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## ЭКОЛОГИЯ СЕГОДНЯ

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## LESSON 1

**Grammar:** 1. Порядок слов в английском повествовательном предложении.

2. Имя существительное (*The Noun*). Число (*Number*). Падеж (*Case*). Имя существительное в функции определения.

3. Артикли (*Articles*).

**Text:**

### On the Move

As winter approaches, billions of birds worldwide are flying mostly south from their northern homes for where food is plentiful and living conditions are hospitable. Like clockwork, these birds depart for their winter homes as a means of survival, despite the fact that their journeys can be quite *formidable*.

*Migrating* birds depend on the seasonal availability of resources in order to survive and maintain their health. In Russia, for example, the Russian Arctic offers swans an abundance of food in the summer, which can be gathered with less competition from other *species*, and safe nesting places where there is relative freedom from human disturbance.

After summer, as the food supply disappears and the ice begins *to permeate* the region, the birds migrate to milder climates such as Great Britain where they can find *ample* resources and shelter to sustain them.

Migration is one of the most widely studied areas of bird biology, and yet it is very poorly understood. Even though people have observed and noted migrations for centuries, there is *sparse* information and few theories about how birds *accomplish* such impressive flights each year. However, what is becoming clearer is that these migratory birds are *harbingers* of the health of our planet, providing clues to changes in the Earth's systems that affect the human condition and overall public health.

Many animals migrate, including whales, fish, butterflies, turtles and numerous species of antelope (i.e. wildebeest, caribou). Moreover, while many of these animals travel incredible distances, like the gray whale, which travels 10 – 14,000 miles round trip, no animal travels as far and through as much *adversity* as many bird species.

In fact, the Arctic Tern accomplishes the extraordinary task of flying from the North Pole to the South Pole – and back again – each year in a route covering about 22,000 miles! And while migration patterns in North America are generally north and south, in Europe, a number of migrations occur more east west.

So why do these species go through so much effort and *peril*. For these birds, it is all about survival, and their survival depends on the state and conditions of the natural world. Just as they have *habitats* on which they depend in one region, they equally depend on habitat in another place that range anywhere from 300 miles to 10,000 miles apart. They begin to migrate when their "biological clock", which is determined by the length of the day, tells them it is time to go. But other environmental factors such as the weather, their state of nutritional health and their interaction with other birds enable them *to pinpoint* exactly when their migration should begin.

Although birds can ride out extreme weather conditions and threats from natural *predators*, their greatest threat comes from loss of habitat, mainly due to human development and related activities. Forests and *wetlands* are vital to birds' survival because they provide food and water, shelter, protection from predators and places for rest and food during their migrations. Over the past 100 years, as human populations *surged* and industrial and technological progress was made, much of the forests and wetlands have been *depleted* and thus seriously changed the landscape and resources for these 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*, and other major changes in the world's ecosystems. Hunting and *trapping* are also contributors, but pale in comparison to changes brought upon the ecosystems. These ecosystems provide vital services (such as maintaining global climate patterns, *mediating* the carbon cycle, safeguarding *watersheds* and stabilizing soils), valued at \$33 trillion per year. The potential loss of large numbers of species facing extinction is a powerful indication that the quality of these ecosystem services is *deteriorating*.

In North America, for example, bird observers have seen a steady decline in the numbers of many of the birds, which migrate to Central and South America. And though *deforestation* or problems with their summer breeding habitats were suspected to be the problems, they also realized that forests were not being lost as fast as the rate of the disappearance of the birds.

A recent study on regional forest fragmentation *pinned* much of the blame on urban *sprawl* and development, which are significantly altering and removing valuable ecosystems on which birds depend. This is not only happening in the United States, but it is happening worldwide. In the US alone, this affects 80 percent of the total bird population since about 520 of the US' 650 bird species migrate.

Wetlands are areas that link water and land. They include a wide range of areas from marshes and *swamps* to areas between dry land and rivers, streams, lakes and coastlines. Though they are not necessarily wet year-round, they harbor very rich nutrients for plants and animals, including insects, which are a primary food for birds. Thus, wetlands provide vital habitat for many species of plants and animals, including about half of all known bird species.

But wetlands also provide needed protection of property and water quality vital for humans. They act as a sponge to absorb floodwaters from nearby streams and rivers or ocean tides, for example, and they filter out impurities and pollutants that could flow into main water sources. Wetlands also serve to clean the air of carbon dioxide, which is absorbed by plants. Carbon dioxide is the substance, which enables photosynthesis in plants, the process by which solar energy is converted into food and *fiber* necessary for plant growth and health. As wetlands become fragmented and disappear, the domino effect extends directly to both humans and wildlife and their respective qualities of life.

Birds live on more than 20 percent of the Earth's surface, but about three-fourths of the threatened or endangered birds inhabit less than five percent of the land. This enables most bird species to be easily tracked, particularly threatened species, and also allows scientists, conservationists and property owners to focus their attention where extinction risks are the highest. Generally, these tracking and planning activities can simultaneously focus on threats to the environment since they are usually at the heart of risks to bird populations.

Bird watching is one of the world's most treasured *pastimes*. According to the US Fish & Wildlife Service, 76 million Americans are actively engaged in the sport of bird watching – or birding, making it the second largest leisure time activity just behind gardening. It is estimated that Americans spend over \$12 billion each year on birdseed and related equipment, making birding not only a major hobby but also big business.

Yet, birding is very important for studying birds and migrations, particularly small migratory birds. There are literally tens of thousands of reporting groups, Internet sites and other forums used by birders to report their findings. Other methods of reporting bird statistics, particularly those of threatened or endangered species, include radar and bird banding (ringing). While radar may be useful in determining mass movements of birds, it is limited in its range and value of information detail collected.

Traditionally popular among scientists and conservationists, bird banding involves the attachment of a band, or ring, on a bird – usually placed harmlessly and painlessly around the bird's leg – which carries special identification (serial number) and tracking information unique to the bird. When they are located, the serial number assigned to the bird is sent to the US Fish & Wildlife Service Bird Branding Laboratory where the information is recorded.

Each year, over a half-million birds are banded by scientists in North America. This is significant because bird banding provides ornithologists with valuable information about the birds, their migration patterns health and other information, which help, determine what they need in order to survive. With this information, ornithologists can best work with conservationists and other scientists and policy makers in creating sound conservation policy.

But a new form of tracking birds began to emerge in the 1980s involving satellites and tiny transmitters attached to the birds themselves. Information about each bird's location and activity is beamed to a satellite, which is then stored by the spacecraft's data collection system. This information is then sent to ground stations on Earth and ultimately is sent to NASA's Goddard Space Flight Center in Maryland for analysis. The information collected includes such vital data as the location of the bird, body and *ambient* temperature, flight speed, etc.

Armed with the comprehensive information now being collected about the world's migratory birds, scientists hope to discover clues and develop solutions relating to Earth's environmental health. Yet, this information

will be effective in helping individuals understand the true inter-connectivity of all life, which will lead to sound policy for sustainable development.

### Words and Expressions:

- *formidable* – грозный, жуткий, пугающий, чудовищный
- *to migrate* – мигрировать (о животных), совершать перелет (о птицах)
- *species* – род, порода, вид, разновидность
- *to permeate* – распространяться
- *ample* – богатый, изобильный, обильный
- *sparse* – разбросанный, редкий
- *to accomplish* – совершать, достигать, доводить до конца, завершать
- *a harbinger* – вестник, предвестник, предшественник
- *adversity* – бедствия, неприятности, несчастья
- *a peril* – опасность, риск, угроза
- *a habitat* – родина, место распространения, ареал, естественная среда
- *to pinpoint* – указать точно, заострить внимание (на чем-либо), акцентировать
- *a predator* – хищник
- *a wetland* – заболоченная территория
- *to surge* – подниматься, вздыматься
- *to deplete* – уменьшать, истощать, исчерпывать
- *extinction* – вымирание, исчезновение, отмирание
- *logging* – заготовка и транспортировка леса
- *trapping* – ловля с помощью капкана, силка, ловушки
- *to mediate* – служить связующим звеном, занимать промежуточное положение
- *a watershed* – бассейн реки, водораздел
- *to deteriorate* – ухудшать, портить, повреждать
- *deforestation* – вырубка леса
- *to pin* – прикалывать, прикреплять, скреплять, скалывать
- *sprawl* – разрастание города
- *a swamp* – болото, топь
- *a fiber* – волокно, волосок, фибра, нить, древесное волокно
- *pastime* – приятное времяпрепровождение, развлечение, забава, увеселение
- *ambient* – внешняя среда, окружающее пространство

### Exercises on the Text:

 Answer the following questions.

1. Why are birds flying south from their northern homes as winter approaches?
2. What do migrating birds depend on?
3. Can you name any migrating animals?
4. How do you understand the term "the biological clock"?
5. Why are forests and wetlands vital to birds' survival?

 Translate the following sentences from Russian into English.

1. Перелетные птицы зависят от сезонной доступности ресурсов для выживания и поддержки своего здоровья.
2. По окончании лета, когда исчезают запасы еды, и земля начинает покрываться льдом, птицы мигрируют в более мягкие климатические условия.
3. Миграция – это одна из наиболее изучаемых областей в биологии птиц, но, несмотря на это, многое остается невыясненным.
4. Животные также мигрируют на огромные расстояния, например серый кит, проплывает 10 – 14 тысяч миль, но ни одно животное не мигрирует так далеко, как птицы.

5. Птицы начинают миграцию, ориентируясь на свои "биологические часы", работа которых зависит от длины светового дня.
6. Обладая информацией о перелетных птицах всего мира, ученые надеются улучшить экологическую обстановку на нашей планете.
7. Птицы живут более чем на 20 % поверхности планеты, но около трех четвертей вымирающих видов птиц населяют менее 5 % территории.
8. Кольцевание птиц предоставляет орнитологам важную информацию о самих птицах, путях миграции и состоянии здоровья, помогающую решить, что нужно птицам для выживания.
9. Заболоченная местность работает, как губка, очищая основные источники воды от различных загрязнений.
10. За прошедшие 100 лет в связи с ростом населения и промышленным прогрессом резко сократилась общая площадь лесов, что повлияло на процесс миграции птиц.

### English in Everyday Communication:

☺ Read, translate and act out the following dialogues. Work in pairs.

#### IN FRONT OF A HOTEL

- Is this the hotel we are going to stay at?
- It is. But I haven't booked rooms yet. I'll go in and see about them now.
- All right. I'll pay the driver and join you in the hall.

#### IN THE HALL

- Good morning. Can I have two single rooms with a bathroom, please?
- We are rather full up, but I'll see. How long do you intend to stay?
- I expect we'll be here for a week or so.
- You can have a double room with a bathroom on the first floor.
- How much is it?
- It's seventy pence a night, including breakfast.
- All right, I'll take it.
- Will you fill in the form, please?
- Surname, Christian name, nationality, permanent address, place and date of birth, signature. Is that all right?
- Yes, that's all, thank you. Here is your key. The boy will show you up to your room and take in your luggage.

### Grammar Reference:

#### ПОРЯДОК СЛОВ В АНГЛИЙСКОМ ПОВЕСТВОВАТЕЛЬНОМ ПРЕДЛОЖЕНИИ

В русском языке члены предложения могут занимать различные места в предложении. При этом смысл высказывания не нарушается. А в английском языке прямой порядок слов, т.е. сначала идет подлежащее, а затем сказуемое. Если изменить прямой порядок слов, то изменится смысл предложения.

В английском языке место слова определяет его роль в предложении. Поэтому при построении английского предложения слова нужно располагать в строго определенном порядке: подлежащее, сказуемое, дополнение, обстоятельство.

Обстоятельства времени могут иногда стоять в начале предложения перед подлежащим: *In the morning our manager reads letters.*

Имя существительное (*The Noun*)

Существительные – это слова, называющие предметы, живые существа, вещества, события, явления, т.е. все слова, отвечающие на вопрос "кто это?" или "что это?" (*who is this? what is this?*). Например: *a manager* – менеджер, *a storm* – шторм, *rain* – дождь, *pain* – боль, *time* – время и т.д.

Имя существительное может быть в предложении:

- а) подлежащим: *The offer is on the table.* – Телеграмма на столе.
- б) именной частью сказуемого: *I am a student.* – Я студент.
- в) дополнением: *I see an office.* – Я вижу офис.
- г) определением: *My secretary's things.* – Вещи моего секретаря.
- д) обстоятельством места, времени, образа действия и т.д.:

*I work at the institute.* – Я работаю в институте.

*He goes to the institute in the morning.* – Он ходит в институт утром.

*I have read this letter with pleasure.* – Я прочел это письмо с удовольствием.

### Число (*Number*)

Существительные в английском языке, как и в русском, имеют два числа: единственное и множественное.

1. Для образования множественного числа к существительному в единственном числе прибавляется окончание *-s*. Например: *a book – books, an offer – offers, a manager – managers.*

2. Если существительное оканчивается на буквы и буквосочетания *-s, -ss, -ch, -sh, -x*, то во множественном числе прибавляется окончание *-es*: *a box – boxes, a match – matches, a telex – telexes.*

Запомните следующие особенности образования существительных множественного числа.

1. Существительные, оканчивающиеся в единственном числе на *-o*, обычно образуют множественное число прибавлением окончания *-es*, например: *potato – potatoes, hero – heroes.*

Сравните: *metro – metros, photo – photos* и т.д.

2. Существительные, оканчивающиеся на *-f* и *-fe*, при прибавлении окончания *-es* меняют *f* на *v*: *a wife – wives, a shelf – shelves.*

3. Существительные, оканчивающиеся в единственном числе на букву *y* с предшествующим согласным звуком, образуют множественное число прибавлением окончания *-es*, причем *y* меняют на *i*. Например: *a company – companies, a city – cities, a duty – duties.* Но: *a day – days, a boy – boys.*

Исключения: *a man – men, a woman – women, a child – children, a tooth – teeth, a foot – feet, an ox – oxen, a mouse – mice, a goose – geese, a phenomenon – phenomena* и т.д.

### Падеж (*Case*)

В современном английском языке существительное имеет два падежа – общий падеж (*the Common Case*) и притяжательный падеж (*the Possessive Case*).

Существительные в общем падеже не имеют падежных окончаний, а отношение существительного к другим членам предложения может выражаться порядком слов или предлогами.

*The secretary asks the director.* – Секретарь спрашивает директора.

*The director asks the secretary.* – Директор спрашивает секретаря.

Существительное в притяжательном падеже служит определением к другому существительному, выражает принадлежность и отвечает на вопрос *whose?*

Притяжательный падеж существительных в единственном числе образуется путем прибавления апострофа и буквы *s* (*'s*) к форме существительного в общем падеже – *my brother's name.*

Притяжательный падеж существительных во множественном числе обозначается только одним апострофом, который ставится после окончания *-s* – *the engineers' room.*

Если существительное во множественном числе не имеет окончания *-s*, то притяжательный падеж образуется, как у существительных в единственном числе – *the women's children.*

Имя существительное в функции определения

В английском языке не только существительные в притяжательном падеже могут выполнять в предложении функцию определения. Существительные в общем падеже также могут быть определением второго и переводятся на русский язык либо прилагательным, либо существительным в косвенных падежах (обычно в родительном падеже).

Например: *Moscow University* – Московский университет.

### Артикли (*Articles*)

Артикль – это служебная часть речи, которая определяет существительное. В тех случаях, когда перед существительным имеются другие определения, артикль оказывается уже не непосредственно перед существительным, а перед этим определением, например: *a man* – человек, *a young man* – молодой человек.

В английском языке два артикля: неопределенный и определенный.

#### Неопределенный артикль (*The Indefinite Article*)

У неопределенного артикля две формы: *a* и *an*.

Форма *a* ставится перед словами, начинающимися с согласного звука, а *an* – перед словами, начинающимися с гласного звука: *a bus*, *an offer*.

Неопределенный артикль употребляется перед исчисляемыми существительными в единственном числе, когда речь идет о предмете или лице, упоминаемом впервые или неизвестном слушающему.

*Today I have seen a beautiful car.* – Сегодня я видел красивый автомобиль.

#### Определенный артикль (*The Definite Article*)

Определенный артикль имеет одну форму – *the* – и употребляется перед существительными, как в единственном, так и во множественном числе, если речь идет об уже известных предметах или лицах.

– *Where is the cable?* – Где телеграмма?

– *The cable is on the table.* – Телеграмма на столе. (Та телеграмма, о которой знают говорящие).

В некоторых случаях всегда употребляется определенный артикль, например:

1) перед прилагательным в превосходной степени, когда прилагательное является определением к последующему существительному (*the best season* – лучшее время года, *the most interesting film* – самый интересный фильм);

2) перед порядковым числительным, когда это числительное является определением к последующему существительному (*the second lesson* – второе занятие, *the fifth page* – пятая страница);

3) перед предметами или понятиями, единственными в своем роде (*the sun* – солнце, *the moon* – луна, *the earth* – земля и т.д.);

4) перед названиями рек (*the Thames* – Темза, *the Volga* – Волга), морей (*the Black Sea* – Черное море), океанов (*the Indian Ocean* – Индийский океан);

5) перед названием некоторых стран и местностей (*the United States* – Соединенные Штаты, *the United Kingdom of Great Britain and Northern Ireland*, *the Crimea* – Крым, *the Caucasus* – Кавказ);

6) перед названиями горных цепей (*the Alps* – Альпы, *the Ural Mountains* – Уральские горы).

### Grammar Exercises:

☞ Look through the text again and find out whether there are sentences illustrating the above mentioned grammatical phenomena.

☞ Put the nouns in brackets in the plural form.

As we sailed up the River Hudson towards the (city) of New York and Brooklyn, we experienced a sensation which is, I think, common to all (traveler) who come to the end of their voyage. Many (man) have tried to analyze this emotion, and I have read many such (analysis) but none have ever really satisfied me.

The (building) stood out against the skyline like enormous (box) of (match) stuck on end. The (house) and (church) were completely dwarfed by them. As we went up the river, we examined it all with our (glass). It seemed as if each building brushed the (sky).

There were a lot of (ship) in the river mouth. They were bringing (cargo) from all over the world – cargoes of meat and (potato) and (mango), of (machine) and (toy) and many other (thing). They carried (silk) from China and (tea) from India as well. They flew the (colour) of almost every seafaring nation on the globe.

(Army) of (customs-official), (port-authority) and others, came on board. The (passenger) were paraded before the port doctor. He was a huge fat man. The first class passengers filed before him as solemn as (ox). Most of the third class passengers stood waiting their turn as quiet as (mouse), though some were as noisy as a flock of (goose). They carried their (saving) in knotted (handkerchief) and the rest of their (belonging) in (bundle). Many seemed to have completely lost their (bearing) in their new and strange (surrounding) and seemed as bewildered as (sheep), while their (wife) and (child) stared around like startled (deer).

There seemed to be varying (criterion) for the treatment of passengers by the immigration authorities, according to the class in which they traveled. Those of the third were examined for (louse) and other (vermin), regardless of their (feeling). And if a single louse was found, the individual was taken to Ellis Island, where there were plenty of delousing (apparatus). Our American (brethren) do nothing by (half), and do not care (six-pence) for anybody's (opinion) of their (method).

We landed with every manifestation of high (spirit) and the customs people examined our (effect). The (hanger-on) stared at us as though we were curious (phenomenon).

On the day we landed, the news got around that an armistice had been signed, and New York was beside itself with joy. Nobody then guessed how many world (crisis) would follow in the (year) to come; and what small consolation there would be for the (man) who had performed their (duty) like (hero) in "a war to and war".

✎ Put the nouns in brackets in the Possessive Case.

1. He did not want to impose his sorrow on his (friends) pleasure.
2. Wormwood Shrubs is a first (offenders) prison.
3. The estate where they were to spend the weekend belonged to a cousin of (Andrew).
4. Otto turned up at (Arthur) about a week later.
5. It was (Robin) turn now to be annoyed with what he felt to be the (boy) stubbornness.
6. Annie turned great-frightened (doll) eyes upon him.
7. In stressing her (mother-in-law) pleasant origin, she found it easier to disregard her.
8. A (professor) life is little better than a high-grade (clerk) nowadays.
9. She did not ask him anything because she knew a (sister) place.
10. The street had not changed. There was the (baker) at the corner, and there was the (butcher) with the gilt ox head on the signboard.
11. I am sure you know far more than they do about their (country) history.
12. The (sun) rays refracted in an intense glare from the chalk-white cliffs.
13. He looked expectantly at Maria, but she dilated her (camel) nostrils slightly and said: "I do not give blank cheques".
14. It was a habit of (John) not to tell you things and then assume that you knew all about them.

✎ Fill in the blanks with *a*, *an* or *the* where necessary.

1. He gave me ... message for you.
2. ... (R)road past ... church was quiet.
3. "Is it true?" "Oh, no. It's pure ... imagination".
4. Only ... poet or ... saint can water ... asphalt pavement in ... confident anticipation that ... lilies will reward his labour.

5. I was quick to weave ... fantasies with my mother, to build ... houses and furnish them, and give her ... motor cars and ... furs.
6. ... (A)all available chairs were occupied, and at least a hundred people were standing.
7. He closed his eyes. ... (P)peculiar weariness came over him.
8. Just about everybody in the town is chasing ... dollar so hard that they only have time to breathe on Sundays.
9. I call it ... very mediocre play.
10. I liked ... pleasure and ... good things.
11. My mother died in May. From ... cemetery, my father and I returned to ... empty house.
12. He wanted to hide ... embarrassment he felt at making this speech.
13. With ... frankness which brought ... colour to her cheeks he said, "I suppose you mean me".
14. She looked in her handbag for ... envelope.
15. He thinks it's pure ... nerves and he's given me ... pills. You'd better hope that ... pills do some good.
16. Peter was alone at home, enjoying ... solitude and ... freedom of ... empty house.
17. You've never bought ... car yet, have you?
18. My mother liked to wait until it was quite dark before we lit ... gas and drew ... blinds.
19. I don't know how to talk to ... children.
20. We sat round ... table in ... kitchen. There was ... cold meat, ... cheese, ... bowl of ... tinned pears, ... jam-tarts, and ... jug of ... cream.
21. She put down ... cup and got up.
22. There was not ... cloud in ... sky.
23. ... (B)big table was covered with ... texts and ... notebooks.
24. She answered ... soft tap at ... door and ... maid came in with ... tray which she set on ... table.

**In Conclusion:**

Interview your classmates and find someone who ...

- a) ... investigates ecological problems.
- b) ... hasn't handed in any homework for a week.
- c) ... always reads through his / her homework before giving it to a teacher.
- d) ... is saving up for something special at the moment.
- e) ... tries to use cosmetics which has not been tested on animals.
- f) ... has something interesting in his / her pocket. If he / she has, ask him / her to take it out and show you.
- g) ... had the possibility of studying English somewhere abroad.
- h) ... finds it difficult to get down to doing homework.
- i) ... is going to become more "green".
- j) ... tries to buy only "environment friendly" products.
- k) ... is going to organize a local recycling centre.

## LESSON 2

**Grammar:** 1. Имя прилагательное (*The Adjective*).  
2. Степени сравнения (*Degrees of Comparison*).

**Text:**

Human Population: Challenging the Balance

Jacques Cousteau, the famous *explorer* who opened the world's eyes to the wonder and *splendor* of our undersea world said it best: "Population growth is the primary source of environmental damage." Of course, this is not a comparison to natural catastrophes that eventually result in a natural change of life and ecosystems, but rather it is a statement about the challenges human population *poses* for nature.

Yet, the human population challenge has really occurred only recently. Let us look at why.

More people have been added to the Earth's population in the 20th century than at any other time in human history. In 1900, just 100 years ago, the world's human population numbered two billion people. Today, the total human population has grown three times as large and is now over six billion people.

The rate of population growth has gone up rapidly in the past two centuries, from 0,0015 % before 1800 to 1,2 % today. At this rate, the Earth adds one billion more people every 14 years. If this continues, the world's population will *double* in the next century, nearing 12 billion in the year 2100. Our planet truly is becoming a more crowded place to live.

What happened over the past 200 years to create such a rapid surge in the number of people living in the world? There are a few simple ideas that lie behind these *trends*. Before 1900, many children who were born did not reach *adulthood* so they never had their own children. In America and Europe, young children died of many *diseases* that we now *immunize* against such as diphtheria, *tetanus*, *measles*, pneumonia and *whooping cough*. In the 20th century, as these diseases became less common, more children lived to adulthood. The result was that more children than ever before were born and lived and had their own children, all of which increased the size of the world's population. And thus, one predator of humans began *to recede*.

At the same time, people are also living longer. For example, in the U.S. the average life expectancy in 1950 was 57 years. Now people, on average, can expect to live 77 years. People living longer increase the population size, and this means that more people are living together on Earth at the same time.

In the latter part of the 20th century, people in other parts of the world – Africa, Asia, South America and the Middle East – who had traditionally lost many children to disease, began *to catch up with* the developed world. People in these parts of the world began to adopt health practices such as immunizing children that also allowed more children to live. As these children grew to adulthood they too started their own families and this also has contributed to the world's current population growth.

But here is the critical question: "Will Earth's population continue to grow as fast as the last 100 years?"

There are signs that population growth rates in some parts of the world have started to slow down. In Europe, America, and in parts of Asia and Australia, most families are having less than two children. Some of these countries are actually experiencing negative population growth meaning that their populations are growing smaller. In Russia, Eastern Europe, Germany and Northern Europe populations may actually *shrink* in size because people are having fewer and fewer children.

The United States will continue to grow. While birth rates in America have gone down – *primarily* because of the migration of persons from other countries – we will continue to have steady population growth. Today, the US has over 287 million people and is expected to grow to 400 million people by 2050.

However, there are many parts of the world where population growth is still very high and populations are expanding rapidly. Six countries *account for* one-half of the population added every year: these are China, India, Pakistan, Bangladesh, Indonesia, and Nigeria. China alone has 1,3 billion people, and India has slightly over 1 billion people, or about one third of the total world population. In countries where the rate of natural *increase* is approximately 2 %, their population will double ever 34 years. If population growth continues to be high in these and other countries, attempts to slow down the growth of the world human population in the twenty first century may well be *futile*.

The other issue is, even if people worldwide choose to have fewer children tomorrow, it will still take 50 – 60 years for the world's population to stabilize, as there are so many people currently in their *childbearing* years. Slowing the growth of the world's population, even though this is happening in many parts of the world, may not be happening quickly enough: the world's populations may still double again by the end of this century to 12 billion persons.

Are these too many people for the size and *resources* of the planet?

### **Words and Expressions:**

- *an explorer* – исследователь
- *splendor* – величие, слава, благородство
- *to pose* – ставить, предлагать
- *a trend* – общее направление, тенденция
- *an adulthood* – зрелость, взрослость, состояние зрелости организма
- *a disease* – болезнь
- *to immunize* – иммунизировать
- *tetanus* – столбняк
- *measles* – корь
- *whooping cough* – коклюш
- *to recede* – убывать, спадать, идти на убыль
- *to catch up with* – нагнать, наверстать
- *to shrink* – уменьшаться, сокращаться
- *to account for* – отвечать, нести ответственность
- *an increase* – возрастание, рост, прибавление, прирост
- *futile* – бесполезный, напрасный, тщетный
- *childbearing* – детородный
- *to double* – удваивать
- *resource* – запасы, ресурсы, средства, природные богатства
- *primarily* – в основном, главным образом

### Exercises on the Text:

 Answer the following questions.

1. What is the primary source of environmental damage?
2. What is the number of total human population today?
3. What is the average life expectancy now?
4. How do you understand the term "negative population growth"?
5. Why does human population shrink in size?

 Translate the following sentences from Russian into English.

1. Рост численности населения – основная причина загрязнения окружающей среды.
2. В XX веке численность населения планеты возросла больше, чем когда-либо за всю историю существования человека.
3. Если эта тенденция сохранится, в следующем веке численность мирового населения удвоится.
4. До 1900 года многие родившиеся дети не доживали до половозрелого возраста и, таким образом, не могли иметь собственных детей.
5. В 1950 году средняя продолжительность жизни в США составляла 57 лет.
6. Люди в этих частях света начали иммунизировать детей, что привело к уменьшению уровня детской смертности.
7. Уже появляются признаки того, что в некоторых частях света рост населения начинает снижаться.
8. В странах, где численность населения увеличивается на 2 % в год, число жителей будет удваиваться каждые 34 года.
9. Если рост численности населения будет высоким в этих и ряде других стран, попытки снизить темп прироста окажутся тщетными.
10. В России численность населения резко сокращается, так как рождается все меньше и меньше детей.

### English in Everyday Communication:

 Read, translate and act out the following dialogue. Work in pairs.

## IMPRESSIONS OF THE FILM

- What films are on this week? Are there any worth seeing?
- "Romeo and Juliet" is on. I saw it at our local cinema the other day. Everybody says it's very good.
- As a matter of fact, I prefer seeing ballet performed at the theatre especially if the plot and the music are familiar.
- I don't quite agree with you. Sometimes I find that ballet is much more expressive on the screen.
- Do you? Then what's your opinion of the screen version of "Romeo and Juliet"?
- I think it's wonderful from beginning to end. I enjoyed every minute of it. The cast is very well chosen and the dancing's excellent.
- Well, I must go and see it for myself since you praise it so highly.
- You certainly must. I am sure it will make you change your mind about ballet films.
- We'll see. Well, then I'll be looking forward to having a good talk with you about it.

### Grammar Reference:

#### Имя прилагательное (*The Adjective*)

Прилагательное – это часть речи, обозначающая качество, признак предмета и отвечающая на вопросы "какой? какая? какое?".

Прилагательное в английском языке не изменяется ни по родам, ни по падежам, ни по числам (*a large letter* – большое письмо, *a large family* – большая семья, *a large table* – большой стол).

В предложениях прилагательное выступает в роли определения (*a difficult problem*) и именной части сказуемого (*This problem is difficult*).

#### Степени сравнения (*Degrees of Comparison*)

Прилагательные в английском языке имеют три формы: форму положительной степени (*positive degree*), сравнительной степени (*comparative degree*) и превосходной степени (*superlative degree*).

Односложные прилагательные и часть двусложных, оканчивающихся на *-le*, *-y*, *-er*, *-ow*, образуют сравнительную степень прибавлением к положительной степени прилагательного суффикса *-er*, а превосходную степень – суффикса *-est*.

1. Если положительная степень прилагательного оканчивается на немое *-e*, то оно опускается при образовании степеней сравнения: *large – larger – largest*.

2. Если положительная степень прилагательного оканчивается на согласный звук с предшествующим кратким гласным, то конечная буква удваивается перед суффиксами *-er* и *-est* для сохранения краткости гласного звука: *hot – hotter – hottest*.

Положительная степень	Сравнительная степень	Превосходная степень
<i>long</i> – длинный	<i>longer</i> – длиннее	<i>longest</i> – самый длинный
<i>large</i> – большой	<i>larger</i> – больше	<i>largest</i> – самый большой
<i>hot</i> – жаркий	<i>hotter</i> – жарче	<i>hottest</i> – самый жаркий
<i>old</i> – старый	<i>older</i> – старше	<i>oldest</i> – самый старый
<i>simple</i> – простой	<i>simpler</i> – проще	<i>simplest</i> – самый простой
<i>narrow</i> – узкий	<i>narrower</i> – уже	<i>narrowest</i> – самый узкий

3. Если положительная степень прилагательного оканчивается на букву *y* после согласного звука, то в сравнительной и превосходной степени *y* переходит в *i* перед суффиксами *-er* и *-est*: *early* – *earlier* – *earliest*. После гласного звука *y* не меняется: *gray* – *grayer* – *grayest*.

Многосложные прилагательные и двусложные прилагательные (кроме тех, которые оканчиваются на *-le*, *-y*, *-er*, *-ow*, образуют сравнительную степень добавлением слова *more* (перед прилагательным) и превосходную степень – слова *most*.

Положительная степень	Сравнительная степень	Превосходная степень
<i>interesting</i>	<i>more interesting</i>	<i>most interesting</i>
<i>beautiful</i>	<i>more beautiful</i>	<i>most beautiful</i>
<i>difficult</i>	<i>more difficult</i>	<i>most difficult</i>

Небольшое число прилагательных образует степени сравнения от другого корня (по исключениям):

*good* – *better* – *best*

хороший – лучше – самый хороший;

*bad* – *worse* – *worst*

плохой – хуже – самый плохой;

*many, much* – *more* – *most*

много – больше – самый большой;

*little, few* – *less* – *least*

мало – меньше – самый маленький.

Существительное, определяемое прилагательным в превосходной степени, всегда употребляется с определенным артиклем *the*.

### Grammar Exercises:

☞ Look through the text again and find out whether there are sentences illustrating the above mentioned grammatical phenomena.

☞ Use the required form of the adjective.

1. He was the (amusing) lad you ever met.
2. He is a far (intelligent) person than my brother.
3. She was the (practical) of the family.
4. When they told me I was cured and could go, I can tell you I was (afraid) than glad.
5. I wanted to ask you both what you thought of my (late) films if you saw them.
6. He is (talkative) than his sister. He will not tire you so much.
7. He turned out to be (angry) than I had expected.
8. Today I am no (wise) than yesterday.
9. This wine is the (good) I ever tasted.
10. Jack is the (clever) of the tree brothers.
11. I do not think it matters in the (little) which seat I choose.
12. He felt (bad) yesterday than the day before.
13. The (near) house is three miles away.
14. Of the two evils, let us choose the (little).
15. He was the (late) man to come.
16. She waited until her silence became the (noticeable) thing in the room.
17. The (near) item on the program is a piano sonata.
18. He is the (tall) of the two.
19. She is (amusing) in a small company.
20. Uncle Nick was the (old) son of the family.

☞ Translate the following into English using various sentence patterns to express comparison.



A short story, a large garden, a beautiful flower, a big table, a high building, a difficult exercise, a new dress, an old book, late news, a comfortable flat, an easy question, clean water, thin ice, a thick dictionary, a good friend, much snow, bad weather, little time, many cars, few mistakes.

### **In Conclusion:**

Work in groups of three or four. You'll need a die. Throw it in turn. When you land on a superlative square, you have to talk on the topic for at least one minute without stopping. If you cannot say anything or stop before thirty seconds are up, you have to move back to the previous square. The student who reaches the *Finish* square first is the winner.

## **LESSON 3**

**Grammar:** 1. Местоимение (*The Pronoun*). Личные местоимения (*The Personal Pronouns*).

2. Притяжательные местоимения (*The Possessive Pronouns*). Указательные местоимения (*The Demonstrative Pronouns*).

3. Вопросительные местоимения (*The Interrogative Pronouns*). Неопределенные местоимения (*The Indefinite Pronouns*). Отрицательное местоимение (*The Negative Pronoun*).

### **Text:**

#### Food's Frontier: the Next Green Revolution

Over the past half century, the United States has sent billions of tons of food to *famine-stricken* countries and that is one reason many remain in a *dire* struggle to feed themselves.

Dumping our *surplus* grain depressed the prices of locally grown grain, pushing farmers in those countries out of business explains environmental writer Richard Manning, author of "Food's Frontier: the Next Green Revolution", a new book on efforts to establish sustainable agriculture in developing countries around the globe.

The situation is critical. Industrial agriculture, mostly developed in the 1960s "Green Revolution", has reached its production limit. In some areas, the combination of *monocropping* and heavy fertilizer and pesticide use has actually reduced the land's capacity to produce. Meanwhile, the population of developing countries is expected to double by 2020.

The second green revolution is a revolution not only in biological science, but also in information distribution among scientists, farmers, and consumers. "Food's Frontier" documents the Minneapolis-based McKnight Foundation's Collaborative Crop Research Program, which has funded research and training in agricultural science in nine developing countries in Africa, Latin America and Asia. Each project is headed by scientists from the developing country, who identify the agricultural problem they want to tackle and put together interdisciplinary teams of scientists such as biologists, economists, and anthropologists. Each team *collaborates with* counterparts in U.S. universities.

"We're realizing that economic and cultural factors are as important as biology, soil and climate in developing a secure global food supply", – Manning said. "Certainly, you have to understand the biology behind the interaction of, say, a *chickpea* and a *pod borer* if you want to reduce the damage the pest does to the plant. But you also need to figure out how to help Ugandan farmers learn about a method of planting that protects sweet potato from *weevils*, or how to convince Mexican wholesalers that there's a potentially strong market in the United States for blue corn".

McKnight-funded research in areas like polyculture – the planting of several crops amongst each other – and the discovery of natural protections against pests in disease in wild relatives of common crops, also stand to benefit U.S. farmers.

"The Midwest is *strewn with* rural ghost towns whose small farmers were driven away by huge agricultural firms farming thousands of acres of a single crop. And the oversupply of grain has promoted widespread usage of high-fructose corn syrup in processed foods, contributing to the epidemic of *obesity*", – Manning said. The McKnight project researching an ancient Aztec polycropping system, still used by Mexican peasants, called "milpa", could provide a solution for reversing monoculture in the U.S.

Experiments underway in New York, Chile and Brazil crossing domestic potatoes, plagued by a range of insect pests, with wild relatives of potatoes, whose *sticky* leaves trap insects, are revolutionizing the economics of potato farming both in the U.S. and worldwide.

"The intensive use of pesticides and herbicides has *contaminated* our water and depleted our soils. It costs between \$60 and \$200 per acre per year to spray potatoes with insecticide. A grower in upstate New York typically gets about \$6 for a hundred pounds of these potatoes, while organic market pays \$30 a hundredweight for pesticide-free potatoes," – Manning said.

Three projects described in "Food's Frontier" involve genetic engineering: in Nanjing, China, creating *scab-resistant* wheat; in India, increasing the efficiency of production and nutritional value of chickpea; and in Shanghai, China, *eradicating viral* rice disease by eliminating the ability of a plant hopper insect to transmit the virus.

Recognizing that modern biotechnology has the potential to contribute much to the solutions of agricultural problems in the developing world, Manning dismisses the argument that genetic engineering is unnatural. "From lop-eared rabbits to wine grapes, artificial form of life as a result of human-engineered selection surrounds us. Every form of life we call domestic has a genetic makeup that is artificial as a result of human activity", – he said.

The biggest danger to the public regarding genetic engineering, Manning feels, is when profit-motivated companies rush to patent and market an untested technique. In contrast, McKnight-funded research remains in the public domain, available to all who need it, and is carefully tested by scientists who live among the farmers where the techniques will be used.

Manning found that Robert Goodman, a University of Wisconsin plant pathologist who oversees the Collaborative Crop Research Program, has his own doubts about the value of genetic engineering.

"We'll eventually have the same problem with genetically engineered plants as we do with more traditional approaches – the pests and diseases we are trying *to repel* are going to develop their own defenses", – Goodman said.

The alternative is not to look only at a single *gene*, but at the entire sequence of genes in a particular plant, as well as the sequence of genes in the organisms living in the surrounding soil and air. With this information, scientists, rather than transferring single genes from one plant species to another, can manipulate a plant's own genes to stimulate certain interactions with the other organisms in its environment. Goodman predicts this practice, called "genomics", will render genetic engineering *obsolete* within a matter of years.

"By the end of the decade we're going to look back at current genetic engineering technology, with its parlor tricks like sweeter tomatoes, as being primitive and almost *arcane*," – Goodman said. "We are finally recognizing that nature is unimaginably complex. To survive, we need to learn to respect and *harness* that complexity, because at a fundamental level, genetic improvement is integral to human society".

"No one ever said feeding a planet of six billion people would be without consequences," – Manning said. "But helping third world scientists feed their own people ensures sensitivity to culture and environment that we missed in the first green revolution".

The McKnight Foundation Collaborative Crop Research Program, begun in 1993, seeks to increase food security in developing countries. The total financial commitment is \$53,5 million over 15 years.

### Words and Expressions:

- *famine-stricken* – голодающий
- *dire* – страшный, ужасный, жуткий, внушающий ужас
- *surplus* – излишний, избыточный, добавочный
- *monocropping* – выращивание одной культуры
- *to collaborate* – работать совместно, сотрудничать
- *chickpea* – нут, турецкий горох

- *a pod borer* – стручковый сверлильщик (червь)
- *a weevil* – долгоносик
- *to strew* – разбрасывать, разбрызгивать
- *obesity* – тучность, ожирение
- *sticky* – клейкий, липкий, вязкий, тягучий
- *to contaminate* – пачкать, загрязнять, марать, портить, отравлять
- *scab-resistant* – устойчивый к парше
- *to eradicate* – искоренять, вырывать с корнем, истреблять
- *viral* – вирусный
- *to repel* – подавлять, сдерживать
- *a gene* – ген
- *obsolete* – устарелый, старый, немодный
- *arcane* – тайный, скрытый, темный, загадочный, потайной, секретный
- *to harness* – использовать

### Exercises on the Text:

📖 Answer the following questions.

1. How will you explain the term "monocropping"?
2. Have you ever heard about the second green revolution?
3. What developing countries can you name?
4. What kind of damage can pests do to plants?
5. Do you know any factors of water and soil contamination?

📖 Translate the following sentences from Russian into English.

1. Сельское хозяйство, которое развивалось быстрыми темпами во время "Зеленой революции" 60-х годов, достигло своего производственного предела.
2. Вторая зеленая революция – это революция не только в самой биологической науке, но и в распределении информации между учеными, фермерами и потребителями.
3. Каждый проект возглавляется учеными из развивающихся стран, которые решают, какую проблему принять к рассмотрению и координируют работу биологов, экономистов и антропологов.
4. Мы осознаем, что экономические и культурные факторы так же важны, как биология, почва и климат в обеспечении мирового запаса пищи.
5. Переизбыток зерна привел к широкому использованию фруктозосодержащего сиропа в пищевом производстве.
6. Интенсивное использование пестицидов и гербицидов приводит к заражению воды и истощению почвы.
7. Современная биотехнология имеет большое значение для решения сельскохозяйственных проблем в развивающемся мире.
8. Начиная от вислоухих кроликов и заканчивая темно-красным виноградом, нас повсюду окружают искусственные формы жизни, полученные в результате использования генной инженерии.
9. Наибольшая опасность для общества при использовании генной инженерии возникает тогда, когда жаждающие прибыли компании представляют на рынок непроверенные технологии.
10. Имея такую информацию, ученые предпочтут не переносить отдельные гены из одного вида в другой, а станут манипулировать имеющимися генами для стимулирования определенного взаимодействия с другими организмами окружающей среды.

### English in Everyday Communication:

☺ Read, translate and act out the following dialogues. Work in pairs.

#### AT THE OFFICE

a)

- Let's have a look at the diary. What are the engagements for today?
- Mr. Petrov has an appointment for ten. And then there's a conference at three.
- Get the documents ready for the conference. I'm afraid these bills will keep me busy till twelve.
- Shall I arrange for Mr. Petrov to come later?
- Yes, you'd better. Phone him straight away and then attend to the documents.
- Very good.

b)

- Could I speak to Mr. Petrov, please?
- He's on another line at the moment. Would you hold on?
- I'm afraid I can't. I'll leave a message for him. Will you please ask him to call at Mr. White's office at twelve o'clock instead of ten?
- All right. I'll let him know.

### Grammar Reference:

#### Местоимение (*The Pronoun*)

Местоимение – это часть речи, которая употребляется вместо существительного, прилагательного или числительного.

*The story is interesting. – It is interesting.*

*The man is very clever. – He is very clever.*

#### Личные местоимения (*The Personal Pronouns*)

Личные местоимения – это местоимения, заменяющие существительные, поэтому они могут употребляться в предложении в качестве подлежащего, дополнения и именной части сказуемого.

Личные местоимения имеют два падежа: именительный и объектный.

Число	Лицо	Именительный падеж личных местоимений (кто? что?)		Объектный падеж личных местоимений (кого? кому? о ком?)	
ед.	1	<i>I</i>	я	<i>me</i>	меня, мне
ед.	2	<i>you</i>	ты	<i>you</i>	тебя, тебе
ед.	3	<i>he</i>	он	<i>him</i>	его, ему
ед.	3	<i>she</i>	она	<i>her</i>	ее, ей
ед.	3	<i>it</i> – он, она, оно (с неодуш. пред.)		<i>it</i>	его, ему, ее, ей
мн.	1	<i>we</i>	мы	<i>us</i>	нас, нам
мн.	2	<i>you</i>	вы	<i>you</i>	вас, вам
мн.	3	<i>they</i>	они	<i>them</i>	их, им

#### Притяжательные местоимения (*The Possessive Pronouns*)

Притяжательные местоимения выражают принадлежность, они обычно находятся перед существительным, к которому относятся, и выполняют функцию определения. Каждому личному местоимению соответствует притяжательное местоимение.

Притяжательные местоимения бывают в общей и абсолютной форме: *my – mine*.

В отличие от притяжательных местоимений общей формы, которые стоят перед существительным и выступают в функции определения, притяжательные местоимения абсолютной формы употребляются самостоятельно, вместо существительного.

Притяжательные местоимения в абсолютной форме употребляются в функции подлежащего, именной части сказуемого, дополнения.

Число	Лицо	Притяжательные местоимения (чей? чья? чье?)			
		Общая форма		Абсолютная форма (самостоятельная)	
ед.	1	<i>my</i>	мой	<i>mine</i>	мой
ед.	2	<i>your</i>	твой	<i>yours</i>	твой
ед.	3	<i>his</i>	его	<i>his</i>	его
ед.	3	<i>her</i>	ее	<i>hers</i>	ее
ед.	3	<i>its</i>	его	<i>its</i>	его
мн.	1	<i>our</i>	наш	<i>ours</i>	наш
мн.	2	<i>your</i>	ваш	<i>yours</i>	ваш
мн.	3	<i>their</i>	их	<i>theirs</i>	их

#### Указательные местоимения (*The Demonstrative Pronouns*)

Указательные местоимения *this* – этот, эта, это и *these* – эти определяют предметы и лица, находящиеся близко к говорящему.

Указательные местоимения *that* – тот, та, то и *those* – те определяют предметы и лица, более отдаленные в пространстве и времени от говорящего: *that day* – тот день, *those days* – те дни.

Иногда, во избежание повторения одного и того же слова, употребляются местоимения *that* и *those*. Например: *The rivers of Russia are much longer than those of England.* – Реки России намного длиннее рек Англии.

#### Вопросительные местоимения (*The Interrogative Pronouns*)

К вопросительным местоимениям относятся: *who* – кто, *whom* – кого, кому, *whose* – чей, *what* – что, *which* – который. Эти местоимения используются для образования так называемых специальных вопросов, т.е. вопросов к различным членам предложения.

Местоимением *what* может начинаться вопрос к подлежащему, к дополнению и к определению:

*What is on the first floor of your office?* – Что находится на втором этаже Вашего офиса (вопрос к подлежащему)?

*What do you see on the shelf?* – Что ты видишь на полке (вопрос к дополнению)?

Местоимением *who* начинается вопрос к подлежащему:

*Who works usually on Sundays?* – Кто обычно работает по воскресеньям? Объектный падеж местоимения *who* – *whom* употребляется в вопросе к дополнению:

*Whom do you want to send there?* – Кого Вы хотите туда отправить?

Местоимение *whose* употребляется в качестве определения:

*Whose laboratory is this?* – Чья это лаборатория?

Местоимение *which* употребляется при выборе из определенного числа предметов или лиц, например:

*Which shop is yours?* – Какой магазин Ваш?

## Неопределенные местоимения *some* и *any* (*The Indefinite Pronouns*). Отрицательное местоимение *no* (*The Negative Pronoun*)

В английском языке местоимение *some* означает какой-то, какой-нибудь, несколько и употребляется обычно в утвердительных предложениях:

*I want to buy some interesting novels.* – Я хочу купить несколько интересных романов.

*Give me some pen.* – Дай мне какую-нибудь ручку.

*Some* перед неисчисляемыми существительными обозначает некоторое количество и в этих случаях не переводится.

*Some* может употребляться в вопросительных предложениях, если вопрос не относится непосредственно к местоимению *some* или к определяемому им существительному. А также в вопросах, выражающих просьбу или предложение.

*Why did you not ask me to give you some more paper?* – Почему ты не попросил меня дать тебе еще немного бумаги?

Местоимение *any* означает какой-то, какой-нибудь, сколько-нибудь и употребляется в вопросительных предложениях, преимущественно в общих вопросах, и в отрицательных предложениях. В утвердительных предложениях *any* имеет значение любой, всякий.

*Did you get any news from this firm?* – Вы узнали от этой фирмы какие-нибудь новости?

*She has not any news.* – У нее нет новостей.

*You may take any of my copies.* – Ты можешь взять любую из моих копий.

Отрицательное местоимение *no* указывает на отсутствие предмета, явления или понятия и употребляется в отрицательных предложениях, причем глагол-сказуемое стоит в утвердительной форме:

*I have no information about it.* – У меня нет информации об этом.

*There are no computers in this room.* – В этой комнате нет компьютеров. Отрицательное местоимение *no* употребляется в предложении в функции определения.

### Grammar Exercises:

☞ Look through the text again and find out whether there are sentences illustrating the above mentioned grammatical phenomena.

☞ Use the appropriate personal pronouns.

1. ... say there has been a great earthquake in the Pacific.
2. If ... see a giraffe once a year ... remains a spectacle; if ... see ... daily ... becomes part of the scenery.
3. "Mary is married now", said Mrs. Scott. "... was in the "Times".
4. The "Friedrich Weber" was a freighter sailing from Hamburg to Colombo. ... also carried passengers.
5. There was a lot of noise all around now, and amongst ... .. could hear a plane flying unusually low.
6. Pat soon made ... clear that ... did not want to stay there long.
7. I got my hat and beat ... .
8. He is dreadfully ugly. ... must not start when ... see ..., or ... will put ... off. ... does not like ... to feel sorry for ....
9. We were climbing a steep heel and the car throbbed as if ... were going to expire.
10. ... was cold to sit on the terrace, pretending that ... was really a summer evening.
11. "Our aim is to keep Italy out of the war until ... is strong enough to come in on our side", said the colonel.
12. Poor old England! I do not suppose I shall see ... again.

☞ Use the appropriate form of possessive pronouns.

1. The man next door has been busy cutting the grass in (he) garden.

2. He put (he) hand in (she).
3. "This foolish wife of (I) thinks I am a great artist", said he.
4. Very well, Mother, I shall have (I) hair cut this afternoon.
5. Then he stopped and pointed and said: "Those are peas". I said, "We have got some peas too". "I expect (you) are bigger than (our)", he said politely.
6. Edwin said, "Dear Mary, we all felt with you. (You) distress was (we)".
7. We can do (we) shopping before lunch.
8. There is a ghastly article of (he) about it in this evening's paper.
9. She folded the letter and replaced it in (it) envelope.
10. The children had had (they) tea. Kate was late for (she) as usual, Mary and Paul were having (they).
11. This demand of (they) is quite ridiculous.
12. She makes all (she) clothes herself.
13. This book is (I). There is (I) name on it.

✎ Supply *some, any* or *no*.

1. If you have ... news, call me back.
2. She helped me borrow ... more money.
3. There is hardly ... a place in this house where we can talk alone.
4. ... boy at the school had ever taken a scholarship to the university.
5. It meant real hardship to my mother unless I earned ... money at once.
6. My mother hoped that perhaps the school had ... funds to give me a grant.
7. It was unlikely that ... of the guests would take particular notice of it.
8. They understood each other without ... words.
9. "Let's go back home. It's already late." "I'd rather stay out a little longer." "I suppose we've got to go home ... time."
10. There isn't ... boot-polish in this tin.
11. You have ... fine flowers in your garden.
12. Go and ask him for ... paper. I haven't ... in my desk.
13. Later we had ... tea.
14. He wants ... more pudding. You can take it away.
15. There are ... matches left. We must buy ... .
16. I wouldn't go to his concert. He is ... pianist.
17. ... time ago I read his story in a magazine.
18. I don't think there is ... milk left in the jug.
19. ... student can answer the question.

### **In Conclusion:**

As we become increasingly concerned with environmental problems, more and more companies claim to be producing "environment friendly" products. Read the claims below and match each one to the type of company that you think have made it.

1. "We provide refills for all our bottles".
2. "All our packing is made of biodegradable materials".
3. "When you've finished with our products bring them back, we recycle them".
4. "Our latest model is much less polluting".

Then, in groups, discuss the following questions:

1. Would you overpay for environment friendly products?
2. What do you personally do to become more friendly to the environment?

## **LESSON 4**

**Grammar:** 1. Числительное (*The Numeral*). Составные числительные. Хронологические даты.  
2. Дробные числительные. Десятичные дроби. Математические знаки.

**Text:**

## Fossils vs. Renewables: Energy's Future Today

There is a great deal of information and enthusiasm today about the development and increased production of our global energy needs from alternative energy sources. *Solar* energy, wind power and moving water are all traditional sources of alternative energy that are making progress. The enthusiasm everyone shares for these developments has in many ways created a sense of *complacency* that our future energy demands will easily be met.

Alternative energy is an interesting concept when you think about it. In our global society, it simply means energy that is produced from sources other than our primary energy supply: *fossil* fuels. Coal, oil and natural gas are the three kinds of fossil fuels that we have mostly depended on for our energy needs, from home heating and electricity to fuel for our automobiles and mass transportation.

The problem is, fossil fuels are *non-renewable*. They are limited in supply and will one day be depleted. There is no escaping this conclusion. Fossil fuels formed from plants and animals that lived hundreds of millions of years ago and became buried way underneath the Earth's surface where their remains collectively transformed into the *combustible* materials we use for fuel.

In fact, the earliest known fossil fuel deposits are from the Cambrian Period about 500 million years ago, way before the *dinosaurs* emerged onto the scene. This is when most of the major groups of animals first appeared on Earth. The later fossil fuels – which provide more substandard fuels like *peat* or *lignite* coal (soft coal) – began forming as late as five million years ago in the Pliocene Period. At our rate of consumption, these fuels cannot occur fast enough to meet our current or future energy demands.

Despite the promise of alternative energy sources – more appropriately called Renewable energy, collectively they provide only about seven percent (7 %) of the world's energy needs. This means that fossil fuels, along with nuclear energy – a controversial, non-renewable energy source – are supplying 93 % of the world's energy resources.

Nuclear energy, which is primarily generated by *splitting* atoms, only provides six percent (6 %) of the world's energy supplies. And it is not likely to be a major source of world energy consumption because of public pressure and the relative dangers associated with *unleashing* the power of the atom. Yet, governments such as the United States see its vast potential and are placing pressure on the further exploitation of nuclear energy.

The total world energy demand is for about 400 quadrillion British Thermal Units – or BTUs – each year. That is 400,000,000,000,000,000 BTUs! A BTU is roughly equal to the energy and heat generated by a match. Oil, coal and natural gas supply nearly 88 % of the world's energy needs, or about 350 quadrillion BTUs. Of this amount, oil is king, providing about 41 percent of the world's total energy supplies, or about 164 quadrillion BTUs. Coal provides 24 % of the world's energy, or 96 quadrillion BTUs, and natural gas provides the remaining 22 %, or 88 quadrillion BTUs.

It is not so much that we mine fossil fuels for our consumption any more than it is to mine salt or tap water supplies way underground. The problems occur when we destroy ecosystems while mining it and while using it. Certainly, if there were a way that fossil fuels can be mined and used in ways that do not harm our ecology, then everything will be okay... in a perfect world. What makes our world perfect is that, it really is not perfect according to definition. It is natural, with all things interdependent on each other to live, grow and produce. Fossil fuel mining and oil production can and has caused *irreparable* damage to our environment.

Fossil fuels exist, and they provide a valuable service. It is not so much that we use fossil fuels for energy that is problematic, but it is the side effects of using them that causes all of the problems. Burning fossil fuels creates carbon dioxide, the number one greenhouse gas contributing to global warming. *Combustion* of these fossil fuels is considered to be the largest contributing factor to the release of greenhouse gases into the atmosphere. In the 20th century, the average temperature of Earth rose one degree Fahrenheit (1 °F). This was a pe-

riod that saw the most *prolific* population growth and industrial development (read use of energy) in Earth's history.

The impact of global warming on the environment is extensive and affects many areas. In the Arctic and Antarctica, warmer temperatures are causing the ice to melt, which will increase sea level and change the composition of the surrounding seawater. Rising sea levels alone can *impede* processes ranging from settlement, agriculture and fishing both commercially and recreationally. Air pollution is also a direct result of the use of fossil fuels, resulting in smog and the degradation of human health and plant growth.

But there's also the great dangers posed to natural ecosystems that result from collecting fossil fuels, particularly coal and oil. Oil *spills* have *devastated* ecosystems and coal mining has stripped lands of their vitality. This is the primary reason there is enormous pressure on the current Bush Administration to discontinue its *pursuit* to tap the vast oil reserves in the Arctic National Wildlife Refuge.

The oil, coal and natural gas companies know these are serious problems. But until our renewable energy sources become more *viable* as major energy providers, the only alternative for our global population is for these companies to continue tapping into the fossil fuel reserves to meet our energy needs. And, you can pretty much count on these companies being there providing energy from renewable sources when the fossil fuels are depleted. Many oil companies, for example, are involved in the development of more reliable renewable energy technologies. For example, British Petroleum Company, today known as BP, has become one of the world's leading providers of solar energy through its BP Solar division, a business that they are planning on *eclipsing* their oil production business in the near future.

Just how limited are our fossil fuel reserves? Some estimates say our fossil fuel reserves will be depleted within 50 years, while others say it will be 100 – 120 years. The fact is that neither one of these projections is very appealing for a global community that is so heavily dependent on fossil fuels to meet basic human needs.

Nobody really knows when the last drop of oil, lump of coal or cubic foot of natural gas will be collected from the Earth. All of it will depend on how well we manage our energy demands along with how well we can develop and use renewable energy sources.

And here is one very important factor: population growth. As the population grows upwards towards nine billion people over the next 50 years, the world's energy demands will increase proportionately. Not only will it be important for renewable energy to keep up with the increasing population growth, but it must outpace not only these demands but begin replacing fossil fuel energy production if we are to meet future energy needs.

By the year 2020, world energy consumption is projected to increase by 50 %, or an additional 207 quadrillion BTUs. If the global consumption of renewable energy sources remains constant, the world's available fossil fuel reserves will be consumed in 104 years or early in the 22nd century. Clearly, renewable energy resources will play an increasingly vital role in the power generation mix over the next century.

Sun, wind and water are perfect energy sources...depending on where you are. They are non-polluting, renewable and efficient. They are simple: all you need is sunlight, running water and/or wind. Not only do the uses of renewable energy sources help reduce global carbon dioxide *emissions*, but they also add some much-needed flexibility to the energy resource mix by decreasing our dependence on limited reserves of fossil fuels.

Essentially, these renewable energy sources create their own energy. The object is to capture and harness their mechanical power and convert it to electricity in the most effective and productive manner possible. There is more than enough renewable energy sources to supply all of the world's energy needs forever; however, the challenge is to develop the capability to effectively and economically capture, store and use the energy when needed.

Take solar energy for example. The ultimate source of energy is the sun. Its energy is found in all things, including fossil fuels. Plants depend on the sun to make food, animals eat the plants, and both ended up becoming the key ingredients for fossil fuels. Without the sun, nothing on this planet would exist.

The sun also provides enough energy that can be stored for use long after the sunsets and even during extended cloudy periods. But making it available is much easier said than done. It would be cost *prohibitive* to make solar energy mainstream for major world consumption in the near future. The technology is pretty much ready for many business and consumer applications, but it would be way too expensive to replace the current energy infrastructure used for fossil fuel energy. Still, according to the European Photovoltaic Industry Association, solar power could provide energy for more than one billion people by 2020 and 26 % percent of global energy needs by 2040.

Wind and hydroelectric power, which have been used effectively for generations, are also rapidly growing energy markets. The principle behind both is that the force of the wind and water currents is passed through *turbines*, which convert their energy into electricity. Commercial wind energy is usually collected by wind "farms" essentially consisting of hundreds of wind turbines (windmills) spread over large plots of land.

But hydroelectric power is harnessed in several different methods. The most popular is through *dams*, such as the Hoover Dam on the Colorado River. Another form of hydroelectric energy is tidal power. In use since the early 1900s, tidal power stations collect the energy created by the rise and fall of the tides to convert to electricity.

Biomass energy, or energy from burning plants and other organic matter, is one of man's earliest sources of energy. Wood was once the main source of power for heat, and it still is in many developing countries. Most people in developed countries use wood only for *aesthetic* purposes or secondary heating, limited mainly to fireplaces and decorative woodstoves. Roughly, one to two billion people in the developing nations still use wood as their primary source of heat. It is this group that is seen being among the first to convert to solar heating and energy because there is no other existing infrastructure *to hinder* its development.

### Words and Expressions:

- *solar* – солнечный
- *complacency* – удовлетворенность, самоуспокоенность
- *a fossil* – ископаемое, окаменелость
- *non-renewable* – невозстановимый, невозобновляемый
- *combustible* – воспламеняемый, горючий
- *a dinosaur* – динозавр
- *peat* – торф, брикет торфа, цвет торфа
- *lignite* – лигнит, бурый уголь
- *to split* – раскалывать, расщеплять, трескаться, разбивать на части
- *to unleash* – развязать, высвободить, дать волю
- *irreparable* – неисправимый, непоправимый, безвозвратный
- *a combustion* – горение, возгорание, сжигание
- *prolific* – изобилующий, богатый
- *to impede* – мешать, препятствовать, быть помехой чему-либо
- *spill* – проливание, разливание
- *to devastate* – истощать, опустошать, разорять
- *to pursuit* – преследовать
- *viable* – жизнеспособный
- *to eclipse* – затмевать, превосходить, заслонять
- *an emission* – выделение, распространение
- *prohibitive* – запрещающий, препятствующий
- *a turbine* – турбина
- *a dam* – дамба, плотина, насыпь, запруда
- *aesthetic* – эстетический
- *to hinder* – задерживать, затруднять, мешать, препятствовать

### Exercises on the Text:

 Answer the following questions.

1. What traditional sources of energy can you name?
2. How will you explain the term "alternative energy"?
3. What kind of fossil fuels do we mostly depend on for our energy needs?
4. During which period did the major groups of animals first appear on Earth?
5. How is nuclear energy generated?

📖 Translate the following sentences from Russian into English.

1. Энергия солнца, сила ветра и движение воды – это традиционные источники альтернативной энергии, прогрессирующие в настоящее время.
2. Уголь, нефть и природный газ – это три базовых источника энергии.
3. Именно в этот период на Земле появились основные группы животных.
4. Несмотря на многообещающие источники альтернативной энергии, в общем они составляют около 7 % мировых запасов энергии.
5. Ядерная энергия, получаемая путем распада атомов, составляет только 6 % мировых запасов энергии.
6. Проблемы возникают, когда мы разрушаем экосистемы, используя их.
7. Это был период, когда мы видели наибольший прирост населения и развитие промышленности (читай использование энергии) в истории Земли.
8. Влияние глобального потепления на окружающую среду очень заметно: оно воздействует на многие области.
9. В Арктике и Антарктике потепление приводит к таянию льда, что повышает уровень моря и изменяет состав морской воды.
10. На самом деле, никто не знает когда будет использована последняя капля нефти, кусочек угля или кубический метр природного газа.

### English in Everyday Communication:

☺ Read, translate and act out the following dialogue. Work in pairs.

#### TALK ABOUT THE WEATHER (part I)

- What lovely weather we had last week. I hope it keeps dry and sunny this week, too.
- Well, I wouldn't be sure. Have you heard the forecast?
- No, what does it say?
- Occasional showers tomorrow morning, drizzle and more cloud later on, unsettled for the rest of the week.
- Oh, isn't that awful! I do hope it clears up by Saturday.
- Why are you so eager?
- Don't you remember? We were planning an outing for this weekend.
- Oh yes, shall I ask Ann? She is a great one for outings.
- Of course. Phone her straight away, will you?
- All right.

### Grammar Reference:

#### Числительное (*The Numeral*)

Числительное – это часть речи, обозначающая количество предметов или их порядок при счете. В английском языке существуют количественные и порядковые числительные.

Количественные числительные указывают на количество предметов или лиц, например, *two weeks* – две недели, *seven tables* – семь столов, *ten men* – десять человек.

Порядковые числительные указывают на порядок предметов при счете, например, *the seventh lesson* – седьмой урок, *the tenth day* – десятый день. Порядковые числительные, за исключением первых трех, образуются от количественных числительных с помощью суффикса *-th* (*first, second, third, fourth, fifth, sixth, seventh, etc.*).

У некоторых числительных изменяется правописание: *five – fifth, twelve – twelfth, eight – eighth, nine – ninth, twenty – twentieth*.

Существительное, перед которым стоит порядковое числительное, употребляется с определенным артиклем, например, *the seventh lesson* – седьмой урок.

### Составные числительные

22 – *twenty-two*

58 – *fifty-eight*

131 – *one hundred and thirty-one*

302 – *three hundred and two*

1001 – *a (one) thousand and one*

1225 – *a (one) thousand two hundred and twenty-five*

3544 – *three thousand five hundred and forty-four*

После сложных числительных, оканчивающихся на единицу, существительное ставится во множественном числе, а не в единственном, как принято в русском языке, например, 51 книга – *fifty-one books*.

### Хронологические даты

При чтении обозначений года называют два двузначных числа, соответствующих двум первым и двум последним цифрам обозначения, например:

1612 – *sixteen twelve*;

1812 – *eighteen twelve*;

1945 – *nineteen forty-five*;

1960 – *nineteen sixty*;

1900 – *nineteen hundred*;

1905 – *nineteen hundred and five* или *nineteen o five*.

В таком чтении слово *year* (год) не добавляется после числа:

Пушкин родился в 1799 году. – *Pushkin was born in seventeen ninety-nine*.

Даты обозначаются и читаются следующим образом:

22 May 1942 – *the twenty-second of May, nineteen forty-two*.

### Дробные числительные

В простых дробях числитель обозначается количественным числительным, а знаменатель – порядковым. Порядковое числительное, т.е. знаменатель, принимает окончание множественного числа *-s*, если числитель больше единицы:

$1/2$  – *a half, one-half*;

$1/3$  – *a third, one third*;

$1/4$  – 1) *a quarter, one quarter*;

2) *a fourth, one fourth*;

$1/25$  – *a (one) twenty-fifth*;

$1/100$  – *a (one) hundredth*;

$1/1225$  – *a (one) thousand two hundred and twenty-fifth*;

$2/3$  – *two thirds*;

$3/4$  – 1) *three fourths*;

2) *three quarters*;

$7/18$  – *seven eighteenths*;

$9/10$  – *nine tenths*;

$2^{1/2}$  – *two and a half*;

$3^{1/4}$  – *three and a quarter (a fourth)*.

### Десятичные дроби

Знаки десятичных дробей отделяются от целого числа точкой. Каждая цифра читается отдельно. Ноль называется по-английски *zero, nought* или *o*. Ноль целых можно совсем не читать.

- 0,2 – 1) *o point two*;  
 2) *nought point two*;  
 3) *zero point two*;  
 4) *point two*.
- 0,02 – 1) *o point o two*;  
 2) *nought point nought two*;  
 3) *zero point zero two*;  
 4) *point nought two*;  
 5) *point zero two*;  
 6) *point o two*.
- 1,5 – *one point five*.
- 25,34 – 1) *twenty-five point three four*;  
 2) *two five point three four*.

### Некоторые математические знаки

"+" – *plus*

"-" – *minus*

"x" – *multiplication sign*

":" – *sign of division*

"=" – *sign of equality*

#### Grammar Exercises:

☞ Look through the text again and find out whether there are sentences illustrating the above mentioned grammatical phenomena.

☞ Write in words the following dates.

1964	1425	1247
1795	1342	1740
1845	1997	1644

☞ Write in words the following praxis.

$40 : 10 = 4$	$10 \times 2 = 20$	$25 \times 0,02 = 0,5$
$72 : 9 = 8$	$30 \times 4 = 120$	$40 \times 0,04 = 0,16$
$54 : 6 = 9$	$25 \times 3 = 75$	$12 \times 1,2 = 12,24$

☞ Write in words the ordinal numerals from the 1<sup>st</sup> to the 21<sup>st</sup>.

#### In Conclusion:

This creature in the picture is a Mutlander. Mutlanders live on the planet Mutland nine billion kilometers from the Earth. Many years ago there was an ecological catastrophe there. Mutlanders managed to adapt to their new environment but have changed very much since then.



You are an environmentalist and have spent a year on Mutland living with these strange creatures. You've just returned home and now have to write a report on Mutlanders' way of life for an ecological conference. Your report must include the following items: Mutlanders' appearance, typical

features of character, means of communication, family structure, food, apartments, money and shopping, leisure activities, travelling, life interval and so on.

## LESSON 5

**Grammar:** 1. Словообразование.

2. Интернациональные слова.

3. Функции Причастия I и Причастия II (*Participle I, Participle II*).

**Text:**

### Ecology Returns to the Deep Sea

*On the heels* of the 2000 Deep Sea Expedition of the Gulf of Mexico, Ecology Communications joined NOAA, ten Universities, the US Geological Survey, Woods Hole Oceanographic Institution (WHOI) and the Wildlife Conservation Society in a three-week exploration of three regions in the Atlantic Ocean *stretching* from Maine to Georgia. "AT&T Broadband – New England" has partnered with "Ecology Communications" once again

*to capture* the exploration, the technologies that make such research possible, the work of the scientists and the discoveries and views of the deep sea on video for television and education. The findings told scientists that there is much about our world we still do not know.

Deep sea biodiversity, deep water coral communities, gas *hydrates*, deep sea geology, search for new organisms and the effects of deep sea *sewage* dumping – all areas of which very little is known – will be studied, explored and *unveiled* through video imaging, *core* sampling, and measurement observations. The three regions include the Georges Bank, an area the size of Rhode Island, Connecticut and Massachusetts on the outer edge of the Gulf of Maine; the Hudson Submarine Canyon, about 400 *nautical* miles seaward from the New Jersey Harbor; and Blake Ridge, a vast area along the southeastern continental margin of the US.

*Aptly* called "Deep East 2001: Voyage of Discovery to Deep Sea Frontiers off the U.S. East Coast", the expedition *spans* 13 days, departing from Woods Hole, MA, and concluding in port at Charleston, SC. The manned deep-sea vehicle "Alvin", the US's only manned *submersible* capable of diving below 2,000 meters,

will be at the center of the technology enabling the *intricate* research of the Atlantic Ocean's depths. "Alvin" will be carried by the 274-foot (84 meter) mother ship R/V "Atlantis" which is customized to support undersea operations. Its special a-frame allows fast, safe *deployment* and recovery of "Alvin". Both "Alvin" and "Atlantis" are maintained and operated by "WHOI Ecology" and "AT&T Broadband" will extend the production on the 2000 deep sea exploration of the Gulf of Mexico to produce a myriad of video applications from the expedition that will focus on the health and stability of our planet and what secrets the oceans hold for our future. Coral communities – their biology, diversity, population status and role as vital habitat for deep-water fishes – will be explored and recorded. Recent submersible dives suggest that the distribution of corals has significantly declined in the past three decades, likely destroyed by *trawling* and *dragging*.

The stability of the continental shelf along the Hudson Canyon, where methane hydrate deposits exist, will be closely examined. Scientists have been concerned that a slumping of shelf along the Hudson Canyon – due to instability of the methane hydrate deposits there – would send destructive tidal waves toward the US coastline. The Hudson Canyon also hosts the world's largest municipal sewage dumpsite along the continental rise off the coast of New Jersey that has been used for offshore dumping since the 1950s. "Deep Water Dumpsite 106", named so because it lies about 106 miles off the coast of New Jersey, received the world's largest *discharge* of municipal sewage sludge from 1986 – 1992 when chemical increases and biological changes finally brought a *halt* to the dumping. The lingering effects of changes that have occurred since then will be recorded and studied.

From the Hudson *canyon* down into Blake Ridge, a relatively unexplored community of life – that which *decoupled* from the photosynthetic food chain and survives on the gas *seeps* from beneath the ocean's surface – will be studied and compared to similar communities explored in the Gulf. These chemosynthetic communities exist far underneath the ocean's surface where sunlight never reaches, yet they *thrive* on chemicals that are *lethal* to animal life, as we know it. Yet, and perhaps of key importance to the sustainability of human energy needs for the next century, is the study of these chemosynthetic or seep communities as important markers for underlying oil and gas resources, specifically methane hydrates. Methane hydrates, which are also in abundance in the Gulf of Mexico, exist as ice crystals under very heavy pressure underneath the ocean floor. The hydrate crystals hold a concentration of methane gas molecules up to 160 times greater than the volume of pure natural gas. Scientists estimate that if these methane hydrates can be successfully mined, the world's energy needs can be met for centuries.

### Words and Expressions:

- *on the heels* – следом за
- *to stretch* – тянуть, растягивать, вытягивать, удлинять
- *to capture* – завладеть, захватить, увлечь, завоевать
- *hydrate* – гидрат, гидроокись
- *sewage* – сточные воды, нечистоты
- *to unveil* – открывать, разоблачать
- *a core* – глубинная, внутренняя, сокровенная часть, суть, сущность
- *nautical* – морской, навигационный, мореходный
- *aptly* – так, как надо, надлежащим, подходящим образом
- *to span* – обхватывать, охватывать
- *submersible* – способный погружаться в воду, действовать в воде
- *intricate* – запутанный, сложный, замысловатый, затруднительный
- *a deployment* – развертывание
- *to trawl* – тралить, ловить рыбу тралом
- *to drag* – углублять дно (реки и т.п.) драгой, драгировать
- *a discharge* – вытекание, выделение, выпускание, спуск, сток, слив
- *a halt* – остановка, прекращение
- *a canyon* – каньон, глубокое ущелье
- *to decouple* – расцеплять, развязывать, разъединять
- *to seep* – просачиваться, проникать, протекать
- *to thrive* – буйно, пышно расти, разрастаться
- *lethal* – смертельный, летальный, смертоносный, вызывающий смерть

## Exercises on the Text:

 Answer the following questions.

1. What are the usual purposes of deep-sea expeditions?
2. Which technologies make such expeditions possible?
3. How can the results of deep-sea expeditions be used in the educational process?
4. There is much about our world we still do not know, isn't there?
5. Which components make up sea biodiversity?

 Translate the following sentences from Russian into English.

1. Эти открытия еще раз доказали ученым, что мы все еще многого не знаем о нашем мире.
2. Ученые займутся исследованием коралловых сообществ, геологией подводного мира и поиском новых живых организмов.
3. Его особая А-образная форма обеспечивает быстрое и безопасное передвижение и подъем на поверхность.
4. Коралловым сообществам – их биологии, разнообразию видов и роли в жизни глубоководных рыб – будет уделено особое внимание.
5. Последние исследования показывают, что распространение кораллов значительно сократилось за прошедшие три десятилетия.
6. Также тщательно будет изучен континентальный шельф в Гудзоне, где находятся залежи метана.
7. Все изменения, произошедшие с тех пор, ни кем не регистрировались и не исследовались.
8. Эти химико-синтетические сообщества находятся глубоко в океане, куда никогда не попадает солнечный свет.
9. Химические вещества, выделяемые этими сообществами, летальны для живых организмов.
10. Данные сообщества являются индикаторами залежей нефти и газа.

## English in Everyday Communication:

 Read, translate and act out the following dialogue. Work in pairs.

### TALK ABOUT THE WEATHER (part II)

- Can I speak to Ann, please?
- Speaking. Is that you, Mary?
- Yes. I say, Ann, what are you going to do over the weekend?
- Well, I haven't made up my mind about the whole of it yet, but I'm staying in on Saturday night. Why?
- Nick suggests an outing on Sunday. Would you like to join?
- Of course. A camping weekend would've been a better idea, only I've got to stay in on Saturday.
- Well, I know camping's your hobby, but you'll have to put up with a day's outing this time.
- All right. When shall I see you about the arrangements?
- Tomorrow after work I suppose. Will that be convenient?
- Yes, quite. See you tomorrow, then.

## Grammar Reference:

### Словообразование

Эффективным средством расширения запаса слов в английском языке служит знание способов словообразования. Зная значение наиболее употребительных префиксов и суффиксов, можно без труда понять значение гнезда слов, образованных из одного корневого слова, которое известно.

### Основные префиксы (приставки)

Префикс	Пример	Перевод
<i>anti-</i>	<i>antimonopoly</i>	антимонопольный
<i>be-</i>	<i>belittle</i>	умалчать
<i>co-</i>	<i>cooperation</i>	сотрудничество
<i>counter-</i>	<i>counterbalance</i>	уравновешивать
<i>de-</i>	<i>devaluation</i>	девальвация
<i>non-</i>	<i>non – payment</i>	неплатеж
<i>dis-</i>	<i>disadvantage</i>	недостаток
<i>in-</i>	<i>indirect</i>	косвенный
<i>il-</i>	<i>illegal</i>	незаконный
<i>im-</i>	<i>impossible</i>	невозможный
<i>ir-</i>	<i>irregular</i>	неправильный
<i>en-</i>	<i>enclose</i>	прилагать
<i>extra-</i>	<i>extraordinary</i>	необычный
<i>inter-</i>	<i>interaction</i>	взаимодействие
<i>mis-</i>	<i>misunderstand</i>	неправильно понять
<i>out-</i>	<i>output</i>	выпуск продукции
<i>over-</i>	<i>overpay</i>	переплачивать
<i>post-</i>	<i>postgraduate</i>	аспирант
<i>pre-</i>	<i>predetermine</i>	предопределять
<i>under-</i>	<i>underestimate</i>	недооценивать
<i>re-</i>	<i>rewrite</i>	переписывать
<i>sub-</i>	<i>subdivision</i>	подразделение
<i>super-</i>	<i>supermarket</i>	супермаркет
<i>ultra-</i>	<i>ultramodern</i>	сверхсовременный
<i>trans-</i>	<i>transoceanic</i>	заокеанский

Префиксы обычно образуют новые слова внутри одной и той же части речи (*pleasant* – приятный, *unpleasant* – неприятный).

Префиксы можно классифицировать по их лексическому значению, а именно: префиксы, придающие словам отрицательное или противоположное значение, выражающее предшествование или последовательность, повторность и т.д.

#### Основные суффиксы глаголов

Суффикс	Пример	Перевод
<i>-ate</i>	<i>to originate</i>	происходить
<i>-en</i>	<i>to threaten</i>	угрожать
<i>-ise,</i> <i>-ize</i>	<i>to advertise</i> <i>to organize</i>	рекламировать организовывать

Производные глаголы образуются обычно от существительных и прилагательных.

#### Интернациональные слова

В европейских языках, в том числе в русском и английском, есть значительное количество международных слов, близких по написанию и даже звучанию, хотя произносятся они по правилам фонологической системы каждого языка.

По значению международные слова в английском и русском языках можно разделить на три основные группы:

- 1) полностью совпадающие по значению в английском и русском языках;
- 2) частично совпадающие по значению, имеющие в русском языке несколько эквивалентов;
- 3) имеющие разные значения в английском и русском языках.

К первой группе относятся: названия наук; слова, связанные с общественно-политической сферой жизни; научные термины; названия месяцев и некоторые другие.

Английское слово	Русский эквивалент
<i>April</i>	апрель
<i>constitution</i>	конституция
<i>delegation</i>	делегация
<i>democracy</i>	демократия
<i>expedition</i>	экспедиция
<i>fact</i>	факт
<i>geography</i>	география
<i>January</i>	январь
<i>magnet</i>	магнит
<i>Mathematics</i>	математика

Ко второй группе относятся английские слова, имеющие в русском языке несколько значений. Одно из них, обычно узкое, совпадает со значением в английском языке, другие могут существенно отличаться от основного значения, например:

- champion (of peace)* – 1) чемпион, победитель;  
2) сторонник, поборник (мира);

- commission* – 1) комиссия, комиссионная продажа;  
2) полномочие, поручение;

- individual* – 1) индивидуальный;  
2) личный, частный;

- progressive* – 1) прогрессивный;  
2) передовой;

- public* – 1) публичный;  
2) общественный, народный, гласный;

- social* – 1) социальный;  
2) общественный;

- character* – 1) характер;  
2) репутация, характеристика;  
3) роль, действующее лицо;

- visit* – 1) визит;  
2) посещение.

Существуют и такие интернациональные слова, которые заметно изменили значение в русском языке по сравнению с английским:

- delicate* – тонкий, хрупкий, но не деликатный  
*data* – данные, а не дата  
*brilliant* – блестящий, яркий, а не бриллиант  
*novel* – роман, а не новелла  
*fabric* – материал, изделие, а не фабрика  
*pretend* – притворяться, делать вид, а не претендовать

### Функции Причастия I и Причастия II (*Participle I* и *Participle II*)

*Participle I* образуется прибавлением суффикса *-ing* к основе глагола:

- to stand* – стоять                      *to carry* – нести  
*standing* – стоящий                      *carrying* – несущий

Функция в предложении	Место в предложении	Примеры	Перевод
Определение	Перед определяемым словом	<i>Boiling water</i>	Кипящая вода
Часть определительного причастного оборота	После определяемого слова	<i>The girl reading a newspaper is our student</i>	Девушка, читающая газету, наша студентка
Обстоятельство	В начале или в конце предложения в обстоятельном причастном обороте	<i>Looking through the book, she came across the description of the process</i>	Листая книгу, она натолкнулась на описание этого процесса

*Participle II* обычно выражает результат действия, которому подвергся предмет, и переводится на русский язык причастием страдательного залога.

- Participle II* стандартных глаголов образуется прибавлением суффикса *-ed* к основе глагола:  
*to complete* – заканчивать;  
*completed* – законченный.

*Participle II* нестандартных глаголов имеют особую форму, которая образуется по-разному у различных глаголов:

- to see* – *seen*;  
*to build* – *built*;  
*to make* – *made*.

Место Participle II в предложении	Функция	Перевод
1. Перед определяемым словом: The selected stories	Определение	Избранные рассказы
2. После определяемого слова: The office built in our street has simple and severe lines	Определение	Офис, построенный на нашей улице, имеет простые и строгие линии
Место Participle II в предложении	Функция	Перевод
3. В начале или в конце предложения (в обстоятельном обороте), сопровождаемый часто союзами if, when, while. When built this office will be the highest in our street	Обстоятельство	Когда построят этот офис, он будет самым высоким на нашей улице
4. The work was done	Именная часть сказуемого	Работа была сделана

### Grammar Exercises:

☞ Look through the text again and find out whether there are sentences illustrating the above mentioned grammatical phenomena.

☞ Form the opposites for the following words and group them according to their prefixes.

Polite, usual, patient, fortunate, grateful, fashionable, fair, possible, effective, tolerant, pure, familiar.

☞ Complete the following table.

NOUN	VERB + PREPOSITION	ADJECTIVE
		involving
tolerance		
	to depend on	
difference		
		agreeable
		patient
confidence		
		defensive
		secure
		tense

Translate the following international words from English into Russian.

Accumulation, phenomena, centre, theoretical, manuscript, literature, geography, mathematics, physics, logic, national, system, democratic, reform, technology, technological, economic, information, computer, ethics, psychology.

Translate the following into English using participles as attributes.

1. Мэри села на упавший ствол дерева.
2. Оркестр на экране телевизора в гостиной исполнял музыку Моцарта.
3. Дети играли в разрушенном коттедже.
4. Там было шесть коробок, туго завернутых в старые газеты.
5. Она подошла к письменному столу и вынула запечатанный конверт.
6. Женщина вышла из магазина и пошла к машине, оставленной на стоянке чуть ниже по улице.
7. Вернувшись в комнату, она позвонила по телефону.
8. Упавшие листья спокойно лежали в пруду.
9. Оставшись один, я огляделся.
10. Застигнутые врасплох, они не знали, что сказать.
11. У меня были свои собственные определенные взгляды на мое будущее.
12. В коробке было несколько негативов, свернутых в тугий виток.

### In Conclusion:

Interview your classmates and find out whether there is at least one person who can agree with all statements.

1. I'm interested in everything connected with the environment.
2. I try to change my lifestyle to become a "green" person.
3. I use my bicycle more often than a car.
4. My car runs on unleaded petrol.
5. I buy washing-up liquids and washing powders that don't do harm to the environment.
6. I think that looking after animals is as important as looking after the environment because they are part of it.
7. I prefer not to eat the meat of killed animals.
8. I think that air pollution can be reduced if companies use trains instead of road transport.

### LESSON 6

- Grammar:**
1. Активный залог видовременных форм английского глагола (*Active Voice*).
  2. Простое настоящее время (*The Present Indefinite Tense*).
  3. Простое прошедшее время (*The Past Indefinite Tense*).
  4. Простое будущее время (*The Future Indefinite Tense*).

### Text:

#### THE NUCLEAR ENERGY CHALLENGE

The atom, the smallest component of any element, contains enormous energy. When it is split – a process called *fission*, this energy is released in the forms of tremendous heat and light. This energy was released on Hiroshima and Nagasaki, Japan, by two separate atom bombs in 1945 that led to the conclusion of World War II. The horrors created by those two bombs led the international community to *condemn* further use of atomic weapons.

Still, engineers, governments and scientists realized that if the atom's energy could be controlled and harnessed, it would revolutionize the world's energy markets and provide significant electricity reserves to help

meet the world's energy demands. It was even *envisioned* that it could one day replace the need for fossil fuels. As a result, the first usable electricity from nuclear fission was produced at the Idaho National Engineering Laboratory in 1951.

In 1954, The Atomic Energy Act was passed to promote the peaceful use of nuclear energy. Subsequently, in 1957, the International Atomic Energy Agency (IAEA) was formed to promote peaceful use of nuclear energy and to provide international safeguards and an inspection system to ensure nuclear materials are not *diverted* from peaceful to military uses. It was later replaced by the Nuclear Regulatory Commission and the Energy Research and Development Administration, the latter of which became the US Department of Energy in 1977.

Commercial nuclear power plants became a commercial reality in the late 1960s when large numbers of orders were placed for nuclear power reactors in the United States. Yet, in 1979, America's fears about nuclear power were realized when a partial *meltdown* occurred in a reactor at the Three Mile Island *facility* in Harrisburg, Pennsylvania. Though minimal radioactive material – which can cause serious damage to or kill living *tissue* – was released, the potential for greater disaster *lurked*.

This greater potential was realized in April 1986 when a full reactor meltdown and fire occurred at the Chernobyl Nuclear Power Plant in the former Soviet Union. This resulted in the massive release of radioactive materials, resulting in major environmental catastrophe. As a result of these disasters, global support for nuclear energy – which already had significant negative public support – *plummeted* to lower levels.

Over the last 15 years, vast improvements to nuclear reactors have been made to make them safer and last longer. There is still strong support for nuclear energy from many sectors that are convinced it is the future of the world's energy sources. While nuclear energy has several advantages over fossil fuels, particularly considering that it does not release the harmful greenhouse gas carbon dioxide into the atmosphere, public resistance remains high.

Nuclear energy requires sources of radioactive elements found naturally in our environment and manmade with which to create the nuclear fission process that splits the atoms. The most common and most used of these elements is Uranium, which is found in two different types or species (called *isotopes*): U-238 and U-235. U-235 is the type used for nuclear fission because it can be readily split, releasing massive energy. The other type of Uranium is called U-238, which is barely radioactive. Of all the known Uranium reserves in the world, almost all of it is U-238, with just over a half a percent of those reserves being U-235.

Plutonium and Thorium are the only other available sources that are used for nuclear energy. Plutonium is not naturally occurring. Thus, the Plutonium used in nuclear reactors is man-made, coming from a nuclear reactor. It is not as stable as U-235 and is harder to use. Thorium, though not yet a *mainstream* nuclear energy supply source, is being heavily studied and applied as a safer, cleaner alternative to Uranium. Still, Uranium is king as the *premiere* provider of nuclear energy.

Perhaps the greatest challenge facing nuclear energy production – after any potential for nuclear disasters similar to the 1986 Chernobyl event – is disposal of the highly radioactive wastes. It could take at least 10,000 years for these materials to fully break down into harmless elements so the challenge is to store them safely for at least that length of time. It is possible, but where and how are still troubling issues.

*Exploitable* Uranium supplies also pose some more short-term challenges. According to the Organization for Economic Cooperation and Development, the world's economically exploitable Uranium reserves are likely to last between 35 and 63 years, depending on whether demand is such as to justify the higher cost of mining less easily exploitable reserves.

Still, in consideration of the power that can be generated by Uranium and the *burgeoning* global energy demands, many governments are placing more emphasis on nuclear energy. The largest user of nuclear energy is the United States, followed by France, Japan, Germany and the Russian Federation. In the US alone, the nation's 103 nuclear power plants each generate an average of around 20 tons of radioactive spent fuel a year. Spent fuel now sits in cooling pools and temporary storage areas waiting for somebody to figure out what to do with it.

A second form of nuclear energy comes from the same process that gives life to our sun and other stars in the universe: nuclear *fusion*. Fusion occurs when two lighter elements, like hydrogen, are forced together – or fused – to create a heavier element, Helium. This occurs only under extraordinary heat and pressure, but it releases enormous energy in the form of heat, light and other radiation.

Deep inside the sun's core, hydrogen is converted to helium at temperatures of 10 – 15 million degrees Celsius. Fusion provides the energy necessary to sustain life on Earth. Sunlight is energy released from fusion reactions inside the sun. This process also produces all of the chemical elements found on Earth.

In 1952, seven years after the atomic bombs were dropped on Japan, the United States developed and successfully tested the hydrogen bomb. Using the same fusion process and hydrogen elements used in the sun and stars, the hydrogen bomb *yields* thousands of times more energy than that provided by nuclear fission. One hydrogen bomb would release five times more energy than all of the bombs dropped in World War II! Fortunately, there have been no hydrogen bombs used in *warfare*.

*Duplicating* the fusion process that is constantly occurring inside the Sun is not that easy. While fusion does not have the harmful radiation side effects that fission creates, the problem with nuclear fusion is to start the fusion reaction in an area small enough at sufficiently high temperatures – about 180,000,000 degrees Fahrenheit! There is currently no known substance that would not melt or *vaporize* at just a few thousand degrees.

### Words and Expressions:

- *a fission* – расщепление, деление атомного ядра при цепной реакции
- *to condemn* – браковать, признавать негодным для использования
- *to envision* – воображать что-либо, представлять себе, предвидеть
- *to divert* – отвлекать, переключать, переводить
- *a meltdown* – расплавка, растворение
- *a facility* – оборудование, приспособление, аппаратура
- *a tissue* – ткань, материя
- *to lurk* – скрываться в засаде, прятаться
- *to plummet* – кидать, бросать, швырять вниз, сбивать
- *an isotope* – изотоп
- *a mainstream* – основное направление, главная тенденция
- *a premiere* – премьера
- *exploitable* – использующийся
- *to burgeon* – распускаться, расцветать
- *a fusion* – синтез, слияние
- *to yield* – давать такой-то результат, приводить к чему-либо
- *a warfare* – война, приемы ведения войны
- *to duplicate* – повторять, копировать
- *to vaporize* – испаряться, распылять

### Exercises on the Text:

📖 Answer the following questions.

1. What is the smallest component of any element?
2. What does the process of fission look like?
3. In what form is nuclear energy always released?
4. Which episode of the Second World War led the international community to condemn further use of atomic weapons?
5. When did commercial nuclear power become a commercial reality?

📖 Translate the following sentences from Russian into English.

1. Атом, мельчайший компонент любого элемента, заключает в себе огромную энергию.
2. Две ядерные бомбы были сброшены на Хиросиму и Нагасаки в Японии, что привело к завершению Второй мировой войны.
3. С тех пор, как инженеры, члены правительств и ученые осознали, что энергией атома можно управлять, они поняли, что это произведет революцию на энергетических рынках.

4. В 1979 г. опасения Америки относительно ядерной энергии оправдались: случилась незначительная утечка реактора в Пенсильвании.

5. В течение последних пятнадцати лет ядерные реакторы были значительно улучшены в плане безопасности и продолжительности срока эксплуатации.

6. Ядерная энергия нуждается в источниках радиоактивных элементов, содержащихся в естественном виде в окружающей среде.

7. Самый распространенный из этих элементов – уран, который существует в двух формах, называемых изотопами.

8. Плутоний и торий – единственные источники ядерной энергии, помимо урана.

9. Торий в настоящий момент тщательно изучается и планируется его применение в качестве более безопасного заменителя урана.

10. Крупнейший потребитель ядерной энергии – США, затем идет Франция, Япония, Германия и Российская Федерация.

### **English in Everyday Communication:**

☺ Read, translate and act out the following dialogues. Work in pairs.

#### **IN THE STREET**

- Let's drop in somewhere for a snack.
- I'd rather have a proper meal, it's lunch time now.
- All right. Shall we go to a restaurant?
- Yes, let's. There's quite a nice one over there on the left-hand side. They have a self-service department there too, though I don't want to go there today.

#### **AT THE RESTAURANT**

- There's a nice table for two. Shall we take it?
- Can't you see it's reserved?
- Oh, I see. Come over here then; we'll be very comfortable at this table.
- (seated) Will you have any snacks?
- Not today. I'll start with soup and have a steak to follow.
- I had meat for my main course yesterday, so I'll have fish for a change.
- Shall we order the sweet straight away? What would you like?
- Fruit salad and ice-cream for me.
- All right, I'll have the same.

### **Grammar Reference:**

Активный залог видовременных форм английского глагола  
(*Active Voice*)

Действительный залог показывает, что действие исходит от подлежащего, т.е. подлежащим является лицо или предмет, производящий действие:

*Popov invented the radio in 1895.* – Попов изобрел радио в 1895 году.

Простое настоящее время (*The Present Indefinite Tense*)

Простое настоящее время *The Simple Present Tense* или *The Present Indefinite Tense* употребляется для выражения постоянного или повторяющегося действия.

Утвердительная форма образуется при помощи инфинитива смыслового глагола без частицы *to*, а в 3-м лице единственного числа к инфинитиву смыслового глагола прибавляется окончание *-s (-es)*.

1. Если глагол оканчивается на *-o, -s, -sh, -ch, -x*, то в 3-м лице единственного числа к нему прибавляется окончание *-es: to go – goes, to do – does, to finish – finishes, to discuss – discusses*.

2. Если глагол оканчивается на -у с предшествующим согласным звуком, то в 3-м лице единственного числа к нему прибавляется окончание *-es*, а буква *у* меняется на *i*: *to study – studies*, но: *to stay – stays*.

Отрицательная форма глаголов в *Present Indefinite* образуется при помощи вспомогательного глагола *do* (в 3-м лице единственного числа *does*) и частицы *not*. Сокращенные формы: *don't, doesn't*.

*I don't like to buy clothes myself.*

Вопросительная форма глагола в *Present Indefinite* образуется с помощью вспомогательного глагола *do* (*does*), который ставится перед подлежащим.

Краткий ответ состоит из подлежащего, выраженного соответствующим местоимением, и вспомогательного глагола.

Например: 1) – *Do you read letters in the morning?* – *Yes, I do.*

2) – *Does your manager read letters in the morning?* – *Yes, he does.*

### Простое прошедшее время (*The Past Indefinite Tense*)

*The Simple Past Tense* или *The Past Indefinite Tense* употребляется для выражения действий, совершившихся в прошлом и не связанных с настоящим моментом, а также для выражения повторяющихся действий в прошлом.

Данное время употребляется со следующими обстоятельствами времени:

*yesterday* – вчера;

*the day before yesterday* – позавчера;

*yesterday morning (afternoon, evening)* – вчера утром (днем, вечером);

*last* – в последний (прошлый) раз;

*last week (month, year) ago* – неделю (месяц, год) тому назад;

*the other day* – на днях;

*in 1969* – в 1969 году.

Время совершения действия может быть не указано, но ясно из ситуации или контекста, например:

– *Did you have a nice weekend?*

– *No, I didn't. The weather was not good and I stayed at home.*

Глаголы в утвердительной форме в *Past Indefinite* не изменяются по лицам и числам. Форма прошедшего времени правильных глаголов совпадает с формой *Participle II*. Каждый неправильный глагол имеет свою форму прошедшего времени.

Отрицательная форма глаголов в *Past Indefinite* образуется при помощи вспомогательного глагола *did* и отрицательной частицы *not*.

*The manager did not look through the mail yesterday morning.*

Вопросительная форма *Past Indefinite* образуется при помощи вспомогательного глагола *did*, который ставится перед подлежащим, а смысловой глагол употребляется в 1-ой форме.

*Did he stay at home last morning?*

Глагол *to be* в *Past Indefinite* имеет форму *was* для 1-го и 3-го лица единственного числа и *were* для 2-го лица единственного числа и всех лиц множественного числа. Отрицательная и вопросительная форма образуется без вспомогательного глагола.

Например: – *Was the General Director in his office yesterday?*

– *No, he wasn't. He was in the conference room.*

### Будущее неопределенное время (*The Future Indefinite Tense*)

*The Future Indefinite Tense* употребляется для выражения действий, которые произойдут в будущем.

Утвердительная форма *Future Indefinite* образуется при помощи вспомогательного глагола *shall* (для 1-го лица) и *will* (для 2-го и 3-го лица) и инфинитива смыслового глагола без частицы *to*.

Например: *We shall go there by train tomorrow.*

Отрицательная форма *Future Indefinite* образуется при помощи вспомогательного глагола *shall* (*will*) и частицы *not*, которая ставится после вспомогательного глагола (*shall not = shan't; will not = won't*).

Например: *We shall not go there by bus tomorrow.*

Вопросительная форма *Future Indefinite* образуется путем перестановки: вспомогательный глагол *shall* (*will*) ставится перед подлежащим.

Например: *When shall we see you?*

### **Grammar Exercises:**

☞ Look through the text again and find out whether there are sentences illustrating the above mentioned grammatical phenomena.

☞ Complete the following sentences, using Present Indefinite.

1. I (sleep) here. My father (sleep) in his study.
2. In case she (want) to see him, he'll come over.
3. "Your mouth is bleeding. ... it (hurt)?" Martha asked me.
4. Where ... we (go) from here?
5. Please see that the children (not to get) nervous.
6. I (do) a lot of traveling, you know.
7. One (live) and (learn).
8. He (own) a big car.
9. "It will not do any good to anyone if you (get) ill", I said.
10. "His men (act) silently as a rule. They (wear) dark glasses and they (call) after dark," he added.

☞ Complete the following sentences, using Past Indefinite.

1. At home we (heat) soup.
2. A netting wire fence (run) all around the house to keep out rabbits and deer.
3. My aunt (look) after my father and they (live) in our old house.
4. He always (smile) at children and (give) them sweets.
5. He (move) across the lawn to the house and I (follow) him. The moonlight (fall) in streaks through the leaves.
6. She (know) her brother at the University where he (lecture) on physics.
7. That evening she (have) a date with a man who (sell) cosmetics.
8. He (sit) down and silently (take) one of the cigarettes from the desk.
9. The office (smell) like a stage dressing room.
10. He (collect) books on Caribbean flora.

☞ Complete the following sentences, using Future Indefinite.

1. I (come) round tomorrow night.
2. His father (not to hear) of his giving up the job.
3. John is not here. He (to be) back soon though.
4. I (drop) you a note when I've seen Paula.
5. Do sit down, Edmund. You (break) something if you go on moving around.
6. I don't know what I (to do) when I live here. I ... probably never (get) another job.

7. ... I (turn) on the bath for you?
8. It (to be) easier when you get away. We (not to see) one another every day.
9. Oh, don't bother about me. I (stroll down) and (look) at the town.
10. They (do) whatever they have to do to regain their self-respect.

**In Conclusion:**

You all were in one class at school fifteen years ago. Now you are going to meet your old classmates again. Move around the classroom and talk to your mates. Find at least one person for each of the items on the worksheet.

When you have found someone, write down his or her name and then ask whether he or she still does the same things now. Don't forget to choose one of the role cards for yourself.

<p style="text-align: center;"><b>Role card 1</b></p> <p>When you were at school, you used to look after animals in the school zoo. Now you are married and work in a bank, so you don't have any time for animals.</p>	<p style="text-align: center;"><b>Role card 2</b></p> <p>When you were at school, you used to be brilliant at biology. You were always a top of the class, and everyone else used to hate you! Now you still study this field of science and you are a famous biologist.</p>
<p style="text-align: center;"><b>Role card 3</b></p> <p>When you were at school, you used to be brilliant at chemistry. You were the cleverest at the chemical tests. When you left school you tried to become a chemist, but you had to give up because of your health (allergy). Now you are interested in the problem of rainforests.</p>	<p style="text-align: center;"><b>Role card 4</b></p> <p>When you were at school, you used to make chemical experiments. When you left school, you started to investigate industrial pollution, and now you are a famous scientist. You are a president of the ecological organization.</p>
<p style="text-align: center;"><b>Role card 5</b></p> <p>When you were at school, you used to be good at singing. As soon as you left school you produced a record, which was sold in over a million copies. Now you are rich and famous, and have just started recording your seventh album.</p>	<p style="text-align: center;"><b>Role card 6</b></p> <p>When you were at school, you used to come late for classes every day! Your teachers used to punish you, but it didn't help at all. Now you work for Utilizing Nuclear Waste, but you are still late for almost every meeting.</p>
<p style="text-align: center;"><b>Role card 7</b></p> <p>When you were at school, you used to rescue animals. Now you are a veterinary surgeon at the local vet hospital and you still rescue them.</p>	<p style="text-align: center;"><b>Role card 8</b></p> <p>When you were at school, you used to be really good at mathematics. However, you haven't done any math since you left school and have now forgotten everything you learnt. You strongly need a calculator now!</p>

<b>Role card 9</b>	<b>Role card 10</b>
When you were at school, you used to be a captain of the school football team. When you left school, you tried to become a professional footballer, but you broke your leg and never played again.	When you were at school, you used to fight with your brother, who was in the same class. Now your brother lives in the other part of the world, and you haven't seen him for years. You miss him a lot, because you have nobody to fight with!
<b>Role card 11</b>	<b>Role card 12</b>
When you were at school, you used to work in the school garden. Now you are married, have two small children and live in a skyscraper, so you don't have the opportunity to work in a garden any more.	When you were at school, you used to live next door to it. Thanks to it you could stay in bed longer than all your classmates! Now you investigate marine environment. That is why your family moved to the sea port a few years ago.

Find someone who ...	Name (s)	Does he/she still do this?
... used to look after animals.		
... used to be brilliant at chemistry.		
... used to be good at singing.		
... used to be late all the time.		
... used to live near the school.		
... used to love biology.		
... used to work in the garden.		
... used to like mathematics.		
... used to play football a lot.		
... used to fight from time to time.		

## LESSON 7

- Grammar:** 1. Функции глагола *to be* в предложении.  
 2. Настоящее продолженное время (*The Present Continuous Tense*).  
 3. Прошедшее продолженное время (*The Past Continuous Tense*).  
 4. Будущее продолженное время (*The Future Continuous Tense*).

**Text:**

### ORGANIC AGRICULTURE TODAY

The production and use of organic food products has taken firm root today as a serious alternative for consumers and farmers. Particularly since the early 1990s, a growing number of North American farmers have

taken steps to minimize the use of and consumers' exposure to, toxic and persistent pesticides by establishing organic agricultural practices.

Organic farming is about building a sustainable, healthy and productive future for every aspect of our planet: the soil, water supply, animals and humans. Consumers who want to minimize their – and the environment's – exposure to toxic and persistent chemicals can do so by buying organic foods and organic *fiber* products, and by choosing organic agricultural methods for home pest control and lawn care. It is simply putting nature to work while removing many potential health risks that exist from certain food production today, mainly the use of pesticides.

In March 2001, the Centres for Disease Control and Prevention (CDC) released findings showing measurable amounts of *residual organophosphate* pesticides in a group of people who were studied. The National Academies of Sciences has indicated that one out of four developmental and behavioral problems in children may be linked to genetic and environmental factors, including exposure to lead, mercury and organophosphate pesticides. When you put these two studies together, the conclusions could be cause for concern. Still, it should be noted that there is still more scientists and doctors need to learn about the long-term health effects of the low-level presence of organophosphates in humans.

Interestingly, a separate study to assess preschool children's organophosphate exposure in the Seattle Metropolitan area showed that one child who showed no measurable pesticide *residue* lived in a family that buys exclusively organic products and does not use any pesticides at home. While this does not conclude that there were any serious health risks to the *remainder* of the group, it does indicate that use of organic food and non-food products can reduce the presence of those products in humans.

With increasing demands for food supplies during the past 60 years, we saw the introduction of the use of *harsh* chemicals and synthetic fertilizers as a way for farmers *to boost* crop yields. This subsequently has been followed by the more recent adoption of planting genetically modified crops.

Even today, there are toxic and persistent pesticides still used in agriculture. CDC noted that organophosphate pesticides account for approximately half of the insecticides used in the United States. An estimated 60 million pounds of organophosphate pesticides are applied to about 60 million acres of U.S. agricultural crops annually, and an additional 17 million pounds are used per year for nonagricultural uses, such as in household pest control products and in lawn and garden sprays.

The National Organic Standards Board defines organic agriculture as an ecological production management system that promotes and *enhances* biodiversity, biological cycles and soil biological activity. It is based on minimal use of off-farm inputs and on management practices that *restore*, maintain and enhance ecological harmony.

Despite the fact that less than 1 percent of U.S. agriculture research dollars are spent on organic practices, organic production has been shown to have yields comparable to, and sometimes higher than, conventional systems. In addition, because organic production improves soil quality as measured by soil structure, organic matter, biological activity, water *infiltration* and water-holding *capacity*, organic systems generally produce higher yields than crops grown using conventional high-input methods during *drought*, leading to production stability year after year.

Organic agriculture is a collection of tested agricultural practices by diligent farmers' *intent* on preserving the health of our planet. Organic agriculture is sustainable, keeping soils healthy and alive, and helping to minimize *contamination* of the earth's *precious* water supplies.

Organophosphates are not allowed in organic agriculture. Instead, organic growers use biological and cultural practices as their first line of defense against pests. Methods used include crop *rotation*, the selection of pest- and disease- resistant varieties, *nutrient* and water management, the provision of habitat for the natural enemies of pests, and release of beneficial organisms to protect crops from damage. The only pesticides allowed in organic agriculture must be on a USDA approved list, with restricted use.

In addition, organic practices prohibit the use of genetic engineering, *irradiation*, *sewage sludge*, antibiotics, and hormones. These practices are allowed in other forms of raising and producing our food, and other agricultural products.

Because organic agriculture respects the balance of microorganisms in the soil, organic producers use *composted manure* and other natural materials, as well as crop rotation, to help improve soil fertility, rather than synthetic fertilizers that can result in an *overabundance* of nitrogen and phosphorous in the ground. As a result,

organic practices protect ground water supplies and avoid runoff of chemicals that can cause "dead zones" in larger bodies of water.

Comparisons in Europe, for instance, have shown nitrate-leaching rates on organic farms are 40 – 57 percent lower per hectare (roughly 2,5 acres or 12,000 square yards) and carbon dioxide *emissions* are 40 – 60 percent lower per hectare than conventional systems.

On the other hand, current conventional practices have led to some measurable problems, including a high level of toxic metals in commercial fertilizers. An analysis of 29 fertilizers found that each contained 22 different heavy metals. In 20 of the products, levels exceeded the limits set on wastes sent to public landfills, with disturbing quantities of arsenic, lead, mercury, cadmium, chromium, and dioxin, among others.

Furthermore, polluted runoff from farms and cities went largely *unabated* and actually increased over the past 30 years according to a 2001 report from the Pew Oceans Commission. The report noted that many of the nation's coastal environments exhibit symptoms of over-enrichment from these run-offs. Symptoms include harmful *algal* blooms, loss of sea grasses and coral reefs, and serious oxygen depletion. Coastal regions, as a result, have suffered reduced production of valuable fisheries and threats to biodiversity and ecosystems less *resilient* to natural and human influences.

Because organic practices help safeguard the environment and protect habitats, organic production conserves and promotes species diversity. In the United Kingdom, a study comparing biodiversity in organic farming and conventional farming systems found that organic farms had five times as many wild plants in *arable* (farmable) fields and 57 percent more species.

The organic farms also had 25 percent more birds at the field edge, 44 percent more in the field in autumn and winter, and 2,2 times as many breeding skylarks and higher *skylark* breeding rates. In addition, they had 1,6 times as many of the *invertebrate arthropods* that make up bird food; three times as many non-pest butterflies in the crop areas; one to five times as many spider numbers, and one to two times as many spider species. They also showed a significant decrease in *aphid* numbers.

Buying organic products is also a way to support conservation of our land. Organic products, whether foods or fiber, are produced through a system of farming that maintains and *replenishes* soil fertility in an ecological way. There were approximately 1,3 million acres in certified organic production in the United States in 1997. The U.S. Department of Agriculture's Economic Research Service estimates 2,6 million acres were in production in 2001.

As far as feeding the world, the late Donella Meadows, who served as director of the Sustainability Institute, wrote: "We already grow enough food to feed everyone; the excess simply is not distributed where it is needed. Industrial agriculture, far from being the *salvation* it promises, is actually undermining the resource base-healthy soil, clean water, and diversity of plants and animals-needed to sustain the world's growing human population in the long term. If anything can restore that resource base and at the same time eliminate hunger it is organic methods."

Organic foods and products are making a healthy comeback from a by-gone era, but in more of the light of what is healthy for Earth's ecology and us. Moreover, the production and use of these products have become the choice of a rapidly growing number of farmers and consumers today. It does prove that the connection between human health and our ecology are indelibly intertwined.

### Words and Expressions:

- *a fiber* – волокно, волосок, фибра, нить, древесное волокно
- *a residual* – остаток, остаточный продукт
- *an organophosphate* – органический фосфат
- *a residue* – осадок, отстой
- *a remainder* – остаток, остатки
- *harsh* – жесткий, твердый, грубый, неприятный
- *to boost* – поднимать, помогать подняться
- *to enhance* – увеличивать, усиливать, улучшать
- *to restore* – возвращать в прежнее состояние
- *infiltration* – инфильтрация, просачивание, проникновение

- *a capacity* – вместимость, емкость
- *a drought* – засуха, засушливость, нехватка дождей, сухость воздуха
- *an intent* – намерение, цель
- *a contamination* – загрязнение, порча
- *precious* – драгоценный, большой ценности
- *a rotation* – чередование, периодическое повторение, очередность, ротация
- *a nutrient* – питательное вещество
- *an irradiation* – облучение, химиотерапия
- *sewage* – сточные воды, нечистоты
- *a sludge* – густая грязь, слякоть, ил, тина
- *to compost* – готовить компост, компостировать, превращать в компост
- *a manure* – навоз, компост, удобрение
- *overabundance* – чрезмерное изобилие, избыток, излишек
- *an emission* – выделение, распространение
- *unabated* – неослабленный
- *algal* – относящийся к водорослям, водорослевый
- *resilient* – пружинистый, упругий, эластичный
- *an arable* – пахота, пашня, пахотная земля
- *a skylark* – жаворонок
- *an invertebrate* – беспозвоночное животное
- *arthropods* – членистоногие
- *an aphid* – тля растительная
- *to replenish* – (снова) наполнять(ся), пополнять(ся)
- *a salvation* – избавление, спасение

### Exercises on the Text:

 Answer the following questions.

1. What does the term "organic" mean in agriculture?
2. Where and when did organic agriculture appear?
3. What is the purpose of organic farming?
4. Why do many farmers use harsh chemicals and synthetic fertilizers?
5. Which agricultural system is more popular nowadays: organic or conventional and why?

 Translate the following sentences from Russian into English.

1. Сегодня производство и использование органических пищевых продуктов представляет собой серьезную альтернативу для потребителей и фермеров.
2. Органическое сельское хозяйство вносит свой вклад в улучшение всех составляющих нашей планеты: почвы, воды, животных и человеческих существ.
3. Доказано, что в одном случае из четырех задержка в развитии у детей связана с генетическими и экологическими факторами, включая контакт со свинцом, ртутью и органофосфатными пестицидами.
4. Так как за последние шестьдесят лет резко возросла потребность в пищевых продуктах, фермеры начали применять химикаты и синтетические удобрения для увеличения урожая.
5. Даже в наши дни токсические пестициды все еще используются в сельском хозяйстве.
6. Органическое сельское хозяйство – это набор сельскохозяйственных практик, разработанных фермерами с целью сохранения здоровой обстановки на нашей планете.
7. Использование органофосфатов запрещено в органическом сельском хозяйстве.

8. Кроме того, органическое сельское хозяйство запрещает использование генной инженерии, антибиотиков и гормонов.

9. Анализ двадцати девяти удобрений показал, что каждое из них содержит двадцать два разных тяжелых металла.

10. Покупка экологически чистых продуктов – это еще один способ поддержать здоровую обстановку на нашей планете.

### **English in Everyday Communication:**

☺ Read, translate and act out the following dialogue. Work in pairs.

#### **MY FRIEND GOES ABROAD**

- Here we are at last. What time does your plane takes off?
- 9.30, we've plenty of time yet. I'll go and have my luggage weighed now.
- How much are you allowed to take with you?
- I travel tourist class, so it's about 20 kilos. I don't think my luggage weighs more than that.
- Will it take you long to go through the customs?
- No, it'll be just a formality. I've nothing to declare.
- When are you due in London?
- It's a non-stop flight so I'll be there long before lunch.
- Oh, that's wonderful, you won't even have time to get air-sick.
- I never do, though I'm a poor sailor.
- Then you can look forward to a pleasant journey.

## Настоящее продолженное время (*The Present Continuous Tense*)

*Present Continuous* употребляется для выражения действия, совершающегося в момент речи или в настоящий период времени. Глаголы, выражающие чувства и восприятия, умственную деятельность и некоторые другие: *to see* – видеть; *to know* – знать; *to like* – нравиться; *to want* – хотеть и прочие в *Present Continuous* не употребляются.

Утвердительная форма *Present Continuous* образуется с помощью вспомогательного глагола *to be* в соответствующей форме *Present Indefinite* и *Participle I* (причастие настоящего времени) смыслового глагола.

Например: *Mr. Bell is reading a letter.*

*Participle I* образуется путем прибавления окончания *-ing* к основной форме глагола: *speak* + *-ing* = *speaking*. Если глагол оканчивается на букву *-e*, то при прибавлении *-ing* *e* опускается: *come* + *-ing* = *coming*. Если глагол оканчивается на согласный звук, перед которым стоит один гласный, то конечная буква удваивается: *sit* + *-ing* = *sitting*.

Отрицательная форма *Present Continuous* образуется с помощью отрицательной частицы *not*, которая ставится после вспомогательного глагола *to be*.

Например: *I am not reading a book now.*

В вопросительной форме *Present Continuous* вспомогательный глагол *to be* ставится перед подлежащим, а смысловой глагол в *Participle I* ставится после подлежащего.

Например: *Is Mr. Bell reading a telex?*

## Прошедшее продолженное время (*The Past Continuous Tense*)

*Past Continuous* употребляется для выражения действия, происходящего в определенный момент в прошлом. Этот момент может быть выражен:

- 1) точным указанием времени;
- 2) другим действием, выраженным глаголом в простом прошедшем времени.

Утвердительная форма глаголов в *Past Continuous* образуется при помощи глагола *to be* в прошедшем времени (*was, were*) и *Present Participle* смыслового глагола.

Например: *Igor was waiting for the British businessmen at 7 o'clock.*

В вопросительной форме *Past Continuous* вспомогательный глагол *to be* в прошедшем времени (*was, were*) ставится перед подлежащим, а смысловой глагол в *Participle I* ставится после подлежащего.

Например: *Were you looking through the latest letters yesterday at nine?*

Отрицательная форма образуется при помощи отрицательной частицы *not*, которая ставится после вспомогательного глагола *to be* в прошедшем времени.

Например: *The director was not looking through the catalogues at two yesterday.*

### Будущее продолженное время (*The Future Continuous Tense*)

Употребляется для выражения незаконченного действия, которое будет совершаться в определенный момент в будущем. Этот момент может быть выражен:

1) точным указанием времени:

*I shall be working at the laboratory at 8 o'clock tomorrow morning.* – Я буду работать в лаборатории завтра утром в 8 часов.

2) другим действием в будущем, выраженным глаголом в *Present Indefinite*:

*When you come to see me, I shall be working at the laboratory.* – Когда Вы придете ко мне, я буду работать в лаборатории.

Глагол в форме *The Future Continuous Tense* переводится на русский язык глаголом в будущем времени несовершенного вида.

Утвердительная форма *The Future Continuous Tense* образуется при помощи вспомогательных глаголов *shall* (для 1-го лица) и *will* (для 2-го и 3-го лица), а также вспомогательного глагола *be* и смыслового глагола в *Participle I*: *shall/will be + -ing*.

Например: *I shall be passing my examination at 3 o'clock tomorrow.*

Вопросительная форма образуется при помощи вспомогательных глаголов *shall* или *will*, которые ставятся перед подлежащим, а вспомогательный глагол *be* и смысловой глагол в *Participle I* ставятся после подлежащего.

Например: *Who will be passing his examination at 3 o'clock tomorrow?*

Отрицательная форма образуется при помощи отрицательной частицы *not*, которая употребляется после вспомогательных глаголов *shall* или *will*.

Например: *He will not be passing his examination at 2 o'clock tomorrow.*

### Grammar Exercises:

☞ Look through the text again and find out whether there are sentences illustrating the above mentioned grammatical phenomena.

☞ Complete the following sentences in Present Continuous.

1. Bill, stop that disgusting game you (to play).
2. They have moved to their London house. They (to buy) new furniture.
3. He paused and looked at her. "You (to shake). Are you all right?"
4. I (to meet) Jason at his office on the 25<sup>th</sup>. Would you join us?
5. You know that cinema audiences (to decline) in the United States.
6. The rain ... just (to begin).
7. I miss her very much, almost every minute of the day I think of her, or I think I (to heart) her.
8. My father ... always (to say) things that he shouldn't say in front of me.
9. Paris is wonderful. I like the food here, and I (to eat) like a mad.

✎ Complete the following sentences in Past Continuous.

1. The front door of the house stood open. The maid (to polish) the windows.
2. After a while he informed me that John (to do) a translation of some poems from Spanish.
3. I knew Harry (to come) sometime on Monday.
4. You remember how he ... always (to write) verses.
5. He glanced my way to see if I (to listen).
6. By the time the month was up, Eric realized he (to fight) a losing battle.
7. She stopped beside Tommy who was in a particularly scornful mood. He (to leave) in the morning.
8. Well, I was taught not to interrupt when older people (to talk).
9. She said it very calmly but her face had gone the curious colour, which meant that she (not to like) it very much.
10. He looked across the street to see if they (to wait).

✎ Complete the following sentences in Future Continuous.

1. "The evenings (to get) long soon," I said to my aunt, to cheer her up.
2. "I do wish you'd do something about these stones," said Mary. "We ... all (to fall) over them."
3. He is very much ashamed. He realizes that it is all over between them. I think he (to leave) quite soon.
4. I (to have) some people in after dinner tonight at my place. Will you come?
5. Well, I (to see) you this evening.
6. "What is your brother like? I (to know) him at Oxford," said Val.
7. Now that your assistant's gone you (to look) for someone to do his job.

### In Conclusion:

Now we are aware of the need to protect our environment. Work in pairs and make up two lists of things we *should do* and *shouldn't do* if we want to protect the planet.

Samples:

We should recycle our wastes.

We shouldn't use so many chemicals in food.

Read out your lists. The pair with the largest number of proposals is the winner.

## LESSON 8

- Grammar:** 1. Функции глагола *to have* в предложении.  
2. Настоящее совершенное время (*The Present Perfect Tense*).  
3. Прошедшее совершенное время (*The Past Perfect Tense*).  
4. Будущее совершенное время (*The Future Perfect Tense*).

**Text:**

### PAPER CHASE

Take a minute to look around the room you are in and notice how many things are made out of paper. There may be books, a few magazines, some printer paper, and perhaps a poster on the wall. Yet, if you consider that each person in the United States uses 749 pounds of paper every year (adding up to a *whopping* 187 billion pounds per year for the entire population, by far the largest *per capita* consumption rate of paper for any country in the world), then you realize that paper comes in many more forms than meets the eye.

The fact is, world consumption of paper has grown four hundred percent in the last 40 years. Now nearly 4 billion trees or 35 % of the total trees cut around the world are used in paper industries on every continent. Besides what you can see around you, paper comes in many forms from *tissue* paper to *cardboard* packaging, to stereo speakers, to electrical plugs, to home *insulation*, to the *sole* inserts in your tennis shoes. In short, paper is everywhere.

So where does it come from? Most people can guess that trees are the *staple* of any paper product. But did you know that until the middle of the 19th century, the main ingredient of paper was cloth rag? And while trees have since become a vital component in the creation of paper, many manufacturers today are beginning to use recycled waste combined with tree *pulp* to decrease the number of trees that need to be cut down and keep up with the growing demand for paper. Also, many environmentalists who believe that the world's forests are being cut down faster than they can grow are pointing to the continued success of wood-free paper made with other plants such as *hemp* and a similarly *fibrous* plant called *kenaf*.

Following is a brief history of paper along with the details of how the modern industry works and a few suggestions for making paper without cutting down so many trees.

The first paper-like substance was invented by the Egyptians over 6,000 years ago. Papyrus, which is the root of our English word "paper", was made by weaving reeds or other fibrous plants together and pounding them into a flat sheet. The Greeks and the Romans also used this technique, although some Ancient Greek paper makers were the first to create a kind of *parchment* paper made out of animal skins. Chances are, Aristotle, Socrates and other Greek philosophers originally wrote their books on the skins of dead cows.

But paper as we know wasn't made until 105 AD, when a Chinese court official named Tsai Lun mixed *mulberry bark* and hemp with water and scraps of cotton and linen cloth (i.e. rags). This *concoction* was mashed into a pulp and pressed into mats that were left in the sun to dry. Rags, as it turns out, would be used as the basis for paper for the next 1700 years.

As the Chinese culture flourished and expanded to the edges of the Asian continent, paper went along with it, first to Korea and Japan and then to the Arab world, which included Egypt and Morocco. Yet, it wasn't until 1009 AD that paper making reached Europe by way of Spain, where the first European paper mill was set up by Arabs in Xativa, near the Mediterranean port city of Valencia.

After that, the Italians and the French became notable paper makers and dominated the paper industry in Europe from 1250 to 1470 AD. After the invention of the moveable type printing press (link) in 1453 by the German inventor Johannes Gutenberg and the subsequent boom in literacy rates in the 16th century, paper for books grew in demand. Paper mills began opening all over the European continent and eventually reached the new world where the first American paper mill opened in Philadelphia in 1690. That increase in demand and the *upsurge* in papermaking began to tax the raw materials used to make paper (which was still largely made with rags) and manufacturers began searching for alternatives. Yet, it was not until 1843 that ground-wood (or pulp) harvested from trees became the papermakers' material of choice.

Today, the world consumes about 300 million tons of paper each year. Most of that paper is made from virgin pulp, but recycled paper accounts for 38 % of the world's total fiber supply and non-wood fibers from plants like hemp or kenaf make up 7 %. The U.S., which contains only 5 % of the world's population, uses 30 % of all paper. In that country, the forest and paper products industry generates \$200 billion dollars in sales every year, accounting for 7 % of the total manufacturing output of the United States. About 28 % of all wood-cuts in the U.S. are used for papermaking and according to a 2000 report by PaperCom Alliance the demand for paper worldwide has grown 30 % in the past 6 years and is projected to grow even more.

Having come a long way from using rags and mulberry bark, papermaking has become a *sophisticated* science. Once a tree is cut down, it goes to a mill where it is *debarked* and then chipped into tiny fragments by a series of whirling blades. These fragments are then "cooked" in a *vat* with water and several chemicals, including *caustic* soda and sodium sulfate, to make *goeey slurry* known as pulp. In the final stages, *additives* such as *starch*, *China clay*, talc and calcium carbonate, are added to the pulp to improve the strength and brightness of the paper. Then the pulp is bleached to a white color using water and chlorine before being pressed into rolls and dried.

Unfortunately, the paper making process is not a clean one. According to the U.S. Toxic Release Inventory report published by the U.S. Environmental Protection Agency, pulp and paper mills are among the worst polluters to air, water and land of any industry in the country. The Worldwatch Institute offers similar statistics for the rest of the world. Each year millions of pounds of highly toxic chemicals such as *toluene*, methanol, chlorine dioxide, hydrochloric acid, and formaldehyde are released into the air and water from paper making plants around the world.

Paper making also uses up vast quantities of trees. But trees are a renewable resource, which means that once one is cut down another can be planted in its place. In fact, much of the wood used by paper companies in the U.S. comes from privately owned tree farms where forests are planted, groomed and thinned for harvest in

20 to 35 year cycles, depending on the tree species. Around the world, tree farms supply 16 % of all wood used in the paper industry while the *bulk* comes from second growth forests. Only 9 % of the wood used to make paper is harvested from old growth forests, which are impossible to replace because of their maturity.

Yet, while tree farms or plantations help feed the demand for wood, they cannot provide the plant and animal diversity found in natural forests. Plus, according to a 1996 report from the U.S. Forest Service, the rate of harvest for softwood trees in the southern United States outpaced growth for the first time since 1953.

For these reasons, there is a growing chorus of entrepreneurs, environmentalists and inventors who are coming up with ways to make paper without having to use as many chemicals or so many trees. Recycling is by far the most common way to help save a tree. According to the Worldwatch Institute recycling efforts around the world recovered about 110 million tons, or 43 %, of all paper used. About 45 % of all paper in the United States was kept out of *landfills* in 1998 and almost all paper makers in the U.S. substitute some recycled paper for virgin wood in the pulp making stage. Some paper mills rely on recycled waste as their primary source of raw material.

Others point to agricultural waste as a stand in for wood. Agri-pulp, as it is called, is wheat, oat, barley and other crop stalks left over after harvesting. Combined with recycled paper and other fillers, some paper makers are finding that agri-pulp paper makes fine stationery.

Hemp is a wood substitute that has a rich history in the paper making industry from paper's origins in China in the first century AD to the Declaration of Independence, which was written in the 18th century on hemp paper. Hemp is now used to make rope and clothes as well as paper. Unfortunately, it is illegal to grow hemp in the U.S. because it is a non-intoxicating variety of *cannabis sativa*, the same plant marijuana comes from. For that reason, hemp must be imported for use in the U.S.

Kenaf is also known as an excellent tree-substitute in making paper. This 4,000-year-old *hibiscus* plant – an annual, non-wood fiber plant related to *okra* and cotton – is native to central Africa and can grow up to 18 feet tall in a four-to-five month season. Like hemp, kenaf is naturally whiter than wood and can be bleached with hydrogen peroxide instead of chlorine.

One of the major reasons paper mills are hesitant to convert to using kenaf or hemp to make paper is because they are not set up to process anything except trees. Converting a paper mill to process these wood pulp alternatives would cost tens of millions of dollars and major coordination with their suppliers and customers.

Still – like the conversion of radio to television as the major entertainment source in the 1950s and 1960s – such a conversion from trees to non-wood source materials in the papermaking process can ultimately provide extraordinary economics for the manufacturers and the consumers. It is simply a matter of the different groups within the industry agreeing on how to best make it happen. And, it is going to take consumers like you and me to start buying recycled products as well as alternative pulp.

What is certain is that with so much of our daily lives dependent on the material, paper is here to stay. Even e-mail and the Internet have not slowed this demand. And yet, as research advances and the environmental impact lessen, perhaps we will be able to live comfortably with paper for the next six thousand years.

### Words and Expressions:

- *whopping* – колоссальный, огромный
- *per capita* – на человека, на душу населения
- *tissue* – ткань
- *cardboard* – картон
- *an insulation* – обособление, изоляция
- *a sole* – подошва, ступня
- *a staple* – главный элемент
- *a pulp* – плоть, мякоть, мягкая масса
- *hemp* – конопля
- *fibrous* – волокнистый, жилистый, фиброзный
- *kenaf* – кенаф (лубяное волокно)
- *parchment* – пергаментная бумага
- *a mulberry* – шелковица, тутовое дерево
- *bark* – кора (дерева)

- *concoction* – варево, стряпня
- *an upsurge* – повышение, подъем, рост
- *sophisticated* – сложный, замысловатый, усовершенствованный
- *to debark* – высаживать(ся), выгружать(ся)
- *a vat* – бак, цистерна, чан, кадка, ушат, бочка
- *caustic* – едкий, каустический
- *gooey* – клейкий, липкий, вязкий, тягучий
- *slurry* – гидросмесь, жидкий цементный раствор
- *an additive* – добавление, дополнение, добавка
- *starch* – крахмал
- *clay* – земля, грязь, ил, тина
- *toluene* – толуол
- *a bulk* – основная масса, большая часть чего-либо
- *landfill* – закапывание мусора, отходов, мусорная свалка
- *cannabis sativa* – гашиш, марихуана
- *hibiscus* – гибискус
- *okra* – бамя, гомбо

### Exercises on the Text:

 Answer the following questions.

1. How many things are made out of paper in your classroom?
2. Why is world consumption of paper growing so rapidly?
3. Where does the paper come from?
4. Do you know any facts from the history of papermaking?
5. Where and when was the first paper-like substance invented?

 Translate the following sentences from Russian into English.

1. Посмотрите вокруг себя, и вы удивитесь, сколько вещей сделано из бумаги.
2. За последние сорок лет мировое потребление бумаги возросло на 100 %.
3. Сегодня многие производители используют переработанные отходы, чтобы сократить объем вырубаемых деревьев.
4. Первое похожее на бумагу вещество было изобретено египтянами более 6000 лет назад.
5. Итальянцы и французы стали монополистами в производстве бумаги и возглавляли бумажную промышленность в Европе с 1250 по 1470 гг.
6. Заводы по производству бумаги стали открываться во всей Европе, а в 1690 году первый бумажный завод был открыт в Филадельфии.
7. В настоящее время в мире ежегодно потребляется 300 миллионов тонн бумаги.
8. США, где проживает только 5 % мирового населения, используют 30 % всей бумаги.
9. Когда деревья срубают, их отправляют на завод, где они измельчаются циркулярными пилами.
10. К сожалению, процесс изготовления бумаги не безопасен с экологической точки зрения.

### English in Everyday Communication:

☺ Read, translate and act out the following dialogue. Work in pairs.

#### GOING TO SEE A DOCTOR

- Hallo, Peter! I haven't seen you around lately. Where have you been?
- I've been away with a bad cold for over a week! In fact I'm still on sick-leave though I'm no longer running a temperature.

– Are you? Well, you should stay in bed until you're completely cured then. Cold may have serious complications.

– I know they may. But as a matter of fact I'm only going to the outpatients'. And then, perhaps I'll drop in at the chemist's.

– Who's your doctor?

– Doctor Krasnov has been treating me. Do you know him?

– Yes, he's a very good man for heart trouble. Well, bye-bye. I wish you a quick recovery.

– Thank you. So long!

### Grammar Reference:

#### Функции глагола *to have* в предложении

Смысловый глагол	Модальный глагол	Вспомогательный глагол
В сочетании с существительным: <i>We had a meeting yesterday.</i> – Вчера у нас было собрание.	В сочетании с инфинитивом: <i>Metals have to stand up to heavy loads.</i> – Металлы должны выдерживать большие нагрузки.	В сочетании с <i>Participle II</i> для образования времен <i>Perfect</i> : <i>They have translated this article from "Smith and C".</i> – Они перевели статью от "Смит и К°".

#### Настоящее совершенное время (*The Present Perfect Tense*)

Это время употребляется для выражения действия, завершившегося к моменту речи и связанного с настоящим временем. На русский язык глаголы в *Present Perfect* в большинстве случаев переводятся прошедшим временем. *Present Perfect* в основном употребляется в устной речи.

Утвердительная форма *Present Perfect* образуется при помощи вспомогательного глагола *to have* в *Present Indefinite* и *Participle II* (причастия прошедшего времени) смыслового глагола: *to have* + + *Participle II*.

Например: *I have just read the offer from Sam and Co.*

1) *Participle II* стандартных глаголов образуется путем прибавления окончания *-ed*, *-d* к инфинитиву глагола без частицы *to*.

Если инфинитив глагола оканчивается на букву *-e*, то прибавляется только *-d*: *to translate* – *translated*.

Буква *у* после согласного звука меняется на *i*, а после гласных *у* сохраняется: *to study* – *studied*, но *to stay* – *stayed*.

После краткого гласного звука конечная согласная удваивается: *to stop* – *stopped*.

2) *Participle II* нестандартных глаголов образуется не по правилам. Каждый нестандартный глагол имеет свою форму:

*to begin* – *begun*, *to drink* – *drunk*.

3) Вспомогательный глагол *to have* меняется на *has* при употреблении с 3-м лицом единственным числом: *He has just read the telegram from this company.*

4) *Present Perfect* часто употребляется:

- а) с наречиями неопределенного времени – *already, yet, lately, just, ever, never*;
- б) со словами, выражающими незаконченный период – *today, this week, this month, this year*.

Вопросительная форма образуется при помощи вспомогательного глагола *have (has)*, который ставится перед подлежащим, и *Participle II* смыслового глагола, который ставится после подлежащего.

Например: *Has he known her for many years?* – Он знает ее много лет?  
*Have you ever been to London?* – Были ли Вы когда-нибудь в Лондоне?

Отрицательная форма образуется при помощи отрицательной частицы *not*, которая ставится после вспомогательного глагола *have (has)*.

Например: *I have not seen you since spring*.

### Прошедшее совершенное время (*The Past Perfect Tense*)

*Past Perfect* употребляется для обозначения действия, совершившегося до определенного момента в прошлом. Этот момент может быть выражен точным указанием времени с предлогом *by* или другим прошедшим действием:

*Richard and his wife were late for the performance. When they got to the theatre, the play had already started.* – Ричард и его жена опоздали на спектакль. Когда они добрались до театра, спектакль уже начался.

Утвердительная форма *Past Perfect* образуется с помощью глагола *to have* в форме *Past Indefinite* и *Participle II* смыслового глагола: *had + Participle II*:

- *When did you finish your work yesterday?*
- *I had finished it by 5 o'clock.*

Вопросительная форма образуется при помощи глагола *to have* в *Past Indefinite*, который ставится перед подлежащим, и *Participle II* смыслового глагола, который ставится после подлежащего:

*What business matters had you discussed before you signed the contract?*

Отрицательная форма образуется при помощи отрицательной частицы *not*, которая ставится после глагола *to have* в *Past Indefinite*.

Например: *I couldn't watch the nine o'clock news on television because I hadn't finished my article by that time.*

### Будущее совершенное время (*The Future Perfect Tense*)

Употребляется для того, чтобы выразить действие, которое будет совершено к определенному моменту в будущем. Этот момент может быть выражен следующими способами.

1 Обозначениями времени с предлогом *by* (*by 6 o'clock* – к 6 часам; *by that time* – к тому времени и т.д.):

*We shall have finished this article by 6 o'clock tomorrow.* – Завтра к 6 часам мы закончим эту статью.

2 Другим будущим действием, выраженным придаточным предложением условия и времени с глаголом в настоящем времени, который переводится на русский язык глаголом в будущем времени.

*You will have finished your work before the bell rings.* – Вы закончите свою работу, прежде чем прозвонит звонок.

Утвердительная форма *Future Perfect* образуется при помощи вспомогательных глаголов *shall/will* и *have*, а также *Participle II* смыслового глагола: *shall/will have + Participle II*.

Например: *I shall have written the letter by seven o'clock.*

Вопросительная форма образуется при помощи вспомогательных глаголов *shall / will*, которые ставятся перед подлежащим, а также вспомогательного глагола *have*, который ставится после подлежащего и *Participle II* смыслового глагола.

Например: *Will you have written this article by 6 o'clock?*

Отрицательная форма образуется при помощи отрицательной частицы *not*, которая ставится после вспомогательного глагола *shall* или *will*.

*They will not have finished this work by 4 o'clock tomorrow.*

### Grammar Exercises:

☞ Look through the text again and find out whether there are sentences illustrating the above mentioned grammatical phenomena.

☞ Complete the following sentences in Present Perfect.

1. He thinks it's pure nerves and he (to give) me pills.
2. Sam, what (to come) over you? You make me sad talking like this.
3. I don't know how often I (to tell) you that I don't believe in this.
4. I (to try) to be good.
5. "Come on, ladies," he shouted, "there's nothing to be afraid of. The mice (to leave) the room."
6. "Your hands are probably soiled. Go and wash them." "I (to wash) them."
7. "Do you know the man?" "I (to meet) him."
8. "Well, it's very nice to see you anyway. I (to be) lonely."
9. "You look a bit shaken. Are you all right?" "It (to be) a pretty awful day, that's all."
10. "Are you keen on sailing?" "I ... never (to do) any."

☞ Complete the following sentences in Past Perfect.

1. He asked me if I (to have) breakfast.
2. He now opened the low gate that he ... so often (to swing) on as a small boy.
3. She was sure that he ... never (to lie) to her before.
4. He knew that as a girl she (to live) in Rome.
5. He glanced up and down the beach to see if he (to leave) anything.
6. She realized that she was faint for food. She (to eat) nothing since the picnic.
7. He quite forgot that Julian (to be divorced) for some time.
8. He decided to wait till he (to talk) to the man himself.
9. He was not aware how long he (to sit) there.
10. I called at nine and the man said she (to go) out about an hour ago.

☞ Complete the following sentences in Future Perfect.

1. If you come back in about twenty minutes Alec and I (to have) our talk.
2. You'd better ring me back in half an hour. By then I (to find) the letter.
3. He says they (to finish) the house by the end of next month.
4. He will probably get here in about three weeks. By which time I (to return) to the University.

5. When we get back he (to have) a bath and we shall find him asleep in his bed.

### **In Conclusion:**

Divide into groups / pairs. Choose one of the topics below and try to write an article on it. Collect all the articles and put them on one table. Read the articles and decide which one is the best in your opinion.

"Depletion of the ozone layer".

"Cruelty towards animals".

"People and rainforests".

"Cars and environment".

"Industrial pollution".

"Nuclear wastes".

## **LESSON 9**

**Grammar:** 1. Модальные глаголы *can, may, must*.

2. Пассивный залог группы *Indefinite (Simple)*.

**Text:**

### **THE COAST REDWOODS OF CALIFORNIA**

They are the oldest living things on the face of the earth and the tallest. Some have looked down on the world around them for two thousand years. Earlier cultures had the good sense *to revere* them; but ours, since the mid-nineteenth century, has systematically destroyed them. The greatest remaining concentration of these great trees – and historically the scene of the greatest *devastation* by *loggers* – is along California's north coast. As a species, the coast *redwoods* are not endangered. New growth takes root easily. What is in danger is the old growth, described as trees that are more than 250 years old, with a *trunk* diameter of more than four feet at breast height. At one time, the majestic old growth forests covered millions of acres along a 50-mile wide coastal band stretching from San Francisco to southern Oregon.

Today, less than 90,000 acres of old-growth forests remain. Through the *concerted* and often *courageous* action of conservationists, starting in the early twentieth century, about 80,000 acres are now incorporated into state or national parks. Some of the most notable are:

- Armstrong Redwoods State Reserve, located north of San Francisco on the Russian River, where two of the largest and most famous trees, named Parson Jones and Colonel Armstrong, stand under the watchful eye of a legendary park ranger;
- Humboldt Redwoods State Park, located in the Eel River Basin of northern California, containing what is claimed to be the largest remaining *contiguous* old-growth redwood forest in the world. The oldest trees are, of course, irreplaceable, and most of them are gone. The remainder is now, for the most part, under federal or state protection. Only a few thousand acres of old growth – perhaps as few as 6,000 – are under the control of the big forest products companies. Is this really enough to cause the intense conflict that still rages between two or three corporations on one side and local conservationists on the other? In our opinion, the answer is yes, and for more than one reason.

The statistics are complicated and are therefore capable of being used in different ways by the differing parties. Published information suggests the following:

- the total distribution of coast redwoods, including old and new growth, currently occupies about 1,740,000 acres;
- of these, only about 350,000 are in the public domain, of which about 80,000 acres are old growth;
- most of the coast redwood forests, amounting to well over a million acres, are owned by no more than seven industrial forest products companies, only a few of which are considered by the conservation community to be engaged in sustainable practices.

Some corporate executives argue that most of the old growth is already protected and that the destructive harvesting of the past was, in any event, not their responsibility. Conservationists argue, we believe correctly, that

any remaining old growth forests – even as little as 6,000 acres – represent a national treasure, which should be placed under a public *trust*. But the argument, and its intensity, runs much deeper. A generally accepted *paradigm* is that the family-owned *timber* companies, many of which harvested sustainably, protecting the long-term health and productivity of their forests, have been taken over by a fewer number of corporate giants which were driven to dispose of the assets as quickly and efficiently as possible.

Pacific Lumber Company, owned by Maxxam, a Texas holding company, is regarded by its California neighbors as the worst offender in this regard. Another large operator, Louisiana Pacific, was similarly distrusted by its neighbors. When it was sold to new owners, a respected family firm, which also owns The Gap, Inc. *retail* chain, expectations were raised very high. But the new company, Mendocino Redwood Co., has quickly *inherited* much of the distrust, which was *lavished* on its *predecessor*.

These problems run much deeper than preservation of the old growth. When short-term profits rather than long-term, sustained prosperity govern harvesting policy, the effect on the surrounding habitat is often devastating. Without natural protection, hillsides wash out into rivers, poorly constructed roads pour dirt and *gravel* into streams, and mudslides pour down on private homes. One of the world's richest and most beautiful natural habitats has suffered enormously. *Salmon* and *trout* are disappearing, many forms of wildlife are threatened, water is badly polluted by herbicides, and the quality of life for the human population is declining. The State of California has offered astonishingly little protection to neighboring communities. And this has led to local activism, which has been characterized, sometimes fairly but more often falsely, as dangerous, irresponsible, and immature.

Unavoidably, the media cover the more flamboyant protesters. But closer examination always reveals a much more serious, thoughtful, and highly localized line of resistance, depending more on moral authority than finances to achieve results. There are many examples along the northern coast of California, such as respectable, grey-haired Mary Pjerrou, a long-time resident of the village of Elk, who leads the Redwood Coast Watersheds Alliance, to fight, in and out of court, to protect her community from destructive harvesting practices. These local resisters have used every tool at their disposal, including the Endangered Species Act. The case of the Northern Spotted Owl received national attention and occasional *ridicule*. It is helpful to keep in mind that, to a local activist, the federal laws protecting the habitat of an endangered species have also become a useful means of protecting the human habitat.

When the public at large finally reaches a consensus on an issue of this kind, solutions can emerge very quickly. A decade or so ago, the public became aware that *tuna* fishermen were setting their *purse* nets on the dolphins which swim just above the tuna schools, killing thousands of these appealing creatures every year. The most effective public response came in the form of *consumerism*, stirring a response from the major food companies to bring dolphin-free tuna to the supermarkets. Similarly, the coast redwood may now become a consumer *protectorate*. Home Depot, the largest retailer of wood products in the world, recently announced that, by the year 2003, it would carry only "certified" wood products. What this means, in practice, is that an independent organization has certified that the product being sold meets a standard of sustainability, according to the following criteria:

- timber sustainability – whether the company's methods will provide for growth rather than depletion of timber stocks over time;
- ecosystem maintenance – how well the company's operation protects endangered species, stream health and unique ecosystems such as old growth forests;
- financial *viability* strong enough to support good citizenship in the local community.

As one timber harvester said to a local newspaper: "The government hasn't been able to change forest practices. The environmental movement has not been able to change forest practices. But the consumer, through the purchase of sustainably grown and certified materials, will be able to finally change forest practices."

The many grass-roots organizations throughout California, which have been out on the front lines for years – such as the Save the Redwoods League -, deserve our respect and the time needed for us to understand the issues. And, as consumers, we have the ability right now to start looking for the "certified" label when we visit Home Depot or the local *lumberyard*.

### **Words and Expressions:**

- *to revere* – уважать, чтить, почитать, благоговеть, боготворить, преклоняться
- *a devastation* – опустошение, разорение

- *a logger* – лесоруб, дровосек
- *redwood* – красное дерево или древесина
- *a trunk* – ствол (дерева)
- *concerted* – согласованный
- *courageous* – бесстрашный, мужественный, отважный, смелый, храбрый
- *contiguous* – соприкасающийся, смежный, граничащий, прилегающий
- *trust* – опека
- *a paradigm* – парадигма, принцип, система взглядов и понятий
- *timber* – лесоматериалы, строевой лес, древесина
- *retail* – розничная продажа
- *to inherit* – наследовать, унаследовать
- *to lavish* – дарить, раздавать, расточать
- *a predecessor* – предшественник
- *gravel* – гравий, галька, галечник
- *a salmon* – лосось, семга, лососина
- *a trout* – форель
- *ridicule* – осмеяние, насмешка, предмет насмешек
- *a tuna* – тунец (рыба)
- *a purse* – деньги, богатство
- *consumerism* – стимулирование потребительского интереса
- *protectorate* – протекторат
- *viability* – жизнеспособность, жизненность, жизнестойкость
- *a lumberyard* – лесной склад

### Exercises on the Text:

 Answer the following questions.

1. What are the tallest and the oldest living things of the earth?
2. Where are redwoods located?
3. Why redwoods are considered a national treasure?
4. What does the term "local resistor" mean?
5. How can consumers change current forest practices?

 Translate the following sentences from Russian into English.

1. Они – одни из самых старых жителей нашей планеты.
2. Некоторые из них прожили уже более двух тысячелетий.
3. Жители древних цивилизаций относились к ним с большим почтением, в то время как наши современники, начиная с середины девятнадцатого столетия, занимались их систематическим уничтожением.
4. Как вид красное дерево не относится к числу исчезающих растений.
5. Молодые насаждения легко приживаются на любой почве.
6. Величественные старые лесонасаждения покрывают миллионы акров прибрежной полосы, простирающейся на 50 миль от Сан-Франциско до южного Орегона.
7. Самые старые деревья, конечно, нельзя сохранить, и большинство из них исчезли.
8. На сегодняшний день оставшаяся часть древней лесополосы находится под государственной или федеральной защитой.
9. Опубликованные данные свидетельствуют о том, что общая площадь прибрежного насаждения красных деревьев составляет на сегодняшний день около 1 740 000 акров.
10. Это не просто защита старых насаждений, проблема их сохранения затрагивает очень многие аспекты.

### English in Everyday Communication:

☺ Read, translate and act out the following dialogue. Work in pairs.

## BOOKING AIRLINE TICKETS BY TELEPHONE

- Good morning. Can I help you?
- I'd like to reserve a seat on a morning flight to Seattle next Wednesday.
- I can offer you two flights: at 7.30 a.m. and at 10 a.m. Which would you prefer?
- I'd rather go by the 7.30.
- First class or economy?
- Economy, please.
- Okay. Anything else?
- When is the plane due in Seattle?
- At 12.30. There are no delays as a rule. Your name, address and telephone number, please.
- (Gives the information required.)
- We'll deliver the ticket two days before your departure. Thank you for calling us.

### Grammar Reference:

#### Модальные глаголы *can, may, must* (Modal Verbs)

Модальные глаголы – это такие глаголы, которые обозначают не само действие, а указывают на отношение говорящего к действию, т.е. указывают на возможность, вероятность или необходимость совершения действия.

Модальные глаголы не употребляются самостоятельно, а только в сочетании с инфинитивом смыслового глагола, образуя глагольное составное сказуемое.

1. Глагол *can* – "могу", "умею" – выражает физическую возможность совершения действия:
  - *Can you speak English?*
  - *Yes, I can speak English.*
2. Глагол *must* – "должен" – выражает долженствование или необходимость совершения действия:
  - *I cannot speak to you now. I must go home.*
  - *Must you go now?*
  - *Yes, I must.*
3. Глагол *may* – "можно" – выражает разрешение выполнить действие. В разговорной речи вместо *may* часто употребляется *can*:
  - *May I go to the cinema?*
  - *No, you must not. The film is not for children.*
  - *You can watch TV at home.*

У модальных глаголов *can, may, must* есть ряд грамматических особенностей.

1. В *Present Simple* не имеют окончания *-s* в 3-м лице единственного числа.
2. Вопросительную и отрицательную формы образуют без вспомогательного глагола *to do*. Отрицательная частица *not* с глаголом *can* пишется слитно – *cannot*.
3. Не имеют формы инфинитива.
4. Следующий за модальным глаголом смысловой глагол употребляется без частицы *to*.
5. Не имеют форм будущего времени (*Future Simple*), а глагол *must* не имеет и формы прошедшего времени (*Past Simple*).

Present	Past	Future
<i>can</i>	<i>could</i>	–
<i>must</i>	–	–
<i>may</i>	<i>might</i>	–

6. Взамен недостающих форм модальных глаголов *can, may, must* употребляются заменители модальных глаголов.

#### Заменители модальных глаголов

Can	May	Must
<i>to be able (to)</i> – быть в состоянии (мочь)	<i>to be allowed (to)</i> – иметь разрешение	<i>to have (to)</i> – быть вынужденным (в силу обстоятельств)  <i>to be (to)</i> – быть обязанным (в силу договоренности, плана, расписания и т.д.)

Заменители модальных глаголов употребляются не только в тех случаях, когда модальные глаголы не имеют соответствующих форм *Future* или *Past*, но и вместо них.

Инфинитив, следующий за заменителем модального глагола, употребляется с частицей *to*.

*They were to be at the conference.* – Они должны были быть (присутствовать) на конференции.

*She was not allowed to stay there.* – Ей не разрешили оставаться там.

7. В вопросительных предложениях модальный глагол ставится перед подлежащим.

8. В отрицательных ответах на вопросы с глаголом *must* употребляется модальный глагол *need* (в отрицательной форме *needn't*) для выражения отсутствия необходимости.

9. Глагол *should* может употребляться в качестве модального глагола, выражая моральную обязанность или необходимость совершения действия. Обычно глагол *should* переводится на русский язык "следует", "следовало бы", "должен".

*You should help him.* – Вам следовало бы помочь ему.

10. Глагол *would* может употребляться в качестве модального глагола для выражения упорного нежелания, отказа выполнить действие, для выражения просьбы:

*We did our best but the motor would not start.*

*Would you come back a little later?*

#### Пассивный залог (*The Passive Voice*)

Пассивный (страдательный) залог показывает, что подлежащее не является производителем действия, оно испытывает действие, направленное на него со стороны другого лица или предмета. Поэтому глагол-сказуемое употребляется в форме страдательного залога. Лицо, совершающее действие, выражается в страдательном обороте существительным или местоимением с предлогом *by*.

*The radio was invented by Popov in 1895.* – Радио было изобретено Поповым в 1895 году.

1. Глаголы, требующие после себя предложного дополнения (*to look at, to listen to, to speak about, to talk about, to send for*), в страдательном залоге сохраняют предлог.

Например: *The doctor was sent for a few minutes ago.*

2. Непереходные глаголы, такие как *to grow, to take place, to take part, to appear* в страдательном залоге не употребляются.

Утвердительная форма глаголов страдательного залога в *Indefinite* образуется при помощи вспомогательного глагола *to be* в нужном времени и *Participle II* смыслового глагола.

Например: – *You often go to the theatre, Lena. Who gets tickets for you?*

– *They are usually booked by my father.*

При образовании вопросительной формы вспомогательный глагол ставится перед подлежащим.

- *Is TV equipment exported to many countries?*
- *Yes, it is.*

При образовании отрицательной формы частица *not* ставится после вспомогательного глагола.

Например: *The goods were not delivered on time because the plant was heavy with orders.*  
*The machines will not be tested next week because they are not ready for tests.*

### Grammar Exercises:

☞ Look through the text again and find out whether there are sentences illustrating the above mentioned grammatical phenomena.

☞ Fill in the blanks with *to have to* or *to be to*.

1. At nightfall the ship put in at a small port where they ... to load three hundred bags of coffee.
2. They ... to light a fire to cook their supper.
3. He set off for the school where he ... to write examinations for entry to the University.
4. When I got home I found I had left my olive oil in front of the notice board and I ... to return in the afternoon to collect it.
5. He made all arrangements for the marriage, which ... to take place on the day of his mother's arrival.
6. The Finnish woman who ... to work for Finch had not arrived yet.
7. She knew there would be more vacations for her sons. But she ... (not) to say it.
8. They knew it as well as she.
9. Eden went to the wood where he ... to meet his brother for a ride.
10. Uncle Nick's things ... to be moved out of his room so that it could be re-let.
11. For the next few weeks I ... to stay in bed. Everyone came to visit me, and brought me presents, and I ... (not) to do the cooking.

☞ Fill in the blanks with *can (be able)*, *may* or *must*.

1. "Will you know where to go?" "Yes, thank you. I ... always ask my brother."
2. "Didn't she hear our shouting?" "She says she heard nothing." "She ... wandered a long way."
3. What ... he have meant when he said it?
4. He hesitated and said, "I ... go to South America. As a tea planter." I said, "I ... be wrong, Jason, but I don't think they grow tea in South America."
5. He ... have flown off after he dropped us. He ... not land here. Not in a plane with wheels.
6. "I'd give anything to meet that fellow." "We ... see what ... be done."
7. Cindy ... have laughed aloud. Instead, she nodded.
8. You ... hardly have been more surprised than I was.
9. The old man cupped his ear in his palm. "I think I ... be getting deaf. I ... not hear you."
10. "There was someone on the phone for you", he said. "Oh, who?" "I don't know. He didn't say. Some man." "It ... have been Mike." "I know Mike. It wasn't Mike." "Oh. Then I ... not think who it ... have been."

☞ Translate the following sentences into English using *can*, *may* or *must* wherever possible.

1. Они должны действовать, как им сказали.
2. Я думаю, мне надо надеть другие туфли на вечеринку.
3. Я не могу уйти, не расплатившись.
4. Они должны вернуть все деньги.
5. Ты мог бы им позвонить и сказать, что не придешь.

6. Я так хотел есть, что чуть не съел всего цыпленка сразу.
7. "Мне взять зонт?" – "Да, похоже, что будет дождь".
8. Тебе удалось закончить работу?
9. Ситуация – хуже не придумаешь.
10. Ты не мог бы прийти немного позже?

✎ Turn the following active constructions into passive omitting all mention of the agent of the action.

1. No one has made any mistakes.
2. What do you call it?
3. They asked us to stay a little longer.
4. One expects him to obey the regulations.
5. People have made great progress in physics.
6. They are discussing the possibility of new negotiations.
7. Everybody thought that Jack was clever but lazy.
8. People use coal for making artificial materials.
9. People say it is difficult.
10. What books are people reading this year?
11. They elected him President of the Club last year.
12. They are rehearsing a new play at the National Theatre.
13. Someone found the children in the morning.
14. Nobody has ever treated me with such kindness.
15. He knew that they had sent the invitations out two weeks earlier.
16. They can arrange all things.
17. People expect you to meet the chief.
18. Are they sending for you?
19. They have always passed his telephone calls through to the Minister without questions.
20. They never took any major decision without his knowledge or advice.
21. I knew that they had told him of the meeting at once.
22. The trouble started when they told me to change the way we were running this department.
23. There was a tear in his trousers, which someone had already darned.
24. In his circle they looked on the police as enemies.
25. They took the child to the hospital for the poor.
26. Ever since I started asking questions about my sister they have lied to me.
27. I'm sure they will look better after him in an army hospital.
28. When the situation called for a lie, he lied firmly and well.
29. No one has ever beaten my brother at tennis.
30. They gave his little daughter a present, too.

### **In Conclusion:**

The following extract describes how Patagonia uses recycled plastic bottles to make material for jackets. Put the verbs in brackets in the required form and organize the stages of the process in the right order.



Bottles ... *(to bring)* to the local recycling centre.



The recycled fibers ... *(to ship)* to the mill.



### PCR Fleece Story

## Soda Bottles to Synchilla Fleece

The plastic ... *(to convert)* into small pieces and ... *(to chop)* into flakes.

The flakes ... *(melt)* and shaped into fine fibers.



They *(to make)* into clothes known as "PCR synchilla clothing".

### LESSON 10

**Grammar:** 1. Сложноподчиненные предложения (*The Complex Sentences*).  
2. Герундий (*Gerund*).

**Text:**

#### The Fate of the Black Rhino

The spring rains came on time and in abundance to the South African landscape this year and from the air the *veld* looks as *lush* and green as ever I have known it as we fly into Johannesburg. Good rains, never certain anywhere in Africa, are always a cause for gratitude, even celebration. They are good for the country, good for the farmers – and particularly good for the wildlife. And wildlife is the whole purpose of our visit.

We, Ecology Communications, spent the first half of November in South Africa, principally at the Hluhluwe-Umfolozi game park, a three-hour drive north of the port city of Durban in KwaZulu-Natal. It is the

home of the greatest concentration of *rhino*, black and white anywhere in the world and we had come looking for answers to the question that *haunts* wildlife conservationists: "Can the black rhino, now on the *brink* of *extinction*, be saved?"

What we found were some very encouraging signs but, as yet, no guarantee that the species will be saved. There is however, a sense of optimism among game rangers and conservationists that were almost nonexistent a few years back. It would seem that the tide of *wanton slaughter* has begun to turn.

It is hard to believe that an entire species could all but vanish in just three decades, wiped out because their horns are so highly prized in the marketplaces of Hong Kong and the Yemen.

As recently as the late 1960s, some 70,000 black rhino *roamed* the plains of Africa. Today, the most recent count puts the number at 2,700. The rhino horn is no more than tightly matted hair and *cartilage*, but in the Far East it is thought to have remarkable *curative* powers and to a Yemeni, there is no finer material from which to craft a *dagger* handle.

With such a high value placed on the horns, the rewards of illegal *poaching* are almost irresistible on a continent of widespread poverty and civil unrest. Moreover, liberation wars and cold war confrontations saw AK47s, the weapon of choice for poachers, strewn all over the plains of Africa.

The Russian weapon is remarkable for the abuse it can take and still keep firing. A conservation officer says he has unearthed several, *remnants* of the struggle against *apartheid*, buried on the Hluhluwe reserve for who knows how many months or years. "But, brush away the soil and its ready to fire," – he says in some admiration.

Wildlife conservation is largely a concern of the West and therefore, in African eyes, of the white man. But Dr. Ian Player, who led the program that saved the white rhino from the fate now faced by the black, is filled with praise for the many Africans who helped him. He also notes that encouraging headway is being made elsewhere in Africa in educating local populations.

When people recognize that rhino are major tourist attractions and that tourist dollars create local jobs they are more ready to become eyes and ears in the war on poaching. Why should a few men become rich from killing rhino when live rhino will help raise living standards for many more is the *rationale* behind this approach?

South Africa, struggling with a poor economy and *soaring* crime rates fuelled by widespread poverty, has seen tourist numbers decline markedly over the years. But the game parks remain popular. Lions, leopards, elephants, rhino and *buffalo*, the "big five" as they are called, hold an almost irresistible attraction to overseas visitors. So do stately giraffe, playful zebra and the ever-so-graceful antelope. Even *cavorting* baboons bring cars to a stop at the roadside.

During our week at Hluhluwe's Hill Top Camp, South African accents are principally those of the staff and tour operators. French and Dutch accents are plentiful, but on this occasion, German tones predominate in the dining room each evening. In contrast, the only American accents are those of my colleagues until our last day when we take breakfast alongside two couples from Chicago.

One man, a businessman temporarily stationed in Durban has brought out his wife and two good friends and they have come to the park for a few days. Republicans all, they had cheered wildly in the African bush for a George W. Bush victory in the presidential elections, only to find their celebration *premature*.

Most South Africans are indifferent as to who wins the election with at least one exception. Dr. Player is passionate about the US election. "God help us (environmentalists) if Bush gets in" – is his *terse* comment. As Vice President, Al Gore had visited with Player on a trip to South Africa and in a recent interview indicated that, Dr. Player would be one of those invited to the White House if he became president.

Player, elder brother of former golfing great, Gary Player who twice won the US Masters tournament at Augusta, is confident the black rhino will *endure* if the practices put in place to save the white rhino in the 1950s are repeated. "We placed a ring of steel around the rhino", – Player says of those days. By that he means that fences surrounding the reserve were strengthened and patrolled by armed wardens. In addition as many individual animals as possible were identified and closely monitored over the years.

In the 1950s all this was done on horseback. Today a tranquilizing dart will drop a rhino within five minutes.

All this is now done from the air as we observed. A program of identification, funded by the World Wildlife Fund, was underway when we visited the park. And we are invited to come along.

A fixed wing aircraft is used to spot the rhinos at which stage a helicopter crew is called in to dart the rhino, land close to the fallen animal, *notch* the ears for easy future identification, then administer the *antidote* and get out.

A quick exit is out of the question when producer and camerawoman Maureen McNamara accompanies the chopper to take close up shots of the entire operation. Only when the ranger administers the antidote, one minute away from a fully mobile rhino does he instruct McNamara. "Get up a tree. Quick", – he says. Seconds later, he *shoves* her unceremoniously up into the relative safety of the tree *canopy*.

"Never, ever run from a rhino," – we are told. "If you run you are dead!" Rhinos have very poor eyesight but good hearing and an *exquisite* sense of smell.

Back-up cameraman Steve Marx is next to being up a tree when faced by a rhino. He is out with a foot patrol when they come across a *lone* cow. She is curious, rather than annoyed by all the movement deliberately made to attract her attention. She *trots* forward to investigate and *prods* the tree immediately below Marx's foot. He captures everything on camera.

At top speed of 36 miles an hour the 3,000-pound rhino would easily have *demolished* the relatively small tree. But that is not the case and Marx returns with a story he will, one day, tell his grandchildren.

Hopefully, if the ongoing programs at Hluhluwe-Umfolozi are adopted elsewhere, they will know just what he is talking about.

Almost certainly, the black rhino will survive in South Africa. It remains to be seen if the same will be said of the rest of Africa.

### Words and Expressions:

- *a veld* – вельд, степь, плоскость
- *lush* – сочный, буйный, пышный
- *a rhino* – носорог
- *to haunt* – неотступно преследовать
- *a brink* – грань, начало, край
- *an extinction* – вымирание
- *wanton* – несдержанный, необузданный, подвижный
- *a slaughter* – убой, забой
- *to roam* – бродить, путешествовать, скитаться, странствовать
- *a cartilage* – хрящ
- *curative* – целебный, целительный
- *a dagger* – кинжал
- *poaching* – браконьерство
- *remnant* – остаток, остатки
- *an apartheid* – апартеид, расовая изоляция
- *a rationale* – разумное объяснение, логическое обоснование, основная причина
- *soaring* – вздымающийся, возвышающийся, высокий, грандиозный
- *a buffalo* – буйвол, бизон
- *to cavort* – прыгать, скакать
- *premature* – необдуманный, непродуманный, опрометчивый, поспешный
- *terse* – сжатый, краткий
- *to endure* – выдерживать испытание временем
- *to notch* – зарубать, делать метку, прорезать, делать запись, отмечать
- *an antidote* – противоядие
- *to shove* – протолкнуть, протащить
- *a canopy* – укрытие, прикрытие, убежище, прибежище
- *exquisite* – наилучший, отборный

- *lone* – одинокий, уединенный
- *to trot* – спешить, торопиться
- *to prod* – колоть, тыкать, прокалывать, протыкать, пронзать
- *to demolish* – стирать с лица земли

### Exercises on the Text:

📖 Answer the following questions.

1. What does the term "conservationist" mean?
2. What was the main purpose of conservationists' visit to Africa?
3. How do you understand the word combination "big five"?
4. Why do poachers need rhino?
5. Will the black rhino survive in South Africa, what do you think?

📖 Translate the following sentences from Russian into English.

1. Обильные дожди необходимы для страны, для фермеров и, особенно, для дикой природы.
2. Дожди в Африке являются причиной не только простой благодарности, но даже торжеств.
3. Это самое большое скопления носорогов в мире, черных и белых, и мы прибыли сюда, чтобы ответить на вопрос, который преследует борцов за охрану дикой природы: "Может ли черный носорог сейчас, находясь на грани исчезновения, быть спасен?"
4. Обнаруженное нами было обнадеживающим знаком, хотя нет никаких гарантий, что носорог будет спасен.
5. Казалось, что волна массовых убийств начала отступать.
6. Трудно поверить в то, что целый вид мог исчезнуть всего за три десятилетия из-за высокой цены на бивни носорога на рынках Гонконга.
7. Защитником дикой природы выступает, главным образом, Запад, а в глазах африканцев – это люди белой расы.
8. Когда местные жители поняли, что носорог представляет особую привлекательность для туристов, они с еще большим вдохновением начали сражаться против браконьерства.
9. У носорогов очень слабое зрение, но хороший слух и отличное обоняние.
10. Он снимал на камеру все происходящее.

### English in Everyday Communication:

☺ Read, translate and act out the following dialogue. Work in pairs.

#### MAKING HOTEL RESERVATIONS BY TELEPHONE

- Centre Hotel. Good morning. Can I help you?
- Good morning. I'd like to reserve a single room with bath beginning next Tuesday.
- Name, please?
- Victor Lavrov.
- How long will you be staying, Mr. Lavrov?
- I'll be staying for two days. And one more thing. I'd like it to be a quiet room, not overlooking the street.
- Just a moment... Unfortunately, we haven't got any such accommodation available at the moment, but the hotel's situated in a very quiet part. I'm sure you'll enjoy your stay here whichever room you book.
- Oh, thanks, I'll leave it to you, then.
- Very good, sir. We'll be looking forward to seeing you with us next Tuesday.

### Grammar Reference:

## Сложноподчиненные предложения (*The Complex Sentences*)

Сложноподчиненное предложение состоит из главного и одного или нескольких придаточных предложений. Придаточные предложения соединяются с главным предложением при помощи подчиненных союзов и союзных слов, а также бессоюзным способом.

### Дополнительные придаточные предложения (*Object Clauses*)

Дополнительные придаточные предложения выполняют в сложном предложении функцию прямого дополнения или предложного косвенного дополнения. Они отвечают на вопросы *whom* – кого? или *what* – что? без предлогов или с предлогами и вводятся союзами *that, if, whether*, союзными словами *who, what, which, when, where, how* или бессоюзно.

*I am sure that he is not at home now.* – Я уверен, что его нет дома сейчас.

*I am glad you have come.* – Я рад, что Вы пришли (бессоюзное подчинение).

### Определительные придаточные предложения (*Attributive Clauses*)

Определительные придаточные предложения выполняют функцию определения в сложноподчиненном предложении, отвечают на вопросы *what, which* – какой? и присоединяются к главному предложению бессоюзным способом или при помощи следующих союзных слов-местоимений: *who* – который (*whom* – которого), *whose* – чей, которого, *which, that* – который, а также наречиями *when* – когда, *where* – где, куда, *why* – почему. Местоимения *who, whom, whose* относятся к существительным, обозначающим одушевленные предметы, *which* относится к неодушевленным предметам, а местоимение *that* относится как к одушевленным, так и неодушевленным предметам.

*Here are the letters that I received yesterday.* – Вот письма, которые я получил вчера.

*The man whom you saw yesterday is our director.* – Человек, которого ты видел вчера, мой директор.

При бессоюзной связи предлог стоит в конце придаточного предложения, а при переводе на русский язык – в начале.

*This is the office we work in.* – Вот офис, в котором мы работаем.

### Обстоятельственные придаточные предложения (*The Adverbial Clauses*)

Обстоятельственные придаточные предложения выполняют в сложном предложении функцию различных обстоятельств. Они делятся по своему значению на обстоятельственные предложения времени, места, образа действия, причины, цели, следствия, уступительные, степени и сравнения, условия.

#### Придаточные предложения времени (*Adverbial Clauses of Time*)

Придаточные предложения времени отвечают на вопросы: *when* – когда; *since when* – с каких пор; *how long* – как долго.

Придаточные предложения времени соединяются с главным предложением союзами: *when* – когда; *while* – в то время как; *before* – перед тем как, до того как, перед; *after* – после того как; *as soon as* – как только; *as* – когда, в то время как, по мере того как; *till, until* – пока, до тех пор, пока не; *as long as* – пока, до тех пор пока; *since* – с тех пор как и др.

*I saw many places of interest when I was in Moscow.* – Я осмотрела много достопримечательностей, когда была в Москве.

*As soon as I receive his cable, I shall give it to you.* – Как только я получу его телеграмму, я дам ее тебе.

*She came after I had left.* – Она пришла после того, как я ушла.

В придаточных предложениях времени будущее время не употребляется.

*While you are working I shall be reading this article.* – Пока Вы будете работать, я прочитаю эту статью.

Придаточные предложения условия (*Adverbial Clauses of Condition*).

Придаточные предложения условия обычно соединяются с главным предложением союзами: *if* – если; *unless* – если не. В английском языке условные предложения подразделяются на три типа.

Первый тип условных предложений выражает осуществимое условие, относящееся к настоящему, прошедшему или будущему времени.

*If it gets dark, we switch the light on.* – Если становится темно, мы включаем свет.

Второй тип составляют предложения, выражающие маловероятные условия, относящиеся к настоящему или будущему времени. Эти предложения употребляются в сослагательном наклонении. В главном предложении употребляются вспомогательные глаголы *should / would* + инфинитив смыслового глагола, в придаточном предложении употребляется форма сослагательного наклонения, совпадающая с *Past Simple*.

*If I had time (now, tomorrow), I should go there.* – Если бы у меня было время (сейчас, завтра), я бы пошла туда.

Третий тип составляют предложения, выражающие неосуществимые предположения, относящиеся к прошедшему времени. В условных предложениях третьего типа глагол главного предложения стоит в форме *should (would) + Infinitive Perfect*, а глагол условного придаточного предложения стоит в форме сослагательного наклонения, совпадающего с *Past Perfect*.

*If you had listened to me carefully, you would not have asked me such questions.* – Если бы Вы слушали меня внимательно, Вы бы не задавали мне таких вопросов.

### Герундий (*Gerund*)

Герундий является неличной формой глагола, которая сочетает в себе свойства глагола и существительного. Герундий не имеет соответствующей формы в русском языке.

Active	Passive	
<i>Writing</i> <i>asking</i>	<i>being written</i> <i>being asked</i>	простые формы (одновременность или будущее)
<i>having written</i> <i>having asked</i>	<i>having been written</i> <i>having been asked</i>	перфектные формы (предшествование)

1. Обладая свойствами глагола, герундий (как и инфинитив) имеет категорию относительного времени и залога, может иметь прямое дополнение и определяться наречием.

*Tom likes reading such books.* – Том любит читать такие книги.

*Tom likes being read such books.* – Том любит, когда ему читают такие книги.

*He is fond of walking quickly.* – Он любит ходить быстро.

*I remember having seen this film many years ago.* – Я помню, что смотрел этот фильм много лет назад.

*I remember having been told about this film.* – Я помню, что мне рассказывали об этом фильме.

2. Обладая свойствами существительного, герундий выполняет в предложении те же синтаксические функции, что и существительное (функции подлежащего, второй части сложного сказуемого, определения, дополнения, обстоятельства). Как всякое существительное, герундий может определяться

притяжательным местоимением или существительным в притяжательном падеже и иметь перед собой различные предлоги.

### Grammar Exercises:

☞ Look through the text again and find out whether there are sentences illustrating the above mentioned grammatical phenomena.

☞ Translate the following conditional sentences into English.

1. Я бы никогда не подумал, что это возможно, если бы я не увидел это своими глазами.
  2. Я бы не стал делать этого на твоём месте.
  3. В случае если тебе придется неожиданно уехать, пришли мне записку.
  4. Пьеса понравилась бы мне больше, если бы она не была такой длинной.
  5. Если бы не его болезнь, семья переехала бы в город.
  6. Если бы он пришел вовремя, этого могло бы не случиться.
  7. Если бы пошел дождь, я бы промокла до костей, так как на мне было очень легкое платье.
  8. Куда бы ты пошел, если бы не было дождя?
  9. Посиди с ним, и, если он вдруг попросит чего-нибудь, скажи мне.
  10. Если бы я сказал что-нибудь подобное твоей тетушке, она сочла бы меня сумасшедшим.
- ☞ Supply infinitive or gerund for the following sentences.

1. It was quite late when they saw Trasker ... up the other side of the street. They saw him ... in front of his house, ... up at it and ... his cigarette away (*to come, to pause, to look, to throw*).
2. ... the truth, he felt disgusted with himself (*to tell*).
3. Even when my mother was alive it was considered ... a great extravagance ... to a hotel for dinner (*to be, to go*).
4. Meg was not much surprised in the morning ... that her uncle was too unwell ..., though he hoped ... his work in the afternoon (*to learn, to appear, to resume*).
5. He knew that he ought to feel ashamed ... his father's money when he made no effort ... himself, but it did not seem ... and he just went on ... (*to keep, to take, to support, to matter, to sketch*).
6. I love you so much that I still can't stop my heart ... fast when I see you ... something as ordinary as ... the table (*to beat, to do, to lay*).
7. ... on the deck Father surveyed the passengers ... up the gang-way (*to stand, to come*).
8. He insisted upon her ... a maid ... in three afternoons a week ... with the cleaning and ironing (*to have, to come, to help*).
9. He thought of ... out and ... a note to his wife ... that he had been called away (*to go, to leave, to say*).
10. ... frank, it is a great shock to me (*to be*).

☞ Translate the following sentences from Russian into English.

1. Пожалуйста, перестаньте разговаривать. Я не слышу, что он говорит.
2. Хотя было очень поздно, он продолжал работать над докладом, который он собирался сделать на следующий день.
3. Они начали работать ровно в девять.
4. Я думаю, мы можем продолжить обсуждение этого вопроса.
5. Он продолжал читать книгу, пока не нашел нужное место.
6. Вы не возражаете, если я приведу с собой друга?
7. Я узнал этого человека, как только она закончила мне его описывать.
8. Я не буду возражать, если вы поможете ему в его работе.
9. Ты не возражаешь, если мы потанцуем еще немного?

## In Conclusion:

Choose one of the cards and move around the class asking everybody your question. At the end of the activity, try to make a report on the most interesting or unusual answers.

How would our life be different if all people ... (be) much more aware of the need to look after our planet?	How would our life be different if we ... (wear) clothes made of organically-grown cotton?
How would our life be different if we ... (can) use only unleaded petrol?	How would our life be different if our Earth ... (get) warmer?
How would our life be different if we ... (have) a local recycling centre?	How would our life be different if the ice at the North and South Poles ... (melt)?
How would our life be different if we ... (use) bicycles more often than cars?	How would our life be different if we ... (not / need) to sleep?
How would our life be different if we ... (know) that some of the most popular products are tested on animals?	How would our life be different if we ... (can / not) eat anything except grass?
How would our life be different if we ... (can) organize separate waste collections for glass, paper, metal and plastic?	How would our life be different if we ... (lose) our memory completely?

## COMMUNICATION PATTERNS

### *Expressing a different opinion:*

- ✓ Yes, I agree, but on the other hand ... – Да, я согласен, но с другой стороны ...
- ✓ I know, but even so ... – Я знаю, но тем не менее ...
- ✓ Perhaps you are right, but what about ...? – Возможно, вы правы, но как насчет ...?
- ✓ Don't forget that ... – Не забывайте, что ...
- ✓ Do you really think that ... ? – Вы действительно думаете, что ...
- ✓ I can agree with you, but only up to a point. – Я могу согласиться с вами, но только в определенной степени.
- ✓ I don't think ... – Я не думаю ...

### *Giving opinions:*

- ✓ I think ... – Я думаю ...
- ✓ I believe ... – Я полагаю ...
- ✓ I guess ... – Я считаю ...
- ✓ I suppose ... – Я предполагаю ...
- ✓ In my opinion ... – По моему мнению ...
- ✓ Perhaps ... – Возможно ...
- ✓ Personally ... – Лично я считаю ...
- ✓ In my view ... – С моей точки зрения ...
- ✓ To my mind ... – По-моему ...
- ✓ I strongly oppose ... – Я абсолютно против ...
- ✓ should / shouldn't be done – следует / не следует делать

- ✓ My main concern is ... – Моя основная задача ...
- ✓ It's a matter of ... – Это касается ...
- ✓ Consider / regard as ... – Считайте это ...
- ✓ The way I see it ... – Как мне кажется ...
- ✓ As far as I can see ... – Насколько я понимаю ...
- ✓ This looks like ... – Это выглядит, как ...
- ✓ This seems / appears to be ... – По всей видимости, это ...
- ✓ It might / could be ... – Это могло бы быть ...
- ✓ It makes me feel ... – Это заставляет меня чувствовать ...
- ✓ It reminds me of ... – Это напоминает мне ...
- ✓ I have no idea ... – Не имею ни малейшего представления ...
- ✓ I can't figure out ... – Не могу представить ...
- ✓ It strikes me that ... – Меня поражает, что ...
- ✓ I feel very strongly that ... – Я уверен, что ...
- ✓ I'm inclined to believe that ... – Я склонен полагать, что ...
- ✓ I'm absolutely convinced that ... – Я абсолютно убежден, что ...
- ✓ I tend to think that ... – Я склонен думать, что ...

*Giving reasons:*

- ✓ because – потому что
- ✓ as – так как
- ✓ since – из-за того, что
- ✓ for – из-за

*Giving examples:*

- ✓ for example ... – к примеру ...
- ✓ for instance ... – например ...
- ✓ such as ... – такой, как

*Expressing attitudes:*

- ✓ I just think it's time to ... – Я думаю, пришло время ...
- ✓ It's not that I'm against ... – Не могу сказать, что я против ...
- ✓ The thing is ... – Дело в том, что ...
- ✓ I do like ... – Мне действительно нравится ...
- ✓ I can honestly say ... – Я могу искренне признаться ...
- ✓ I hate everything about ... – Я просто ненавижу ...
- ✓ That's what I love best about ... – Больше всего мне нравится в этом ...

*Reporting results:*

- ✓ Almost everybody reported that ... – Почти все сказали, что ...
- ✓ The majority of people said that ... – Большинство сказало, что ...
- ✓ Only a few people complained that ... – Только некоторые пожаловались на ...
- ✓ Now I'd like to ... – Сейчас я бы хотел ...
- ✓ A believes that ... while B thinks ... – A полагает, что ... , в то время, как B думает, что ...
- ✓ A considers that ... whereas B finds it ... – A считает, что ... , однако, B полагает это ...
- ✓ Both my colleagues think ... – Мои коллеги оба думают, что ...
- ✓ They've come to an agreement that ... – Они пришли к соглашению, что ...
- ✓ They couldn't agree that ... – Они не могли согласиться с тем, что ...
- ✓ To sum up what has been said ... – Подводя итог всему выше сказанному ...
- ✓ In conclusion I'd like to ... – В заключение мне бы хотелось ...

### *Expressing causes:*

- ✓ causes – является причиной
- ✓ leads to – ведет к
- ✓ results in – приводит к

### *Expressing effects:*

- ✓ results from – является результатом
- ✓ is caused by – вызвано

### *Expressing probability:*

- ✓ I'm absolutely sure ... – Я абсолютно уверен ...
- ✓ He is likely to be ... – Возможно, он ...
- ✓ He seems rather ... – Он кажется достаточно ...
- ✓ It might be that he is ... – Вполне возможно, что он ...
- ✓ He is probably ... – Возможно, он ...
- ✓ He can't be ... – Не может быть, чтобы он ...
- ✓ She may ... – Она может ...

### *Expressing agreement:*

- ✓ Yes, that's right. – Да, это верно.
- ✓ I think so, too. – Я тоже так думаю.
- ✓ Exactly. – Абсолютно верно.
- ✓ It's true. – Это верно.
- ✓ Yes, I agree entirely here. – Да, я абсолютно с вами согласен.
- ✓ It stands to reason. – Само собой разумеется.
- ✓ That's my way of looking at it, too. – Это соответствует моей точке зрения на данную проблему.
- ✓ What you say is perfectly true. – Все, что вы говорите, абсолютно верно.

### *Expressing disagreement:*

- ✓ I don't agree. – Я не согласен.
- ✓ I don't think so. – Я так не думаю.
- ✓ You can't say that. – Вы не можете этого утверждать.
- ✓ That's not the point. – Не в этом дело.
- ✓ You could be right but I think ... – Возможно, вы правы, но я думаю ...
- ✓ I'm not quite sure I agree ... – Не уверен, что соглашусь с вами ...
- ✓ I can see your point, but ... – Я понимаю, что вы хотите сказать, но ...
- ✓ I'm afraid I'm not of the same opinion ... – Боюсь, у меня другая точка зрения ...
- ✓ I'm sorry, but I can't agree with you. – Простите, но я не могу согласиться с вами.
- ✓ You don't seem to realize that ... – Мне кажется, вы не понимаете, что ...
- ✓ Well, I wouldn't go quite that far ... – Я бы не стал заходить так далеко ...

### *Giving advice:*

- ✓ Have you ever thought of...? – Вы когда-нибудь думали о ...?
- ✓ If you want my advice ... – Если вам нужен мой совет ...
- ✓ I think you should ... – Я думаю, вам следует ...
- ✓ My advice would be to ... – Я бы посоветовал вам ...
- ✓ You'd better ... – Вам лучше ...

- ✓ Whatever you do, never ... – Что бы вы не делали, никогда ...

#### *Language of persuasion:*

- ✓ I can assure you that ... – Могу уверить вас, что ...
- ✓ I urge you to ... – Я настойчиво рекомендую вам ...
- ✓ I call upon you to ... – Я призываю вас ...
- ✓ I appeal to you to ... – Я обращаюсь к вам ...
- ✓ Please consider ... – Пожалуйста, имейте в виду ...
- ✓ As I'm sure you'll agree ... – Я уверен, что вы согласитесь ...
- ✓ You can take my word for it that ... – Даю слово, что ...
- ✓ You need to think about ... – Вам следует подумать о ...
- ✓ Believe me ... – Поверьте мне ...

#### *Expressing complaint:*

- ✓ I am sorry to have to say that ... – К сожалению, вынужден сообщить ...
- ✓ We've got a bit of problem here ... – Здесь у нас небольшая проблема ...
- ✓ You see ... – Видите ли ...
- ✓ I'm sorry to trouble you, but ... – Прошу прощения за беспокойство, но ...
- ✓ I'd like to point out that ... – Мне бы хотелось подчеркнуть, что ...
- ✓ I think it is pretty unpleasant ... – Я думаю, это довольно неприятно ...
- ✓ I am fed up with ... – Мне надоело ...
- ✓ I can't take any more of this. – Я больше не могу этого выносить.

#### *Expressing request and compromise:*

- ✓ I'd be happy if ... – Я был бы счастлив, если ...
- ✓ Would you be so kind as to ... – Не могли бы вы, пожалуйста ...
- ✓ Could you ... – Не могли бы вы ...
- ✓ Let's meet half way. – Давайте придерживаться золотой середины.

#### *Expressing apology:*

- ✓ Oh, dear, I'm really sorry. – О боже, мне так жаль.
- ✓ I'm ever so sorry. – Я очень сожалею.
- ✓ I'm sorry I didn't realize ... – Жаль, что я не осознавал ...
- ✓ I just don't know what to say. – Я даже не знаю, что сказать.

#### *Expressing threat:*

- ✓ If you ... I'll ... – Если вы ... , то я ...
- ✓ I'm warning you ... – Предупреждаю вас, что ...
- ✓ This is your last chance to ... – Это ваш последний шанс ...

## **EXTENSIVE READING**

### **1. ECOLOGY**

Ecology is the study of the relationship of plants and animals with their physical and biological environment. The physical environment includes light and heat or solar radiation, moisture, wind, oxygen, carbon dioxide, nutrients in soil, water, and atmosphere. The biological environment includes organisms of the same kind as well as other plants and animals.

Because of the diverse approaches required to study organisms in their environment, ecology draws upon such fields as climatology, hydrology, oceanography, physics, chemistry, geology, and soil analysis. To study the relationships between organisms, ecology also involves such disparate sciences as animal behavior, taxonomy, physiology, and mathematics.

An increased public awareness of environmental problems has made ecology a common but often misused word. It is confused with environmental programs and environmental science. Although the field is a distinct scientific discipline, ecology does indeed contribute to the study and understanding of environmental problems.

The term "ecology" was introduced by the German biologist Ernst Heinrich Haeckel in 1866; it is derived from the Greek "oikos" ("household"), sharing the same root word as "economics". Thus, the term implies the study of the economy of nature. Modern ecology, in part, began with Charles Darwin. In developing his theory of evolution, Darwin stressed the adaptation of organisms to their environment through natural selection. Also making important contributions were plant geographers, such as Alexander von Humboldt, who were deeply interested in the "how" and "why" of vegetation distribution around the world.

The thin mantle of life that covers the earth is called the biosphere. Several approaches are used to classify its regions.

The broad units of vegetation are called "plant formations" by European ecologists and "biomes" by North American ecologists. The major difference between the two terms is that "biomes" include associated animal life. Major biomes, however, go by the name of the dominant forms of plant life.

Influenced by latitude, elevation, and associated moisture and temperature regimes, terrestrial biomes vary geographically from the tropics through the arctic and include various types of forest, grassland, shrub land, and desert. These biomes also include their associated freshwater communities: streams, lakes, ponds, and wetlands. Marine environments, also considered biomes by some ecologists, comprise the open ocean, littoral (shallow water) regions, benthic (bottom) regions, rocky shores, sandy shores, estuaries, and associated tidal marshes.

A more useful way of looking at the terrestrial and aquatic landscapes is to view them as ecosystems, a word coined in 1935 by the British plant ecologist Sir Arthur George Tansley to stress the concept of each locale or habitat as an integrated whole. A system is a collection of interdependent parts that function as a unit and involve inputs and outputs. The major parts of an ecosystem are the producers (green plants), the consumers (herbivores and carnivores), the decomposers (fungi and bacteria), and the nonliving, or abiotic, components, consisting of dead organic matter and nutrients in the soil and water. Inputs into the ecosystem are solar energy, water, oxygen, carbon dioxide, nitrogen, and other elements and compounds. Outputs from the ecosystem include water, oxygen, carbon dioxide, nutrient losses, and the heat released in cellular respiration, or heat of respiration. The major driving force is solar energy.

Ecosystems function with energy flowing in one direction from the sun, and through nutrients, which are continuously recycled. Light energy is used by plants, which, by the process of photosynthesis, convert it to chemical energy in the form of carbohydrates and other carbon compounds. This energy is then transferred through the ecosystem by a series of steps that involve eating and being eaten, or what is called a food web. Each step in the transfer of energy involves several trophic, or feeding, levels: plants, herbivores (plant eaters), two or three levels of carnivores (meat eaters), and decomposers. Only a fraction of the energy fixed by plants follows this pathway, known as the grazing food web. Plant and animal matter not used in the grazing food chain, such as fallen leaves, twigs, roots, tree trunks, and the dead bodies of animals, support the decomposer food web. Bacteria, fungi, and animals that feed on dead material become the energy source for higher trophic levels that tie into the grazing food web. In this way, nature makes maximum use of energy originally fixed by plants.

The number of trophic levels is limited in both types of food webs, because at each transfer a great deal of energy is lost (such as heat of respiration) and is no longer usable or transferable to the next trophic level. Thus, each trophic level contains less energy than the trophic level supporting it. For this reason, as an example, deer or caribou (herbivores) are more abundant than wolves (carnivores).

Energy flow fuels the biogeochemical, or nutrient, cycles. The cycling of nutrients begins with their release from organic matter by weathering and decomposition in a form that can be picked up by plants. Plants incorporate nutrients available in soil and water and store them in their tissues. The nutrients are transferred from one trophic level to another through the food web. Because most plants and animals go uneaten, nutrients con-

tained in their tissues, after passing through the decomposer food web, are ultimately released by bacterial and fungal decomposition, a process that reduces complex organic compounds into simple inorganic compounds available for reuse by plants.

Within an ecosystem, nutrients are cycled internally. But there are leakages or outputs, and these must be balanced by inputs, or the ecosystem will fail to function. Nutrient inputs to the system come from weathering of rocks, from windblown dust, and from precipitation, which can carry material great distances. Varying quantities of nutrients are carried from terrestrial ecosystems by the movement of water and deposited in aquatic ecosystems and associated lowlands. Erosion and the harvesting of timber and crops remove considerable quantities of nutrients that must be replaced. The failure to do so results in an impoverishment of the ecosystem. This is why agricultural lands must be fertilized.

If inputs of any nutrient greatly exceed outputs, the nutrient cycle in the ecosystem becomes stressed or overloaded, resulting in pollution. Pollution can be considered an input of nutrients exceeding the capability of the ecosystem to process them. Nutrients eroded and leached from agricultural lands, along with sewage and industrial wastes accumulated from urban areas, all drain into streams, rivers, lakes, and estuaries. These pollutants destroy plants and animals that cannot tolerate their presence or the changed environmental conditions caused by them; at the same time, they favor a few organisms more tolerant to changed conditions. Thus, precipitation filled with sulfur dioxide and oxides of nitrogen from industrial areas converts to weak sulfuric and nitric acids, known as acid rain, and falls on large areas of terrestrial and aquatic ecosystems. This upsets acid-base relations in some ecosystems, killing fish and aquatic invertebrates, and increasing soil acidity, which reduces forest growth in northern and other ecosystems that lack limestone to neutralize the acid.

The functional units of an ecosystem are the populations of organisms through which energy and nutrients move. A population is a group of interbreeding organisms of the same kind living in the same place at the same time. Groups of populations within an ecosystem interact in various ways. These interdependent populations of plants and animals make up the community, which encompasses the biotic portion of the ecosystem.

The community has certain attributes, among them dominance and species diversity. Dominance results when one or several species control the environmental conditions that influence associated species. In a forest, for example, the dominant species may be one or more species of trees, such as oak or spruce; in a marine community, the dominant organisms frequently are animals such as mussels or oysters. Dominance can influence diversity of species in a community because diversity involves not only the number of species in a community, but also how numbers of individual species are apportioned.

The physical nature of a community is evidenced by layering, or stratification. In terrestrial communities, stratification is influenced by the growth form of the plants. Simple communities such as grasslands, with little vertical stratification, usually consist of two layers, the ground layer and the herbaceous layer. A forest has up to six layers: ground, herbaceous, low shrub, low tree and high shrub, lower canopy, and upper canopy. These strata influence the physical environment and diversity of habitats for wildlife. Vertical stratification of life in aquatic communities, by contrast, is influenced mostly by physical conditions: depth, light, temperature, pressure, salinity, oxygen, and carbon dioxide.

The community provides the habitat – the place where particular plants or animals live. Within the habitat, organisms occupy different niches. A niche is the functional role of a species in a community – that is, its occupation, or how it earns its living. For example, the scarlet tanager lives in a deciduous forest habitat. Its niche, in part, is gleaning insects from the canopy foliage. The more a community is stratified, the more finely the habitat is divided into additional niches.

## 2. ENVIRONMENT

Environment comprises all of the external factors affecting an organism. These factors may be other living organisms (biotic factors) or nonliving variables (abiotic factors), such as temperature, rainfall, day length, wind, and ocean currents. The interactions of organisms with biotic and abiotic factors form an ecosystem. Even minute changes in any one factor in an ecosystem can influence whether or not a particular plant or animal species will be successful in its environment.

Organisms and their environment constantly interact, and both are changed by this interaction. Like all other living creatures, humans have clearly changed their environment, but they have done so generally on a

grander scale than have all other species. Some of these human-induced changes – such as the destruction of the world's tropical rain forests to create farms or grazing land for cattle – have led to altered climate patterns. In turn, altered climate patterns have changed the way animals and plants are distributed in different ecosystems.

Scientists study the long-term consequences of human actions on the environment, while environmentalists-professionals in various fields, as well as concerned citizens-advocate ways to lessen the impact of human activity on the natural world.

The science of ecology attempts to explain why plants and animals live where they do and why their populations are the sizes they are. Understanding the distribution and population size of organisms helps scientists evaluate the health of the environment.

In 1840 German chemist, Justus von Liebig first proposed that populations could not grow indefinitely, a basic principle now known as the Law of the Minimum. Biotic and abiotic factors, singly or in combination, ultimately limit the size that any population may attain. This size limit, known as a population's carrying capacity, occurs when needed resources, such as food, breeding sites, and water, are in short supply. For example, the amount of nutrients in soil influences the amount of wheat that grows on a farm. If just one soil nutrient, such as nitrogen, is missing or below optimal levels, fewer healthy wheat plants will grow.

Either population size or distribution may also be affected, directly or indirectly, by the way species in an ecosystem interact with one another. In an experiment performed in the late 1960s in the rocky tidal zone along the Pacific Coast of the United States, American ecologist Robert Paine studied an area that contained 15 species of invertebrates, including starfish, mussels, limpets, barnacles, and chitons. Paine found that in this ecosystem one species of starfish preyed heavily on a species of mussel, preventing that mussel population from multiplying and monopolizing space in the tidal zone. When Paine removed the starfish from the area, he found that the mussel population quickly increased in size, crowding out most other organisms from rock surfaces. The number of invertebrate species in the ecosystem soon dropped to eight species. Paine concluded that the loss of just one species, the starfish, indirectly led to the loss of an additional six species and a transformation of the ecosystem.

Typically, the species that coexist in ecosystems have evolved together for many generations. These populations have established balanced interactions with each other that enable all populations in the area to remain relatively stable. Occasionally, however, natural or human-made disruptions occur that have unforeseen consequences to populations in an ecosystem. For example, 17th-century sailors routinely introduced goats to isolated oceanic islands, intending for the goats to roam freely and serve as a source of meat when the sailors returned to the islands during future voyages. As non-native species free from all natural predators, the goats thrived and, in the process, overgrazed many of the islands. With a change in plant composition, many of the native animal species on the islands were driven to extinction. A simple action, the introduction of goats to an island, yielded many changes in the island ecosystem, demonstrating that all members of a community are closely interconnected.

To better understand the impact of natural and human disruptions on the Earth, in 1991, the National Aeronautics and Space Administration (NASA) began to use artificial satellites to study global change. NASA's undertaking, called Earth Science Enterprise, and is a part of an international effort linking numerous satellites into a single Earth Observing System (EOS). EOS collects information about the interactions occurring in the atmosphere, on land, and in the oceans, and these data help scientists and lawmakers make sound environmental policy decisions.

The problems facing the environment are vast and diverse. Global warming, the depletion of the ozone layer in the atmosphere, and destruction of the world's rain forests are just some of the problems that many scientists believe will reach critical proportions in the coming decades. All of these problems will be directly affected by the size of the human population.

Human population growth is at the root of virtually all of the world's environmental problems. Although the growth rate of the world's population has slowed slightly since the 1990s, the world's population increases by about 77 million human beings each year. As the number of people increases, crowding generates pollution, destroys more habitats, and uses up additional natural resources.

The Population Division of the United Nations (UN) predicts that the world's population will increase from 6.23 billion people in 2000 to 9.3 billion people in 2050. The UN estimates that the population will stabilize at

more than 11 billion in 2200. Other experts predict that numbers will continue to rise into the foreseeable future, to as many as 19 billion people by the year 2200.

Although rates of population increase are now much slower in the developed world than in the developing world, it would be a mistake to assume that population growth is primarily a problem of developing countries. In fact, because larger amounts of resources per person are used in developed nations, each individual from the developed world has a much greater environmental impact than does a person from a developing country. Conservation strategies that would not significantly alter lifestyles but that would greatly lessen environmental impact are essential in the developed world.

In the developing world, meanwhile, the most important factors necessary to lower population growth rates are democracy and social justice. Studies show that population growth rates have fallen in developing areas where several social conditions exist. In these areas, literacy rates have increased and women receive economic status equal to that of men, enabling women to hold jobs and own property. In addition, birth control information in these areas is more widely available, and women are free to make their own reproductive decisions.

Like the glass panes in a greenhouse, certain gases in the Earth's atmosphere permit the Sun's radiation to heat Earth. At the same time, these gases retard the escape into space of the infrared energy radiated back out by Earth. This process is referred to as the greenhouse effect. These gases, primarily carbon dioxide, methane, nitrous oxide, and water vapor, insulate Earth's surface, helping to maintain warm temperatures. Without these gases, Earth would be a frozen planet with an average temperature of about  $-18^{\circ}\text{C}$  (about  $0^{\circ}\text{F}$ ) instead of a comfortable  $15^{\circ}\text{C}$  ( $59^{\circ}\text{F}$ ). If the concentration of these gases rises, they trap more heat within the atmosphere, causing worldwide temperatures to rise.

Within the last century, the amount of carbon dioxide in the atmosphere has increased dramatically, largely because people burn vast amounts of fossil fuels – coal and petroleum and its derivatives. Average global temperature also has increased – by about 0.6 Celsius degrees (1 Fahrenheit degree) within the past century. Atmospheric scientists have found that at least half of that temperature increase can be attributed to human activity. They predict that unless dramatic action is taken, global temperature will continue to rise by 1,4 to 5,8 Celsius degrees (2,5 to 10,4 Fahrenheit degrees) over the next century. Although such an increase may not seem like a great difference, during the last ice age the global temperature was only 2,2 Celsius degrees (4 Fahrenheit degrees) cooler than it is presently.

The consequences of such a modest increase in temperature may be devastating. Already scientists have detected a 40 percent reduction in the average thickness of Arctic ice. Other problems that may develop include a rise in sea levels that will completely inundate a number of low-lying island nations and flood many coastal cities, such as New York and Miami. Many plant and animal species will probably be driven into extinction, agriculture will be severely disrupted in many regions, and the frequency of severe hurricanes and droughts will likely increase.

The ozone layer, a thin band in the stratosphere (layer of the upper atmosphere), serves to shield Earth from the Sun's harmful ultraviolet rays. In the 1970s, scientists discovered that chlorofluorocarbons (CFCs)-chemicals used in refrigeration, air-conditioning systems, cleaning solvents, and aerosol sprays-destroy the ozone layer. CFCs release chlorine into the atmosphere; chlorine, in turn, breaks down ozone molecules. Because chlorine is not affected by its interaction with ozone, each chlorine molecule has the ability to destroy a large amount of ozone for an extended period of time.

The consequences of continued depletion of the ozone layer would be dramatic. Increased ultraviolet radiation would lead to a growing number of skin cancers and cataracts and also reduce the ability of immune systems to respond to infection. Additionally, growth of the world's oceanic plankton, the base of most marine food chains, would decline. Plankton contains photosynthetic organisms that break down carbon dioxide. If plankton populations decline, it may lead to increased carbon dioxide levels in the atmosphere and thus to global warming. Recent studies suggest that global warming, in turn, may increase the amount of ozone destroyed. Even if the manufacture of CFCs is immediately banned, the chlorine already released into the atmosphere will continue to destroy the ozone layer for many decades.

In 1987, an international pact called the Montreal Protocol on Substances that Deplete the Ozone Layer set specific targets for all nations to achieve in order to reduce emissions of chemicals responsible for the destruction of the ozone layer. Many people had hoped that this treaty would cause ozone loss to peak and begin to decline by the year 2000. In fact, in the fall of 2000, the hole in the ozone layer over Antarctica was the largest ever recorded. The hole the following year was slightly smaller, leading some to believe that the depletion of

ozone had stabilized. Even if the most stringent prohibitions against CFCs are implemented, however, scientists expect that it will take at least 50 more years for the hole over Antarctica to close completely.

Plant and animal species are dying out at an unprecedented rate. Estimates range that from 4,000 to as many as 50,000 species per year become extinct. The leading cause of extinction is habitat destruction, particularly of the world's richest ecosystems-tropical rain forests and coral reefs. If the world's rain forests continue to be cut down at the current rate, they may completely disappear by the year 2030. In addition, if the world's population continues to grow at its present rate and puts even more pressure on these habitats, they might well be destroyed sooner.

A significant portion of industry and transportation burns fossil fuels, such as gasoline. When these fuels burn, chemicals and particulate matter are released into the atmosphere. Although a vast number of substances contribute to air pollution, the most common air pollutants contain carbon, sulfur, and nitrogen. These chemicals interact with one another and with ultraviolet radiation in sunlight in dangerous ways. Smog, usually found in urban areas with large numbers of automobiles, forms when nitrogen oxides react with hydrocarbons in the air to produce aldehydes and ketones. Smog can cause serious health problems.

Acid rain forms when sulfur dioxide and nitrous oxide transform into sulfuric acid and nitric acid in the atmosphere and come back to Earth in precipitation. Acid rain has made numerous lakes so acidic that they no longer support fish populations. Acid rain is also responsible for the decline of many forest ecosystems worldwide, including Germany's Black Forest and forests throughout the eastern United States.

Estimates suggest that nearly 1.5 billion people worldwide lack safe drinking water and that at least 5 million deaths per year can be attributed to waterborne diseases. Water pollution may come from point sources or nonpoint sources. Point sources discharge pollutants from specific locations, such as factories, sewage treatment plants, and oil tankers. The technology exists to monitor and regulate point sources of pollution, although in some areas this occurs only sporadically. Pollution from nonpoint sources occurs when rainfall or snowmelt moves over and through the ground. As the runoff moves, it picks up and carries away pollutants, such as pesticides and fertilizers, depositing the pollutants into lakes, rivers, wetlands, coastal waters, and even underground sources of drinking water. Pollution arising from nonpoint sources accounts for a majority of the contaminants in streams and lakes.

With almost 80 percent of the planet covered by oceans, people have long acted as if those bodies of water could serve as a limitless dumping ground for wastes. However, raw sewage, garbage, and oil spills have begun to overwhelm the diluting capabilities of the oceans, and most coastal waters are now polluted, threatening marine wildlife. Beaches around the world close regularly, often because the surrounding waters contain high levels of bacteria from sewage disposal.

### **3. HOW ECOSYSTEMS WORK. ECOSYSTEM MANAGEMENT**

Ecosystem comprises organisms living in a particular environment, such as a forest or a coral reef, and the physical parts of the environment that affect them. The term ecosystem was coined in 1935 by the British ecologist Sir Arthur George Tansley, who described natural systems in "constant interchange" among their living and nonliving parts.

The ecosystem concept fits into an ordered view of nature that was developed by scientists to simplify the study of the relationships between organisms and their physical environment, a field known as ecology. At the top of the hierarchy is the planet's entire living environment, known as the biosphere. Within this biosphere are several large categories of living communities known as biomes that are usually characterized by their dominant vegetation, such as grasslands, tropical forests, or deserts. The biomes are in turn made up of ecosystems. The living, or biotic, parts of an ecosystem, such as the plants, animals, and bacteria found in soil, are known as a community. The physical surroundings, or abiotic components, such as the minerals found in the soil, are known as the environment or habitat.

Any given place may have several different ecosystems that vary in size and complexity. A tropical island, for example, may have a rain forest ecosystem that covers hundreds of square miles, a mangrove swamp ecosystem along the coast, and an underwater coral reef ecosystem. No matter how the size or complexity of an ecosystem is characterized, all ecosystems exhibit a constant exchange of matter and energy between the biotic and abiotic community. Ecosystem components are so interconnected that a change in any one component of an ecosystem will cause subsequent changes throughout the system.

The living portion of an ecosystem is best described in terms of feeding levels known as trophic levels. Green plants make up the first trophic level and are known as primary producers. Plants are able to convert energy from the sun into food in a process known as photosynthesis. In the second trophic level, the primary consumers – known as herbivores – are animals and insects that obtain their energy solely by eating the green plants. The third trophic level is composed of the secondary consumers, flesh-eating or carnivorous animals that feed on herbivores. At the fourth level are the tertiary consumers, carnivores that feed on other carnivores. Finally, the fifth trophic level consists of the decomposers, organisms such as fungi and bacteria that break down dead or dying matter into nutrients that can be used again.

Some or all of these trophic levels combine to form what is known as a food web, the ecosystem's mechanism for circulating and recycling energy and materials. For example, in an aquatic ecosystem algae and other aquatic plants use sunlight to produce energy in the form of carbohydrates. Primary consumers such as insects and small fish may feed on some of this plant matter, and are in turn eaten by secondary consumers, such as salmon. A brown bear may play the role of the tertiary consumer by catching and eating salmon. Bacteria and fungi may then feed upon and decompose the salmon carcass left behind by the bear, enabling the valuable nonliving components of the ecosystem, such as chemical nutrients, to leach back into the soil and water, where they can be absorbed by the roots of plants. In this way, nutrients and the energy that green plants derive from sunlight are efficiently transferred and recycled throughout the ecosystem.

In addition to the exchange of energy, ecosystems are characterized by several other cycles. Elements such as carbon and nitrogen travel throughout the biotic and abiotic components of an ecosystem in processes known as nutrient cycles. For example, nitrogen traveling in the air may be snatched by tree-dwelling, or epiphytic, lichen that converts it to a form useful to plants. When rain drips through the lichen and falls to the ground, or the lichen itself falls to the forest floor, the nitrogen from the raindrops or the lichen is leached into the soil to be used by plants and trees. Another process important to ecosystems is the water cycle, the movement of water from ocean to atmosphere, to land and eventually back to the ocean. An ecosystem such as a forest or wetland plays a significant role in this cycle by storing, releasing, or filtering the water as it passes through the system.

Every ecosystem is also characterized by a disturbance cycle, a regular cycle of events such as fires, storms, floods, and landslides that keeps the ecosystem in a constant state of change and adaptation. Some species even depend on the disturbance cycle for survival or reproduction. For example, longleaf pine forests depend on frequent low-intensity fires for reproduction. The cones of the trees, which contain the reproductive structures, are sealed shut with a resin that melts away to release the seeds only under high heat.

Humans benefit from these smooth-functioning ecosystems in many ways. Healthy forests, streams, and wetlands contribute to clean air and clean water by trapping fast-moving air and water, enabling impurities to settle out or be converted to harmless compounds by plants or soil. The diversity of organisms, or biodiversity, in an ecosystem provides essential foods, medicines, and other materials. But as human populations increase and their encroachment on natural habitats expand, humans are having detrimental effects on the very ecosystems on which they depend. The survival of natural ecosystems around the world is threatened by many human activities: bulldozing wetlands and clear-cutting forests – the systematic cutting of all trees in a specific area – to make room for new housing and agricultural land; damming rivers to harness the energy for electricity and water for irrigation; and polluting the air, soil, and water.

Many organizations and government agencies have adopted a new approach to managing natural resources – naturally occurring materials that have economic or cultural value, such as commercial fisheries, timber, and water, in order to prevent their catastrophic depletion. This strategy, known as ecosystem management, treats resources as interdependent ecosystems rather than simply commodities to be extracted. Using advances in the study of ecology to protect the biodiversity of an ecosystem, ecosystem management encourages practices that enable humans to obtain necessary resources using methods that protect the whole ecosystem. Because regional economic prosperity may be linked to ecosystem health, the needs of the human community are also considered.

Ecosystem management often requires special measures to protect threatened or endangered species that play key roles in the ecosystem. In the commercial shrimp trawling industry, for example, ecosystem management techniques protect loggerhead sea turtles. In the last thirty years, populations of loggerhead turtles on the southeastern coasts of the United States have been declining at alarming rates due to beach development and the ensuing erosion, bright lights, and traffic, which make it nearly impossible for female turtles to build nests on beaches. At sea, loggerheads are threatened by oil spills and plastic debris, offshore dredging, injury from

boat propellers, and being caught in fishing nets and equipment. In 1970, the species was listed as threatened under the Endangered Species Act.

When scientists learned that commercial shrimp trawling nets were trapping and killing between 5000 and 50,000 loggerhead sea turtles a year, they developed a large metal grid called a Turtle Excluder Device (TED) that fits into the trawl net, preventing 97 percent of trawl-related loggerhead turtle deaths while only minimally reducing the commercial shrimp harvest. In 1992, the National Marine Fisheries Service (NMFS) implemented regulations requiring commercial shrimp trawlers to use TEDs, effectively balancing the commercial demand for shrimp with the health and vitality of the loggerhead sea turtle population.

#### **4. THE ENVIRONMENT IN THE NEW MILLENNIUM: THE WAY OF THE WORLD**

"The Economist", the famous magazine of the United Kingdom, has analyzed the trend of the world in the twentieth century. The environment of the past 100 years has not been as bad as the people have thought. On the contrary, the environment of the world has been good and will be so until the next century. Although the population of the world has been increasing quickly during the last century, it has not caused any serious problems as world production has also been highly increased. The environment of the world has not been a disaster (like the prophecy of many others) because of the changes of many factors. There is the change of resource prices and society. The development of democracy and the planning of environment are to meet the pressure from the people.

It is seen that when there are more people, more consuming, more production, the use of natural is increasing. The price goes up when there is the need. There is then the force of being economical in use, the need to find new resource sites, new kinds of resources, new technology, and new ways for humanity. The mechanism of prices has been quite efficient in solving the problems of natural resource.

However, we need to accept that marketing mechanisms have not been quite satisfactory in solving environmental problems, particularly, where there is something in nature, which does not belong to any one. Therefore, there is the tendency that resources will be used inconsiderately. There is no one to care for conservation. There is the example that resources in the sea and the ocean will continue being in hazard in the next century.

Moreover, in some cases, the hazard in the environment has not been reflected in the way we can see like "price". There is the case that pollution is setting into air and water. The pollution occurs to the ecology and community. However, the price does not reflect any of these damages. It is because private business wants to decrease the capital amount and want to continue getting the highest profit. They let the disasters happen. Communities, society and nature meet danger from the environment as we see in the developing countries all over the world.

"The Economist" points out that in a country with advanced industry, pollution is not a big problem because they have developed democracy, which then has the checking, there is always the pressure from the people. The democratic government has answered the people's needs with the awareness that something needs to be done and some things have already been done. We can see that air pollution in industrial society, which had been increasing for 300 years, is solved satisfactorily. This will be continued for a long time. In a developing country, this problem may continue to the next century.

#### **5. THE CRISIS OF ECOLOGY IN THE DEVELOPING WORLD**

In the analysis, "The Economist" may be too positive in assessing the environmental problem and regarding only one aspect like pollution in industry. There is the conclusion that the incidence of pollution in the air has been decreasing. Nothing is said about the pollution of toxic waste, which has been left, and keeps piling up in the environment for so long in the world of industry. This tendency will continue until the next century as the government in industrial countries like America, Japan and Germany have not been successful in solving the problems of toxic waste, which has been accumulating for so long. It is because the main environmental policy emphasizes only the problems, which are visible and can be felt. The emphasis is on short-term pollution, which has an immediate effect to on people's health. The accumulating pollution cannot be seen easily, it is then neglected.

Besides, the analysis of the population of the world overlooks one main fact – although the growth rate is not as high as before the population of the world in this turn of the century will increase by approximately 80 million a year. (The amount is equal to the number of people in Germany.) It means that this amount of population among the impoverished and the deterioration of rural environment will heighten the environment crisis, which will have an effect on the production system and the ways of living of the people in developing countries. The very high increase of the population has affected the development in city and the living in urban areas. At present, there are 2,6 billion people living in cities. 1,7 billion of that amount live in the cities of developing countries. There is the prediction that the ratio will accelerate until the year 2015. Three quarters of the world population is in developing countries, which are very crowded, and the health problems are serious.

When we adopt the well-known "environmental formula" of Anne and Paul Ehrlich as the base on considering problems, we get the conclusion that the environment crisis has the tendency to become very critical. This formula says:

"Environment crisis (I) is settled by the amount of the population (P), the economic growth (A) and Production Technology (T), that is  $I = P \times A \times T$ ".

Economic growth is also another main variable. The more development, there is the more the increase in production. It heightens the ecology system. Moreover, the production of one unit may cause a large quantity of pollution because of the use of unclean (unhealthy) technology, which endangers the environment. It is worrying that the trading, the production and the consuming will enhance the squandering of resources and the environment will be seriously destroyed.

## **6. ENVIRONMENTAL INNOVATION**

Among the rich countries, it is assumed that it is not so hard to solve environmental problems of the 21st century. These countries will compete with each other in improving the quality of their products. There is always the search for innovation, environmental innovation, in particular, is an important instrument in encouraging the progress of the industrial world. At present, the rich countries have already had the high potentiality of developing new technology for the production process with the regard for environmental quality.

The innovative analyst regards that the ability of industry in responding to the environmental problems is the main indicator if that kind of industry can compete at the world level. Those who want to succeed must integrate the main idea with the production system. It means the protection of the environment, solving the problem of pollution, increasing the efficiency in using natural resources and power. The strict standard of the environment will enhance the thinking of production method, which will benefit the environment.

At present, the governments of the industrial world, like Sweden, agree with "Environment Innovation Ways". There is a conclusion in the latest report of the national environment that "The policy on environment of the Swedish government is very important in enhancing the modernity in industrial business sectors. The improvement of the environment has turned out to be the main factor in accelerating the competition in this industry."

This is the entire new western concept, which emphasizes "How to bring about Ecological Modernization." It is the new concept on new environmental technology and every step is used for the industrial production process. However, there needs to be adaptation of the whole production structure, which needs systematic "environmental planning", and the adapting of world vision and the conscience of the environment of the people in every field. The concept of "Ecological Innovation" does not emphasize only the technology but also regards the importance of "Environmental management" which needs to be done in both the governmental and private sectors. This can be seen in countries like Sweden, Denmark, Holland and Germany, which are regarded as the leaders in "Environmental Innovation".

## **7. ENVIRONMENTALISM AND TECHNOLOGY**

Wait a minute, you might say, it is environmentalism against technology, for isn't technology a fundamental source of environmental problems?

This has been the position of deep greens. In fact, some trace all environmental problems to the beginning of agriculture, arguing that it was the shift from hunter-gatherer to farming that created what they consider the

human cancer consuming the globe. Even moderate greens can be anti-tech, reflecting both skepticism about capitalism and the counter cultural ideology that characterizes most environmental discourse.

Consider, for example, something as mainstream, as the precautionary principle, which holds that no new technology be introduced until it can be demonstrated to have no harmful environmental impacts. Taken at face value, this embeds within it a strong preference for "privileging the present" – that is, attempting to ban or limit technological evolution – for the potential implications of all but the most trivial technological innovations cannot be known in advance.

Positioning environmentalism against technology, however, has its problems. For one, it misunderstands the nature of complex cultural systems. These inevitably evolve, generally towards greater complexity; consider, for example, how much more complex international governance, information networks, or financial structures are now than just a few years ago.

And technologies are evolving rapidly as well, particularly in the three areas that promise to impact environmental systems the most: biotechnology, nanotechnology, and information technology. The first will, over time, give us design capabilities over life; the second will let us manipulate matter at the molecular level; the third will change how we perceive and understand the world within which the first two are accomplished.

Moreover, developing such capabilities will give the cultures that do so significant competitive advantages over those that opt for stability rather than technological evolution. There are historical examples of this process – for example, China, from roughly the 11th to the 14th centuries. At that time, China was the most technically advanced society, but for a number of reasons its elite chose stability over the social and cultural confusion that development and diffusion of technologies (such as gunpowder and firearms) might have caused. Northern Europe, however, followed a more chaotic path, including the Enlightenment and the Industrial Revolution, which favored technological evolution. The result: Eurocentric, not Chinese, culture forms the basis of today's globalization.

Applying this lesson to current conditions raises the question of whether deep-green opposition to certain technological advances, especially genetically modified organisms, could halt technological advance. Some societies – Europe, in particular – may choose stasis over evolution. But biotech is such a powerful advance in human capabilities that other societies – especially developing countries with immediate needs that biotech can address – are not likely to forego its benefits. And to the extent, their cultures become more competitive by doing so, they may come to dominate global culture.

So is the answer then to simply give up and let technology evolve, as it will? Not at all. In fact, the essential problem with an ideological opposition to technology is that it prevents precisely the kind of dialog between the environmentalist and technological discourses required to create a rational and ethical anthropogenic earth. For technologies are not unproblematic, and their evolutionary paths are not preordained; rather, they are products of complex and little-known social, cultural, economic, and systems dynamics, it is important that they be questioned and understood.

The challenge is thus not unthinking opposition, or maintenance of ideological purity, or even meaningless repetition of ambiguous phrases such as "precautionary principle." It is far more demanding. It is to learn to perceive and understand technology as a human practice and experience, and to help guide that experience in ways that are environmentally appropriate.

## **8. BUT I WANT TO WORK ON ENVIRONMENTAL STUFF!**

One of the horrible existential challenges of being a student is that, in most cases, one must at some point leave school and begin work, presumably in an area for which one has been training these many years. For those reading this column, the area of interest is likely environmental, usually expanded these days to include sustainability. Put bluntly, the relevant questions are likely to be "How do I do well and what is the job market like?" Recognizing that planning your career on the basis of a 750-word column is probably not a great idea, here are some thoughts while you hit the books.

First, the good news. There are plenty of opportunities to do great things: to help your employer (be it a private firm, government, or NGO), help the world, and feed yourself. Now, the bad news. Most of these opportunities are disguised, most have nothing to do with environment as currently taught and thought about at most schools, many of the opportunities have yet to be invented, and almost any worthwhile job will require that you develop it yourself, from inside.

To begin with, traditional environmental jobs that is, those based on current regulatory and policy structures, primarily cleanup and end-of-pipe emissions control will be with us for a long time, especially in developing countries. They are necessary. But this field is not growing, offers few intellectual challenges, and will have little to do with solving the larger problems of the anthropogenic world albeit improving health significantly in developing countries. So if you really want to help the environment in the broader sense – perturbed climatic and oceanic systems; anthropogenic carbon, nitrogen, sulfur, and hydrologic system changes; biosphere disruptions – this is not the place for you.

The next step up is a position in the "sustainability industry." Superficially, at least, such jobs, which are frequently with niche consulting firms, are broader in scope and offer more intellectual opportunities. But caution is in order. The term "sustainability" has now grown to be so politically correct, and at the same time flown so far beyond mere ambiguity, that there is no substantive content to much of this work. In too many cases, it now amounts to a somewhat patronizing, highly ingrown dialog within a small circle of friends that tend to regard themselves as the great and the good, and spend a lot of time reinforcing one another's mental models.

The result is a nouveau utopianism that has tenuous connections with the real world, except for the few that are already True Believers. Thus, for example, I recently participated in a sustainability workshop where one conclusion was that firms should exist not for profit, but only to redistribute income (and that, by the way, money should be banned). Those with any historical background will recognize that this proposed policy closely tracks that of the early Leninist/Marxist Soviet Union. They did ban money – and the economy collapsed. Moreover, you can imagine how the typical executive would greet such a proposal as a model for how his/her firm could be "sustainable."

So, be careful if you want to work in this area. Before you jump in, you may want to work inside a firm first to get an idea of what companies really are like. It will help you maintain perspective. There are a few real opportunities – but caveat emptor.

So what to do? Back to first principles. The challenge of environmental (and related social) issues is precisely that they have become so all encompassing. They are not separable from the messy, multidisciplinary worlds of commerce, of ordinary life, of birth and death, of long natural cycles. So the kinds of things that contribute most to social and environmental progress – employee telework options, efficient network routing algorithms for air and ground transport systems, low-energy and reduced-water manufacturing technologies – come not from the environmental staff, but from the core operating competencies – engineers, business planners, product designers, and others. So, by all means remain committed to sustainability, but get expertise in international business, chemical engineering, or finance. Then, when you get your non-environmental, line position, you can start to change the world.

## **9. WORKING FOR THE ENVIRONMENT – INDUSTRIAL COMPLEX**

A while ago, I was reading an article on pollution prevention written by an ex-EPA consultant, and was both amused and somewhat surprised to see "industrial ecology" identified as industry green wash.

My first response, of course, was dismissive: didn't the author realize that meaningful environmental progress could be achieved only through such systematic approaches as industrial ecology, and its implementation through (for example) Design for Environment and Life Cycle Assessment methodologies?

Indeed, pollution prevention as usually interpreted by environmental regulators is a singularly limited concept, a relatively insignificant extension of end-of-pipe approaches, and it requires something like industrial ecology to energize it.

But my initial reaction was both unfair and superficial. The author was not really reacting to industrial ecology as laid out in existing texts or as being implemented in some firms today. Rather, the article implicitly made an important point about the nature of "environment" itself: the very concept (and closely related concepts such as "wilderness" and "nature") is constructed from underlying mental models, which may differ significantly and carry very different policy and governance implications.

Thus, "industrial ecology" does not enter the environmental discourse as an objective concept (although industrial ecology studies strive for objectivity and good science). Rather, an environmentalist will see it as a response to growing political pressure by powerful administrative and bureaucratic systems, with a belief system based on scientific and technical rationality – as, in short, a defensive thrust based on a state/corporatist managerialism mental model.

Seen in this light, the concept carries several implications which to an environmentalist may be problematic: a powerful (and polluting) elite co-opting "real" environmentalism; establishment of a playing field (high technology and industrial systems) which implicitly degrades the knowledge base and operational characteristics of traditional environmental NGOs; and, more subtle but all the more powerful for that, a vision of a future "sustainable" world based on a high technology, urbanized society as opposed to an agrarian, localized world with large portions of limits to people.

It was important, therefore, not to take that article as just a naive rejection of industrial ecology and its promise, but to understand it as a reflection of deeply conflicting worldviews which were all the more critical for being implicit and, to a large extent, even unconscious.

And, of course, these two mental models – call them the managerialistic and the edenistic – are not the only common ones. Others which might be identified include the "authoritarian" (environmental crises require centralized authoritarian institutions); "communal" (with the caution that some communities can be extraordinarily violent towards minorities and outsiders); "ecosocialist" (capitalistic exploitation of workers and commoditization of the world are the source of environmental degradation); "ecofeminist" (male exploitation of nature and women derive from the same power drive, and must be addressed concomitantly) and "pluralistic liberalism" (open collaboration involving diverse interests is the proper process to achieve environmental progress).

All of these raise some very difficult questions. For example, ecosocialism is somewhat tarnished by the abysmal environmental record of Eastern European communist governments.

The obvious question for the manager blessed with the opportunity to manage among these minefields is which one of these mental models is "right"? The unfortunate truth is that we as a society are not ready to answer that question yet.

This is not just because most people – environmental professionals, environmentalists, regulators, industry leaders – are naive positivists, and therefore unwilling or unable for the most part to recognize their own mental models, much less to respect other parties' mental models.

It also reflects a disturbing and almost complete ignorance about the implications of each model for the real world. What levels of human population, of biodiversity, of economic activity, would each mental model imply? What kind of governance structure? Who would win and who would lose (more precisely, what would the distributional effects of each model be)?

The important point, I think, is not the correctness of any particular model. Rather, it is the need to understand that differences among stakeholders in environmental disputes may arise not just from factual or economic disagreements, but from differences in fundamental worldviews – and that, at present, our current knowledge cannot anoint any particular one as "privileged."

A little sensitivity to how one's position and practices are understood by others can go a long way towards facilitating collaborations, which are both necessary and plenty difficult as it is. Before one too readily criticizes others, one should recall the Socratic admonition and know thyself – and thy mental models.

## 10. PRE-CAMBRIAN PERIOD

The Earth formed under so much heat and pressure that it formed as a molten planet. For nearly the first billion years of its formation – called the Hadean Period (or "hellish" period) – Earth was bombarded continuously by the remnants of the dust and debris – like asteroids, meteors and comets – until it formed into a solid sphere, fell into an orbit around the sun, and began to cool down.

As Earth began to take solid form, it had no free oxygen in its atmosphere. It was so hot that the water droplets in its atmosphere could not settle to form surface water or ice. Its atmosphere was also so poisonous that nothing would have been able to survive.

Earth's early atmosphere most likely resembled that of Jupiter's atmosphere, which contains hydrogen, helium, methane and ammonia, and is poisonous to humans.

Earth's atmosphere was formed mostly from the outgassing of such volatile compounds as water vapor, carbon monoxide, methane, ammonia, nitrogen, carbon dioxide, nitrogen, hydrochloric acid and sulfur produced by the constant volcanic eruptions that besieged the Earth. It had no free oxygen.

About 4.1 billion years ago, the Earth's surface – or crust – began to cool and stabilize, creating the solid surface with its rocky terrain. Clouds formed as the Earth began to cool, producing enormous volumes of rain-

water that formed the oceans. For the next 1,3 billion years (3,8 to 2,5 billion years ago), called the Archean Period, first life began to appear (at least as far as our fossil records tell us... there may have been life before this!) and the world's landmasses began to form. Earth's initial life forms were bacteria, which could survive in the highly toxic atmosphere that existed during this time. In fact, all life was bacteria during the Archean Period.

Toward the end of the Archean Period and at the beginning of the Proterozoic Period, about 2,5 billion years ago, oxygen-forming photosynthesis began to occur. The first fossils, in fact, were a type of blue-green algae that could photosynthesize.

Some of the most exciting events in Earth's history and life occurred during this time, which spanned about two billion years until about 550 million years ago. The continents began to form and stabilize, creating the super continent Rodinia about 1.1 billion years ago. (Rodinia is widely accepted as the first super continent, but there were probably others before it.) Although Rodinia is composed of some of the same land fragments as the more popular super continent, Pangea, they are two different super continents. Pangea formed some 225 million years ago and would evolve into the seven continents we know today.

Earth's atmosphere was first supplied by the gasses expelled from the massive volcanic eruptions of the Hadean Era. These gases were so poisonous, and the world was so hot, that nothing could survive. As the planet began to cool, its surface solidified as a rocky terrain, much like Mars' surface and the oceans began to form as the water vapor condensed into rain. First life came from the oceans. Free oxygen began to build up around the middle of the Proterozoic Period around 1,8 billion years ago – and made way for the emergence of life, as we know it today. This event, of course, created conditions that would not allow most of the existing life to survive and thus made way for the more oxygen dependent life forms.

By the end of the Proterozoic Period, Earth was well along in its evolutionary processes leading to our current period, the Holocene Period, also known as the Age of Man. Thus, about 550 million years ago, the Cambrian Period began. During this period, life "exploded" developing almost all of the major groups of plants and animals in a relatively short time. It ended with the massive extinction of most of the existing species about 500 million years ago, making room for the future appearance and evolution of new plant and animal species.

And then, about 498 million years later – 2,2 million years ago – the first modern human species emerged.

## 11. THE OZONE LAYER

Although ozone ( $O_3$ ) is present in small concentrations throughout the atmosphere, most ozone (about 90 %) exists in the stratosphere, in a layer between 10 and 50 km above the surface of the earth. This ozone layer performs the essential task of filtering out most of the sun's biologically harmful ultraviolet (UV-B) radiation. Concentrations of ozone in the atmosphere vary naturally according to temperature, weather, latitude and altitude. Furthermore, aerosols and other particles ejected by natural events such as volcanic eruptions can have measurable impacts on ozone levels.

In 1985, scientists identified a thinning of the ozone layer over the Antarctic during the spring months, which became known as the "ozone hole". The scientific evidence shows that human-made chemicals are responsible for the creation of the Antarctic ozone hole and are also likely to play a role in global ozone losses. Ozone Depleting Substances (ODS) have been used in many products which take advantage of their physical properties (e.g. chlorofluorocarbons (CFCs) have been used as aerosol propellants and refrigerants).

CFCs are broken down by sunlight in the stratosphere, producing halogen (e.g. chlorine) atoms, which subsequently destroy ozone through a complex catalytic cycle. Ozone destruction is greatest at the South Pole where very low stratospheric temperatures in winter create polar stratospheric clouds (PSCs). Ice crystals formed in PSCs provide a large surface area for chemical reactions, accelerating catalytic cycles. The destruction of ozone also involves sunlight, so the process intensifies during springtime, when the levels of solar radiation at the pole are highest, and PSCs are continually present.

Although ozone levels vary seasonally, stratospheric ozone levels have been observed to be decreasing annually since the 1970s. Mid-latitudes have experienced greater losses than equatorial regions. In 1997, the Antarctic ozone hole covered 24 million  $km^2$  in October, with an average of 40 % ozone depletion and ozone levels in Scandinavia, Greenland and Siberia reached an unprecedented 45 % depletion in 1996.

The amount of UV reaching the earth's surface has been shown to correlate with the extent of ozone depletion. In 1997, UV-B levels continued to rise at a rate of 2 % per annum. Increased UV levels at the earth's sur-

face are damaging to human health, air quality, biological life, and certain materials such as plastics. Human health effects include increases in the incidence of certain types of skin cancers, cataracts and immune deficiency disorders. Increased penetration of UV results in additional production of ground level ozone, which causes respiratory illnesses. Biologically, UV affects terrestrial and aquatic ecosystems, altering growth, food chains and biochemical cycles. In particular, aquatic life occurring just below the surface of the water, where plant species forming the basis of the food chain are most abundant, are adversely affected by elevated levels of UV radiation. The tensile properties of certain plastics can be affected by exposure to UV radiation. Depletion of stratospheric ozone also alters the temperature distribution in the atmosphere, resulting in indeterminate environmental and climatic impacts.

Despite existing regulation of ODS, there continues to be severe ozone depletion and maximum stratospheric levels of chlorine and bromine are predicted to occur only during the next decade. Without further measures, the ozone hole will continue to exist beyond 2050. However, the success of the Montreal Protocol has already been observed in terms of changes in the concentrations of man-made chlorine-containing chemicals in the troposphere (i.e. the rates of release of ODS to the atmosphere have been reduced). Additional measures are currently being proposed by the European Commission to accelerate the phase out of various ODS and thereby to provide much-needed additional protection for the ozone layer.

You have already taken the first steps to help protect the ozone layer by informing yourself of the problem and its causes. Try to find out as much as you can about the problem from publications, schools or public libraries. The only way to mend the ozone hole is to stop the release of CFCs and other ozone depleting substances (ODS) into the atmosphere. European legislation aims to achieve this by phasing out ODS as soon as viable alternatives become available, and where no such alternatives are available, restricting the use of these substances as far as possible. However, there are a number of practical initiatives, which can be taken at the individual level to help protect the ozone layer: try to use products, which are labeled "ozone-friendly".

Ensure technicians repairing your refrigerator or air conditioner recover and recycle the old CFCs so they are not released into the atmosphere.

Vehicle air conditioning units should regularly be checked for leaks.

Ask about converting your car to a substitute refrigerant if the a/c system needs major repair.

Remove the refrigerant from refrigerators, air conditioners, and dehumidifiers before disposing of them.

Help start a refrigerant recovery and recycling program in your area if none already exists.

Suggest school activities to increase awareness of the problem and to initiate local action.

There is a direct link between increased exposure to UV radiation and elevated risk of contracting certain types of skin cancers. Risk factors include skin type, sunburn during childhood, and exposure to intense sunlight. Recent changes in lifestyle, with more people going on holiday and deliberately increasing their exposure to strong sunlight, are partly responsible for an increase in malignant skin cancers. In order to minimize the risk of contracting skin cancer, cover exposed skin with clothing or with a suitable sunscreen, wear a hat, and wear UV-certified sunglasses to protect the eyes.

## **12. A NEW LOOK AT HUMAN EXTINCTION**

The very powerful technologies of the new Millennium – from robotics, genetic engineering and nanotechnologies – "are threatening to make humans an endangered species," according to the April 2000 issue of "Wired Magazine" ("Why the Future Doesn't Need Us") in an article by Billy Joy, co-founder and chief scientist of Sun Microsystems. As man's dependence on technology continues to substantially increase, so does his progress in developing intelligent machines that can and will do all things better than humans can do themselves. In a way, it is the technological version of Charles Darwin's "survival of the fittest." If technological evolution reaches the point where sophisticated systems of machines can function on a cognitive level, and make decisions and perform tasks without the need for any human intervention whatsoever, then, as Mr. Joy points out, the human race would be at the mercy of machines.

So, why doesn't the future need us? Mr. Joy covers this possibility in extraordinary thought which considers a simple theme in our efforts to improve the quality of our lives, we – humans – strive to make things that can do things better than we can ourselves. In so doing, we create things that replace what humans once did exclusively. Just consider such simple creations as the calculator, remote control devices, personal computers and microwave ovens.

Yet, the 21st century will provide such compelling technologies as genetic engineering and nanotechnologies (work at the atomic, as opposed to the molecular level) that have the potential to threaten any human involvement whatsoever – far more than the simpler technologies of yore. According to Joy, "Specifically, robots, engineered organisms, and nanobots (robots on the atomic level) share a dangerous amplifying factor: they can self-replicate. A bomb is blown up only once – but one can become many, and quickly get out of control." And the risk of this would be substantial damage to the physical world, the environment on which humans and all of Earth's other organic co-inhabitants depend.

The promises of these new technologies are equally powerful: virtual immortality, providing treatments and cures for almost every disease, and solutions and advances that could expand the human life span indefinitely and improve the quality of our lives – particularly the environment. All the while, Joy says, "with each of these technologies, a sequence of small, individually sensible advances leads to an accumulation of great power, and, concomitantly [coupled with], real danger."

Simply getting rid of machines would be suicide, Joy points out. So perhaps an equally viable option is that human progress be tempered with the care of ensuring that human involvement remains essential to that progress, thereby ensuring that human needs are maintained and the quality of life improved. While it's true that machines and other products of our technologies have no consciousness, it does not mean that they will not some day have the cognitive qualities to perform tasks as humans do. Today, that is called science fiction.

But as we have learned from our science fiction literature of the past, such things are based on real possibilities, many of which we have already witnessed in our lifetime, such as space travel, visiting other planets, the creation of the atomic bomb, nuclear power and machines that will talk to you. Perhaps English author H.G. Wells, considered by many to be the father of modern science fiction, could foresee such human decline "at a time when civilization passes its zenith," when he authored his first literary work, "The Time Machine" in 1895. In speaking of the result of human progress witnessed far into the future by the Time Traveler, he wrote: "The great triumph of Humanity I had dreamed of took a different shape in my mind. It had been no such triumph of moral education and general co-operation as I had imagined. Instead, I saw a real aristocracy, armed with a perfected science and working to a logical conclusion the industrial system of today. Its triumph had not been simply a triumph over Nature, but a triumph over Nature and the fellow man."

### **13. CAPTIVE CHIMPANZEES FIND SANCTUARY**

It took a great collective effort to rescue a group of chimpanzees from the laboratories of the Coulston Foundation. These chimpanzees, which were part of the US space program, were awarded to Coulston in August 1998 by the US Air Force and the Department of Defense as a result of a Congressional decree. And so, on October 28, 1999, after a yearlong lawsuit against the US Air Force, the Center for Captive Chimpanzee Care (CCCC) was awarded 21 of the chimpanzees that will be retired to a 150-acre sanctuary in South Florida. The chimpanzees are expected to move to their new homes sometime this spring or summer, as soon as the compound can be prepared to accommodate them. Even though it was the will of many people to retire the "Space Chimps", including such well-known supporters as Dr. Jane Goodall and Dr. Roger Fouts, it was the efforts of CCCC founder and director Dr. Carol Noon that made it happen. "This has been an agonizing year, but today makes it all worthwhile," Dr. Noon said after the agreement was announced.

The agreement follows a yearlong lawsuit brought against the U.S. Air Force by the Center. The Center filed its case after the Air Force awarded 111 of its 141 chimpanzees to The Coulston Foundation in August 1998. The chimps were the subjects of a controversial. The Center, which has world-renowned primatologist Jane Goodall on its board of directors, submitted a proposal to the Air Force to retire the chimps to a sanctuary, but the bid was rejected. The remaining 30 chimps were sent to Primarily Primates in San Antonio, TX, which is a sanctuary for chimpanzees and other "domesticated" wildlife unable to be returned to the wild.

Chimpanzees have been used as human surrogates in biomedical experiments for most of the 20th century. The reason was that chimpanzees are most similar to humans of all other animal species; they share about 98.5 percent of humans' DNA; and it was "logically" felt that the very dangerous and often lethal tests for the advancement of human medicine would be best served by using chimpanzees. This gave rise to the development of a large number of biomedical research laboratories, such as the Coulston Foundation, which have heavily relied upon such research on chimpanzees and the billions of dollars they have received in funding for such research.

The chimpanzees awarded to the Center for Captive Chimpanzee Care are direct descendants of those who paved the way for human space travel. The most famous of these descendants is Ham, the first chimp in space, who preceded Alan Shepard's inaugural manned space flight. CCCC's chimpanzees range in age from 6 to 40 years old. The oldest is Hanzie who was born in Africa right around the time Jane Goodall began her study of chimpanzees. The youngest is Lil' Mini whose mother died last year. Minnie was used in the original Project Mercury tests including zero gravity testing. Mercury "couch" training – the chair Ham and Enos (the second chimpanzee in space) were strapped into during their space flights. Enos' flight was a full dress rehearsal for the space flight that would carry it into orbit.

#### **14. AGRICULTURE DEVELOPS ROOTS IN SPACE**

The \$60 billion-plus International Space Station is allowing scientists and other researchers to explore and develop food production systems in space that will enable sustained life support systems. Termed astroculture, these studies hold clues for increasing and sustaining Earth's environmental and public health.

Crops in Space? Absolutely... especially if people are to travel for months and years to other worlds and systems. It would be impossible, for instance, to send along enough food and water for a team of space explorers on a mission to Mars.

The reality is food and water production over a full life cycle is essential for extended space exploration.

But more importantly, space offers extraordinary possibilities for increasing the yield and vitality of food production on Earth and for the generation of self-sustaining life support systems wherever people may live.

Astronauts have been trying to grow plants in space since the early days of space exploration. When the Apollo astronauts explored the Moon, scientists attempted to grow seeds in the lunar soil that was returned to Earth. But with the establishment of the Russian space station Mir and the International Space Station completed last March, agriculture in space took on new dimensions.

Despite all of Mir's technical challenges, the space station delivered the first wheat crop ever grown and harvested in space, thanks to a special Bulgarian-built greenhouse that created the right conditions for growth. Thus, a new age of food production in space was born, and scientists began to see how space technology can positively impact many of Earth's environmental problems.

An advanced AstroCulture plant growth unit is helping scientists gain new insights about how to improve food products including crop production.

Astroculture, as trademarked by NASA, is a pioneering science that connects people directly with the elements essential to the web of life that depend on healthy, natural processes. Whereas on Earth, the processes for healthy life are naturally occurring, systems have to be put in place for these same processes to occur in space. And NASA is well along in the study of creating these bioregenerative life support systems capable of indefinitely supporting human and plant life.

The lack of gravity is essential for plants to develop strong rooting, sunlight, available nutrients, insects (for cross pollination), controlled climate and clean water are all challenges for astroculture. Bioregenerative support systems take all of these vital elements into consideration.

First of all, humans and plants are ideal companions in space and on Earth.

People breathe air and produce carbon dioxide, and plants consume the carbon dioxide to produce oxygen. Humans can also consume edible plants or plant parts for sustenance. This produces waste by-products, which can be broken down to supply nourishment for plants.

Given this unique relationship between plants and humans, all that is left for consideration is the supply of energy, regeneration of clean water and the effect of gravity to make it all work. Energy, which must be highly efficient, is provided in the form of light. And clean water comes from re-occurring and self-sustaining natural cleaning and filtration systems inherent to regenerative life support systems.

A space greenhouse creates energy from light sources, which must be as efficient as possible to reduce energy demands. Here, wheat is growing under Light Emitting Diodes (LEDs), which are generally used in today's consumer electronics.

LEDs save energy by only releasing light in frequencies that plants can use for photosynthesis.

The creation of microgravity systems, which would be developed for long-term piloted missions to Mars and other places, would provide the gravitational effects needed for healthy plant growth.

Today, industries and scientists are being allowed to explore and study plant growth and long-term plant production on board the \$60 billion International Space Station, which launched last May. NASA's Astroculture Commercial project is providing myriad platforms for such study, which will also have a huge impact on Earth-based agriculture. In one instance involving microgravity, researchers will be studying and expecting to develop custom crops that withstand hostile conditions, resist diseases and require less space in which to grow. According to NASA scientists, the microgravity provides a highly efficient environment for using bacteria to transfer desirable genes such as those that increase a plant's immunity to disease and pestilence.

Simply put, if we can sustain food production in space, then we can sustain human life anywhere in the universe. Plants, like all living things, depend on nourishment and the right living conditions in order to grow. And with a burgeoning population on Earth, astroculture benefits will help us better provide food, sustenance and the required healthy ecosystems essential to promoting public health.

### Grammar Reference:

#### Функции глагола *to be* в предложении

Смысловый глагол	Глагол-связка	Модальный глагол	Вспомогательный глагол
<p>1. В сочетании с существительным и предлогом:  <i>We are at the lesson.</i> – Мы на уроке.  <i>He was at the Institute in the morning.</i> – Утром он был в институте.</p> <p>2. В обороте <i>there + to be</i>:  <i>There is a letter for you at the table.</i> – На столе есть письмо для Вас.</p>	<p>В сочетании с существительным, прилагательным или числительным, а также в сочетании с инфинитивом или герундием (если подлежащее выражено абстрактным существительным) в составе именного составного сказуемого:  <i>She is a student.</i> – Она студентка.  <i>Our task is to learn to speak English.</i> – Наша задача состоит в том, чтобы научиться говорить по-английски.</p>	<p>В сочетании с инфинитивом, если подлежащее выражает лицо или предмет:  <i>They are to come soon.</i> – Они должны скоро прийти.  <i>They were to finish this work yesterday.</i> – Они должны были закончить эту работу вчера.</p>	<p>В сочетании с <i>Participle I</i> для образования времени <i>Continuous</i> или <i>Participle II</i> для образования <i>Passive Voice</i>:  <i>He is reading a letter.</i> – Он читает письмо.  <i>The letter was written yesterday.</i> – Письмо было написано вчера.</p>