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BIOLOGIYA FAKULTETI TALABALARI UCHUN

INGLIZ TILI

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BIOLOGIYA FAKULTETI TALABALARI UCHUN INGLIZ TILI

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This guidebook is planned for the 3rd year students of the non-philological directions, especially for biology faculty. Materials, which were given in it, are chosen to increase four main skills (reading, listening, writing and speaking) and vocabulary of the students.

Oral topics and texts given on the basis of the programme of the subject Foreign language, improve not only oral and written speech of the students, but also exercises given in it, give the students chance to work privately and increase their knowledge.

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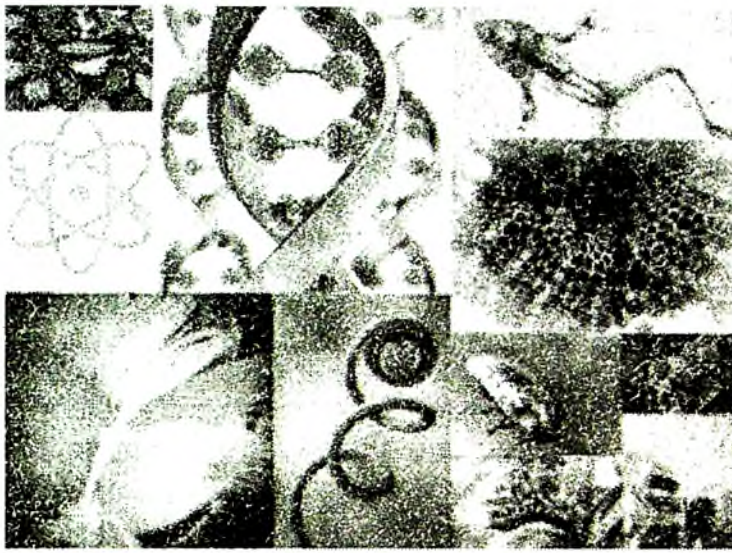
UNIT 1
WHAT IS BIOLOGY?



Opener

1. Discuss the following questions.

1. What is biology?
2. Why do you learn biology?
3. What branches does biology include?

Reading and Speaking

2. Read the given text and make your essential assignments:

Biology is the study of life and living organisms. For as long as people have looked at the world around them, people have studied biology. Even in the days before recorded history, people knew and passed on information about plants and animals.

Modern biology really began in the 17th century. At that time, Anton van Leeuwenhoek, in Holland, invented the microscope and William Harvey, in England, described the circulation of blood. The microscope allowed scientists to discover bacteria, leading to an understanding of the causes of disease, while new knowledge about how the human body works allowed others to find more effective ways of treating illnesses. All these new knowledge needed to be put into order and in the 18th century the Swedish scientist Carl Linnaeus classified all living things into the biological families we know and use today.

In the middle of the 19th century, unnoticed by anyone else, the Austrian monk Gregor Mendel, created his Laws of Inheritance, beginning the study of genetics that is such an important part of biology today. At the same time, while traveling around the world, Charles Darwin was formulating the central principle of modern biology – natural selection as the bases of evolution.

It is hard to believe, but the nature of viruses has become apparent only within the last half of the 19th century and the first step on this path of discovery was taken by the Russian botanist Dmitry Ivanovsky in 1892.

In the 20th century biologists began to recognize how plants and animals live and pass on their genetically coded information to the next generation. Since then, partly because of developments in computer technology, there have been great advances in the field of biology; it is an area of ever-growing knowledge.

During the past few hundred years biology has changed from concentrating on the structure of living organisms to looking more at how they work or function. Over this time biologists have discovered much about health and disease, about the genes which control the activities of our bodies and how humans can control the lives of other organisms. We need

to understand how our activities affect the environment, how humans can take responsibility for their own health and welfare and how we must be careful to make appropriate rules for the use of our genetic information.

Nowadays biologists are making fantastic discoveries which will affect all our lives. These discoveries have given us the power to shape our own evolution and to determine the type of world we will live in. Recent advances, especially in genetic engineering, have dramatically affected agriculture, medicine, veterinary science, and industry, and our world view has been revolutionized by modern developments in ecology. There has never been a more exciting nor a more important time to study biology.

Biology is the scientific study of life. But what is life? When we see a bird on a rock it may seem obvious that the bird is alive and the rock is not, but what precisely makes the bird alive and the rock not? Throughout history, thinkers in many fields tried to define life. Although they have failed to provide a universally accepted definition, most scientists agree that all living things share certain basic characteristics:

- Living things are made of organized structures.
- Living things reproduce.
- Living things grow and develop.
- Living things feed.
- Living things respire.
- Living things excrete and waste.
- Living things respond to their surroundings.
- Living things move.
- Living things control their internal conditions.
- Living things are able to evolve.

Non-living systems may show some of the characteristics of living things, but life is the combination of all these characteristics.

3. Answer the following questions. Use all information given before:

1. Have scientists provided a universally accepted definition of life?
2. What is a living thing?
3. What is a non-living thing?
4. What can living things do that non-living things can not?
5. What do cells contain?
6. What does genetic information determine?
7. How is growth brought about?
8. Can heat be used to drive biological processes?
9. How do living things acquire energy and nutrients?
10. What do living things need to stay alive?
11. What does the degree of responsiveness depend on?
12. How do movements of living things differ from those of non-living?
13. What is homeostasis?

4. Match the sentence halves. Make complete sentences:

1.	Biologists are making discoveries	A.	those of non-living things by being energy-requiring processes arising from within cells.
2.	Growth is accompanied by	B.	one of the main features of living things.
3.	DNA contains genetic information which	C.	are transforming one form of energy into another.
4.	Movements of living things differ from	D.	all living things share certain basic characteristics.
5.	Reproduction is	E.	chemicals are packed into highly organized structures.

6.	To stay alive living thing	F.	an increase in complexity.
7.	Most scientists think that	G.	determines the characteristics of an organism, including how it will grow and develop.
8.	In living things	H.	which will affect all our lives.

Writing

5. Write a short paragraph giving answers to the following questions.

1. Why did you choose biology?
2. What is your direction?
3. What contributions are you going to make to the field of biology?

UNIT 2
HEALTHY LIFESTYLE

Opener

1. Discuss the questions with the whole group.

Can people who are ill get better without the help of modern medicine?

Do you know people who use alternative medicine?

Reading

2. Read the text and discuss it in a group.

ALTERNATIVE MEDICINE
Is it all in the mind?

Much so-called alternative medicine is at best harmless and at worst dangerous.

I remember going to the doctor for my first acupuncture session. I pretended to be calm, although I couldn't help feeling nervous! I didn't exactly enjoy having acupuncture, but it didn't hurt and the next day my back was much better.

My father took herbal medicine when he tried to stop smoking last year. It didn't work. But that's probably his fault, because he didn't remember to take it every day.

Research shows that patients who tried having acupuncture for bad headaches had fewer headaches and saw the doctor less often, than those who didn't try it.

One in five people in the UK choose to use alternative medicine every year.

Alternative medicine may be news, but it's not new. It's modern medicine that is new – for example, the first synthetic drug, aspirin, only dates from 1899. But alternative medicine goes back thousands of years. Acupuncture, inserting fine needles at selected points in the body, was used in China over 2000 years ago and keeps growing in popularity. Herbal medicine, treating illness and pain with natural remedies, is the oldest system of medicine in the world. Herbalists are prepared to spend more time than modern doctors with patients so they can treat them as individuals.

And what's next? 'Acupuncture-in-a-pill'! A company in Singapore expects to identify the gene responsible for acupuncture healing soon. It will then make a pill for people who want to avoid having acupuncture because they can't stand the thought of all those needles.

A recent TV programme on alternative medicine showed a young Chinese woman having open-heart surgery without a general anaesthetic – but with acupuncture. There seemed to be no doubt that acupuncture stopped the woman feeling pain. Later the programme showed how the needles appeared to change the brain's reaction to pain.

Then there's the 'placebo' effect. In a major trial in the USA a group of patients had a normal operation for bad knee pain. Another group of patients with knee pain also believed they had operations. But in fact all the surgeon did was cut the knee open and close it again. Both groups had the same

positive results from their 'operations'. In other words, the effect of real and fake operations was the same.

So what does this experiment tell us about medicine? Simply this: when people expect to get better they often do.

Comprehension

3. True or false/ Correct the false sentences.

1. Patients who had acupuncture for headaches saw the doctor more often. _____

2. Acupuncture can help people with back pain._____

3. More and more people are trying acupuncture._____

4. Herbalists treat each patient as being different._____

5. A company hopes to make pills which will work in the same way as acupuncture._____

6. A Chinese woman had a major operation without a general anaesthetic._____

7. Acupuncture needles seem to change the way the brain reacts to pain._____

8. The effects on those patients who had a real knee operation and those who didn't were different._____

4. Make a word map for medicine. Use words from the text, and add other words you know.

Grammar Practice

5. Find these verbs in the texts in exercise 2 and complete the table.

avoid appear couldn't help choose expect keep seem pretend stop want

Verb +Gerund	Verb +Infinitive

6. Gerund or Infinitive? Complete with the correct form of the verb.

A Doctor talks about alternative medicine

'My own interest in alternative medicine goes back to when I was a medical student on a visit to China. I really enjoyed _____ (travel) round the country. I'll never forget _____ (go) into the operating theatre of a hospital in a small town. A woman was on the operating table with three needles in her left ear. I tried _____ (see) if she had any other anaesthetic, but there didn't appear _____ (be) any. I kept _____ (think) 'They certainly didn't tell us this in medical school.' I had forgotten _____(take) my camera with me, so unfortunately I couldn't take a photo. When I returned to the UK I tried _____ (find) out more about acupuncture. I remember _____ (tell) my professor about it but he didn't really want _____ (discuss) it.'

Reading, Vocabulary and Speaking

5. Read the text for scanning.

Where Do the Most Vegetarians Live?

Some people choose to be vegetarian, but others are vegetarian because of their religion, their culture, or the place they live. There are vegetarians all over the world, but the country with the most vegetarians is India.

About one billion people live in India, and most follow the Hindu religion. Hindus think it is wrong to kill or make animals **suffer.** They think if they do, they will suffer the same way **one day.** Hindus believe the cow is **sacred;** therefore, most Hindus do not eat beef. **In fact,** the Hindu word for cow, *aghnaya,* means "not to be killed."

There are different kinds of vegetarians in the world. Some vegetarians do not eat beef or red meat, but they eat chicken and fish. Some do not eat red meat, chicken, or fish but they eat

cheese, butter, eggs, milk, and other animal **products.** Other vegetarians do not use anything that **comes from** an animal. Some don't wear wool because it harms the sheep, don't use silk because it hurts silkworms, and don't eat honey because they do not want to hurt bees. Other vegetarians only eat vegetables; however they do not kill plants. For example, they will not eat carrots or potatoes because when you pick them, the plant dies. They will eat apples or pears because picking them does not harm the plant. Some vegetarians do not kill or hurt any animal–not even a fly or a mosquito!

In India, too, there are different kinds of vegetarians. Some Hindus are **strict** vegetarians. Other Hindus eat all meat **except for** beef, but they only eat it about once a week. Many families eat chicken or lamb a few times a year at special occasions, like weddings. The Hindus of the upper **classes** do not eat meat or drink alcohol. However, the lower classes eat all meats except for beef. The upper classes, or *Brahmans,* cannot kill anything that is moving. If they do, they believe they will become that animal in their next lives and will be killed, too.

Hindus follow other rules when they eat. They **rinse** their mouths, arms, and legs before and after eating to clean themselves. It is a custom for the man of the house to eat thirty-two mouthfuls at each meal, chewing carefully and thinking about pleasant things. Strict Hindus do not eat garlic or onions. They believe that foods have characteristics. Some foods are "hot," others are "cold." They think the strong smells of these foods are too powerful for the **mild** tastes and smells of other vegetables. Also, in middle-class families, many women do not eat meat, but men do. Women think eating meat is something **masculine.** They also connect meat with **violence.**

Hindus also think it is lucky to eat with a person who is one hundred years old or a student, but should avoid eating with a bald person, an actor, an athlete, a musician, or a woman with a second husband. Strict Hindus also believe it is not correct for

a wife to eat with her husband, but it is good if she eats the rest of his food after he finishes his meal. It is wrong for a Hindu to eat food that has stood overnight, has been cooked twice, or is left over from an earlier meal. Any food that has been touched by a foot, a person's clothing, or a dog cannot be eaten.

Vegetarians are everywhere in both rich and poor countries. In parts of the world such as Africa, the Middle East, and Southeast Asia, meat is uncommon, and therefore it is an easy choice to be vegetarian. Surveys show that in both the United States and Britain about 4 percent of the population is vegetarian. And more and more people are choosing vegetarianism every day. Many people become vegetarian for health reasons. They look and feel better when they stop eating meat. Some famous vegetarians include Leonardo da Vinci, Albert Einstein, Thomas Edison, Leo Tolstoy, Brad Pitt, Sylvester Stallone, Paul McCartney, Penelope Cruz, and Madonna.

Vocabulary

6. Write the correct words in the blanks.

suffer sacred violence strict mild rinse classes masculine products

1. Hindus do not kill cows because they believe cows are very, very special. They believe cows are _____ .

2. Hindus believe it is wrong to give pain to an animal and make it _____ .

3. Some vegetarians don't eat anything that comes from an animal. They don't even eat animal _____ , such as milk, cheese, and butter.

4. It is important for some Hindus to be clean before they eat so they _____ their mouths, arms, and legs with water.

5. Hindu people have different social levels, or _____ , from lower to high or upper.

6. Some vegetarians follow all the rules very seriously. They are _____ .

7. Some foods have a strong taste, other foods do not have a strong taste. They have a _____ taste.

8. Men have special qualities that only men have. These are _____ qualities.

9. When people hurt or kill, they use _____ .

Words that go together

7. Write the correct words in the blanks.

in fact except for one day comes from

1. A product such as milk _____ the cow.

2. Hindus believe that _____ they will come back to the world as a man or animal.

3. Not all Hindus are strict vegetarians. _____ , some eat chicken or lamb a few times a year.

4. Some Hindus eat chicken and lamb. They eat ail meat - beef.

8. Work with a partner to answer the questions. Use complete sentences.

1. What are some milk *products* people eat?
2. What is something you usually *rinse*?
3. Is your teacher *strict*, not *strict*, or very *strict*?
4. What vegetable has a *mild* taste?
5. What movie star looks *masculine*?
6. What do you want to be *one day*?

COMPREHENSION

Understanding the reading

9. Circle the letter of the correct answer.

1. Vegetarians are _____ .

a. only in poor countries

b. all over the world

c. only in religious countries
d. only in India, the United States, and Britain

2. Strict Hindu husbands and wives _____ .
a. never eat together
b. always eat the same things
c. connect meat with violence
d. eat thirty-two mouthfuls at each meal

3. All over the world, _____ .
a. people are becoming vegetarian
b. vegetarians are religious
c. vegetarians follow the same rules
d. there are more women vegetarians than men vegetarians

Remembering details

10. Circle *T* if the sentence is true. Circle *F* if the sentence is false.

1. Some vegetarians do not wear wool.	**T**	**F**
2. Strict vegetarians do not eat potatoes.	**T**	**F**
3. Two percent of Americans are vegetarian.	**T**	**F**
4. It is lucky for a Hindu to eat with a bald person.	**T**	**F**
5. Strict Hindus do not eat onions.	**T**	**F**
6. Rich countries do not have vegetarians.	**T**	**F**

Making inferences

11. All of the statements below are true. Some of them are stated directly in the reading. Others can be inferred, or guessed, from the reading. Write S for each stated fact. Write 7 for each inference.

1. Many intelligent people choose to be vegetarian.
2. Hindus are vegetarian because of their religion.
3. Many Americans become vegetarian for health reasons.

4. Vegetarianism is growing because meat may cause some illnesses.

5. In some parts of the world, people are vegetarian because there is no meat for them to eat.

Tell the story

12. Work with a partner or together as a class. Tell the story of vegetarians. Use your own words. Your partner or other students can ask questions about the story.

Discussion

13. Discuss the answers to these questions with your classmates.

1. Do you think it is good for your health to be a vegetarian? Why or why not?
2. What are some rules about food in some religions?
3. Do you think it is right for strict vegetarian parents to raise their children as vegetarians too?

Writing

14. Write a short paragraph about the kinds of foods you eat.

Example: *I am not a vegetarian. I eat meat, fish, and animal products because I think they are good for you.*

UNIT 3
HEALTHY FOOD

Opener

1. Discuss the questions below.

What are your favourite things to eat and drink?

Are they good or bad for you? How do you know?

Reading

2. Read Food and Drink: Fact and Fiction? And decide: true or false?

Food and Drink: Fact or Fiction?

1. Bottled water is purer than tap water.
2. A vegetarian diet is the healthiest.
3. Eating cheese gives you nightmares.
4. Dried fruit is not as healthy as fresh fruit.
5. Margarine contains less fat than butter.
6. A food label which includes the words 'low fat' indicates a healthy choice.
7. Neither fruit juice nor diet drinks are bad for your teeth.
8. Experts disagree with each other about what healthy eating is.

Now match statements 1-8 with answers A-H.

A

In fact, the main messages about healthy eating have stayed the same for some time. For example, 15 years ago experts were saying that we should reduce the amount of fat that we eat. And over 50 years ago they were emphasising the importance of fruit and vegetables. They appear to disagree because the media often exaggerate when reporting scientific research.

B

In fact both are. Fruit juice contains sugar, which can damage your teeth. Diet drinks are often acidic, which means that they can cause tooth decay. The best drinks for your teeth are water or milk.

C

As part of a balanced diet we need to eat at least five portions of different fruit and vegetables a day. It doesn't matter whether they are fresh, frozen, tinned or dried (but fruit juice only counts as one portion a day). The only thing which dried fruit lacks, and fresh fruit has, is vitamin C, but both are equally healthy.

D

It often seems from advertising that this is true. However, while butter and margarine contain different kinds of fat, they both contain a similar amount of fat.

E

It's not what you eat but when you eat that matters. Scientists agree that it's not a good idea to eat just before you go to bed. You can't relax properly while you're digesting food.

F

It depends. Vegetarian diets can be very healthy. But if your vegetarian diet consists of chips and biscuits, then that's a different matter. Make sure that your diet includes food with the protein, vitamins and minerals you normally get from meat.

G

Not at all. 'Low' products must contain 25% less fat than usual, so people suppose that they are OK. But these types of food are often very high in fat to start with. So a 'low fat' product can still have quite a high amount of fat.

H

This is a popular myth. Although some people think that bottled water tastes or smells better, there's nothing to prove that it's always purer than tap water. In fact, in the USA it's believed that 25-30% of bottled water comes from tap water. And do you realise that bottled water can cost up to 10,000 times more than tap water?

Comprehension

3. Answer the questions.

1. How many of the statements 1-8 are true, how many are false and how many could be true or false?
2. Why do experts appear to disagree about healthy eating?
3. What were experts saying 15 years ago?
4. What does advertising make us believe?
5. Why is it a bad idea to eat late in the evening?
6. What is an example of an unhealthy vegetarian diet?
7. Why do people think that 'low fat' products are OK? Are they right?
8. Why do some people prefer bottled water?

Grammar Practice

4. Which verbs can you find in the texts in exercise 2?

Verbs not usually used in continuous forms
agree/disagree appear believe consist contain depend feel like / dislike include matter prefer promise realise hear understand mean smell sound suppose taste need remember think want know lack love see recognize seem

Speaking

5. Discuss these statements with another student using the verbs from exercise 4.

•The best way to lose weight is to skip a meal.
• Healthy food is boring and expensive.
• I like junk food – what's wrong with that?
• I take vitamins, so I don't have to worry about what I eat.
• It's not a good idea to go swimming for an hour after a meal.
• Eating lots of carrots helps you see better in the dark.

Examples:

Student A

Some people believe in skipping meals, but they soon feel hungry and eat lots of snacks.

Student B

I prefer to eat normally and take exercise.

6. Make notes for food diary, describing what you have eaten and drunk in the last 24 hours. Then show your notes to another student and discuss them.

You had cereal and fruit for breakfast. What did you have to drink?

Tea – I dislike coffee. In fact, I like hot chocolate best. How about you?
I didn't have breakfast – it doesn't matter. I can get some crisps at break.

Writing

7. Using at least five of the verbs in the box above in exercise 4, write a paragraph about the advantages and disadvantages of healthy food and junk food.

8. Read the text and summarize it in 50-80 words. Then discuss the questions below.

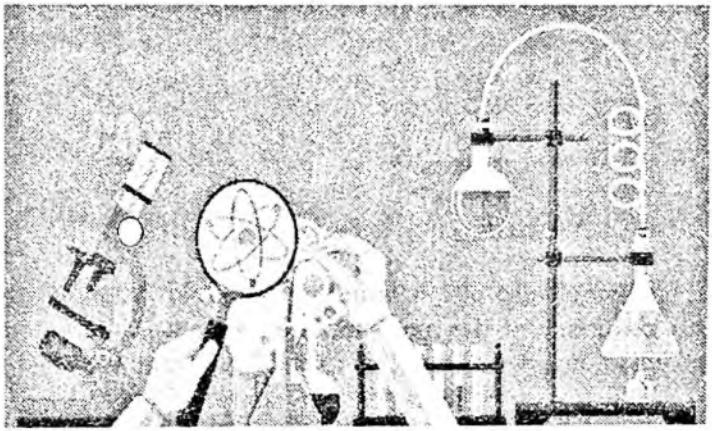
Popcorn

Today Americans still continue the custom of eating popcorn at the movies. Americans use 500,000 pounds of popcorn every year. All corn does not pop. A seed or kernel of corn must have 14 percent water in to pop. Other kinds of pop have less water and do not pop. When you put a kernel of corn on a fire, the water in inside makes the corn explode.

This makes a "pop" noise. That is why we called it popcorn. The American Indians popped corn a long time ago. The Indians knew there were three kinds of corn. There was sweet corn for eating, corn for animals, and corn for popping. The Indians introduced corn to the first settlers, or Pilgrims, when they come to America in 1620. One year after they came, the Pilgrims had Thanksgiving dinner. They invited the Indians. The Indians brought food with them. One Indian brought popcorn. Since that time Americans continued to pop corn at home. But in 1945 there was a new machine that changed the history of popcorn. This electric machine popped corn outside the home. Soon movie theatres started to sell popcorn to make more money. Popcorn at the movies became more and more popular. Many people like to put salt and melted butter on their popcorn. Some people eat it without salt or butter. Either way - Americans love their popcorn!

1. Do you like eating popcorn? Why? Why not?
2. Is eating popcorn a custom in your country?
3. What other eating customs can you tell?
4. Does your nation have any customs which are connected with history?

UNIT 4
FAMOUS SCIENTISTS



Opener

1. Answer the following questions.

1. Which famous scientists do you know?

2. Which scientists made contributions to the field of biology?

3. Which invention do you think is the best one in the field of biology?

Reading

2. Read *People Who Changed The World* and complete the text with four of the phrases a- f. There are two extra phrases.

a. and to reduce environmental damage

b. which led to his 'germ theory of disease'

c. since the beginning of the century

d. which will be extremely difficult

e. by boiling and then cooling the liquid

f. published in 1962

People Who Changed the World

The French chemist and biologist **Louis Pasteur** (1822-1895) made one of the most important discoveries in medical history. He discovered that there were germs called bacteria in the air which caused liquids to turn sour, so he developed the process called 'pasteurisation': killing the bacteria (1)___. Because of Pasteur's research, most dairy products today are pasteurised. Pasteur then realised that most infectious diseases are caused by germs in the air, (2) ___. He used this theory to explain how vaccination worked and showed how doctors could prevent some illnesses by injecting weak forms of the disease. Pasteur's pioneering work has protected millions of people from disease, thanks to pasteurisation and vaccination.

The American writer and biologist **Rachel Carson** (1907-1964) started the modern environmental movement when she wrote a controversial book about the destructive effects of pesticides on the chain of life. *Silent Spring*, (3) ___, is one of the few books that have changed the way people view the natural world. Its impact was so enormous that it was compared with Charles Darwin's theory of evolution. As a result, Carson was attacked by the chemical industry, but *Silent Spring* also caused a massive protest against environmental pollution. Consequently, the US government started to take action to control the use of pesticides in agriculture (4) ___.

And thanks to Rachel Carson, there is now a worldwide movement to protect the environment.

3. Find words in the text which mean:

1. disease that can pass from one person to another *adj*
2. idea which explains how or why something happens *n*
3. causing discussing and disagreement *adj*
4. chemicals used to kill insects *n*
5. effect *n*
6. damage caused to the air, water or land (by chemicals) *n*
7. growing crops on farms *n*

Reading

4. Read the text for scanning.

Why Is Louis Pasteur Important?

Louis Pasteur was one of the first people to discover that diseases come from germs. The word *pasteurize* that we usually see on milk containers comes from his name.

Louis Pasteur was born in 1822 in a small village in France. As a boy, Louis **was interested in** art and was a very good painter. His father did not want his son to be an artist when he grew up. He wanted Louis to be a great teacher. Louis was also interested in chemistry and other **sciences,** so he agreed with his father and decided to go to college.

After college, Louis attended a famous school in Paris that trains teachers, the Ëcole Normale Superieure. He entered the school in 1843 to study how to teach chemistry and physics. He soon **made a name for himself** with his research. After he graduated, he became a professor at the University of Strasbourg. At the university, he met Marie Laurent, the daughter of the director of the university. They **fell in love** and married in 1849. They were very happy and had five children. Sadly, only one boy and one girl lived to be adults.

In 1854, Louis took a job at the University of Lille, a city in the north of France. He was a professor of chemistry' and dean of the faculty of science—a very high position for a man of thirty-two. Around this time, the French wine industry was in terrible **trouble.** Their wine was **sour** and they didn't know why. The winemakers around Lille asked Pasteur to help them. After many experiments, Louis discovered that the problem came from germs. The **solution** was to heat the wine. This would kill the **harmful** genus. The winemakers were shocked, but the method worked. Soon they also heated other drinks such as beer and milk. This made them safe to drink. The method was called pasteurization, after Louis Pasteur.

In 1857, Pasteur returned to Paris to become director of science studies at the Ëcole Normale Superieure. At that time, there was a terrible disease called anthrax. It killed thousands of sheep and cows every year. Pasteur **noticed** something interesting. If an animal was sick with anthrax and **got well,** it never caught the disease again. He decided to inject healthy sheep with **weak** anthrax germs. These sheep lived and never caught the disease. Pasteur had a vaccine against anthrax!

One day in 1885, a doctor brought a nine-year-old boy named Joseph Meister to Pasteur. A mad dog with the disease rabies bit the boy, and the doctor didn't know how to save him. In the past, Pasteur helped animals with this disease, but would his method work on humans, or would the boy die? Pasteur was very **worried,** but finally he tried an experiment. He injected Joseph with his vaccine and sat by his bed to watch the result. The boy lived! Immediately the news spread around the world, and Pasteur was famous.

Pasteur* wanted to build a research institute in Paris to continue his work. People read about his methods and sent money from all over the world to help build the institute. The Pasteur Institute opened its doors in 1888. It is still one of the world's most respected centers for the study of diseases and

how to fight them. Pasteur was the director of the Institute and he worked there until he died in 1895. Everyone remembered Pasteur as a great man.

Year's later, during World War II, the Germans came to Paris. A German officer wanted to open Pasteur's tomb, but the old French guard said no. When the German demanded that he open it or die, the guard killed himself. The name of the guard was Joseph Meister.

Vocabulary

5. Write the correct words in the blanks.

noticed sciences worried solution harmful weak sour trouble

1. Louis Pasteur liked art, but he also liked the - _____ , such as physics and chemistry.
2. When wine becomes bad and people can't drink it, it tastes _____ like vinegar.
3. Pasteur had to find a _____ to the winemakers' problem.
4. The winemakers had problems and needed help. The French wine industry was in _____ .
5. We can kill dangerous and _____ germs with heat.
6. Pasteur _____ that if an animal with anthrax becomes healthy, it never catches the disease again.
7. He injected sheep with anthrax germs. These germs were not strong. They were _____ .
8. Pasteur was _____ about Joseph. The little boy needed help, but Louis didn't want to hurt him.

WORDS THAT GO TOGETHER

6. Write the correct words in the blanks.

got well was interested in fell in love made a name for himself

1. Pasteur liked to paint and draw pictures. He _____ art.

2. People began to know about Pasteur because he did important research. Pasteur _____ in the world of science.

3. Pasteur _____ with Marie Laurent, and they got married in 1849.

4. Animals that were sick with anthrax and _____ never had the disease again.

7. Work with a partner to answer the questions. Use complete sentences.

1. What is something that is *harmful* to people?

2. What foods or drinks have a *sour* taste? Do you like how they taste?

3. What do you *worry* about?

4. Do you ever feel weak? What are some other things that are or can be weak?

5. What subjects *are* you *interested in?*

6. Did you *ever fall in love* with someone? Who? What happened?

7. When you catch a cold, what do you do to *get well?*

Comprehension

8. Circle the correct answer.

1. Louis Pasteur discovered _____ .

a. how to make wine and beer
b. a way to kill harmful germs
c. how to make a better wine
d. a way to make wine taste sour

2. Pasteur _____ .

a. invented a vaccine for anthrax and other diseases

b. invented a method to pasteurize sheep

c. discovered a new disease

d. invented vaccines for animals but not humans

3. Pasteur's research institute _____ .

a. closed because of World War II

b. is a museum today

c. continues to operate today

d. closed when Pasteur died in 1895

Remembering details

9. Reread the passage and fill in the blanks.

1. Marie Laurent was the daughter of the director of the _____

2. Louis and Marie Pasteur had _____ children.

3. Pasteur's solution was _____ the sour wine. This killed the germs.

4. Before the vaccine, anthrax killed _____ every year.

5. Louis didn't know whether his rabies vaccine worked - _____ .

He was worried, but he gave it to Joseph Meister and waited for the result.

6. The Pasteur Institute is a research center for the study of _____ .

Making inferences

10. All of the statements below are true. Some of them are stated directly in the reading. Others can be inferred, or guessed, from the reading. Write S for each stated fact. Write / for each inference.

1. Pasteur was famous when he was alive.

2. It worried Pasteur to experiment on Joseph Meister because Pasteur was not a doctor.

3. Pasteur was not sure that his vaccine would work on humans.

4. Joseph Meister worked at the Pasteur Institute because he wanted to be near the man who saved his life.

5. Joseph Meister killed himself to save Pasteur's tomb.

Tell the story

11. Work with a partner or together as a class. Tell the story of Louis Pasteur. Use your own words. Your partner or other students can ask questions about the story.

12. Discuss the answers to these questions with your classmates.

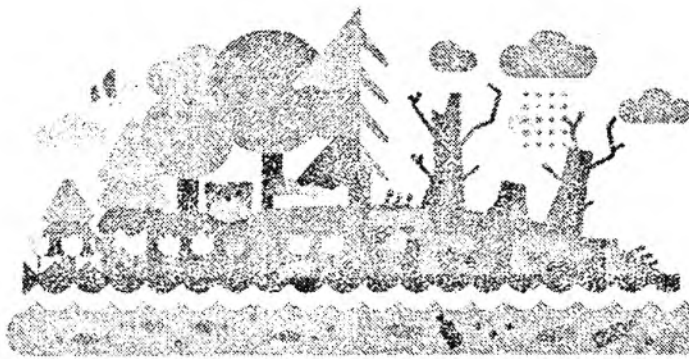
1. What scientific discoveries have been made recently?
2. Are all new medical discoveries good? Why or why not?
3. How safe are vaccines and medicines? What about natural remedies, such as herbs and vitamins?

Writing

13. Write a short paragraph about a medical discovery that has helped people.

Example: *I think antibiotics were a great discovery. Before we had antibiotics many people died.*

UNIT 5
ECOLOGICAL PROBLEMS



Opener

1. Discuss the questions in a group.

1. What ecological problems can you name?

2. Which ecological problem is the most serious one in the world?

3. What ecological problems should be solved in our country?

Speaking and Vocabulary

Environmental problems

2. Use these expressions in the box to complete the text:

natural habitats	in danger of extinction
long terms	natural resources
way of life	indigenous people
destruction	future generations

The (1) ..... of the rainforest is very worrying. Thousands of acres of forest are being cut down every year and the (2) .....

Of many animals are being destroyed. As a result, many species are (3) ..... .

This, in turn, threatens the traditional (4) ..... of many of the (5) ..... who live in some of the most remote areas of our planet. As with most environmental issues, we need to think more (6) ..... and realise that everything we do has implications for (7)..... . If we want to hand on our world to our children and grandchildren, we simply can't continue to misuse the world's (8) ..... as we are at the moment.

Do the same with this text:

heavily polluted	cloud of pollution
uninhabitable	air quality

The (9) ..... in many of the world's largest cities is so poor that we have seen an enormous increase in chest and lung illnesses such as asthma. These cities are (10) ..... and some are permanently covered by a (11) ..... . .Unless we begin to take the problems more seriously and start to do something about them, many of our biggest cities, particularly in the developing world, will become (12) ..... .

Protecting the environment

3. Match a word on the left with a word on the right to make common expressions:

1. unleaded	a. bank
2. public	b. friendly
3. recycling	c. energy
4. bottle	d. point
5. environmentally	e. transport
6. renewable	f. petrol

If you want to protect the environment, here are some things you should do. Use the expressions above.

7. Make sure your car runs on ..... and your home uses sources of .....

8. Use ..... instead of taking your car.

9. Take glass, paper and plastic to a ..... and your empty bottles to a .....

10. Buy ..... products whenever possible.

4. Green politics

Use a dictionary to fill the gaps below:

noun	adjective	person
environment	.....	.....
ecology	.....	.....

Conservationists campaign to protect the environment. In most countries there are political parties which aim to protect the environment – the Green Party or the Ecology Party, for example, Greenpeace is an international group that protests against anything which is threat to the environment, like dumping nuclear waste and, more recently, growing genetically modified crops.

1. Are you worried about the environment? What do you do to help protect it?

2. Are there any political parties which aim to protect the environment in your country?

Reading and Speaking

5. Read the text for scanning paying attention to the words in bold.

Environmental Pollution

People have always polluted their **surroundings**. But until now pollution was not such a serious problem. People lived in uncrowded rural areas and did not have pollution — causing machines. With the development of crowded industrial cities which put huge amounts of pollutants into small areas, the problem has become more important.

Automobiles and other new inventions make pollution steadily worse. Since the late 1960's people have become **alarmed** with the danger of pollution.

Air, water, and soil are necessary for **existence** of all living things. But polluted air can cause illness, and even death. Polluted water kills fish and other **marine life**. On polluted soil, food can not be grown. In addition environmental pollution **spoils** the natural beauty of our planet.

Pollution is as **complicated** as serious problem. Automobiles are polluting the air but they provide transportation for the people. Factories pollute the air and the water but they provide jobs for people and produce necessary goods. **Fertilizers** and **pesticides** are important for growing crops but they can ruin soil.

Thus, people would have to stop using many useful things if they wanted to end pollution immediately. Most people do not want that of course. But pollution can be **reduced** gradually.

Scientists and engineers can find the ways to reduce pollution from automobiles and factories. Government can pass the laws that would make **enterprises** take measures for reducing of pollution. Individuals and groups of people can work together to persuade enterprises to stop polluting activities.

6. Discuss the questions with the whole group.

1. Why wasn't pollution such as a serious problem earlier?

2. When have people become alarmed with the danger of pollution?

3. What can environmental pollution cause?

4. Why is pollution a complicated problem?

5. Can pollution be stopped immediately?

6. What can government and individuals do to reduce pollution?

Vocabulary:

environment pollution – atrof-muhit ifloslanishi – загрязнение окружающей среды

uncrowded – aholi kam tarqalgan hudud – слабонаселенный

rural – qishloq – сельскохозяйственный

pollution-causing – ifloslantiruvchi – вызывающий загрязнение

crowded – zich joylashgan – густонаселенный

pollutants – chiqindilar – отходы

invention – ixtiro – изобретение

soil – zamin, yer – грунт, земля

existance – mavjudlik – существование

goods – mollar – товары

fertilizer – o'g'it – удобрение

pesticide – pestitsid – пестицид

to grow – etishtirmoq – выращивать

crops – ekinlar – сельскохозяйственные культуры

to ruin – buzmoq – портить

immediately – darhol – сразу, немедленно

to reduce – kamaytirish – уменьшить

gradually – asta-sekin – постепенно

to pass a law – qonun qabul qilmoq – принять закон

enterprise – korxona – предприятие

to take measures – chora ko'rmoq – принять меры

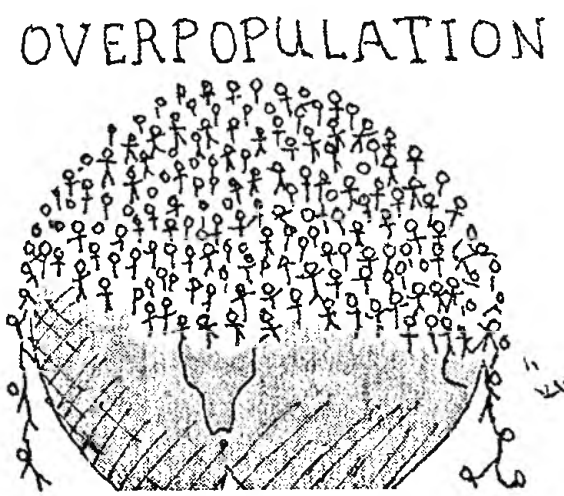
to persuade – ishontirmoq – убедить

activity – faoliyat – деятельность

Writing

7. Write a short paragraph describing one of the ecological problems of our country or region.

UNIT 6
GLOBAL PROBLEMS



Opener

1. Discuss the questions in group.

1. What global problems do you know?

2. Which global problem causes the biggest danger to the world?

Reading and Speaking

2. Read the text for scanning.

OVER POPULATION

The world's population is an important issue. For hundreds of thousands of years, the human population grew at a low but steadily increasing rate. Then, in less than last 200 years, the world population went from several hundreds of millions to more than 6 billion people.

The Earth has certain limitations and in particular, there are limits to growth of things of things that consume the Earth resources.

Many people believe that these resources, both the Earth and the human intellect are endless and population growth can continue and that there is no danger that we will ever run out of anything. Yes, many population growth. Countries try not to raise this subject to the public much , because they do not want to raise panic.

Nowadays they have to do something about it gets out of hand. They try to censor it and sometimes lie. Do you know that the USA itself consumes 50 per cent of all electricity produced on the Earth? The population of the USA is just around 285 millions people. It is an interesting fact.

Overpopulation is like a big magnifying little problems into big ones. Overpopulation is destroying our environment, lowering the standard of living, and generally degrading the quality of life.

Overpopulation also causes more violence, environmental pollution that reflects on land degradation, tropical forest destruction, global warming and destruction of coral reefs, 6 billion member society has to get a huge food infrastructure, so society start producing genetically made food, which is cheaper than ordinary one but might reflect in the nutrient balance. For example, in China it is prohibited to have more than one child for a couple. There is a very dangerous situations in India. By the year 2025 its population might reach 1.5 billion people.

The planet urgently needs population control. Birth control, abortion and quotas need to be supported, if the planet is to remain habitable in the long term.

Every second five people are born and two people die, so there is a gain of there people. At this rate, the world population is doubling every 40 years and would be: 12 billions people.

2. Discuss the questions in groups.

1. How many people live on the Earth today?

2. Why is overpopulation an important issue?

3. Does overpopulation hurt our environment?

4. Is it prohibited to have more than three children for a couple in China?

5. How much time does it take to double the Earth's population?

6. How many people might live in India by the year 2025?

Vocabulary:

natural resources – tabiiy resurslar – природные ресурсы

to raise – ko'talmoq, oshirmoq – повышать, увеличивать

to get out of hand – nazoratdan chiqmoq – выйти из-под контроля

to consume – singdirmoq – съедать, поглощать (о еде); потреблять

electricity – elektr energiyasi – электричество

environment – atrof muhit – окружающая среда

to degrade – pasaytirmoq – деградировать, ухудшаться, портиться

violence – shafqatsizlik, zo'ravonlik – жестокость, насилие

pollution – ifloslanish – загрязнение

Reading and Writing

4. Work in two groups. Read the texts in groups and summarize them in 80-100 words.

GLOBAL WARMING

Global warming is sometimes referred to as the greenhouse effect. The greenhouse effect is the absorption of energy radiated from the Earth's surface by carbon dioxide and other gases in the atmosphere, causing the atmosphere to become

warmer. Each time we burn gasoline, oil, coal, or even natural gas, more carbon dioxide is added to the atmosphere. The greenhouse effect is causing the temperature on the Earth to rise, and creating many problems that will begin to take place in the coming decades.

Today, however, major changes are taking place. People are conducting an unplanned global experiment by changing the face of the entire planet. We are destroying the ozone layer, which allows life to exist on the Earth's surface.

Ozone layer

Ozone layer or ozonosphere, region of the stratosphere containing relatively high concentrations of ozone , located at altitudes of 12-30 mi (19-48 km) above the earth's surface. Ozone in the ozone layer is formed by the action of solar ultraviolet light on oxygen.

The ozone layer prevents most ultraviolet (UV) and other high-energy radiation from penetrating to the earth's surface but does allow through sufficient ultraviolet rays to support the activation of vitamin D in humans. The full radiation, if unhindered by this filtering effect, would destroy animal tissue. Higher levels of radiation resulting from the depletion of the ozone layer have been linked with increases in skin cancers and cataracts and have been implicated in the decline of certain amphibian species.

In 1974 scientists warned that certain industrial chemicals, e.g., chlorofluorocarbons (CFCs) and to a lesser extent, halons and carbon tetrachloride, could migrate to the stratosphere. There, sunlight could free the chlorine or bromine atoms to form chlorine monoxide or other chemicals, which would deplete upper-atmospheric ozone. A seasonal decrease, or "hole," discovered in 1985 in the ozone layer above Antarctica was the first confirmation of a thinning of the layer. In addition, the polar winds, which follow a swirling pattern,

create a confined vortex, trapping the chemicals. When the Antarctic sun rises in August or September and hits the trapped chemicals, a chain reaction begins in which chlorine, bromine (from the halons), and ice crystals react with the ozone and destroy it very quickly. There is a corresponding hole over the Arctic that similarly appears in the spring, although in some years warmer winters there do not result in a major depletion of the ozone layer. A global thinning of the ozone layer results as ozone-rich air from the remaining ozone layer flows into the ozone-poor areas.

Reading and Speaking

5. Read about overpopulation and write correct spelling of the underlined words. Then read the text again.

Overpopulation is a real rloepmb _____. It could kill the Earth. Very soon, there will be too many people and not enough land. There won't be enough rmafs _____to grow food for everyone. We'll eat all of the fish in the sea. And our pollution will uecas _____more gaollb _____warming. I think we are in a very isuoser _____situation. I don't know what the answer is. Our leaders don't seem too worried. They never see the bigger piurcte _____ . The world's population is exploding, and explosions cause great daaegm _____ . More and more people are vilgni _____longer and longer. We have better medicines. Our scientists have found usrec _____to many diseases. There are many ernaoss _____. What we really need to do is think about how overpopulation is damaging the Earth.

6. Work in two groups and do a discussion exercise.

DISCUSSION (Write your own questions)

GROUP A's QUESTIONS (Do not show these to group B)

1. _____
2. _____
3. _____

4. _____
5. _____
6. _____

DISCUSSION (Write your own questions)

GROUP B's QUESTIONS (Do not show these to group A)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

7. STUDENT OVERPOPULATION SURVEY

Write five GOOD questions about overpopulation in the table. Do this in pairs. Each student must write the questions on his / her own paper.

When you have finished, interview other students. Write down their answers.

	STUDENT 1 _____	STUDENT 2 _____	STUDENT 3 _____
Q.1.			
Q.2.			
Q.3.			
Q.4.			
Q.5.			

- Now return to your original partner and share and talk about what you found out. Change partners often.
- Make mini-presentations to other groups on your findings.

WRITING

8. Write about overpopulation for 10 minutes. Show your partner your paper. Correct each other's work.

9. VOCABULARY EXTENSION: Choose several of the words from the text. Use a dictionary or Google's search field (or another search engine) to build up more associations / collocations of each word.

10. INTERNET INFO: Search the Internet and find more information about overpopulation. Talk about what you discover with your partner(s).

11. OVERPOPULATION POSTER Make a poster about overpopulation. Show it to your classmates. Give each other feedback on your posters.

Writing

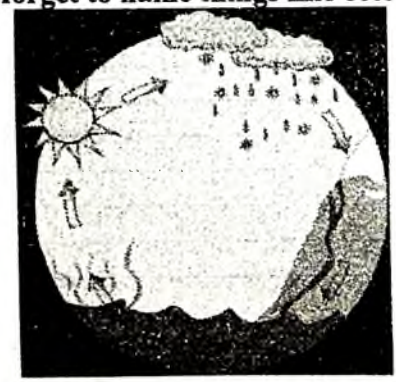
12. Write a short paragraph describing one of the global problems of the world.

UNIT 7
SAVE WATER

Opener

1. This unit is about the water that is necessary for life on our planet. What objects can you name in the picture? Write a list of all the names you know in English.

Tip: Don't forget to name things like colours!



Share your list with your classmates. If a classmate writes a word you don't know, ask what it means! Be ready to tell a classmate what any word on your list means! Write one word below that you learned from a classmate.

(Adapted from 'Bridges' by Dee Broughton, Georgetown University Center for Intercultural Education and Development for the U.S Department of State English Language Fellow Program 2013)

Reading and Speaking

Activity 1

a) Instructions: Study the text, then do the language task.

Water boy

Vijay liked to play with water. He liked to play with water in many ways:

- He liked to fill up a big tub with water and play with his toy boat in there.
- He liked to make big mud puddles in the garden and pretend it was a lake.
- He liked to open the hose and splash his friends when they walked by.

His mother told him many times not to waste water, but he did not listen.

One day his mother decided to take him with her to visit her brother. Vijay's uncle stayed in a small village. Vijay was very happy to go because he would be able to play with his cousins. Vijay and his mother arrived at his uncle's place late at night and Vijay went off to sleep. Suddenly, in the middle of the night, Vijay woke up. There was a lot of noise outside his room. Vijay could not understand why so many people were awake at night, but he was very tired. Very soon, he fell back to sleep.

b) Answer the following questions.

1. What characters have been mentioned in the story so far?
2. While Vijay was sleeping, something happened to wake up the other people in the house. What do you imagine might have happened?
3. Ask your classmates what they think might have happened in the house. Write down the idea of your classmate that you find most interesting.

Water boy- Part 2- By Damyani Umra

The next morning, Vijay got up and went to the bathroom. When he opened the tap, there was no water. He looked around and found water stored in many buckets. He was surprised and asked his cousin about it.

His cousin, Rajesh, explained that there was no water anywhere. It had not rained for many years and all the lakes had dried up. They had to depend on some water that came from one tap and they had to keep awake to see that they did not miss it as it could come any day and any time!

Last night, luckily the water had come, but it might be days before it came again. Till then, they would have to only use the water they had collected in the night. Rajesh told Vijay to be careful and not to waste water.

If the family ran out of water, they would have to buy water from someone else, and it was very expensive.

Rajesh gave Vijay some examples of ways to use water wisely:

- He gave Vijay a glass of water and told him to use it for brushing his teeth.
- He told Vijay to take a bath with a very small amount of water in a bucket.
- He told Vijay to save the water used for washing his clothes so it could be used again later.

Vijay was surprised – he had never imagined that there could be a place where water was so scarce. His cousin laughed at Vijay and said, "Vijay, you use too much water every day. Soon there will be less rain, and you may have the same problems that we are facing now. You should learn to save water."

Do

Imagine Vijay carrying water. Imagine anything you want to about what Vijay will do with water. Do you imagine his wasting water or using it wisely?

Vijay will .....

In your sentence, does Vijay use water wisely or wastefully?

(Adapted from 'Bridges' by Dee Broughton, Georgetown University Center for Intercultural Education and Development for the U.S Department of State English Language Fellow Program 2013)

Speaking and Vocabulary

Activity 2

a) Read this information about water.

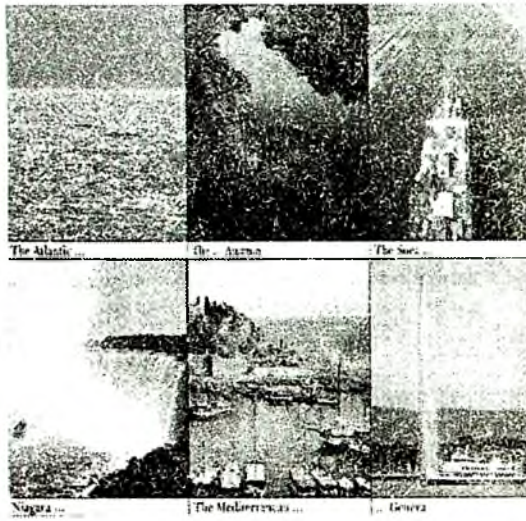
Water is a clear liquid, without colour or taste, which falls from the sky as rain and is necessary for animal and plant life. Salt water is found in seas and oceans, fresh water is found in rivers and lakes, although there are also salt water lakes. We say the water to refer to an area of water, such as the sea, a lake or a swimming pool.

b) Now complete these sentences using either *water* or *the water*.

1. Can I have a glass of ... please?
2. Is ... very deep in this swimming pool?
3. I bought a bottle of ... but I can't remember where I put it.
4. I went to the lake to swim but ... was too cold.
5. Fifty per cent of the human body is ...

c) Complete the names of the places below. Use one of these words in each name.

canal channel falls glacier iceberg
lake ocean river sea springs



Activity 3

a) Now answer these questions.

1. Which of the words in c) were not required in the place names?

2. Which of the places in the photographs have fresh water and which have salt water?

b) Choose answer (a), (b) or (c) for each question in the box below.

1. What is the difference between an ocean and a sea?

(a) An ocean is between two land masses, whereas a sea is inside a country.

(b) An ocean contains fresh water, whereas a sea contains salt water.

(c) An ocean is bigger than a sea.

2. What is the difference between a canal and a channel?

(a) A canal is wider or longer than a channel.

(b) Ships can sail along a canal but they can't sail along a channel.

(c) A channel is a natural waterway, whereas a canal has been built.

3. What's the difference between an iceberg and a glacier?

(a) Icebergs are bigger than glaciers.

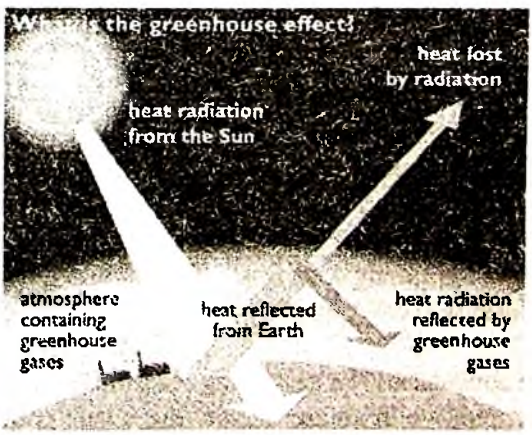
(b) Icebergs float in the sea, whereas glaciers are attached to land masses.

(c) Icebergs are only found at the North Pole, whereas glaciers are everywhere.

Activity 4

Look at the illustration below, read the information and discuss it in groups.

Solar energy (energy from the sun) is vital to the existence of planet Earth. It passes through the atmosphere to Earth's surface. This is not a problem, provided that Earth sends some of this solar energy back into space. This process is called radiation. However, in recent years, partly because of pollution, Earth has not radiated enough of the solar energy back into space. Some of the solar energy reflects back onto Earth's surface, making Earth warmer than it should be. This process is called the greenhouse effect, and the result is global warming - planet Earth is now hotter than it should be.



(Adapted from Move Ahead 3 by Printha Ellis, Ken Wilson. James Taylor, Macmillan Publishers Limited 2006)

Writing

Activity 5

What do you think?

1. A shortage of fresh water threatens many parts of the world. Look at the poster below which shows some solutions suggested by the authorities in one area with a serious water problem.

2. Which of the changes would you consider acceptable and which would you consider unacceptable? Write a short composition explaining your views. You don't have to refer to every point in the Water Crisis poster. Organise your composition as follows:

- **Paragraph 1 – introduction**

Mention the solutions from the poster that you are going to cover.

- **Paragraph 2 - acceptable solutions**

Explain which solutions you think would be acceptable in your country, and why. If you can, say if you think they would be acceptable in other countries, too.

- **Paragraph 3 - unacceptable solutions**

Explain which solutions you think would not be acceptable in your country. Would they be unacceptable in other countries, too?

- **Paragraph 4 - conclusion**

Your personal opinion about the seriousness of this problem and any other suggestions you want to add.

WATER CRISIS

This region is facing a serious water shortage. If we don't take action NOW, our supply of water may end suddenly.

We are considering the following solutions.

1. If people live in an area where there isn't enough water, they will have to move to an area where there is more water.

2. If water consumption in an area has to be reduced by 10%, then water supplies will be cut off for 10% of the time.

3. If the situation gets worse, water supplies to homes will be cut off completely. Water will only be available from special pipes at street corners.

4. People will be encouraged to reduce the amount of water they use for washing, cooking and cleaning.

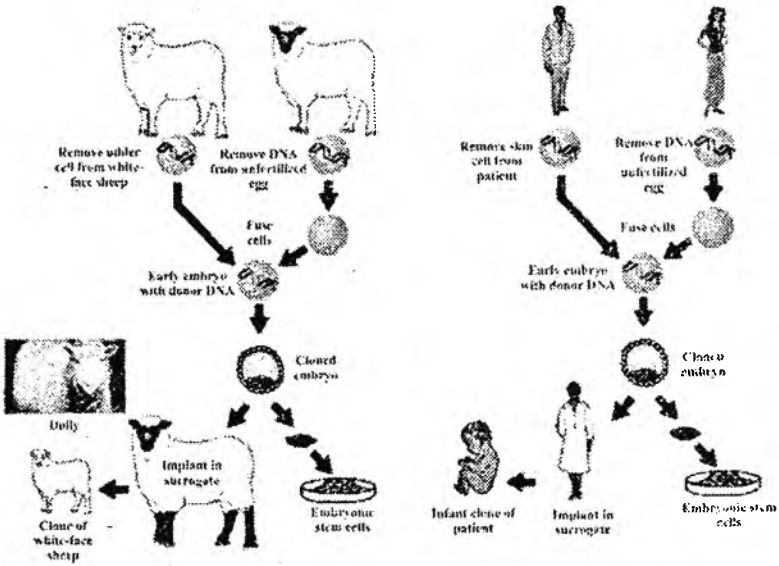
5. Services such as car-cleaning and window-washing will be suspended.

6. People will be encouraged to buy bottled water for drinking.

7. Public swimming pools will be closed until the water crisis has ended. Private swimming pools may have to close as well.

8. Non-emergency hospital operations will be postponed, but otherwise, hospitals won't be affected by these changes.

UNIT 8
CLONING



Opener

1. Work with a partner. Look at the photographs and discuss these questions.

a) This sheep is famous – do you know why?

b) What do the pictures have in common?

Speaking and Reading

2. Do you think these statements are true or false?

1. By the year 2050 we will all have a clone of ourselves.

2. Cloning experiments have been banned in some European countries.

3. Within ten years scientists will probably have cloned a human being.

3. Read the text quickly and check your answers.

Cloning: future perfect?	Cloning: perfect future?

1 _____

Think about the following scene: you are walking the street and you see a mother and her children walking side by side. The children look identical, but they are different ages. If human cloning becomes normal, scenes like this will have become normal by the year 2050.

2 _____

A clone is an exact copy of a plant or animal produced from any one cell. Since Scottish scientists reported that they had managed to clone a sheep named Dolly in 1997, research into cloning has grown rapidly. In May 1998, scientists in Massachusetts managed to create two identical calves using new cloning technology. A mouse has also been cloned successfully. But the debate over cloning humans really started when Chicago physicist Richard Seed made a sensational announcement. "We will have managed to clone a human being within the next two years", he told the world.

3 _____

Seed's announcement provoked a lot of media attention, most of it negative. In Europe, nineteen nations have already signed an agreement banning human cloning and in the US the President announced: "We will be introducing a law to ban all human cloning and many states in the US will have passed anti-cloning laws by the end of the year."

4 _____

Many researchers are not so negative about cloning. They are worried that laws banning human cloning will threaten important research. In March, The New England Journal of medicine called any plan to ban research on cloning humans seriously mistaken. Many researchers also believe that in spite of attempts to ban it, human cloning will have become routine by 2010 because it is impossible to stop the progress of science.

5 _____

Is there reason to fear that cloning will lead to a nightmare world? The public has been bombarded with newspaper article, television shows and films, as well as cartoons. Such information is often misleading, and makes people wonder what on earth the scientists will be doing next.

6 _____

Within the next five to ten years scientists will probably have found a way of cloning humans. It could be that pretty soon we will be able to choose the person that we want our child to look like. But how would it feel to be a clone among hundreds, the anti-cloners ask. Pretty cool, answer the pro-cloners.

Comprehension

4. Choose the most suitable heading from the list A-G for each part 1-6 of the article. There is one extra heading which you do not need to use.

A. The right to choose

B. A common sight

C. Anxiety about the future

D. teenagers in favour of cloning

E. Arguments in favour of cloning
F. What is cloning?
G. Strong reactions

5. Read the text and underline the arguments for and against cloning.

Vocabulary

6. Find words in the text that have a similar meaning to the following. The first letter of each word is given to help you.

1. a picture of a place s_____
2. the baby of cow (plural) c_____
3. a discussion on an important subject d_____
4. something said in public a _____
5. caused something p _____
6. to pass a law to say something is not permitted b _____
7. the way something develops p _____

Writing

7. Write a short paragraph describing your opinion about cloning humans.

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

UNIT 9
ANIMALS

Opener

1. Look at the pictures above, write the names of the animals and speak about them.

Reading

Save the white rhino

1

a Read this short text about rhinoceroses (rhinos). Find a piece of information which is untrue.

Rhinos are massive animals with one or two horns, which are made of hair. Rhinos are vegetarians and have very poor sight. They usually feed at night and rest in the shade during the daytime. During their rare excursions in daylight, many rhinos allow birds to sit on their heads. The birds warn them of obstructions, such as trees, and other dangers. Rhinos are very solitary animals, and their behaviour is unpredictible. They have been hinted almost to extinction for their horns. Powdered rhino horn is sold as aphrodisiac. Rhonos live in Africa, South East Asia and Australia.

b What untrue information have you found?

2

a Before you read the next article about rhinos, what do the following words mean: conservation and an endangered species?

b Now read the complete text and answer these questions.

1 What exactly does the organisation Traffic do?

2 What are the rhino horns used for in Yemen?

3 Has the Yemenigovernment action made any difference to the trade?

4 What is the advantage of using sniffer dogs?

Trade in rhino horns for daggers is wiping out the species

Report by David Gough, Nairobi

The illegal export of rhinoceros horns from Africa to Yemen threatens to wipe out the population, the continent's rhino population, conservationists say. In the past 30 years, nearly 154,000 pounds (75,000 kilos) of rhinoceros horns have been imported into Yemen. A spokesperson for traffic, the wildlife

trade monitoring organisation, said that more than 22,000 rhinos had been killed since 1970 to meet this demand. A survey by Traffic in 1997 found that outside southern Africa only 192 white rhinos and 427 black rhinos remained in the wild.

Rhino horns, traditionally used in ornaments, are in high demand in Yemen, where they ae used to make the handle of the Jambiya dagger carried by all Yemeni men. Edmund Bradley Martin, a conservationist who has been studying the trade in rhino horns for many years, said that demand had remained high and the trade had continued despite Yemeni government legislation in 1981 banning imports of rhino horns.

Mr Martin said that it was not clear where the horns were coming from from, but poaching had continued in the Democratic Republic of Congo and also in Kenya and Tanzania. With an average price of more than $ 1.000 a kilo for rhino horns, the temptation to poach is obvious.

Nairobi and Dar es Salaam, the capitals of Kenya and Tanzania, are leading centres for the shipment of rhino horns. Seizure rates in both countries are low, and poorly paid customs officers are easy targets for bribery. As a solution, Rob Barnett of Traffic is in favour of the introduction of sniffer dogs into the customs service. 'One dog can do the work of 35 men,' he said. 'One dog and its handler can search a plane with 400 passengers in 20 minutes. It would take 36 men to perform the same task in the same time.'

(Adapted from an article in the Guardian, 6th April 1999)

Comprehension

3. Read the following extracts (or paraphrases) of lines in the text and answer the questions.

1. The illegal export of rhinoceros horns threatens to wipe out the continent's rhino population.

Does this mean there will be a smaller number of rhinos or no rhinos at all?

2. Rhino horns are in high demand in Yemen.

Does this mean there are a lot of horns in Yemen, or that a lot of people in yemen want them?

3. More than 22,000 rhinos have been killed to meet this demand.

Does this mean that these rhinos were killed because of the demand? Or were they killed for other reasons?

4.The Yemeni government banned the import of rhino horns.

Does this mean that the government stopped the import of horns or agreed with this?

5. The temptation to poach is obvious.

Does this mean that it is easy or difficult to understand why poachers do what they do?

6. Poorly paid customs officers are easy targets for bribery.

Does this mean that customs officers are good or bad at their jobs?

Grammar Practice

4. Find examples of past tense passives and past perfect tense passives in the text. Why are the verbs in the passive form?

Vocabulary

5. Use your dictionary to find out more about these words which appear in the reading text.

bribery export/import illegal poaching solution threaten

1. What is the name given to money (or other things) which is offered in bribery?

2. What is the difference in the pronunciation of import and export when they are verbs and nouns?

3. What is the opposite of illegal? What is the difference between illegal and immoral?

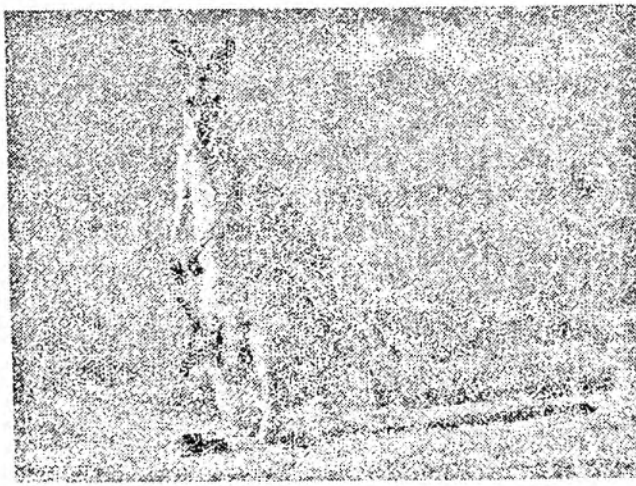
4. The verb is to poach. What do you call a person who poaches?

5. What is the verb related to the abstract noun solution?

6. Threaten is a verb. Is there a related abstract noun?

Reading and Speaking

6. Work in groups. Read the text and discuss it in each group.Then answer the questions below.



Kangaroo

Kangaroo name for a variety of hopping marsupials , or pouched mammals, of the family Macropodidae, found in Australia, Tasmania, and New Guinea. The term is applied especially to the large kangaroos of the genus Macropus. Kangaroos have powerful hind legs designed for leaping, long feet, short forelimbs, and long muscular tails. The hind legs are also used to deliver blows at enemies when the animal is cornered; the feet are sharply clawed. The tail serves as a balance when the animal leaps and as a prop when it stands; the usual posture is bipedal. The hand like forepaws are used for

grasping. As in most marsupials, females have a pouch surrounding the teats. The single young is born in an immature state after a gestation period of about 40 days and is suckled in the mother's pouch for about six months. After it begins to graze it returns frequently to the pouch for shelter and transport until it is too large to be carried. Kangaroos feed on grass and other vegetation; they are the chief grazers of the Australian plains. Day-active animals, they move about in herds called mobs and sleep on the ground at night. Males are called boomers, females flyers; the young are called joeys. Because many types of kangaroo have valuable hides, and because they compete with domestic livestock for grazing land, kangaroos have been extensively hunted and are now extremely reduced in numbers.

Questions:

1. What other strange animals can you name?
2. Which Australian animals do you know?
3. Which animals can only be found in Asia, Africa, Europe and America?

7. Read the text. Find and correct six mistakes in the text.

AFRICAN ELEPHANTS

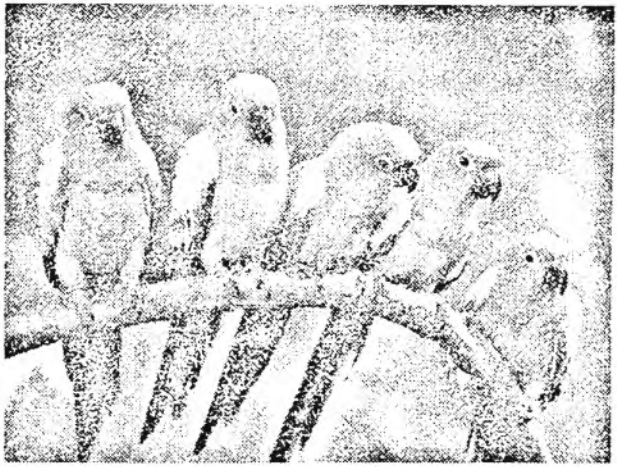
There are a lot of interest facts about African elephants. For a start, they're the largest living land mammals in the world. Male elephants weigh about 6 tonnes. Females are smaller than males. Their weigh is about 3 tonnes, but that's still very heavy! Elephants eat bark, fruit, grass and leaves. They are very strong and will push down trees to eat from them. Water is extreme important to them because they drink up to 50 gallons a day. They also have the able to find water in the ground. They do this by digging deeply holes in the earth using their trunks. It's thought that they find these locations by communicating with other elephants. A few years ago they were close to extinction because people hunted them for their ivory tusks. Today they have better protect from hunters.

(Adapted from Build up to Count down by Jenny Quintana, Oxford University Press 2007)

Writing

8. Write a short descriptive composition describing an animal that you know best.

UNIT 10
BIRDS



Activity 1

Work as two groups. Read the words in the box and classify the names of the birds into land and marine birds, write them on the whiteboard.

a golden eagle a gull a barn owl a finch a pheasant an albatross
a woodpecker a crow a vulture a penguin a pelican an oriole
a sparrow a dunlin a magpie a puffin a sanderling a kittiwake
an ostrich a heron an egret a sea duck a sandpiper a cormorant

Land birds **Marine birds**

_____ _____

_____ _____

_____ _____

Speaking

Activity 2

Look at the pictures, choose one of them and describe habits and life style of the bird in it.









Activity 3

Read the text about Marine birds for scanning.

Marine Birds

There are an estimated 8600 species of birds, but only about 3 percent of these are considered marine species. Marine birds include the oceanic albatross, the flightless penguin, the large pelicans and cormorants, the diving puffins, the familiar gulls, and the shorebirds such as herons, egrets, sandpipers, sea

ducks, and oystercatchers. Their association with the sea may be periodic or continuous, but all spend a large portion of their lives there. Some are so well adapted to oceanic life that they rarely come ashore; others move daily into coastal waters to feed, but all return to shore to nest. They often congregate in large groups, thousands and hundreds of thousands of birds crowded together along shore cliffs and beaches or on islands. Since a very large portion of the population may be in one small area at the same time, they are vulnerable to human predation and pollution. Most have definite breeding seasons, and they may migrate thousands of kilometers as they travel from feeding ground to breeding area.

Seabirds

The wandering albatross of the southern oceans is the most truly oceanic of marine birds; it has the largest wing spread of all birds, 3,5 meters. These great white birds with black –tipped wings spend four to five years at sea before returning to their nesting sites. The smallest of the oceanic birds, Wilson's petrel, is a swallow like bird that breeds in Antarctica and flies 16,000 kilometers along the Gulf Stream to Labrador during the Southern Hemisphere winter, returning to the Southern Hemisphere for the southern summer, another 16,000 kilometers.

Penguins are gregarious birds living in crowded breeding areas or rookeries; they swim in flocks using their wings for propulsion and steering with their feet. Their underwater swimming speed is almost 16 kilometers per hour. They feed on fish, krill, squid and shellfish. All but the Galapagos penguin are found in the Southern Hemisphere, and two species, the emperor and the adelie, are found in Antarctica. The emperor is the largest of the penguins; it is1,3 meters tall and weight 45 kilometers. This penguin can remain under water for more than 15 minutes and dive to depths of 265

meters. The emperor penguin breeds on the Antarctic ice sheet. keeping its egg warm by holding it on its feet and covering it with a fold of skin.

Pelicans and cormorants are large fishing birds with big beaks. They are strong fliers found mostly in costal areas, but some venture far out to sea. A pelican has a particularly large beak from which hangs a pouch used in catching fish. White pelicans of North America nest inland but winter in California, in Florida, and along the Gulf Coast. They fish in groups, herding small schools of fish into shallow0 water and then scooping them up in their large pouches. The brown pelican lives along the Pacific and southeastern coasts. It does a spectacular dive from up to 10 meters above the water to capture its prey. Cormorants are black, long-bodied birds with snakelike necks and moderately long bills that are hooked at the tip. They are found along the coasts of all the world's oceans. Cormorants settle on the water and make repeated dives from the surface. Swimming primarily with their feet but also using their wings, they chase and catch fish under water. Cormorants float low in the water with only their necks and heads above the surface, for they do not have the water repellent feathers of other seabirds and must return to land periodically to dry out. There is a flightless cormorant in the Galapagos Islands.

Gulls and terns are found all over the world except in South Pacific between South America and Australia. Gulls are strong flyers and feed on anything and everything, foraging over beach and open water. Most are white or white with some black or gray. The terns are smaller and more graceful with a slender bill and forked tail; they plunge into the water to catch fish. The Arctic tern breeds in the Arctic and in winter migrates south of the Antarctic Circle, a round-trip of 35,000 kilometers.

The puffins, murres, and auks are heavy-bodied, short-winged, and short-legged diving birds. They feed on fish,

crustaceans, squid, and some krill. All are limited to the North Atlantic, North Pacific, and Arctic areas where most nest on isolated cliffs and islands. In prehistoric times great auks were abundant on both sides of the North Atlantic. The great auk was a large, slow, flightless bird, 0.6 meters high that provided food for generations of sea travelers. It was easily killed for both its meat and its feathers, and as its numbers dwindled museums and private collectors paid more and more for each bird. The last two were killed on a small island off Iceland on June 2, 1844.

Activity 4

Answer the following questions using NO MORE THAN FOUR words for each answer.

1. Which marine birds return to shore to nest? _____
2. Which seabird finds food in groups? _____
3. Where can't gulls and terns be found? _____
4. Name two flightless birds. _____

Activity 5

Work as a pair. Find the answers from the text complete the table below. If there is no information in the text write NOT GIVEN.

Birds	Place where they live	Food they feed on	Place where they breed on
Albatross			
Penguins			
Pelicans			
Cormorants			
Gulls			
Puffins			

Writing

Activity 6

Work in groups. Write a short descriptive composition about a marine animal or land bird. Include information about their feeding, nesting, and other topics, as above.

Activity 7

Give your compositions a final check. Share your descriptive compositions with other groups.

Activity 8

Work in a group. Design your own table about marine animals or land birds, as given above and complete it.

Bonus Activity

Read the text and translate it into your own language.

Eagle

Eagle common name for large predatory birds of the family Falconidae (hawk family), found in all parts of the world. Eagles are similar to the buteos, or buzzard hawks, but are larger both in length and in wingspread (up to 7 1/2 ft/228 cm) and have beaks nearly as long as their heads. They are solitary birds, said to mate for life. The nest, or aerie, of twigs and sticks is built at a vantage point high in a tree or on a cliff in a permanent feeding territory and is added to year after year, the refuse of the previous nests decomposing beneath the new additions. Nests can become enormous, measuring up to ten feet across and weighing well over 1,000 pounds. The eaglets (usually two) do not develop adult markings until their third year, when they leave parental protection and seek their own mates and territories.

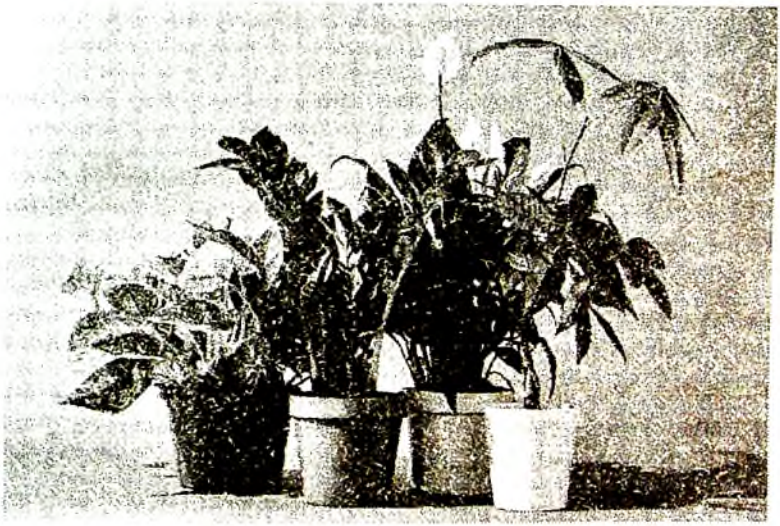
The American bald (in the sense of white, as in piebald), or white-headed, eagle (Haliaetus leucocephalus) is found in all parts of North America near water and feeds chiefly on dead fish (sometimes robbing the osprey 's catch) and rodents. It is dark brown with white head, neck, and tail plumage. The northern species (found chiefly in Canada) is slightly larger than the southern, which ranges throughout the United States. With only 417 known breeding pairs in the 48 contiguous states in 1963, the bald eagle population was dwindling alarmingly; a decade later they were placed on the endangered species list. In one of the greatest success stories in species recovery, conservation methods such as the banning of DDT and the prohibition against eagle hunting had by the beginning of the 21st cent. increased the breeding population in the lower 48 states to some 5,000 pairs. The bald eagle was removed

from endangered status in 1995 and is now classified as threatened.

The golden, or mountain, eagle (genus Aquila— whence aquiline, meaning eagle like) is widespread in the Northern Hemisphere, in the United States found mostly in the West. Unlike the bald eagle, it is an aggressive predator. In Asia it is trained to hunt small game (see falconry). The adult is sooty brown with tawny head and neck feathers; unlike those of the bald eagle, its legs are feathered to the toes. The gray and Steller's sea eagles (also in the genus Haliaetus) are native to colder areas of the Northern Hemisphere; the king or imperial eagle to S Europe and Asia; and the rare monkey-eating eagle to the Philippines. The harpy, or harpy eagle (Thrasyaetus harpyia), of Central and South America, the largest (38 in./95 cm long) of the hawks, eats macaws and sloths. It was named for the winged monsters of Greek myth and was called "winged wolf" by the Aztecs. New Zealand's extinct Haast's eagle, which had a 10-ft (3-m) wingspan and weighed 30% to 40% more than the harpy, was the top predator in the archipelago's ecosystem prior to the arrival of humans.

Eagles—impressive both in size and for their fearsome beauty—have long been symbols of royal power and have appeared on coins, seals, flags, and standards since ancient times. The eagle was the emblem of one of the Ptolemies of Egypt and was borne on the standards of the Roman armies and of Napoleon's troops. The American bald eagle became the national emblem of the United States by act of Congress in 1782.

UNIT 11
PLANTS



Opener

1. Write the names of ten plants that you know best and share them with your classmates.

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Reading and Speaking

2. Read the texts and discuss them in groups.

THREE PLANTS THAT CHANGED THE WORLD

Seeds of Change

History books are full of the ways in which the actions of men and women have changed the world, but what about

plants? Which plants have changed history? Henry Hobhouse, farmer and journalist, discussed this in his fascinating and illuminating book Seeds of Change.

TOBACCO

For thousand of years tobacco was used by the American Indians with no ill-effect. In the 16th century it was brought to Europe. This early tobacco was mixed with soil and rather dirty. It was chewed or smoked in pipes only by men – women thought it smelly and disgusting.

It was first grown commercially in America in the 17th century on slave plantations. In the 18th century new technology refined tobacco and the first cigarettes were produced. By the 1880s huge factories were producing cigarettes which were clean easy to smoke. Chain-smoking and inhaling became possible and by the middle of the 20th century tobacco addicts, both men and women, were dying of lung cancer in great numbers.

Nowadays cigarette smoking is banned in many places, especially in the USA. But until 1820 tobacco was America's main export, and still today their tobacco industry makes over $4.2 billion a year.

SUGAR

Sugar cane was grown in India thousands of years ago. In Roman times it was known in Europe as a great luxury, and it was rare and expensive for many centuries after that. In 1493 Columbus took sugar plant with him to the West Indies, where it grew so well that huge plantations were started by Europeans and worked on by slaves. The slaves were shipped across the Atlantic from Africa, packed sometimes one on top of the other in chains, on a journey that took six weeks. Many died. The empty ships then carried the sugar back to Europe. So much was made that sugar was known as "white gold".

Sugar is used to sweeten food and make sweets and chocolate. It is addictive but unnecessary. By the 16th century the English were the greatest sugar-eaters in history. Elizabeth I lost all her teeth because she ate so much of it.

COTTON

Cotton has been grown for over five thousand years in places as far apart as Mexico, China, Egypt, and India. It was first planted in America in 1607.Before 1800 cotton was a great luxury, more expensive than silk, because so many workers were needed to pick it. However, a huge increase in the number of slaves in the American South resulted in much greater cotton production and a fall in the price. This, and the new technology of the industrial revolution, made cotton the cheapest fabric in history. By 1820 cotton was making more money for the USA than tobacco, and more money worldwide than sugar.

The American Civil War of 1861-1865 was fought because the Southern States wanted to form a separate country, so that they could continue to keep slaves on their cotton plantations. Slavery was banned in the Northern States in 1808. 500,000 soldiers were killed in the war.

Writing

3. Write a description of a plant which can be found nearby of your house in 60-80 words.

Reading and Speaking

4. Read the text and do the tasks below.

Flowers

Flowers are a true gift from God. All of them are beautiful. One of life's pleasures is looking at flowers. If you look at them really closely, it's amazing just how beautiful they are. Their colours are so rich and deep. I don't know of anything in the world more red than a rose or more yellow than a tulip. Flowers seem to be a big part of every culture. People give flowers as gifts, arrange them in their houses, grow them in their gardens. Some people even name their daughters after flowers. I can't imagine how boring the world would be without flowers. I'm always coming across new flowers. Every time I travel to another country, I find lots of flowers I've never seen before. It must be nice to be a bee and spend all day flying from flower to flower.

5. Work in two groups and do the discussion exercise.

DISCUSSION (Write your own questions)

GROUP A's QUESTIONS (Do not show these to group B)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

DISCUSSION (Write your own questions)

GROUP B's QUESTIONS (Do not show these to group A)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

6. STUDENT FLOWERS SURVEY

Write five GOOD questions about flowers in the table. Do this in pairs. Each student must write the questions on his / her own paper.

When you have finished, interview other students. Write down their answers.

	STUDENT 1	STUDENT 2	STUDENT 3
Q.1.			
Q.2.			
Q.3.			
Q.4.			
Q.5.			

- Now return to your original partner and share and talk about what you found out. Change partners often.
- Make mini-presentations to other groups on your findings.

FLOWERS POSTER Make a poster about flowers. Show it to your classmates in the next lesson. Give each other feedback on your posters.

7. VOCABULARY EXTENSION: Choose several of the words from the text. Use a dictionary or Google's search field (or another search engine) to build up more associations / collocations of each word.

8. INTERNET INFO: Search the Internet and find more information about flowers. Talk about what you discover with your partner(s).

9. Write about flowers. Show your partner your paper. Correct each other's work.

10. MAGAZINE ARTICLE: Write a magazine article about flowers. Read what you wrote to your classmates in the next lesson. Give each other feedback on your articles.

UNIT 12
Nature and people

Opener

1. How much do you know about the nature? Do the quiz and find out.

1. The longest river in Great Britain is

a) The Thames
b) The Severn
c) The Tyne

2. The Salt Lake is in

a) South America
b) Northern Asia
c) North America

3. The koalas live in

a) Australia
b) all over the world
c) South Asia

4. The highest mountain in the world is

a) Mount Etna
b) Mount Everest
c) Mount Kilomanjaro

5. A lizard is a / an

a) bird

b) insect

c) reptile

Reading and Speaking

2. Discuss the questions in a group.

1. How much of the Earth's land is desert?

2. Are deserts as hot at night as they are in the day?

3. What's the largest desert in the world?

4. What do we mean by ecotourism in a desert?

5. Can new deserts form?

6. Where is the Kalahari desert ?

3. Read the following article.

People can live and grow crops in the desert only at oases – places where they can get water. The water comes from a great distance and flows under the desert, sometimes reaching the surface as springs that flow through cracks in the rock. Shallow wells can reach the water in some areas but usually it lies far deeper below ground than in humid lands. Oases are most commonly found where wadis (watercourses which are dry for most of the year) are numerous. Sometimes deep wells have to be dug to reach any water at all.

Rivers that rise in rainy regions outside deserts bring the most generous supply of water for irrigation. All the large deserts, except those in Australia, are crossed by such rivers. Two of the largest and best known are the Nile in North Africa and the Indus in Asia. Large-scale dams are sometimes built across huge rivers and the resulting irrigation permits wide cultivation. Desert soils are usually productive when given water, and irrigation change desrt regions into green and fertile land.

(Adapted from Move ahead by Deirdre Howard-Williams, Workbook 3, Macmillan Publishers Limited, 2006.)

4. Look at these statements about deserts. Underline any false ones and correct them.

a. There are streams flowing under all the world's deserts.

b. The water under deserts can only be reached by deep wells.

c. Once there is water, it is possible to grow plentiful crops in the desert.

d. Dams are dug deep into the ground to find water.

e. Rivers start in deserts and flow into springs.

5. Use words from the passage to fill the spaces.

a. In the jungle the air was uncomfortably hot and _____.

b. She found a _____ in one of her teacups and had to throw it away.

c. On the camping trip, we all had to carry our own _____ of food.

d. The valleys were so _____ that the farmers had two crops every year.

e. There was a complicated _____ system to get enough water to the rice fields.

f. Judith was such a _____ person that she paid for everyone's ticket to the cinema.

g. The stream was _____ so she could cross it without having to swim.

Writing

6. In your notebook, write the ways the desert can be irrigated and combine them into one or two sentences (of not more than thirty words) to give a short summary of the passage.

Reading / Gapped text

7. Read the text quickly. Find out:

1. when John first became interested in wildlife.
2. how people at school felt about his career choice.
3. what John does for a living.
4. how much he enjoys his career.

8. Read the missing sentences A - G, then read the text again. Choose the sentence which best fits each gap 1-6. There is an extra sentence that you do not need.

A. The information also helps to work out ways of protecting the environment in which they live.

B. He was advised to study tigers during university holidays and to get a more lucrative job at a later stage.

C. Holding a 5-week-old cub in his arms is a memory he cherishes more than anything.

D. Reading through it, he came across a course called Wildlife Biology.

E. It was pointed out to him that this was by no means an easy way of making a living.

F. Fishing, hiking and cross-country skiing became his hobbies.

G. It was this that first inspired him to study large predators like bears, leopards and lions.

Wild about wildlife

John was born a biologist. Some of his earliest memories are of watching and interacting with the wild inhabitants of the natural world. When he was just two years old, John remembers digging up animal tracks in the mud so he could take them home. As he grew up, he spent most of his time

outdoors. He remembers the fascination of watching tadpoles turn into frogs in the garden pond. ____ **1**

When he was at school, John didn't feel that any of the lessons connected with his interest in nature. He didn't even know there were careers in wildlife until he was looking through a university prospectus. _____**2** There was no question in John's mind about what he was going to study when he left school.

Many teachers, including his careers advisor, strongly discouraged the idea. _____**3** But John wasn't concerned about money and while at the present moment he may not have enough to buy everything he wants, he has enough to buy the things he needs.

His parents, however, supported his choice. Indeed, they had always encouraged his love of the wild, and had once given him a book about a scientist working on wolves. _____**4** And so when he was offered a job studying Siberian tigers in the frozen forests of Russia, it was almost beyond his wildest dreams.

Jonh's work involves studying wild carnivores – Siberian tigers, brown bears, Asiatic black bears, Eurasian lynx – in the wilds of the Russian Far East. He uses the information he collects to help develop conservation strategies for these animals. _____**5**

In the field, Jonh spends most of his time radio-tracking tigers and occasionally interacting with these magnificent animals. _____**6** Knowing that he is helping save a place in the future for these animals is deeply satisfying. In fact, these things are worth much more to Jonh than the money a different career might have brought him.

9. Find words or phrases in the text and missing sentences that mean:

1. discover or calculate (missing sentences)
2. found by chance (missing sentences)
3. pastimes (missing sentences)
4. worried (paragraph 3)
5. more than he could hope for (paragraph 4)
6. pleasing (paragraph 6)

(Adapted from Build up to Count down by Jenny Quintana, Oxford University Press 2007)

UNIT 13
THE NATURAL WORLD

Opener

Look at these quotes from an American Indian Chief speaking over 140 years ago.

`Only when the last tree has died and the last river been poisoned and the last fish been caught will we realize that we cannot eat money.`

`The Earth does not belong to us: we belong to the Earth. And all things are connected. Whatever happens to the Earth, happens to us. We did not weave the web of life. We are only a strand in it. Whatever we do to the web, we do to ourselves.`

What does he mean by "web of life"? When he says "we cannot eat money", what is he implying about our attitude towards the environment? Do you agree with the Chief's ideas on the environment and our relationship with it?

(Adapted from "Word Wise" by Martin Seviour, 1997)

Reading

Activity 1

a) Read the text and missing paragraphs quickly. What two types of volcanoes are described in the text?

b) Read the text again. Choose from the paragraphs A-E, the one which fits each gap 1-4.

Fire and Nature

An erupting volcano is probably the most terrifying sight in nature, yet it's estimated that there are over 1500 'active' volcanoes on the surface of the earth and that one in ten of the world's population have homes near them.

(0) C

Super volcanoes are the most dangerous volcanoes. They are much bigger than ordinary volcanoes and they lie under the ground. They cover enormous areas of land and are an amazing sight, with hot water and steam boiling out from thousands of springs and holes.

(1) __

The last eruption of a super volcano was exactly like this. It happened 74,000 years ago in Sumatra and created a world disaster. Scientists believe that only a few thousand people survived.

(2) __

Submarine volcanoes are another type of volcano that lie deep beneath the sea. Scientists don't know very much about them, but they do know there are more volcanoes in the sea than there are on land. Thousands of active submarine volcanoes have already been discovered, and scientists believe they will find thousands more. But how dangerous are they when they erupt?

(3) __

A very famous underwater eruption happened in 1963. When Surtsey near

Iceland erupted, the explosion was so big that rock emerged from the sea and became an island.

(4) __

Thankfully, as technology improves, scientists can learn more and more about volcanoes. They may not be able to stop an eruption, but at least they can warn us when one is likely to happen.

A

This could easily happen again. Today, one of the most treacherous submarine volcanoes is called Kick 'em Jenny. This volcano which is located in the Caribbean, has already had many small eruptions and it is getting closer to the surface of the sea.

B

If one of these super volcanoes erupts it won't be like any volcano we've ever seen. The explosion will be heard around the world. The sky will become dark and it will be very, very cold. Black rain will fall and the weather will change completely.

C

Most of these active volcanoes are formed by rock that rises deep from within the earth to form a mountain. However, there is another type of volcano on the surface of the earth which is called a super volcano.

D

When volcanoes erupt in deep water, the weight of the water prevents an explosion. However, as a volcano grows and gets closer to the surface, there is a huge explosion which sends rock and steam out of the ocean.

E

Will such a huge eruption happen again? The largest super volcano is in Yellowstone Park in America. Scientists believe that it erupts around every 600,000 years. The last eruption was 640,000 years ago ... But don't worry! Scientists think that by the time the explosion happens, the volcano will have given many warnings.

(Adapted from Build up to Count down by Jenny Quintana, Oxford University Press 2007)

Activity 2

a) Match the words from the text to the definitions.

1. surface (line 2)	**a.** came out
2. emerged (line 21)	**b.** dangerous
3. treacherous (line 28)	**c.** goes up
4. rises (line 38)	**d.** stops something from happening
5. prevents (line 42)	**e.** the outside part of something

b) Match the volcanic words to the definitions.

1. steam (line 7)	**a.** alive and working
2. springs (line 8)	**b.** it's produced by boiling water
3. erupts (line 33)	**c.** places where water comes naturally from the ground
4. active (line 37)	**d.** explodes and throws out fire and rock

Speaking and reading

Activity 3

How much do you know about the natural world? Do the quiz and find out.

1. The longest river in the world is

A. the Nile.

B. the Amazon.

C. the Mississippi.

2. Mount Etna is a volcano in

A. Spain.

B. Italy.

C. Greece.

3. A penguin is a / an

A. bird

B. animal

C. reptile.

4. Caretta turtles live in

A. Iceland.

B. Greece.

C. Japan.

5. There ISN'T a rainforest in

A. South America.

B. Australia.

C. Europe.

6. The only land mammals at the South Pole are

A. visiting scientists.

B. polar bears.

C. camels.

7. The ___ Sea is so salty that fish can 't live in it.

A. Mediterranean

B. Dead

C. Red

8. Ayers Rock is in

A. Australia.

B. France.

C. China.

Scores

7-8 Excellent! You know a lot about nature.

5-6 Good! You could learn more on the internet.

3-4 Not very good! Watch more nature programmes.

1-2 Oh dear! Buy an encyclopaedia!

Think of three more questions about the natural world and ask a partner.

(Adapted from Build up to Count down by Jenny Quintana, Oxford University Press 2007)

UNIT 14
INTERNATIONAL ORGANIZATIONS

Opener

1. Answer the questions below.

1. What international organizations do you know?

2. Which organizations aim to work with human health and ecological problems?

3. What international organizations are functioning in Uzbekistan?

Speaking, Writing, Reading and Vocabulary

2. There are many international non-governmental organisations (NGOs) working in Uzbekistan. They cooperate with the Government in various fields of social and economic development. With a partner write the names of oganisations you know. For each one write its full name and a brief description of the kind of work it does here in Uzbekistan.

_____

_____

_____

3. One aspect of the work of international organisations in Uzbekistan is the organization of important meeting and conferences. Below are extracts from newspaper reports about three international conferences. Read the extracts and then complete the table below.

A The conference "Privatisation in Uzbekistan", organised jointly by UNDP and UNIDO and supported by the Swiss Government, was held in Geneva from 26-27 October 1995. It provided a forum for leading western businessmen to assess the progress now being made in Uzbekistan, to meet with Uzbek officials, and to hear first hand from major investors including Daewoo, Coca-Cola and others. Over 200 delegates representing about 100 firms, banks and international organisations took part. The keynote address was given by the Deputy Prime Minister of Uzbekistan and there were important speeches from representatives of the United Nations and the World Bank. Over 20 agreements were signed during the conference.

B An international conference on the development of disabled children was held in Tashkent from 13-15 December 1995. The conference was jointly sponsored by the Disabled Society of Uzbekistan and the British NGO Save the Children Fund. The meeting brought together representatives of organisations working with disabled children from all the Central Asian states as well as from Britain, India and several other countries. In plenary sessions delegates had the opportunity to discuss important questions, exchange

experiences on their work with disabled children and listen to several keynote speakers. Separate working groups drafted a series of recommendations to be put to the Ministry.

C A second international meeting on the Aral Sea Basin was held in Paris on 23-24 June 1994, under the auspices of the World Bank, the UNDP and UNEP. The meeting was attended by delegations from the Aral Sea Basin states as well as several other governments and international agencies. The efforts of NGOs in tackling the Aral Sea disaster were warmly recognised by all participants. Donors were strongly encouraged to provide humanitarian assistance urgently, in particular to meet the immediate need for clean water and medicines. In response, donors pledged $31 million towards the funding of the first phase of a programme of assistance and agreed to cooperate closely in supporting the implementation of projects.

	A	B	C
Topic of conference			
Organisers			
When held			
Where held			
Who attended			
Main result			

4. Look at the underlined words in the extracts. If you are not sure of their meanings try to work them out by looking for clues in the context. Then check in a good dictionary.

5. The following verbs are often used when describing the work of international organisations. Match the verbs with the definitions on the right.

1. to administer	a. to begin something which may become permanent
2. to promote	b. to provide with money
3. to cooperate	c. to put a plan into action
4. to establish	d. to work together with others
5. to implement	e. to manage something
6. to fund	f. to encourage pr support something

Reading

5. Read the text for scanning paying attention to the words in bold.

United Nations International Children's Emergency Fund

United Nations Children's Fund (or **UNICEF**) pronounced was created by the United Nations General Assembly on December 11, 1946, to provide **emergency** food and healthcare to children in countries that had been **devastated** by World War II. In 1953, UNICEF became a **permanent** part of the United Nations System and its name was shortened from the originated United Nations International Children's Emergency Fund but it has continued to be known by the popular **acronym** based on this old name. Headquartered in New York City, UNICEF provides long-term humanitarian and developmental **assistance** to children and mothers in developing countries.

UNICEF relies on **contributions** from governments and private donors and UNICEF's total **income** for 2006 was $2,781,000,000. Governments contribute two thirds of the organization's resources; private group and some 6 million individuals contribute the rest through the National Committees. UNICEF's programs **emphasize** developing

community-level services to **promote** the health and well-being of children. UNICEF was awarded the Nobel Peace Prize in 1965 and the Prince of Asturias Award of Concord in 2006.

UNICEF National Committees

There are National Committees in 36 industrialized countries **worldwide**, each established as an independent local non-governmental organization. The National Committees serve as the public face and dedicated voice of UNICEF, raising funds from the private sector, promoting children's rights, and securing worldwide **visibility** for children threatened by poverty, disasters, armed conflict, **abuse** and **exploitation**.

UNICEF is funded exclusively by **voluntary** contributions, and the National Committee, collectively **raise** around one-third of UNICEF's annual income. This comes through contributions from corporations, civil society organizations and more than 6 million individual donors worldwide. They also **rally** many different partners – including the media, national and local government officials, NGOs specialists such as doctors and lawyers, corporations, schools, young people and the general public – on issues related to children's rights.

Vocabulary

6. Write translations of the words in the box and make up sentences using them.

United Nations Children's Fund (or UNICEF)
emergency devastated permanent assistance contributions income emphasize promote worldwide visibility exploitation abuse voluntary raise rally

7. Answer the following questions.

1. Whom and when was UNICEF created by?
2. What is the main function of UNICEF?

3. When did UNICEF become permanent part of the UNO?

4. When was UNICEF awarded the Nobel Peace Prize and the Prince of Asturias

Award of Concord?

5. What service do the National Committees serve?

6. How does UNICEF get its fund?

Grammar Practice

8. Rewrite the following sentences using a passive form. You also need to decide whether or not the agent should be mentioned.

1. People celebrate international Women's day on March each year.

.....

2. UNESCO recently organised a conference on Uzbekistan's national monuments.

.....

3. TACIS funds hundreds of projects in the agricultural and business sectors.

.....

4. In Britain people do not elect their head of state.

.....

5. Peace Corps volunteers teach thousands of students around the country.

.....

6. Save the Children Fund is distributing vitamin tablets in Karakalpakstan.

.....

7. Engineers are constructing a new metro line in Tashkent.

.....

8. The OSCE has monitored elections in many countries.

.....

9. The BBC has recently published an English textbook for Uzbekistan called 'One to One'.

.....

9. VOCABULARY EXTENSION: Choose several of the words from the text of this unit. Use a dictionary or Google's search field (or another search engine) to build up more associations / collocations of each word.

10. INTERNET INFO: Search the Internet and find more information about international organisations. Talk about what you discover with your partner(s).

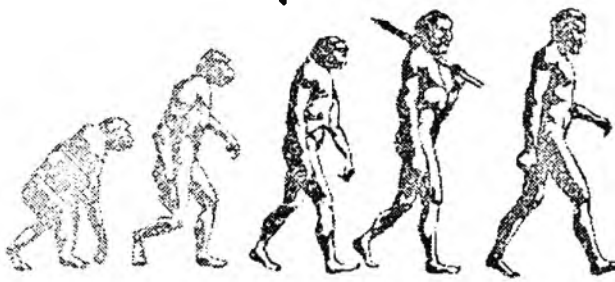
Writing

11. Search the Internet and write a short paragraph about WORLD HEALTH ORGANIZATION.

12. International organisations poster. Make a poster about international organisations. Show it to your classmates in the next lesson. Give each other feedback on your posters.

UNIT 15

The Theory Of Evolution



Opener

1. Answer the questions below.

1. Who invented the theory of evolution?
2. What is the importance of the theory in our life?
3. Do you agree with the theory? Why? Why not?

Reading

2. Read the text for scanning.

The mechanism of evolution.

Evolution is not a modern concept. Since ancient times, a number of philosophers and naturalists (including Confucius and Aristotle in Greece) have suggested that complex species evolve from simpler pre-existing ones by a process of continuous and gradual change. However, it was not until the 19thcentury that scientists came up with plausible mechanisms for evolution. The mechanism that is widely accepted among biologists today is called neo-Darwinism. It is modern theory based on the work of the nineteenth- century naturalist Charles Darwin.

Between 1831 and 1836, Darwin was the naturalist on board HMS Beagle, a research vessel engaged in mapping

different parts of the world. After spending over three years surveying the coast of South America, the Beagle landed on the Galapagos Islands in the Pacific Ocean. Darwin compared the organisms on these islands with those on the South American mainland, and this led him to develop his theory of evolution. He came to the conclusion that, over successive generation, a new species comes into being by slow and gradual changes from a pre-existing one. He believed that these changes are brought about by a process which he called natural selection.

Darwin's theory was based on three main observations:

1. Within a population are organisms with varying characteristics, and these variations are inherited (at least in part) by their offspring.

2. Organisms produce more offspring than are required to replace their parents.

3. On average, population numbers remain relatively constant and no population gets bigger indefinitely.

From these observations, Darwin came to the conclusion that within a population many individuals do not survive, or fail to reproduce. There is a "struggle for existence". For example, members of the same population compete to obtain limited resources, and there is a struggle to avoid predation and disease, or to tolerate changes in environmental conditions such as temperature. In this struggle for existence those individuals that are best adapted to their environment will have a selective advantage: they will be more likely to survive and produce offspring than less well-adapted organisms.

3. Answer the following questions. Use all information given before:

1. How does the evolution usually take place?

2. What led Charles Darwin to develop his theory of evolution?

3. What did Darwin mean by "natural selection"?
4. What are three main observations of Darwin's theory?
5. What does "struggle for existence" mean?
6. What book has been called the most important biology book ever written?
7. Do the majority of biologists accept Darwin's theory?
8. What is called neo-Darwinism?

4. Match the sentence halves. Make complete sentences:

1.	According to most biologists, the millions of species living on Earth today	A.	is called neo-Darwinism.
2.	Evolution happens	B.	than are required to replace their parents.
3.	The mechanism that is widely accepted among biologists today	C.	to support his theory and refined his ideas.
4.	Organisms produce more offspring	D.	which underpins much of modern biology.
5.	Members of the same population compete	E.	are descended from other species that inhabited the world in the past.
6.	For more than 20 years, Darwin collected evidence	F.	come about by random and spontaneous changes in genes.
7.	Evolution by natural selection has become a central theme	G.	to obtain limited resources.
8.	The variations that are so important in natural selection	H.	when the genetic composition of a population changes over successive generations.

5. Use monolingual English dictionary and write down what could the words given below mean:

change, naturalist, complex, to escape, to collect, humans.

6. Match these words with their definitions:

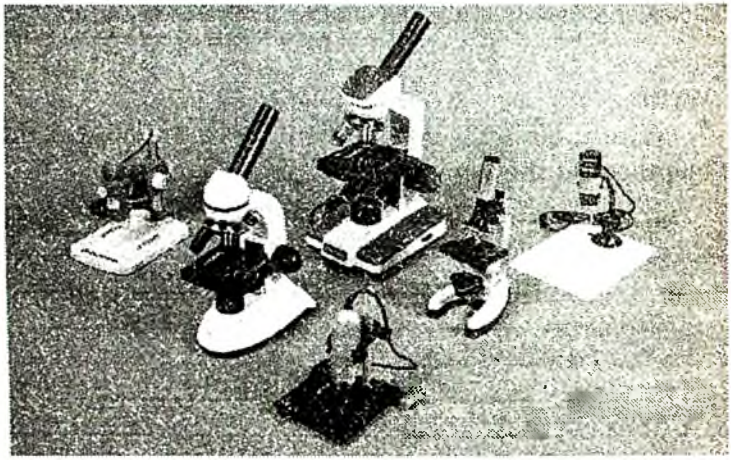
1	generation	A.	an illness or unhealthy condition in your body
2	evolution	B.	the air, water and land in which people, animals and plants live
3	evidence	C.	a member of your family who lived a long time ago
4	reproduce	D.	the careful choice of a particular person or thing from among a group of similar people or things
5	species	E.	to continue to live or exist
6	survive	F.	to change into a larger, stronger, or more advanced state
7	ancestor	G.	to produce young animals from parents of different breeds or groups
8	develop	H.	all the members of a group of things which have been developed from a previous group
9	naturalist	I.	an animal's baby or babies
10	environment	J.	the state of existing
11	selection	K.	the gradual change and development
12	disease	L.	to produce young animals or plants
13	interbreed	M.	someone who studies plants or animals, especially outdoors

14	offspring	N.	facts that make you believe that something exist or is true
15	existence	O.	a group of closely related organisms

Writing

7. Write about a theory you think that contributed the development of the humanity.

UNIT 16
TYPES OF MICROSCOPES



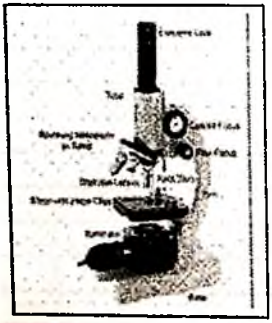
Opener

1. Answer the questions.

1. Who invented a microscope?
2. What types of microscopes are used today?

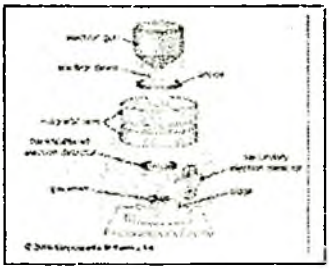
Reading and Vocabulary

2. Read the given text and make your essential assignments:



A microscope is used to produce a magnified image of an object or specimen. Anton van Leeuwenhoek (1632-1723) was the first to invent a microscope powerful enough to explore the world of microbes. His discoveries stimulated an explosion of interest in the scientific use of microscopes. Since the 18th century many new types have been invented, of

which the most commonly used today are the compound light microscope and the electron microscope.



The transmission electron microscope

The TEM is used to study the details of the internal structure of cells. Extremely thin samples of the specimen are needed. To make these the specimen is supported in a resin block to prevent in collapsing during cutting, and is sliced with a diamond or glass knife. The section is then impregnated with a heavy-metal stain, such as osmium tetroxide.

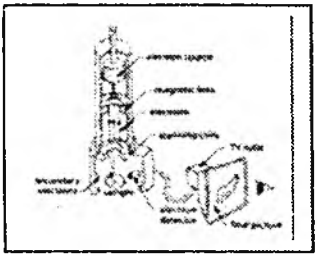
As the beam passes through the specimen, electrons are absorbed by heavily stained parts but pass readily through the lightly stained parts. Electromagnets bend the electron beam to focus an image onto a fluorescent screen or photographic film. Photograph taken through an electron microscope is called an electron micrograph.

The most modern TEMs distinguish objects as small as 0.2nm. This means that they can produce clear images magnified up to 250 000 times. The magnification is varied by changing the strength of the electromagnets.

The scanning electron microscope

The SEM is used to produce three-dimensional images of the surface of specimens. Electron are reflected from the surface of a specimen stained with a heavy metal. This enables the SEM to produce images of whole specimens: cells, tissues, or even organisms.

Although electron microscopes have revolutionized cell biology, they have not completely replaced light microscopes.



Light microscopes are used to examine living and unstained specimens. Preparation of specimens for electron microscopy is complicated and time-consuming. Electron microscopes are very expensive and can be used only to study dead specimens stained with heavy metal, which might well produce artifacts.

1. How is the magnification varied in:

a) a light microscope

b) an electron microscope?

2. Why is the resolving power of an electron microscope so much better than of a light microscope?

3. What is the approximate size of the smallest structure that can be observed with a light microscope?

3. Fill in the missing words:

Term (verb)	Noun	Adjective
magnify	.....	.....
multiply	.....	.....
reflect	.....	.....
absorb	.....	.....
prevent	.....	.....

4. Use monolingual English dictionary and write down what could the words given below mean:

microscope, to refract, magnification, sample, ray.

5. Match these words with their definitions:

1	beam	A.	a piece of curved glass which makes things look bigger or smaller
2	toinvent	B.	the power of a microscope to give a clear picture of things, or a measure of this
3	eyepiece	C.	to change the position of the lens on a microscope so that you can see something clearly
4	lens	D.	to make a substance spread completely through something
5	resolution	E.	a shining line of light from the sun, a lamp
6	to focus	F.	a picture of a subject in a mirror or in the lens of a camera
7	specimen	G.	easily noticed
8	to impregnate	H.	to make, design, or produce something new for the first time
9	image	I.	made up of two or more parts or substances
10	apparent	J.	a small amount or piece of something that is taken from a plant or animal, so that can be tested or examined
11	compound	K.	the glass piece that you look through in a microscope

Speaking

6. Answer the following questions. Use all information given before:

1. What are microscopes used for?
2. What types of microscopes are most commonly used today?
3. What is a compound light microscope?
4. What does the magnification of an instrument depend on?
5. How do electron microscopes differ from compound light microscopes?
6. What are the main types of electron microscopes?
7. What is the difference between the transmission electron microscope and the scanning electron microscope?

7. Match the sentence halves. Make complete centences:

1.	A microscope is used	A.	a light microscope or optical microscope.
2.	Since the 18th century many new types have been invented, of which the most commonly used today are	B.	they have not completely replaced light microscopes.
3.	The compound light microscope is also called	C.	in the apparent size of the object.
4.	The compound light microscope is also called	D.	the transmission electron microscope and the scanning electron microscope.
5.	The magnification of an instrument is the increase	E.	the compound light microscope and the electron microscope.
6.	Light microscopes can magnify objects up to	F.	a beam of light.

7.	Electron microscopes use a beam of electrons instead of	G.	to produce a magnified image of an object or specimen.
8.	There are two main types of electron microscopes:	H.	a light microscope or optical microscope.
9.	Although electron microscopes have revolutionized cell biology,	I.	about 1500 times without losing clarity.

8. Read and translate the short text without any dictionary:

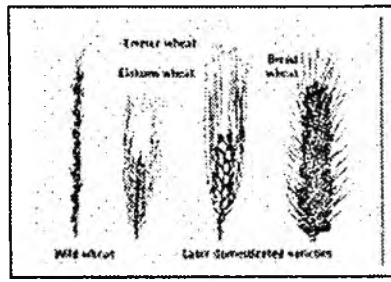
Fact of life:

A new microscope, called a scanning tunneling microscope, was invented in 1980. It measures surface features by moving a sharp probe over the object's surface. It can achieve magnifications of 100 million, allowing scientists to view atoms on the surface of a solid. This type of microscope is likely to have a major impact on biology. Recently, it has been used to view DNA directly.

Writing

9. Write a short paragraph about your first experience with microscope.

UNIT 17
ARTIFICIAL SELECTION



Opener

1. In a small group discuss the current problems associated with the artificial selection and then try and answer the following questions:

1. How do you understand artificial selection?
2. Do you have any ideas about how wheat cultivation began?
3. Can you explain the difference between inbreeding and outbreeding?

Reading, Vocabulary and Speaking

2. Read the given text and make your essential assignments:

The cultivation of wheat

Ever since farming began in the Middle East about 10 000 years ago, humans have been breeding animals and plants selectively to produce specific desirable qualities. Wheat was probably among the first crop to be cultivated. By selective breeding over thousands of generations, wild wheat has been converted into the modern types which produce much higher yields. In selective breeding, particular individuals are chosen and allowed to breed, whereas others are prevented from

breeding. This means that alleles that give characteristics favoured by humans are retained, while those that give undesirable characteristics are eliminated. Artificial selection is therefore similar to directional selection, in that selection pressure brings about a gradual change in the genotype of a group of organisms. However, in artificial selection it is humans, not environmental factors, that act as the selection pressure, gradually bringing about changes in allele frequencies.

We can only speculate as to how wheat cultivation began. Perhaps people who gathered wild seeds for food observed that seeds spilled accidentally sprouted new plants from which more seeds could be harvested. This might have encouraged them to save some seeds to sow for the following season's crop.

Wild wheat sheds its grains as soon as they are ripe.

This makes harvesting difficult. Therefore, grains were most likely to be gathered from plants that by chance retained their grains a little longer. By using this grain for the next crop, farmers would inadvertently have started the process of selective breeding.

The next stage in the cultivation of wheat would have been the deliberate selection of varieties with desirable qualities. Early farmers appear to have selected grains from plants which gave the greatest yield, and produced grain which was easy to separate from its husk. Eventually, over many generations, the variety of cultivated wheat changed. This led to the ancestor of our modern wheat, in which the grains are held so firmly that they must be removed by a separate operation after harvest. Selective breeding of wheat continues today by a combination of inbreeding and outbreeding.

Inbreeding involves breeding between closely related individuals which by chance, possess some desirable character. In wheat, desirable characters include:

· high yield

· short stem length (allowing the plant to devote more energy to the production of seeds, which have a much higher value than straw from stems)

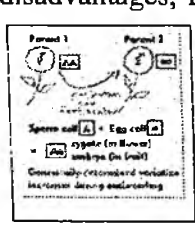
· pest resistance (for example, to fungal moulds and rusts)

· high protein content of the grain.

Inbreeding is carried out to try and retain the desirable characters in future generations. Wheat plants are particularly suitable for selective breeding because they self pollinate naturally. They are unlikely to cross fertilise without the intervention of the plant breeder.

Inbreeding allows a farmer to produce a uniform crop which is easy to harvest and has, given certain conditions, predictable characters. However, this uniformity of characters is at the expense of genetic diversity may be reduced to such an extent that every individual has identical alleles (a condition known as complete homozygosity). Such a wheat strain cannot be changed because there are no other alleles present that could produce genetically different plants. Another problem is that if genetically identical plants are exposed to new diseases to which the plants have no resistance, all the plants may be killed.

Similar techniques of selective breeding have been used to develop domestic and farm animals. Although complete homozygosity has not been reached in any animals, inbreeding increases the risk of a harmful recessive allele occurring in the homozygous condition and being expressed. Because of these disadvantages, inbreeding is not carried out indefinitely. New alleles are introduced by outbreeding with other stock.



Outbreeding involves crossing individuals from genetically distinct strains. The offspring from such a cross are called hybrids. If the parental stocks are pure

breeding, the offspring are called F1 hybrids. F1 hybrids often have characters, such as grain yield in wheat, which are superior to the characters in either parent. This phenomenon is called hybrid vigouror heterosis. Hybrid vigour probably results from an increased heterozygosity arising from the mixing of alleles. Harmful recessive alleles are less likely to be present in the homozygous condition. Hybrid vigour is also thought to result from some form of interaction between particular combinations of alleles in the hybrid. Whatever the explanation of hybrid vigour, if the descendants of F1 hybrids are continually inbred, the vigour decreases as the plant become more homozygous again.

Outbreeding depends on the availability of genetically distinct animals and plants. It is therefore important to maintainsources of genetic diversity. This may be done by maintaining seed banks of old or wild varieties of plants (the genetic diversity of wheat, rice, cabbages, and carrots is maintained in this way). Also, adults of old varieties of animals and plants with little or no commercial value may be maintained as a source of new alleles for future breeding programmes.

3. Quick check:

1. Which type of natural selection does artificial selection resemble?

2. Give two possible explanations of hybrid vigour in plants produced by a cross between two different strains of pure-breeding plants.

4. Fill in the missing words:

Term (verb)	Noun	Adjective
suit	.....	.....

resist	.....	.....
interact	.....	.....
value	.....	.....
cultivate	.....	.....
desire	.....	.....

5. Use monolingual English dictionary and write down what could the words given below mean:

breeding, desirable, seed, cultivation, stem, crop.

6. Match these words with their definitions:

1	decrease	A.	the seeds of crops
2	modern	B.	living in natural state, not changed or controlled by humans
3	famine	C.	the preparation and use of land for growing crops
4	yield	D.	to go down to a lower level
5	grain	E.	happening because someone has made it happen and not as a part of a natural process
6	hybrid	F.	physical and mental energy
7.	domestic animal	G.	breeding between closely related individuals
8.	wild	H.	time belonging to the present time
9.	cultivation	I.	to plant seeds on a piece of ground
10	artificial	J.	to produce crops, profits
11	vigour	K.	a thing, place activity, etc. that you get

			something from
12.	pollinate	L.	an animal or plant produced from parents of different breeds or types
13.	inbreeding	M.	an animal lives on a farm or in someone's home
14.	sow	N.	no food for a long time and many people or animals die
15.	source	O.	to make a flower or plant produce seeds by giving it pollen

7. Find synonyms among the pool of words:

Pool of words	Synonyms
1)1.harvest /2.stock /3.crop /4.yield /5.strain /6.breed	
2) 1.seed /2.vigour /3.strength /4.grain	
3)1.retain /2.sow /3.decrease /4.keep /5.plant /6. reduce	
4) 1.distinct /2.diversity /3.different /4.variety	

8. Answer the following questions. Use all information given before:

1. How long have humans been breeding animals and plants selectively to produce specific desirable qualities?
2. What does selective breeding mean?
3. What type of natural selection is artificial selection similar to?
4. Describe how wheat cultivation began?
5. What does inbreeding involve?
6. Why is inbreeding carried out?
7. What does outbreeding involve?
8. How is the offspring from outbreeding called?
9. What is called hybrid vigour?

9. Match the sentence halves. Make complete sentences:

1.	Artificial selection is therefore similar to directional selection, in that selection pressure brings about	A.	to try and retain the desirable characters in future generations.
2.	In selective breeding, particular individuals are chosen and allowed	B.	closely related individuals which by chance, possess some desirable character.
3.	Inbreeding involves breeding between	C.	crossing individuals from genetically distinct strains.
4.	Inbreeding is carried out	D.	to breed, whereas others are prevented from breeding.
5.	Outbreedinginvolves	E.	a gradual change in the genotype of a group of organisms.
6.	If the parental stocks are pure breeding,	F.	the vigour decreases as the plant become more homozygous again.
7.	If the descendants of F1 hybrids are continually inbred,	G.	on the availability of genetically distinct animals and plants.
8.	Outbreeding depends	H.	the offspring are called F1 hybrids.

10. Read and translate the short text without any dictionary:

Fact of life:

With the advent of genetic engineering. Artificial selection has entered a new phase. It is now possible to breed clones of

cattle and sheep which have genes for producing specific human proteins. What is more, nuclei of two different species can be combined to form a completely new type of animal. In this way, a hybrid that combines the characters of a sheep and a goat has been formed: this new species has been dubbed a "geep" by the popular press. Plants can also genetically engineered to incorporate characters of a number of different species, for example, potatoes with a high starch content and high productivity can be genetically engineered to produce the beta-carotene of green vegetables and the vitamins of citrus fruits. One day it might be possible to design foods on a computer by choosing characteristics from a palette of tastes, colours, textures, and nutrients.

Food for thought:

The dog is thought to have been the first domesticated animal. For at least 12 000 years, it has been subjected to artificial selection. Dogs have been bred to do specific types of work (for example, Labrador retrievers for retrieving fishing gear, Old English sheepdogs for rounding up sheep, and poodles for retrieving ducks) or for show. Suggest why pedigree dogs bred for show tend to have more genetic disorders than mongrels and cross-breeds (for example, highly inbred pedigree Labradors often have hip problems, St Bernards suffer eye problems, and Pekineses often have respiratory problems).

Writing

11. Search the Internet and write a short paragraph about artificial selection.

SUPPLEMENTARY READING

Texts for Reading, Retelling and Discussing

■ Text 1. Louis Pasteur

Pasteur (1822-1895) began his scientific career as a chemist, but it is because of his applications of germ theory to the prevention of disease that he became known as 'The Father of Microbiology'.

Pasteur did not create germ theory, but he proved it to be correct. Once he had achieved this, he set about finding ways to prevent germs, the microorganisms present in the air, from infecting food and people.

He completed his famous experiment proving that microorganisms were present in the air while working for a wine company. He was trying to discover why wine sometimes went bad as it was being made. Once he had found the cause – microorganisms – he began to develop the process which carries his name – pasteurization. It was perfectly possible to kill all the microorganisms in food by boiling it, a process known as sterilization, but this damaged the taste and the quality of the food. Pasteur's process killed not all, but most, of the microorganisms, with the result that the food needed to be kept cool and eaten or drunk within a limited time. Most importantly, the quality of the food was not harmed by the process. Much of the food we eat today is pasteurized.

His next achievement was to build on the discovery of the British scientist Edward Jenner. Many years earlier, Jenner had discovered a way of giving people resistance to the deadly disease smallpox, by injecting them with a similar disease that was found among cows. The process became known as vaccination. Pasteur applied germ theory to his work and

looked at samples of blood taken from healthy and infected animals.

He grew bacteria in his laboratory and used it to infect animals. By chance, some of these germs failed to grow well in his laboratory; these weak germs were then used to infect some chickens. Although the chickens suffered at first, they made a complete recovery and could not be infected again. In this way he discovered a way of increasing resistance to disease. Pasteur developed vaccines for many serious diseases including cholera and anthrax. At that time, these illnesses were certain death for anyone who caught them.

Pasteur's discoveries revolutionized work on infectious diseases. Pasteur's vaccines were different from Jenner's in one important way. Jenner found a weak form of smallpox and transferred it to humans. Pasteur weakened the disease in a laboratory and immunized people with that weakened form. His success allowed a colleague to develop the first vaccine for rabies, which Pasteur used to save the life of a nine-year-old boy. By this act, Pasteur's position as a hero was assured.

Thanks to the work of Pasteur, we now live longer, our food stays fresh longer and we are less likely to die of disease. Indeed, smallpox is no longer found anywhere in the world, due to a huge vaccination programme carried out in the 20th century. This could never have happened without the scientific achievements of The Father of Microbiology.

Extract from a lecture about immunization

Historically, being immunized against diseases is a relatively new thing but that doesn't mean the idea hadn't been thought before. If we go as far back as 429 BC, the historian Thucydides noted that after a smallpox plague in Athens survivors did not become infected again. This was a time before there was even recognition of such things as bacteria and viruses.

Nowadays we take it for granted that we will be vaccinated and avoid diseases like polio, but how many of us actually stop to ask ourselves what is behind the injection we have? How does vaccination work?

Basically, it is the process by which a person is exposed to an agent so that his or her immune system develops against that agent. The immune system makes antibodies which fight against infection. Once the human immune system is exposed, that is, made open to a disease, it is able to act against any future infection. Vaccination exposes a person to an immunogen – something which helps develop immunity – in a controlled way by using a weak dose so he or she doesn't become ill while being immunized.

The good thing about a vaccination programme is that it can limit the spread of a disease among a population, reducing the risk for people who have not been vaccinated, so we have something which is known as herd immunity. That means when the number of non-immune people has dropped to a certain level, the disease will disappear from the whole population. This is how we have achieved the elimination of many diseases.

Quick check:

1. What does pasteurization mean?
2. What is the difference between pasteurization and sterilization?
3. What does the word vaccination mean?
4. Do we need vaccination?
5. What vaccinations have you had?
6. Are there any negative aspects to vaccination?
7. Do you know of any diseases for which we cannot be immunized?
8. What vaccines would you like to see developed?

9. In what way do Pasteur's vaccines differ from those of Jenner?

■ Text 2. Gregor Mendel

Gregor Mendel was born on 20th July, 1822, and died on 6th January, 1884. He was a biologist and botanist whose scientific research showed that inheritance proceeds according to certain scientific laws.

Mendel was a brilliant student and his family encouraged him to study, but they were very poor so Mendel entered a monastery in 1843. There he taught Mathematics, Physics and Greek to his school students. Eight years later, in 1851, the monastery sent him to the University of Vienna where he was able to continue his education. In 1853, he returned to the monastery and began teaching and researching again.

Mendel's theories of heredity based on his work with pea plants are well known to students of Biology. But his findings were so different from the accepted views on heredity at the time that his work was ignored until long after his death. His paper, 'Experiments in Plant Hybridisation", in which he described how traits were inherited, has become one of the most influential publications in the history of science.

Mendel was the first person to trace the characteristics of successive generations of an organism. In Mendel's day, a number of hypotheses had been suggested to explain heredity. The most popular one was the so-called *blending theory*. According to this theory, inherited traits blended from generation to generation. For instance, a red rose crossed with a white rose would, over time, produce a pink rose. Another theory put forward by Charles Darwin was called *pangenesis*. This stated that there were hereditary particles in our bodies,

and that these particles were affected by our actions. The altered particles could be inherited by the next generation. These theories were disproved by Mendel.

The first thing he noticed when he began his experiments was that traits were inherited in certain numerical ratios.

This observation led him to come up with the idea of the dominance of genes and he tested it in peas. For seven years he crossed thousands of plants to prove the Laws of Inheritance. From his experiments, Mendel developed the basic laws of heredity. Those laws are the following: that traits do not combine, but are passed whole from generation to generation (which disproved the blending theory and Darwin's theory); each member of the parental generation passes on only half of its hereditary information to each offspring (with certain traits dominant over others); and different offspring of the same parents receive different sets of hereditary information.

Mendel's research formed the beginning of the modern science of genetics. Genetic theory has had a huge impact on our lives. Many diseases, for example haemophilia, are known to be inherited, and family histories can be traced to determine the probability of passing on a hereditary disease. Scientists can now design plants that are easier to grow, or which can produce more food. This practical side of the results of Mendel's research is being used to improve the way we live.

Quick check:

1. How did the blending theory explain heredity?

2. What did the pangenesis theory state?

3. What was the first thing that Mendel noticed when experimenting with peas?

4. How are characteristics passed on from generation to generation?

5. How does modern science change this? Why?

■ Text 3. Vladimir Vernadsky

Vladimir Ivanovich Vernadsky was a Russian scientist who was born on 12th March, 1863 in St. Petersburg.

His most important contributions to science were the development of the ideas of the biosphere (from the Greek word *bios* meaning *life*) and the noosphere (from the Greek word *noos* meaning mind).

He graduated from the Physics and Mathematics Department of St Petersburg University in 1885. From 1890 to 1911 he taught mineralogy and crystallogaphy at the University of Moscow. In 1912 he was made a full member of the Russian Academy of Sciences where he was actively involved for 33 years, until his death in Moscow on 6th January, 1945.

Through his work in mineralogy, Vernadsky became interested in the distribution of chemical elements in the Earth's crust, hydrosphere and atmosphere – the field known as geo chemistry. Vernadsky published many papers on the geochemistry of various elements, including the geochemistry of radioactive compounds.

Vernadsky was one of the first scientists to suggest the possibility of using radioactive elements as sources of energy, and he organized a special commissions to look for uranium ores in Russia. In 1916, the first uranium deposits were discovered. But Vernadsky was aware of the danger of putting atomic energy into the hands of man. He said that scientists carried the huge responsibility of making sure their discoveries did not lead to destruction.

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However, Vernadsky is probably best known for his development of the idea of the biosphere of the Earth and his ideas on the evolution of the biosphere into the noosphere.

The biosphere is the layer of the Earth in which all life exists. The term biosphere was coined in 1875 by the geologist, Eduard Suess, but it was Vladimir Vernadsky who recognized its ecological importance in 1929. He believed that all living organisms together with their environments make up the biosphere. These environments include the air (the atmosphere), land (the geosphere), rocks (the lithospere) and water (the hydrosphere). The exact thickness of the biosphere on Earth is difficult to calculate, but most scientists would agree that it is from about 5000 metres above sea level to around 9000 metres below sea level. Thus, there is a 14-kilometre zone within which life exists.

Vernadsky defined the boundaries of the biosphere by showing that the biosphere includes all the hydrosphere, part of the troposphere – the lowest layer of the atmosphere where most weather changes take place – and the upper part of the Earth's crust down to a depth of two or three kilometers, in short, everywhere that life exists. For Vernadsky, the biosphere had existed since the very beginning of the Earth's history and it was constantly evolving. Our present living world is the product of a long and complex evolution of the biosphere.

Vernadsky believed that the technological activities of mankind were a stage in this evolution. He believed that human reason and combined scientific efforts could overcome the negative results of technology and could lead to a safe future for everyone. This positive evolutionary stage of the biosphere of the Earth is for him the *noosphere,* the sphere of reason.

In his paper, *Several Words on the Noosphere* (1944, the last paper he published before his death), Vernadsky outlined the conditions that were required for the creation of the noosphere: equality for all people and an end to wars, poverty

and hunger. Today, Vernadsky's vision of the world is more important than ever before.

Quick check:

1. What do you understand by the term *biosphere*?
2. Why is it so important?
3. What layers does it consist of?
4. In what sorts of different environments can life exist?
5. Think about humanity. How do we affect our environment?

Text 4. Ivan Pavlov

Ivan Petrovich Pavlov was born on September 14, 1849 at Ryazan, where his father, Peter Dmitrievich Pavlov, was a village priest. He was educated first at the church school in Ryazan and then at the theological seminary there.

Inspired by the progressive ideas which D. I. Pisarev, the most eminent of the Russian literary critics of the 1860's and I. M. Sechenov, the father of Russian physiology, were spreading, Pavlov abandoned his religious career and decided to devote his life to science. In 1870 he enrolled in the physics and mathematics faculty to take the course in natural science.

Pavlov became passionately absorbed with physiology, which in fact was to remain of such fundamental importance to him throughout his life. It was during this first course that he produced, in collaboration with another student, Afanasyev, his first learned treatise, a work on the physiology of the pancreatic nerves. This work was widely acclaimed and he was awarded a gold medal for it.

the reflex mechanisms of psychic activity into an experimentally proven theory of conditioned reflexes.

As guiding principles of materialistic teaching on the laws governing the activity of living organisms, Pavlov deduced three principles for the theory of reflexes: the principle of determinism, the principle of analysis and synthesis, and the principle of structure.

The development of these principles by Pavlov and his school helped greatly towards the building-up of a scientific theory of medicine and towards the discovery of laws governing the functioning of the organism as a whole.

Experiments carried out by Pavlov and his pupils showed that conditioned reflexes originate in the cerebral cortex, which acts as the «prime distributor and organizer of all activity of the organism» and which is responsible for the very delicate equilibrium of an animal with its environment. In 1905 it was established that any external agent could, by coinciding in time with an ordinary reflex, become the conditioned signal for the formation of a new conditioned reflex. In connection with the discovery of this general postulate Pavlov proceeded to investigate «artificial conditioned reflexes». Research in Pavlov's laboratories over a number of years revealed for the first time the basic laws governing the functioning of the cortex of the great hemispheres. Many physiologists were drawn to the problem of developing Pavlov's basic laws governing the activity of the cerebrum. As a result of all this research there emerged an integrated Pavlovian theory on higher nervous activity.

Even in the early stages of his research Pavlov received world acclaim and recognition. In 1901 he was elected a corresponding member of the Russian Academy of Sciences, in 1904 he was awarded a Nobel Prize, and in 1907 he was elected Academician of the Russian Academy of Sciences; in 1912 he was given an honorary doctorate at Cambridge University and in the following years honorary membership of

various scientific societies abroad. Finally, upon the recommendation of the Medical Academy of Paris, he was awarded the Order of the Legion of Honour (1915).

Pavlov directed all his indefatigable energy towards scientific reforms. He devoted much effort to transforming the physiological institutions headed by him into world centres of scientific knowledge, and it is generally acknowledged that he succeeded in this endeavour.

Pavlov created a great school of physiologists, which produced many distinguished pupils. He left the richest scientific legacy - a brilliant group of pupils, who would continue developing the ideas of their master, and a host of followers all over the world.

Dr. Pavlov died in Leningrad on February 27, 1936.

From Nobel Lectures, Physiology or Medicine 1901-1921, Elsevier Publishing Company, Amsterdam, 1967.

Quick check:

1. What made Pavlov devote his life to physiology?
2. What does the term "chronic" experiment mean?
3. Does the merit of inventing the method of establishing fistulas in the ducts of salivary glands belong to Pavlov?
4. What did the discovery of the function of conditioned reflexes help to study?
5. Name three principles of the theory of reflexes.
6. What did the development of these principles lead to?
7. Where do conditioned reflexes start?
8. What is the main postulate of the theory of "artificial conditioned reflexes"?
9. What was the outcome of all Pavlov's investigations?
10. What highest award did I.P. Pavlov receive and when?

Glossary of Biological Terms

Aerobe an organism which needs molecular oxygen for its metabolism.

agar a jelly-like substance obtained from seaweed (red algae) used to help solidify nutrient media for growing microorganisms.

anaerobe an organism which cannot grow if molecular oxygen is present; strict anaerobes are killed by oxygen, facultative anaerobes will grow if oxygen is present but can also grow if oxygen is absent.

antibiotic a chemical produced by microorganisms, such as bacteria and moulds that, in dilute solution, can kill or inhibit the growth of other microorganisms.

antibody a protein produced by B lymphocytes of the immune system. Antibodies are very specific and help defend the body against pathogens and foreign molecules by binding to antigens and bringing about their destruction.

antigen a molecule that is recognised and bound by a specific antibody.

apoptosis a kind of cellular self-destruction that demands energy and protein synthesis for its occurrence.

artificial selection the purposeful breeding of certain traits over others.

autotroph an organism that is able to synthesise the organic materials it requires from inorganic substances in its environment.

biotechnology the application of living organisms, or substances made from them, to make products of value to humans.

capsid the protein coat of a virus.

cell a very small unit of living matter.

cell culture growing cells or tissues in a laboratory, or on an appropriate nutrient medium.

chemoautotroph an organism which uses carbon dioxide as its sole source of carbon and inorganic chemicals as its source of energy.

chitin a tough resistant polysaccharide which is a component of some fungal cell walls.

class the second highest group into which animals and plants are divided, below a Phylum and including several orders.

clone a group of genetically identical organisms or cells which are all descended asexually from the same individual.

coccus (*plural* **cocci**) a sphere-shaped bacterium.

dry without moisture.

environment the natural conditions, eg land, air and water, in which people, animals and plants live.

eukaryotic cells containing a true nucleus, with a nuclear membrane and membrane-bound organelles.

evolution the scientific theory according to which types of animals and plants change gradually over long periods of time through a process known as natural selection to become better adapted to their environment.

family a group of related animals, plants, etc.

fermentation the extraction of energy from organic products without the involvement of oxygen or the use of microorganisms or enzymes extracted from microorganisms to carry out a wide variety of chemical reactions, which may or may not be anaerobic.

flagellum (*plural* **flagella**) a fine, long, whip-like organelle which protrudes from the cell surface. Used in locomotion and feeding they are common in some protoctista where they have a 9+2 arrangement of microtubules in cross section. They are also found as thread-like organelles in some bacteria, also used in locomotion, they have a much simpler structure in prokaryotes, being a rigid hollow cylinder of protein with a rotating base which propels the cell along.

fungi a kingdom of eukaryotic, mainly multicellular organisms which lack chlorophyll.

gene a length of DNA which codes for the production of a particular protein.

genetic engineering the application of methods using recombinant DNA to give new genetic traits to an organism by introducing new genes into its cells.

genome the complete set of genes present in an organism.

genus(*plural* **genera**) a group of animals or plants within a family, often itself divided into several species.

grow 1. to increase in size or quantity; to become greater; 2. to develop into a mature or an adult form.

growth the process of growing; development.

heterotroph an organism which requires organic compounds as its carbon and energy source.

host an animal or a plant on which another animal or plant lives.

hypothesis(*plural* **hypotheses**) an idea or a suggestion that is based on known facts and is used as a basis for reasoning or further investigation.

immunization a process rendering a host immunity to a disease.

in vitro latin for 'in glass'. This term refers to biological processes carried out outside a living organism, for example, in a test tube.

inoculation the transfer of microorganisms from one source to another, e.g. transferring bacteria from a broth culture on to a sterile agar plate, or from a starter culture into a fermenter containing sterile medium.

interferons a group of proteins which are active in the immune system. They fight viral infections and stimulate the cell-killing abilities of some immune cells.

They are being tested for use in cancer therapy and in the treatment of AIDS and other viral diseases.

limb 1. a leg, an arm or a wing; 2. a large branch of a tree.

lymphocyte a type of white blood cell (granulocyte) for example B and T cells.

magnify to make something appear larger, especially by using a lens or microscope.

meristem culture plant cells cultured from the undifferentiated meristematic tissue from which new cells arise.

mesophile an organism which has an optimum growth between 20*C and 40*C, including most human pathogens.

microscope an instrument for making very small objects appear larger, especially for scientific study.

muscle a piece of elastic body tissue that can be tightened or relaxed to produce movement.

mycelium composed of a mass of fungal hyphae tangled together.

natural selection the process by which heritable advantageous traits become more common in successive generations, and unfavourable traits become less common.

nutrient a substance that helps a living thing to grow.

order a group of related animals or plants below a class and above a family.

pathogen a microorganism or virus that causes disease.

phylum (*plural* **phyla**) a major group to which animals or plants belong.

plant a living thing that grows in the earth and usually has a stem, leaves and roots.

plasmid a small, usually circular molecule of DNA that occurs in bacteria but is not part of the bacterial chromosome. Plasmids have been used as cloning vectors to transfer genes between species.

prokaryotae a kingdom of microscopic, mainly unicellular microorganisms, including bacteria. Their DNA is circular, naked, and not situated inside a nuclear membrane. Prokaryotic cells also lack membrane-bound organelles, such as mitochondria.

protoctista a kingdom of microscopic, eukaryotic organisms. They may be unicellular or multicellular, and mainly show sexual reproduction. It is a diverse group including heterotrophic and photosynthetic organisms.

protoplasts plant cells that have had their rigid cellulose cell walls removed. They are fused to produce cell hybrids and used as targets for gene transfer in plant genetic engineering.

recombinant DNA DNA molecule that has been formed by joining together segments of DNA from two or more sources.

root the part of a plant that grows under the ground, absorbing water and minerals.

sample one of a number of things, one part of a whole, that can be examined in order to seewhat the rest is like; a specimen.

sap the liquid in a plant that carries food to all parts of it.

seed the part of a plant from which a new plantof the same kind can grow.

species a group of animals or plants within a Genus. Members of a species are able to breed with each other but usually not with other species.

stem the main long thin part of a plant above the ground, or any of the smaller parts growing from this, from which the leaves or flowers grow.

substrate a compound acted on by an enzyme and converted to a product.

vector in biotechnology, a vector is a DNA molecule which is used to transfer genes into cells; usually this is plasmid or viral DNA.

vegetation plants in general; plants found in a particular environment.

viable live; capable of reproducing.

virology the study of viruses and some other virus-like agents.

virus a particle containing a nucleic acid core, either DNA or RNA, surrounded by a protein coat called a capsid. Viruses are obligate parasites that reproduce by entering cells and taking over the cell's own protein synthesizing mechanisms.

vital connected with or essential to life.

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