional Communication

1 You`ve read and found out about the world`s national parks and some endangered species.
2 You`ve practiced in making a presentation.

General Language Skills

1 You`ve improved your comprehension of new materials in grammar: present perfect and past simple.
2 You`ve learnt how to make your speech more logical using contrasting and joining words.
3 You have enriched your vocabulary on the topic and have memorized a lot of/ a few/ several new words.

UNIT 4
AIR POLLUTION

READING SKILLS (1)

1. Look at the title of the text 1. What do you expect to read?

2. Check the pronunciation of the highlighted words in the text with the help of your electronic dictionary and discuss their Russian equivalents with your partner.

TEXT 1

WHAT IS AIR POLLUTION?

Air pollution is a substance introduced into the air, like chemicals, biological **pollutants**, or particles which **damage environments** or **cause harm** to living organisms.

These pollutants can be caused both by stationary and moving sources. The examples of stationary sources are huge factories and coal and mining industries. However, more damaging sources of pollution are the moving ones, like different types of motor **vehicles.** These can include boats, cars, buses, trains, and aircrafts.

Pollution in the air is **harmful** to the environment and also to all of our bodies. If you continuously breathe in pollutants, it can lead to severe respiratory **disease** and even death. Air pollution is a major **cause** of lung cancer and heart disease. If you have respiratory problems, it is best to avoid living in areas that are near high traffic roads and large factories and plants.

People in big cities often **suffer from** smog. Smog is a form of outdoor pollution. Smog was born in Los Angeles, but today most cities have their own smog – and the problem is growing. Usually cities experience smog during summer months when **exhaust** from vehicles mixes with pollution from industries. During the cold months of the year cities can get a different kind of pollution such as carbon monoxide, or **particulate** air pollution. The reason for either type of air pollution in the city is temperature **inversion**. This inversion is caused when the air near the earth surface is much colder than the air right above it. Then the pollution can't rise and be **dispersed** away from the city.

Indoor air pollution may not sound too serious, but it contributes to some terrible diseases like asthma, respiratory infections, and even lung cancer. At home you can have a number of biological pollutants in your air, such as **bacteria, molds**, **pollen, viruses**, and **dust mites**. A major cause of indoor air pollution is cigarette smoke. Another cause of indoor air pollution is carbon monoxide. There are many

appliances in the home that use gas or wood as fuel, including heating systems which can **release carbon monoxide** into your home. Your furniture, walls, ceilings and floors can be made of dangerous materials which release harmful substances into the air. They are usually odorless and colorless but they can cause headache, fatigue, confusion and even death.

The best way to **improve** the quality of air at home is to follow some rules. For example, to help prevent the growth of various molds, you should keep the humidity levels of bathrooms, kitchens and basements low. You should also **ventilate** your rooms regularly and buy furniture made of ecologically- friendly materials.

COMPREHENSION CHECK

Read the text again and mark the following statements as true (T) or false (F).

1) Stationary sources of pollution are more damaging.
2) Smog is a form of both outdoor and indoor pollution.
3) The birthplace of smog is Los Angeles.
4) Temperature inversion is the cause of outdoor air pollution.
5) A major cause of indoor air pollution is cigarette smoke.
6) The most harmful pollutants which cause indoor air pollution are biological pollutants.
7) Heating systems at homes are completely safe.
8) Usually cities experience smog during winter months.
9) Particulate air pollution takes place because of cigarette smoke.
10) Smog is a problem of rural areas.

VOCABULARY DEVELOPMENT
WORD FORMATION

Study the theory box.

! Blending

A **blend word** or a **blend** is a word formed from parts of two or more other words. For example, *brunch* is a blend of ***br****eakfast* and ***l****unch*. *Smog* is a blend of ***sm****oke and* ***fog***.

1. **Look at the blend words given below and guess what words were used to form them:**

Edutainment; simulcast; cyborg; motel; foodoholic; fanzine; slanguage; Wiktionary; Eurasia; Amerenglish; acromania; bit; cinemaddict; chunnel; dramedy ;

detectifiction; faction; informercial; medicare; magalog; slimnastics; socialite; slanguist.

2. **Match the words and phrases from columns A and B to make word collocations. Use the collocations in the sentences of your own.**

A	B
1. disperse	a. inversion
2. suffer from	b. carbon monoxide
3. temperature	c. rooms
4. dust	d. air pollution
5. release	e. smog/ disease
6. improve	f. exhaust with pollution
7. ventilate	g. disease/ harm
8. particulate	h. quality of air
9. mix	i. vehicles
10. motor	j. mites
11. cause	k. pollution

GRAMMAR
CONDITIONAL SENTENCES

Study the grammar box.

Conditional 1 (real)	If the weather is fine tomorrow, we will go for a walk.	Do not use **future forms** after 'if, as soon as, when'
Conditional 2 (unreal)	If I were you, I would buy a new car. If we lived in the 18th century, we would wear long dresses. If he won a million in a lottery, he would stop working.	Use past forms after 'if' and infinitive after 'would'
Conditional 3 (unreal referring to the past)	If we had left home earlier, we would not have missed the train.	Use Past Perfect after 'if' and Present Perfect after 'would'

1. **Skim the text and find conditional sentences. Translate them into Russian. What type are they?**

2. Match the beginnings and the endings of conditional sentences.

1. If all countries of the world agreed to cut their emissions of the ozone-destroying chemicals,
2. If industries had to pay high fines for air pollution,
3. As soon as engine manufacturers improve their engines to meet the strict environmental standards,
4. If you are going to move, say, to Los Angeles,
5. If they hadn't lived near the chemical factory,
6. If people kept mould out of their homes,
7. If smoking in public places had been banned earlier,

a) They would not get sick.
b) You should know that it's a leading city in America for smog concentration.
c) They would use environmentally acceptable equipment.
d) Thousands of non-smokers would have avoided lung cancer.
e) The state of the ozone layer would be much better.
f) The quality of air will improve.
g) They would not have suffered from asthma.

3. Finish the sentences given below:

1. If I were a government member,
2. If we stopped using Freon in refrigerators and air conditioners,
3. If we didn't ventilate the rooms at our homes,
4. If the mankind invented new types of environmentally friendly fuel,
5. If I lived near the airport,

SPEAKING SKILLS DEVELOPMENT

Work in pairs. Choose one of the topics given below and make up a micro-dialogue with your partner. Use conditional sentences as many times as you can.

- Dangers of outdoor and indoor pollution.
- Causes of indoor pollution.
- Methods of fighting the indoor air pollution.

READING SKILLS (2)

1. Read the text to understand its content.

Human activities greatly affect our atmosphere. Air pollution from cars and other vehicles is making the hole in the ozone layer bigger and bigger, thus allowing too many dangerous rays through and subjecting people to health **hazards** and influencing our climate.

Aircraft **emissions** were recognized as a problem in the early 1980s, when interest in acid rain and ozone **depletion** increased. Though aviation contributes only 3% of the pollution from all transportation sources, the industry has introduced its own regulatory standards for both noise and pollution. Pollution by the aviation industry costs very much and will considerably increase if, as forecast, air travel triples by 2030.

Most of the estimated cost of aviation-related pollution comes from jet engine emissions of the **greenhouse gases** believed to cause global warming. There are four main types of emissions from aircraft engines: carbon monoxide (CO), unburned hydrocarbons (UHC), carbon dioxide (CO2) and nitrogen oxides (NOx). CO and UHC are produced in small quantities and are not considered significant emissions. CO2 is produced directly from the **combustion** of fuel. Modern engines have better fuel economy, and produce less CO2 than early jet engines.

NOx is the most significant emission. During an average flight, 80% of the pollution is NOx, produced by heating air to high temperatures as it passes through the engine combustion chamber.

Acting under the Clean Air Act, the Environmental Protection Agency requires chemical manufacturers to **reduce** airborne emissions of 111 **pollutants** by 88%. Manufacturers will have to introduce new technologies.

We have learned to expect bad news when we hear about our planet. However, environmental scientists finally have good news. **Ozone thinning** has decreased since a number of nations agreed to the Copenhagen Protocol.

The ozone layer is vital to the health of many organisms, including humans. It reduces the amount of **ultraviolet radiation** that reaches the Earth. Radiation exposure in humans causes severe medical conditions like cataracts and malignant melanomas. Radiation also causes the death of **phytoplankton**, which performs an important role in regulating atmospheric CO2. Naturally, we want to protect the ozone layer.

A few decades ago, scientists discovered that increased radiation was passing through ozone holes. They determined that compounds called CFCs **were** breaking down the ozone. The compounds were being released with the use of **Freon.** Theses

included **coolants** in refrigerators and **propellants** in spray cans, among other products. These products **depleted** the ozone layer at an alarming rate.

In response, many countries agreed to **phase out** these harmful products. Unfortunately, ozone **recovery** may be a slow process. Seasonal ozone depletion remains high in some areas. However, scientists are optimistic that ozone levels will return to normal in the next few decades.

COMPREHENSION CHECK

2. Read the text more carefully and choose the correct answers to the following questions.

1. What is the purpose of the text?
   - A. to encourage people to avoid using CFCs and propellants
   - B. to recommend government assistance with ozone recovery
   - C. to explain the importance of preserving the atmosphere
   - D. to describe treatments for radiation exposure
2. Which of the following is NOT a cause of ozone depletion?
   - A. Freon
   - B. coolants
   - C. propellants
   - D. radiation
3. According to the text, what is true about ozone recovery?
   - A. It may take a few decades.
   - B. It is easier with increased use of CFCs.
   - C. It is not likely to happen.
   - D. It will probably cause phytoplankton deaths.
4. Aircraft emissions were recognized as a problem in the early 1980s, because
   - A. pollution by the aviation industry costs very much
   - B. the aviation industry introduced its own regulatory standards
   - C. acid rain and ozone depletion became burning issues
   - D. aviation contributes 3% of the pollution from all transportation sources
5. Ecologists warn that the most harmful aviation-related pollution comes from
   - A. carbon monoxide
   - B. nitrogen oxides
   - C. carbon dioxide
   - D. unburned hydrocarbons

VOCABULARY DEVELOPMENT

1. **Match the words (1-8) with the definitions (A-H):**

1) CFC
2) Ozone
3) Deplete
4) Seasonal
5) Phase out
6) Phytoplankton
7) Ozone thinning
8) Ultraviolet radiation

A) The process in which the protective stratospheric layer becomes depleted
B) Powerful energy from the sun that is harmful at high levels
C) A compound that is used to make some coolants and propellants
D) Occurring at a particular time of year
E) To greatly reduce the amount of something
F) To gradually remove or stop something
G) A type of small plant that lives in water
H) A protective layer of oxygen in the atmosphere

2. Fill in the vocabulary table placing the following words and phrases under the correct headings:
Coolant; Freon; ozone layer; cataract; propellant; recovery; Copenhagen Protocol; malignant melanoma

Causes of ozone depletion	Effects of ozone depletion	Reversing ozone depletion

SPEAKING SKILLS DEVELOPMENT

1. **Find information about the legislation regulating air pollution in different countries of the world (e.g. the Clean Air Act, the Copenhagen protocol etc.)**
2. **Prepare a 2-minute report on what the International Cremation movement or 'The 30% Club" is. Find more information about other national and international societies and organizations which deal with problems of air pollution.**

WRITING

1. **Write an official letter encouraging a nation's President to sign the Copenhagen Protocol**. **Try to include the following items:**

- A change in the ozone layer
- Effects of the change
- How the protocol will improve the situation.

USEFUL VOCABULARY

Appliance (n) – прибор, устройство
Cause (v) – быть причиной, вызывать ч-л
Coolant (n) – охлаждающее вещество
Combustion (n) – сжигание
Deplete (v) – разрушать, истощать
Disperse (v) – развеивать, разгонять, распространять
Disease (n) – заболевание
Dust mite – пылевой клещ
Greenhouse gases – газы, вызывающие парниковый эффект
Hazard (n) – риск, угроза, опасный фактор
Harm (v) – вред, урон
Mould (n) – плесень
Ozone holes – озоновые дыры
Ozone thinning – истончение озонового слоя
Particulate (adj.) – состоящий из частиц
Phase out (v) – постепенно, поэтапно ликвидировать ч-л
Pollutant (n) – загрязнитель окружающей среды
Pollen (n) – пыльца
Propellant (n) – топливо для двигателей
Recovery (n) – восстановление
Inversion (n) – взаимная перестановка, перевертывание

WHAT HAVE YOU LEARNED IN THIS UNIT?

Evaluate your progress on each of the items. Use the following symbols: S – satisfied with progress, D – still developing

Professional Communication

1. You`ve read and learned about different types of air pollution, their causes and consequences.
2. You`ve learned how to write an official letter.

General Language Skills

1. You've learned how blend words are formed.
2. You`ve enriched your vocabulary on the topic.
3. You`ve learned how to make real and unreal conditional sentences and use them in your speech.

UNIT 5
ENVIRONMENTAL FACTORS

READING SKILLS

BIOTIC AND ABIOTIC FACTORS IN THE ENVIRONMENT

1. **Look at the title of the text «Biotic and Abiotic Factors in the Environment». What do you expect to read?**
2. **Check the pronunciation of the highlighted words in the text with the help of your electronic dictionary and discuss their Russian equivalents with your partner.**

A Environmental **factors** partly **determine** organism **distribution**, which means that organisms tend to live where the environment is suitable for them. Any feature affecting a living organism is called an environmental factor. Each kind of living things is **adapte**d to cope with a particular set of environmental factors. **Polar** bears, for example, can live in the **intense** cold of the **Arctic** because they possess a thick layer of fat beneath their skin to insulate their bodies. Poppies grow where the ground has recently been disturbed, because this is where their seeds can germinate easily. They cannot cope with the **constant** mowing on a lawn. The cold of the Arctic, the disturbance of **ground** and the mowing of a lawn are the examples of environmental factors.

B There are many different environmental factors; therefore, it is useful to **group** them. The two main groups are **biotic** factors, which are the influences of other living organisms, and **abiotic** factors, which are the influences of non-living parts of the environment. Abiotic factors include **climatic** factors, such as sunlight, humidity and **temperature**. Also important are **chemical** and **physical** factors, such as the amount of oxygen dissolved in a pond or stream, the amount of **hydrogen sulphide gas** in the air, or the pH of the water in the pond. Factors caused by the soil are also very important. They are called **edaphic** factors.

C Biotic factors include availability of food, and how many predators there are. **Parasites** and **pathogens** are very important biotic factors. Another is the amount of competition with other organisms for food, shelter, or anything else an organism needs. Although parasites usually have plenty of food, their lives are not always easy ones. The tapeworm, for example, has hooks and suckers on its head to grip to the wall of its host alimentary canal, so that not to be swept away by **peristalsis**. A pathogen is an organism which causes disease. The most important pathogens are **bacteria, viruses, fungi** and **protoctists.** A predator needs to be adapted to catch and kill its prey. But animals which are preyed on must also be adapted to **protect** themselves from their predators. Caddis fly larvae, for example, which may be **attacked** by dragonfly nymphs, build protective cases around their soft bodies.

D On a world scale, climate has a great influence on the kinds of plants and animals which can live in different areas. The two most important factors are temperature and rainfall. For example, in hot places with plenty of rainfall, a large variety of plants can thrive, and **tropical** rain forest is formed. This provides a very rich and varied environment for the large number and diversity of animals. In dry or desert areas, where plants and animals lose water by evaporation and cannot easily replace it, only a few of them are adapted to live in these conditions.

E The climate in a small space is called a **microclimate**, which can differ from the general climate in a particular area. For example, beneath the log humidity will probably be nearly 100%, whereas the air outside might be quite dry. Woodlice are not well adapted to **conserve** water, so they tend to stay under the cover during the day and come out at night when the air is cooler and more humid.

F Among chemical factors oxygen is known to be another abiotic factor of great importance. Most living things need oxygen for respiration. Aquatic organisms rely on oxygen dissolved in the water. Some of it will come from the air and some from water plants, which give off oxygen during **photosynthesis.** Shallow fast-flowing streams always have plenty of oxygen. Trout and salmon swimming very **actively**, need plenty of oxygen and can be found there. They are not found in deep, poorly oxygenated water.

G Light is very important for plants because they need it for **photosynthesis**. Many plants, such as poppies need as much light as they can get. Others, such as dog`s mercury are adapted to live in more shady places, so dog`s mercury can be found in woodland where it can **tolerate** the shade of the trees. By growing in the shade it avoids competition with other plants, which need more light.

3. **Read again and say which paragraph A – G describes:**

- ✓ Means of adaptation of the tapeworm
- ✓ How woodlice are adapted to the environment
- ✓ Some examples of abiotic factors
- ✓ What provides a rich biological diversity
- ✓ Why trout and salmon cannot be found in deep water
- ✓ In what way poppies are adapted to their environment
- ✓ Different plants which need different amount of light for their adaptation

4. **Read the text «Biotic and Abiotic Factors in the Environment» more carefully and say which statements are True/False.**

1. Tropical rainforest is formed under the conditions of low temperature and plenty of rainfall.
2. Parasites` lives are always easy because they usually have plenty of food.
3. Biotic factors are the influences of non-living parts of the environment.
4. Abiotic factors include only climatic factors.
5. Polar bears can live in the Arctic cold because they have a fat layer under their skin which protects them from extremely low temperatures.
6. Organism distribution is determined by environmental factors.
7. Lots of plants and animals can live in the areas where the amount of water is limited.
8. Aquatic organisms can`t get oxygen in the water and usually die.
9. Most plants need shady places for their distribution.
10. Woodlice are not well adapted to live in the humid microclimate.

VOCABULARY DEVELOPMENT

1. **Match the word in column A with the word in column B. Read and learn by heart the collocations formed. Get ready to write a terminological dictation.**

A **B**

Affect	the shade
Alimentary	in the rainforest
Availability	environment
Beneath	a lawn
Disturb	seeds
Diversity	an organism
Germinate	of plants and animals
Mow	the ground
Suitable	canal
Thrive	the skin
Tolerate	of food

2. **Complete the gaps in the following sentences with the appropriate words:**
Preys, competitions, factors, predators, microclimates, thrive, distribution, alimentary canal, light, pathogens.

1. The size of population of a ……may be affected by its prey.
2. It is usually very difficult to find out which environmental ……..are controlling the size of a population.
3……..happen whenever two or more organisms need the same thing, which is in short supply.
4…….and prey sometimes have important effects on each other`s population sizes.
5. The most important ……are bacteria and viruses.
6. The tapeworm has to protect itself from being digested by its host`s enzymes, so it has to grip to the wall of its host`s ……..
7. A very important environmental factor for plants is ……, because they need it for photosynthesis.
8. Environmental factors alone, cannot completely explain the …….of living organisms.
9. A large variety of plants can …….in the tropical rain forest.
10……..may be quite different from the general climate in a particular area.

3. **Match each term with its proper definition using the forms of the verb to be (is, are).**

a) Biotic factor	1) an influence on an organism caused by a non-living feature of its environment;
b) Parasite	2) a feature of an organism which enables it to live successfully in the environment;
c) Pollution	3) living in water;
d) Predator	4) an influence on an organism by other organisms;

e) Aquatic	5) an organism which lives in very close association with another and feeds on it;
f) Abiotic factor	6) an organism which causes disease;
g) Adaptation	7) the addition of harmful substances;
h) Pathogen	8) an animal which kills a prey for food;

USEFUL VOCABULARY

Alimentary (canal) (adj) – пищеварительный (тракт)
Availability (n) – доступность
Avoid (v) – избегать
Competition (n) – конкуренция
Determine (v) – определять
Dissolve (v) – растворяться
Distribution (n) – распространение
Disturb the ground (v) – перепахать землю
Diversity (n) – разнообразие
Germinate (v) – проращивать
Hooks (n) – крючки
Humidity (n) – влажность
Lawn (n) – газон, лужайка
Layer (n) – слой
Mow (v) – косить
Predator (n) – хищник
Prey (n) – жертва
Shade (n) – тень
Suckers (n) – присоски
Tolerate (v) – переносить

DEVELOPMENT OF GRAMMAR SKILLS
THE PARTICIPLE

Study the grammar box.
There are two types of participles in the English language.

! Participle1–причастие настоящего времени (Present Participle**)** *загрязняющий, растущий;*
деепричастие, e.g. загрязняя, выращивая.
It is formed with the help of the ending **– ing:** pollut**ing**, grow**ing.**

! Participle II – причастие прошедшего времени (Past Participle**)**
It is formed with the help of the ending –**ed** for Regular verbs**,** or **V3** for Irregular verbs, e.g. pollut**ed, grown.**

The Participle Forms Table

		Active Voice	Passive Voice
Participle I	non-perfect	Polluting – загрязняющий, загрязняя Growing – растущий, выращивая	Being polluted – будучи загрязненным Being grown – будучи выращенным
	Perfect	Having polluted – загрязнив Having grown – вырастив	Having been polluted – будучи загрязненным Having been grown – будучи выращенным
Participle II	Polluted – загрязняемый, загрязненный Grown – выращиваемый, выращенный		

GRAMMAR EXERCISES

1. **Use the appropriate participle form in the following sentences. Refer to the table in difficult cases.**

1. The malarial parasite (to control) by reducing the population of mosquitoes is still very common in some parts of the world.
2. Predators (to adapt) to catch and kill their prey have important effects on the prey population size.
3. (To be) a very important environmental factor for plants, light is necessary for photosynthesis.
4. Plants and animals (to adapt) to live in deserts are very few there.
5. Oxygen (to dissolve) in the water is available to aquatic organisms.
6. Factors (to cause) by the soil are called edaphic factors.
7. (To group) different environmental factors, scientists could explain the importance of each of them.
8. (To dry) a clay soil is difficult to break up.

9. Among other abiotic factors (to know) chemical factors, such as oxygen are of great importance for organisms` adaptation.
10. The earthworm (to add) humus to the soil can help to improve the soil for plant growth.

2. Using the given phrases, express the ideas in English. Refer to the table when it is necessary.

1. **To pollute the environment**

Загрязняя окружающую среду
Заводы, загрязняющие окружающую среду
Окружающая среда, загрязненная
Загрязнив окружающую среду

2. To group environmental factors

Экологи, группирующие факторы окружающей среды
Группируя факторы окружающей среды
Сгруппировав факторы окружающей среды
Факторы окружающей среды, сгруппированные

3. To oxygenate water

Насыщая воду кислородом
Растения, насыщающие воду кислородом
Вода, насыщенная кислородом
Окислив воду

4. To catch and kill a prey

Поймав и убив жертву
Жертва, пойманная и убитая хищником
Ловя и убивая жертву
Хищник, ловящий и убивающий жертву

5. To grip to the wall of the host`s alimentary canal

Крепко держась за стенку пищеварительного тракта хозяина
Паразит, крепко держащийся за стенку пищеварительного тракта хозяина
Стенка пищеварительного тракта хозяина, за которую крепко держится
Крепко прикрепившись к стенке пищеварительного тракта хозяина

6. **To cause disease**

Являясь причиной болезни

Явившись причиной болезни

Болезнь, вызванная патогеном

SPEAKING SKILLS

1. **Choose one block of questions A or B and prepare a report using the following questions as a plan.**

A

What is an environmental factor?

What is meant by a biotic factor?

What is meant by an abiotic factor?

What are edaphic factors?

What is a microclimate?

B

How do environmental factors affect living organisms?

What are the two most important factors influencing the type of vegetation found in the area?

Why are woodlice more active at night than in the daytime?

How are polar bears adapted to live in the intense cold of the Arctic?

Why do poppies grow where the ground has recently been disturbed?

2. **Work in two groups: group 1 is responsible for biotic factors, group 2 – for abiotic factors. Surf the Internet for getting more information. Create a group presentation of the material on your topic. Give 4 -5 examples of organisms` ways of adaptation.**

WRITING

1. **Study the two paragraphs. Underline the topic sentences. What additional information do the supporting sentences give?**

   A

   Pork and beef tapeworms are now very rare in Great Britain, because beef and pork are carefully inspected for bladder worms. For many years, any meat containing bladder worms has been banned from sale, so the tapeworm`s life cycle has been broken.

B

Head lice are well adapted to cope with their parasitic life style. Their flattened shape lets them lie close against the scalp or hair. Their eggs are cemented to hairs, and the adults` legs can grip to hair, so that they are not dislodged even when you wash or comb your hair.

2. **Which paragraph A or B describes the ways of adaptation of the living organisms? What are they? How many are they?**

3. **Write two paragraphs to describe at least three ways in which (a) the herring – (*сельдь)*; (b) the locust – (*саранча)* are adapted to their way of life.**

WHAT HAVE YOU LEARNED IN THIS UNIT?

Evaluate your progress on each of the items. Use the following symbols: S – satisfied with progress; D – still developing.

Professional Communication

1 You`ve read and found out about biotic and abiotic environmental factors and their influence on the ways of adaptation of different living organisms.

2 You`ve practiced in making a group presentation and a report on the professional topic.

3 You`ve practiced in writing paragraphs on the professional topic.

General Language Skills

1 You`ve improved your comprehension of new materials in grammar: the forms of the Participle.

2 You have enriched your vocabulary on the topic and have memorized a lot of/ a few/ several new words.

UNIT 6
MICROBIAL ECOLOGY

READING SKILLS (1)

1. **Look at the title of the text 1. What do you expect to read?**
2. **Check the pronunciation of the highlighted words in the text with the help of your electronic dictionary and discuss their Russian equivalents with your partner.**

TEXT 1

MICROBIAL ECOLOGY: WHAT IS IT?

Microbial ecology is an important study that looks at the relationship that the microorganisms living throughout the Earth have with the environment around them as well as their relationship with each other. In this study, all three major domains of life are considered. This includes **bacteria, archaea**, and **eukaryota** and also looks at **viruses.** These very small microorganisms are found in virtually all areas of the environment, including the most extreme conditions such as lakes of acid and deep within the ocean.

Microbial ecology is quite fascinating. This study focuses on the **composition** as well as the **physiology** of these **tiny beings.** In doing so, people seek to learn more about how they live and what they do that `affects the world around us. Most scientists believe that microorganisms cover the entire world in some form. Yet, knowing they are there is only the start. The fact is, it is **estimated** that scientists and researchers only know about a small **fraction** of them, just one percent.

These **diverse creatures** are powerfully important to the rest of the planet. Microbial ecology studies this importance. Microorganisms are known to be able to **withstand** some of the **harshest** of environments. For example, you can find them in high temperatures which are over 100 degrees C. Microorganisms have been found in geysers, in oil wells and in **high saline** locations, or water that is high in **alkalinity** or **acidity.**

The importance of these small creatures is **evident** in the way they affect the whole **biosphere**. They are often called the backbone of the zones where light is not found.

How is microbial ecology important to **conservation** and environment protection? There are several ways. For example, microorganisms are used in microbial **biodegrading**. They help to break down pollution that is found in soils and sediment. They can also be used in **marine** environments to improve the overall

quality of the location. Since they are able to degrade toxic waste, they are incredibly important.

A good example of how microbial ecology works is in **oil spill**. Since petroleum oil is a toxic chemical, and therefore destroys the environment, these organisms can be used to **rectify** the situation. They can rebuild the area by removing the oil pollution from the natural habitats.

Scientists dealing with microorganisms hope to be able to improve the overall well-being of the planet.

COMPREHENSION CHECK

1. **Look through the text carefully and find the answers to the following questions.**

- What types of living things are studied by microbial ecology?
- What makes microorganisms unique in terms of their environment?
- How can microorganisms be used to improve the environment?

VOCABULARY DEVELOPMENT

1. Match the terms from the text and their definitions:
Bacterium, archaea, eukaryote, virus, harsh, rectify, withstand, oil spill, biodegrade, microbe.

a. an extremely small living thing that you can only see under a microscope and that may cause disease;
b. to change back to a harmless natural state by the action of bacteria;
c. a small infectious agent that replicates only inside the living cells of an organism;
d. single-celled microorganisms which have no cell nucleus;
e. a type of biological cell, typically a few micrometres in length, has a number of shapes, ranging from spheres to rods and spirals;
f. an organisms whose cells have a nucleus enclosed within membranes, unlike prokaryotes (Bacteria and Archaea), which have no membrane-bound organelles;
g. severe, difficult;
h. to put right something that is wrong, improve;
i. to be strong enough not to be hurt or damaged by extreme conditions;
j. the amount of oil that comes out or falls out

2. Choose the correct option and complete the sentences:

1. In the home, pets can be carriers of …… for example, reptiles are commonly carriers of salmonella.

a. bacteria b. archaea c. eukaryote

2. Generally bacteria and … require a wet environment with a humidity of over 10 percent.

A archaea B viruses C eukaryote

3. Microorganisms can … all of our planet's environments, including some of the most extreme, from frozen environments and acidic lakes, to hydrothermal vents at the bottom of deepest oceans.

A rectify B withstand C survive

4. Some microbes are decomposers, with the ability to … other organisms' waste products.

A biodegrade B withstand C rectify

5. Marine life suffers greatly from ..... and microorganisms play a very important role in solving this problem.

A bacteria B oil spills C viruses

READING SKILLS (2)

VIRAL SOUP

1. **Read the text to understand its content.**

A. Researchers studying the bacteria that live in the ocean have long been troubled by one question: Given the **abundance** of the bacteria, and given that their marine predators can't possibly consume them as fast as they grow, why haven't bacterial colonies **saturated** the oceans? Two recent studies may have given the answer: the bacteria are held back by bacteria-killing viruses whose numbers are thousands of times greater than once thought.

B. The first study was conducted over the past two years by ecologists from the University of Bergen in Norway. Traveling to remote patches of ocean, they collected **samples** of unpolluted water, which they then spun at 100,000 times the force of gravity. With an electron microscope, they counted the virus particles that were sorted out and found that a milliliter of water can contain 100 million viruses.

C. The second study, by biological oceanographers Jed Fuhrman and Lita Proctor of the University of Southern California, was designed to see if these viruses are **infecting** a large number of oceanic bacteria. Fuhrman and Proctor concentrated the **organic matter** in 25 gallons of seawater (95 litres) down to a pinhead-size **pellet.** Then they sliced the pellet into sections. When they examined the sections under the microscope, they found a virtual viral epidemic – suggesting that viruses could be killing up to 70 percent of the oceans' bacteria.

D. The researchers believe that this scenario explains how nature keeps its bacteria under control. But what controls the viruses? “So many things kill viruses in the lab,” Proctor said, “that we have to assume something’s killing them in the sea. We just don’t know what.”

2. **Read the text again and name the paragraphs that**:

- present the research problem
- describe the research results
- contain the research conclusion

SPEAKING SKILLS DEVELOPMENT (1)

1. **Summarize the content of the text and prepare a 2-minute talk on what you`ve learned. Use the following phrases**:

- This text deals with…
- The text describes the research …
- The purpose of the research was to …
- It is reported that …
- The research results showed that …

VOCABULARY DEVELOPMENT

1. **Talking about research. Skim the text and write down all verbs that are used to describe the scientists’ work.**
2. **Find in the text Russian equivalents of the following words and phrases:**

Изучать; исследовать; проводить исследование; собирать образцы; подсчитывать; считать; обнаружить; объяснять; допускать; планировать исследование; полагать; сгустить органическое вещество.

DEVELOPMENT OF GRAMMAR SKILLS

Asking questions

Read about different types of questions in the English language.

1. **Yes/ No question:** ***Do*** you speak English? ***Can*** she drive? ***Will*** they come to the party?

2. **Alternative question:** ***Is*** he **a teacher or a student**? ***Can*** she play **the guitar or the violin?** ***Did*** Helen major **in biology or in ecology**?

3. **Wh-question: Where *do*** you study**? When *did*** they enter university**? How old *is*** your sister**? What *should*** I do**?**

4. **Tag question:**
   A. **+, – ?**
   You *are* a first-year student, ***aren't*** **you**?
   He *can* ride a bike, ***can't*** **he**?
   Helen graduated from university last year, ***didn't*** **she**?
   B. **—, + ?**

You *are not* a Master student, ***are*** **you**?
Peter *can't* speak French, ***can*** **he**?
The English *don't* drink much coffee, ***do*** **they**?

GRAMMAR EXERCISES

1. Add tags to the following sentences to make tag questions:

1. They are first-year students.
2. Helen majors in ecology.
3. They didn't take the test in history.
4. Ann will enter Moscow University.
5. You haven't met Boris.
6. Nick is doing a Bachelor course.
7. Sara has already translated the text.
8. Helen didn't study English at school.
9. Mike will go skiing in the Alps.
10. They won't be ready by 2 o'clock.

2. Ask wh-questions to the underlined parts of the sentences:

1. The term 'niche' was coined by the naturalist Joseph Grinnel <u>in 1917.</u>
2. The niche concept was popularized by <u>the zoologist G. Evelyn Hutchinson.</u>
3. The fundamental niche of a species includes <u>the total range of environmental conditions that are suitable for existence of a species.</u>
4. <u>The realized</u> niche describes the part of the fundamental niche which is actually occupied by the species.
5. <u>The niche of a plant</u> might include the range of temperatures that it can tolerate/ the intensity of light required for photosynthesis, specific humidity regimes, and minimum quantities of essential soil nutrients for uptake.

3. Ask alternative questions to the following sentences. Use the prompts given in brackets:

1. Helen likes green tea. (black tea)

2. Tom studied French at college. (English)
3. They major in biology. (ecology)
4. Ann is a first-year student. (second-year)
5. He has three classes on Friday. (four)
6. Mary plays the guitar. (the violin)

SPEAKING SKILLS DEVELOPMENT (2)

Role-play.
Press conference.
Get ready to take part in a press conference of ecologists who are going to discuss the results of recent studies at the universities of Bergen (Norway), and South California (the USA).
Roles:

- Ecologists from Bergen University – professor Breivik and professor Nesbo.
- Oceanographers from the University of Southern California – Jed Fuhrman and Lita Proctor.
- Journalists.

Journalists prepare questions to the scientists. Scientists answer the questions using the information from text 2.

USEFUL VOCABULARY

Abundance (n) – обилие, множество
Acidity (n) – кислотность
Alkalinity (n) – щёлочность
Archaea (n) – археи, архебактерии
Bacterium (pl. bacteria) (n) – бактерия
Biodegradation (n) – биоразложение
Composition (n) – состав
Conservation (n) – сохранение
Eukaryote (n) – эукариот
Estimate (v) – подсчитывать
Fraction (n) – частица
Harsh (adj.) – суровый
High saline – сильнозасоленный
Microbial (adj.) – микробиологический, состоящий из микроорганизмов, микробный
Oil spill – разлив нефти
Organic matter – органическое вещество
Pellet (n) – гранула

Physiology (n) – физиология
Rectify (v) – исправлять, улучшать
Sample (n) – образец
Saturate (v) – переполнять
Tiny beings – крошечные существа
Withstand (v) – выдерживать

WHAT HAVE YOU LEARNED IN THIS UNIT?

Evaluate your progress on each of the items. Use the following symbols: S – satisfied with progress, D – still developing

Professional Communication

1. You`ve read and learned about the microbial ecology.
2. You`ve learned how to talk about research.
3. You've learned how to ask about the results of research.

General Language Skills

1. You`ve practiced asking different types of questions.
2. You`ve enriched your vocabulary on the topic.
3. You've developed your speaking s

UNIT 7
HUMANS AND THE ENVIRONMENT

READING SKILLS (1)

5. **Look at the title of the text «Human Effects on the Environment». What do you expect to read?**
6. **Check the pronunciation of the highlighted words in the text with the help of your electronic dictionary and discuss their Russian equivalents with your partner.**

HUMAN EFFECTS ON THE ENVIRONMENT

A All living things affect the living and not living things around them. For example, earthworms make burrows and worm casts, which affect the soil and

therefore the plants living in it. Rabbit fleas carry the **virus** which causes **myxomatosis**, so they can affect the size of a rabbit **population** and perhaps the size of the fox population if the foxes depend on rabbits for food. Humans also affect the environment. Within the past 10000 years or so, this organism has had an enormous impact on the environment. Ever since humans learnt to hunt with weapons, to domesticate animals and to farm crops, we have been changing the environment around us in a very significant way by killing wild animals for food, decreasing their population, making some species extinct, cutting down forests and building cities, roads and dams. We also release harmful substances into the water, air and soil which results in water, air and soil pollution.

B High up in the Earth`s **atmosphere** between about 12 and 50 km above the ground is a layer of the **ozone gas.** An ozone molecule contains three oxygen **atoms**, so its **formula** is O_3. The **ultraviolet** light comes from the Sun. Most of it is **absorbed** by the ozone layer, so there is less of it in the lower layers of the atmosphere. What breaks the ozone down? This happens quite **naturally**. For example, one of the three oxygen atoms in an ozone molecule may **separate** from the others and then **combine** with another ozone molecule **to form** oxygen. Until quite recently, the rates at which ozone formed and broke down were about **equal**. The amount of ozone stayed about the same. But since the 1970s, the amount of ozone has been decreasing.

C Ozone is broken down by CFCs or **chlorofluorocarbons** which are very **stable, unreactive** and non-poisonous **chemicals.** They have a great variety of uses: as **coolants** in fridges, as **aerosol propellants** and for filling spaces in foam used to make **packaging** or **furniture**. It was a long time before anyone realized the harm that these seemingly harmless chemicals were doing. When CFCs escape from fridge cooling systems or from aerosols they find their way up to the level of the ozone layer. Chlorine is released from CFC molecules and reacts with ozone molecules speeding up the rate at which they break down. If the ozone layer is lost then we will have no natural protection from harmful ultraviolet reaction. The more we understand, the more we can do to prevent too much damage before it happens and keep the Earth a pleasant place for humans, plants and animals to live.

7. **Skim the paragraphs A, B, C and find an appropriate topic for each of them.**

Topics:	**Paragraphs:**
▪ Loss of natural protection	……
▪ Useful chemicals	……...
▪ Population interdependence	……
▪ Destroying the ozone layer	……

- Three atoms of oxygen ……
- Absorbing radiation ……

4. Read the text more carefully to answer the following questions.

1. Why is most ozone found in a layer high in the Earth`s atmosphere, rather than close to the ground?
2. What are CFCs?
3. What are CFCs used for?
4. How are CFCs damaging the ozone layer?
5. What gas can be released from CFCs?
6. What are the harmful effects which could occur if the ozone layer is destroyed?
7. What are the ways of protecting the ozone layer?
8. How do humans affect the environment?

5. Read again the text «Human Effects on the Environment» and say which statements are True/False/Not Given.

1. Building cities, roads and dams human civilization makes the Earth a better place to live.
2. Cutting down forests human civilization changes the environment for the worse.
3. The layer of the ozone is not higher than fifty kilometers above the ground in the Earth`s atmosphere.
4. By killing wild animals for food we do not increase their populations.
5. An ozone molecule formula is not different from an oxygen one.
6. The nature of ozone formation hasn`t been studied by scientists.
7. Chlorofluorocarbons are not poisonous substances.
8. CFCs are present in various spheres of our modern life.
9. The rate of breaking down the ozone molecules is decreased by the chlorine released by CFC molecules.
10. We can`t make the Earth a good place to live if we realize the danger of making harm to the ozone layer.

VOCABULARY DEVELOPMENT

PHRASAL VERBS – we often use verbs with these words: in, on, out, down, etc. But often these words (in, on, out, down, etc.) give a special meaning to a verb. For example:

- I was so tired this morning that I couldn`t **get up.**
- How did you **get on** in your examination yesterday?

The verbs** get up/get on **are phrasal verbs.

1. **Study the meanings of the following phrasal verbs formed from the verb *BREAK:***

Break down – to be destroyed, to stop working
Break into – to enter by force
Break off – to stop doing something suddenly
Break out – to escape from prison
Break up – to be closed on holidays

2. **Complete the sentences using an appropriate phrasal verb from exercise1.**

1. The ozone layer is …… by seemingly non-poisonous chemicals called chlorofluorocarbons.
2. The bus ……again that morning.
3. There isn`t going to be a wedding – they have ……their engagement.
4. The police …….the door and got into the house.
5. Burglars …… our house while we were on holidays.
6. The students passed their last examination and were happy to ……. for having their winter vacation.
7. The criminal managed to ……..of prison in a very unusual way.
8. Have you ever had problems because of something (a car or a device) …… at an inconvenient time?

3. **Complete the following sentences choosing the best appropriate word given below.**

Separate Damage Enormous Cause Layers Impact Harm Amount Happened Combine.

1. The biggest effect which living organisms have had on the environment …… about 1.500 million years ago.
2. Anaerobic organisms could only live in particular parts of the Earth which were oxygen-free, such as in deep ……..of mud.
3. Within the past 10000 years or so, another organism has had a great ……..on the environment.
4. Each of reactive individual oxygen atoms can …….with an oxygen molecule to form an ozone molecule.
5. Although alternative chemicals may not do any …….to the ozone layer, they may contribute to the greenhouse effect.
6. Even if everyone stopped producing and using CFCs, it would take about 100 years for the ……..of ozone to get back to normal.

7. In an ozone molecule, one of the three oxygen atoms may ……..from the others.
8. It was a long time before anyone realized the …….that chlorofluorocarbons were doing.
9. One effect ultraviolet light can have is to …….mutations because of damaging DNA in cells.
10. We cannot afford to do this ……..experiment with our planet!

PROBLEM PAIRS – pairs of words often confused, for example: affect/effect, prevent/avoid, etc.

Affect/effect

1. Complete the sentences using an appropriate word: affect/effect.

A) Deforestation ……..many species of animals and plants and threatens them with extinction.
B) CFCs have no …… on the rate of reforming the ozone molecules.
C) The punishment had no …… on him. As soon as he left prison he began to steal again.
D) Living organisms …… all living and not living things around them.
E) The new taxes will ……..the rich, they`ll have to pay more.
F) The new bus fares won`t …… me. I have a car.
G) The medicine had an immediate ……. . I felt better at once.
H) The greenhouse ……..caused by release of carbon dioxide can reduce the amount of fossil fuels.
I) People drink alcoholic drinks because they enjoy the ……that alcohol has on their nerves.

Prevent/avoid

2. Complete the sentences using an appropriate word: prevent/avoid.

A) The ozone layer …… the ultraviolet rays from getting them onto the surface of the Earth.
B) I try to ……..travelling in the rush hour. It`s so tiring.
C) The police managed to ……. the people from moving forward.
D) It is necessary to ……..careless use of insecticides and herbicides and develop alternative methods instead.
E) We must do something to ……. such a thing happening again.
F) Cryptozoic animals ……..staying under cover during the day and come out at night when the air is cooler and more humid.
G) Human ecology gives a better understanding of the human impact on the environment so that future destruction can be ……
H) Can we …….global warming?

USEFUL VOCABULARY

Affect (v) – влиять, воздействовать
Amount (n) – количество, объем
Avoid (v) – избегать, уклоняться
Break down (v) – разрушаться
Burrow (v) – рыть нору, ход
Cause (v) – вызывать, быть причиной
Combine (v) – объединяться
Damage (v) – повреждать, портить
Domesticate (v) – приручать, одомашнивать
Enormous (adj) – громадный, грандиозный
Harm (n) – вред
Happen (v) – случаться, происходить
Impact (n) – влияние, воздействие
Layer (n) – слой
Lead to (v) – приводить к
Prevent (v) – предотвращать, препятствовать
Rate (n) – скорость, темп
Result in (v) – приводить к
Seemingly (adv) – по внешнему виду, на вид, как будто
Separate (v) – отделяться, разделяться
Significant (adj) – важный, показательный
Speed up (v) – убыстрять, увеличиваться

GRAMMAR SKILLS DEVELOPMENT

Adjectives ending in – *ing* and – *ed*

There are many pairs of adjectives ending in – **ing** and – **ed.** For example: interest**ed** and interest**ing.**

! Someone is –ed

! Something is –ing

Tom is **interested** in some environmental issues.
Tom finds environmental issues **interesting**.

1. **Form pairs of adjectives ending in –*ing* and –*ed* from the verbs given below. Give their Russian equivalents.**

Amaze Astonish Excite Fascinate Shock Horrify Terrify Depress Worry Satisfy Tire Exhaust Devastate Damage.

2. Choose the right adjective.

1. We were all (*horrifying/horrified)* when we heard about the ecological catastrophe in the sea.
2. Human ecology is a (*fascinated/fascinating)* study that is designed to improve the quality of life.
3. Ultraviolet light is very (*damaged/damaging).*
4. Most rainforests grow in (*developed/developing)* countries, where many of the people are very poor.
5. It was a really (*terrifying/terrified)* experience. Afterwards everybody was very (*shocked/shocking).*
6. The size of (*existing/existed)* fish populations must be estimated, which is very difficult to do.
7. They carried out an experiment and were extremely (*interested/interesting)* in getting (*amazed/amazing)* results.
8. These losses could have a (*devastating/devastated)* effect on the earth in the nearest future.
9. The study of global ecology is (*amazing/amazed),* because it studies everything from the largest mammals to the smallest microorganisms.
10. Even an (*annoyed/annoying)* insect has a purpose and helps to shape the future generations on the earth.

READING SKILLS (2)

1. Read the dialogue between Dr. Cowmeadow and Mary and state what the subject of the conversation is.

1. Global warming
2. Deforestation
3. Water pollution
4. The ozone layer

Mary: Excuse me, Dr. Cowmeadow…
Dr.: Yes?
Mary: I`m Mary Smith, a journalist… writing for *Nature.* How are you?
Dr.: Fine, thanks. How are you? Can I be of any help?
Mary: You see. I am writing an article about rainforests. It`s commonly known that you are the best expert in this field, so you could probably answer some of my questions?
Dr.: I`d be glad to. What exactly are you interested in?
Mary: First, I`d like to know if the much discussed loss of rainforests is really the

disaster of our time? I mean…. Most concern about deforestation….

Dr.: Well, a rainforest is a special place, full of many different species of plants and animals. More different species live in a small area of rainforest than in an equivalent area of any other habitat in the world. We say that rainforests have high species diversity.

Mary: May I interrupt you for a moment, Dr. Cowmeadow? What happens when an area of rainforest is cut down?

Dr.: When an area of rainforest is cut down, the soil under the trees is exposed to the rain. The soil of a rainforest is very thin, so it is quickly washed away and it loses its cover of plants. The soil can also be washed into rivers , filling up the river bed and causing flooding.

Mary: I see. But how does deforestation threaten different species of plants and animals?

Dr.: The loss of part of a rainforest means a loss of a habitat for many species of animals. Even if small areas of forest are left as reserves, these may not be large enough to support a breeding population of the animals, which leads to the threat of extinction.

Mary: Yes, but humans have always cut down trees, because wood is an excellent fuel and building material. Are there any other reasons for cutting down?

Dr.: The land on which trees grow can be used for growing crops for food, or for sale. **As** most rainforests grow in developing countries, where many of the people are very poor, they may cut down the forests to clear land on which they can grow food to keep their family alive.

Mary: Can developed countries help to prevent the loss of rainforests?

Pr.: Right! What`s more, international conservational groups such as WWF, and governments of the USA and the UK, can help by providing funds to the people or governments of developing countries or alternative sources of income. Many of the most successful projects involve showing how the people can actually make use of the rainforest in a sustainable way.

Mary: Thank you, Dr. Cowmeadow, you`ve helped me a great deal.

Dr.: You`re welcome.

2. **Read the dialogue again and write out the questions on the part of Mary. Ask your partner the questions you`ve written out and let him/her answer them.**
3. **Make up your own dialogue on the problems of rainforest. Use some expressions on the part of Mary and Dr. Cowmeadow. Act the dialogue out before the group.**

LISTENING SKILLS

You will hear a radio interview with John Burgess, a member of the Forest Preservation Society. Read the following sentences, then listen to the tape and fill in the missing parts.

- Paper is used in many different forms – from ……**1** to milk cartons.
- We need more paper than we can ……**2.**
- One way of increasing paper production is to grow……**3.**
- Trees grow much faster in ……..**4** areas.
- A tree planted in Brazil can be harvested within ……**5** years.
- Most plantations are in ……..**6.**
- The trees in these plantations are used only for …….**7** which means that no natural forests need to be ……..**8.**
- What we should be trying to do is to restore and preserve ……**9** and to use less ……..**10.**

(Based on Enterprise 4 Coursebook by Virginia Evans – Jenny Doodley)

WRITING SKILLS DEVELOPMENT

Writing a gist

! To write a gist means to render a text or texts in order to represent the main content of the material you have read. You may also include your personal judgments, thoughts or any other ideas into the gist.

1. **Study the reading material (1) and (2) of the Unit very carefully. Write a gist on the professional topic «Human Influence on the Environment».**

Here`s the gist ……..**.....**

(200 – 250 words)

SPEAKING SKILLS

1. **When you describe the type of environmental damage you have to mention causes and results of it. Match the following types of environmental damage with causes and results.**

Types of damage:

- Acid rain can deteriorate the water in lakes and rivers.
- The ozone layer is broken down.
- Many species of animals lose their habitat.

- Eutrophication destructs our lakes and rivers.
- Deforestation threatens many species of plants and animals with extinction.
- The enhanced greenhouse effect provides unfavorable conditions for climate changes.
- Some pesticides did a lot of damage to the environment.

Causes:

1. Sulphur dioxide and nitrogen oxides released from burning fossil fuels.
2. The loss of habitat.
3. Sewage and fertilizers running into streams.
4. Release of carbon dioxide, methane, CFCs and nitrogen oxides into the atmosphere.
5. Careless use of insecticides and herbicides.
6. The destruction of forests, especially rainforests for wood.
7. CFCs still used in our everyday life.

Results:

A) The reduction of breeding populations of animals in future.
B) The rise of temperature in many parts of the world.
C) The risk of catching a wide variety of diseases.
D) The acidity of water which will kill plants and animals living in it.
E) The damage of DNA in cells, causing mutations.
F) The loss of species diversity.
G) The water contaminated with harmful bacteria.

2. Make sentences about each type of damage, describing how it came and what result can be. Use the following phrases:

Causes:

This is the result of…….
This is largely due to ……
This is because of ……..

Results:

As a result, we will have……..
It may lead to …….
It could result in ……

***For example**:*

In recent years there has been increasing concern about the threat to fish populations. **This is largely due to** overfishing that got worse. **As a result, we will have** smaller populations of most of the species used for food.

WHAT HAVE YOU LEARNED IN THIS UNIT?

Evaluate your progress on each of the items. Use the following symbols: S – satisfied with progress; D – still developing.

Professional Communication

1 You`ve read and found out about human effects on the environment, problems of rainforest.

2 You`ve practiced in acting out a dialogue on the professional topic.

3 You`ve practiced in listening on the problem of deforestation.

4 You`ve practiced in writing a gist on the professional topic.

General Language Skills

1 You`ve improved your comprehension of new materials in grammar: adjectives ending in –ing and – ed

2 You have enriched your vocabulary on the topic and have memorized a lot of/ a few/ several new words.

UNIT 8
ECOLOGICAL NICHE

READING SKILLS (1)

1. Look at the title of the text 1. What do you expect to read?

2. Check the pronunciation of the highlighted words in the text with the help of your electronic dictionary and discuss their Russian equivalents with your partner.

What is niche?

1. **'Niche'** is a term that refers to a life-role, or job-description, or one species' position in the **community.** A niche is the role that a particular organism plays in an **ecosystem**, including the resources it consumes, the way it reproduces, and its effect on other organisms.

2. The term 'niche' was coined by an American naturalist Joseph Grinnell in 1917, in his paper "The niche relationships of the California Thrasher". However, the first working definition of the niche concept was given in 1927 by Charles Elton, a British ecologist. The niche concept was popularized by the zoologist G. Evelyn Hutchinson in 1957. Hutchinson wanted to know why there are so many different types of organisms in any one habitat.

3. The description of a niche may include descriptions of the organism's life history, habitat, and place in the **food chain.** According to the **competitive exclusion principle,** no two species can occupy the same niche in the same environment for a long time.

4. Different species can hold similar niches in different locations and the same species may occupy different niches in different locations. For instance, (1) … Once a niche is left vacant, other organisms can fill into that position. For example, (2) … When plants and animals are introduced into a new environment, they can occupy the new niches or niches of native organisms, **outcompete** the indigenous species, and become a serious **pest.**

5. A useful extension of the niche concept is the distinction between **fundamental and realized niches.** The full range of environmental conditions (biological and physical) under which an organism can exist describes its fundamental niche. As a result of pressure from, and interactions with, other organisms (e.g. (3)…) species are usually forced **to occupy a niche** that is narrower than this and to which they **are** mostly highly **adapted.** This is termed the realized niche. G.H.Hutchinson also defined the ecological niche as a "Hypervolume". This term defines the multi-dimensional space of resources (i. e., (4) …) available to (and specifically used by) organisms.

COMPREHENSION CHECK

1. **Read the text more carefully and state what part(s) of the text match the following headings:**
   - The history of the term 'niche' is described
   - Different types of niches are described
   - Definition of the term 'niche' is given?

2. **Some of the examples were removed from the text. What ideas do they illustrate? Put them back to the paragraphs where they best fit.**
   a. Superior competitions
   b. The niche that was left vacant by the extinction of the tarpan has been filled by other animals (in particular a small home breed, the konik).
   c. The Australian grasslands species, though different from those of the Great Plains grasslands, occupy the same niche.
   d. Light, nutrients, structure, etc.

VOCABULARY DEVELOPMENT

1. **Skim the text and write down all verbs and adjectives which can be used with the word 'niche'. Use the collocations in the sentences of your own.**
2. **Match words and their definitions.**

a. ecosystem; b. community; c. niche; d. pest; e. interaction; f. food chain

1. all the plants and living creatures in a particular area considered in relation to their physical environment (a)
2. a series of living creatures in which each type of creature feeds on the one below it in the series (f)
3. the conditions of environment within which a particular type of living thing can live successfully (c)
4. a group of plants and animals growing or living in the same place or environment (b)
5. producing an effect on each other (e)
6. a living creature that destroys plants, food etc.

DEVELOPMENT OF GRAMMAR SKILLS

Modals and their equivalents

Meaning	Modal	Modal equivalent(s)
Ability	Can	Be able to
Permission	May, can	Be allowed to
Necessity, obligation	Must	Have to (necessity because of rules or situation), be to (about time-tables, programmes etc.)
Absence of necessity	Don't have to, needn't	
Advice, recommendation, opinion	Should	Ought to (more formal than 'should', often used to refer to moral issues)
Prohibition	Mustn't, can't	

GRAMMAR EXERCISES

Choose the best option.

1. She *must/ has to/ should* work part-time to pay for her education.
2. They *mustn't/ don't have to/ can't* take the bus to get to the university. They live nearby.
3. Ann *could/ might/was able to* read and write at the age of 5.
4. She *could/ was able to / was allowed to* come later because she went to the doctor.
5. We *mustn't / can't/needn't* buy the textbooks because we borrow them at the library.
6. I *am not able to/ can't* ride a bike.
7. *Can/ may/should* I take your pen?
8. She *may/ should/ could* join the drama club. She wants to become an actress.
9. He was a good swimmer and *could/was able to/might* swim across the Kama river.
10. The 1st of May is a day off. We *mustn't/ won't be able to/ don't have to* go to University.
11. Mary *could/ should/ has to* wear a uniform at work every day.
12. We *won't be allowed to/ won't be able to* visit Helen at the hospital because we are not her family members.
13. My Mum *has to/ must* do all the housework.
14. Our teacher says we *can/will be able to* speak English well in 3 years.
15. You *can't/ shouldn't* use your notes during examination.
16. They *had to/ were able to/ could* spend the weekend at home because the weather was nasty.
17. *Can/ may/could* you give me a pen, please?
18. *Can/ may/could* I open the window?
19. Peter *can't/ is not able to* ride a bike.
20. Younger generations *should/ ought to* take care of elderly people.

Make the following sentences negative:

1. They have to wear a uniform at school.
2. We must translate this text at home.
3. He could play the guitar at the age of 7.
4. You can smoke in special places outside the university campus.
5. We will be allowed to invite our parents to the party.

Correct the mistakes in the sentences given below:

1. Am I able to bring my friends to your birthday party?
2. She hasn't to get up early. Her classes begin at 13.30
3. He may to come later after work .

4. You can speak English so you'll be allowed to understand the article from the English paper.
5. You may not smoke in public places
6. Could I open the window?
7. She ought consult the doctor.
8. The historians didn't able to find Atlantida.
9. My uncle don't have to work. He is very rich .
10. Could I take your textbook, please?

READING SKILLS (2)

1. **Read the text and prove the importance of the concept of the ecological niche. Illustrate it with some examples: a) determine the oak trees' habitat and 'profession'; b) define the ecological niche of hedgehogs.**

The Concept of the Ecological Niche

The concept of the ecological niche is very important. It helps to understand how organisms in an ecosystem interact with each other. American ecologist H.T. Odum (1924 – 2002) describes this concept in the following way.

The ecological niche of an organism depends not only on where it lives but also on what it does. By analogy, it may be said that the habitat is the organism's "address", and the niche is its "profession", biologically speaking.

Here are a few examples to help you understand what ecologists mean when they use the term 'niche'. Oak trees live in oak woodlands. The oak woodland is the habitat. So if H.T. Odum was writing a letter to an oak tree he would address the letter to:

Sir Deciduous Oak Tree,
The Oak Forest,
England,
U. K.

What do oak trees do? If you can answer that `question you know the oak trees 'profession' or their ecological niche. Perhaps you think that oak trees just stand there looking pretty and not doing very much, but think about it.

Oak trees:

1) absorb sunlight by photosynthesis;
2) absorb water and mineral salts from the soil;
3) provide shelter for many animals and other plants;

4) act as a support for creeping plants;
5) serve as a source of food for animals;
6) cover the ground with dead leaves in autumn.

These six things are the 'profession' or ecological niche of the oak tree. You can think of it as being a kind of job description. If the oak trees were cut down or destroyed by fire or storms they would no longer be doing their job and this would have a disastrous effect on all the other organisms living in the same habitat.

Hedgehogs in the garden also have an ecological niche. They rummage about in the flowerbeds eating a variety of insects and other **invertebrates** which live underneath the dead leaves and twigs in the flowerbeds. That is their 'profession'. They are covered in sharp spines which protect them from predators, so being caught and eaten is not a part of their job description.

Hedgehogs put nitrogen back into the soil when they urinate. It helps the plants. They also eat slugs, and that reduces the effect which slugs have on the flowers.

So the idea of an ecological niche is very simple. You just need to know, where the animal or plant lives and what it does.

SPEAKING SKILLS
Illustrating Your Point

In conversation we often need to illustrate what we are saying with an example. Look at the list of words used to illustrate your point.

- For example
- For instance
- Take the way (he) …
- Take the example …
- For one thing …
- To give you an idea …
- Look at the way …
- By way of illustration … (formal, used only for official meetings etc.)

4. Choose a plant or an animal and describe their niches using the metaphor offered by H.T.Odum. Use the phrases from the list above to give examples.

LISTENING SKILLS

(Based on Macmillan Guide to Science, 2012, Unit 1.)

1. **Listen to part of a TV program about climate change. Then decide if the following statements are true or false.**
   A. The report suggests there are reasons for hope as well as worry.
   B. In the past, ice ages and droughts killed off all life.
   C. Temperatures are rising by five degrees every century.
   D. Some plants and animals move as climates become warmer.
   E. There are mountain animals that will die if temperatures rise.

2. **Listen to the program again and fill the gaps in the summary below:**

1. Today we're considering how worried we should be about …
2. Climatic change does not always affect …to the point of disaster.
3. Animals and plants are very …
4. A severe lack of …completely destroyed some types of animals and plants.
5. Wildlife survives extreme climate conditions by …
6. Recent studies have shown rising global temperatures on average about … Centigrade.
7. Today rising temperatures is happening much …than in previous centuries.
8. Climate change makes it necessary for animals and plants to find …
9. It was observed in … that plants are moving up …metres.
10. Some mountain animals cannot survive in …

USEFUL VOCABULARY

Adaptable (adj.) – способный адаптироваться
Be adapted to – быть приспособленным к
Community (n) – сообщество
Competitive exclusion – конкурентное вытеснение
Extinct (adj.) – вымерший
Food chain – пищевая цепочка
Influence (v) – воздействовать
Interaction (n) – взаимодействие
Outcompete (v) – вытеснить, победить в конкурентной борьбе
Pest (n) – вредитель
Survive (v) – выжить

WHAT HAVE YOU LEARNED IN THIS UNIT?

Evaluate your progress on each of the items. Use the following symbols: S – satisfied with progress, D – still developing

Professional Communication

1. You`ve read and learned about the ecological niche.
2. You`ve learned how to illustrate your narration with examples.

General Language Skills

1. You`ve practiced the usage of modals and their equivalents.
2. You`ve enriched your vocabulary on the topic.
3. You've developed your listening skills.

UNIT 9
WATER POLLUTION

READING SKILLS (1)

The Water Crisis

8. **Look at the title of the text «The Water Crisis». What do you expect to read?**
9. **Check the pronunciation of the highlighted words in the text with the help of your electronic dictionary and discuss their Russian equivalents with your partner.**

A One of the most urgent **problems** in the world today is the shortage of the clean water. Access to clean water is the basic **human** right. But acid rain, industrial pollution and sewage dumping, oil spills have made water undrinkable. According to the UN, nowadays 40 per cent of the world has no access to clean water, and as **industrial** and agricultural development **escalates**, the **situation** is deteriorating. Worldwide demand for water is doubling every 21 years, and even more in some countries.

B The demand for water in many countries simply outruns the supply. Water is likely to become a growing source of tension and competition between **nations.** There are large differences in **per capita** water consumption between different countries. In some countries people are surviving on the daily ration **equal** to a

bucket of water, while an average American citizen uses 1000 litres of water a day. The shortage of drinking water could affect one-third of the world by 2025.

C According to the UN **Commission** on Water more than half the world`s rivers are going to dry or be polluted in the 21st century, which is posing a threat to the health and lives of the people who depend on rivers for **irrigation**, drinking and industrial water. The healthiest rivers are the **Amazon** in South America and the **Congo** in the Saharan Africa. But the Yellow River in China is severely polluted, 90 per cent of the flow of the **Nile** River is full of irrigation **drainage** and industrial and **municipal** waste. The **Amur**`s and **Syr Darya**`s waters flowing into the Aral Sea in Asia have been reduced by three quarters, which caused a **catastrophic regression** of the sea level. The Aral Sea is just a quarter of the size it was 50 years ago and suffers from the increased salinity.

D Lake **Baikal** in **Siberia** with the depth of more than a **mile**, **contains** one-fifth of the world`s fresh water **resources.** The **local** people call it the Holy Sea. It **contains** a great variety of animals and plants, including 1,300 rare **endemic** species. It was **declared** a World Heritage Site in 1996. Now the environment around Lake Baikal is being endangered not only because of **massive** volumes of **industrial** effluents, but by a joint **Russian-Chinese** pipeline **construction** in the **region,** which will pipe 30 **tons** of crude oil every year.

1. **Add these sentences to the end of the paragraphs (A-D) where they fit best.**

1 ……
Thus, the world`s natural underground reservoirs are diminishing very rapidly.
2……
We are running out of something no one can live without.
3……...
The North of Africa and the Middle East, Northern China, Western and Southern India, a part of Pakistan, South America and much of Mexico all face water scarcity.
4…….
The sea is drying into a huge salt plain that cause dust storms, spread diseases and severely damage agriculture.

2. **Read again the text «The Water Crisis» and say which statements are True/False.**

1. Because of the rapid industrial and agricultural development the water situation is not going to improve.
2. At present the Aral Sea is half its size that it was 50 years ago.

3. Most polluted rivers are the Amazon in South America and the Congo in the Saharan Africa.
4. The threat is going to be posed to the people whose life depends on rivers.
5. There are some people in the world who consume only ten litres of water each day.
6. Water consumption per capita does not differ from country to country.
7. Lake Baikal is very rich in the endemic plant and animal species.
8. The shortage of drinking water will influence on the life of one-third of the world population in the nearest future.
9. Sewage dumping, oil spills, industrial pollution have made water dangerous to drink.
10. The irrigation drainage is making water in the Nile clean and drinkable.

VOCABULARY DEVELOPMENT

1. **Form collocations by adding the word *water* to the following. Find out their Russian equivalents and learn them by heart.**

   - Shortage of clean…….
   - Access to clean ……
   - Contamination of ……
   - ……scarcity
   - Demand for ……..
   - To experience ……..shortage
   - …….pollution
   - ……consumption
   - Drinking …….
   - To run out of …….

2. **Use the collocations with the word *water* from the exercise above in the following situations.**

1. …….of water occurs with oil occurs when water is injected into oil wells to increase the production.
2. Technological catastrophes are among extremely appalling sources of water ……
3. Lake Erie is not considered to be suitable for human water ……
4. Worldwide ……..for water is doubling every 21 years.
5. Every country in North Africa is……water ……as well as India, Pakistan, Mexico and others.

6. Lake Baikal in Russia contains one-fifth of the world`s …….water ……
7. …….to ……water is one of the basic human rights and the most important problem at the moment.
8. Nowadays forty per cent of the world are suffering from water …….. because of the industrial development everywhere.
9. ……..water is still of bad quality and in some cases it can cause serious diseases.
10. People are ……out of water no one can live without it.

USEFUL VOCABULARY

Access (n) – доступ
Appalling (adj) – ужасающий
Demand (n) – потребность, нужда
Deteriorate (v) – ухудшаться, портиться
Diminish (v) – уменьшаться, убавляться
Disease (n) – болезнь
Drainage (n) – канализация, сток
Dumping (n) – свалка мусора
Effluent (n) – промышленный сток
Evidence (n) – основание, доказательство
Experience (v) – испытывать, знать по опыту
Quality (n) – качество
Rapidly (adv) – быстро
Run out of (v) – истощить свой запас
Salinity (n) – соленость
Scarcity (n) – недостаток, нехватка
Sewage (n) – сточные воды, нечистоты
Shortage (n) – нехватка, недостаток
Spill (n) – пролив (нефти)
Urgent (adj) – настоятельный, крайне необходимый

DEVELOPMENT OF GRAMMAR SKILLS
PRESENT PROGRESSIVE (ACTIVE AND PASSIVE)

Study the grammar box.

ACTIVE

I **am**
He/she/it **is** + **– ing (**gett**ing,** increas**ing,** reduc**ing,** etc.**)**
We/you/they **are**

PASSIVE

I **am**
He/she/it **is** + be**ing** + **V3**
We/you/they **are**

! We use present progressive when we talk about **changing.**

Is the population of the world ris**ing** very fast?

The environmental situation is bad in this region and it **is** gett**ing** worse.

! When we are talking about what we have already arranged to do, use the present progressive, i.e. actions **with a future meaning.**

They **are** meet**ing** a group of environmentalists from Great Britain at the railway station **tomorrow.**

GRAMMAR EXERCISES

1. **Complete the following sentences using one of the verbs in the Present Progressive Tense.**
   Reduce Increase Suffer Replace Demonstrate Face Dry Grow Drop Advance Get Come Diminish.

1. The concern about the safety and quality of drinking water ……. .
2. The research in the field of recovering from oil spills ……..steadily.
3. The risk for ground water ……from toxic leakage around waste-disposal facilities.
4. Today many countries ……surface water contaminated with sewage by ground water as a safe source of drinking water.
5. The number of dangerous chemicals …….not ……. in the contaminated drinking water.
6. The world`s natural underground reservoirs …… rapidly.
7. They ……..a film on ecological problems in the lecture room tomorrow.

8. The ground water levels ……up to 10 feet nowadays each year, largely due to irrigation.
9. The sea ……..into a huge salt plain as it……..from increased salinity.
10. More people ……..to know more about bats and …….to love and value them.

2. **Express the following ideas in the present progressive passive.**

1. The professor **is examining** our group next Monday.
2. What film **are** they **demonstrating** in the lecture room?
3. More than 3 billion people **are experiencing** drinking water shortage nowadays.
4. They **are increasing** the production of oil from oil shale because it is needed by many countries in the world.
5. Nowadays not only conservation experts **are carrying out** work at nature reserves.
6. The members of the National Rivers Protection group **are meeting** new conservation volunteers next weekend to work in the Oxford area.
7. At present most rivers **are posing** a threat to human health.
8. More and more people **are joining** the Oxford Urban Group to learn about different environmental issues.
9. This summer we **are creating** a pond to encourage frogs and dragonflies to breed.
10. Little by little the world **is approaching** the water crisis.

GEOGRAPHICAL NAMES WITH/WITHOUT *THE*

Study the theory box.

! **Continents, countries** do not have ***the*** in their names:
Africa (not: the Africa), Asia, Europe, South Africa
Japan, Nigeria, West Germany, England, France

! **Lakes** usually have names without ***the:***
Lake Baikal, Lake Ontario, Lake Superior

! **Oceans/seas/rivers/canals** usually have ***the:***
The Atlantic Ocean, the Indian Ocean
The Black Sea, the Mediterranean Sea
The Kama, the Volga, the Nile, the Amazon
The Panama Canal, the Suez Canal

! **Regions** usually have ***the:***
The Middle East, the Far East

The north of England, the south of Spain, the west of Canada

! **But**: northern England, southern Spain, western Canada – without ***the***

GRAMMAR EXERCISES

1. **Complete the following sentences by adding *the* or – (for no article).**

1 ……..Nile is the longest river in ……..Africa.
2 …….Africa is much larger than ……..Europe.
3 The name of the canal between ……England and …….France is …….English Channel.
4 ……. Panama Canal joins……Atlantic and……Pacific oceans.
5 …….Danube flows through ….Vienna, …… Budapest and …….. Belgrade.
6 ……is situated in ……..South America.
7 ……Asia is the largest continent.
8 ……Volga is considered to be the greatest Russian river.
9 The name of the sea between ……Africa and ……..Europe is …….Mediterranean Sea.
10 …….Amur and …….Syr Darya flows into ……..Aral Sea.

SPEAKING SKILLS (1)

1. **Discuss the following questions with your partners in groups of 3-4 students.**

1. What per cent of water is consumed properly in Russia: 17%, 30%, 50%, 75%?
2. What are the possible ways of improving the situation?
3. How would you characterize the water consumption in Russia in comparison with Great Britain, the USA, etc.?
4. What do you know about the quality of water in the place of your residence?
5. Have you ever heard about oil spills on the Kama river or some other rivers in Perm`krai?
6. When will a citizen of our city be able to turn on the tap and trust the drinking water?

2. **Swap the information received with the rest of the students in the form of the group discussion. Use the phrases for expressing your personal opinion.**

3. **Surf the Internet and find out more about the consumption and the quality of water in different regions of Russia.**

4. **Get ready to make a presentation on the topic including as many figures and interesting facts as possible.**

SPEAKING SKILLS (2)

1. **Read the authentic text «Reporting Pollution».**

Another important contribution we can all make is to control the pollution we cause and report any instances where we suspect pollution of rivers, streams or the drainage system.

A worrying amount of water pollution is caused by people pouring used engine oil and also washing machine outflows full of detergents, direct into outside drains. And it`s a growing problem. So, if you ever do this, please stop! Many water courses are badly contaminated each year and fish, birds and mammals poisoned, injured and killed as a result.

There are now several Oil Recycling Points at garages throughout the City to help the safe disposal of oil (phone free **0800 66 33 66** for locations). All washing machines should be plumbed into the sewage system so that outflows can be treated. If you see **evidence of water pollution,** please report it immediately to the National Rivers Authority free pollution hotline on **0800 80 70 60.**

2. **Prepare a report on an evidence of water pollution and make a call to the National Rivers Authority on one of the phones of the water pollution hotline.**

WHAT HAVE YOU LEARNED IN THIS UNIT?

Evaluate your progress on each of the items. Use the following symbols: S – satisfied with progress; D – still developing.

Professional Communication

1 You`ve read and found out about some problems of water pollution, water consumption in different countries, the state of some rivers, seas and Lake Baikal.
2 You`ve practiced in making a presentation on the professional topic.
3 You`ve discussed the water problems in your region.
4 You`ve practiced in having a conversation over the telephone reporting about a water pollution evidence.

General Language Skills

1 You`ve improved your comprehension of new materials in grammar: present progressive active and passive.

2 You`ve learnt how to use the article with the geographical names.
3 You have enriched your vocabulary on the topic and have memorized a lot of/ a few/ several new words.

UNIT 10
WASTE DISPOSAL

READING SKILLS (1)

3. **Look at the title of the text 1. What do you expect to read?**
4. **Check the pronunciation of the highlighted words in the text with the help of your electronic dictionary and discuss their Russian equivalents with your partner.**

TEXT 1

THE WAY THAT WE TREAT YOUR RUBBISH IS GOING TO CHANGE

Rubbish, waste, garbage, junk, trash, litter… whatever you call it, the amount we produce is increasing every year and putting the environment under serious pressure. When something is thrown away, the natural resources, energy and time used to make the product is lost. The vast majority of resources used to make products cannot be replaced and will eventually **run out.**

Dealing with our **rubbish** is everyone's problem – we all create it and we all need to take responsibility for **getting rid of** it.

- On average each UK household **generates** 1.2 tonnes of rubbish each year, of which 70 % is **biodegradeable**.
- About four fifths of the UK's **household waste** is currently sent straight to **landfill sites**.
- Under European law the UK must, by 2020, reduce the amount of biodegradable household rubbish sent to landfill sites to about 1/3 of the current amount.
- The average household water bill is 250 pounds, but the average household waste bill is only 90 pounds.

What are the options? There are a number of options we can consider to **dispose of** our rubbish in a safe and **environmentally friendly** way. Some of them also mean that the process used creates energy which can be used o generate heat or electricity.

Recycling. Energy from waste encompasses a number of different processes where household rubbish that is not recycled is burned at a high temperature in a

purpose built industrial plant. Theses plants are designed to meet strict environmental controls and are heavily regulated to reduce **pollution.** In addition, these plants produce energy, including electricity. These types of treatment are widely used in such countries as Germany, Denmark and Sweden.

Mechanical – biological treatment. Under this method of treatment, as much as possible of the rubbish is sorted for **recycling** using screens and magnets. (that`s the mechanical side). Then the organic rubbish is broken down by **composting** (that's the biological side). The remaining rubbish which cannot be recycled or composted is then either burned or landfilled. The rubbish is more stable (doesn't break down) and therefore requires reduced management on a long-term basis. So although landfill would still be used the **environmental impact** is less and the cost is less. This type of treatment is used extensively in Germany, Italy and Austria and is becoming more popular in the UK.

Anaerobic digestion is similar to mechanical-biological treatment, but once the rubbish is mechanically broken up and sorted, the organic rubbish is digested, in plants found on sewage treatment works, to produce gas for energy.

In-vessel composting. Kitchen organic rubbish can be collected and composted in large indoor industrial plants. Garden waste can also be composted with special wormeries and composters.

What you can do…It is impossible to eliminate rubbish altogether but there are easy steps we can all take. At home, work and in our local communities, we can all reduce the amount of rubbish we produce. We can all play a part in tackling the problem of waste by practicing the 3Rs in every aspect of our lives:

REDUCE to prevent waste before it's created
REUSE using products over again, e.g. calico bags
RECYCLE making something old into something new, e.g. plastic can be recycled into jewellery and clothes, like fleece jackets.

Next time you are in the supermarket think about the items you are going o buy and recognise how much rubbish they will produce.

VOCABULARY DEVELOPMENT

Study the comments given in *Oxford Advanced Learner's Dictionary.*

British English (BrE) v. NAmE (North American English):

- **Rubbish** is the usual word in BrE for the things that you throw away because you no longer want or need them. **Garbage** and **trash** are both used in NAmE inside the home: **garbage** tends to mean waste food and other wet material, while **trash** is paper, cardboard and dry material.

- In BrE you put your **rubbish** in a **dustbin** in the street to be collected by the **dustmen.** In NAmE, your **garbage** and **trash** goes in a **trash can** in the street and is collected by **garbage men/ collectors.**
- **Refuse** (n) is a formal word and is used in both BrE and NAmE. **Refuse collector** is the formal word for a dustman or garbage collector.
- **Litter** (n) **–** small pieces of rubbish/ garbage such as paper, cans and bottles that people have left lying in a public place.
- **Junk** (n) **–** things that are considered useless or of little value.
- **Waste** (n) **–** materials that are no longer needed and are thrown away.

VOCABULARY EXERCISES

1. **Choose the proper word:**
2. Streets were littered with *rubbish/ refuse/ garbage.*
3. Don't forget to take out the *litter/ waste/ garbage.*
4. This china came from a *junk/ waste/ rubbish* shop.
5. There will be fines for people who drop *rubbish/ litter/ garbage.*
6. What is this *trash/ garbage/ rubbish* you are watching?
7. I've cleared out all that old trash/ litter/ rubbish/ *junk* in the attic.
8. *Waste/ junk/ rubbish* water is pumped from the factory into a nearby river.

2. **Collocations. Read and remember how to use the following words and word combinations. Learn them by heart and get ready to write a terminological dictation.**

Rubbish (n): a rubbish bag/ bin; a rubbish dump/ heap/ tip; garden/ household rubbish.

Garbage (n): a garbage man; a garbage collector; a garbage can; garbage disposal; garbage truck.

Litter (n): to drop litter; litter bin (a container for rubbish in a public place or street); litterbug (a person who leaves litter in public places).

Trash (n) – trash can.

Junk (n) – junk food; junk mail; junkyard (= scrap yard) – a place where old cars, machines etc. are collected; junk shop.

Waste (n) – household/ industrial waste; toxic wastes; waste disposal; waste basket/ waste-paper basket; waste bin; waste pipe; waste product.

3. **Idioms. Match idioms and their meanings. Make up your own sentences using the idioms.**

a. Garbage in, garbage out (GIGO)
b. A waste of space
c. Lay smth waste / lay waste (to) smth
d. Talk rubbish

1. Destroy a place completely.
2. If wrong or poor quality data is put into a computer, wrong or poor quality data will come out of it.
3. Say stupid things
4. A person who is useless or no good at anything.

WORD FORMATION
PREFIXES

1. Study the theory box.

! To form new English words we can use different prefixes. Look at the list of prefixes and their meanings. Try to understand unfamiliar words. Check in a dictionary if you're not sure.

prefix	*meaning*	*examples*
anti	against	anti-war, antisocial, antibiotic
auto	by oneself	autograph, auto-pilot, autobiography
bi	two, twice	bicycle, bi-monthly, biannual, bilingual
ex	former	ex-wife, ex-student, ex-president
ex	out of	extract, exhale, excommunicate
micro	small	micro-computer, microwave, microscopic
mono	one, single	monotonous, monologue, monogamous
multi	multi	multi-national, multi-purpose, multi-racial
over	too much	overdo, overtired, oversleep, overeat
post	after	postwar, postgraduate, post-revolutionary
pro	in favour of	pro-government, pro-revolutionary
pseudo	false	pseudo-scientific, pseudo-intellectual
re	again or back	retype, reread, replace, rewind
semi	half	semicircular, semi-final, semi-detached
sub	under	subway, submarine, subdivision
under	not enough	underworked, underused, undercooked

2. Using the table from task 1 construct words or phrases to replace the underlined words.

1. The post office shuts for lunch but it should open again at 2 p.m.
2. She needs a holiday and a complete break from her job. She is working too much at the moment.
3. My homework was terrible, so I had to do it again.
4. Her alarm clock didn't ring and she woke up too late.
5. He's in favour of the American approach.
6. Most people say they have to work too hard but are paid too little.
7. She's still on good terms with the man who used to be her husband.
8. He made so many mistakes in the letter that he had to write it again.
9. He dated his cheque with a date that was later than the real date.
10. Some people eat too much at New Year night.

3. Answer the following questions using the words with prefixes.

1. What kind of oven cooks things particularly fast?
2. What kind of drug can help somebody with an infection?
3. What kind of company has branches in many countries?
4. What is a student who is studying for a second degree?
5. What means 'underground railway' in the US and 'underground passage' in the UK?

WRITING AND SPEAKING SKILLS
SAYING NUMBERS, FRACTIONS, DECIMALS, DATES

Study the theory box.

! We don't use plural '*s*' after *hundred, thousand, million* etc. when they are part of a number:

379 – three **hundred** and seventy nine
5, 084 – five **thousand** and eighty-four
3,000,000,000 – three **billion**

! We say years of the 21st century as mathematical numbers:

2018 – two thousand eighteen (not '*twenty eighteen'*)

! **We say years of the previous centuries like this:**

1997 – nineteen ninety seven
1905 – nineteen hundred and five / nineteen oh five

! In English decimals we use dots (not commas!):

0.5 – (nought) point five
0.25 – (nought) point two five
1.5 – one point five
1.75 – one point seven five

! We say fractions in the following way:
½ – a half (*plural* halves)
¼ – a quarter
¾ – three quarters
1/3 – a third
2/3 – two thirds
1 ½ – one and a half
3 ¾ – two and three quarters

1.1 Find numbers, dates etc. in the text and read them aloud.
1.2 Read aloud the following extracts:

A. In Oxfordshire residents throw out **300,000** tonnes of household rubbish every year, a massive **470** kg for every person in Oxfordshire.

B. Over **500,000** tonnes of junk mail is generated each year which is equivalent to **216** pieces of mail through your letterbox!

C. 50% of the **7.5 billion** articles (clothing and other household items) discarded annually meet the criteria of the 3 R's, which means **3.75 billion** unwanted articles could be reduced, reused or recycled annually.

D. Over **1/3** of all household waste can be reduced by turning it into compost.

E. In the UK, we produce more than **430 million** tonnes of rubbish per year. This rubbish is created by every sector of society, from the largest industry down to each individual.

F. Plastic bags take up to **500** years to decay, creating a major problem in landfill sites. We use **150 million** plastic carrier bags every week in the UK. Reduce this rubbish by reusing plastic bags each time you go shopping or take your own reusable bag.

G. If you recycle **25** of your plastic bottles we can make **1** fleece.

H. By **2025** the rubbish we create needs to be reduced to **50%** – that means we have to dispose of **100,000** tonnes of rubbish in a different way.

I. 100,000 tonnes is roughly equivalent to **125 million** loaves of bread or **6600** double decker buses and requires a lot of space!

J. One average household produces **1.2** tonnes of rubbish per year. Collecting, processing and disposing of **1** tonne costs around **80** pounds. That means that throwing away a full bin bag is the equivalent of throwing away a pound coin.

1.3 How do you say these numbers in English? Write down your answers.

1. 468 –
2. 3 ½ -
3. 2,354 –
4. 6.75 –
5. 0.25 –
6. 3 1/3 –
7. 1,250,000 –
8. 10.04 –
9. 47%
10. in 2021

2. Expressing opinion.

2.1 Complete the phrases below using the words in the box:

Ask Concerned Firmly Me Mind My Opinion Point See Seems Think Would

1. In my ……
2. The way I ….. it
3. To my ….
4. In … view
5. If you … me
6. From my … of view
7. As `far as I'm ….
8. I …
9. It … to me that
10. I … believe
11. For ….
12. I … argue that

2.2 Discussion. Read the advertisement of a local council in Oxfordshire.

"The county council welcomes your participation in a debate on possible ways of dealing with our rubbish. We need to make a decision that makes both environmental and economic sense. Please come along and tell us what you think."

Imagine you are a resident of Oxfordshire. Be ready to take part in the debate and express your opinion using the phrases from task 2.1.

USEFUL VOCABULARY

Anaerobic digestion – анаэробное разложение, обработка

Compost (v) – изготовлять компост

Dispose of (rubbish) (v) – утилизировать, избавиться от (мусора)

Environmental impact – воздействие на окружающую среду
Environmentally friendly – благоприятный для окружающей среды
Garbage (n) – отбросы, мусор
Get rid of (v) – избавиться от
Household waste – домашний мусор
Junk (n) – ненужный хлам, барахло
Landfill (n) – свалка
Litter (n) – сор, мусор
Recycle (v) – перерабатывать
Rubbish (n) – мусор, сор, хлам
Reduce (v) – сократить, уменьшить
Run out (v) – истощаться, заканчиваться
Toxic (adj.) – ядовитый, токсичный
Trash (n) – отбросы, мусор, хлам
Reuse (v) – использовать повторно
Waste (n) – отходы
Waste (v) – тратить зря, попусту

READING SKILLS (2)

Recycling

A. Some waste is not dangerous. Often somebody will recycle it and do something useful with it. You can break up old cars to get the metal, or make new glass from old bottles. But some waste is toxic – it is very poisonous. In the USA, for example, factories dump – throw away – 265 million tones of toxic waste every year.

B. How do you dump toxic waste safely? Well, you can put it in metal containers and leave it somewhere safe. But this can be a very bad idea.

You can bury toxic waste. You put it in a deep hole and cover it with soil. That is what happened at Love Canal in the USA. In the 1930s a chemical producer buried many tones of toxic waste in metal containers. In the 1950s, a builder bought the land and built a little town there. Nobody remembered the containers of toxic waste under the ground. Then, in the 1970s, the waste started to come through the metal of the containers and pollute the ground. Trees and grass blackened and died. There was a bad smell everywhere. People had to leave their homes. The people who cleaned up Love Canal found eighty-two different toxic chemicals in the soil.

C. You can burn toxic waste, but it is more expensive than burying it, and the burning can produce dangerous gases. So some countries burn their toxic waste at sea in special ships. The chemicals get into the air and the wind carries them a long way.

D. You can send your toxic waste to a poorer country and pay somebody to burn or bury it there. The USA sends toxic waste to Panama. Germany and Holland send toxic waste to the Czech Republic. Is this a good idea?

E. Toxic waste can be useful if you know how to recycle it. Some petrol producers bury their toxic waste in the soil. There, special bacteria in the soil eat the waste and change it into clean, safe carbon dioxide and water. In Britain, some companies are growing special waste-eating bacteria. These bacteria eat toxic waste in the world: are these bacteria hungry enough?

1. Read the text and say which passage A, B, C, D or E describes:

1. safe dumping of waste
2. unsafe dumping of waste
3. burning waste
4. recycling waste
5. the amount of toxic waste produced in a country every year

2. Choose the most appropriate word in the following sentences:

1. In the USA factories *burn/ bury/ dump* 265 million tones of toxic waste every year.
2. Burning waste can produce dangerous *gases/ bacteria/ smog.*
3. The USA sends toxic waste to *Czech Republic/ Panama/ Holland.*
4. Special bacteria eat the waste and change it into *oxygen/ carbon dioxide/ cellulose* and water.
5. To dump toxic waste safely, you can put it into *plastic / glass / metal* containers.

3. Put these sentences into the right order.

1. People had to leave their homes.
2. Nobody remembered the containers of toxic waste under the ground.
3. In the 1950s a builder bought the land and built a little town there.
4. In the 1930s a chemical producer buried many tones of toxic waste in metal containers.
5. There was a bad smell everywhere.
6. Then, in the 1970s, the waste started to come through the metal of the containers and pollute the ground.
7. The people who cleaned up the town found eighty-two different toxic chemicals in the ground.

4. Can you think of three examples of pollution near your home? Write a blog about them.

DEVELOPMENT OF GRAMMAR SKILLS
COMPARISON

Study the theory box.

! We use ***–er, (the) –est*** with short words: clean – clean**er** – **the** clean**est.**

! We use ***more/less*** and ***the most / the least*** with long words: toxic – **more/ less** toxic – **the most/the least** toxic.

! We use special forms of irregular adjectives and adverbs:

Good – better – the best

Bad – worse – the worst

Many/ much – more – the most

Little – less – the least

! To compare similar things we use **as … as (**negative **not so … as):** as safe as; not so safe as

1. **Scan the text 'Recycling' and find as many examples of comparison as you can.**
2. **Open the brackets and use the word in correct form:**

1. Recycling paper has been (big) success.
2. Paper is (easy) material to recycle.
3. Paper is (cheap) than straw so some farmers use it in their barns.
4. Plastic is (hard) material to recycle, because there are many different kinds which should be treated differently.
5. Windows made of recycled plastic are (good) than normal windows because they are much (hard) to break.
6. Burning toxic waste is (expensive) than burying it.
7. Sending toxic waste to (poor) countries is not (good) solution to the problem.

Project work

1. **Read what people say about waste disposal in their countries.**

A. **Cincia Cellone, Italy**: 'In each town we have different days for disposal of different types of wastes. For example, in Rimini we can throw away paper on Mondays, glass – on Tuesdays, plastic – on Wednesdays, metal – on Thursdays and so on. So each family has to put different types of wastes in different bags.'

B. **Kurosava Siomoto, Japan**: 'The Japanese usually don't buy much furniture. We value open space. It's very expensive to get rid of old things. For example,

if you want to throw away an old sofa, you must pay a tax (about 1800 yens). That is why we prefer to swap old things with people who need them or repair and reuse them.'

C. **Pierre Leroy, France: '**In my country eco-tourism is becoming more and more popular. Many people work as volunteers during their holidays. They clean beaches and do a lot of other jobs to help the environment. Last summer I worked at a national park. We removed litter and did conservation work.'
D. **Helen Ivanova, Russia: '**In 2018 Russia hosted a World Football Cup. Thousands of football funs came to our country. I worked as a volunteer in S.Petersburg. We were deeply impressed by tourists from Japan who cleaned their zone at the stadium after all the matches. They had special bags to put litter in. They told us it was normal and there was nothing unusual in their behavior.'
E. **Bert Vahnhulle, Holland:** 'In my country we classify our household garbage into different categories and put wastes made of different materials in different garbage bins. Before throwing away a plastic bottle we usually remove its label and top.'

2. Surf the Internet and find more information on methods of waste disposal in different countries of the world. Make a presentation and share your data with your group mates.

WHAT HAVE YOU LEARNED IN THIS UNIT?

Evaluate your progress on each of the items. Use the following symbols: S – satisfied with progress, D – still developing

Professional Communication

1. You`ve read and learned about waste management, different ways of rubbish disposal and recycling and can write a blog on it.
2. You`ve learned how to express your opinion in a debate.

General Language Skills

1. You`ve practiced saying numbers, decimals, dates.
2. You've learned the meanings of different prefixes.
3. You`ve enriched your vocabulary on the topic.
4. You`ve practiced your grammar on making comparisons and can better understand how to use comparative forms.

UNIT 11
BIRD ECOLOGY

READING SKILLS (1)

1. Look at the title of the text 1. What do you expect to read?

2. Check the pronunciation of the highlighted words in the text with the help of your electronic dictionary and discuss their Russian equivalents with your partner.

TEXT 1

BIRD ECOLOGY AND CONSERVATION

Birds follow a certain behavior pattern that could **have a big impact on** the Earth if it were to be drastically changed. This happens when a species becomes **extinct** or when the weather changes dramatically causing confusion among the birds. They aren't sure when to migrate, mate or do any of their natural functions. It is important to study birds and learn how they are related to the environment.

The greatest **threat** for birds comes from loss of **habitat**, mainly due to human activities. Forests and wetlands are vital to birds' **survival** because they provide food and shelter as well as protection from **predators** and places for rest during their migrations. Over the past 100 years much of the forests and wetlands have been depleted and thus seriously changed the landscape and resources for migrating birds. As a result, bird numbers have been seriously affected in many parts of the world.

Of the 9,600 known bird species, nearly 1,200 are threatened with extinction. About 99 % of the globally threatened birds **are at risk** from human activities such as agriculture, logging, hunting and trapping causing other major changes in the world's ecosystems.

In North America, for example, bird observers have seen a steady **decline** in the numbers of many birds which migrate to Central and South America. **Deforestation** and problems with summer breeding habitats, **urban sprawl** and **contamination** of environment are significantly altering and removing valuable ecosystems on which birds depend. This is happening worldwide. In the USA alone, this affects 80% of total bird population since about 520 of the US' 650 bird species migrate.

The study of bird ecology can help to find ways to undo some of the **damage** that has been done and to **prevent** more **harm** from being done. Armed with the comprehensive information now being collected about the world's migratory birds, scientists hope to develop solutions relating to the Earth's environmental health.

3. **Skim the text and finish the statements below.**
2. The greatest threat for birds comes from …
3. The study of bird ecology can help to …
4. About 99 % of the globally threatened birds are at risk from …
5. Forests and wetlands are vital to birds' survival because …
6. Bird numbers have been seriously affected as a result of …
7. Birds aren't sure when to migrate, mate or do any of their natural functions when …

VOCABULARY DEVELOPMENT

1. **Match words from columns A and B to make collocations. Use them in the sentences of your own.**

A	B
1. prevent	a. at risk (of)
2. have	b. extinct
3. be	c. harm
4.become	d. damage/ harm
5. see	e. a big impact (on)
6. undo	f. a decline
7. change (v)	g. dramatically/ drastically

2. **Adverbs describing changes. Look at the collocations from text 1:** to change *drastically/ seriously/ dramatically;* to alter *significantly;* to affect *seriously.*

Categorize each adverb A or B according to whether they describe:
A a big/ fast change
B a small/ slow change
Dramatically gradually rapidly sharply significantly slightly steadily steeply substantially drastically seriously

3. **Idioms with birds. Match idioms and their meanings. Use the idioms in the sentences of your own.**

a. put the cat among the pigeons
b. like water off a duck's back
c. run round like headless chickens
d. a little bird told me

a. create a crisis or a problematic situation
b. try to solve too many problems, and end up not achieving anything
c. not to take any notice (of complains, anger etc.)
d. I don't want to disclose the source of my information

4. Proverbs with birds. Match beginnings, endings and meaning of proverbs. Find a Russian proverb with a similar meaning.

Beginning of proverb	**ending of proverb**	**meaning of proverb**
Birds of a feather	is worth two in the bush	To be successful you shouldn't start your day late
A bird in hand	catches the worm	People who have similar characters or interests will often choose to spend time together
An early bird	flock together	It's better to keep what you have rather than to risk losing it by trying to get more

WORD FORMATION

1. Language of change. Tick the verbs in the list below which are unchanged in the noun form. Where the noun is different, write it next to the verb.

a. to decline
b. to dip
c. to increase
d. to grow
e. to fall
f. to decrease
g. to fluctuate
h. to recover
i. to drop
j. to rise

2. Noun suffixes to describe people and their jobs.

! –er/ -or/ -ist is used with verbs or nouns to describe people and their jobs: *actor, observer; conservationist.*

! Sometimes **-er** and **–ee** can contrast with each other meaning 'person who does something' (-er) and 'person who receives or experiences the action' (-ee), e.g. *employer / employee, sender/ addressee.*

Add suffixes to the following words and put them into three groups:

- used with the suffix –er
- used with the suffix –or
- used with the suffix -ist

operate; supervise; manage; employ; economics; translate; psychology; art; journal; murder; football; act; art; direct; sing; research; farm; physics; ornithology

READING SKILLS (2)
NOT TO VANISH – UNDER PROTECTION

Conservationists warn that soon the three birds – the turtle dove, partridge and blackbird – could be seen only on Christmas cards. In fact, all three species have suffered catastrophic declines because of the intensification of agriculture. Since 1940, an astonishing 70 per cent of Britain's semi-natural habitats has been lost.

Numbers of grey partridge have collapsed by 83 per cent in the last 30 years. These birds **rely on** caterpillars to **feed** their **chicks.** The caterpillars have been totally eradicated by pesticides.

The turtle dove, meanwhile, has cut the number of **broods** it raises each year from three to two because of the shortage of wild flower seeds to feed to its **nestlings**. Overall, since 1980, the turtle dove population has crashed by 70 per cent. As well as a lack of plant food in Britain, it is also being hit by the boom in the use of plastic wine stoppers, which is threatening to cause the collapse of the European cork industry. The cork forests of Spain and Portugal are the continent's most valuable wildlife habitats on which the migrant turtle dove and many other bird species rely for feeding and nestling.

Blackbirds have suffered a 26 per cent decline over three decades. One of the possible reasons for this is that they rely on worms for food. And worms have become harder to find. Experts believe that worms may have become harder to find because of land drainage.

In 1970, pesticides in the food chain cut numbers of the peregrine falcon to 39 pairs. Now there are almost 1,600 pairs in North America. Now it is to be taken off American **endangered species list** after hugely successful **captive breeding**.

Students of Delta University (US) examined abandoned nests of city bird species. The research showed that nowadays birds living in city parks use a lot of litter and waste to build their nests. Among the materials found there were cigarettes' ends, plastic, wire, paper and ropes. These materials are environmentally unfriendly and may be dangerous for the nestlings' health.

Bird ecology and conservation studies are essential to the health and well-being of the bird species. The way they eat, live, mate and even take care of their young will affect the world in some way.

1. Skim the text and be ready to explain what facts these numbers and dates refer to:

1970; 1940; 30; 39; 70%; 83%; 1,600; 26%

2. Decide if the information in the following statements is TRUE, FALSE or NOT GIVEN in the text.

1. Soon peregrine falcons could be seen only on Christmas cards as conservationists warn.
2. City birds use only natural materials to build their nests.
3. The turtle dove has cut the number of broods it raises each year from three to two because of urban sprawl.
4. The intensification of agriculture has caused catastrophic decline in bird species.
5. Numbers of grey partridge and blackbirds have collapsed because of the deformation of food chains.
6. At present British farmers do not use pesticides.

VOCABULARY DEVELOPMENT
Reason, Cause and Result

! To describe **reason** we use ***because*** *(+ clause)/* ***as/ since/ because of*** *(+ noun)/* ***due to*** (formal)/ ***owing to*** (formal)
! To describe **cause and result** we use ***cause/ lead to/ result in***
! To describe **result** we use ***consequently/ therefore/ as a result/ so***

1. Transform the sentences using *because of.*
For example: He couldn't play **because** he had an injured shoulder. – He couldn't play **because of** his injured shoulder.

1. She got the job because her qualifications are excellent.
2. The weather was terrible, so we couldn't eat outside.
3. She had o stay at home because she has a broken ankle.
4. The light was very bad, so the referee had to stop the game.
5. The flowers died because it was so dry.
6. The traffic was very heavy. I was half an hour late.

2. Combine two sentences into one sentence using *so, so that, because, as, since.* More than one answer is possible in some sentences.
1. I didn't phone you. It was very late.
2. I turned up the radio in the living-room. I could hear it in the kitchen.
3. The restaurant was full. We went to the bar next door.
4. I stayed at home. I was expecting a phone call.
5. It's a very large city. You have to use metro a lot.

3. Use facts from texts 1 and 2 and describe the reasons for changes in the birds' behavior. Can you give your own examples of causes and results of those changes?

DEVELOPMENT OF GRAMMAR SKILLS
REVISION OF GRAMMAR TENSES

1. Time expressions. Study the theory box.

- Some time expressions are normally used with the present perfect: *since January, lately, already, just, yet* etc. E.g. *I **haven't been** abroad since January. **Have** you **seen** any good films lately?*
- Some time expressions are normally used with the past simple: *last week, in 1989, the other day, two weeks ago, yesterday* etc. E.g. *In 1989 he **graduated from** university. **Did** you **see** a documentary about South African animals the other day?*
- Some can be used either with the past simple or the present perfect, depending on the situation: *this year; this afternoon; ever; never etc.* E.g. *'**Have** you ever **been** to Kenya?' 'Yes, I have. I **went** there earlier this year.' '**Did** you ever **go** to Mombasa while you were in Kenya?'*

2. Arrange the time expressions below into three lists:

a. **used with Past Simple**
b. **used with Present Perfect**
c. **used either with Past Simple or Present Perfect**

already; a few minutes ago; a little while earlier; a long time ago; a moment ago; all my life; always; at midnight; by now; for two months; in the morning; in 1990; just; last year; never; not long ago; recently; so far; still; this afternoon; this week; this year; two years ago; until today; when I was at school; yesterday; yet

3. Skim texts 1 and 2 and find examples of sentences with Past Simple and Present Perfect (both Active and Passive). Translate them into Russian.

USEFUL VOCABULARY

Brood (n) – выводок
Be at risk – находиться под угрозой
Captive breeding – разведение в неволе
Contamination (n) – загрязнение
Deforestation (n) – обезлесивание, исчезновение лесов
Decline (n, v) – сокращение, сокращаться
Endangered species – виды, находящиеся под угрозой исчезновения
Extinct (adj.) – вымерший
Have an impact on – влиять, воздействовать на
Habitat (n) – место обитания
Mate (v) – спариваться
Nest (n) – гнездо
Nestling (n) – птенец
Predator (n) – хищник

Rely on (v) – зависеть от
Survival (n) – выживание
Threat (n) – угроза
Urban sprawl – рост городов за счет сельской местности

SPEAKING SKILLS

1. Prepare a 2-minute report on bird parks of the world.

Surf the Internet and find information about one of the world's bird parks. Imagine that you work at the park as a researcher. You are participating at a round-table discussion on bird ecology and conservation. Tell your colleagues from other countries about your park. You should mention its:

- name
- location
- history
- aim
- events and activities for visitors

WHAT HAVE YOU LEARNED IN THIS UNIT?

Evaluate your progress on each of the items. Use the following symbols: S – satisfied with progress, D – still developing

Professional Communication

1. You`ve read and learned about birds ecology and conservation and can describe the main reasons for changes in birds' behavior.
2. You`ve learned how to talk about cause and result.

General Language Skills

1. You`ve practiced saying numbers, decimals, dates.
2. You've learned different suffixes used to describe people and their jobs.
3. You`ve enriched your vocabulary on the topic.
4. You`ve practiced your grammar on using time expressions with Past Simple and Present Perfect.

UNIT 12
RADIOACTIVE ECOLOGY

READING SKILLS (1)

1. Read the text. Pay attention to the words in bold type. Try to guess their meaning.

NUCLEAR PROBLEMS

A few decades ago **nuclear energy** was thought to be a clean, modern and efficient way **to generate** almost unlimited amounts of **electricity.**

There are several arguments for using **nuclear power**. First, the supply of **fossil fuels** is limited. Second, **burning** fossil fuels is harmful to the environment, it adds to the green house effect. Third, the earth contains a large **supply** of natural uranium. Nuclear power could, theoretically, supply the entire world's energy for thousands of years. Fourth, nuclear power comes to the consumer as electricity, which is a clear and **convenient** form of energy. Although **nuclear stations** are large and unattractive, they can be built at long distances from cities and towns. Finally, the cost of electricity produced by a nuclear power station is relatively low.

However, there are serious reasons against using nuclear power. First of all, there is a risk of terrorist activity and pollution. Nuclear power stations are a potential source of harmful **radiation.** Accidental **leaks** of radiation take place. What's more, power stations have to deal with the disposal of radiation wastes from **nuclear reactors**. The potential threat of cancer and genetic mutations make these materials very frightening.

A major problem that many countries have to face today is the disposal of nuclear waste. What can you do with radioactive materials that you don't want?

There are two approaches to the nuclear waste. One is to **store** the waste, either on the surface or underground. If the waste is kept for long enough, the radioactivity **drops** to safe levels. In some cases, however, it would have to be stored for tens of thousands of years. The problems of handling and storing highly radioactive waste can be reduced if it is sealed in concrete or glass blocks before storage.

Another solution is to release the waste to the environment so that it gets **diluted** in the sea or in the air. This is only done in the case of **low-activity** waste that will not significantly affect the environment.

The problem of nuclear waste still remains to be solved and calls for further investigation.

COMPREHENSION CHECK

1. What are the main reasons for using nuclear power?
2. What are the main reasons against using nuclear power?
3. What is the major problem of the countries which build nuclear power stations?
4. What are the main approaches to nuclear waste disposal?

VOCABULARY DEVELOPMENT

1. Find in the text all the collocations with the word *nuclear*. Make your own sentences with them.

2. Give synonyms to the following words:

- To affect (the environment) – …
- Investigation – …
- Pollution – …..
- To drop – …

Give antonyms to the following words:

- Clean – …
- Modern – …
- Efficient – …
- Limited – …
- Low-activity – …

READING SKILLS (2)
JIGSAW READING

1. **Work in pairs. Student A should read the text A. Student B should read the text B. Ask each other questions to get missing information.**

EFFECTS OF RADIOACTIVE POLLUTION
Text A

The source of radioactive pollution is mostly man-made. Radioactive substances are those which have the ability to (1) …, like alpha and beta particles and gamma rays. Large amount of radioactive waste is generated from (2) … Nuclear accidents and nuclear explosions are two of the worst man-made sources of radioactive pollution.

Radioactive emissions from nuclear weapons are considered as the most harmful for the environment, as they stay in the atmosphere for (3) … Thus, they affect several generations. Similarly, the radioactive substances from the land surface may flow down to the water and remain there for years to come. It causes harm to the

aquatic animals. Thus radioactive pollution has a destructive effect on the entire ecosystem.

When the soil gets contaminated by radioactive substances, it is transferred to the plants growing on it. This can lead to (4) …

The effects of radioactive pollution on human beings vary from mild to severe. The effect of alpha particles is (5) … and the gamma rays are the most dangerous. The radioactive rays can cause irreparable damage to the DNA molecules and lead to a life-threatening condition. It causes genetic mutations which may result in (6) … The effects of genetic mutation tend to pass on to the future generations as well. Most of these effects of radioactive pollution do not show up immediately, but have severe long term health consequences.

Text B

The source of radioactive pollution is mostly man-made. Radioactive substances are those which have the ability to emit high energy particles, like (1) … Large amount of radioactive waste is generated from nuclear reactors used in nuclear power plants. Nuclear accidents and nuclear explosions are two of the worst man-made sources of radioactive pollution.

Radioactive emissions from nuclear weapons are considered as the most harmful for (2) …, as they stay in the atmosphere for as long as a hundred years. Thus, they affect several generations. Similarly, the radioactive substances from the land surface may flow down to the water and remain there for years to come. It causes harm to (3) … Thus radioactive pollution has a destructive effect on the entire ecosystem.

When the soil gets contaminated by radioactive substances, it is transferred to (4) …This can lead to genetic mutation of the plants' DNA. The effects of radioactive pollution on human beings vary from mild to severe. The effect of alpha particles is the lowest and (5) … are the most dangerous. The radioactive rays can cause irreparable damage to the DNA molecules and lead to a life-threatening condition. It causes (6)…. which may result in cancer. The effects of genetic mutation tend to pass on to the future generations as well. Most of these effects of radioactive pollution do not show up immediately, but have severe long term health consequences.

SPEAKING SKILLS

DEBATING A POINT

1. **Study the following Useful Phrases to practice giving opinions, expressing agreements and disagreements, and asking for clarifications.**

If a person you are talking to is not logical:

- What has it got to do with the problem?
- What has it got to do with the thing we are discussing?
- It doesn't follow from what you said before.
- You are repeating yourself.
- It doesn't make sense.
- It doesn't prove a thing.
- That isn't true to fact.

If a person you are talking to ignores facts:

- Let's take facts.
- Stick to facts.
- There is no getting away from the fact that …
- Take into consideration the fact that ….

If your opponent is talking sense and you are convinced:

- It stands to reason.
- Right you are.
- I agree with you.
- There is something in what you say.

If your opponent says things you don't agree with:

- It's a matter of opinion.
- That's all very well but …
- You are painting it too black.
- You are carrying it too far.

If your opponent says something he didn't mention before:

- It's quite a different thing.
- That makes all the difference.
- Now you are talking.

2. **Work in groups of four to discuss the following points. Practice saying Useful Phrases from exercise 1, the information from the texts you`ve read in this unit and your own background knowledge.**

- What are the advantages and disadvantages of nuclear power?

- Why do some countries want to remain nuclear-free?
- What accidents have greatly changed the attitude of people to nuclear energy?
- What do you know about the consequences of Chernobyl accident (1986)?

DEVELOPMENT OF GRAMMAR SKILLS

FUTURE TENSES REVISION

Read the grammar box and do the exercises below.

! To talk about plans and arrangements use Present Continuous**:** *I **am meeting** the manager tomorrow.*

! To talk about events in the future based on a fixed timetable, program or calendar use Present Simple: *They **arrive** on Monday. Ann's plane **leaves** at 12.00. The conference **opens** next Tuesday.*

! To talk about intentions use *to be going to**: I'm going to** spend two weeks in Siberia.*

! To talk about instant decisions use Future Simple (will)**:** *I am hungry. **I'll go** and **make** some tea.*

! To talk generally about future opinions, hopes and predictions use Future Simple (will): *In the next century, most people **will probably live** in large cities.*

GRAMMAR EXERCISES

1. Put in the missing words. Use one word only in each space.

1**)** I don't want fish. I think I'll … a steak.
2) There's a fireworks display next Monday. Karen is … to watch it.
3) We're at that table in the corner. …you join us?
4) I'm … the boss this afternoon. So I must study this report before.
5) There will be drinks at the reception, but there will … be any food.
6) The European heads of state are … meet in Brussels on 5 October.
7) It is a nice day. …we go for a walk?
8) My birthday … next Sunday.
9) My brother is … married in June.
10) Mike has got his coat on. I think he's … to go out.

2. Fill the gaps with a suitable verb form

1. My brother… (graduate) from university next year.
2. They don't have a car. I think they… (take) a taxi.
3. I … (leave) tomorrow morning. – Mike …. (give) you a lift at the station.
4. She … (be) an actress.
5. Is that a telephone ringing? I …. (answer) it.
6. …you (do) anything tonight? – I … (have) a party. Would you like to come?
7. Jane … (have) another driving lesson soon.
8. I … (meet) your mother for lunch at one.
9. Peter and Simon …. (travel) abroad next year.
10. Perhaps it … (rain) tomorrow.

PREPOSITIONS OF TIME

! We use *at* for times and certain expressions:

At 8.00	**at** midnight
At lunchtime	**at** the weekend
At Christmas	**at** the same time
At the moment	**at** the age of 8

! We use *on* for days and dates:

On Friday	**on** Friday morning
On 12 October	**on** Saturday evening

! We use *in* for longer periods such as months, years, and seasons:

In April	**in** 1965
In summer	**in** the 20th century

! We say, *at night* but *in the evening/ afternoon/ morning.*
! There is no preposition before *last, next, this:*
What did you do **last night?**
I'll see you **next week.**

1. Put *in, at, on* or nothing into each gap:

1. 'It's my birthday … next week.' – 'When?' – '… Monday.' – '… what time were you born?' – ' … 8 o'clock … the morning.'
2. 'I'm meeting Alan … this evening.' – 'What time?' – '… six.'
3. 'What did you do … the weekend?' – ' … Friday evening we went to a party. We slept in late … Saturday morning, and then … the afternoon we went shopping. … 7 .00 some friends came around for a drink. We didn't do anything … Sunday. What about you?'
4. The weather in England is unreliable. …summer it can be hot, but it often rains … April and June. …last year the summer was awful. The best English weather is … spring and autumn.

5. I learned to drive … 1980 … the age of 17. My brother learned … same time as me, but I passed first.
6. I'll phone you … next week. … Tuesday, may be.....the afternoon. … about 3 p.m. OK?
7. I don't see my parents much. … Christmas, usually, and …the holidays.

On time and *in time*

! On time = punctual: *I'll meet you at 5. – OK, but please be on time.*
The opposite of *on time* is *late.*

At the end and *in the end*

! At the end = at the time when something ends: *at the end of the month; at the end of the concert; at the end of the film.*
! In the end = finally: *We had a lot of problems with this car. In the end we sold it.*
The opposite of *in the end* is *at first:* *At first we didn't like each other, but in the end we became good friends.*

1. Complete the sentences with *on time* or *in time:*

i. The bus was late this morning but usually it is …
ii. I like to get up … to have a big breakfast before going to work.
iii. We want to start the meeting …, so please don't be late.
iv. The bus service isn't very good. Buses are rarely …
v. I nearly missed my flight this morning. I got to the airport just …
vi. She nearly forgot that it was Mike's birthday. Fortunately she remembered …
vii. Why are you never …? You always keep everybody waiting.

2. Put in *at* or *in:*

1. I'm going away … the end of the month.
2. It took me a long time to find a job. …the end I got a job in a hotel.
3. Are you going away … the beginning of August or … the end?
4. I couldn't decide what to buy Kate for her birthday. I bought a CD … the end.
5. We waited ages for a taxi. We gave up … the end and walked home.
6. I'll be moving to a new address … the end of May.
7. At first Helen didn't want to go to the theatre but she came with us … the end.
8. I'm going away … the end of this week.
9. I didn't know what to do. …the end I decided to go to college.

USEFUL VOCABULARY

Accident (n) – авария
Convenient (adj.) – удобный
Drop (v) – падать, сокращаться, снижаться
Diluted (adj.) – растворенный, рассеянный
Fossil fuel – ископаемое топливо
Leak (v) – протекать, просачиваться
Nuclear explosion – атомный взрыв
Nuclear station – атомная станция
Nuclear energy –атомная энергия
Store (v) – хранить
Supply (n) – запасы
Radioactive substance – радиоактивное вещество

WHAT HAVE YOU LEARNED IN THIS UNIT?

Evaluate your progress on each of the items. Use the following symbols: S – satisfied with progress, D – still developing

Professional Communication

1. You`ve read and learned about radioactive pollution and can describe its reasons and its main consequences.
2. You`ve learned how to debate an issue.

General Language Skills

3. You`ve practiced using prepositions of time.
4. You've practiced asking and answering questions on the topic.
5. You've learned different ways of talking about the future.
6. You`ve enriched your vocabulary on the topic.

EXTRACURRICULAR SELF-GUIDED WORK

UNIT 1
ECOLOGY AS A SCIENCE

1. **Choose and read one of the articles «Branches of Ecology» or «Understanding Ecology» according to your English language level and answer the questions given below.**

Text 1 Level A/2
Article 1

Branches of Ecology

Ecology is usually considered as a branch of biology, the general science that studies living organisms. It is associated with the highest levels of biological organization, including the individual organism, the population, the ecological community, the ecosystem and the biosphere as a whole. When referring to the study of a single species, a distinction is often made between its "ecology" and its "biology". For example, "polar bear biology" might include the study of the polar bear's physiology, morphology, pathology and ontogeny, whereas "polar bear ecology" would include a study of its prey species, its population and metapopulation status, distribution, dependence on environmental conditions, etc. Because of its focus on the interrelations between organisms and their environment, ecology is a multidisciplinary science that draws on many other branches, including geology and geography, meteorology, soil science, genetics, chemistry, physics, mathematics and statistics. Due to its width of scope, ecology is considered by some to be a holistic science, one that over-arches older disciplines such as biology which in this view become sub-disciplines contributing to ecological knowledge. It has been argued that the mechanistic models which have driven the development of most other sciences are inappropriate for unraveling the complex interactions in most ecosystems, and that progress in ecology is better served by a central paradigm driven by information theory and complexity theory.

Ecology is also a highly applied science, especially with respect to issues of natural resource management: wildlife conservation, habitat management, mitigation of ecological impacts of environmental pollution, ecosystem restoration, species reintroductions, fisheries, forestry and game management. These are often the direct domains of applied ecology. Urban development, agricultural and public health issues are also often informed by ecological perspectives and analysis.

Article 2
Text 2 Level A2/B1

Understanding Ecology

Ecology is the science which studies the biota and the environment, and their interactions. It comes from the Greek *oikos* = house; *logos* = study. Ecology is the study of ecosystems. Ecosystems describe the web or network of relations among organisms at different scales of organization. Since ecology refers to any form of biodiversity, ecologists research everything from tiny bacteria in nutrient recycling to the effects of tropical rain forests on the Earth's atmosphere. Scientists who study these interactions are called *ecologists*.

Terrestrial ecoregion and climate change research are two areas where ecologists (people studying ecology) now focus.

There are many practical applications of ecology: conservation biology, wetland management, natural resource management (agriculture, forestry , fisheries), city planning (urban ecology), community health, economics, and applied science. It provides a framework for understanding and researching human social interaction.

Ecology starts many powerful philosophical and political movements – including the conservation movement, wellness movement, environmental movement, and ecology movement we know today. When these are combined with peace movements and the Six Principles, they are called green movements. In general, these put ecosystem health first on a list of human moral and political priorities, as the way to achieve better human health and social harmony, and better economics.

People with these beliefs are called political ecologists. Some have organized into the Green Parties, but there are actually political ecologists in most political parties. They very often use arguments from ecology to advance policy, especially forest policy and energy policy.

Also, ecology means that it is the branch of biology dealing with the relations and interactions between organisms and their environment, including other organisms.

Many ecologists also deal with human economics:

- Lynn Margulis says that economics studies how humans make a living, while ecology studies how every other animal makes a living.
- Mike Nickerson says that "economy is three-fifths of ecology", since ecosystems create resources and dispose of waste, which the economy assumes is done "for free".

Ecological economics and human development theory try to separate the economic questions from others, but it is difficult. Many people think economics is just part of ecology now, and that economics that ignores it is wrong. "Natural capital" is an example of one theory combining both.

Sometimes ecology is compared to anthropology, because both use a lot of methods to study one thing we cannot live without. Anthropology is about how our bodies and minds are affected by our environment, while ecology is about how our environment is affected by our bodies and minds. There is even a type of anthropology called ecological anthropology, which studies how people interact with the environment.
Antoine de Saint-Exupery stated: "The earth teaches us more about ourselves than all the books. Man discovers himself when he measures himself against the obstacle."

2. **Answer the following questions to check your comprehension of the text in a written form and show it to your English tutor.**
   1. What object does ecology study?
   2. What is the distinction between ecology and biology?
   3. What are the main domains of applied ecology?
   4. Why is ecology a multidisciplinary science?
   5. How are issues of natural resource management related to applied ecology?

3. **Work in groups of 3-4 students to create a crossword on the topic. Use all the names of sciences mentioned in the text in your crossword.**

UNIT 2
ACID RAIN

Recommendations for Scientific Reports, Abstracts and Theses Writing

Students often need to write reports, abstracts, theses. For doing that kind of work students must read a lot of scientific articles in order to use the material obtained in the oral or written speech. The framework or structure of rendering any professionally-oriented scientific article is as follows.

1. **Study the Table of Rendering a Scientific Article. Memorize the cliché phrases and sentences to use them for making a good report.**

The Table of Rendering a Scientific Article

1.	The title of the article	The article is headlined …… The headline of the article I have read is ……..
2.	The author of the article, where and when it was published	The author of the article is …….. The article was written by……. It was published in …….. It was printed in……..
3.	The main idea of the article	The main idea of the article is ……. The article is devoted to ……/deals with ……../touches upon…….
4.	The purpose (aim) of the article	The purpose of the article is to give readers some information on …….. The aim of the article is to provide readers with some material (data) on …….
5.	The contents of the article, some facts, names, figures	A The author starts by telling us about that …….. The author writes (states, thinks, stresses, points out) that ……. B Further the author reports (says) that …… C In conclusion the author ……..
6.	Your opinion of the article	I found the article interesting (important, of great value, too hard to understand) because ……..

2. Read the article «Eutrophication of Water» to understand its contents.

ARTICLE 3

Eutrophication of Water

Eutrophication is the addition of artificial or natural substances, such as nitrates and phosphates, through fertilizers or sewage, to an aquatic system. Negative environmental effects include hypoxia, the depletion of oxygen in the water, which induces reductions in specific fish and animal populations. Other species, such as Nemopilema nomurai jellyfish in the Japanese waters, may experience an increase in population that can negatively affect other species.

Eutrophication can be human- caused or natural. Untreated sewage effluent and agricultural run-off carrying fertilizers are examples of human- caused eutrophication. Eutrophication usually promotes excessive plant growth and decay, favoring simple algae and plankton over other more complicated plants and can cause a severe reduction of water quality. The enhanced growth of aquatic vegetation and phytoplankton distracts the normal function of an ecosystem, causing a variety of problems, such as lack of oxygen needed to fish and shellfish to survive. Eutrophication also decreases the value of rivers, lakes and estuaries for fishing, hunting and aesthetic enjoyment.

Eutrophication was recognized as a pollution problem in some European and American lakes and reservoirs at the end of the 20^{th} century. Since then it has become more widespread. The research surveys showed that 54% of lakes are eutrophic in Asia, 48% in South America, 53% in North America, 28% in Africa.

Although eutrophication is commonly caused by human activity, it can also be a natural process, particularly in lakes. Specialists recognize that climate changes, geological works, and other external influences are critical in regulating the natural productivity of lakes. Human activity can accelerate the rate at which nutrients enter ecosystems. The run-off from agriculture, pollution from septic systems and sewers, and other human related activities may increase the flow of both inorganic nutrients and organic substances into ecosystems.

Elevated levels of atmospheric compounds of nitrogen can increase nitrogen availability. Phosphorus is often regarded the main culprit of lake eutrophication, as its concentrations promote the active growth of algae and the trophic state of lakes. The studies conducted in the Experimental Lakes Area in Ontario proved the relationship between the addition of phosphorus and the rate of eutrophication. As a result of human activity the rate of phosphorus, cycling on the Earth has

considerably increased. It is estimated 600,000,000 tons of phosphorus released onto the surface of the planet, primarily on the croplands.

There are three particularly troubling ecological impacts: decreased biodiversity, changes in species composition and dominance of toxicity effects. Here are some ecological effects caused by eutrophication:

- ✓ Increased biomass of phytoplankton
- ✓ Toxic phytoplankton species
- ✓ Decreased biomass of benthic zooplankton
- ✓ Changes in macrophyte species composition and its biomass
- ✓ Decreased water transparency
- ✓ Water color and smell problems
- ✓ Depletion of oxygen dissolved in water
- ✓ Loss of desirable fish species
- ✓ Decreased aesthetic value of the water body

3. **Formulate the main idea of the article.**
4. **Render the text of the article using the plan and cliches as given in the table above.**
5. **Present the material in a written form to your English tutor.**
6. **Memorize the material prepared; be ready to make a 2-minute report on it speaking before your group.**

UNIT 3
WILDLIFE AND ENVIRONMENT

1. **Read the authentic article «Discover Shotover Country Park» to get to know more about the national parks in Great Britain.**

ARTICLE 4

DISCOVER SHOTOVER COUNTRY PARK

Nature and Wildlife

Whether you are a serious naturalist or simply love being in the countryside there`s so much to see at Shotover. Rare wildflowers such as wild bluebells and yellow archangel and several butterfly species are protected in the woodland. Springs in the hillside create small wetland patches – look out for insects such as dragonflies and patches of peppermint and golden saxifrage. In early summer, the

grassland is full of white flowers of heath bedstraw. In high summer, next to Brasenose Wood you can see some of the last of the flowery meadows which once covered Oxford`s Clay Vale; in August the purple flowers of heather come out. Shotover is home to foxes and badgers. Look out also for interesting birds like yellowhammers, green woodpeckers and goldfinches. And all year round there are magical views down to Oxford and across country.

Paths and Activities

Three nature trails guide you through the Park. Assuming the relaxed pace, the red trail is half an hour, yellow 45 minutes and green about 90 minutes – you`ll love a stroll at Shotover! There are several picnic tables, log seats and a natural sandpit too. Whatever your energy level there`s something for young, old and in-between to share at Shotover. It`s easy to get to Shotover. There`s a car park at the end of the Old Road on the edge of the Park; or take the Wood Farm bus, get off at the corner of Quarry Road and the Old Road.

Shotover Facts

- From Saxon times until the Civil War (1640-s) Shotover was part of a Royal Forest.
- Today the Country Park covers 117 hectares (289 acres) of meadow, valley and woodland.
- The soil is sandy, producing sandy grassland and heath land.
- It`s a nationally important site for several rare species with the whole area designated as a site of special scientific interest.
- Brasenose Wood, at the bottom of the hill provided great beams of oak for many of Oxford`s historic buildings.
- The site is managed to retain its historic character and for conservation, for example the hazel bushes in Brasenose.
- Fascinating conservation work goes on – contact the Countryside Service for details of volunteering and education opportunities.

2. **Work in groups of 3-4 students. Discuss the contents of the article to create a collage depicting the beauty of nature at Shotover in different seasons.**
3. **Work in groups of 3-4 students. Discuss the contents of the article to draw a guide map depicting the three main trails at Shotover Country Park: red, yellow and green.**
4. **Write an informational flyer using the materials studied in the unit. Attract as many tourists as possible to visit national parks of the world.**

UNIT 4
AIR POLLUTION

Text 1 Level A/1

1. **Choose one of the texts «Clean Air at Home» or «What Causes Indoor Air Pollution» to read and understand the contents according to your English language level and answer the questions.**

1. What pollutes air indoors?
2. What happens if we don`t allow fresh air into our houses frequently?
3. What problems can stale air cause at home?

Article 5

Clean Air at Home

Air pollution doesn`t come from factories and our cars. We also cause it at home with the products we use and the way we live. Air indoors can be polluted by cleaning products, dust, paint, insect sprays, cigarette smoke or steam from cooking. We often need to keep doors and windows closed to keep the insides of our houses cool in the summer or warm in the winter. This traps pollutants and can make places for insects, dust mites and mould to live.

Some pollutants such as smoke and insect sprays can cause breathing problems such as asthma, especially for those people who are allergic to dust. To reduce air pollution at home you should open the doors and windows 2 – 3 times a day, use natural cleaning products, and do not allow smoking.

Article 6

Text 2 Level B/1

What Causes Indoor Air Pollution?

Indoor air pollution may not sound too serious, but it does contribute to some terrible diseases like asthma, respiratory infections, and even lung cancer. You need to be very concerned with pollution indoors because lung disease, every year, claims 335.000 American lives. People constantly warn you of the harmful effects of giant factories and exhaust from motor vehicles. However, they do not often discuss the dangers of indoor air pollution.

It is especially dangerous for someone who already suffers from lung problems to be exposed to indoor air pollution on a regular basis. You may never

suspect it, but the quality of air in your home could easily be polluted by many biological pollutants.

Many people get sick and miss days of school and work, when their illness could be prevented by keeping up with good quality air in the home. You could have a number of biological pollutants in your air such as, bacteria, mould, dust mites, and even pets. There are many ways to keep things like mould out of your home, and the sooner you learn of it, the better your life will be.

To help prevent the growth of mould in your home, you need to keep the humidity levels of bathrooms, kitchens, and basements low. This can be done by keeping good air flow in the rooms, and keeping them clean regularly.

A major cause of indoor air pollution is cigarette smoke. It is especially terrible if a person smokes around non smokers. Environmental tobacco smoke is known to cause 3.000 lung cancer deaths and at least 30.000 deaths from heart disease each year among non smokers.

Another cause of indoor air pollution is carbon monoxide. There are many appliances in the home that use gas or wood as fuel, including heating systems, which can release carbon monoxide into your home. This is a serious problem because carbon monoxide is an odorless, colorless gas that stops oxygen from getting to vital parts of the body. In mild cases it can cause dizziness, confusion, headache, and fatigue. However, high doses of carbon monoxide can lead to death. The best defense for indoor air pollution is research combined with common sense choices.

2. Do the quiz to find out if you keep the air inside your house clean and safe.

1. Do people smoke cigarettes in your house?

A Never **B** Sometimes **C** Often

2. Do you use water-based cleaning products to clean your house?

A Yes, always **B** I try to **C** I don`t check

3. Do you clean your air-conditioning filter?

A Yes **B** Sometimes **C** Where is it?

4. Do you ever enjoy meals that require little or no cooking like salads?

A Often **B** Sometimes **C** Not very often

5. Do you clean bedding and items used by your pets regularly?

A No, never **B** Sometimes **C** Yes, often

Mostly As: Great work!

Bs: Try to do your best to reduce indoor air pollution in your home.

Cs: You can do much more to reduce indoor air pollution. Try harder!

3. **Work in groups of 3 – 4 students. Surf the Internet and find more examples of indoor air pollution and its harmful effects. Give a two-minute talk about indoor air pollution and how we can have clean air in our homes.**
4. **Record yourself and let other students and your English tutor listen to your talk in the classroom.**

UNIT 5
ENVIRONMENTAL FACTORS

1. Read the article «Ecological Crisis» to understand its contents.

Article 7

Ecological Crisis

Generally, an ecological crisis **occurs** with the loss of adaptive **capacity** when the **resilience** of an environment or of a species or a population **evolves** in a way unfavorable to coping with **perturbations** that **interfere** with that ecosystem, landscape or species **survival** perspective. It may be that the environment quality **degrades** compared to the species needs, after a change in an abiotic ecological factor (for example, an increase of temperature, less **significant** rainfalls). It may be that the environment becomes unfavorable for the survival of a species (or a population) **due to** an increased pressure of **predation (**for example overfishing). Lastly, it may be that the situation becomes unfavorable to the **quality** of life of the species (or the population) due to a rise in the number of individuals (overpopulation).

Ecological crises vary in length and **severity,** occurring within a few months or taking as long as a few million years. They can also be of natural or anthropic **origin**. They may relate to one unique species or to many species, as in an **extinction** event. Lastly, an ecological crisis may be local (as an oil spill) or global (a rise in the sea level due to global warming).

According to its degree of endemism, a local crisis will have more or less significant **consequences,** from the death of many individuals to the total extinction of a species. Whatever its origin, disappearance of one or several species often will **involve a rupture** in the food **chain**, further impacting the survival of other species.

In the case of a global crisis, the consequences can be much more significant; some extinction events showed the **disappearance** of more than 90% of existing species at that time. However, it should be noted that the disappearance of **certain** species, such as the dinosaurs, by freeing an ecological niche, allowed the development and the

diversification of the mammals. An ecological crisis thus paradoxically favored **biodiversity.**

Sometimes, an ecological crisis can be a specific and **reversible** phenomenon at the ecosystem scale. But more generally, the crises impact will last. Indeed, it rather is a connected **series of events**, which occur till a final point. From this **stage,** no return to the **previous** stable state is possible, and a new stable state will be set up **gradually.**

Lastly, if an ecological crisis can cause extinction, it can also more simply reduce the quality of life of the **remaining i**ndividuals. Thus, even if the diversity of the human population is sometimes considered **threatened** (see in particular **indigenous** people), few people **envision** human disappearance at short **span**. However, epidemic diseases, **famines,** impact on health of reduction of air quality, food crises, reduction of living space and **accumulation** of toxic or non degradable wastes, threats on **keystone** species (great apes, panda, whales) are also factors influencing the **well-being** of people.

Due to the increases in technology and a **rapidly** increasing population, humans have more **influence** on their own environment than any other ecosystem engineer.

2. **Create a glossary to the article «Ecological Crisis». Include the words highlighted in the text.**
3. **Make up lexical cards for each student in the group placing 20-25 words on them either in English or in Russian. Let your group mates translate them at the classes.**

UNIT 6
MICROBIAL ECOLOGY

1. **Read the article «Making Use of Microorganisms» to understand its contents.**

Article 8

Making Use of Microorganisms

Today many industrial processes use biotechnology. Biotechnology means using living organisms to carry out the processes which make substances which we want. The term is normally only used when microorganisms are used, or plants and animals are used to produce something other than food. A microorganism is any organism which is too small to be seen without a microscope. The examples of the

four groups of microorganisms are as follows: protoctists, viruses, bacteria and fungi. You will not be able to do any experiments with viruses, because viruses are very difficult to grow. They can only be grown inside living cells. Bacteria and fungi are quite easy to grow. They need three things – water, warm temperature and a food source to grow and reproduce quickly. Most of them also need oxygen.

Yeast is a single-celled fungus. Yeast cells feed saprophytically. This means they secrete enzymes from their cells. The enzymes digest the food on which the yeast is living, breaking down large molecules into small ones. The small molecules then diffuse into the yeast cell. Wild yeast grows in many different places. It usually grows on foods which contain sugar, such as fruit. When we grow yeast, we need to provide it with the types of food which it needs. It is usually grown in a solution containing carbohydrate in the form of sugar and minerals, including ammonium ions. Each yeast cell absorbs the sugar and minerals, and uses some of them to grow. When the cell gets to a certain size, it produces a new cell. Yeast cells reproduce fastest when the temperature is quite warm.

People have been using yeast for thousands of years to make alcohol. If yeast is added to a sugar solution, it absorbs some of the sugar into its cells. It then uses this sugar in respiration. Usually, the yeast respires anaerobically. When it does this, it converts the sugar to ethanol and carbon dioxide. This process is called alcoholic fermentation. Fermentation is a name for any type of respiration which makes a product other than carbon dioxide and water. Many different alcoholic drinks are made in this way.

Some bacteria, like yeast, respire anaerobically when provided with a suitable source of sugar. One bacterium which does this is called *Lactobacillus.* It uses sugar from milk as its energy source. This sugar is called lactose. *Lactobacillus* converts the lactose to lactic acid. Like all acids, it tastes sour. However, most people like its taste. All sorts of different foods can be made using *Lactobacillus* and milk. Yoghurt is made using a species called *Lactobacillus bulgaricus.* A culture of the bacterium is simply added to warm milk, and left for a few hours. Other species of *Lactobacillus* are used to make cheese. A bacterium called *Acetobacter* can convert alcohol into vinegar, which is a solution of ethanoic acid. It takes just a few days for the bacteria to convert the alcohol into vinegar. The equation for the reaction is: ethanol + oxygen = ethanoic acid + water + energy.

To make bread, yeast, sugar, flour and water are mixed together to make a dough, which is then left in a warm place to rise. The dough is then mixed again, and made into the shapes of the loaves to be made. It is left to rise again, and then baked. The high temperatures kill the yeast, break down the alcohol which it has made, and alter the remaining starch and gluten to make firm textured bread.

2. **Write out the definitions of the most essential topical notions in the article. Give their Russian equivalents and memorize as many as you can.**

e. g.: ***A microorganism*** *is any organism which is too small to be seen without a microscope. Микроорганизм – это любой очень маленький организм, который невозможно увидеть без микроскопа.*

3. **Make a basic bread dough in the following way:**

1 Mix about 0.5 g of sugar into about 50 cm^3 of warm water.
2 Mix about 1 g of dried yeast into the warm sugar solution, and leave for a few minutes.
3 Measure out about 75 g of flour.
4 Add the yeast and sugar mixture to the flour, and pull it around with your hands to make dough.
5 Leave the dough to rise in a warm place covered with cling film.

4. **Study the factors which affect how much the dough rises and also how fast it rises. Choose two factors from the following list to investigate.**

(A) Temperature
(B) Ratio of yeast to flour
(C) Addition of salt (sodium chloride)
(D) Type of flour used
(E) Type of yeast used
(F) Addition of flour improvers, such as ascorbic acid (vitamin C)
(G) Addition of amylase

If you are able to do this practical in a room used for food preparation, then you could bake and eat your bread!
However, if you are working in a science laboratory, then it is not safe to do this!

5. **Prepare a two-minute report on the results of your investigation on making dough. Get ready to speak about it before the group.**

UNIT 7
HUMANS AND THE ENVIRONMENT

1. **Read the article «Can We Avoid Global Warming?» and to understand its contents. Be able to interpret the highlighted expressions in English.**

Article 9

Can We Avoid Global Warming?

Although we need **the greenhouse effect**, people are worried that it may be increasing. The amount of carbon dioxide and other greenhouse gases in the atmosphere is getting greater. This may trap more infrared radiation, and make the atmosphere warmer. This is called the **enhanced greenhouse effect**, and its possible effect on the Earth`s temperature is called **global warming**.

Over recent years, the amount of fossil fuels which have been burnt by industry, and in engines of vehicles such as cars, trains and airplanes, has increased greatly. This releases carbon dioxide into the atmosphere. Fig. 1 shows what has happened to the amount of carbon dioxide in the atmosphere since 1750.

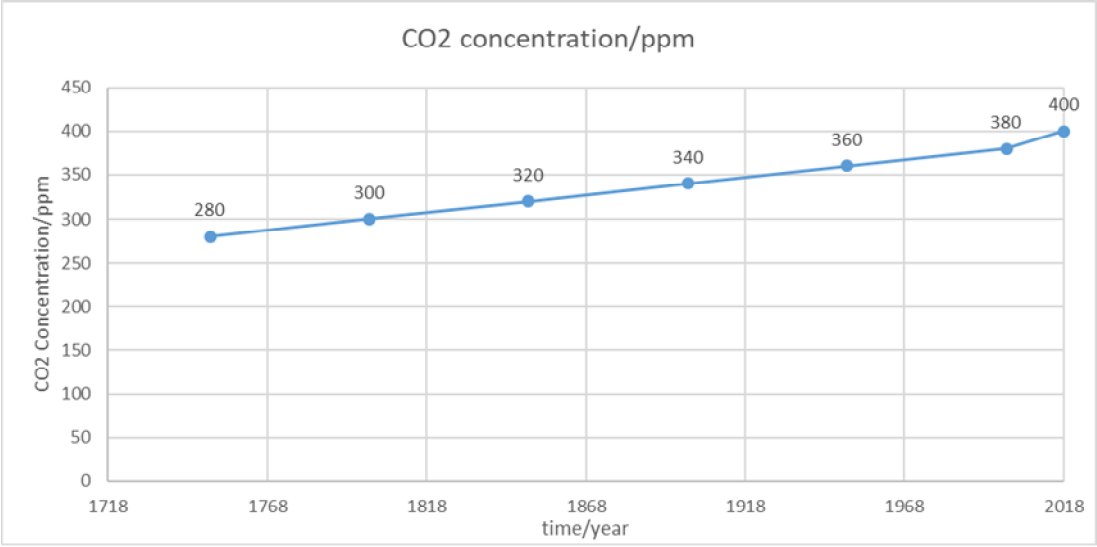

Fig. 1. How carbon dioxide concentrations in the atmosphere have changed since 1750

Other gases which contribute to the greenhouse effect have also been release by human activities. These include methane, nitrous oxide and CFCs. The concentration of all of these gases in the atmosphere is steadily increasing. Some scientists think that, as the concentration of these gases increases, the temperature on Earth will also increase. At the moment, however, no one is quite sure whether this will happen or not.

The fact is that, although we know that the levels of **greenhouse gases** are increasing, we do not know whether this will cause global warming. Nor do we know for sure what effects global warming would have. It is important that we cut down the

emission of greenhouse gases. One obvious way to do this is to reduce the amount of fossil fuels which are burnt. This would reduce the amount of carbon dioxide we pour into the air. Agreements have been made between countries to try to do this, but they are proving very difficult to implement.

Deforestation has also been blamed for increasing the amount of carbon dioxide in the air. It has been argued that, by cutting down rainforests, there are fewer trees to photosynthesize and remove carbon dioxide from the air. If the tree is burnt or left to rot when it is chopped down, then carbon dioxide will be released from it.

Farming can add nitrous oxide to the air. This is because nitrogen-containing fertilizers can release this gas. Nitrogen oxide also comes from burning fossil fuels. We could reduce the amount of nitrous oxide which we release by reducing the usage of fertilizers, as well as cutting down the use of fossil fuel.

Methane, like nitrous oxide, is produced by farming activities. It is released by bacteria which live on organic matter, such as in paddy fields – flooded fields which are used for growing rice, by animals which chew the cud, such as cattle, and by some insects, such as termites. Methane is also produced by decaying rubbish in landfill sites. We can help this problem by reducing the amount of rubbish which we throw away, and by collecting the methane from these sites. It can be used as fuel! Although burning it for fuel does release carbon dioxide, this carbon dioxide does not trap so much infrared radiation as the methane would have done.

2. Study the graph given in the article and answer the following questions.

1. What does the graph describe?
2. What period of time does the graph cover?
3. Did the amount of carbon dioxide remain the same from 1750 to 2018?
3. When was the least amount of carbon dioxide produced by the human?
4. What is the general trend of releasing carbon dioxide according to the graph?
5. What is the largest amount of carbon dioxide released into the air?

3. Write a summary describing the processes of carbon dioxide emissions as it is shown in the graph.

4. Speak on the reasons for increasing carbon dioxide emissions on the basis of the article you have read and the graph you have described.

UNIT 8
WATER POLLUTION

1. **Read the article «Overfishing» to understand its contents and to learn more about the problems overfishing can cause.**

Article 10

Overfishing

Humans have probably always used fish as a source of protein-rich food. However, in recent years there has been increasing concern about the threat to fish populations from the large numbers of fish which are being caught. As a result of the great numbers of fish being caught, the populations of most of the species which are used for food are getting less and less. If we are not careful, the populations will get so small that there will not be enough adult fish left to breed. As it is, fishermen have to work harder to catch enough fish to make a living.

The only way to ensure that we do not destroy fish populations is to reduce the number of fish which are caught. However, this is not easy. Each country wants to make sure that it gets a fair share of the fish catch, so any international decision is very difficult to make. Everyone is worried that the other countries are getting more fish than they are. Moreover, fish do not stay in one place in the sea. Even if a country manages to reduce fishing to reasonable levels around its own shores, the same fish may be under threat when they move to the seas around other countries.

In 1982, the European Community agreed on a common Fisheries Policy, to manage fish resources in the seas around Europe. That policy was concerned not only with conserving fish stocks, but also with making sure that European fishermen could compete with fishing industries in other parts of the world, and that there was a plentiful supply of fish for people to buy at reasonable prices. It resulted in an increase in fishing, because it helped people to replace their old fishing boats with new, more efficient ones. As a result, overfishing actually got worse. In 1992 and 2002, the Common Fisheries Policy was reviewed. There was great concern that there would soon be no fish left to catch. A system of control is now used called *Total Allowable Catches*. This means that fishing fleets are given a maximum amount of fish that they are allowed to catch. Once they have caught this amount, they must stop fishing. Only certain species of fish are allowed to be caught, and only fish over a certain size. This, in theory, leaves the young fish to grow and reproduce. To help to stop small fish being caught, the mesh size of the nets must be above a certain size.

There are still many problems with this policy. Firstly, the size of existing fish populations must be estimated, which is very difficult to do. Then someone must calculate the probable effects on the populations of different amounts of fishing, and

decide on a Total Allowable Catch which will allow the population to stay the same, or to grow. There is constant pressure from fishermen to increase the Total Allowable Catch, because this is how they earn their living. Consumers also want the amount of fish caught to be as high as possible, because this keeps fish prices down. Another problem is policing the amount of fish caught. It is obviously impossible for every catch from every fishing boat to be checked. Fishermen are mostly responsible for reporting their own catch. It is easy for them to say they have caught less than they really have. Could the Common Fishing Policy be improved? Most conservationists think that it is essential to make more effort to conserve fish stocks, unless we want to have no fish left in a few years` time. They suggest that the size of fishing fleets must be reduced, even though this would mean many people losing their jobs. But this is a very difficult political decision for a government to take.

2. **Imagine you are a conservationist or a fisherman. Make up a dialogue with your partner on the problems of overfishing. Try to discuss the following items:**

- ❖ Aims of the Common Fisheries Policy of 1982;
- ❖ Ways in which the policy of 1992 and 2002 tried to solve the problem of overfishing;
- ❖ Explain why the policy of 1992 and 2002 was not successful in its aim of conserving fish stocks;
- ❖ Make your own suggestions as to how the problem of overfishing in the seas around Europe could be solved.

3. **Surf the Internet to find out what documents regulate fishing policy in Russia. Report on your findings before the group.**

UNIT 9
ECOLOGICAL NICHE

Read the article «Studying Ecosystems» and match the headlines (1 – 5) with the paragraphs (A – E) to check the comprehension of the text.

1. Transects sample changes between habitats.
2. Quadrats are used to sample plant cover.
3. Sampling can estimate abundance.
4. Mark, release, recapture estimates numbers.
5. Sampling should be random.

Article 11

Studying Ecosystems

A There are many different ways of studying ecosystems. But whatever ecosystem you study, and however you decide to study it, you will have to begin by identifying the living organisms in it. When you have identified as many of the organisms as possible in your ecosystem, you can make a list of them, called a species list. The next job will probably be to try to find out how many of each species live there. Sometimes, you can simply count them. Often it is not quite that easy. If you are studying part of a field, for example, you could not possibly count every buttercup plant. You will have to take a sample of the field, and count the numbers of each species in that sample. If you work out the scale factor of the sample to the whole field, you could then get an indication of the numbers of each species in the field.

B One very useful way of taking a sample is to use a quadrat. **A** quadrat is a square. It can be any size, but one with sides of about 0.5 m is a convenient size to use in a field. The quadrat is put down onto the ground, and the numbers of each species of plant inside it is counted. With some species, like grasses, though, it is impossible to say where one plant stops and another begins. In this case, you can estimate what percentage of the quadrat area is covered by grass, and by other plants. If the plants in your quadrat are quite tall, there may be more than one layer of plants. In this case, the total of all your percentages may be more than 100%.

C Your quadrat sample only gives you an idea of the numbers of plants in one small area. You cannot guarantee that the area is representative of the whole field. You will need to do many quadrats, and average your results from each, to be sure of getting a representative sample. The placing of your quadrat is very important. If you just choose where to put it, the part of the field full of gorse bushes and nettles, with a bull standing behind them, will probably not get sampled very often! So you

must use some way of placing your quadrats randomly in the field. There are several ways of doing this. One way is to divide the piece of ground into squares and use pairs of random numbers as co-ordinates. These you can get from tables. If your numbers are 12.8 for example, you could go twelve squares forward from a corner along an edge, and then eight squares out into the field, and put your quadrat down at that point.

D Another way of sampling the distribution of organisms in your field is to use a transect. A transect is a line crossing the field. You can use a long tape measure to mark the transect. You then record the species of plants touching the tape. Often, it would take far too long to record all the plants touching the tape. Instead, you might record them at intervals, say every 10 cm. Transects are particularly useful where one kind of habitat is changing into another. You could use one, for example, where a grassy field merged into a wood, or into a stream. A transect will give you information about how the numbers and kinds of species change, as the environment changes.

E Quadrats and transects are very useful ways of finding out how many organisms of different species are living in a habitat. But they can only be used with organisms which stay in one place for most of the time. This usually means plants, though on a seashore you can also count limpets, barnacles, sea anemones, and many other animals in this way. You need a different method for estimating the numbers of animals that move around a lot. One method is the marks, release, recapture technique. It works so long as there are reasonable numbers of each kind of animal, and so long as they move around quite freely. Suppose that you wanted to estimate the size of a population of woodlice. First, you need to capture a sample of perhaps 30 woodlice. Each woodlouse is marked with a small spot of waterproof paint, and then released. The woodlice are then left alone for about a day, to give the marked ones a chance to become mixed with any unmarked ones. You then capture a second sample, of as many woodlice as you can. Count the total number, and the number of marked ones. Suppose that you caught 100 woodlice in your second sample, and 10 of them had been marked. You have recaptured 10 of the 30 you originally marked, or one third of them. So it is probable that you have caught about one third of the whole woodlouse population. The size of the population will therefore be about 3x100 woodlice, that is 300. In general, the formula for working this out is: *numbers of animals caught the first time* ***x*** *(number of animals caught the second time****:*** *number of marked animals caught the second time*).

2. **Write out of the article you have read the names of all the plants and animals mentioned in the text. Find their Russian equivalents in your dictionary.**

3. Write down the answers to the following questions.

1. When using a quadrat, how can you estimate the amount of a plant, such as grass, in your sample?
2. Why is it important to place quadrats randomly?
3. When might you use a transect?
4. 50 water beetles were caught and marked, before being returned to their pond. The next day another fifty water beetles were caught, ten of which had been marked. About how many water beetles were in the pond altogether?

4. Work in groups of 3-4 students. On the basis of the article you have read prepare a presentation on different methods of studying ecosystems.

UNIT 10
WASTE DISPOSAL

1. Read the article «Recharge Your Batteries!» from the magazine «Best». Find out what solutions to some ecological problems are offered in it.

Article 12

Recharge Your Batteries!

Every time you throw away a battery, you are adding to the toxic waste that is spoiling our planet. So why not buy rechargeable ones and help solve the problem?

Have you ever thought about the number of battery-operated appliances you own? From radios and cameras to torches and toys, they quickly add up. But batteries contain mercury, lead and cadmium, all of which are known to be toxic. When they are dumped or incinerated, those heavy metals escape into the atmosphere and the ground.

The making of batteries also uses a great deal of energy – up to 50 times as much as they`ll ever give you in your favorite device! So always plug things into the main if you can. And when you buy toys for children, try to avoid battery-operated varieties.

Some green batteries contain reduced amount of cadmium, or even none at all, but still work just as well. You can find them in supermarkets and chemicals. The greatest solution – and much cheaper – is to buy a battery recharger, and start using rechargeables. These batteries can be re-used up to 50 times, and are juiced up overnight from the main.

Most manufacturers also run a recycling scheme for used rechargeables, to ensure they`re safely disposed of when they reach the end of their life.

Green tip: when you throw away an aluminium can, you waste as much energy as if you`d half filled it with petrol and poured it all away! So recycle instead – can banks are everywhere now!

2. **Create a list of green tips which would contribute to keeping the environment cleaner and healthier. Report on them in the classroom.**
3. **Choose 3 – 4 makes of batteries and compare their advantages and disadvantages. Write down two paragraphs on the topic expressing your ideas.**

UNIT 11
BIRD ECOLOGY

1. **Read the article «Bird Ecology and Conservation» to understand its contents. Level A2/B1.**

Article 13

Bird Ecology and Conservation

What is bird ecology and conservation and why is it important? Ecology is the study of animals and how they relate to their environment. Bird conservation is the study and science relating to birds that are threatened by the dwindling of natural resources. It is a way to try and conserve the birds and prevent them from dying off. Therefore, bird ecology and conservation would be the science that revolves around the bird population and the environment.

Scientists have learnt that the human race has made quite an impact on the birds in the world. In fact, some have already become extinct or on the verge of extinction due to the impact the humanity has made on the earth. The study of bird ecology and conservation can help to find ways to undo some of the damage that has been done or at the very least help to prevent more harm from being done.

Humanity is not the only thing that affects birds and their environment. Other animals that are natural predators play a big role in how birds of all kinds impact the earth. The change in the weather even has an effect on the bird population and their habitats. Birds follow a certain behavior pattern that could have a big impact on the earth if it were to be drastically changed. This happens

when a species becomes extinct or when the weather changes dramatically causing confusion among birds. They are not sure when to migrate, mate or do any of their natural functions when nature is out of whack.

Bird ecology and conservation studies are essential to the health and well-being of the bird species. The way they eat, live, mate and even take care of their young will affect the world in some way. Therefore, it is important to study them and learn how they are related to the environment. This is the only chance to protect and conserve the natural order of things, to help enhance the quality of life for the future generations to enjoy.

2. **Give a 2-minute talk describing why it is important to study bird ecology and conservation. Use the information given in the text.**

3. **Read the authentic article «The British Birds» from the book «What to look for in summer» and find out more about the diversity of birds in the UK. Level B1/B2**

Article 14

Some 230 kinds of birds live in the UK, another 200 are regular visitors, and many are songbirds. The most numerous are blackbirds, sparrows and starlings. Robin Redbreast is the national bird of the UK. The number of ducks, geese and other water fowl has diminished during recent years. Partridges, pheasants and other large and rare birds are protected by law. Gulls and other sea birds nest near the coast.

In the marshland the redshanks that were nesting in April and May have, by June, hatched their chicks. Redshanks lay large eggs, and when the chicks hatch they are able to run and help look after themselves. With their long bills, like their parents, they can probe the moist earth for worms and insects. They have lovely surroundings for their school and playground. Ragged-robin and cotton-sedge grow together in moist places. When any danger threatens, the mother redshank will give a warning call – a plaintive piping, *tu-tu-ee* – as she takes wing. The young birds crouch down and freeze at her command. They stay absolutely still and obedient, their color blending so well with the surroundings that they are extremely difficult to see. When the threat has passed, only then will she give the word that all is safe again: the chicks come out of their freeze and unconcernedly look around for something to eat.

Wild creatures are always in danger, but they do not suffer fear as human beings do. To them it is all part of the business of growing-up. The seven chicks of the moorhen`s brood have survived, and by mid-June are half grown, though still covered by their infant-down. The broad, floating leaves of the water lilies are quite

strong enough to support both young and full-grown birds as they run across them to plunge again into the pond. Of the original fourteen chicks that were hatched on their island-nest, only half are still alive. They follow their mother obediently, but, since she doesn`t know how to count, she doesn`t miss the laggard when it fails exhausted by the way. But now the dangers of the early days are passed, and so these seven chicks are likely to become full-grown moorhens.

The swallows are skimming the air and hawking the flies. A couple of starlings with their maturing brood are perched on the roof ridge. Starlings are sociable birds, good mimics and extremely talkative. When several thousand flock together they can make a great din. A family of jackdaws is flying over, and a young pied-wagtail has just caught a large fly. A spotted fly-catcher has just left its look out perch on a post and is hawking flies. Why, you may ask, is it called a spotted fly-catcher when it has no spots? It is the young birds, in their first year`s plumage, that have the spots – and very striking they are.

A flock of Canada geese is swimming upstream. It is debatable whether these handsome birds are really natives of the British Isles. But whether they have escaped from zoos or private parks, or are migrants from North America, it is certain that they have bred here for more than two centuries in a wild state – so it looks as though they might be claimed as British birds.

4. **Create a glossary of the birds` names mentioned in the text, give their Russian equivalents and check the pronunciation in your dictionary (at least 12 names!).**
5. **Prepare a 2-minute talk on one of the kinds of birds found in the UK. Use the information given in the article.**

UNIT 12
RADIOACTIVE ECOLOGY

1. **Read the article «Effects of Radioactive Pollution» to understand its content.**

Article 15

The source of radioactive pollution is mostly man-made. Radioactive substances are those which have the ability to emit high energy particles, like alpha and beta particles and gamma rays. Radioactive substances are unstable in nature and are continuously emitting these particles in order to gain some stability. When we are talking about the effects of radioactive pollution, it means the effects of these emissions on the environment and living beings of the earth.

Radioactive pollution is rising because of the increase in radioactivity uses. It occurs mostly from the waste products that are left behind after the use of radioactive substances. The materials are disposed off without any precautions to isolate the emissions, which then contaminate the air, soil and water. The greatest amount of radioactive waste is generated from nuclear reactors used in nuclear power plants and for many other purposes. It may also occur during extraction of the radioactive material. Nuclear accidents and nuclear explosions are two of the worst man-made sources of radioactive pollution.

Radioactive emissions from nuclear weapons are the most harmful for the environment, as they stay in the atmosphere as long as a hundred years. Thus, it affects several generations. Similarly, the radioactive substances from the land surface may flow down to the water and remain there for years, which cause harm to the aquatic animals. In this way radioactive pollution has a destructive effect on the entire ecosystem.

When the soil gets contaminated by radioactive substances, it is transferred to the plants growing on it. It can lead to genetic mutations of the plants` DNA and affect its normal functioning. Some of the plants may die after such exposure while others may develop weak seeds. When any part of the contaminated plant is consumed by humans, it causes serious health risks. The effects of radioactive pollution on human beings often vary from mild to severe. Among the particles emitted from these substances, the effect of alpha particles is the lowest and the gamma rays are the most dangerous. When the human body is exposed to radiation, it reacts with its biological molecules. This leads to the formation of a large number of free radicals that destroy vital molecular components like proteins, enzymes, nucleic acids, etc.

Long term exposure has far more serious health effects. It has a serious threat to various systems of the body including cardiac system, neurological system and reproductive system. The radioactive rays can cause irreparable damage to the DNA molecules and lead to a life-threatening condition. It causes genetic mutations that promote the growth of cancerous cells in the body. The effects of genetic mutations tend to pass on to the future generations as well. In other words, if the parents are exposed to nuclear radiation, then their child could be born with genetic birth defects and retardation.

Most of these effects of radioactive pollution do not show up immediately, but have severe long term health consequences. Therefore, it is imperative that some measures must be taken to minimize radioactive pollution.

2. Check your comprehension of the text. Decide which of the following statements are True/False.

1. Some of the plants may reproduce weak seeds or even die after X-ray exposure.
2. The effects of genetic mutation never pass on the next generations.
3. The effects of radioactive pollution show up immediately, but have no serious health consequences.
4. Radioactive pollution is rising because of the increase in radioactive uses.
5. Nuclear accidents and nuclear explosions are the two main sources of radioactive pollution.
6. Radioactive pollution may occur during the extraction of the radioactive material.
7. Contaminated plants, for example fruit, consumed by the human doesn`t cause any serious health risks.

3. Choose one of the topics and make up a micro-dialogue with your partner on the basis of the text you`ve read. Act it out in the classroom:

- ❖ Damage caused by radioactive pollution to plants and animals.
- ❖ Physical properties of radioactive substances.
- ❖ Threats to human health by radioactive pollution.

Writing bank

1. Writing an email.
2. Writing a formal letter.
3. Writing a memo.
4. Writing a report.
5. Writing a preliminary grant application.
6. Writing an informational flyer.
7. Writing a request for lab work.
8. Writing a preliminary project form.
9. Writing a summary of a treatment plan.
10. Writing an information leaflet.
11.Writing water treatment recommendation.
12. Writing a recycling center brochure.
13. Writing a resume.
14. Filling in a form.

b. Writing an email.

Emails should have a clear logical structure. Look at the recommendations given below.

Email structure

Subject line: This should be short and give some specific information about the contents of your message.

Salutation: As in letter – writing, the salutation can be formal or informal, depending on how well you know the person you are writing to. After the salutation a comma is used. In formal letters written in American English a colon may be used. Never put an exclamation mark after your salutation!

Dear Mr, Mrs, Ms ...A formal form of address, also used when first contacting a person.

Dear John Less formal. Either you have had contact with this person before, or they have already addressed you by your first name.

Hi/ Hello Mary (or just the name) Informal, usually used with colleagues you often work with. In the USA and the UK also sometimes used at first contact.

(No salutation) Very informal, usually used in messages which are part of a longer email exchange.

Opening sentence: This is used to explain why you are writing. (Remember: the opening sentence should always start with a capital letter).

I'm writing to ... More formal introduction to say why you are writing.

Just a quick note to ... Friendly, informal way to say why you are writing.

Conclusion: This is where you tell the reader what kind of response, if any, you expect.

Looking forward to your reply. Friendly ending, can be used in formal or informal correspondence.

Hope to hear from you soon. Informal ending to indicate a reply is necessary.

Close: Like the salutation, this can vary from formal to very informal.
Yours sincerely Very formal, rarely used in email correspondence.
Regards / Best wishes Most commonly used close, can be used in formal and informal emails.
Bye / All the best / Best Friendly, informal close.
James/ Mary Name only (or initials) is also common when writing to close colleagues.

c. Writing a formal letter

Task1. Answer the following questions to see how much you know about writing formal letters.

1. **How do you write your address in a formal letter in English?**

a) 52, Petersfield Road
Richmond
Surrey TW7 8AS

b) Petersfield Road 52
Richmond
Surrey TW7 8AS

c) Mark Evans
52 Petersfield Road
Richmond
Surrey TW7 8 AS

2. **Where do you write your address?**

a) In the top right corner
b) In the top left corner
c) Below the address of the person or company you are writing to

3. **Where do you write the address of the person or company you are writing to?**

a) below your own address on the right
b) below your own address on the left
c) in the top left corner

4. **How do you start your letter?**

a) Dear Mr Black
b) Dear Arthur
c) Dear Arthur Black

5. **How do you start your letter if you don't know the person's name or if he/she is a man or a woman?**

a) Dear Mister or Madam
b) Sir or Madam
c) Dear Sir or Madam

6. **How do you end your letter?**

a) Thank you in advance for your interest.
b) See you soon.
c) I look forward to hearing from you.
d) Thank you for your kind attention.

7. How do you say goodbye in a formal letter?

a) *Love,*
Mark

b) *Best wishes,*
Mark

c) *Yours sincerely,*
Mark Evans

d) *Yours faithfully,*
Mark Evans

e) *Cheers,*
Mark

8. When do you use *Yours sincerely* and when do you use *Yours faithfully?*

a) When you know the surname of the person you are writing to

b) When you don't know the surname of the person you are writing to.

Task 2. Match a greeting with a suitable ending:

Dear Sir or Madam	Yours, Bob
Darling Rosie	Yours faithfully, Robert J.Fleming
Dear Ms McDonald	Lots of love, Bobby xxx
My dear Helen	Yours sincerely, Brian Forth
Dear Philip	Love, Mary

Task 3. There can be a big difference between the styles used for writing emails and for writing letters. Often – but not always – emails are less formal. Below is a table of different expressions used for writing letters and emails. Write each phrase below in the correct place in the table.

1. *wbw*
2. *Re:*
3. *Dear Sam*
4. *Let me know if you need more information*
5. *Hi Sam*
6. *Sorry about*
7. *Please …*
8. *… attached*
9. *I should be grateful if you would …*
10. *Please accept our apologies for …*
11. *We regret to inform you …*

12. *Please find enclosed …*
13. *With reference to …*
14. *I'm afraid …*
15. *We are very pleased to inform you …*
16. *If you need more information, please do not hesitate to contact us.*
17. *I'm happy to tell you…*
18. *With best wishes*

	Letters	Emails
Greeting		
Topic		
Request		
Apology		
Documentation		
Bad news		
Good news		
Conclusion		
Closing		

Task 4. Below is an outline of a formal letter. Look at it carefully.

Your address
(not your name)

The name and address
of who you are writing to

The date

The greeting

Introduction

Main part

Concluding comment

The ending

Your signature

Task5. The following are the contents of a letter. Divide it correctly and put in the right place according to a formal letter layout rules.

Rua Luis de Deus 18, 3000 Coimbra, Portugal. 29th March 1991. The principal, The Oxford English College, 234 Hilton Road, Eastbourne BN43UA. Dear Sir or Madam, I saw your advertisement for English classes in this month's *English Today* magazine and I am interested in coming to your school this summer. I have studied English for three years but I have never been to England and I feel that this is now necessary, especially to improve my pronunciation. Please could you send me more information about your courses, and an application form. I would also like some information about accommodation. I look forward to hearing from you as soon as possible. Yours faithfully, Ana Maria Fernandes.

d. Writing a memo

Read guidelines for writing a memo:
Memos are usually for internal communication. The level of formality depends on the relationship between the writer and reader.

1. Use the neutral language.
2. Use a standard format. It should include:

- The name of the sender
- The names of the staff or the department who are to receive the memo
- The date it was issued
- The names of any people who are to receive copies

3. Be brief and to the point.
4. You can use some abbreviations. E.g. pls=please; asap= as soon as possible CC= copy to; attn= attention

Internal Memo

To: *David*	Date: *15 April*
From: *Sandra Clifford*	CC: *Michael Tailor*

Attn: Significant Climate Change in Gilbert Valley

While monitoring Gilbert Valley I noticed these trends:
The average temperature is up 20 degrees. Also, the average precipitation has decreased by 15 inches. This is significant and we need to research these changes further asap.

e. Writing a report

Look at the examples of different reports and be ready to write a report of your own.

1. **Write a report about population growth. Include: statistics on population growth, the effects of it, and predictions for the future. Suggested answer:**

Population growth has become a huge problem for our planet. Right now, there are over 7 billion people on Earth. That number is increasing by 1.14% every year. In less than 100 years, the population will exceed the planet's carrying capacity.

This has many negative effects on our resources. Services like healthcare are already suffering at the current population level. There is much demand for natural resources, too. Consumption of fossil fuels is very high. In the future, we won't have any.

To stop the strain on our resources, population growth must slow down. Education about birth control and family planning will help control the population. Governments should develop programs to help people with these things.

2. **Write a report on a standing body of water. Include: the problems discovered, the cause of the problems, and the likely consequences**.

Suggested answer:

The problem: Summit Lake is becoming too polluted to support life.

Cause: Cultural eutrophication is causing the problem in the lake. Pollutants are increasing algae growth.

Likely consequences: The algae are growing too quickly, and toxins are present. The algae growth is also lowering levels of dissolved oxygen. This is dangerous for the fish and the whole aquatic ecosystem. The fish population could die off, and any humans that drink the water could become ill.

3. **Write a report on the benefits of an advanced wastewater treatment plant. Include: the differences between primary and secondary treatment, and the environmental effects of wastewater.**

Sample answer:

The importance of developing a new wastewater treatment plant

The proposal: The city should create an advanced wastewater plant with secondary treatment options, including a bioreactor and activated sludge.

The purpose: Primary treatment of wastewater only removes sediment. In addition to removing sediment, secondary treatment of wastewater removes pathogens and chemicals. Without secondary treatment, those substances would enter larger aquatic bodies.

The outcome: Creating a secondary treatment center for wastewater will help protect the local and global environment. The undesirable chemicals in the wastewater will be removed before the wastewater runs into larger bodies of water.

4. **Write a report about improvements to a power plant. Include: controls that need improvement, your recommendations, and the benefits of these improvements.**

Sample answer:

The Northwest Power Plant is in great need of modernization. Our processes are simply too outdated. They are creating large amounts of pollution. The plant needs to improve its precombustion and postcombustion controls. For precombustion controls, the plant currently uses low-sulfur coal. However, coal cleaning may be a better method. This will not only reduce emissions, but also increase overall efficiency in the plant.

The plant's current postcombustion controls include flue gas desulfurization. However, this is too expensive and not very efficient. Particulate control devices may work better. For instance, cyclone collectors will collect large particulate matter. And baghouses will collect smaller matter. In addition, they are very cost effective. Incorporating these pre- and postcombustion controls will improve the overall effectiveness of the Northwest Power Plant.

5. Writing a preliminary grant application

Look at the sample of a preliminary grant application. It should include a brief description of your project and the reasons for its financial support.

Sample answer

Federal Public Works Funding
Preliminary Grant Application

Briefly describe the project for which you are requesting funding: The project seeks to improve energy recovery for businesses in our region. It focuses particularly on improving recycling rates.

Explain why federal funds are necessary to complete this project: The cost of necessary machinery exceeds the budget allowed by the municipality.

6. Writing an informational flyer

Task: write an informational flyer about your city's waste management programs. Include: the methods the city uses, their benefits, and their safety features.

Suggested answer:

City of Bridgeport
Waste Management

We need to protect our health and the health of our environment. Tha's why waste management is a huge priority in Bridgeport. We use a number of waste management methods, including:

Solid waste landfills: These sites handle most of the city's municipal and industrial waste. They are safe and carefully regulated. To control odors and to prevent garbage from scattering, we use cells, daily covers and lifts. The landfills also have composites liner to prevent water pollution. To keep the air clean, we use pipes to remove methane from the landfill.

Deep-well disposal: Our deep-well disposal site is for liquid hazardous waste. It is a permanent storage method for toxic liquids. And unlike other liquid waste management methods, it is relatively safe for the environment.

7. Writing a request for lab work

Write a request for lab work. Sample answer:

Boro Labs
Lab Work Request Form

Client: Carter Crops, a client that is trying to improve crop output
Lab work requested: The client would like to prevent diseases that affect young plants.
What is the purpose of the requested work?
This will help the client to reduce consumption of his product and improve his final product output.

8. Writing a preliminary project form

Fill out the preliminary project form.
Sample answer:

Jarman Environment Planning
Preliminary Project Proposal

Description of the proposed project:
The proposed project is to reroute the development of a new highway around the city.

Reason for project:
This project will help protect endangered herons.

Research required:
We need to determine how the new route will affect the surrounding environment.

9. Writing a summary of a treatment plan

Task: Summarize the treatment plan for a brownfield. Include the type of treatment that will be used, why it was chosen, and how it will be delivered.

Suggested answer:

Green Valley Land Restoration

Summary of treatment: We plan to use ISCO, also known as in situ chemical oxidation, to treat the contamination around the brownfield. ISCO uses chemical oxidants to oxidize and destroy contaminants. We decided to use this treatment because it has been proven effective against chlorinated solvents similar to the chemicals contaminating the brownfield. While ISCR may have treated the contaminants, there was no guarantee, so we decided against using it. To deliver the chemical oxidants, we decided to use direct push drilling. This method is the standard for soil of this permeability, and soil mixing was not an option because the contaminants have seeped too far into the ground. Thus, direct push drilling is most cost effective.

10. Writing an information leaflet

Task: Write an information leaflet about sustainability/ Include: changes to make at home, other ways to help, and how to get involved.
Suggested answer:

Sustainable Living: What Can ***YOU*** Do?

Climate change, overpopulation, pollution – the challenges facing the Earth today can seem almost impossible to overcome. But the contributions of every individual can lead to a sustainable living culture. In almost every aspect of your life, you can make choices to reduce your carbon footprint.
So, what can you do? First, use mass transit or carpool. Carbon dioxide emissions from cars count for over 30% of all carbon emissions.
Next, if you can, plant a garden. If you don't have space for one, make sure you buy local produce. Either way, you'll reduce the amount of fuel it takes to transport produce from far away.

You can also conserve water whenever possible, and small changes can lead to big savings. Grass lawns waste thousands of gallons of water. Xeriscape your yard to cut back on water usage. By purchasing rain barrels, you can water that yard without wasting a drop of water.
In your home, make sure that you unplug all vampire appliances. Simply unplugging your cell phone charger can reduce the amount of wasted electricity.
Above all else, avoid apathy! Get involved with the political process. Support legislation that promotes alternative energy sources, and boycott companies that aren't environmentally friendly.

11.Writing water treatment recommendations

Task: Write a water treatment recommendation for the city council. Include: how the water is currently treated and recommendations for new treatment methods.
Sample answer:

Overview of water treatment

Pollutants come from many different sources. Point sources, like factories and sewage plants, are easy to identify and regulate. Waste can be treated before release. Then it can be released under controlled conditions into flowing water. There, natural processes will cleanse the water and filter out degradable waste.
Nonpoint sources are more challenging to manage. These sources often leak pollutants into inaccessible groundwater. Since the water moves slowly, it does not dilute waste very quickly. Excessive nutrients leak into lakes and streams, causing cultural eutrophication. While some eutrophication is okay, too much algae impairs other life.
To address these problems, we must treat wastewater. Before water can be reused, it must undergo disinfection. This can be done chemically by chlorination, or with UV light. For urban sewage, primary sewage treatment is a method that removes solids from waste. This can be combined with the biological purification of secondary sewage treatment. Together, they remove up to 97% of organic waste from water. Septic tanks are a good way to perform treatment for individual homes.

12.Writing a recycling centre brochure

Task: Write a recycling centre brochure.
Sample answer:

Chester cleans up with recycling program

Get ready to recycle, reduce, and reuse. Mayor Wendy Richardson announced plans for Chester's recycling program yesterday.
Richardson wants to reduce consumption. "We need to use less and recycle more," she said.
The program will start next month. Residents can put bags of postconsumer waste next to their regular garbage. A recycling truck will pick them up. They will go to a new recycling center. "We will accept plastics with recycling codes of 1 and 2. We'll also take glass, aluminum, and paper products," Richardson said. "We'll even take Styrofoam."
The recycling center has two separate facilities. One is for primary recycling. The other is for secondary recycling. The city is also working with local manufacturing plants. It will collect their preconsumer waste, which is often thrown away. Many residents are excited about the recycling initiative. Randall Davis said, "I'll make compost with my kitchen waste. But I'd love to recycle non-organic materials. This is a great program!"

13.Writing a resume

A good resume should be:
1. Well structured;
2. Short (not more than one page);
3. Written in a correct precise language.
There are different types of resumes. Usually there are 7 sections in a resume: 1) personal information (your name, marital status, age, contacts – email address, mobile phone number); 2) objective (a statement which explains what position you want to get); 3) education (educational institutions with dates of attendance, listed in a reverse chronological order); 4) work experience (places of work, positions and main responsibilities listed in a reverse chronological order); 5) skills (computer literacy, languages); 6) extracurricular activities (your hobbies and interests); 7) references.
Look at a sample of a resume given below and be ready to write a resume of your own.

Maria Alvarez

12 Santa Rufino
33396 Gijon, Spain
Email: maralva@hotmail.com
Tel.: (+34) 663 246 357
Marital status: single
Nationality: Spanish (EU citizen)

Final year ecology student with good IT, organizational and research skills, seeking a position of environmental engineer in a dynamic group

EDUCATION

2018 – Present	Manchester Metropolitan University, Faculty of Biology, Master course, Major in Ecology
2014 – 2018	Madrid University, faculty of biology, Bachelor course, Major in Ecology. Graduated with high honors.

PROFESSIONAL EXPERIENCE

2018 – Present	Centre for Environmental Engineering, Manchester, Lab Assistant. Dealing with sustainability practices. Assistance in designing water treatment projects.

SKILLS:

IT	Microsoft Office – competent in Word, Excel, PowerPoint.
Languages	Spanish – mother tongue English (B2)
INTERESTS	Sport (mountaineering), travelling, music
REFERENCES	Available upon request

14.Filling in forms

Look at the typical phrases used in forms. Make sure you understand all of them:

1. *Please write in block capitals.*
2. *Delete where not applicable.*
3. *Put a tick where applicable.*
4. *Put a cross where applicable.*
5. *Put your signature.*

Match the questions and the sections in forms:

A	**B**
1. What is your first name?	a. Occupation

2. What is your family name?	b. Nationality
3. Where should we write to you?	c. Permanent address
4. Where are you staying?	d. Marital status
5. Where do you live?	e. Current address
6. Are you married?	f. First name
7. What do you do?	g. Surname
8. What is your citizenship?	h. Correspondence address
9. Are you male or female?	i. Gender

Marital status can be described in different ways:

- Single
- Married
- Unmarried partner
- Divorced
- Widowed

Task1. Search the Internet, look at the sites of foreign universities, find an application form for admission as an international student and fill it in.

Task2. Fill in a visa application form.

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