

**НАЦІОНАЛЬНИЙ ПЕДАГОГІЧНИЙ УНІВЕРСИТЕТ
ІМЕНІ М. П. ДРАГОМАНОВА**

**АНГЛІЙСЬКА МОВА
ЗА ПРОФЕСІЙНИМ СПРЯМУВАННЯМ
ДЛЯ СТУДЕНТІВ ПРИРОДНИЧИХ
СПЕЦІАЛЬНОСТЕЙ**

ENGLISH FOR BIOLOGY STUDENTS

Навчальний посібник



КИЇВ
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Навчальний посібник “Біологія” призначений для вивчення англійської мови за професійним спрямуванням студентами I та II курсів природничих спеціальностей. Завдання розроблені з урахуванням комунікативних потреб майбутніх спеціалістів з біології. Посібник забезпечує формування мовленнєвої компетенції, допомагає засвоїти фахову термінологію, активізувати вміння практично застосовувати набуті знання.

Посібник рекомендовано до вивчення як в аудиторії, так і самостійно.

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Передмова

Навчальний посібник для роботи над текстами за фахом “Біологія” призначений для вивчення англійської мови студентами I та II курсів природничих спеціальностей.

Методична розробка складена згідно з вимогами навчальної програми з іноземних мов для підготовки бакалаврів з біології і охоплює базовий лексичний мінімум.

Мета даної розробки – розвиток навичок розуміння й аналізу наукових текстів з основних проблем біології, уміння вести бесіду, брати участь у дискусіях англійською мовою, формувати соціально-комунікативну позицію фахівця в галузі природничих наук.

Збірник складається з 16 розділів, кожний з яких містить окрему проблему – тему і включає автентичні тексти із зарубіжної наукової літератури. До текстів пропонуються лексичні вправи та завдання на розвиток мовленнєвих вмінь та навичок в ситуаціях реального спілкування. Це вправи на тлумачення окремих фахових термінів, на переклад з рідної мови на англійську і навпаки. В кінці кожної теми пропонуються різні творчі завдання, спрямовані на закріплення вивченого матеріалу. Посібник містить інформацію про вищу освіту у Великобританії та США, вимоги та план навчання в університеті, тлумачний словник фахової термінології та список інтернет-ресурсів.

Рекомендується для опрацювання студентами як в аудиторії, так і самотійно.

Навчальний посібник розрахований на засвоєння англійської мови на рівні B2, необхідного для професійного використання та проведення майбутньої науково-пошукової роботи студентів.

UNIT 1

STUDENTS' LIFE AND STUDIES

I. Read the text and make a short summary.

Learning and Studying at University

Studying for a degree is exciting, stimulating, and a challenge. As a mature student, you bring with you a wide range of skills and strengths from your past experience, whether this includes study at college, employment or looking after a family. Whatever your previous background and experience, you will have valuable skills to draw on as you adapt to university study and develop ways of learning that suit you.

Features of university study

A main feature of university study is independent learning. Lectures are your main introduction to a topic, and you plan your own reading and research around these, to explore a topic in more depth.

Reading lists are only a starting point – you get used to browsing and making your own decisions about the type of information you need to focus on. There is generally less contact with lecturers than you may be used to previously.

When you have assignments, you will usually have several weeks to complete them. This means planning time effectively, and fitting study tasks within a weekly schedule. Depending on your course, you are expected to study for roughly 2 hours for every 1 hour lecture. This is only a rough guide, but gives an idea of how many hours in the week you may be studying – for most courses, this adds up to 20-30 hours. Students generally have to be fairly self-reliant, both in making their

own decisions about a task, finding the information they need, and locating sources of advice and support when they are needed.

Key skills

Key skills needed for independent learning are being able to organize your time, processing information and making priorities with study tasks, and also thinking for yourself – questioning and thinking critically about ideas and information. It also helps to focus on developing particular skills for particular tasks, such as planning and writing essays, reading and note-taking, and dealing effectively with lectures. You may want to think about how you take notes and deal with lectures initially. Later on, other skills become more important, such as essay writing and revision and exam techniques.

You will also develop skills in other areas of study such as group-work and giving presentations. All these skills are transferable, relevant not only to university study, but for whatever you choose to do after graduation.

How you are assessed

There are four types of assessment common across the university. These are essays, reports, presentations and exams.

Essays

Writing an essay is your opportunity to show what you know about a given subject. You will be given both a topic and a word limit. A word limit is used to make sure that you are to the point yet thorough with the information provided. You may already be familiar with writing essays and in many ways writing an essay at university is no different. One area however, that students can struggle with, is citation. Citation is the referencing of any source of research you refer to in your essay. If you fail to reference or reference incorrectly you may be accused of plagiarism (passing other peoples work off as your own).

Reports

You may be asked to write a report at the end of a practical or research project. A report differs from an essay in that it usually ends with clear recommendations as a result of your findings. A report is split in to clear sections so that the reader can gain information quickly.

These sections are usually numbered and headed, any information that is not vital but in support of the report can be included in an appendix at the end.

Presentations

You may be asked to give presentations in a variety of situations. You may be asked to present your findings from a research project, a piece of design work or a group project. You will be given a time limit on the presentation and may even be cut off, by the tutor, if you start to overrun.

How you are taught

You may have between 10 and 25 hours teaching time a week, depending on the practical elements of the course. You will also be required to undertake independent study through reading and making notes to aid understanding.

Lectures

A lecture is a presentation from a tutor, or guest, on a specific topic area to a large group of students. Lectures usually take place in a lecture theatre and can accommodate as many as 300 students. You will be expected to take notes and to have undertaken some reading on the topic beforehand. It can be tempting to miss lectures, especially those early morning sessions. Good attendance generally equates to good marks. Lectures often give direction to further reading and provide the foundation for further seminars and workshops.

Seminars

Seminars take place in much smaller groups than a lecture and will often be timetabled to enable discussion to develop. Seminars give opportunity to ask questions, clarify areas and discuss the subject matter. You will be expected to play a part in seminars and engage with the topic under discussion. Undertaking any suggested reading will make it easier to participate in seminars and feel more confident contributing to any discussion.

Tutorials

Tutorials are your opportunity to discuss on a one-to-one basis with a tutor any individual essays and projects. You may find that some

tutorials involve other students from your course who are working on the same assignment.

Labs, workshop and studio time

Some courses will have timetabled practical sessions based in specialized classrooms.

II. In groups speak about learning and studying at your University.

III. Match the word combinations in column A with their equivalents in column B:

A		B	
1.	social sciences	a.	стати членом наукового гуртка/клубу
2.	to have an opportunity (to do smth.)	b.	вступати в аспірантуру
3.	a modern well-equipped research laboratory	c.	мати нахил до наукової роботи
4.	the problem under investigation	d.	суспільні науки
5.	to get acquainted with (the basic laws of biology)	e.	отримувати знання
6.	to lecture in a subject	f.	проблема, що досліджується
7.	to attend lectures on (physics ...)	g.	сучасна, гарно оснащена науково-дослідна лабораторія
8.	narrow specialization	h.	мати можливість (зробити щось)
9.	a specialized course in (biochemistry)	i.	випускник біологічного факультету
10.	to choose a branch of biology as one's future speciality	j.	відвідувати лекції з (фізики ...)
11.	to join a scientific circle/club	k.	вузька спеціалізація
12.	to acquire knowledge	l.	спецкурс з (біохімії)
13.	a graduate of the biological faculty	m.	читати лекції з предмету
14.	to have a bent for (research work)	n.	вибрати галузь біології, як свою майбутню спеціальність
15.	to apply for a post-graduate course	o.	ознайомитися з основними законами біології

IV. Which of these branches of biology do you take a special interest in and why?

Biophysics, biochemistry, botany, microbiology, zoology, physiology of man and animals, physiology of plants, genetics.

V. Put the verb “to be” into a proper tense form:

1. Vaccines, penicillin and sulpha (to be) products of the biological laboratory. 2. Elementary training in general biology (to be) essential for every educated person. 3. Medicine, physiology, agriculture and forestry (to be) the fields of knowledge requiring elementary training in general biology. 4. In external appearance plants (to be) usually green. 5. The aim of his experiments (to be) to learn more about how the body adapts to weightlessness.

VI. State the tense and voice used in the following sentences:

1. Such functions as sensation, motion, food-taking and respiration are called life functions. 2. To find this out hundreds of guesses were made, thousands of experiments staged. 3. We call sciences studying nature natural sciences. 4. Botany is the scientific study of plants. 5. With the invention of the microscope scientists saw things that had been hidden before. 6. In certain parts of the tropics the arrival of the rainy season has stimulated growth of plants. 7. A lot of investigations have been conducted in this field. 8. No important animal phylum will be restricted to these environments. 9. Almost all the main branches of the animal kingdom are represented in the ocean. 10. Carbon dioxide is constantly being moved from place to place so as to be available everywhere.

VII. Use the passive voice in the following sentences:

Example: *Biology gives a lot of information about different living things.*
A lot of information about different living things is given by biology.

1. The life of other living things affects mankind. 2. Biologists have increased our food supply. 3. They have developed new and better varieties of plants and animals. 4. Scientific methods of farming have given us much more food. 5. Biologists control many diseases. 6. They have saved millions of lives. 7. Biologists have discovered and

developed the methods of prevention and cure of many diseases.
8. Biologists have solved many mysteries of the human body.
9. Biologists have discovered how blood circulates.

VIII. Translate the following sentences into Ukrainian paying attention to the meaning of each modal verb:

1. Some animals can exist under the immense pressure of the deep seas. 2. They are at the University now but they are to meet here. 3. The crop yields are to be increased this year. 4. He has to translate a new article so he will have to work the whole evening. 5. You must read this book. 6. He has to read this book. 7. You should read this book. 8. You are to read this book. 9. You ought to read this book 10. We have to develop new varieties of plants. 11. We had to adapt the plants to new conditions. 12. We shall have to create suitable conditions for this experiment. 13. Our teacher is to be here at 9 o'clock. 14. This plant has to be treated with cold. 15. These fruits are to be crossed. 16. You ought to plant these seeds in spring. 17. Green plants are so common that you may never stop to think how wonderful and how important they are. 18. The "Beagle" was to make a voyage around the world. 19. He had to learn poetry instead of collecting plants. 20. The giant seaweeds may be more than 100 feet long. 21. The fungi have no chlorophyll. They must get their food from other plants and animals.

IX. Read the text and learn it by heart.

Our University

There are many universities in our city. The biggest and oldest of them are the National Taras Shevchenko University, the National Technical University, the National Medical University and the National Drahomanov Pedagogical University. I am a student of the National Drahomanov Pedagogical University which is situated in the heart of the city. In April 2015 we celebrated the 180th Anniversary of our University. At the University over 36,000 students study in 78 pedagogical specialities. Our University has a full range of pedagogical specialities for almost all school subjects. The University consists of 106 Departments and 20 Institutes: Pedagogics and Psychology, Physics and Mathematics, Information Science and

Technologies, Arts, Distance Education, Social Work and Management, Natural Sciences Education and Ecology, Sociology, Historical Education, Physical Education and Sports, Engineering and others.

1,500 lecturers, 630 Doctors of Philosophy (PhD) and Associate Professors, 250 Doctors of Science and Professors, 12 People's Artists and 7 Honoured Artists of Ukraine work at the University.

Students study at full-time and correspondence departments. The course of study lasts for four years to get Bachelor's Degree and five years – to get Master's Degree.

Our University is a four-storeyed building with many lecture rooms, different laboratories and workshops. All of them are provided with modern equipment. At these laboratories and workshops our students have got their practical training. There are many computer classes; our students get basic computer skills there.

I study at the Natural Sciences Education and Ecology Institute. I want to become a teacher of Biology and English. I am a full-time student, so I have to attend all classes. Our students do not miss classes, because they want to get good knowledge. The classes start at 8 a.m. and finish at 2 or 3.20 p.m. During the breaks we can have a snack at the students' cafe. We usually have six or eight classes every day.

We study different subjects: botany, zoology, anatomy, microbiology, genetics, physiology of man and animals, physiology of plants, chemistry, physics, natural sciences, English and others. My favourite subjects are botany, zoology, anatomy and English.

We have two English classes a week. There are also English classrooms at our University. They are provided with TV sets and video. We can watch English films at classes and listen to tape-recorded exercises and texts. At our English lessons we read texts on our speciality, translate sentences both from Ukrainian into English and vice versa, do many exercises and speak on different topics. Sometimes we have to write a composition or an essay, to prepare a project or to learn texts by heart. It is not easy to learn a foreign language, but it is a real pleasure to speak English, German or French.

There is a big scientific library at the University. It is situated on the ground floor. We can get all necessary course books there. There is a

reading room in the library. The students can work there at the literature they need.

The professors and students of the University take part in scientific and research work. The University organizes annual scientific and research conferences both for the teaching staff and students. The results of the research are published in scientific journals and collections of articles. Advanced information and telecommunication technologies penetrate the training process deeper and deeper: the distance learning centre has been organized and all Institutes have free access to the Internet.

Olympiads in many subjects take place annually to elicit students who have the best knowledge.

There is a large sports centre where students have opportunity to go in for different kinds of sports. They take part in many competitions and often have good results.

The University cooperates with the leading higher educational establishments and scientific research institutes of the USA, Sweden, France, Poland, Slovakia, Bulgaria, Romania and others.

My Department

I am a student of the biological department. Our department is one of the largest at the University. We study different subjects: Botany, Anatomy, Microbiology and many others. Besides these subjects we study some social sciences and English. We study English to be able to read scientific books on biology and discuss biological problems.

There are many departments at our Institute: of botany, of zoology, of microbiology, of physiology of man and animals, of physiology of plants, of genetics, and of soil science. Besides, there are research laboratories. Every student has an opportunity to work in modern well-equipped laboratories, where different problems of biology are under investigation.

Students get acquainted with all branches of biology. They are lectured in various subjects of Natural Sciences, namely botany, zoology, anatomy, microbiology, biophysics, biochemistry, genetics and soil science.

During the first two years they attend lectures on chemistry, physics and some subjects of Natural Sciences and foreign languages. In the third year more narrow specialization begins. They have several specialized courses and additional practical and research work in the subject they have chosen as their future speciality. Besides attending lectures they may join some scientific circles and choose a problem to work on according to their bents. All of them know that biology is the science of glorious past and great future. They do their best to acquire as much knowledge as possible.

Graduates of the biological department are assigned to work at laboratories, schools and research institutes. Those who have a bent for research work may apply for a post-graduate course of study.

X. Speaking people ask each other different types of questions. The following schemes can help you to compose your questions correctly:

Model 1. A general question.

Do you study English?

1. You are a student of the biological department. 2. The department is one of the largest at the University. 3. You study different subjects. 4. You study English. 5. Botany is one of the largest departments of the Institute. 6. Every student has an opportunity to work in a laboratory. 7. Laboratories are modern and well-equipped. 8. Students can join any scientific club at the faculty. 9. You can choose a problem to work on.

Model 2. An alternative question.

Do you study English or French?

1. You are a student of the biological department (chemistry). 2. You study only biology (social sciences too). 3. You study English (French). 4. You are lectured only in biological sciences (relative sciences too). 5. You attend lectures on subjects of Natural Sciences only (the Humanities too). 6. More narrow specialization begins in the third year (first year). 7. You can choose a problem to work at on your own (your teacher does it). 8. You have a bent for research work (you prefer to work at school as a teacher of biology).

Model 3. A special question.

Where do you study English?

1. You are a student of ... department. 2. You study ... social sciences. 3. You study ... language. 4. You are lectured in ... sciences. 5. You attend lectures on ... subjects. 6. More narrow specialization begins in ... year. 7. You can choose a problem to work at 8. You prefer to work where ...

XI. Work in pairs. Ask your partner:

- if he studies at the biological or chemical department;
- if the biological department is the largest at the University;
- if he studies biochemistry;
- if there are many departments at his Institute;
- if he gets acquainted with all branches of biology;
- if he attends lectures on microbiology;
- when narrow specialization begins;
- what specialized course he has;
- if he can choose a problem to work on according to his bents.

XII. Act out the following situations:

a) you meet a foreign student. Tell him about your studies at the University. b) a group of students have come to NPU on an exchange visit. They would like to interview you about your life and studies at the University.

XIII. Write a composition “University is the best time of my life”

XIV. Read the texts and make a short summary.

Higher Education in Great Britain

After finishing secondary school or college you can apply to a university, polytechnic, college of education or you can continue to study in a college of further education.

The academic year in Britain's universities, Polytechnics, Colleges of education is divided into 3 terms, which usually run from the beginning of October to the middle of December, the middle of January

to the end of March, from the middle of April to the end of June or the beginning of July.

There are 46 universities in Britain. The oldest and best-known universities are located in Oxford, Cambridge, London, Leeds, Manchester, Liverpool, Edinburgh, Southampton, Cardiff, Bristol and Birmingham.

Good A-level results in at least 2 subjects are necessary to get a place at a university. However, good exam passes alone are not enough. Universities choose their students after interviews. For all British citizens a place at a university brings with it a grant from their local education authority.

English universities greatly differ from each other. They differ in date of foundation, size, history, tradition, general organization, methods of instruction and way of student life.

After three years of study a university graduate will leave with the Degree of Bachelor of Arts, Science, Engineering, Medicine, etc. Some courses, such as languages and medicine, may be one or two years longer. The degrees are awarded at public degree ceremonies. Later he/she may continue to take Master's Degree and then a Doctor's Degree.

The 2 intellectual eyes of Britain – Oxford & Cambridge Universities – date from the 12 & 13 centuries. They are known for all over the world and are the oldest and most prestigious universities in Britain. They are often called collectively Oxbridge, but both of them are completely independent. Only education elite go to Oxford and Cambridge.

The Scottish universities of St. Andrews, Glasgow, Aberdeen & Edinburgh date from the fifteenth and sixteenth centuries.

In the nineteenth and the early part of the twentieth centuries the so-called Redbrick universities were founded. These include London, Manchester, Leeds, Liverpool, Sheffield, and Birmingham. During the late sixties and early seventies some 20 'new' universities were set up. Sometimes they are called 'concrete and glass' universities. Among them are the universities of Sussex, York, East Anglia and some others.

During these years the government set up 30 Polytechnics. The Polytechnics, like the universities, offer first and higher degrees. Some

of them offer full-time and sandwich courses (for working students). Colleges of Education provide two-year courses in teacher education or sometimes three years if the graduate specializes in some Particular subjects.

Some of them who decide to leave school at the age of 16 may go to a further education college where they can follow a course in typing, engineering, town planning, cooking, or hairdressing, full-time or part-time. Further education colleges have strong ties with commerce and industry.

There's an interesting form of studies which is called the Open University. It's intended for people who study in their own free time and who 'attend' lectures by watching TV and listening to the radio. They keep in touch by phone and letter with their tutors and attend summer schools. The Open University students have no formal qualifications and would be unable to enter ordinary universities.

Some 80,000 overseas students study at British universities or further education colleges or train in nursing, law, banking or in industry.

Overview of the American Education System

In the American education system, students must obtain a high school diploma before they are admitted into college or university. Foreign students who would like to attend an American college or university must complete coursework that is equivalent to what is taught at an American high school. Foreign students, who would like to attend an American high school, need to consider how the high school they select will give them access to the best colleges.

Undergraduate school

Students who have completed high school and would like to attend college or university must attend what is referred to as an undergraduate school. These are schools that offer either a two-year degree (called an associate) or a four-year degree (called a bachelor's degree) in a specific course of study. That course of study is called the major. While most schools that offer a four-year degree will admit students who have not yet chosen a major, all students are required to select (or declare) a major by their second year at school. Students who complete an

associate degree can continue their education at a four-year school and eventually complete a bachelor's degree.

Graduate school

Students who have obtained a bachelor's degree can continue their education by pursuing one of two types of degrees. The first is a master's degree. This is usually a two-year degree that is highly specialized in a specific field. Students are sometimes admitted to a master's degree program only if they have a bachelor's degree in a closely related field. However, there are many exceptions to this, such as with students who want to pursue a Master's in Business Administration (MBA) degree. Students who want to advance their education even further in a specific field can pursue a doctorate degree, also called a PhD. A PhD degree can take between three and six years to complete, depending on the course of study chosen, the ability of the student, and the thesis that the student has selected. The thesis is a very intensive research paper that must be completed prior to earning the degree. It is always required of students pursuing a PhD, and may sometimes be required of students pursuing a master's degree (depending on the school).

Certain courses of study are only available at the graduate school level in America. The most notable of these are law, dentistry, and medicine. Students who want to pursue a degree in one of these fields must first obtain a bachelor's degree.

What is a bachelor's degree?

A bachelor's degree is the traditional degree given by American undergraduate colleges and universities. It normally requires at least four years but not more than five years of full-time college-level coursework. The two most common classes of bachelor's degrees awarded by US schools are the Bachelor of Science degree (also called the B.S.) and the Bachelor of Arts degree (also called the B.A.). Some schools offer only the B.A. degree, even for science majors (such as a B.A. in biology). Other schools offer both the B.A. and the B.S. Bachelor degrees are what most students pursue when enrolling in a US university or college. People with a bachelor's degree earn substantially more than those who don't. More and more jobs and careers today require applicants to

possess an accredited bachelor degree. Some would argue that a bachelor degree is the first step to success.

All students pursuing a bachelor's degree must select a major, usually by the end of their second year. Students must complete a required number of courses (or units) within their major in order to graduate with a bachelor degree in that major. They may also be required to complete a number of courses in closely related fields in order to satisfy bachelor degree requirements. For example, a student who is majoring in chemistry will not only have to complete chemistry courses, but also mathematics, biology, and physics courses in order to graduate with a bachelor of science degree in chemistry. In addition to the requirements for the major, students must also complete a series of courses outside of their major. These requirements will apply to all students attending the college, regardless of major. For example, all students may be required to complete courses in writing, foreign language, communications, and American history. There are various types of schools that offer bachelor's degree programs.

Master's Degree Programs and PhD Programs

A college graduate with a bachelor's degree may find that degree to be insufficient for the type of profession he would like to have. It may often be necessary to pursue an advanced degree, such as a US master's degree or US doctorate (also known as PhD) degree, to advance your career. For example, a US master's degree may be necessary if you are seeking a position as an economist with your local government, or you may need a PhD degree to teach at a university in your country. In addition, some disciplines are taught only at the graduate school program level in the USA. Among these are law, medicine, and dentistry, both of which are doctoral programs.

Not all USA colleges and universities offer USA master's degree programs. Even fewer offer US PhD degree programs. Also, the number of majors offered at the graduate level by a graduate school will usually be much smaller than the number of majors at the undergraduate level. Occasionally, a school will only offer a major at the graduate program level. For example, Stanford University offers a USA master's degree in

business administration, but offers no undergraduate business degree program.

The US master's degree is a graduate school degree that typically requires two years of full-time graduate school coursework to complete. Unlike students pursuing a bachelor's degree, students in a master's degree program will complete courses that are highly focused in their field of study (their major). As such, students must have already decided on their major before applying to a master's degree program.

The US PhD degree or doctoral degree is even more focused and specialized than the master's degree.

Some students will complete a master's degree before applying to a doctorate degree program, but that is not always necessary. Completion of a US doctorate degree typically takes between three and six years. The length of time will depend on the student's educational background (a student with a master's degree may take less time to complete his PhD if it is in the same field), the field of study selected, the student's dedication and ability, and the complexity of the thesis the student has chosen for his PhD. The thesis is a very long, extensive, and original research paper that is a requirement for completing the PhD program. (Some master's degree programs also require a thesis, but it is much simpler and shorter than the PhD program thesis.)

XV. Make an overview of higher education in Ukraine.

XVI. Give the Ukrainian equivalents and learn by heart:

university	long-term	since
EU = European Union	cause	course
hear	latter	expect
lot a ~	affect	potential
become	applicant	saving
get into university	autumn	decide
could = (can)	likely	without
change	last	gap
within	variable	get in
competition	so-called	ahead
stiff	top	regime
there are (MH.)	fee	acknowledge

higher education	some	end [end]
fund	similar	compare
council		around [a'raund]
chief executive	fear	attraction
evidence	introduction	reputation
apply	tuition	like
either ~ or	prove	treat
forgo	ungrounded	overseas
postpone	following	and so
avoid	parliamentary	average
pay	rebellion	once
total	generous	citizen
over	grant	although
rather	bursary	eligible
current	poor	unless
consolation	important	lose
reject	highlight	test
might = may	report	currently
however	think-tank	court
bring	attract	justice
entrance	lurid	extra
for several years to	headline	welcome
come	invasion	qualify
significant	state	moreover
demographic	version	wish
rise	predict	subject
rate	influx	maths = mathematics
almost	flood	physics
decade	eastern	add
mean	taxpayer	leave
additional	expense [ik'spens]	clear
demand	show	substantial
level	while [wail]	supply
pass	due [dju:]	to meet this demand
continue	join	target
improve	net	achieve
qualification	benefit	create
of course	in short	estimate
possible	arrival	hard
deter	afloat	
	accession	

UNIT 2

THE WORLD AROUND US

I. Practice the following for pronunciation:

science [ˈsaɪəns]	discover [dɪˈskʌvə(r)]
scientific [ˌsaɪənˈtɪfɪk]	control [kənˈtrəʊl]
biology [baɪˈɒlədʒi]	diversity [daɪˈvɜː(r)səti]
biological [ˌbaɪəˈlɒdʒ(ə)l]	function [ˈfʌŋk(ə)n]
biologist [baɪˈɒlədʒɪst]	mankind [mænˈkaɪnd]
guide [ɡaɪd]	knowledge [ˈnɒlɪdʒ]
contribution [ˌkɒntrɪˈbjʊʃ(ə)n]	healthy [ˈhelθi]
increase [ɪnˈkriːs]	method [ˈmeθəd]
supply [səˈplaɪ]	vaccine [ˈvæksɪn]
variety [vəˈraɪəti]	penicillin [ˌpenəˈsɪlɪn]
disease [dɪˈziːz]	sulpha [ˈsʌlfə]
life [laɪf]	digest [daɪˈdʒest]
circulate [ˌsɜː(r)kjʊleɪt]	blood [blʊd]

II. Translate the following words paying attention to the affixes:

Biology (n), biologist (n), biological (adj.), function (n), functional (adj.); life (n), live (v), living (adj.), nonliving (adj.); health (n), healthy (adj.); inform(v), information (n); solve (v), solution (n); science (n), scientific (adj.); develop (v), development (n); variety (n), vary (v); discover (v), discovery (n); prevent (v), prevention (n); produce (v), product (n), production (n); circle (n), circulate (v), circulation (n).

III. Match the word combinations in column A with their equivalents in column B:

A		B	
1.	to study life in all its diversity	a.	методи профілактики та лікування хвороб
2.	the diversity of living things	b.	підтримувати здоров'я
3.	to give information	c.	перетравлювати їжу
4.	food supply	d.	здійснювати вплив на людство
5.	mysteries of life	e.	вирішення проблем
6.	to affect mankind	f.	виявити причини захворювання
7.	knowledge of biology	g.	надавати інформацію
8.	solution of problems	h.	харчовий запас
9.	scientific methods of investigation	i.	циркуляція крові
10.	varieties of plants and animals	j.	зробити (великий) внесок у (науку)
11.	methods of prevention and cure of diseases	k.	таємниці життя
12.	to digest food	l.	вивчати життя у всій його різноманітності
13.	to discover the causes of diseases	m.	різновиди рослин і тварин
14.	to make a (great) contribution to (science)	n.	наукові методи дослідження
15.	blood circulation	o.	різноманітність живих організмів
16.	to keep healthy	p.	знання з біології

IV. State the tenses used in the following sentences:

1. I am studying biology. 2. Students of the biological department study different subjects. 3. Biologists have solved many mysteries of the body. 4. They began to investigate this problem last year. 5. What branches of biology will you study in the third course? 6. He has been working at this problem for a year and a half. 7. They were discussing this problem when we came. 8. She will be going to Kyiv at this time tomorrow. 9. After they had performed an experiment on the monkey they came to the conclusion that they had been right in their assumption. 10. What brunch of biology are you going to choose for your future

specialization? 11. He never stopped to admire the beauties of nature. He used to spend hours watching an insect moving on a stem, leaf or flower of a plant. 12. Don't worry! He will have come by that time. 13. They had been working at the laboratory for two years when the first results of the experiments appeared. 14. I am sure they will have been working in the laboratory for hours to get the results they need.

V. Put the verbs in brackets into a proper tense form:

1. Due to the discovery of the moss *Sphagnum* and the vaccine made of it biologists (to save) millions of lives during World War II. 2. Louis Pasteur (to discover) the causes of such a disease as smallpox. 3. The discovery of viruses at the beginning of the 20th century (to lead) to a solution of many medical and biological problems. 4. With the invention of the microscope biology (to give) scientists a lot of information about unicellular living things. 7. Scientists (to do) their best to increase our food supply. 8. The invention of the microscope (to help) to discover many mysteries of life. 9. Biology (to study) life in all its diversity.

VI. Read the text: The Science of Life

Biology is the science of life. It studies life in all its diversity. Biology tells us about our body: how it is constructed and how it functions. It gives us information about other living things, and how their lives affect mankind. Knowledge of biology will help you to keep healthy. It will be your guide in solving many of everyday living and scientific problems.

Biologists have made a great contribution to science. They have increased our food supply. They have developed new and better varieties of plants and animals. Scientific methods of farming have given us much more food.

Biologists control many diseases. They have saved millions of lives by discovering the causes of these diseases and methods of their prevention and cure. Vaccines, penicillin and sulpha are products of the biological laboratory. Biologists have solved many mysteries of the body. They have discovered how blood circulates, how food is digested

and many other secrets of life. They are now working in different fields of biology and their studies may lead to a solution of many problems.

VII. Which of the following headlines goes with the content of the text better? Give a good reason for your choice:

1. Biology and the living world.
2. Biology and our everyday life.
3. Biology and the subject of its study.
4. Biology and its services to mankind.

VIII. Match a line in A with a line in B to define the branches of biology and relative sciences:

A		B		
1.	Agriculture	is the study	a.	and development of new medicines and drugs on the basis of biochemical investigations.
2.	Anatomy		b.	discovering the causes of diseases and methods of their prevention and cure.
3.	Breeding		c.	of how a living body is constructed.
4.	Medicine		d.	of scientific methods of farming.
5.	Pharmaceutical chemistry		e.	of how a living body is functions.
6.	Physiology		f.	developing new and better varieties of plants and animals.

IX. Fill in the blanks with the words from the text:

1. Biologists study life in all its 2. Biology gives us information about other...things. 3. The life of other living things ... mankind. 4. Biologists have made a great ... to natural sciences. 5. Biologists have increased our food 6. They have ... new and better varieties of plants and 7. Scientific methods of ... have given us much more food. 8. Biologists ... of many diseases. 9. Biologists have discovered and developed the methods of ... and ... of many diseases.

X. Fill in the blanks with proper prepositions:

1. Vaccines, penicillin and sulpha are products ... the biological laboratory. 2. Many ... life have been discovered ... biologists. 3. Biologists are working ...different fields ... this science. 4. The studies ... biologists lead ...a solution ... many problems. 5. Biology studies life ...all its diversity. 6. It gives us information ...other living things. 7. Biologists have made a great contribution ...natural sciences. 8. Biologists have saved millions of lives ... discovering the causes ... these diseases.

XI. Using the text, give the equivalents to the following word combinations:

секрети життя, берегти здоров'я, вирішувати наукові проблеми, робити внесок у науку, повсякденні проблеми, виводити нові та кращі різновиди рослин і тварин, контролювати хвороби, методи землеробства, спасти мільйони життів, причини захворювання, працювати в різних галузях біології, привести до рішення проблем.

XII. Retell the text according to the following plan:

- a) the subject matter of biology;
- b) branches of biology and relative sciences;
- c) its contribution to sciences and its services to mankind.

XIII. Translate the text without a dictionary:

Biology is a science of living organisms. It is concerned with their nature, functions, reproduction, and place in their environment. It is rooted in physics and chemistry and many of its interpretations are made in terms of these sciences and of mathematics. It is bound closely with geology and meteorology, and applications of its principles are found in anthropology, psychology, sociology, agriculture, medicine, industry, and indeed, in everyday living. Inasmuch as one of its ultimate aims is thorough understanding of living organisms including a man, biology is entitled to be called the most vital of the sciences.

UNIT 3

BIOLOGY AND RELATED SCIENCES

The Characteristics of Life

I. Match the definition with the correct word.

1.	feature	A.	a substance in general that everything in the world consists of
2.	matter	B.	a useless material or substance
3.	heat	C.	natural world in which people and animals live
4.	chemical	D.	the smallest unit of living matter
5.	cell	E.	outer form or outline
6.	environment	F.	a form of energy
7.	shape	G.	substance used in chemistry
8.	waste product	H.	something important or typical of a place or thing

II. Read and translate the text:

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.

Organization. All things are made of chemicals, but in living things the chemicals are packaged into highly organized structures. The basic structure of life is the cell. Cells themselves contain small organelles that carry out specific functions. A cell may exist on its own or in association with other cells to form tissues and organs. Because of their highly organized structure, living things are organisms.

Reproduction. Reproduction is the ability to produce other individuals of the same species. It may be sexual or asexual. Reproduction involves the replication of DNA. This chemical contains genetic information which determines the characteristics of an organism, including how it will grow and develop. The continued existence of life depends on reproduction, and this is perhaps the most characteristic feature of living things. Reproduction allows both continuity and change. Over countless generations this has allowed species to become well suited to their environment, and life to evolve gradually to more complex forms.

Growth and development. All organisms must grow and develop to reach the size and level of complexity required to complete their life cycle. Growth is a relatively permanent increase in size of an organism. It is brought about by taking in substances from the environment and incorporating them into the internal structure of the organism. Growth may be measured by increases in linear dimensions (length, height, etc.), but is best measured in terms of dry weight as this eliminates temporary changes due to intake of water which are not regarded as growth. Development involves a change in a shape and form of an organism as it matures. It is usually accompanied by an increase in complexity.

Feeding. Living things are continually transforming one form of energy into another to stay alive. Although energy is not destroyed during these transformations, heat is always formed. Heat is a form of energy which cannot be used to drive biological processes, so it is sometimes regarded as `wasted energy`.

Living things have to renew their energy stores periodically from their environment, to continue transforming energy and to replace the `wasted energy`. They also have to obtain nutrients – chemicals that make up their bodies or help them carry out their biological processes. Living things acquire energy and nutrients by feeding, either by eating other organisms, or by making their own food out of simple inorganic chemicals using energy from sunlight or from chemical reactions.

Respiration. Living things need energy to stay alive and to do work. Although food contains energy, this is not in a directly usable form. It has to be broken down.

The energy released during the breakdown is used to make ATP (adenosine triphosphate) in a process called respiration. ATP is an energy rich molecule and is the only fuel that can be used directly to drive metabolic reactions in living organisms.

Excretion. The energy transformations that take place in an organism involve chemical reactions. Chemical reactions that occur in organisms are called metabolic reactions.

Waste products are formed in these reactions, some of which are poisonous, so they must be disposed of in some way. The disposal of metabolic waste products is called excretion.

Responsiveness. All living things are sensitive to certain changes in their environments (stimuli) and respond in ways that tend to improve their chances of survival.

The degree of responsiveness depends on an organism's complexity: a bacterium may be limited to simple responses, such as moving towards favorable stimuli or away from harmful ones; people can make highly sophisticated responses to a wide variety of stimuli which they may perceive either directly or with the aid of technological devices.

Movement. Responses usually involve some form of movement. Movement of whole organisms from one place to another is called locomotion. Plants and other organisms that are fixed in one place do not display locomotion, but they can move parts of their bodies. Movements of living things differ from those of non-living things by being active, energy-requiring processes arising from within cells.

Homeostasis. All living things are, to some extent, able to control their internal conditions so that their cells have a constant chemical and physical environment in which they can function effectively. The regulation and maintenance of a relatively constant set of conditions within an organism is called homeostasis. Homeostasis is a feature of all living systems, from a single cell to a whole biosphere (the part of Earth containing life).

Evolution. Living things are able to change into new forms of life. This evolution usually takes place gradually over successive generations in response to changes in the environment.

III. A. Decide if the following statements are true or false.

1. The earliest people must have known about plants or they would have died.
2. The microscope allowed biologists to treat illnesses.
3. Darwin's theory was one of the most important in biology.
4. The study of biology has not changed at all over the centuries.

B. What is the difference between:

1. the growth of a crystal and the growth of a plant
2. the movement of a cloud and the movement of an animal?

IV. Fill in the missing words:

Term (verb)	Noun
respond	
transform	
move	
develop	
respire	
create	
define	

V. Use the dictionary and write down the meanings of the given words:

nutrient; sunlight; poison; breakdown; harmful.

VI. Find the English equivalents to the following word combinations:

№	Ukrainian term	English equivalent
1.	загальноприйняте визначення	
2.	виконувати (проводити) спеціальні функції	
3.	той самий вид рослини; тварини	
4.	постійне збільшення розміру	
5.	виходячи з (на основі) сухої ваги	
6.	через кількість спожитої води	
7.	прискорювати обмін речовин	
8.	покрощувати шанси на виживання	
9.	за допомогою технологічних приборів	
10.	до деякої міри	
11.	підтримування постійних умов	
12.	відбуватися поступово	

№	Ukrainian term	English equivalent
13.	визначати характеристики організму	
14.	реагувати на умови навколишнього середовища	
15.	ВІДОМИЙ ЯК	

VII. Give the Ukrainian equivalents to the following English terms:

№	English term	Ukrainian equivalent
1.	living things share certain basic characteristics	
2.	to reach the size and level of complexity	
3.	to measure by increase in linear dimensions (length; heights)	
4.	temporary changes	
5.	transform one form of energy into another	
6.	to obtain nutrient chemicals	
7.	to make their own food	
8.	energy-rich molecule	
9.	sensitive to certain changes in their environment	
10.	degree of responsiveness	
11.	moving toward favourable stimuli	
12.	wide variety of stimuli	
13.	energy-requiring processes	
14.	to be known as	

VIII. Find the synonyms:

Words	Synonyms
1)1.determine/2.start/3.change/4.alter/5.define/6.begin	
2)1.breath/2.initiate/3.happen/4.respiration/5.occur/6.start	
3)1.investigation /2.dimension/ 3.research /4.size	
4)1.due to/2.possess/3.ruin/ 4.because of/5.have/6.destroy	

IX. Answer the following questions:

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 cannot?
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?

X. Match the sentence halves:

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.

XI. Read and translate text without a dictionary:

Fact of life:

The continued existence of life depends on reproduction, and this is perhaps the most characteristic feature of living things. Reproduction allows both continuity and change. Over countless generations this has allowed species to become well suited to their environment, and life to evolve gradually to more complex forms.

Food for thought:

a) You might be familiar with the mnemonic (memory aid) `Richard of York Gave Battle In Vain` for remembering the colors of the spectrum – red, orange, yellow, green, blue, indigo, and violet. Suggest a mnemonic for the ten characteristic features of living things described in this unit. You can change the order of the features.

b) Robots can move and respond, and require energy to maintain their organization and a constant internal environment. How would you argue that robots are non-living objects? A robot could be made that has all the characteristic features of living things. Would it still be non-living?

XII. Translate into English:

1. Біологічна наука вивчає усі живі організми, які населяють нашу планету.
2. Навіть у самі далекі часи люди намагалися зрозуміти оточуючий їх світ і володіли досить вагомими знаннями про рослини і тварини.
3. Сучасна біологія почала розвиватися у XVII столітті.
4. Мікроскоп, який був винайдений Левенгуком, дозволив вченим виявити світ мікроорганізмів.

-
5. У XVIII столітті Карл Лінней заклав основи сучасної класифікації живих істот.
 6. Закони спадковості і принцип природного відбору були сформульовані у XIX столітті.
 7. У наші дні знання людини у сфері біології ростуть дуже швидко завдяки комп'ютерним технологіям.

What Do Biologists Do?

I. Working in pairs, discuss these questions with your partner.

1. What do biologists study?
2. What careers in biology can you think of?
3. What areas of biology do you consider as the most important for human society nowadays? Give your reasons.
4. Could you name the key elements of biological investigations?

II. Read and translate the given texts:

Part A. The levels of biological organization:

Biologists study every aspect of life at every level of its organization, from the atoms that make up biological molecules to the ecosystems that form the biosphere.

Here are the levels of biological organization from atoms, the smallest components of living things, to the biosphere, the entire living planet:

- *Biosphere*
- *Ecosystem*
- *Population*
- *Individual*
- *Organ system: digestive system*
- *Organ: stomach*
- *Tissue: smooth muscle*
- *Cell: smooth muscle cell*
- *Organelle: Mitochondrion*
- *Macromolecules: proteins*
- *Chemical building blocks or monomers: amino acid*
- *Atoms: carbon*

Part B. Aspects of biology:

Modern biology is an enormous subject that has many branches. Specialists in some branches include:

- molecular biologists and biochemists who work at the chemical level, with the aim of revealing how DNA, proteins, and other molecules are involved in biological processes;
- geneticists who study genes and their involvement in inheritance and development;
- cell biologists who study individual cells or groups of cells, often by culturing them outside organisms; they investigate how cells interact with each other and their environment;
- physiologists who find out how organ systems work in a healthy body;
- pathologists who study diseased and dysfunctional organs;
- ecologists who study interactions between organisms and their environment. Some focus their attention on whole organisms; others study populations, individuals of the same species living together at one location.

There are also biologists who specialize in particular groups of organisms; for example, bacteriologists study bacteria, botanists study plants, and zoologists study animals.

Biologists are employed in many fields including conservation and wildlife management, industry, health care, horticulture, agriculture, zoos, museums, information science, and marine and freshwater biology. In addition, many biologists are employed as teachers, lecturers, or research workers.

Part C. A letter to students who study biology:

Dear Students,

I am writing this letter to welcome all of you who are about to begin your first year course in Biology here at the university. You might think it is a little early for me to ask you to think about what you will do when you leave here in three years' time. However, our science, like any other, has so many different areas it is impossible to study them all. The first thing you will have to think about is specializing. This letter is to offer you some suggestions to think about for your future.

As you know, there are four main areas of biology that we shall concentrate on in the coming years. Biology can be divided into zoology, the study of animal life, and botany, the study of plant life. We shall also study molecular biology, the study of how the building blocks of living things, the cells, work. Another topic of interest is genetics, how biological information is passed on from one generation to the next: that is, inheritance. You should specialize, but you will also need to know about all of these four areas of study. Plants and animals do not live separately from each other; all living things are made up of cells and one of things genetics tells us is how plants and animals adapt to the conditions around them.

So what about after the course is over and you have graduated in Biology? Can you have a career in biology? For those who choose to specialize in genetics or molecular biology there are important career opportunities in medicine. At the present time, there is a great deal of research going on in gene therapy where biologists are working with doctors and chemists to find new ways of treating diseases. Other biologists are looking at ways of changing the genetic composition of the plants we grow for food; of making them more able to fight diseases and at the same time produce more food.

We are experiencing a period of climatic change too, and this is having an effect on the way animals and plants live. The science of ecology is becoming more and more important; biologists who specialize in zoology are working in many parts of the world. Some are working to protect species like the tiger, which are seriously threatened by climate change. Others are investigating wildlife from the smallest insects to the largest mammals, trying to understand how they all live together. Botanists are looking at the effect new types of food crops have on the environment and how changes in that area can affect our general health. There is even a new area of biology called astrobiology, which is looking at the possibilities of life on other planets – but perhaps that is something for the more distant future.

Whatever you specialize in, as long as there is life on this (or any other) planet, there is work for a biologist.

Good luck and enjoy your studies!

Jean Shearer

Professor of Biology

Part D. The scientific method:

The definition of biology states that it is a `scientific study`. This distinguishes biology from other ways of studying life. However, there

is no single rigid scientific method that biologists use: there are numerous ways of studying life scientifically. Nevertheless, biological investigations usually include one or more of the following key elements:

- observing: making observations and taking measurements
- questioning: asking questions about observations and posing a problem
- hypothesizing: formulating a hypothesis, a statement that explains a problem and can be tested
- predicting: stating what would happen if the hypothesis were true
- testing: testing the hypothesis, usually by carrying out a controlled experiment aimed at producing data that will either support or contradict the hypothesis
- interpreting: interpreting the test results objectively and drawing conclusions that accept, modify, or reject the hypothesis.

A biologist may start an investigation by making observations or by using observations described by other biologists. Such observations may be obtained directly by the senses, such as listening to a bird song, or indirectly through instruments such as recording the song on a computer system. On the other hand, an investigation may start simply by a biologist having an idea that something happens in a particular way, and then the idea will be tested by making observations or carrying out experiments to see if it is valid. A hypothesis is suggested and then tested in all investigations. One essential aspect of a scientific experiment is that it can be repeated by other scientists working independently.

A typical hypothesis makes a clear link between an independent or manipulated variable and a dependent variable. Variables are conditions or factors (such as light, temperature, or time) that can vary or may be varied. In an experiment, the independent or manipulated variable is the one that is systematically changed; the dependent variable is the effect or outcome that is measured. For example, when investigating the activity of an enzyme at different temperatures, temperature is the independent variable that is manipulated by the scientist; rate of reaction is the dependent variable that is measured at each temperature. Other

variables called controlled variables are kept constant or controlled at set levels.

At the end of an experiment, the results must be interpreted as objectively as possible. Sometimes they are so clear that it is obvious whether they support or contradict the hypothesis. Often, however, results are variable and need statistical analysis before conclusions can be made. The conclusions may lead to the hypothesis being accepted, modified, or rejected. Even if results support hypothesis, it is accepted only tentatively because it can never be proved completely. However, it only needs a single contrary observation to refute a hypothesis (prove it wrong or incomplete). A hypothesis is therefore only the best available explanation at any time. This makes biology a highly dynamic subject and not merely a collection of facts.

A typical sequence of events in a scientific investigation:

- *Observations*
- *Questions*
- *Hypothesis (accept, modify, reject)*
- *Predictions*
- *Experiments*
- *Test experiments*
- *Control experiments*
- *Results*
- *Interpretation*
- *Conclusion (accept, modify, reject)*

III. Answer the following questions:

1. What is the difference between a physiologist and a pathologist?
2. Which is the highest level of biological organization on Earth?
3. In an experiment in which the rate of photosynthesis of a plant is measured at different light intensities, which is the independent (manipulated) variable and which is the dependent variable?
4. How can biologists help animals in the wild?
5. What is astrobiology?

IV. Find the synonyms:

Words	Synonyms
1) 1.enormous/2.valid/3.reject/ 4.great/5.refute/6.important	
2) 1.reveal/2.open /3.differ/ 4.take place/5.vary/6.happen	
3) 1.work /2.be involved /3.take part /4.be employed	
4) 1.carry out /2.experimentally /3.fulfill /4.tentatively	
5) 1.change /2.investidation /3.modify /4.research	

V. Fill in the missing words:

№	Term (verb)	Noun
1.	employ	
2.	inherit	
3.	modify	
4.	observe	
5.	measure	
6.	predict	
7.	understand	
8.	discover	
9.	know	
10	contradict	

VI. Use the dictionary and write down the meanings of the given words:

inheritance, interpretation, species, hypothesis, to refute.

VII. Match the words with their definitions:

№	Word		Definition
1	individual	A.	very strict and difficult to change
1.	horticulture	B.	the protection of natural environment

№	Word		Definition
2.	rigid	C.	the natural world in which people, animals and plants live
3.	predict	D.	to say that sth a person has said or written is wrong or untruthful
4.	conservation	E.	a single person or thing, considered separately from the class or group to which he, she, or it belongs
5.	contradict	F.	to say that sth will happen in the future
6.	variable	G.	the art, practice or science of growing fruit, flowers and vegetables
7.	environment	H.	a thing or quantity that can change and be changed
8.			

VIII. Find the English equivalents to the following word combinations:

N	Ukrainian term	English equivalent
1.	Особини одного виду, які живуть в одному місці.	
2.	Крім того, багато біологів працюють вчителями, викладачами вузів або дослідниками.	
3.	Існує багато способів наукового вивчення життя.	
4.	Що відбулося б, якби ця гіпотеза виявилась вірною?	
5.	Вчені можуть повторити експеримент, використовуючи спостереження, отримані іншими біологами.	
6.	З іншого боку.	
7.	Результат необхідно інтерпретувати якомога об'єктивніше.	
8.	Очевидно.	

N	Ukrainian term	English equivalent
9.	Гіпотеза приймається тільки експериментально.	
10.	Підтримати гіпотезу або спростувати її.	

IX. Find the Ukrainian equivalents to the following word combinations:

№	English term	Ukrainian equivalent
1	Such observations may be obtained directly or indirectly.	
2	To carry out a controlled experiment aimed at producing data.	
3	Culturing cells outside organisms.	
4	To refute a hypothesis.	
5	Dysfunctional organs.	
6	In addition.	
7	An essential aspect of a scientific experiment.	
8	Factors that can vary or may be varied.	
9	To draw conclusions that accept or reject the hypothesis.	

X. Read and translate the text without a dictionary.

Fact of life:

No matter how dramatic it is, any discovery must be shared before it can make a contribution to our scientific knowledge. Biologists communicate with each other mainly by means of concise reports called papers.

Typically, a paper contains the aims of investigation, a description of the method used, the results obtained, and a discussion of the significance of the results. The method is described in enough detail to allow someone else to repeat the investigation. Well over one million

original papers are published in the biological sciences each year, in subjects ranging from the behavioural interactions of different animal populations to the analysis of chemical reactions taking place in cells.

Food for thought:

The life sciences have made an enormous contribution to human welfare, especially through their applied branches of medicine, agriculture, and biotechnology. However, an important part of understanding biology and the other sciences is realising their limitations. Science does not, for example, deal with hypotheses that are not testable. Suggest questions that might not be possible to answer using a scientific method.

XI. Translate into English:

1. У наші дні нараховується така велика кількість біологічних дисциплін, що одна людина не може вивчити їх усіх.
2. Студенти повинні вивчити основи чотирьох головних розділів біології: зоології, ботаніки, молекулярної біології та генетики.
3. Генетика вивчає закони спадковості і те, як живі істоти пристосовуються до навколишніх умов.
4. Випускникам біологічних факультетів надається багато можливостей для кар'єрного росту.
5. Медицині потрібні талановиті вчені, які могли б проводити дослідження у сфері генної терапії, вірусних інфекцій та ін.
6. Людство переживає період кліматичних змін, і завдання у нього – передбачити можливі наслідки цих процесів.
7. Екологія вивчає навколишнє середовище і те, яким чином рослини, тварини і люди існують разом і впливають один на одного.

XII. Write a letter to your tutor telling him or her which areas of Biology you would like to specialize in and why.

UNIT 4

PLANTS AND ANIMALS AROUND US

I. Practice the following for pronunciation:

kind [kaɪnd]	classification [ˌklæsɪfɪˈkeɪʃ(ə)n]
provide [prəˈvaɪd]	estimate [ˈestɪmeɪt]
include [ɪnˈkluːd]	clothing [ˈkləʊðɪŋ]
pierce [pɪə(r)s]	easy [ˈiːzi]
describe [dɪˈskraɪb]	

II. Translate the following words paying attention to the affixes:

Estimate (v), estimation (n); provide (v), providence (n); provident (adj.); include (v), exclude (v); describe (v), description (n); classify (v), classification (n); feed (v), food (n).

III. Translate the following word combinations into Ukrainian:

to live and grow inside the body, to keep track of animals, to learn about the living, a system of classification, life depends on...

IV. Put the verb “to be” into a proper tense form:

1. There (to be) many special fields of knowledge and many phases and principles to which elementary training in general biology essential.
2. There (to be) plants which have no apparent blossoms.
3. Among animals there (to be) a great variety of sizes, shapes and colours.
4. There (to be) a system of classification to keep track of this great number of living things.
5. At the dawn of civilization there (to be) only a few sciences.
6. There (to be) places where there (to be) no pronounced seasonal variation in temperature.
7. There (to be) few localities where there (to be) no animal life.
8. There (to be) very few

bioluminescent animals in caves. 9. In nature there (to be) rarely too much oxygen for animal life. 10. There (to be) forms that can reduce their oxygen requirements.

V. Put the verbs in brackets into a proper tense form:

1. No one (to know) how many different kinds of plants and animals there are. 2. Some scientists (to estimate) the number of plants and animals as three million. 3. There (to be) some plants and animals that (to pierce) our skin. 4. Some animals (to feed) on the blood of living things. 5. There (to be) many other living things living and growing inside our bodies. 6. By the present time we (to learn) much about all the living things around us. 7. A system of classification (to be set up).

VI. In the sentences below change the Passive constructions into Active ones:

Example: *Many secrets of life have been discovered by biologists.*
Biologists have discovered many secrets of life.

1. Many secrets of life have been discovered by biologists. 2. Up to the present time it was named and described more than 840 000 kinds of animals and 345 000 kinds of plants. 3. A system of classification has been set up. 4. Plants and animals are sorted into groups according to their structure. 5. The only light in all this darkness is made by animals themselves. 6. One more method of discovering the presence of that illness has been found. 7. A lot of different kinds of plants and animals have been studied, identified and named.

VII. In the sentences below change the Active constructions into Passive ones:

Example: *Some scientists estimate the number of plants and animals as three million.*
The number of plants and animals is estimated as three million.

1. Some scientists estimate the number of plants and animals as three million. 2. Many of the plants provide us with food, clothing, shelter and medicines. 3. Some plants and animals can pierce our skin. 4. Certain plants and animals can cause diseases. 5. Scientists study

living things with great care. 6. We have learned much about all the living around us.

VIII. Translate the following sentences into Ukrainian:

1. Some mistakes **must have been made** in choosing the methods of investigation. Chalk is made of the shells of little animals. They **must have been** tiny things, for you can only see the shells with a very strong glass. 3. The process of decay of some plants **must have been** very gradual and constant. 4. More **might have been said** about how some of the important advances in biochemistry have been made. 5. The discussion of the previous section **must have been made** it clear that in order to understand the problem of life in general, we must look for the solution in the structure and properties of the living cells. 6. There is actually no reason why this experiment **could not have been performed** by this assistant. 7. What seems easy to us now **might not have been** so many years ago.

IX. Make up word combinations using the words below:

Example A: *to live, matter -----living matter*

1. To compose, elements. 2. To grow, plants. 3. To reproduce, animals. 4. To direct, center. 5. To control, animals. 6. To appear, fruits. 7. To surprise, capacities of protoplasm. 8. To separate, membrane. 9. To form, cells. 10. To divide, nucleus. 11. To function, organs. 12. To convince, facts.

Example B: *to consider, problems ----- considered problems*

1. To test, facts. 2. to examine, parts of plants. 3. To remain, elements. 4. To absorb, water. 5. To digest and to assimilate, foods. 6. To control, animals. 7. To know, data. 8. To disclose, characteristics. 9. To conduct, investigation. 10. To grow, plants. 11. To convert, substances. 12. To dissolve, salts. 13. To suspend, substances.

X. Complete the sentences making up Participle constructions from the word combinations given below:

Example A:

Scientists/to classify these organisms differently...

1. Scientists (classifying these organisms differently) refer them to different kingdoms.
2. Scientists (having classified these organisms differently) refer them to different kingdoms.

1) scientists/to investigate these problems; 2) lungs/to carry out the function of respiration; 3) plants/to perform the function of photosynthesis; 4) a group of young scientists/to conduct investigations in the field; 5) the student/to examine a tiny piece of a plant under the microscope; 6) these experiments/to surprise everybody; 7) these characteristics/to change in a new generation of the plants; 8) substances/to permeate through the openings in the membrane; 9) the cell wall/to encase the protoplasm; 10) the discovery of the cell/to play an important role; 11) the cell membrane/to protect the cell against injury.

Example B:

plants to be grouped according to their structure ...

1. Plants (grouped according to their structure) form a gender.
2. Plants (being grouped according to their structure) form a gender.

1) problems/to be investigated by scientists; 2) respiration/to be carried out by lungs; 3) photosynthesis/to be performed by plants; 4) metabolic wastes and excretory products/to be ejected from the cell; 5) the cytoplasm/to be moved to another part of the cell; 6) the nutritive substances/to be passed through the membrane; 7) the green tissue of leaves/to be exposed to light; 8) the foods/to be manufactured by plants; 9) inorganic substances/to be converted in plants into organic ones; 10) mineral salts/to be dissolved in water; 11) water/to be left in the cell.

XI. Use Participle constructions in the sentences below:

Example A:

All the plants which are grown in this region require fertilizers.

All the plants grown in this region require fertilizers.

Example B:

There are living things which live and grow inside our bodies.

There are living things living and grow inside our bodies.

Example C:

A system of classification has been set up. It sorts plants and animals according to their structure.

A system of classification has been set up sorting plants and animals according to their structure.

Example D:

When he conducted his experiments he tried different approaches to the problem.

Conducting his experiments he tried different approaches to the problem.

1. Medicine, physiology and agriculture are fields of knowledge which require elementary training in general biology. 2. There are plants which have no apparent blossoms. 3. Plants have a cell wall which is actually non-living in chemical nature. 4. If some bacteria live and grow inside our bodies they may cause diseases. 5. Some bacteria live and grow inside our bodies and cause diseases. 6. At the conference they discussed the kinds of observations which have been made. 7. We must select the varieties which are being grown for storage. 8. Camels can live in dessert for two or three weeks and eat only dry food and drink no water.

XII. Read the text: Plants and Animals

No one knows how many different kinds of plants and animals there are. Some scientists estimate the number of three million. Many of the plants provide us with food, clothing, shelter and medicines. Some, (including several kinds of insects) pierce our skin and feed on the blood. Some of living things even live and grow inside our bodies. In this way they may cause diseases. You can see why scientists study living things with great care. Our lives may depend on how we have learned about the living around us. Because there are so many different

kinds of plants and animals, the task of a biologist is not easy one. Up to the present time it was named and described more than 840,000 kinds of animals and 345,000 kinds of plants. To keep track of this great number a system of kingdom classification has been set up. Plants and animals are sorted into groups according to the way they are built. For example, the tiger, the leopard, and the lion will be all grouped together. All of them belong to the cat family. All the members of cat family, in turn, belong to a larger group that includes such meat-eating animals as the dog, the bear. They have teeth that are built for tearing and cutting flesh. Their sharp claws help them to capture and eat their prey. In this way, all plants and animals were classified according to their structure. All living plants and animals were divided in two kingdoms: the animal kingdom and the plant kingdom.

Among the smallest and simplest living things there are some that are difficult to classify. They are tiny plant-like cells that can swim about actively in the water. In some cases, the classification of these is still in doubt.

XIII. Find in the text English equivalents to the following Ukrainian words and phrases:

основні завдання біологів, різні види рослин і тварин, бути причиною хвороби, велика кількість живих організмів, вивчати живі організми; відносити(ся) до сімейства (кошачих), у свою чергу, піймати і з'їсти свою здобич, таким чином, у деяких випадках.

XIV. Fill in the blanks with the words from the text:

1. ... bacteria may live inside our bodies. 2. They may ... different diseases. 3. Our lives may ... on how we have learned about the living around us. 4. Scientists study living things with great 5. Up to the ... scientists have named and described a great number of plants and animals. 6. Scientists of a great number of living things. 7. Scientists have ... a system of classification. 8. Plants and animals are ... into groups ... to their structure.

XV. Fill in the blanks with proper prepositions:

1. The life of plants and animals depends ... many factors. 2. Plant cells have been studied ... great care. 3. Even ... the present time scientists discover unknown living things. 4. It is not easy to keep track ... animals in the wild.

XVI. Work in pairs. Ask your partner about:

- the usual colour of plants;
- the flowers that plants usually have;
- the size and shape of plants;
- the difference between plants and animals;
- the main likenesses between plants and animals;
- how some scientists estimate the number of plants and animals;
- things plants and animals provide us with;
- things plants and animals feed on;
- diseases plants and animals may cause;
- the problems which scientists face now and why they face these problems;
- how many plants and animals scientists have named and described;
- reasons which caused the system of classification;
- reasons which make it difficult to keep track of animals;
- the principles according to which plants and animals are classified.

XVII. Classify the following words and fill the table:

vaccine, skin, medicine, flowers, living things, horticulture, man blood, hygiene, animals, cell, farming, penicillin, organ, agriculture, insects, secrets of life, forestry sanitation, plants, sulphur, physiology.

Medicine	Living things	Sciences connected with biology	Structure of the body

LIVING ENVIRONMENT

I. Practice the following for pronunciation:

special [ˌspeʃ(ə)l]	protoplasm [ˌprəʊtəplæz(ə)m]
condition [kənˌdɪʃ(ə)n]	material [məˌtɪəriəl]
desert [ˌdezət]	microscopic [maɪkrəˌskɒpɪk]
mountain [ˌmaʊntɪn]	basic [ˌbeɪsɪk]
oxygen [ˌɒksɪdʒ(ə)n]	property [ˌprɒpəti]
important [ɪmˌpɔːt(ə)nt]	botany [ˌbɒt(ə)ni]
assimilation [əˌsɪmɪˌleɪʃ(ə)n]	zoology [zuˌɒlədʒi]
growth [grəʊθ]	pressure [ˌpreʃə]
reproduction [ˌriːprəˌdʌkʃ(ə)n]	likeness [ˌlaɪknəs]
temperature [ˌtemprɪtʃə]	conscious [ˌkɒnʃəs]
substance [ˌsʌbstəns]	respiration [ˌrespəˌreɪʃ(ə)n]

II. Translate the following words paying attention to the affixes:

Subdivision (n), subdivide (v); define (v), definition (n); exist (v), existence (n); press (v), pressure (n); deep (adj), depth (n); certain (adj), certainly (adv); necessary (adj), necessity (n), necessitate (v); sense (n), sensitive (adj); resemble (v), resemblance (n); proper (adj), properly (adv), property (n); respire (v), respiration (n); assimilate (v), assimilation (n); reproduce (v), reproduction (n); conscious (adj), consciousness (n); fundamental (adj), fundamentally (adv).

III. Match the word combinations in column A with their equivalents in column B:

A		B	
1.	to include facts/principles	a.	жити під високим тиском (води)
2.	in spite of difficult condition	b.	загальні властивості
3.	to live under immense pressure of (water)	c.	мікроскопічна одиниця
4.	important points of resemblance	d.	включати факти/властивості
5.	general properties	e.	помірна кількість тепла
6.	a microscopic unit	f.	важливі риси (особливості) подібності
7.	to take place in the same manner	g.	незважаючи на важкі умови
8.	Moderate amount of heat	h.	протікати (відбуватися) таким же чином

IV. Use the verb “to be” in the sentences below:

1. Biology (to be) the science of living things. 2. The special study of plants called botany (to be) one of the two great subdivisions of the science biology. 3. The living substance of plants and animals (to be) organized into protoplasm. 4. Protoplasm (to be) the basic material of all living systems. 5. The general properties of protoplasm (to be) fundamentally the same in each system, both in plants and animals. 6. Processes common to both plants and animals (to be) respiration, digestion, assimilation, growth and reproduction. 7. They (to be) both of different shapes, sizes and colours. 8. The differences between plants and animals (to be) more apparent than likenesses. 9. Only three of these differences (to be) important.

V. Statements given below are false. Make them true using negative forms. Add new facts to each statement if you can:

1. Scientists know how many different kinds of plants and animals there are. 2. There is some fundamental difference between plant and animal life. 3. Plants are conscious. 4. Plants can move about. 5. This method fits all the areas from which we are going to gain information. 6. There is protoplasm in lifeless matter. 7. Scientists know everything about the fundamental chemical and physical organization of protoplasm.

VI. Put the verbs in brackets into a proper tense form:

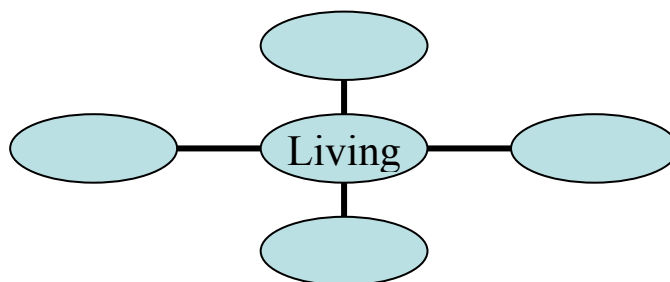
1. The word “biology” (to come) from the Greek words “bio”=life and “logos”=study. 2. Biology (to include) all the facts and principles which have been derived from the scientific study of living things. 3. Life (to exist) in many places in the earth. 4. In the Arctic region the temperature sometimes (to fall) to degrees below zero. 5. In desert the temperature sometimes (to climb) to 120 degrees above zero. 6. Some animals (to live) under the immense pressure of the deep seas. 7. These animals (to live) near the tops of the highest mountains. 8. Certain vital processes (to take) place in plant bodies in the same manner as in animal bodies.

VII. Translate the following. Pay attention to the use of tenses in the “if” and “when” sentences:

1. If the secondary roots outgrow the primary ones, they will give rise to the fibrous root system. 2. If the plant is eaten by an animal, the plant tissues will be digested and carbon atom will be absorbed and assimilated into the body of animals. 3. If the dead body of the plant or animal decays, the carbon atom will be involved in the process of decomposition and return to the atmosphere in a molecule of carbon dioxide. 4. If the plant or animal becomes buried in a peat bog, the carbon atom will become an atom of coal in time. 5. When the coal is burned, the carbon atom will again return to the atmosphere. 6. If living things have access to this or that place and if they find the necessary conditions for their existence there, they will invade it. 7. If you are going to proceed to a new stage of your experiment, there is no time like the present. 8. If water is withdrawn from protoplasm, it will suspend its functions. 9. If water contains salt in such concentration that no osmosis takes place, this water is the most favourable medium for animal life. 10. If water is isotonic with protoplasm, it will be the most favourable medium for animal life. 11. Osmosis doesn't take place between the cell and its surroundings if both contain pure water.

VIII. It is useful to record words which are associated in networks because it can help you to remember them. You can do this in the form of diagram:

What do you associate the word “living” with:



IX. Read the text to find out the details of the conditions living organisms live in and the vital processes taking place inside them.

The Origin of Biology

Biology is the science of living things. The word “biology” comes from the Greek words “bio”=life and “logos”=study. Biology includes all the facts and principles which have been derived from the scientific study of living things. The special study of plants, called Botany, and animals, called Zoology, are the two great subdivisions of the science biology. Plants and animals are called organisms, so biology may also be defined as the science of organisms.

Life exists in many places on the earth, often in spite of very difficult conditions. In the Arctic region the temperature may fall to degrees below zero, while in deserts it may climb over 120 degrees. Some animals live under the immense pressure of the deep seas and other live near the tops of the highest mountains. Let us see what these are: living things need oxygen, living things must have the right amount of pressure, living things must have water, living things need the proper temperature, living things must have food.

Most people think that plants are not alive in the same sense that animals are, or that there is some fundamental difference between plant and animal life. But this is not so. Plants and animals have much in common. There more important points or resemblance are: 1. The living substance of plants and animals is organized into protoplasm. Protoplasm is the basic material of all living systems and its general properties are fundamentally the same in each system both in plants and animals. 2. The living matter is organized in both plants and animals into microscopic units called cells. 3. Certain vital processes take place in plant bodies in the same manner as in animal bodies. These processes are respiration, digestion, assimilation, growth and reproduction. 4. Both plants and animals cannot live without water, air, food, light, and moderate amount of heat.

They both are of different shapes, sizes and colours. In fact, the differences are not so many as the likenesses although they are more apparent, for only three are important, namely: plants are not conscious, they are unable to move about, but they make their own food.

X. Make up five sentences with the word combinations of exercise III.

XI. Use the Passive in the following sentences:

1. Biology includes all the facts and principles derived from a scientific study of living things.
2. Some animals endure the immense pressure of the deep seas.
3. Living things require oxygen.
4. Living things require proper temperature.
5. Plants make their own food.

XII. Translate the following sentences into Ukrainian. Follow the example:

Example:

A man is an organism subject to the same laws of nature as all other higher animals.	Людина – це організм, який підкоряється тим самим законам природи, що і всі вищі тварини.
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1. A man is an organism subject to the same laws of nature as all other higher animals. 2. Some living things including several kinds of insects pierce our skin and feed on the blood. 3. The special study of plants called botany is one of the two great subdivisions of the science biology. 4. The living matter is organized in both plants and animals into microscopic units called cells. 5. Processes common to both plants and animals are respiration, digestion, assimilation, growth and reproduction.

XIII. Test yourself. Give the English equivalence for the following word combinations:

наука про живі організми, основний розділ, падати нижче нуля, глибокі моря, вершини гір, не має значення, визначені необхідні умови, мати потребу в кисні, рівень тиску, відповідна температура, жива речовина, певні життєві процеси, відмінності і подібності.

XIV. Report the following questions, beginning with “Tell me please”:

1. What language does the word “biology” come from?

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2. What are the two greatest subdivisions of the science biology?
What do they study?
 3. What physical factors do living things require for their existence?
 4. What extreme conditions can living things live on?
 5. Is living matter organized into microscopic units called cells?
 6. Why is protoplasm considered to be the basic material of all living systems?
 7. What are the general properties?
 8. What vital processes take place inside the cell?
 9. Is there fundamental and apparent difference between plant and animal life?
 10. How do plants and animals differ in appearance?
 11. What do plants and animals have in common?

XV. Retell the text, using the following phrases:

to come from, in spite of, to be derived from, Arctic region, to fall to, to climb to, to live under the pressure of (the deep seas), to live near the tops of mountains, no matter (where/what), proper temperature, in the (same) sense, fundamental difference between, to have (much, little, nothing) in common, general properties, vital processes, moderate amount of heat, to be of different shapes, sizes and colours.

XVI. Discuss with your fellow student likenesses and differences of plant and animal life, mentioning facts and examples other than those used in the text.

UNIT 5

BIOLOGY AS A SCIENCE

BIOLOGY

Biology is the science of life. The English zoologist Thomas Henry Huxley, who was also an important educator, insisted that the conventional segregation of zoology and botany was intellectually meaningless because scientists now realize that many lower organisms are neither plants nor animals. Today biology is subdivided into hierarchies based on the molecule, the cell, the organism, and the population.

Molecular biology is the branch of biology which spans biophysics and biochemistry. Much is now known about the structure and action of nucleic acids and protein, the key molecules of all living matter. The discovery of the mechanism of heredity was a major breakthrough in modern science. Another important advance was in understanding how molecules conduct metabolism, that is, how they process the energy needed to sustain life.

Cellular biology is closely linked with molecular biology. To understand the functions of the cell – the basic structural unit of living matter – cell biologists study its components on the molecular level. Organismal biology, in turn, is related to cellular biology, because the life functions of multicellular organisms are governed by the activities and interactions of their cellular components. The study of organisms includes their growth and development (developmental biology) and how they function (physiology). Particularly important are investigations of the brain and nervous system (neurophysiology) and animal behavior (ethology).

Population genetics, the study of gene changes in populations, and ecology, the study of populations in their natural habitats, have been established subject areas since the 1930s. These two fields were combined in the 1960s to form a rapidly developing new discipline often called, simply, population biology.

Biology also includes the study of humans at the molecular, cellular, and organismal levels.

Vocabulary. Transcribe and memorize:

Hierarchy, interaction, nucleic acid, brain, protein, behavior, matter, genetics, heredity, human, metabolism, habitat, cell, multicellular.

I. Translate into English:

1. Біологія вивчає живі організми на рівні клітин, молекул, організмів і популяцій.
2. Нуклеїнові кислоти і білок – найважливіші молекули, що входять до складу живих організмів.
3. Біологи вивчають компоненти клітини на рівні молекули, щоб з'ясувати функції клітини.
4. Біологія організмів вивчає ріст, розвиток і фізіологію організмів.
5. Біологія популяції включає генетику популяції і екологію.

II. Answer the questions:

1. What did Thomas Huxley suggest? How did he explain his suggestion?
2. What the most important advances were made in recent years?
3. What is metabolism?
4. Give the definition of the word “cell”.
5. How is organismal biology connected with cellular biology?
6. What does population genetics study?
7. What levels does the study of humans include?

III. Give the main idea of the text: say 1-2 sentences for each passage.

IV. Explain in English the following terms:

Habitat, living organisms, genes, molecule, segregation, matter.

V. Write down 4 types of questions to each sentence:

1. Molecular biology is the branch of biology which spans biophysics and biochemistry.
2. Population genetics and ecology have been established subject areas since the 1930s.
3. The study of organisms includes their growth and development.
4. Population biology was formed as a new discipline in the 1960s.
5. Cellular biology is closely linked with molecular biology.

VI. Make the summary of the text (in writing).

VII. Retell the text.

UNIT 6

BOTANY AS A SCIENCE

BOTANY

Botany is the branch of biology concerned with the study of plants. Plants are now defined as multicellular organisms that carry out photosynthesis. Organisms that had previously been called plants, however, such as bacteria, algae, and fungi continue to be the province of botany, because of their historical connection with the discipline and their many similarities to true plants. Botany is concerned with all aspects of the study of plants, from the smallest and simplest forms to the largest and most complex, from the study of all aspects of an individual plant to the complex interactions of all the different members of a complicated botanical community of plants with their environment and with animals.

Gross observations and experiments on photosynthesis and the movement of water in plants can be made without knowledge of their structure, but explanations of these phenomena require knowledge of morphology – the study and interpretation of plant form, development, and life histories – and of anatomy – the study of plant tissues and their origin and relations to one another.

Such observations were important not only in the development of plant physiology and anatomy but also in the understanding of genetics, the science of heredity, and of evolution. In the 19th century the Austrian botanist Gregor Mendel worked out the basic principles of genetics. His hybridization experiments required knowledge of the function of the various parts of the flower in reproduction, and this knowledge was derived from the experiments of the Dutch botanist Rudolph Jacob Camerarius, who established the nature of sexual reproduction in plants. Mendel's experiments went unnoticed; in the meantime, Charles Darwin founded the theory of evolution (which in

modern form depends on the principles of genetics) without knowledge of Mendel's work. Darwin observed variation and changes in organisms through time, and Mendel worked out the laws governing the assortment and recombination of different traits. The source of differences and changes became known due to the Dutch botanist Hugo Marie de Vries.

Knowledge of anatomy, genetics and evolution has greatly advanced plant classification by providing a rational basis for this subdivision of botany. The 17th-century British naturalist John Ray divided plants into nonflowering and flowering types, and flowering plants into dicots and monocots. The 18th-century Swedish botanist Carolus Linnaeus, however, provided the framework on which modern classifications are based and, just as important, a simplified system of nomenclature in which each plant is given two names: the first the name of the genus and the second the name of the species.

Botany does not depend on the fossil record for information concerning evolution and classification as much as does zoology, because the record for plants is much less complete than that for animals. Botanists – those engaged in the study of plants – occupy themselves with a broad range of activities. Many botanists are in academic positions that involve both teaching and research duties. The latter may involve laboratory work or field studies. Strictly speaking, botany is a pure science concerned with investigating the basic nature of plants.

Vocabulary. Transcribe and memorize:

Plant, photosynthesis, bacteria, algae (alga), fungi (fungus), tissue, flower, reproduction, trait, flowering/ nonflowering, dicots/ monocots, species, to investigate, to concern, to involve, to observe, to work out.

I. Answer the questions:

1. Give the definition of plants.
2. What organisms were previously included in the kingdom of plants?
3. Speak about each of them in short.
4. Speak about the sphere of study of botany.
5. What knowledge does the explanation of photosynthesis require?
6. Speak about the great botanists and their contribution.

7. Speak about the kind of work botanists do.

II. Write down 4 types of questions to each sentence:

1. Botany is concerned with all aspects of the study of plants.
2. In the 19th century the Austrian botanist G. Mendel worked out the basic principles of genetics.
3. Botanists are engaged in the study of plants.
4. Charles Darwin founded the theory of evolution without knowledge of Mendel's work.
5. Knowledge of anatomy, genetics, evolution has greatly advanced plant classification.

III. Translate into English:

1. Ботаніка – розділ біології, що вивчає рослини, гриби і водорості (їх будову, життєдіяльність, географічне поширення, класифікацію тощо).
2. В середині 18 ст. Карл Лінней першим зробив спробу класифікації рослин та розробив штучну систему, розподіливши рослинний світ на 24 класи.
3. Садівництво, сільське господарство і лісівництво також є галузями ботаніки.
4. Винахід мікроскопа створив умови для розвитку анатомії, клітинної біології.
5. В 1856-66 рр. Грегор Мендель провів свої знамениті дослідження, що сприяли розвитку нової науки – генетики.
6. Біологія також вивчає структуру, розвиток і розміщення на земній кулі рослинних угруповань.

IV. Explain in English the following terms:

Species, genetics, anatomy, evolution, reproduction.

V. Give the main idea of the text: say 1-3 sentences for each passage.

VI. Make the summary of the text (in writing).

VII. Retell the text.

UNIT 7

ZOOLOGY AS A SCIENCE

ZOOLOGY

Zoology is the branch of biology devoted to the study of the animal kingdom. The study of zoology can be viewed as a series of efforts to analyze and classify animals. Aristotle was the first to devise a system of classifying animals that recognized a basic unity of plants among diverse organisms; he arranged groups of animals according to mode of reproduction and habitat. He noted that general structures appear before specialized ones, and he also distinguished between asexual and sexual reproduction.

Until the Middle Ages, zoology was a conglomeration of folklore, superstition, misconception, and descriptions of animals, but during the 12th century it began to emerge as a science. The anatomical studies of Leonardo da Vinci were far in advance of the age. His dissections and comparisons of the structure of humans and other animals led him to important conclusions. He noted, for example, that the arrangement of joints and bones in the leg is similar in both horses and humans, thus grasping the concept of homology (the similarity of corresponding parts in different kinds of animals, suggesting a common grouping).

Contemporary zoological studies have two main focuses: on particular taxonomic groups, and on the structures and processes common to most of them.

Taxonomically oriented studies concentrate on the different divisions of animal life. Invertebrate zoology deals with multicellular animals without backbones; its subdivisions include entomology (the study of insects) and malacology (the study of mollusks). Vertebrate zoology, the study of animals with backbones, is divided into

ichthyology (fish), herpetology (amphibians and reptiles), ornithology (birds), and mammalogy (mammals). Paleontology, the study of fossils, is subdivided by taxonomic groups. In each of these fields, researchers investigate the classification, distribution, life cycle, and evolutionary history of the particular animal or group of animals under study.

Morphology, the study of structure, includes gross morphology, which examines entire structures or systems, such as muscles or bones; histology, which examines body tissues; and cytology, which focuses on cells and their components. Physiology is the study of function.

Animal behavioral studies developed along two lines: animal psychology, concentrated on laboratory techniques such as conditioning, and ethology, that has its origins in observations of animals under natural conditions.

The study of the interactions between animals and their environment is known as ecology.

Vocabulary. Transcribe and memorize:

Kingdom, to classify, dissection, conclusion (to conclude), joint, backbone, bone, leg, muscles, horse, vertebrate/ invertebrate, insect, reptile, amphibian, mammal, life cycle.

I. Answer the questions:

1. What can you say about Aristotle's suggestion of animal classification?
2. Do you know any modern classifications? Speak about it.
3. What was zoology until the Middle Ages?
4. What contribution and in what way did da Vinci make?
5. What focuses do modern zoological studies include?
6. What are the two main branches of zoology?
7. What do paleontologists study?
8. Speak about the subdivisions of morphology.
9. What is the difference between animal physiology and ethology?
10. What do ecologists study?

II. Translate into English:

1. Зоологія – це біологічна дисципліна, що вивчає навколишній світ тварин та їх взаємозв'язки з навколишнім середовищем.
2. Засновник етології Конрад Лоренц називав етологію “морфологією” поведінки тварин.
3. Ентомологи вивчають комах, що є корисними або шкідливими для людини (наприклад, павуки, скорпіони, кліщі).
4. Теріологія (маммологія, ссавцезнавство) – це наука про ссавців. Сама людина належить до класу ссавців.
5. Герпетологія – це наука про плазунів та амфібій. Пізніше до неї увійшла батрахологія (наука про земноводних).
6. Орнітологи проводять свої дослідження різними способами: найпростіший — спостереження (birdwatching), а також методом кільцювання птахів (ringing).

III. Give the main idea of the text: say 3 sentences for each passage.

IV. Explain in English the following terms:

Morphology, structure, reproduction, taxonomy, mammals, fossils.

V. Write down 4 types of questions to each sentence:

1. During the 12th century zoology began to emerge as a science.
2. Zoology is the branch of biology devoted to the study of the animal kingdom.
3. The study of zoology can be viewed as a series of efforts to analyze and classify animals.
4. The anatomical studies of Leonardo da Vinci were far in advance of the age.
5. The study of the interactions between animals and their environment is known as ecology.

VI. Make the summary of the text (in writing).

VII. Retell the text.

UNIT 8

ANATOMY AS A SCIENCE

ANATOMY

Anatomy (from the Greek *anatomia* – to cut up, cut open) is a branch of biology and medicine that is the consideration of the structure of living things. It is a general term that includes human anatomy, animal anatomy and plant anatomy.

The history of anatomy has been characterized, over time, by a continually developing understanding of the functions of organs and structures in the body. Methods have also improved dramatically, advancing from examination of animals through dissection of cadavers (dead human bodies) to technologically complex techniques developed in the 20th century including X-ray, ultrasound, and MRI imaging.

Human anatomy is primarily the scientific study of the morphology of the adult human body.

Generally, students of certain biological sciences, paramedics, physiotherapists, nurses, and medical students learn gross anatomy and microscopic anatomy from anatomical models, skeletons, textbooks, diagrams, photographs, lectures and tutorials. The study of microscopic anatomy (or histology) can be aided by practical experience examining histological preparations (or slides) under a microscope; and in addition, medical students generally also learn gross anatomy with practical experience of dissection and inspection of cadavers.

Human anatomy, physiology and biochemistry are complementary basic medical sciences, which are generally taught to medical students in their first year at medical school. Human anatomy can be taught regionally or systemically; that is, respectively, studying anatomy by bodily regions such as the head and chest, or studying by specific

systems, such as the nervous or respiratory systems. A thorough working knowledge of anatomy is required by all medical doctors, especially surgeons, and doctors working in some diagnostic specialities, such as histopathology and radiology.

Vocabulary. Transcribe and memorize:

Medicine, cadaver, X-ray, ultrasound, adult, skeleton, histology, chest, respiratory system, surgeon.

I. Answer the questions.

What does the term “anatomy” mean?

What has the history of anatomy been characterized by?

Speak about methods of investigation used in anatomy.

What is human anatomy?

What do students of certain biological sciences learn?

Which are complementary basic medical sciences?

How can human anatomy be taught?

II. Ask 7 questions to the text. Let your groupmates answer them.

III. Write down 4 types of questions to each sentence:

1. Human anatomy is primarily the scientific study of the morphology of the adult human body.
2. Zoology is a general term that includes human anatomy, animal anatomy and plant anatomy.
3. Human anatomy, physiology and biochemistry are complementary basic medical sciences, which are generally taught to medical students in their first year at medical school.
4. A thorough working knowledge of anatomy is required by all medical doctors, especially surgeons, and doctors working in some diagnostic specialities, such as histopathology and radiology.

IV. Explain in English the following terms:

Human anatomy, physiology, biochemistry, medicine, dissection.

V. Translate into English:

1. Анатомія людини – це розділ анатомії, що вивчає органи та системи органів людського тіла.
2. Видатними представниками грецької медицини та анатомії були Гіпократ, Аристотель.
3. Французький природодослідник Жан Батист Ламарк у своєму творі “Філософія зоології” одним із перших висловив ідею еволюції організму під впливом навколишнього середовища.
4. Учень Платона Аристотель зробив першу спробу порівняння тіла тварин і вивчення зародка і став зачинателем порівняльної анатомії і ембріології.
5. Скелет людини – це тверда структура, утворена сукупністю кісток, яка служить опорою людського тіла.
6. При народженні скелет людини містить близько 270 кісток; до досягнення дорослого віку кількість кісток зменшується приблизно до 206.

VI. Render the whole text.

VII. Retell the text.

UNIT 9

PLANTS

PLANTS

Plant is any member of the plant kingdom comprising about 260,000 known species of mosses, liverworts, ferns, herbaceous and woody plants, bushes, vines, trees, and various other forms that mantle the Earth and are also found in its waters. Plants range in size and complexity from small, nonvascular mosses, which depend on direct contact with surface water, to giant sequoia trees, which can draw water and minerals through their vascular systems to elevations of more than 100m.

Plants are multicellular eukaryotes. They differ from other eukaryotes because their cells are enclosed by more or less rigid cell walls composed primarily of cellulose. The most important characteristic of plants is their ability to photosynthesize. During photosynthesis, plants make their own food by converting light energy into chemical energy – a process carried out in the green cellular organelles called chloroplasts. A few plants have lost their chlorophyll and have become saprophytes or parasites – that is, they absorb their food from dead organic matter or living organic matter, respectively.

Fungi, also eukaryotic and long considered members of the plant kingdom, have now been placed in a separate kingdom because they lack chlorophyll and plastids and because their rigid cell walls contain chitin rather than cellulose.

The various groups of algae were also formerly placed in the plant kingdom because many are eukaryotic and because most have rigid cell walls and carry out photosynthesis. Nonetheless, because of the variety of pigment types, cell wall types, and physical attributes found in the

algae, they are now recognized as part of two separate kingdoms, containing a diversity of plantlike and other organisms that are not necessarily closely related.

The members of the animal kingdom differ from the plants in deriving nutrition from other organic matter; by ingesting food rather than absorbing it, as in the fungi; by lacking rigid cell walls; and, usually, by having sensory capabilities and being motile, at least at some stage.

Many species of organisms in the plant kingdom are divided into several phyla. The bryophytes are a diverse assemblage of three phyla of nonvascular plants that includes the mosses, liverworts, and hornworts. The other phyla are collectively termed vascular plants, or tracheophytes. There are two types of vascular tissue: xylem, which conducts water and minerals from the ground to stems and leaves, and phloem, which conducts food produced in the leaves to the stems, roots, and storage and reproductive organs. Besides the presence of vascular tissue, tracheophytes contrast with bryophytes in that tracheophyte leafy plants are the asexual, or spore-producing, generation of their life cycle.

Vocabulary. Transcribe and memorize the following words:

Moss, liverwort, bush, vine, tree, vascular/ nonvascular, eukaryotes/ prokaryotes, cellulose, organelle, saprophyte, chitin, nutrition, to ingest, to absorb, to lack, motile, phyla, bryophytes, tracheophytes, xylem, phloem, root, stem, leaf.

I. Answer the questions:

1. What is plant?
2. What is the main characteristic of plant?
3. Why is photosynthesis very important for plants?
4. Have all plants ability to photosynthesize?
5. Why have fungi been placed in a separate kingdom?
6. How many phyla are there in the plant kingdom?

II. Explain in English the following terms:

Plant, fungi, algae, photosynthesize, phyla.

III. Write down 4 types of questions to each sentence:

1. Plant is any member of the plant kingdom.
2. The most important feature of plants is their ability to photosynthesize.
3. Many species of organisms in the plant kingdom are divided into several phyla.
4. The members of the animal kingdom differ from the plants.
5. There are two types of vascular tissue.

IV. Translate into English:

1. Царство рослин включає мохи, папороті, трави, кущі, дерева та інші форми.
2. Важливою характеристикою рослин є фотосинтез.
3. Деякі рослини живляться за рахунок інших організмів.
4. Гриби відносять до царства рослин.
5. Рослина живиться за рахунок перетворення енергії світла в хімічну енергію.
6. Багато видів організмів в царстві рослин поділяються на декілька типів.
7. До царства рослин входять різні групи водоростей, так як вони мають тверді стінки клітини і здійснюють фотосинтез.

V. Draw a scheme according to the task that you choose. You should do it with your own hands. It must be simple, understandable and contain explanatory drawings.

- plant classification;
- the classification into kingdoms and domains;
- nomenclature.

VI. Give the main idea of the text.

VII. Retell the text.

UNIT 10

TISSUE SYSTEMS AND PLANT ORGANS

TISSUE SYSTEMS AND PLANT ORGANS

There are many variants of the generalized plant cell and its parts. Similar kinds of cells are organized into structural and functional units, or tissues. Three tissue systems are recognized in vascular plants: dermal, vascular, and ground (or fundamental).

The dermal system consists of the epidermis, or outermost layer, of the plant body. It forms the skin of the plant, covering the leaves, flowers, roots, fruits, and seeds. The epidermis may contain stomata, openings through which gases are exchanged with the atmosphere. The epidermis is covered with a waxy coating called the cuticle, which functions as a waterproofing layer and thus reduces water loss from the plant surface through evaporation. The vascular tissue system consists of two kinds of conducting tissues: the xylem, responsible for conduction of water and dissolved mineral nutrients, and the phloem, responsible for conduction of food. The xylem also stores food and helps support the plant. The ground, or fundamental, tissue systems of plants consist of three types of tissue. The first called parenchyma. The cells of parenchyma tissue carry out many specialized physiological functions – for example, photosynthesis, storage, secretion, and wound healing. Collenchyma functions as support tissue in young, growing portions of plants. Sclerenchyma tissue is important in supporting and strengthening those portions of plants that have finished growing.

The body of a vascular plant is organized into three general kinds of organs: roots, stems, and leaves.

The function of roots is to anchor the plant to its substrate and to absorb water and minerals. Thus, roots are generally found underground and grow downward, or in the direction of gravity. Unlike stems, they have no leaves or nodes. Some roots are important food and storage organs – for example, beets, carrots, and radishes.

Stems usually are above ground, grow upward, and bear leaves, which are attached in a regular pattern at nodes along the stem. Stems are more variable in external appearance and internal structure than are roots. Stems increase in diameter through the activity of lateral meristems, which produce the bark and wood in woody plants. The bark serves as a protective outer covering, preventing damage and water loss. Within the plant kingdom there are many modifications of the basic stem, such as the thorns of hawthorns. Many plants have reduced leaves or no leaves at all. Some stems creep along the surface of the ground other stems are borne underground and serve as food-storage organs.

The leaf is the primary photosynthetic organ of most plants. Many specialized forms of leaves occur. Some are modified as spines, which help protect plants from predators. Insectivorous plants possess leaves that trap and digest insects.

Some leaves are brightly colored to attract pollinators. Perhaps the most highly modified leaves are flowers themselves. The individual parts of flowers – carpels, stamens, petals, and sepals – are all modified leaves that have taken on reproductive functions.

Vocabulary. Transcribe and memorize the following words:

Ground tissue system, seed, fruit, stomata, to exchange, layer, to reduce, evaporation, nutrients, to store, parenchyma, to carry out, underground (adv.), carrot, radish, beet, meristem, bark, protective, to prevent, thorn, to creep, to serve as, spine, insect, pollinator, carpel, stamen, petal, sepal.

I. Answer the questions:

1. What tissue systems do you know?
2. What is the dermal system?
3. What is the vascular tissue system?

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4. What is the ground tissue system?
 5. What are the organs of a vascular plant?
 6. Can you name the function of roots? What is it?
 7. What is the stem?
 8. What forms of leaves do you know?

II. Explain in English the following terms:

Tissue system, parenchyma, collenchyma, sclerenchyma, root, stem, leaf.

III. Write down 4 types of questions to each sentence:

1. Three tissue systems are recognized in vascular plants: dermal, vascular, and ground.
2. The dermal system consists of the epidermis of the plant body.
3. The cells of parenchyma tissue carry out many specialized physiological functions.
4. The body of a vascular plant is organized into three general kinds of organs: roots, stems, and leaves.
5. Stems are more variable in external appearance and internal structure than are roots.

IV. Translate into English:

1. Розрізняють три типи тканин у судинних рослинах: зовнішня, судинна, основна.
2. Епідерміс – зовнішній шар тіла рослини, який вкриває листя, квіти, коріння, фрукти та насіння.
3. Тіло рослини має три основні органи: корінь, стебло, листя.
4. Корінь – це важливий орган для живлення і зберігання поживних речовин.
5. Стебло відрізняється від кореня зовнішнім виглядом та внутрішньою будовою.
6. Листя – це головний орган фотосинтезу рослини.
7. Квітка має такі органи: плодолистик, тичинку, пелюстки, чашолистки.

V. Draw a scheme according to the task that you choose:

- tissue system of a plant organ;
- the structure of a plant organ;
- the diversity of plant organs;
- the structure of a plant.

VI. Give the main idea of the text.

VII. Retell the text.

UNIT 11

ANIMALS

PART I

Animals are multicellular organisms that obtain energy by eating food. They live in a vast range of habitats, from deserts and Arctic tundra to the deep-sea floor.

Like all living things, animals show similarities and differences that enable them to be classified into groups. Birds, for example, are the only animals that have feathers, while mammals are the only ones that have fur. Animals are also classified according to other characteristics, including their internal anatomy, patterns of development, and genetic makeup. Scientists divide the animal kingdom into approximately 30 groups, each called a phylum.

One phylum of animals, the chordates, has been more intensively studied than has any other, because it comprises nearly all the world's largest and most familiar animals as well as humans. This phylum includes mammals, birds, reptiles, amphibians, and fish together with a collection of lesser-known organisms. Some invertebrate phyla contain relatively few species. Vertebrates are customarily divided into cold-blooded (an animal whose temperature is dictated by its surroundings) and warm-blooded animals (is one that keeps its body at a constant warm temperature by generating internal heat).

Few parts of Earth's surface are entirely devoid of animal life. Animals cannot survive in places where water is unavailable or permanently frozen, or where temperatures regularly exceed 55°C. However, in all habitats that lie between these extremes, animal life abounds. In the seas and oceans, the greatest diversity of animal life is found in habitats close to shores. On land, animal habitats are strongly

influenced by climate, the combination of precipitation and temperature conditions experienced in a region. For land animals, the most testing habitats are ones that experience intense drought or extreme cold.

Animals all feed on organic matter, but their diets and way of obtaining food vary enormously. Some animals are omnivores, meaning that they are capable of surviving on a very wide range of foods. Many other animals have extremely precise requirements and cannot deviate from their highly specialized diet. In general, animals eat plants, other animals, or the remains of living things. Plant-eaters, or herbivores, often do not have to search far to find things to eat, and in some cases – for example wood-boring insects – they are entirely surrounded by their food. But plant food can be difficult to digest and is often low in nutrients. Carnivores live on flesh from other animals that is often nutrient-rich and easy to digest but difficult to obtain. Finding and capturing this kind of food calls for keen senses. Some mammalian predators increase their chances of success by hunting in groups. Some position themselves in a suitable location and wait for their prey to come within striking distance. In predatory animals, teeth or other mouthparts often play a part in catching and subduing food as well as in preparing it for digestion.

Wherever they live, animals need oxygen in order to survive. By breathing, or respiring, they extract oxygen from their surroundings and dispose of carbon dioxide waste. Very small animals do not need any special adaptations for obtaining oxygen. Oxygen simply diffuses in through their body surface, with carbon dioxide travelling out the same way. To obtain sufficient oxygen, large animals have to boost their oxygen intake by using special respiratory organs. In water, many animals breathe by using gills.

Vocabulary. Transcribe and memorize the following words:

To obtain, habitat, desert, tundra, bird, feather, fur, internal anatomy, chordates, to comprise, reptile, amphibian, fish, invertebrates/vertebrates, cold-blooded, warm-blooded, to abound, diversity, climate, precipitation, condition, drought, carnivores/ omnivores/ herbivores, keen senses, predator, prey, to hunt, teeth, to subdue, to breathe, gills, to extract, to dispose.

I. Answer the questions:

1. What are animals?
2. What are the main characteristics of animal classification?
3. How many phylum of the animal kingdom do scientists name?
4. What does the phylum chordates include?
5. Where can animals survive?
6. What do animals eat?
7. How can animals breathe?

II. Explain in English the following terms:

Anatomy, chordates, vertebrates, amphibian, birds.

III. Write down 4 types of questions to each sentence:

1. Animals live in a vast range of habitats, from deserts and Arctic tundra to the deep-sea floor.
2. Scientists divide the animal kingdom into approximately 30 groups.
3. Animals all feed on organic matter.
4. Animals need oxygen in order to survive.
5. In the seas and oceans, the greatest diversity of animal life is found in habitats close to shores.

IV. Translate into English:

1. Тварини – багатоклітинні організми, які отримують енергію з їжі.
2. Як усі живі організми, тварини мають подібні і відмінні риси.
3. Вчені виділяють у класифікації тварин 30 типів.
4. Хребетні тварини поділяються на теплокровних та холонокровних.
5. Тварини живляться рослинами, іншими тваринами або залишками живих організмів.
6. На землі є місця, де тварини не можуть існувати.
7. Деякі види тварин об'єднуються у зграї для захисту від ворогів.

V. Give each passage a title, say 1-3 sentences to each passage.**VI. Retell the text.**

UNIT 12

ANIMALS

PART II

All animals can move parts of their bodies. Many simple animals move with the help of microscopic hairlike structures called cilia. Another form of creeping movement, seen in earthworms, involves changes in body shape.

Jointed limbs are found in only two groups of animals: the arthropods and vertebrates. Many animals can glide, but only insects, birds, and bats are capable of powered flight.

Like all living things, animals have limited life spans. Although individual animals eventually die, reproduction ensures that they hand on their characteristics to future generations. Animal reproduction takes two overall forms. In the first form, called asexual reproduction, animals produce offspring without needing a partner. A second and much more common form of reproduction, sexual reproduction, involves two parents. The parents produce sperm and egg cells (gametes), which are brought together to form a fertilized cell (zygote) with a new and unique combination of genes.

Asexual reproduction is relatively easy to achieve because it involves only a single animal. Sexual reproduction is much more complex because the partners often have to find each other and precisely coordinate their reproductive behavior.

In the living world, resources such as food and space are limited. As a result, survival is a constant struggle. Through evolution, animals have developed a range of adaptations that give them the best chances of success. The need to eat exposes animals to the danger of being attacked and eaten themselves. To avoid this fate, all animals have physical adaptations that enable them to escape being attacked or to survive an

attack once it is underway. The simplest form of defense is a rapid escape. Many plant-eating mammals depend on this strategy for survival and must maintain a constant lookout for danger. A less-demanding survival strategy, found in many small animals such as insects, involves deception. These animals use camouflage to blend in with their backgrounds, or they mimic inedible objects such as twigs or bird droppings. A more sophisticated form of mimicry occurs in animals that resemble species that are poisonous. An alternative defense, seen in a wide range of animals, uses armor or spines to fend off an attack (hard shells, overlapping scales, bands of hardened plates).

Many forms of behavior help animals to survive severe environmental conditions. Two examples are hibernation, which enables animals to survive cold and food shortages in winter; and aestivation, which allows animals to survive drought and heat in summer. Special forms of behavior also help animals to find food, to avoid being eaten, and to protect their young. One of the most advanced forms of this behavior is the use of tools. More rarely, some tool-using animals seek out a particular object and then shape it so that it can be used. Defensive behavior is exhibited by individual animals and also by animal groups. Group defense is common in herding mammals, which form a protective ring around their calves when threatened by wolves. Individual defensive behavior is often based on threatening gestures that make an animal look larger or more dangerous than it actually is. Sometimes it involves some highly specialized forms of deception. One of the most remarkable is playing dead.

Vocabulary. Transcribe and memorize the following words:

Locomotion, cilia, earthworm, anthropoids, bat, zygote, to attack, to avoid, to defense, to escape, deception, camouflage, mimic, inedible, poisonous, armor, scales, shell, hibernation, aestivation, herding, to threaten.

I. Answer the questions:

1. How can animals move?
2. What forms of animal reproduction do you know? Describe them.
3. What physical adaptations help animals to survive?
4. What forms of behavior enable animals to survive?

5. What is camouflage?

II. Explain in English the following terms:

Locomotion, cilia, camouflage, aestivation, hibernation.

III. Write down 4 types of questions to each sentence:

1. All animals can move parts of their bodies.
2. Only insects, birds, and bats are capable of powered flight.
3. Animal reproduction takes two overall forms.
4. Many forms of behavior help animals to survive severe environmental conditions.
5. Defensive behavior is exhibited by individual animals and also by animal groups.

IV. Give the feminine of the following nouns:

Gander, ram, bull, stag, tiger, lion, cock, boar, drake, stallion.

V. Give the masculine of the following nouns:

Mare, ewe, goose, tigress, hen, cow, doe, lioness, sow, sheep.

VI. Translate into English:

1. Усі тварини можуть рухати частинами свого тіла.
2. Як і всі живі організми, тварини живуть певний проміжок часу.
3. Впродовж еволюції у тварин розвинулися певні пристосування, що допомагають їм виживати.
4. Багато тварин використовують для захисту камуфляж.
5. Певні форми поведінки допомагають тваринам знаходити їжу, врятуватися від нападу та захистити своє потомство.
6. Існує дві форми розмноження тварин.
7. Щоб пережити посуху і спеку тварини впадають у «літню сплячку».

VII. Give each passage a title, say 1-3 sentences to each passage.

VIII. Retell the text.

UNIT 13

HUMANS

Part I: The Skeleton and the Muscles

The human body is separable into the head, the trunk and the limbs. In the head the skull is distinguishable from the face. The trunk includes the chest (thorax) and the abdomen. Of the limbs there are two pairs – the upper (arms), consisting of the upper arm, the forearm, the wrist and the fingers, and the lower limbs (legs), including the thigh, the leg and the toes.

The bones form the skeleton of the body. The most important part of the skeleton is the backbone. The bones which form the skeleton or bony framework of the body include the bones of the head, the bones of the trunk, the bones of the lower and upper limbs. The bones of the head include the bones which make up the skull and freely movable bone which forms our lower jaw. The bones of the trunk include the spinal column, the ribs and the breastbone. The arms join the body at the shoulder, which consists of two bones - the collar-bone in front, and the shoulder-blade behind. Between the shoulder and the elbow there is only one bone in the arm (humerus), but between the elbow and the wrist there are two (ulna, radius). In the wrist there are eight small bones. Next come the bones of the hand itself. We have twenty-seven bones in the framework of the hand and wrist alone.

We know that the muscles constitute approximately fifty per cent of the total body weight. There are three main types of muscular tissue that we identify and classify on the basis of structure and function: smooth or visceral muscle, striated or skeletal muscle, cardiac muscle.

Smooth muscles can contract slowly. They make up the walls of the internal organs such as those of the blood vessels and the digestive tract. The walls of the blood vessels are contracting and expanding when they

respond to certain chemicals in the blood or in response to the effect of temperature, but we can't cause them to lift our arm or to open our mouth (involuntary muscles). Striated muscles are most necessary for manipulation of the bones of the skeleton. Those are the muscles necessary for walking, running, turning the head and so on. That's why they are sometimes called the skeletal muscles. This type includes all those muscles which must react quickly to changes in the environment, i.e. those that become active through an effort of will (voluntary muscles). A characteristic feature of cardiac muscle is that fibres have neither a beginning nor an end. In other words, the heart is simply a huge net of muscles in which all elements are continuous with each other.

Vocabulary. Transcribe and memorize:

Trunk, limbs, skull, thorax, abdomen, upper arm, forearm, wrist, thigh, leg, toe, backbone, framework, jaw, spinal column, rib, breastbone, shoulder, collar-bone, shoulder-blade, elbow, humerus, ulna, radius, smooth (visceral), striated (skeleton), cardiac, to contract, internal, blood vessels, digestive tract, voluntary/involuntary, fibres.

I. Translate into Ukrainian:

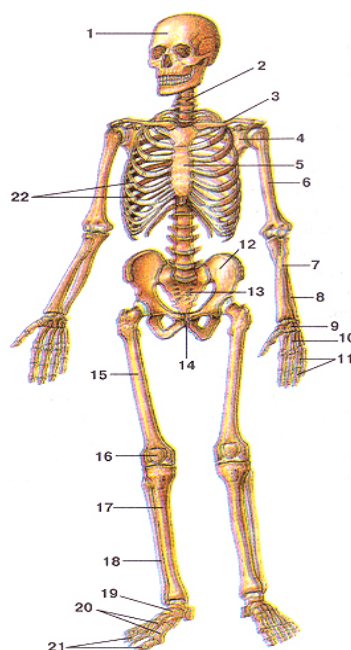
1. The number of the bones in the hand and wrist alone is 27.
2. A separate bone in the vertebral column is called a vertebra.
3. Each hand has four fingers and one thumb.
4. We have no special names for ulna and radius in the modern English language.
5. There is the skull at the upper end of the backbone.
6. There are three bones in each finger.
7. There is no backbone in invertebrate.
8. Naturalists divided all animals into two classes.
9. The bones of the trunk include the spinal column, the ribs and the breastbone.
10. The upper cavity, the thorax, includes the heart and the lungs.
11. The parts of the body are the head, the trunk, and the limbs.
12. Smooth or unstriated muscles contract without any volition.

-
13. Blood vessels are contracting when they respond to the temperature.
 14. The bones of our body make up the skeleton.
 15. The word “muscle” means “little mouse” in Latin.
 16. Cardiac muscle is under involuntary control.
 17. The involuntary muscles control the beating of the heart.
 18. The walls of the blood vessels are expanding when they respond to certain chemicals in the blood.
 19. The skeletal muscles are the organs of muscle system.
 20. Smooth muscles form the muscular coat of internal organs, blood vessels and skin.
 21. We call the muscles that form internal organs visceral muscles.

II. Translate into English:

1. Хребетні тварини утворюють клас вищих тварин.
2. Ребра захищають серце, легені та інші органи грудної клітки.
3. За структурою і функціями м'язи можна розділити на три групи.
4. Гладенькі м'язи скорочуються мимовільно.
5. Поперечно-смугасті або скелетні м'язи реагують на зміни в оточуючому середовищі.

III. Write the bones of the skeleton according to the task:



IV. Speak about the bones of the lower limbs. You may use the passage in which the bones of the upper limbs are described.

V. Speak about the functions of the muscles:

- smooth /visceral/;
- striated /skeletal/;
- cardiac.

VII. Make the summary of the text.

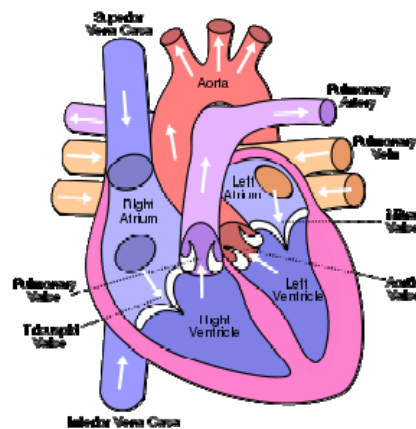
VIII. Retell the text.

UNIT 14

HUMANS

Part II: The Circulatory System. Respiration.

The cardiovascular system is the system of blood circulation. By the cardiovascular system we mean the heart, the arteries, the veins and the capillaries of the human body. The centre of the circulatory system is the heart. It lies in the thoracic cavity and has four chambers. The right heart consists of an upper chamber – the atrium or the auricle – and a lower chamber – ventricle. Between these two chambers is a one-way valve, the tricuspid valve. The left heart has two chambers, but the valve that separates them is called the mitral valve. The right heart receives blood (which is a red fluid) from the veins and pumps it into the lungs by way of the lesser circulatory system. In the lungs the blood receives oxygen. Then it moves into the left heart. From the left heart the well-oxygenated blood moves into a large artery, the aorta. The blood returns to the heart by means of the veins.



Blood vessels that receive blood from the ventricle and lead it away from the heart and towards other organs are arteries. The arteries

continue to divide and form smaller and smaller vessels and finally divide into capillaries. Gradually the capillaries begin to join into larger vessels – the veins. The pulmonary vein carries the freshly oxygenated blood to the left auricle. The pulmonary artery and the pulmonary vein make up the pulmonary circulation.

The term “respiration” means the exchange of gases, which takes place between the living organism and the environment. It is the process by which the body cells and tissues make use of oxygen and carbon dioxide or the waste products of respiration are removed. Air is breathed through either the mouth or nose into oral cavity (pharynx). It then passes through the voice box (larynx) into the trachea. The trachea divides into two smaller tubes (bronchi), one is going to each lung. The bronchi divide into tiny passage-ways that are named bronchioles, which lead to air sacs (alveoli). The exchange of life-giving gases is effected through the walls of the alveoli.

Inhaled air contains about 20 per cent oxygen and four hundredths of one per cent carbon dioxide. Exhaled air consists of approximately 16 per cent oxygen and 4 per cent carbon dioxide. Nitrogen, which makes up about 79 per cent of the atmosphere, is not involved in the breathing process. When the air is inhaled into the lungs, a portion of the oxygen is passing into the blood and is being circulated through the body. At the same time, carbon dioxide is being diffused of the blood into the lungs and exhaled.

Vocabulary. Transcribe and memorize:

Cardiovascular, blood circulation, pulmonary, artery, aorta, vein, capillaries, thoracic cavity, atrium/ auricle, ventricle, valve, to separate, tricuspid, mitral, to pump, lung, to breathe, pharynx, larynx, oral cavity, trachea, bronchi, passage-way, bronchioles, inhale/ exhale, approximately.

I. Translate into Ukrainian:

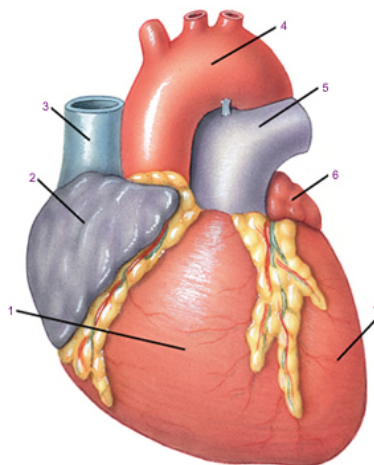
1. The heart makes 70-80 contractions a minute.
2. The veins are larger than capillaries.

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3. The aorta is the largest artery which distributes the blood throughout the body.
 4. The blood reaches the arteries, because of the contraction of the heart.
 5. The walls of the arteries and veins are thicker than those of the capillaries.
 6. There are no blood capillaries in certain parts of the body.
 7. We call the valve that separates the chambers, the atrium and the ventricle, the mitral valve.
 8. The heart is a hollow organ and has four chambers.
 9. We call the three major types of blood vessels: the arteries, veins and capillaries.
 10. The heart pumps the blood into the lungs by the circulatory system.
 11. From the left heart the blood is pumped into the aorta.
 12. Harvey collected ideas of the circulation of blood which until then had been studied but not confirmed by the experiments.
 13. When the left ventricle is contracting its contained blood is being forced into the aortic artery.
 14. The total number of alveoli in the lung has been estimated as 750 millions.
 15. Respiration is usually thought of as the mechanical process of breathing.
 16. Air is breathed into the lungs 20 times a minute all our life.
 17. The lungs are built of the alveoli and through the bronchi, larynx, pharynx, mouth cavity and nasal ones they expire CO₂ and inspire oxygen.
 18. The term “respiration” means the exchange of gases.
 19. The exchange of gases varies according to the size and activity of the organism.
 20. The right lung that is slightly larger of the two is divided into three lobes.
 21. It is possible to remove one lobe of the lung without any damage to the rest.

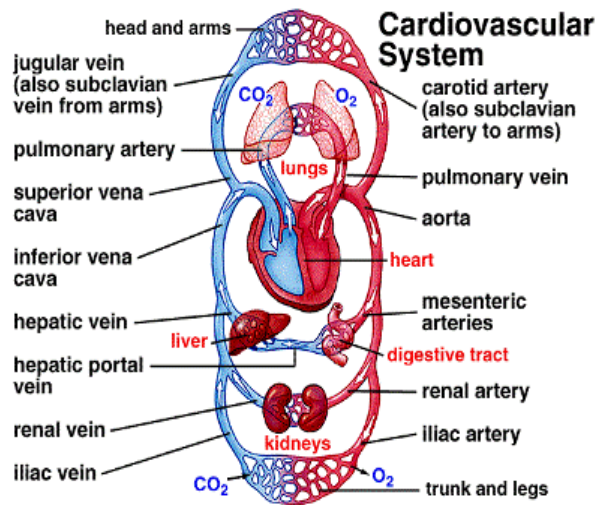
II. Translate into English:

1. Серцево-судинна система включає серце, артерії, вени і капіляри.
2. Кров рухається до серця по венах.
3. Права і ліва частини серця складаються з двох камер: передсерця і шлуночка.
4. При скороченнях лівого шлуночка кров проштовхується в аорту.
5. Стінки капілярів такі тонкі, що поживні речовини і кисень проникають через них в тканини.
6. Дихання властиве всьому живому – як тваринам, так і рослинам.
7. У процесі дихання тканини поглинають кисень, а CO₂ - виводиться з організму.
8. Повітря, яке ми видихаємо, містить близько 20% кисню.
9. Бронхи поділяються на дрібні повітроносні шляхи, які називаються бронхіолами.
10. Зупинка дихання навіть на кілька хвилин призводить до смерті.
11. Верхня частина дихальної системи служить для проведення повітря і відтворювання голосу; вона складається з носа, глотки, гортані, трахеї і бронхів.

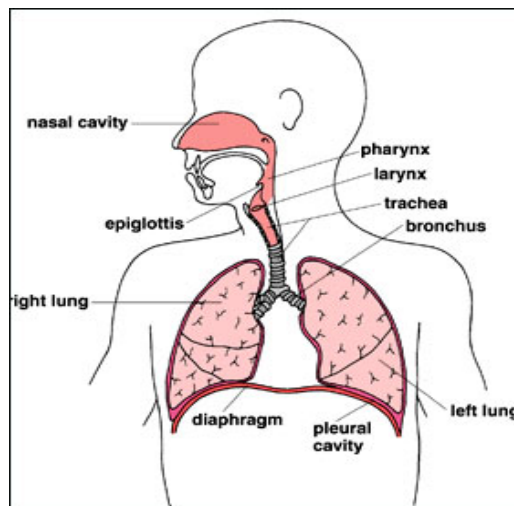
III. Write down the parts of the heart. Describe the way of the blood through the heart.



IV. Speak about the large circulatory system. Describe the process.



V. Speak about the way the air makes when it is got inside our body.



VI. Speak about the contents of inhaled and exhaled air.

VII. Make the summary of the text (in writing).

VIII. Retell the text.

UNIT 15

HUMANS

Part III: The Abdomen. Foods

The abdomen is the largest cavity of the body. The organs of the abdominal cavity are the liver, the gall-bladder, the stomach, the intestines, the pancreas, the spleen, the kidneys and the bladder. The liver lies under the right ribs. It weighs about one and a half (1.5) kg. The liver secretes bile, which detoxifies some toxic substances. The gall-bladder lies beneath the right lobe of the liver. It serves as a bile reservoir. The stomach lies under the left ribs and extends across to the right. It serves as a container of food, which is partly digested in it. The size and shape of the stomach vary with any amount of food. Its capacity is some 1-2 litres. The intestines occupy chiefly the central portions of the abdominal cavity. In the small intestine the food undergoes further mechanical and chemical changes. As the contents of the small intestine cannot move back they may freely pass into the large intestine.

Every cell of the human body requires certain chemical nutrients to supply them the body must break down complex foods into molecules to pass through tissues and be delivered by blood or lymphatic systems to the various body cells. This break of insoluble forms is known as digestion.

Foods are substances which when taken into the body yield energy on oxidation, build new tissue, repair old tissue and play an essential role in growth and nutrition. Foods are to be divided into two general classes. These are inorganic and organic foods. The former class includes inorganic salts and water. The latter class includes carbohydrates, fats and proteins.

Proteins are found most abundantly in muscles. Fat is concentrated in the adipose (fat) cells under the skin and around the intestines. Carbohydrates are found mainly in the liver, muscles and blood. Carbohydrates are known as the chief source of energy. The absence of carbohydrates upsets the fat and protein metabolism. As for the minerals, high levels of calcium and phosphorus form part of the bones and teeth, sodium and chloride are found mainly in the body fluids, potassium is the main mineral in the muscles, iron is essential to red blood cells, and magnesium is found throughout the body.

Other types of food (vitamins) needed in very small amounts for various functions of the body are essential. They are found in certain foods and are necessary for the growth, development and general health of the body. Such foods include milk and many products made from it, all green leafy vegetables like cabbage, spinach, other fresh vegetables, fruits and fruit juices, whole-grained cereals, eggs and number of others. You determine how you feel throughout each day by the type of breakfast you eat. Your energy production, which corresponds to the quality of sugar available, determines how you think, act and feel.

Vocabulary. Transcribe and memorize:

Liver, gall-bladder, stomach, intestines, pancreas, spleen, kidneys, bladder, bile, nutrients, lymphatic, carbohydrates, fat, protein, adipose cells, cabbage, spinach, whole-grained cereals.

I. Translate into Ukrainian:

1. The liver plays a very important part in the vital activity of the organism.
2. It secretes bile which participates in the digestive process and has a defensive function, i.e. some toxic substances are detoxified in the liver.
3. The stomach is a bag the walls of which are largely made up of involuntary or smooth muscles.
4. It is the gastric glands in the stomach that secrete gastric juice, which is acid and acts on meals.
5. After the food leaves the stomach it is acted on by several enzymes.

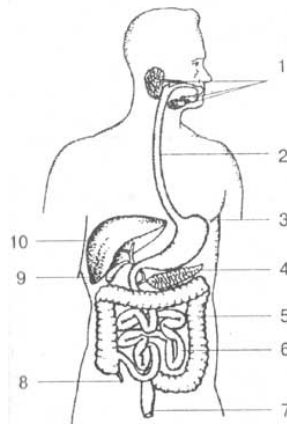
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6. After the food is properly prepared it is absorbed into the lymph and blood vessels.
 7. Salivary glands, liver and pancreas are situated outside the digestive tract.
 8. The muscles of different types form the walls of the intestine.
 9. It is known that the abdomen is the largest cavity of the body.
 10. Nutrients are substances that help your body to grow and develop.
 11. There was general agreement that the patient's diet should be rich in protein and carbohydrates, but poor in fat.
 12. The vitamins are substances which must be found in the diets of animals in order they can utilize the organic foodstuffs to best advantage.
 13. The present investigation is carried out to determine the liver functions in experimental dogs.
 14. It is advisable to study the movements of the stomach by means of X-rays.
 15. Protein is essential for growth and repair.
 16. The most convenient approach to understand metabolism is to examine the properties of different sorts of foods.
 17. The carbohydrates animals most commonly ingest consist of a variety of sugars.
 18. Vitamins are organic chemical compounds to be present in the diet.
 19. Certain foods are the best sources each body requires.
 20. Vitamin K is produced by intestinal bacteria.
 21. Scientists have studied the deficiency diseases for many years.
 22. The body is known to utilize six kinds of food-stuffs - carbohydrates, proteins, fats, water, mineral salts and vitamins.

II. Translate into English:

1. Відомо, що печінка, розташована у правому підребер'ї, є одним з найбільших органів.
2. Вона виконує декілька життєво важливих функцій.
3. Саме в печінці знешкоджуються деякі токсичні речовини.
4. Продукти харчування, які ми вживаємо, можна розподілити на два загальні класи. Це органічні і неорганічні речовини.

5. Додаткові речовини, що має містити наша дієта, це — вітаміни.
6. Відсутність або нестача вуглеводів в організмі порушує жировий і білковий обмін.

III. Write down the internal organs that you know:



IV. What is digestion? Describe the process of digestion in any form you like.

V. Make the table of foods sources according to the task:

a)

FOODS	MEANING	PRODUCTS
<i>fats</i>		
<i>carbohydrates</i>		
<i>proteins</i>		

b)

VITAMINS	MEANING	PRODUCTS

VI. Make the summary of the text (in writing).

VII. Retell the text.

UNIT 16

HUMANS

Part IV: Endocrine Glands. The Nervous System. Senses.

There are two organ systems – the nervous system and the endocrines – which coordinate the activities of all others. Thus, the thyroid gland stimulates the metabolism of all bodily parts. The adrenal medulla mobilizes the activities of many organ systems in case of the emergency. And the adrenal cortex exercises control over many body functions, so important that its removal results in failure of the functions and the death of an animal.

Endocrine glands or glands of internal secretion are ductless glands, that is, they empty their secretion – chemical substances called hormones – directly into the blood stream. Many of hormones affect metabolism and the activity of the cardiovascular and other systems. The activities endocrine glands are regulated by the nervous system, particularly through the hypophysis. It is the gland which consists of an anterior lobe, an intermediate part and a posterior lobe. Anterior lobe is necessary for proper growth to adult stature, for normal development and function of the reproductive system and for control the activities of other endocrine glands.

The hypophysis is connected with the hypothalamus, which secretes special substances to regulate the secretion of the hypophysical hormones.

The nervous system is made up of the nerve cells with their fibres. Nerves lead from the spinal cord or from the brain to each part of the body. Then they lead from each part of the body back to the brain or spinal cord. The brain is made up of three parts. The cerebrum sits like a cap on the cerebellum. And the medulla is that long portion connecting

the brain with the spinal cord. The cerebrum has certain parts that do certain work. Studying human beings with accidental injuries of brains helped scientists to get information about these areas. Many experiments have shown that the brain is the centre of feeling and understanding. The nerve cells in the brain can be “put to sleep” with ether or other anaesthetics.

Sense organs are specialized endings of the sensory division of the peripheral nerves. We are commonly thought to possess five senses. Actually, there are many more. We may classify them as follows: 1) the cutaneous senses – touch, heat, cold and pain; 2) the deeper senses – pressure and muscle sense; 3) the internal senses, or senses from the internal organs of the body; 4) the special senses, or those in which the receptors lie in special organs – sight, hearing, equilibrium, taste and smell; and finally 5) the general body senses – hunger, thirst, fatigue, sexual sensation, etc.

Vocabulary. Transcribe and memorize:

Endocrine, thyroid gland, adrenal medulla, adrenal cortex, emergency, ductless, internal secretion, hormone, hypophysis, stature, reproductive, hypothalamus, cerebrum, cerebellum, sense, cutaneous, sight, equilibrium, taste, smell, thirst, fatigue.

I. Translate into Ukrainian:

1. Thus, the thyroid gland stimulates metabolism.
2. Hormones affect metabolism and the function of the cardiovascular system.
3. The functions of the endocrine glands are interconnected.
4. The hormones either stimulate or depress the activity of various organs.
5. The activities of endocrine glands are regulated by the nervous system.
6. The hypophysis is believed to be the chief endocrine gland.

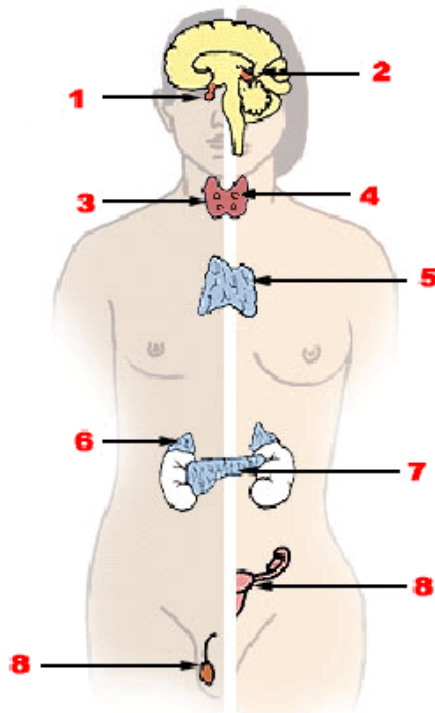
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7. Cells need oxygen to carry metabolic processes.
 8. There are more senses than we are commonly thought to possess.
 9. The spinal cord and the brain regulate motor activity.
 10. The brain is the primary centre for regulating and coordinating body activities.
 11. The man receives his information concerning the outside world through his sense organs.
 12. We know the position of an arm or leg without looking at it.
 13. The conditioned reflexes discovered by I.P. Pavlov are the mechanism through which the body responds to the outside world in avoiding injury, obtaining food and performing many more complex acts.
 14. The brain has many different parts controlling different aspects of the body functions.
 15. The cerebellum is located beneath the posterior part of the cerebrum, its function being to aid in the coordination of voluntary movements and to maintain balance and muscular tone.
 16. The Professor told us about the diagnosing the hypophysis disfunctions.
 17. If you ascend in the atmosphere as in flying an airplane, climbing up a high mountain, or riding a fast elevator, the atmospheric pressure, and that in the outer ear will drop, while that in the middle ear remains the same.
 18. All sensations such as touch, pain and temperature are lost if cerebral hemispheres are destroyed.

II. Translate into English:

1. Нервова і ендокринна системи координують і стимулюють діяльність організму.
2. Зниження функції або зменшення активності ендокринних залоз викликає (провокує) зміни в роботі всього організму.
3. Діяльність усіх ендокринних залоз взаємозв'язана і регулюється гіпофізом.
4. Нервова система контролює роботу ендокринних залоз.
5. Багато наукових досліджень підтвердили той факт, що саме мозок є центром почуттів і розуміння.

-
6. Клітинам потрібен кисень, щоб керувати метаболічними процесами в організмі.
 7. Людина отримує всю інформацію з навколишнього світу через органи відчуттів.

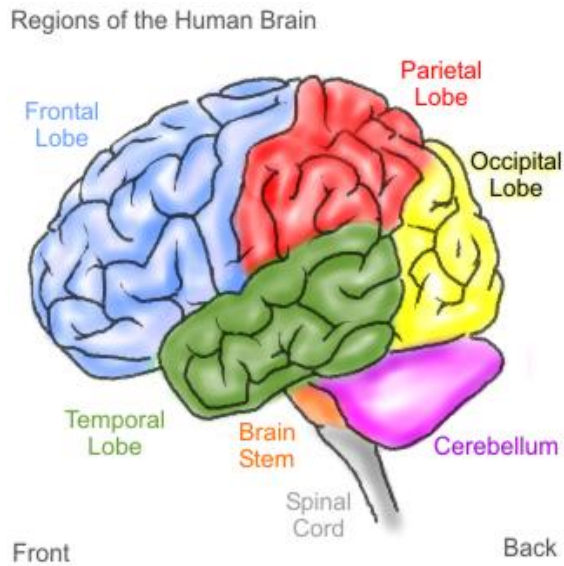
III. Write down the organs that are familiar to you:



IV. Determine the class of a sense present in the following situations:

1. It's rather a problem to walk along the roads in winter as they are partly covered with ice.
2. I won't eat even a piece, my stomach is full.
3. I hate camping – wherever you go there is always a great amount of mosquitoes.
4. I need to sleep.
5. I feel short of breath and I'm constantly coughing.

V. Look at the brain. You see what parts of the brain control different activities. Read the titles and speak about the brain of a man.



VI. Make the summary of the text (in writing).

VII. Retell the text.

FINAL CREDIT TEST

Part I

Topics for discussion:

1. Natural studies. Its branches and activities.
2. Diversity of the biosphere. Classifications.
3. Plants. Classification. General characteristics.
4. Protista. General characteristics. The main representatives.
5. Insects. General characteristics.
6. Fish. Internal anatomy.
7. Reptiles. Internal anatomy.
8. Amphibian. Internal anatomy.
9. Birds. Internal anatomy.
10. Mammals. Classification. Internal anatomy.

Part II

Individual tasks (to be done in writing):

(Choose the topic you are interested in and prepare a short report or composition. Your opinion is important).

1. My view of the origin of life (based on theories or the theory of your own).
2. My opinion of a possible end of the world (from the scientific point of view).
3. The place of a human being in the natural hierarchy.
4. The aim of biology.
5. Is our world knowable (cognizable) or is it not? Are we able to learn all the secrets of nature?
6. What is NATURE for you? Is it only your surrounding or anything more?
7. What is death? Do you believe in anything after death? What is it (if you do)?

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 recognized 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 synthesize 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, e.g. 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 protocista 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** A 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 see what 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 plant of 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.

LATIN POPULAR EXPRESSIONS

Ad exemplum (a.e.) – За зразком.

Alea iacta est. – Жереб кинуто.

Anno Domini (A. D.) – від Різдва Христового, нашої ери.

Ad hoc – за місцем призначення, для цього, для даної події, з цією метою.

Ante meridiem (a.m.) – до полудня.

Post meridiem (p.m.) – після полудня.

Circa (ca.) – приблизно (відноситься до дати).

Et alia (et al.) – і таке інше.

Alma mater. – Мати-годувальниця (традиційна образна назва навчальних закладів).

Alter ego. – Друге я; близький друг, однодумець.

Aurea mediocritas. – Золота середина.

Contra – Проти.

Contra spem spero. – Без надії сподіваюсь.

Curriculum Vitae – життєпис, короткі відомості про життя будь-якої особи.

De facto. – Фактично.

De jure – Юридично, формально.

Dictum – factum. – Сказано – зроблено.

Docendo discimus. – Навчаючи, вчимося.

Errare humanum est. – Людині властиво помилятися.

Et caetera (etc). – І так далі, та інше.

Ex nihilo nihil. – З нічого – ніщо.

Ex professo – за своєю спеціальністю, професією.

F.V. (Folio verso) – На наступній сторінці.

Homo sapiens. – Людина розумна.

Ibidem (ib., Ibid.) – Там же.

Idem (Id) – Теж саме, також.

Id est (i. e.) – Тобто.

Ignorantia non est argumentum. – Незнання – не довід.

Inde – Отже.

In scientia naturali principia observationibus confirmari debent. – У природничій науці принципи мають підтверджуватися спостереженнями.

In situ – на місці, у визначеному стані або умові– у сучасній мові вживається переважно у природничо-наукових текстах.

Ex situ – протилежне " *in situ*".

Opere citato (ор. cit.) – робота, яка цитується/у процитованій роботі) – вираз використовується у примітках для спрямування читача до більш раннього цитування.

Sic – так, «таким чином, саме так. Вживається для того, щоб показати, що попереднє неправильне або незвичне написання є цитатою, а не помилкою набору.

Item – Також.

Liber est mutus magister. – Книга – це німий учитель.

Maiori cede. – Поступайся старшим.

Mens sana in corpore sano. – У здоровому тілі здоровий дух.

Modus vivendi. – Спосіб життя.

Multi multa sciunt, nemo omnia. – Багато хто знає багато, ніхто всього.

Natura arte adiuta interdum facit miracula. – Природа за допомогою мистецтва (науки) інколи робить дива.

Natura est semper invicta. – Природа завжди непереможна.

Natura nihil facit frustra. – Природа нічого не робить даремно.

Natura rerum. – Природа речей.

Naturalia non sunt turpia. – Природне не огидне.

Nomen nescio (N. N.) – Без імені, невідома особа.

Nota bene! (NB!) – Познач добре, зверни увагу.

Nulla aetas ad discendum sera. – Вчитися ніколи не пізно.

Nulla regula sine exceptione. – Немає правила без винятку.

Omnia mea mecum porto. – Все своє ношу з собою.

Per aspera ad astra. – Через терни до зірок.

Post factum – Після того, як щось вже відбулося.

Post scriptum (P.S.). – Після написаного, приписка в кінці листа, постскриптум.

Potius sero quam nunquam. – Краще пізніше, ніж ніколи.

Repetitio est mater studiorum. – Повторення – мати навчання.

Scientia potentia est. – Знання – сила.

Scilicet (Scil.) – А саме, тобто.

Sine anno (S. A.) – Без зазначення року (видання книги і т.д.)

Sine loco (S. L.) – Без зазначення місця (видання книги і т.д.)

Tabula rasa. – Чиста дошка; щось неторкнуте.

Terra incognita. – Невідома земля; щось незнане.

Tertium non datur. – Третього не дано.

Usus optimus magister est. – Досвід – найкращий вчитель.

Vale! – Будь здоровий, прощай!

Veni, vidi, vici. – Прийшов, побачив, переміг.

Verba magistri. – Слова вчителя, авторитетної людини.

Vice versa – На іншій стороні, навпаки.

Vis medicatrix naturae. – Цілюща сила природи.

Videre licet, videlicet (viz.) – а саме.

Vide – дивись.

Vide ante – дивись перед.

Vide infra – дивись нижче.

Vide post – дивись після.

Vide supra – дивись вище.

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Навчальне видання

**АНГЛІЙСЬКА МОВА
ЗА ПРОФЕСІЙНИМ СПРЯМУВАННЯМ
ДЛЯ СТУДЕНТІВ ПРИРОДНИЧИХ
СПЕЦІАЛЬНОСТЕЙ**

ENGLISH FOR BIOLOGY STUDENTS

Навчальний посібник

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