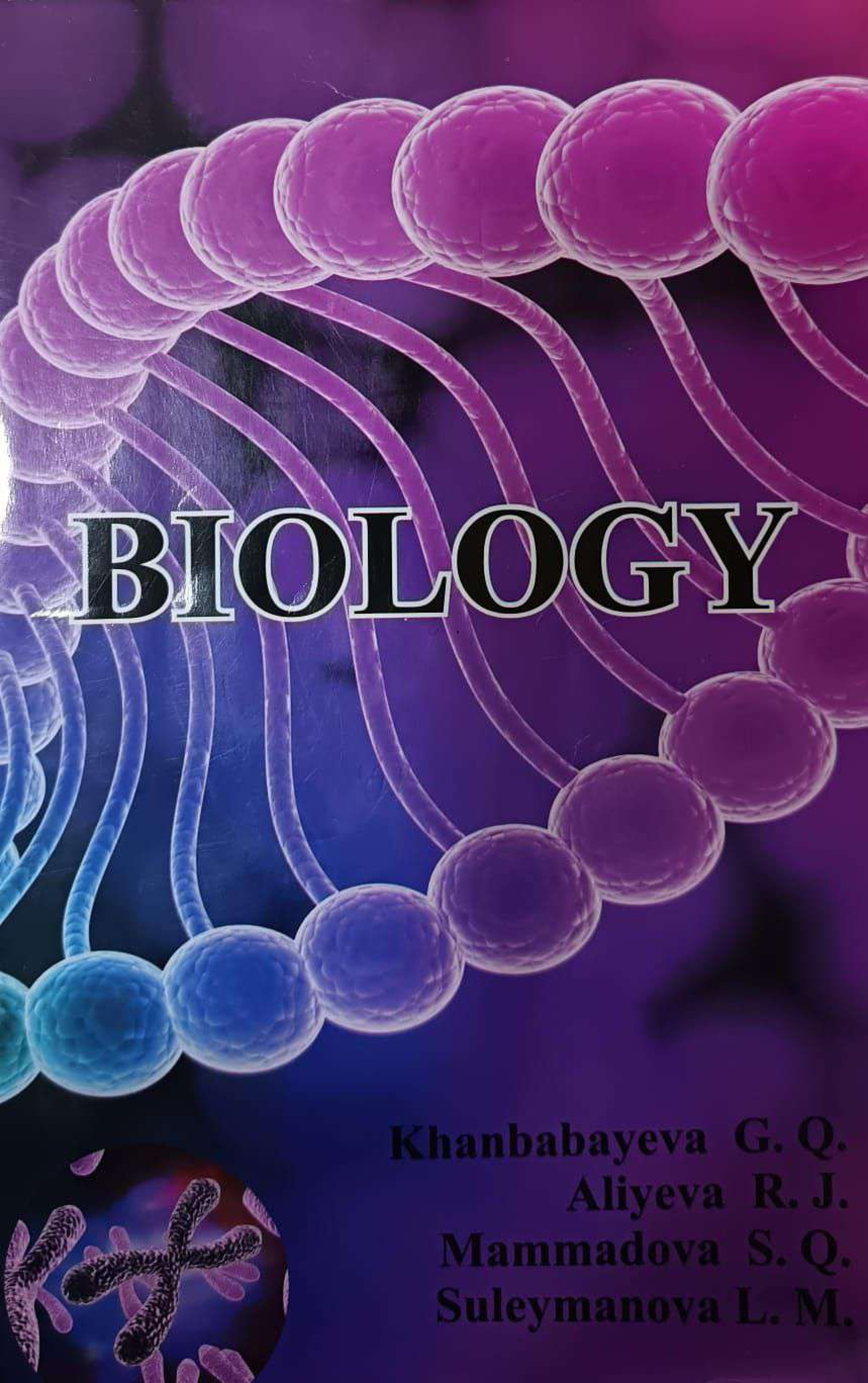

BIOLOGY

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BIOLOGY

for the students of Master's degree

Manual

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This manual on the course of "Biology" is intended for students of master`s degree, it should also be useful for the school-leavers, entrants and teachers of schools studying in English.

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PREFACE

Profound knowledge of fundamentals of biology is necessary for successful entrance and further education in universities of medical and biological profiles.

The biology is theoretical base of medicine therefore to the entrants going to the universities of a medical and biological profile, great demands are made. Entrants have to show knowledge of the basic concepts and the laws concerning a structure, functioning and development of plant, animal and human organisms.

All sections of the textbook are given approximately with the identical depth and degree of difficulty. The order of their arrangement corresponds to the school program.

The main task of the textbook is to help to understand the entrant the most important and difficult questions of the program. It doesn't duplicate school textbooks, and explains basic provisions of the sections in biology course.

The book contains three sections, each of which gives answers to all questions of the program.

Authors

I

chapter

BOTANY

Unit 1. CLASSIFICATION OF PLANTS

Plants dominate all terrestrial communities, from forests to pastures, from lands to deserts. They provide most of our food (directly and indirectly), as well as much of our shelter, clothing and medicines. Green plants and other photosynthetic organisms use the energy in sunlight to combine carbon dioxide (CO_2) from the air and water from the soil to make food. This food-making process is called photosynthesis (figure 1). Photosynthesis provides plants with the food energy needed for growth and development. Photosynthesis also provides energy to animals that eat the plants. The following simple equation summarizes the overall process of photosynthesis:

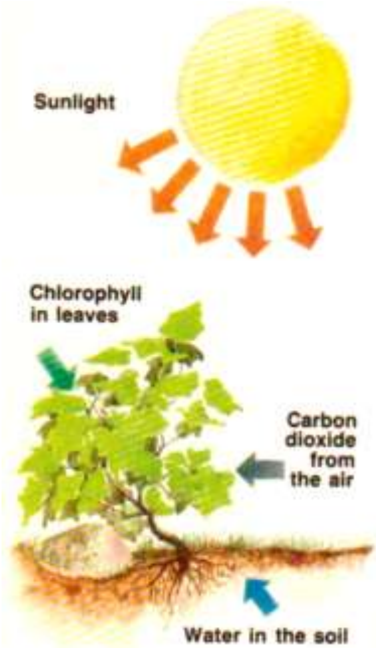

Figure 1 *Photosynthesis*

$$6CO_2 + 12H_2O + light = C_6H_{12}O_6 \text{ (glucose)} + 6H_2O + 6O_2$$

More than 500 000 organisms have been classified in the Plant kingdom. Botanists have divided the Plant kingdom into two groups, or divisions. The divisions of the Plant kingdom are based on how water and dissolved minerals are moved throughout the plant. The two divisions are the tracheophytes and bryophytes.

In tracheophytes, water and nutrients move through tubelike cells to all of the plant's structure. These tubelike cells make up vascular tissue. Tracheophytes have vascular tissue in their roots, stems and leaves. For this reason, tracheophytes are called vascular plants. The roots of a tracheophyte take in water and dissolved nutrients from the soil. In addition to supplying a plant with nutrients, vascular tissue also helps support a plant (anchor in the soil). Because they have vascular tissue, tracheophytes can grow much taller than any of the bryophytes.

Unlike tracheophytes, bryophytes do not have true roots, stems and leaves. They do, however, have rootlike and leaflike structures. Bryophytes also lack vascular tissue. Because they have no vascular tissue, bryophytes are called nonvascular plants. In bryophytes, dissolved materials move from one cell to the next by diffusion. Diffusion is a very slowly process of transport.

New words and word combinations.

classification	təsnifat
dominate	dominantlıq etmək
terrestrial	yer, ərazi
community	icma, canlılar
pasture	otlaq, çəmən
desert	səhra
land	torpaq, yer, ölkə
to provide	təmin etmək, təchiz etmək

food	qida
food stuff	qida məhsulları, ərzaq
direct	birbaşa
as well as	eləcə də
shelter	sığınacaq
clothes	paltar, geyim
medical	tibbi
medical student	tibb təhsili olan tələbə
photosynthetic	fotosintetik
energetic	çalışqan, enerjili, fəal
energy	enerji
sunlight	günəş işığı
combination	birləşmə, əlaqələndirmə
overall	ümumi, bütün
dissolve	həll olmaq, ərimək, həll etmək
nutrient	qidalı maddə
tissue	toxuma
transport	daşıma, daşınma
vascular	ötürücü, damarlı
diffusion	diffuziya, yayılma, sirayət
bryophyte	briofit (yosun növləri)

Exercises

I. Find out corresponding equivalents of the following word combinations in your native language:

All terrestrial communities; from forests to pastures; from lands to deserts; our shelter; clothing and medicines; photosynthetic organisms; to combine carbon dioxide; to make food; food-making process; to be called photosynthesis; plant kingdom; dissolved minerals; throughout the plant; tracheophytes and bryophytes; tubelike cells; plant's structure; vascular tissue; the roots of a tracheophyte; to help support a plant; leaflike structures; lack vascular tissue; true roots; nonvascular plants; by diffusion; process of transport.

II. Find out corresponding equivalents of the following word combinations into English:

Qida məhsulu; qida hazırlayan; bitkilərin təsnifatı; meşələrdən otlaqlara (səhralara); qurudan səhralara; yaşıl bitkilər; geyim və dərmanlar; eləcə də; karbon 2 oksidi birləşdirmək; böyümə və inkişaf üçün; lazım olan sadə tənlik; bitkilər aləmi; heyvanlar aləmi; bitki aləminin bölgüsü; bitki boyunca hərəkət etdirilmək; bu səbəbə görə; ötürücü toxuma, damar toxuma, ali bitkilərin kökləri; köklər; həll olmuş minerallar; torpaqla bərkimə; ləng daşınma prosesi olmaq.

III. Match the highlited words in the text to the correct meaning.

terrestrial	a. unite or merge to form a whole
provide	b. the process of equating one thing with another
photosynthesis	c. make available for use supply
to combine	d. relating to the earth or dry land
growth	e. the process of growing
equation	f. the process by which green plants use sunlight to syntherize nutrients from carbon
summaries	g. a new product or idea
development	h. give a brief statement of the main points of (smth)

IV. Complete the sentences with a word and word combination from the list.

1. The food-making proces is called ----------.
2. Photosyntesis ---------- plants with good energy needed for growth and development.
3. Botanists have divided ---------- into two groups.
4. These ------------ make up vascular tissue.

5. For this reason, tracheophytes are called --------.
6. They do, however, have rootlike and ----------.
7. -------- vascular tissue, bryophytes are called nonvascular plants.

the plant kingdom, tubelike cells, provides, leaflike structures, vascular plants, because they have no, photosynthesis.

V. Write translations and transcriptions, try to remember the words

dominate	food
plant	growth
pasture	animals
deserts	division
soil	energy

VI. Use simple present or the present progressive of the verbs in parentheses.

1. It’s a gray day today. The sun (to shine).
2. This book is mine. That one (belong) to Pierre.
3. Shhh! The baby (to sleep). We don’t want to wake him up.
4. This box (to weight) a lot. It’s too heavy for me to lift.
5. Jack (to appear) happy this morning. He’s smiling.
6. Susan is looking at some people across the street, but she (see not).
7. Dennis (drink, usually) coffee with his breakfast, but this morning he (drink) tea instead.
8. The team plays badly. They (lose) the game by seven points at the moment.

Unit 2. PLANT CELLS AND TISSUES

Figure 2 illustrates a plant cell and an animal cell. You may notice that the plant cell has green structures that the animal cell does not have. These green structures are chloroplasts. Chloroplasts contain the green pigment chlorophyll. Plants need chlorophyll to carry out photosynthesis.

The number and sizes of vacuoles differ from one kind of cell to another. Animal cells usually have many small vacuoles in their cytoplasm. A plant cell, however, have only one or two large vacuoles.

Other differences can be observed between plant and animal cells. One of these differences is the cell wall. Plant cells always have a rigid, rather thick cell wall. Animal cells do not have a cell wall. Another difference is the centrioles, which are located near the nucleus of an animal cell. Plant cells do not have centrioles.

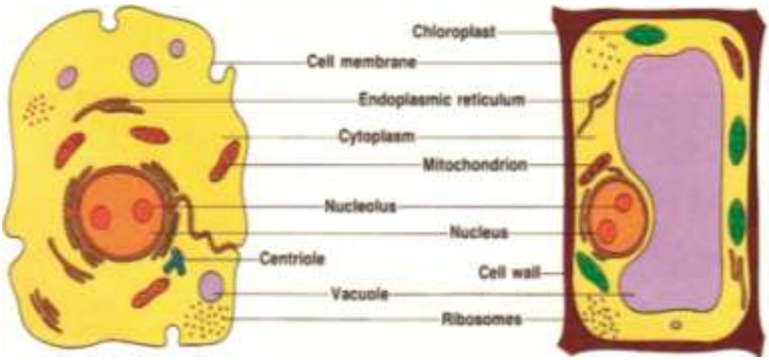

Figure 2 *Animal cell (left) and plant cell (right)*

Table 1 shows the major organelles present in the cells of both animals and plants.

Seed plants are multicellular organisms. The cells of seed plants are organized into tissues. Tissues are groups of cells that look alike and do the same job. The tissues of seed plants also are organized into organs. Organs are made up of several tissues that work together to do a specific job. For example, leaves, stems and roots are vegetative organs in a plant.

The cells of plants are organized into four main tissue systems: epidermal tissue, ground tissue, vascular tissue and meristematic tissue (figure 3).

Epidermis is the thin outer layer of cell that covers a plant and is analogous to an animal's skin. The leaves, stems and roots of all plant are covered by epidermis. The main job of the epidermis is to prevent plants from drying out.

Ground tissue contains parenchyma cells, which carry out most of the metabolic reactions of the plant, including photosynthesis (food-making process). Ground tissue also contains two specialized cell types (collenchyma cells and sclerenchyma cells) that are characterized by thick cell walls and provide structural support to the plant. Thereby ground tissue stores food.

Table 1

Structure	Animal cell	Plant cell	Feature and function
Cell wall	Absent	Present	Support and protection
Cell membrane	Present	Present	Regulates the passage of materials in and out of cell
Cytoplasm	Present	Present	Fluid material surrounded by cell membrane
Nucleus	Present	Present	Controls all cell activities
Nucleolus	Present	Present	Synthesis and stores ribosomes
Mitochondrion	Present	Present	Energy production center of cell
E. Reticulum	Present	Present	Channels for material transportation and lipid synthesis (smooth ER)
Ribosome	Present	Present	Protein synthesis
Golgi apparatus	Present	Present	Preparation of materials for secretion
Lysosome	Present	Absent	Storage of digestive enzymes
Centriole	Present	Absent	Cell division
Vacuole	Present	Present	Fluid-filled storage sacs

Vascular tissue forms two types of elongated cells (xylem and phloem), which are responsible for the transport of water and nutrients throughout the plant. Xylem carries water up from the roots to the leaves. Phloem carries food made in the leaves to all other parts of the plants.

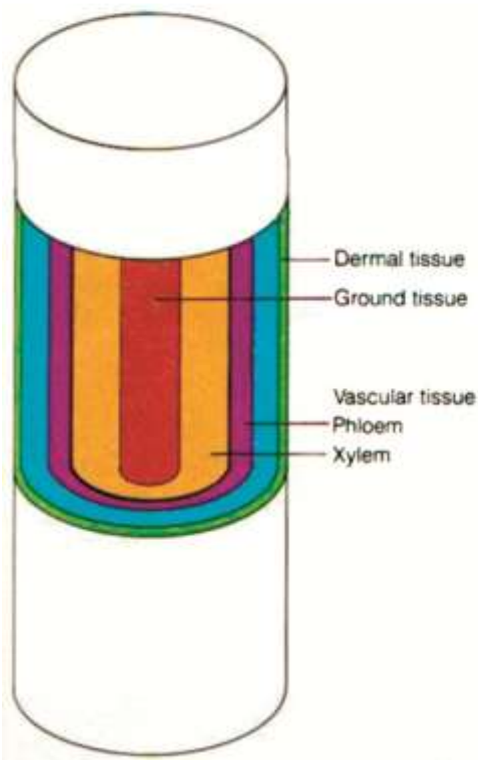

Figure 3 *Organization of tissue system*

Plant tissue which grows very rapidly and is founds at the tops of plant stems and in the lower tips of roots forms meristematic tissue. Meristematic tissue also is found as a layer inside stems or branches. Rapid division of the cells in the meristematic tissue causes plant to grow up, out and down.

There are two types of meristematic tissue. The first type, apical meristem, is found at the tips of roots and stems. Apical meristems allow shoots to grow upward toward the light and allow roots to push ever deeper into the soil to a water source. Growth arising from apical meristems is called primary growth. The second type, lateral meristem, is division of cells in the stems and roots that cause these parts to become thicker. The enlarged diameter of a stem or root due to cell divisions in the lateral meristems is called secondary growth (figure 4).

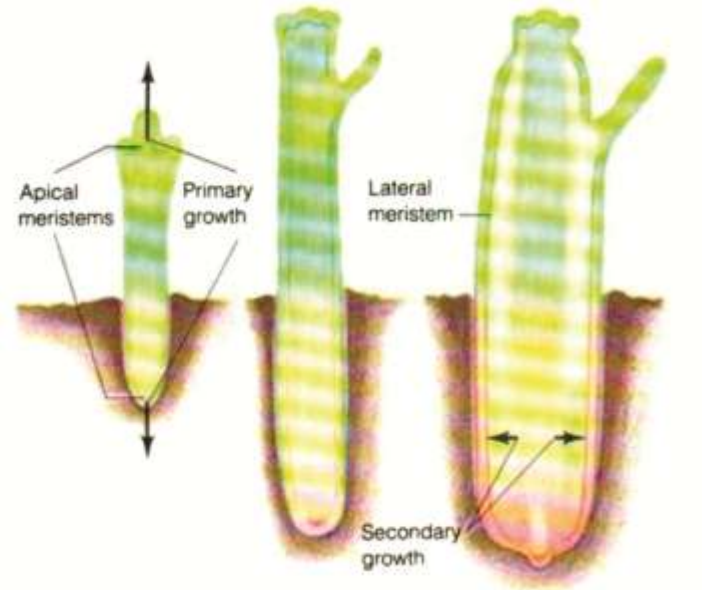

Figure 4 *Primary and Secondary Growth*

Plant organ system

Vascular plants consist of a root system and a shoot system. The root system anchors the plant and penetrates the soil, from which it absorbs water and minerals to the plant's nutrition. The shoot system includes the stem, branches, leaves, flowers and fruit (figure 5).

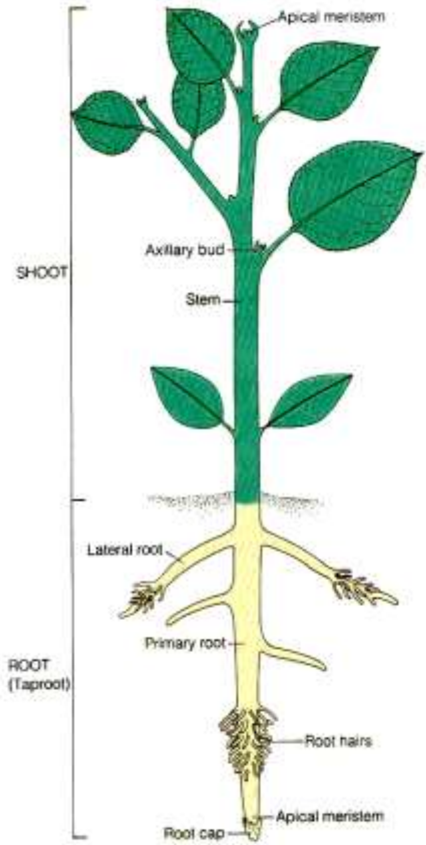

Figure 5 *Root and Shoot*

New words and word combinations.

notice	görmək
structure	quruluş, struktur
pigment	piqment
differ	fərqlənmək
difference	fərq
observe	riayət etmək, müşahidə etmək
cell wall	hüceyrə divarı

rigid	qatı, sərt, dönməz, donuq
rather	kifayət qədər, daha, olduqca
thick	sıx, kök
locate	yerləşdirmək, taxmaq
nuclear	nüvə
nucleus	nüvə (hüceyrənin)
major	daha böyük, boş, daha vacib
seed	toxum
to organize	təşkil etmək
majority	əksəriyyət, çoxluq
alike	oxşar
specific	xüsusi
specify	dəqiqləşdirmək
leaf	yarpaq
analogous	oxşar, bənzər
analogue	eynilik, analoq
prevent	qarşısını almaq, yol vermək
ground tissue	əsas (və ya yer) toxuma
store	ehtiyat, anbar
elongate	(böyümə) uzununa
xylem	ksilema
phloem	floema
responsible	məsul, cavabdeh, etibarlı
transport	daşıma, daşınma, nəqliyyat
rapid	tez, cəld, sürətli, iti
tip	uc
apical	təpə, uc
shoot	zoğ, cavan
shoot up	tez böyümə
primary	ilk, əvvəl, əvvəlcə, ibtidai
lateral	yan
penetrate	nüfuz etmək, nüfuz etmək
absorb	hopdurmaq, canına çəkmək
to consist of	ibarət olmaq

Exercises

I. Find out corresponding equivalents of the following word combinations in your native language:

Plant cell; animal cell; chloroplast; the green pigment chlorophyll; to carry out; the number and size of vacuoles; can be observed; thick cell wall; another difference; to be located; nucleus of an animal cell; do not have centrioles; seed plants; multicellular organisms; look alike; to be made up of; vegetative organs; are organized; epidermal tissue; ground tissue; vascular tissue; meristematic tissue; an animal's skin; are covered by epidermis; prevent plants; parenchyma cells; metabolic reactions; cell types; structural support; stores food; elongated cells for the transport of water; from the roots; at the tops of plant stems; in the cover tips of roots; meristematic tissue; apical meristem; a water source; primary growth; lateral meristem; the enlarged diameter of a stem; secondary growth.

II. Find out corresponding equivalents of the following word combinations into English:

Bitki hüceyrələri; heyvan hüceyrələri; vakuolun sayı və ölçüsü; fərqlənmək; digər fərqlər; bu fərqlərdən biri; nüvənin yaxınlığında yerləşmək; heyvan və bitkilərin hər ikisi; oxşar olmaq; toxumlu bitkilərin toxumaları; təşkil olunmaq; hüceyrələrin nazik üst qatı; epidermislə örtülmüş; sıx hüceyrə divarı ilə; daşımağa cavabdeh; suyu daşımaq; köklərdən yarpaqlara; örtük toxuma, törədici toxuma; əsas toxuma; ötürücü toxuma.

III. Match the highlited words in the text to the correct meaning.

illustrate a. the smallest unit of an organism.
pigment b. be situated in a particular place.
chlorophyll c. the natural colouring matter of animal or plant tissue

cell d. the upper layer of earth.
difference e. make clear by using examples, charts.
be located f. a green pigment
soil g. a way in which people or things are different
to plant h. place (seed bulb or plant) in the ground so that it can grow

IV. Complete the sentences with a word and word combination from the list.

1) Chloroplasts contain the green ------------.
2) ----------- to carry out photosynthesis.
3) A plant cell, however, have only one or -----------.
4) Other differences can be observed between ----------.
5) Animal cells ---------- a cell wall.
6) Seed plants are --------- organisms.
7) ---------- made up of several tissues that work together to do a specific job.
8) ------- water up from the roots to the leaves.

Pigment chlorophyll, plants need chlorophyll, plant and animal cells, xylem carries, two large vacuoles, do not have, multicellular, organs.

V. Write translations and transcriptions, try to remember the words

cell	centrioles
structure	multicellular
need	epidermal
vacuoles	ground
rigid	apical

VI. Use Simple past of irregular verbs.

1. All of the witness (swear) -------- to tell the truth in the court of law.
2. Mike was so cold that this whole body (shake) --------.

3. Using only a pen with blue ink, she ------------ (draw) a beautiful picture of a bird.
4. When the balloon (burst) -----------.
5. Paul (hide) ------- his money because he was afraid it would get stolen while he was away.
6. Emily accidently (stick) -------- her finger with a needle whole she was sewing.
7. Janice (slit) ------- the top of envelope with a knife instead of repping it open.
8. I lost control of my car, and it (slide).
9. Mary (spread) butter all over her piece of toast with her knife.
10. Our team finally (win) --------- the soccer game by one goal.

Unit 3. ROOT

Roots are branching organs that grow downward into the soil and help support the plant both physically, by spreading out through the soil to provide a solid base of attachment, and nutritionally, by absorbing and transporting water and mineral nutrients.

There are two kinds of root systems. One kind of root system is called a taproot. Thick, trunklike taproot grows straight down into the soil. Many smaller roots grow from the taproot. Taproots store water, as well as food in the form of starch. In contrast, grasses and a few other kinds of plants have a mass of narrow fibrous roots that branch downward and outward from the plant’s stem and efficiently anchor the plant and absorb water and nutrients (figure 6).

Figure 6 *Taproot (left) and fibrous root (right)*

As germination (the sprouting of seed) occurs, the first root begins primary growth – growth in length from the apical meristem. A root grows as new cells are produced by the meristematic tissue in the root tip. This type of root is called the primary root. The tip of the root is covered by the root cap. The root cap protects the tip of the growing root and also helps the root move easily through the soil.

As the primary root grows downward into the soil, smaller roots, which are called secondary roots, begin to grow from it. Tiny, hairlike structures called root hairs grow from the primary and secondary roots.

As root grows in length, the stems and roots of plants also increase in diameter. This secondary growth coming from the lateral meristem forms cortex. Water and food are stored in the cortex. If water and food do not stored in the cortex, they would pass into the vascular tissue in the center of the root. First kind of vascular tissue is xylem that transports water and dissolved minerals from the roots throughout the plant. Another kind of vascular tissue is phloem that transports sap containing dissolved sugars and amino acids from the leaves throughout the plant.

Four zones are commonly recognized in developing roots. The zones are called the root cap, the zone of cell division, the zone of elongation and the zone of maturation (figure 7).

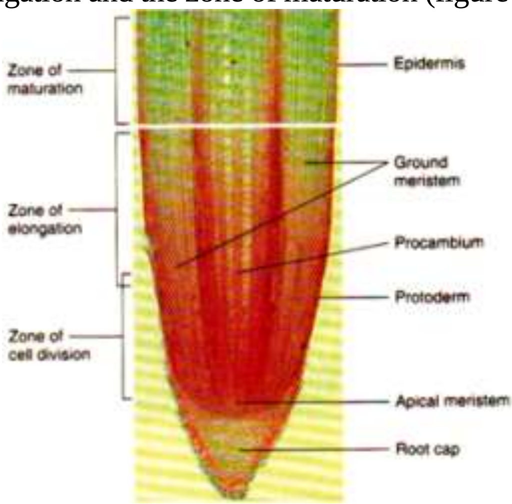

Figure 7 *Root zones*

The root cap, which has no equivalent in stems, is covered the tip of each young root. Golgi apparatus in the outer root cap cells secrete a slimy substance that passes to the outside. Because of this slimy substance, the root tip is able to move easily through the soil.

In the zone of cell division takes place rhythmically division of apical meristem cells. Most of the cells are cuboidal with small vacuoles, centrally located nuclei. The apical meristem subdivides into the three parts: protoderm, which becomes the epidermis, procambium, which produces primary vascular tissues, and ground meristem, which differentiates further into ground tissue.

In the zone of elongation, the cells produced by the apical meristems become several times longer than wide, and their width also increases slightly. The small vacuoles present merge and grow until they occupy 90% or more of the volume of each cell.

In the zone of maturation the cells that have elongated in the zone of elongation become differentiated into specific cell types.

Modified roots

Modifications of roots, stems and leaves allow plants to survive in a wide variety of environments.

Some plants have modified roots that carry out photosynthesis, gather oxygen, parasitize other plants, store food or water, or stabilize the stem (figure 8).

Aerical roots. Some plants, such as orchids, have roots that extent out into the air. Aerical roots can absorb water from the air. A plant with aerical roots is called an air plant.

Pneumatophores. Some plants (mangrove) that grow in wet places (swamps) may produce spongy outgrowths called pneumatophores from their underwater roots. The pneumatophores extend several centimeters above water, facilitating the oxygen supply to the roots beneath.

Parasitic roots. Some plants, such as dodder, produce peglike roots called haustoria that penetrate the host plants around which they are twined. The haustoria establish contact with the conducting tissues of the host and effectively parasitize them.

Contractile roots. The roots of some plants (lilies, dandelions) pull the plant a little deeper into the soil each year until they reach an area of relatively stable temperatures.

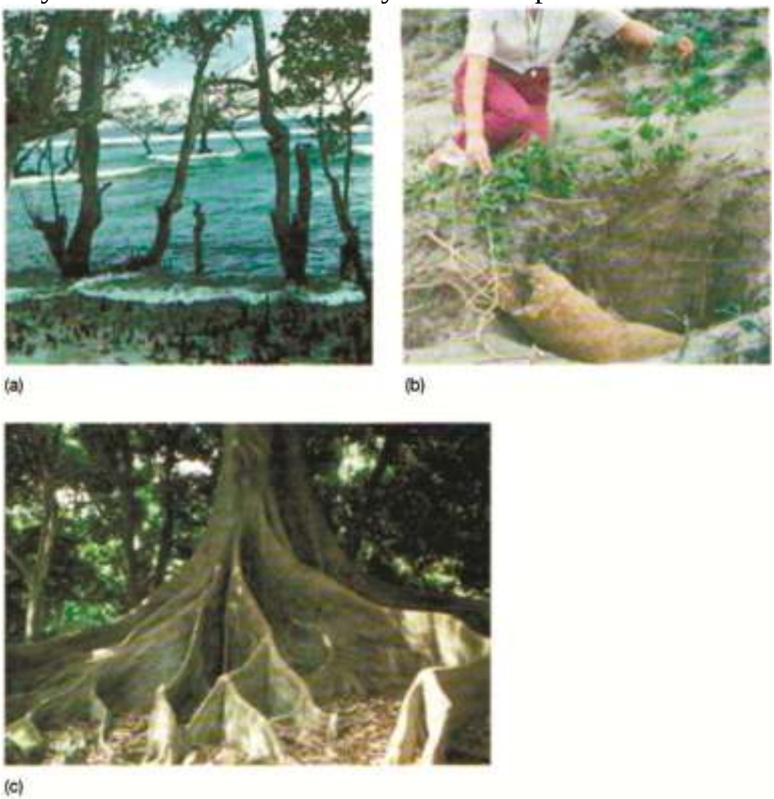

Figure 8 *Modified roots:*
(a) *Pneumatophores;* ***(b)*** *Water storage root;* ***(c)*** *Buttress roots*

Food storage roots. The roots of some plants (carrots, beets, radishes, turnips) store large amount of carbohydrates that produce by xylem of branch roots.

Water storage roots. Some members of the pumpkin family, especially that grow in arid regions, may produce water storage roots weighing 50 kg or more.

Buttress roots. Some species of fig produce huge buttress roots toward the base of the trunk, which provide stability.

New words and word combinations

downward	aşağıya doğru
support	dayaq, müdafiə etmək
a solid	bərk, möhkəm, təmiz, bərk cisim
attachment	əlavə, qoşma, bağlılıq, mənsubiyyət
nutrition	qidalanma, qidalı
taproot	mil kök
trunklike	gövdəyə bənzər (ağac)
grass	ot (yaşıl), çəmən
mass	kütlə, yığın, çoxluq
narrow	dar, darlaşdırmaq
starch	nişasta
efficient	səmərəli, məhsuldar
anchor	lövbər, lövbər salmaq
apical	təpə, apical
meristem	meristem
move	hərəkət etmək
protect	müdafiə etmək
hairlike	tükə oxşar (bənzər)
cortex	qabıq
mature	yetkin, yetişmiş, vaxtı çatmış
vacuole	vakuol
procambium	prokambi
width	en, enli

increase	artma, böyümə, artım, çoxalmaq
slightly	yüngülcə
merge	birləşdirmək, qatışmaq
sapling	ting, şitil
modification	dəyişilmə, modifikasiya
survive	sağ qalmaq, yaşamaq
gather	toplamaq, bir yerə yığılmaq, toplaşmaq
parasite	parazit, tüfeyli
orchid	orxideya, səhləb, səhləbçiçəyi
extent	genişləndirmək, uzatmaq, yaymaq
wet	yaş, nəm, qurumamış
daddery	zəif
penetrate	nüfuz etmək
twine	kəndir, buraz, qatma, sarmaşmaq
lily	zanbaq
dandelions	zəncirotu
carrot	yerkökü
beet	şəkər çuğunduru
radish	qırmızı turp
turnip	şalğam, ağ turp
pumpkin	balqabaq
arid	quru, quraq, susuz
fig	əncir
huge	çox böyük, nəhəng, zorba

Exercises

I. Find out corresponding equivalents of the following word combinations in your native language:

Branching organs; to grow downward; by spreading out; a solid base of attachment; by absorbing and transporting; trunklike taproots; store water; form of starch; fibrous roots; primary growth; apical meristem; by the tissue; primary root; root cap; secondary roots; hairlike structures; rod hair; forms cortex; containing dissolved sugars; throughout the plant; cell division; the zone of elongation; the zone of maturation.

II. Find out corresponding equivalents of the following word combinations into English:

şaxələnən orqanlar; ehtiyat su saxlayan mil kök; nişasta formasında; əksinə; lifli köklər; təpə meristemi; kökcükdə meristematik toxuma; əsas kök; kök üsküyü ilə örtülmək; kökün ucunu qorumaq; əsas kökün göyərməsi; nisbətən kiçik köklər; ikincili köklər; xırda tükvari quruluşlar; saçaqlı köklər adlanmaq; yan törədici toxuma; həll olmuş minerallar; bölünmə zonası; uzanma zonası; qidalanma zonası; yetkinlik zonasında; şəklini dəyişmiş köklər; hava kökləri; tənəffüs kökləri; parazit köklər; əmici tellər; şaxəli köklər; ehtiyat qida kökləri; dayaq köklər; dəyişilmiş kök, gövdə və yarpaq; ətraf mühitin geniş müxtəlifliyi; fotosintezi icra etmək; qida yaxud suyu saxlamaq; gövdəni sabitləşdirmək; sarmaşıq kimi;

III. Match the highlited words in the text to the correct meaning.

to grow	a. kept ready for use
store	b. dividing or being divided
narrow	c. upper layer of earth.
absorb	d. short growing.
soil	e. small in width
germination	f. outer layer of tissue.
cortex	g. icrease in size.
division	h. take in.

IV. Complete the sentences with a word and word combination from the list.

1. There are two kinds of --------.
2. One kind of root system is called ---------.

3. Many smaller roots -------- from the taproots.
4. -------- as new cells are produced by the meristematic tissue in the root tip.
5. This type of root is called the --------------.
6. As root grows in length, --------- of plants also uncrease in diameter.
7. This secondary growth coming from the lateral meristem forms ---------.
8. ---------- are stored in the cortex.

root systems; a root grows; grow; primary root; taproot; water and food; cortex; the stems and roots

V. Write translations and transcriptions, try to remember the words

root	meristem
trunklike	root hair
taproot	cortex
fibrous roots	root cap
absorb	maturation

VI. Open the brackets using the Present Perfect.

1. Our football team is having a great season. They (win) all but one of their games so far this year and will probably win the championship.
2. Jane is expecting a letter from me, but I (not write) to her yet.
3. Jack is living in Spain now. His Spanish used to be terrible, but it (improve) greatly since he moved there.
4. Our baby (not start) to talk yet. My friend's baby, who is several months older, can already say a few words in English and a few words in French.
5. Everyone makes mistakes in life. I (make) lots of

mistakes in my life, the important thing is to leaner from one's mistakes right?

6. A: I (never ride) on the subways in New York City. Have you?
   B: I've never even been in New York City.
7. Little Freddie (grow) a lot since last saw him. He's going to be just like his father, isnt'he?
8. Let's stop at the next motel we (drive) 500 miles so far today and that's enough.

Unit 4. STEM

Stems have two main functions: supporting the plant and acting as a central corridor for the transport of water, minerals, sugars and other substances.

There are two kinds of stem: herbaceous stem and woody stem. Stems of many plants are soft, green and filled with water. These soft, green stems are called herbaceous stems. Plants that have herbaceous stems do not live more than one growing season. Figure 9 shows cross sections of the herbaceous stems of a dicot and a monocot.

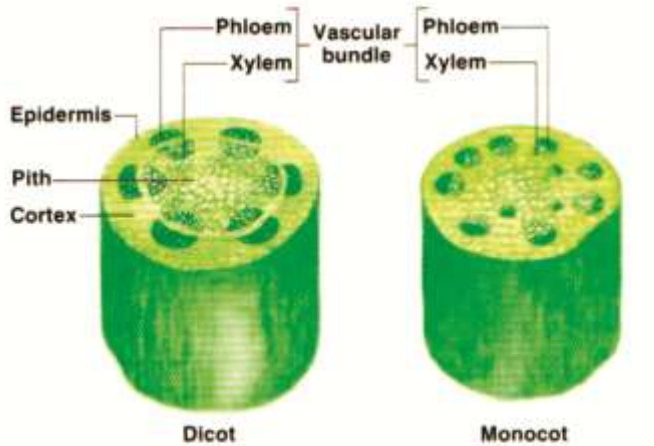

Figure 9 *Herbaceous stems of Dicot and Monocot*

The bundles of vascular tissue around the cortex are called vascular bundles. The vascular bundles contain xylem and phloem. Notice that the arrangement of vascular bundles is different in dicots and monocots. For example, in a dicot, such as bean plant, the vascular bundles are arranged in a ring around the cortex. In a monocot, such as a corn plant, the vascular bundles are scattered throughout the cortex.

Another kind of stem is woody stems. All trees have woody stems. Woody stems are nongreen stems that are much thicker and harder than herbaceous stems (figure 10).

The rough outer covering of a woody stem is called the bark. The bark of a tree is the first line of defense against injury and disease. Bark is made up of cork and phloem. Cork is a layer of dead cells that protects the stem from insects, bacteria and fungi. The cork also prevents the inner layers of a stem from drying out. Beneath the cork layer is cortex. The cortex of a woody stem functions like the cortex of a root (stores water and food). A very thin layer of living meristematic tissue (lateral meristem) is located between the phloem and xylem of a woody stem. This layer is called the cambium. As the cambium layer of a tree grows, the tree gets wider. Cells on the outer part of the cambium produce new phloem cells. Dead phloem cells become the cork of the tree. Cells on the inner part of the cambium produce new xylem cells. When the xylem cells die, they form the inner woody part of a tree. The largest part of a woody stem is made up of dead xylem cells.

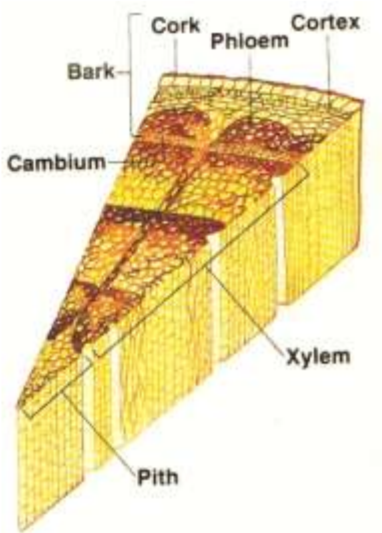

Figure 10 *Woody stem*

In the center of stems is located pith which is made up of ground tissue. Pith provides some storage and support.

How do stems grow in length? At the tip of a stem is a bud called the terminal bud. The stem of a plant gets longer as cells are produced by the apical meristem in the terminal bud. New branches, leaves and flowers are produced by lateral buds. Lateral buds grow from the sides of the main stem of a plant.

The xylem of a tree goes through two growth periods each year. In the spring, large xylem cells are produced. This wood is called springwood. In the summer, smaller xylem cells are produced. This wood is called summerwood. There are some differences in appearance between springwood and summerwood, or annual rings (figure 11). They differ by color and width of ring. Annual rings can be used to determine the age of the tree when it is cut down. Each ring represents one year's growth. Thus, a tree with 100 rings is 100 years old.

Figure 11 *Annual rings*

Modified stems

Some plants possess modified stems that serve special purposes such as food storage or adventitious growth (figure 12).

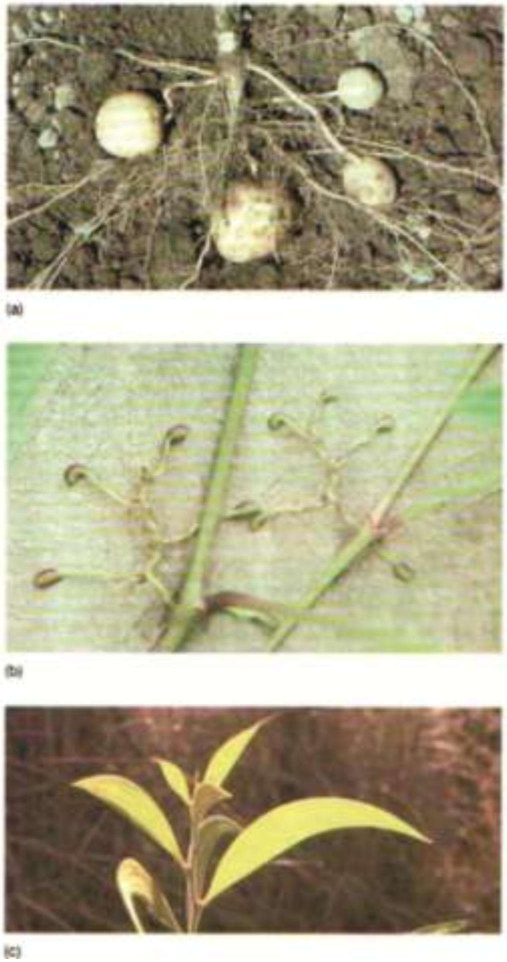

Figure 12 *Modified stems:*
(a) *Tubers;* ***(b)*** *Tendrils;* ***(c)*** *Cladophylls*

Bulbs are swollen underground stems that are really buds with adventitious roots at the base. Most of the bulbs consist of fleshy leaves attached to a small, knoblike stem (onions, lilies, tulips).

Corms. Almost all of corms consist of stem with a few papery, brown nonfunctional leaves on the outside, and adventitious roots below (crocuses, gladioluses).

Rhizomes are horizontal stems that grow underground, often close to the surface (ferns, irises).

Runners. Runners are horizontal stems with long internodes, which, unlike rhizomes, usually grow along the surface of the ground (strawberry).

Tubers. In white potato plants, carbohydrates may accumulate at the tips of stolons, which swell, becoming tubers. The stolon dies after the tubers mature.

Tendrils are modified stems which twine around supports and aid in climbing (grapes, peas).

Cladophylls are flattened, photosynthetic stems that resemble leaves (cactus). In cactus, the real leaves are modified as spines.

New words and word combinations.

substance	maddə, materiya
dicot (dicotyledon)	ikiləpəli bitki
monocot	birləpəli bitkilər
arrangement	düzülüş, razılıq
bean	paxla, paxlalı bitki, lobya
ring	üzük, həlgə, rinq; dövr etmək
corn	dən, taxıl, qarğıdalı
scatter	səpələmək, dağılmaq, səpmək
bark	ağac qabığı
defense	müdafiə
diffenseless	köməksiz, müdafiəsiz

injured	zədələnmiş
disease	xəstəlik
cork	mantar, tıxac, mantarla bağlamaq
layer	qat, lay
beneath	altında, aşağı, altına
meristematic	törədici, meristematik
pith	məğz, özək
pithy	məzmunlu, maraqlı
determine	müəyyən etmək, qət etmək, qərara almaq

Exercises

I. Find out corresponding equivalents of the following word combinations in your native language:

Supporting plant; acting as; transport of water; other substances; herbaceous stem; woody stem; filled with water; growing season; cross sections; dicot and a monocot; the bundles of vascular tissue; vascular bundles; to contain xylem and phloem; arrangement of vascular bundles; a ring around the cortex; a corn plant; to be scattered; throughout the cortex; nongreen stems; much thicker and harder; the rough outer covering; the bark of a tree; the first line of defense; against injury and disease; to be made up of cork and phloem; dead cells; from ingests; bacteria and fungi; the inner layers of a stem; from drying out; beneath the cork layer; a very thin layer; living meristematic tissue; cambium layer of a tree; to produce new phloem cells; inner woody part of a tree; ground tissue; at the tip of a stem; the terminal bud; apical meristem; by lateral buds; to be called springwood; to be called summerwood; some differences; annual rings; worth of ring; the age of the tree; one year's growth; possess modified stems; food storage; adventitious root

II. Find out corresponding equivalents of the following word combinations into English:

daşınma üçün; mərkəzi dəhliz kimi; həmişəyaşıl gövdə; ağac gövdəsi; ötürücü topaların toxumaları; qabığın ətrafında; üzük qabığın ətrafında; qabıq boyunca səpələnmək; ölü hüceyrələr təbəqəsi; mantarın tənəffüsü; canlı meristem toxuması; floema və ksilemanın arasında yerləşmək; xarici hissədə olan hüceyrələr; damarlı borucuq; tənəffüs edən mantar qatı; kambinin xarici hüceyrələr qabığı; kambinin daxili hüceyrələri; gövdənin mərkəzində; illik halqalar; yeni floema hüceyrələri əmələ gətirmək; ağacın daxili hissəsi; ağacın yaşı; bir illik böyümə; qida anbarı (ehtiyatı)

III. Match the highlited words in the text to the correct meaning.

stem a. liquid which forms the seas lakes, rivers
transport b. the time of year
soft c. the main body or stalk of a plant
water d. a collection of things or quantity material tied or wrapped up together
season e. the grain of any cereal crop
bundles f. to take or carry from one place to another
corn g. throw in various random directions
scatter h. easy to mould, cut, compress

IV. Complete the sentences with a word and word combination from the list.

1. Stems have two main -------------.
2. Stems of many plants are ----------.
3. Plants that have --------- stems do not live more than one growing season.
4. The rough outer covering of a woody stem is called -----------.
5. --------- is a layer of dead cells that protects the stem

from insects, bacteria and fungi.

6. Beneath the cork layer is -----------.
7. In the center of stems is located ------ which is made up of ground tissue.
8. New branches, leaves and flowers are produced by ---------.

herbaceous, the bark, cork, pith, function, soft, cortex, lateral buds.

V. Write translations and transcriptions, try to remember the words

stem	vascular
season	woody
show	produce
bundle	cambium
dicot	cladophyll

VI. Present Perfect Tense. Use *since* and *for*

1. I haven't seen my brother -------- 6 months.
   I haven't seen my sister ---------- April.
2. My wife and I have moved three times ------- we got married.
3. We've lived here -------- three years, but we're going to move again soon.
4. The Smith's have lived here ------- a long time.
   They've lived here ------- 1980.
5. My sister's husband got a job on a fishing boat in Alaska. He's been there ----- eleven weeks, but he should be coming home soon.
6. The International Olympic Games have continued almost without interruption --------- 1896.
7. The world has enjoyed Beethoven's music ------- nearly 200 years.
8. They have been married -------- last summer.

Unit 5. LEAF

Leaves are thin, flat and green structures that carry on most of the photosynthesis on plants. Most leaves are composed of a broad, flat part, called the blade, and a petiole connecting blade and plant stem. Some plants do not have petioles. The leaves of these plants are attached directly to the stem. Leaf blades are often flat and thin, which maximizes surface area for absorbing light. In most leaves, the petiole becomes the main vein of the leaf. Vein, consisting of both xylem and phloem, are distributed throughout the leaf blade. The main vein is parallel in most monocot leaves. The veins of dicots form network (figure 13).

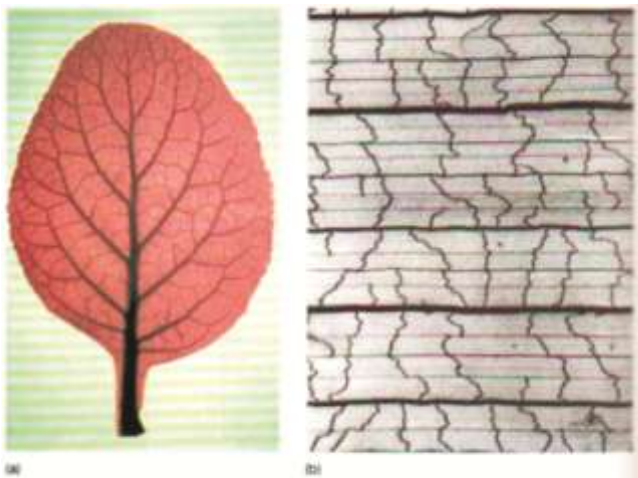

Figure 13 *Veins of leaves: (a) Netted veins; (b) Parallel veins*

Plants have either simple leaves or compound leaves (figure 14). A simple leaf has one blade and one petiole. A compound leaf has a blade that is divided into smaller parts, called leaflets.

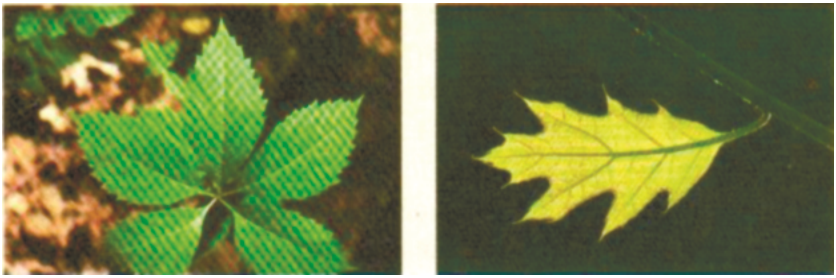

Figure 14 *Simple leaf (right) and compound leaf (left)*

Leaves, regardless of whether they are simple or compound, may be alternately arranged (alternate leaves usually spiral around a shoot) or they may be in opposite pairs. Less often three or more leaves may be in a whorl, a circle of leaves at the same level at a node (figure 15).

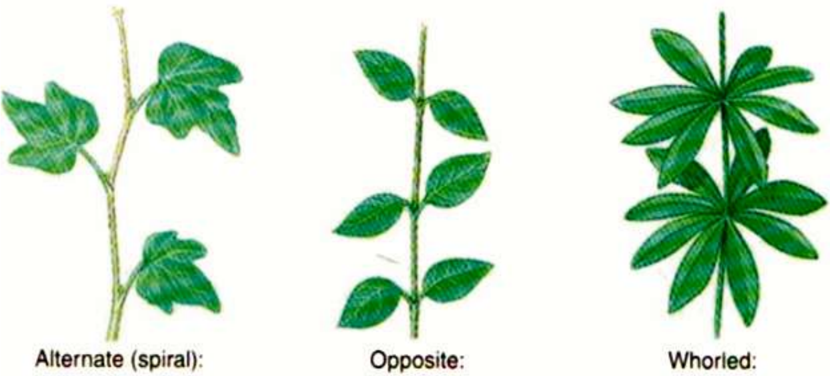

Figure 15 *Types of leaf arrangements*

The entire surface of a leaf is covered by upper and lower epidermis. The upper epidermis of many leaves is protected by a nonliving waxy substance, called the cuticle. Together, the cuticle and the epidermis of a leaf reduce water loss and also protect a leaf from most bacteria, fungi and insects.

The tissue between the upper and lower epidermis is called mesophyll. There are two types of mesophyll: palisade mesophyll and spongy mesophyll. Below the upper epidermis is a palisade mesophyll. The palisade mesophyll is made up of parenchyma cells. Most photosynthesis in plants takes place in the parenchyma cells of palisade mesophyll. Vascular tissue from the roots and stem continue into the leaf and end in the palisade mesophyll.

Below the palisade mesophyll is a layer that contains many air spaces. This layer is called the spongy mesophyll. The spongy mesophyll is involved in gas exchange (figure 16).

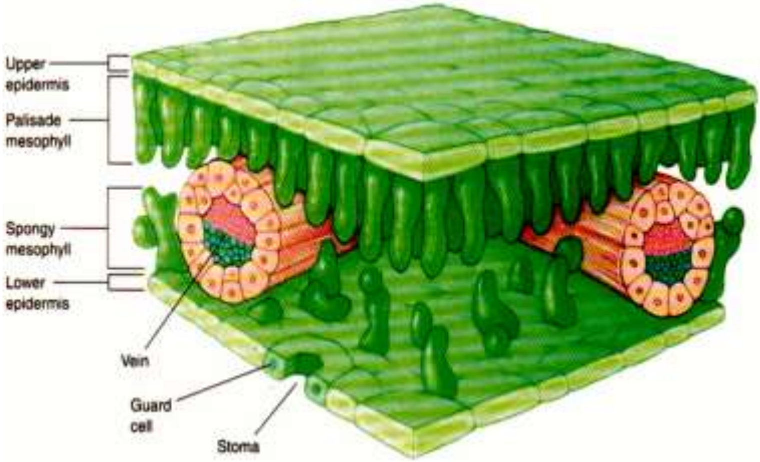

Figure 16 *Internal structure of leaf*

A lower epidermis is ventilated by openings. These openings are called stomata (sing. stoma). During the day, stomata absorb carbon dioxide from the air and release oxygen and water. The stomata also absorb the oxygen needed by the plant for respiration and release carbon dioxide and water. Two bean-shaped cells, called guard cells, surround each of the stomata. The guard cells control the size of the stomata. When the guard cells swell, the stoma open. When the guard cells shrink, the stoma close (figure 17).

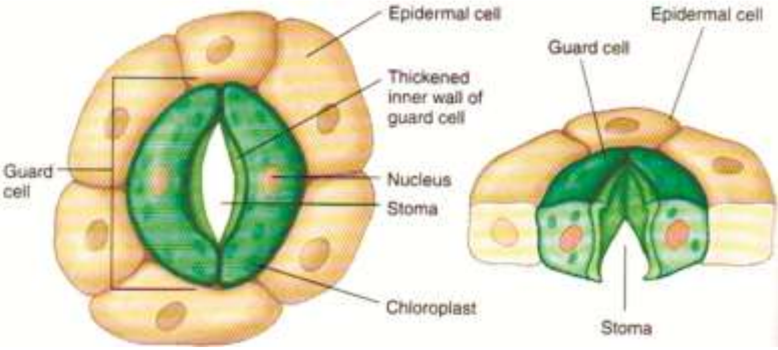

Figure 17 *Stoma*

Plants lose water through the stomata in their leaves in a process called <u>transpiration</u>. To reduce water loss, the guard cells shrink and close the stomata on hot days.

Modified leaves

The leaves of plants exhibit a variety of adaptations, including spines, reproduction and even leaves that are carnivorous (figure 18).

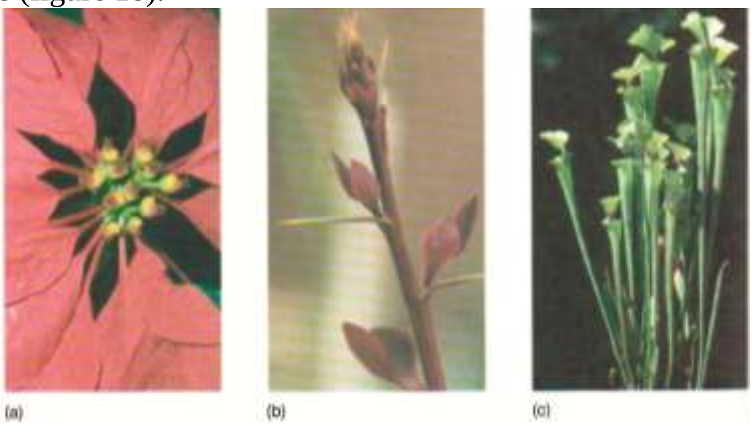

Figure 18 *Modified leaves:* ***(a)*** *Floral leaves;* ***(b)*** *Spines;* ***(c)*** *Insectivorous leaves*

Floral leaves (bracts) are large modified leaves that mostly colored and surround the true flowers and perform the same function as showy petals (dogwood).

Spines. The leaves of many cactuses, barberries and other plants are modified as spines. Because a cactus lives in a very dry environment, such as a desert, the cactus cannot afford to lose much water by transpiration. For this reason, the cactus has spinelike leaves instead of broad leaves.

Reproductive leaves look like plantlets that is capable of growing independently into a full-sized plant (fern).

Window leaves. Some plants growing in arid regions produce cone-shaped leaves with transparent tips. The leaves often become mostly buried in sand blown by the wind, but the transparent tips, which have a thick epidermis and cuticle, admit light to the hollow interior. This allows photosynthesis to take place beneath the surface of the ground.

Insectivorous leaves can trap insects with some digesting their soft parts. Plants with insectivorous leaves often grow in acid swamps (pitcher plant).

New words and word combinations.

flat	yastı, düz, yastısına
blade	tiyə, bıçaq ağzı, yarpaq kənarı
petiole	yarpaq sapı
directly	birbaşa, dərhal
vein	damar
network	şəbəkə
opposite	qarşılıqlı, qabaq-qabağa, əks
whorled	topalı, halqa düzülüşlü
cuticle	qabıqüstü, kutikula
reduce	azaltmaq, kiçiltmək
stomata	ağızcıq
swell	şişmək

shrink	büzülmək, qısalmaq
spine	onurğa sütunu, bel, fəqərə
spines	tikanlar
cactuses	kaktus, maldili
barberries	zirinc
plantlet	kiçik bitki
spinelike	tikanabənzər
digest	həzm etmək, sinirmək, əritmək
digestion	həzm, qidanın həzm olunması

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

to carry on the photosynthesis on plants; to be composed of; a broad, flat part; connecting blade and plant stem; to be attached; directly to the stem; leaf blades; surface area; for absorbing light; vein of the leaf; to be distributed; throughout the leaf blade; in most monocot leaves; the veins of dicots; form network; may be alternately arranged; opposite pairs; the entire surface of a leaf; the upper epidermis; to be protected by; waxy substance; palisade mesophyll; spongy mesophyll; to be ventilated by openings; to absorb carbon dioxide; to release oxygen and water; for respiration; the guard cells, the stoma open, when the guard cells shrink; water loss; a variety of adaptations; including spines; floral leaves; showy petals; to be modified a spines; dry environment; by transpiration; spinelike leaves; a full-sized plant; window leaves; in arid regions; cone-shaped leaves with transparent tips; admit light to the hollow interior; insectivorous leaves; in acid swamps.

II. Find out corresponding equivalents of the following word combinations into English:

yarpaqların damarlanması; torşəkilli damarlanma; parallel damarlanma; sadə yarpaq; mürəkkəb yarpaq; ibarət olmaq; bu bitkilərin yarpaqları; yastı və nazik; yarpaqların əksəriyyətində; yarpaqlar topalı şəkildə ola bilər; yuxarı və aşağı epidermislə örtülmüşdür; muma bənzər maddə; yuxarı və aşağı epidermisin arasındakı toxumalar; iki tip mesofil; yastı və məsaməli; süngər hüceyrələrindən təşkil olunmaq; bir çox yarpaqların üst epidermisi; havadan karbon qazını udmaq; bu səbəbə görə; çoxalan yarpaqlar; çiçək yarpaqları; qırıq ləçəklər; onurğa sütunu; quru mühit; səhra kimi; bu səbəbə görə; çoxalan yarpaqlar; görünüşcə oxşar; hava yarpaqları; şəffaf sonluqlar; qalın epidermis və kutikula; yerin üzərində; külək vasitəsilə yayılan; eyni funksiya; yarpaqların daxili quruluşu.

III. Match the highlited words in the text to the correct meaning.

leaf	a. constitute or make up
compose	b. make as large or great as possible
attach	c. outside part or uppermost layer of something
maximize	d. one of the parts of a plant
distribute	e. fasten; join
compound	f. be spread over or throughout an area
opposite	g. consisting of two or more simple parts
circle	h. situated on the other or further side
whole	i. each of the sets of organs, especially the petals and sepals
surface	j. a round plane figure

IV. Complete the sentences with a word and word combination from the list.

1. Leaves are -----, ---- and green structures that carry on most of the photosynthesis on plants.
2. The leaves of these plants are attached directly ---------.
3. The main vein is parallel in most --------.

4. The veins of -------- form network.
5. ------- between the upper and lower epidermis is called mesophyll.
6. The palisade ------ is made up of parenchyma cells.
7. This layer is called ------ mesophyll.
8. Plants lose water through the stomata in their leaves in a process called ------.

monocot leaves; the tissue; thin, flat; dicots; transpiration; to the stem; mesophyll; the spongy

V. Write translations and transcriptions, try to remember the words

blade	whorl
petiole	cuticle
flat	mesophyll
thin	stomata
dicots	respiration

VI. Complete the sentences by using the present perfect or the present perfect progressive of the words in the list. Use each verb only once include any words in parentheses.

understand; paint; travel; meet; grow.

1. They have never gotten along with each other. I (never) ------- why they agreed to be roommates in the first place.
2. Ali just introduced me to his sister. Now I ------ every one in his family.
3. My uncle ------- the outside to his house for three weeks, and he's still not finished. He's being very careful. He wants his house to look just right.

4. The Smiths are presently in Tunesia. They ------- throughout North Africa since the middle of May. They’ll return home in another month.
5. My brother’s daughter ------- nearly six inches (15cm) since I last saw her two years ago.

Unit 6. FLOWER

Flower is the reproductive organ of a plant. Each flower originated as a <u>primordium</u> that develops into a bud at the end of stalk called a <u>pedicel</u>. The pedicel expands slightly at the tip into a base, the <u>receptacle</u>, to which the remaining flower parts are attached. The outer parts of a flower are called <u>sepals</u>. Sepals are green leaflike structures that surround and protect the <u>petals.</u> Some flowers, such as roses and lilies are sweet-smelling and have large, colorful petals. Unlike roses and lilies, the flowers of grass plants have very small petals that are not colorful or sweet-smelling.

The male reproductive organ of a flower is called a <u>stamen</u>. Each stamen consists of a pollen-bearing <u>anther</u> and a stalk called a <u>filament</u>.

The female reproductive organ of a plant is a <u>pistil</u>. A pistil has three major regions. The <u>ovary</u> is the swollen base, which contains from one to hundreds of ovules. The ovary later develops into a fruit. The tip of the pistil is called a <u>stigma</u>. Most stigmas are sticky, causing pollen grains that land on them to adhere. Typically there is a neck or stalk called a <u>style</u> connecting the stigma and the ovary. In some flowers the style may be very short or even missing.

Many flowers have nectar-secreting glands called <u>nectarines</u>, often located toward the base of the ovary. Nectar is a fluid containing sugars, amino acids and other substances. It plays an important role in attracting insects, birds and other animals to flowers (figure 19).

The transfer of a pollen grain from a stamen to a pistil is called <u>pollination</u>. In some plants, a pollen grain is carried from the stamen to the pistil of the same flower. This process is called self-pollination. Most plants, however, are pollinated by other flowers of the same species. This process is called cross-pollination.

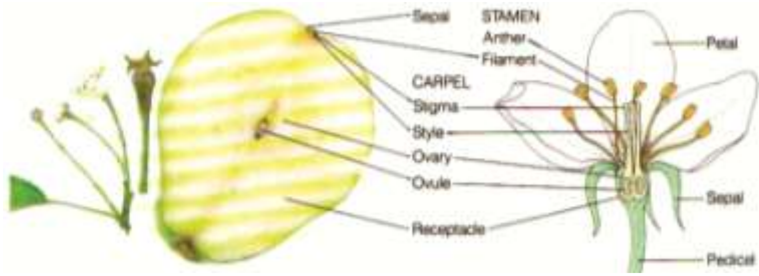

Figure 19 *Pear fruit and flower*

Pollen formation. Pollen grains form in the two pollen sacs located in the anther. Each pollen sac contains specialized chambers in which the microspore mother cell (2n) are enclosed and protected. The microspore mother cell undergoes meiosis to form four haploid (n) microspores. After mitotic divisions of these microspores form two cells (n): one of them forms pollen tube, second cell again undergoes mitosis and in result form two sperms.

Egg formation. Eggs develop in the ovules of flower. Within each ovule is a megaspore mother cell (2n). Each megaspore mother cell undergoes meiosis to produce four haploid megaspores (n). One of these megaspore survives. The rest are absorbed by the ovule. The lone remaining megaspore undergoes three repeated mitotic divisions to produce eight nuclei (n) that are enclosed within an embryo sac. Within the embryo sac, the eight nuclei are arranged in precise positions. One nucleus is located near the opening of embryo sac. Two are fused (2n) and located in the middle of the embryo sac and called polar nuclei. Two nuclei which called synergids flank the egg cell and the other three nuclei reside in cells called the antipodal, located at the end of the sac, opposite the egg cell.

Double fertilization. Once a pollen grain has been spread by wind, by animals or through self-pollination, it adheres to the sticky, sugary substance that covers the stigma and begins to grow a pollen tube. The pollen tube, nourished by the sugary substance, grows until it reaches the ovule in the ovary. Meanwhile, one of the cells within the pollen grain inside the tube divides to form two sperm cells.

The pollen tube eventually reaches the embryo sac in the ovule. At the entry to the embryo sac, the tip of the pollen tube bursts and releases two sperm cells. Simultaneously, the two nuclei that flank the egg cell and three nuclei that located at the end of the sac disintegrate, and one of the sperm cells fertilizes the egg cell, which located near the opening of embryo sac, forming zygote (2n). The other sperm cell fuses with the two polar nuclei located at the center of the embryo sac, forming the triploid (3n) primary endosperm nucleus. The primary endosperm nucleus eventually develops into the endosperm. This process is called double fertilization (figure 20). As a result of double fertilization, an embryo plant begins to develop inside the ovule. As the embryo plant grows, the ovary of the flower gets larger.

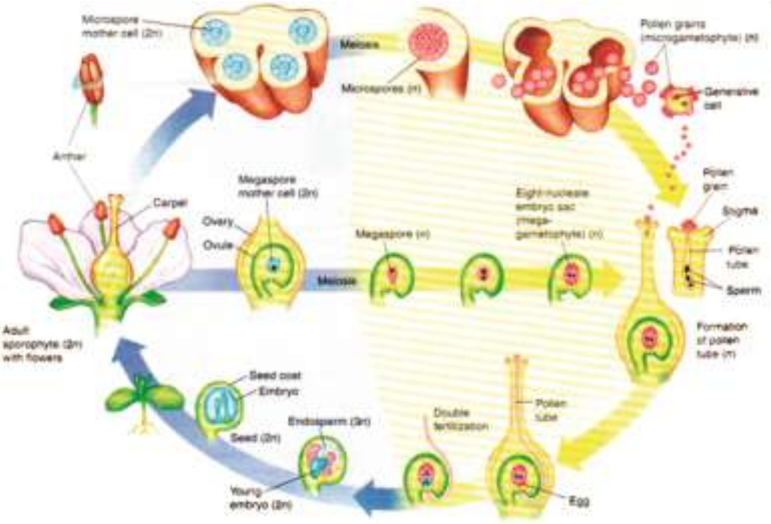

Figure 20 Double fertilization of flower

As summer progresses, the wall of the ovary begins to enlarge into a fleshy fruit. Figure 21 illustrates examples of some fruit types: pomes (apples, pears), drupes (peaches, apricots), true berries (tomatoes, grapes), aggregate fruits (blackberries, strawberries), follicles (milkweed, larkspur), silicles (cabbages, radishes), capsules (orchids, lilies), samaras (big-leaf maple, ashes).

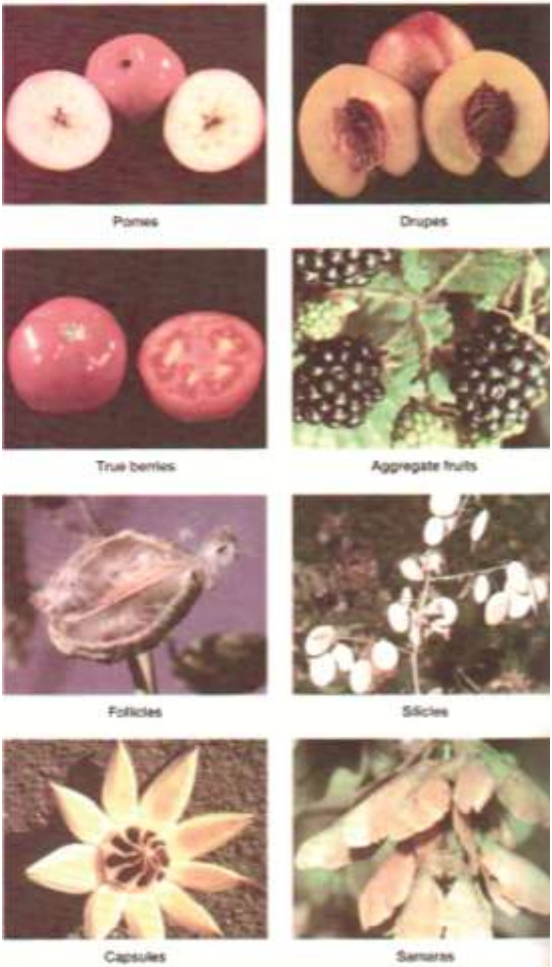

Figure 21 *Types of fruit*

New words and word combinations.

reproductive	reproduktiv, törədici, artma, meydana gəlmək
originate	yaratmaq, başlanğıcını görmək
bud	tumurcuq, qönçə
petal	ləçək
stamen	erkəkcik
anther	tozluq
filament	lif
ovary	yumurtalıq
adhere	yapışqan
style	üslub, dəb, moda
stigma	dişicik ağızcığı, ləkə, damğa
sac	oyuq, çala, çuxur, kisə
receptacle	yuva
sepal	kasa yarpağı, çanaq yarpağı
pistil	dişicik
nectar	nektar
pollen	tozcuq
chambers	bölmələr, otaqlar, kameralar
meiosis	meyoz

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

Reproductive organ; originated as a primordium; at the end of stalk; to expand slightly; to be called sepals; leaflike structures; protect the petals; colorful petals; unlike roses; grass plants; sweet-smelling; to be called a stamen; swollen base; the tip of the pistil; causing pollen-bearing anther; nectar-secreting glands; base of the ovary; attracting insects; a pollen grain; to be pollinated by; pollen formation; to be located in the anther; specialized chambers; to be enclosed; undergoes meiosis; haploid microspores; after mitotic division; pollen tube; a megaspore mother cell; produce eight nuclei; within the embryo sac; in precise positions; to be fused and located; synergids flank; through self-pollination; to adhere to the sticky; sugary substance; a pollen tube; to be nourished; embryo sac; as a result of double fertilization; the ovary of the flower.

II. Find out corresponding equivalents of the following word combinations into English:

Çoxalma orqanı; sapın sonunda; çiçəyin xarici hissəsi; çiçəyin erkək çoxalma orqanı; bitkinin dişi çoxalma orqanı; üç əsas hissəli dişicik; dişiciyin ucu; stiqmaların çoxu; tozlanmada mühüm rol oynamaq; bəzi bitkilərdə; onlardan biri, tozlanma borusunu yaratmaq; ikinci hüceyrə yenidən mitoz keçirir; nəticədə iki sperm yaranır; iki çiçəyin yumurtacığından inkişaf etmək; hər bir yumurtacıq; meqaspor ana hüceyrəsi olmaq; dörd haploid meqaspor ixrac olunmaq; bu meqasporlardan biri.

III. Match the highlited words in the text to the correct meaning.

organ	a. be situated in particular place
bud	b. a group of living organisms
surround	c. a sugary fluid secreted within flowers
pistil	d. a narrow typically elongated extension of the ovary.
nectar	e. part of an animal body or plant that has a particular purpose
style	f. a warm-blooded egglaying vertebrate animal of a class distinguished by the possession of feathers, wings and a beak.
bird	j. the central and most important part of an object
species	h. the female organs of a flower
locate	t. be all round; encircle
nuclei (pl)	k. an outgrowth from an organism

IV. Complete the sentences with a word and word combination from the list.

1. Flower is the reproductive organ of -------.
2. ------- of a flower are called sepals.
3. The male reproductive organ of a flower is called -------.
4. ------- is the swollen base, which contains from one to hundreds of ovules.
5. The transfer of a pollen grain from a stamen to a pistil is called ----------.
6. Within each ------- is a megaspore mother cell.
7. As the embryo plant grows, the ovary the flower -------.
8. As summer progresses, the wall of the ovary begins to enlarge into ---------.

the outer parts; the ovary; a stamen; a plant; pollination; a fleshly fruit; ovule; gets larger

V. Write translations and transcriptions, try to remember the words

pomes	capsules
true berries	samaras
aggregate fruits	big-leaf maple
follicles	ashes
silicles	

VI.Use the simple past or the past perfect of the verbs in the list to complete the sentences. Include any words in parentheses. Use each verb only once.

turn on; finish; burn; leave; invent.

1. By the time Adel arrived to help, we (already) ------

moving everything.

2. The apartment was hot when I got home, so I ------- the air conditioner.
3. Alex (already) ------- the telephone by the time I was born.
4. The farmers barn caught on fire some time during the night. By the time the firefighters arrived the building ------ to the ground. It was a total loss.
5. Promptly at five, I went to Iris' office to offer her a ride home from work, but I couldn't find her, she (already) ---------.

Unit 7. BACTERIA

Biologists divide the millions of species of living things into five kingdoms: monerans, protists, fungi, plants and animals. Within these kingdoms, there are two major types of cells: prokaryotic and eukaryotic.

The kingdom Monera contains more than 5 500 species of single-celled organisms (mostly bacteria), and each individual is a prokaryotic cell.

The term prokaryotic means “before nucleus”. The name reflects their lack of a nucleus. Prokaryotes do possess DNA, but it occurs in a naked circular strand that unprotected by a nuclear membrane. Prokaryotes also lack the other membrane-bounded organelles that eukaryotes possess (endoplasmic reticulum, Golgi apparatus and lysosome).

Bacteria are the simplest organisms living on Earth today. They are found almost everywhere on our body, including in our mouth.

There are three shapes of bacteria. Spherical bacteria are called cocci, cylindrical bacteria – bacilli, spiral-shaped bacteria – spirilla (figure 22).

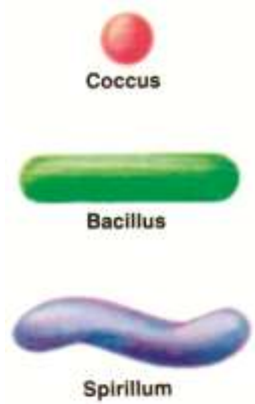

Figure 22 *Forms of bacteria*

Bacilli and cocci may adhere in small groups or chains. Some cocci form pairs. These cocci are called diplococci. Other cocci form chains which called streptococci. Some cocci form grapelike bunches called staphylococci (figure 23).

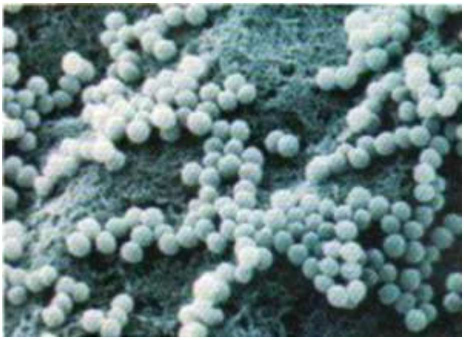

Figure 23 *Grapelike bunches of staphylococci*

Like many cocci, some bacilli form pairs or chains, but do not form bunches. Pairs of bacilli are called diplobacilli (figure 24).

Figure 24 *Pairs of bacilli*

Unlike cocci and bacilli, spirilla live only as single cells.

Spirilla have three shapes. Some look like tiny commas. Others look wavy. Still others look like corkscrews. These corkscrew type cells are called spirochetes (figure 25). A spirochete causes syphilis. It can transmit during sexual contact or through direct contact with an open syphilis sore. The spirochete can also be transmitted from mother to her fetus.

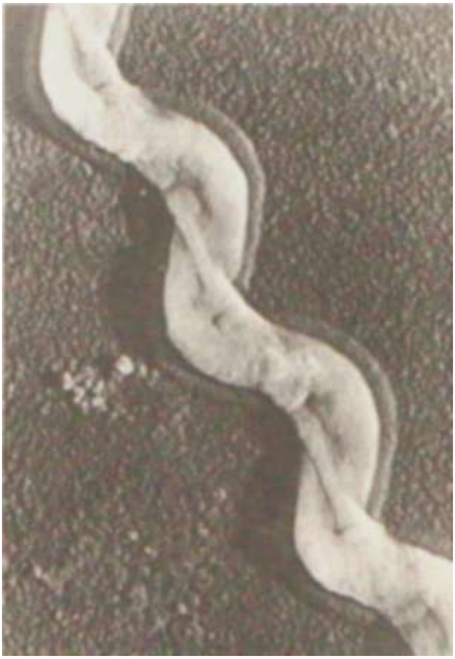

Figure 25 *Spirochete*

Most bacteria have a protective polysaccharide cell wall surrounding the cell membrane. The cell wall helps the bacterium maintain its shape in changing osmotic environments.

Bacteria reproduce by binary fission – a form of asexual reproduction. Asexual reproduction involves only one parent organism. Although bacteria are smaller and simpler than eukaryotic cells, the replication of their material is still complex.

In bacterial cell division, the replicated DNA is attached to a special region of the plasma membrane and is replicated before cell division. Each of the two replicas of the DNA attaches to the plasma membrane. As division begins, the bacterial cell grows and elongates, moving the DNA apart. When the cell volume has approximately doubled, the membrane and cell wall pinch inward and two new cells form, each with an identical single DNA as illustrated in figure 26.

Many bacteria are autotrophic, obtaining energy from sunlight or from inorganic chemicals. Some bacteria (blue-green bacteria) carry out photosynthesis, using the energy of sunlight to build organic molecules from carbon dioxide (photosynthesizers). Other bacteria obtain their energy by oxidizing inorganic substances (chemoautotrophs).

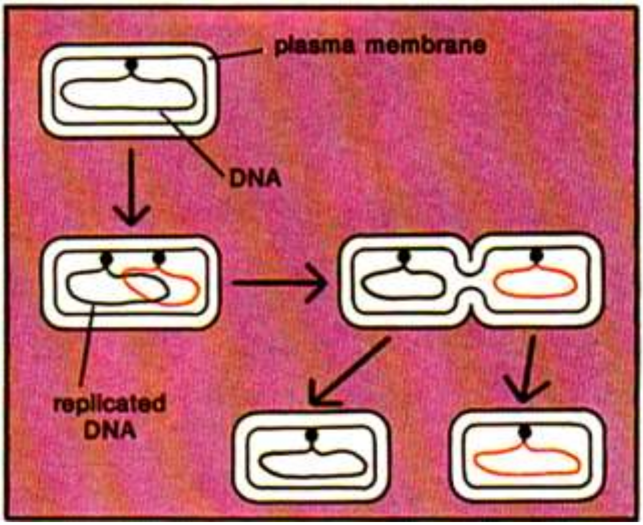

Figure 26 *Division of bacterium*

Some bacteria are heterotrophs, obtaining their energy from organic molecules. Bacteria play an important role as decomposers in food webs. Decomposers feed upon the remains of dead organisms. As decomposers feed, they break down their food into simpler substances such as carbon and nitrogen. These substances can then be reused by other living organisms.

Some bacteria are harmful and cause disease in human. For example, bacteria cause many diseases in humans, including cholera, leprosy, tetanus, bacterial pneumonia, whooping cough and diphtheria. Bacteria also can cause food to spoil. The damage caused by bacteria depends on the kind of food and how it is stored. Foods that are easily spoiled by bacteria include fish, milk, fruits and vegetables.

Helpful bacteria are used in the production of some foods, provide nitrogen for some plants and animals, play important roles in the body. For example, certain bacteria produce vinegar. In similar way, other bacteria produce acids that help make yogurt and pickles. Many cheeses also are made using bacteria.

Certain bacteria live within the roots of plants, such as soybeans, clover, peas. These bacteria change nitrogen gas into a form that can be used by plants and animals. This process is called nitrogen fixation. The plants provide the bacteria with food. In turn, the bacteria supply the plants with nitrogen. When animals eat the plants, the animals get usable nitrogen.

Bacteria also live inside humans. For example, bacteria in human's large intestine make vitamin K which takes part in clotting of blood.

New words and word combinations.

to divide	bölmək
coccus	kokk (bakteriya)
bacillus	çöp,basil
spirillum	spiril, sprilla
bunch	dəstə, qam, salxım
wavy	dalğalı, dalğavari
maintain	saxlamaq, tutmaq

shape	forma
binary	ikili, bivar, açılan, ikili
involve	cəlb etmək, calamaq, cəlb
attach	bərkitmək, yapışdırmaq
approximately	təxmini, təqribi, yaxınlaşma
doubled	ikiqat, ikili, qoşa, cüt, iki dəfə
pinch	sıxmaq, çimdik
inward	daxili, içə
identical	eyni, oxşar
autotropic	avtotrop
decompose	çürümək, ayrılmaq, ayırmaq
harmful	zərərli, ziyanlı
wineqour	sirkə
yogurt	süzmə, kefir
protist	bir hüceyrəli orqanizm
prokaryotic	prokariot
enkaryotic	eukariot
strand	saç, tel, ip,
stranded	çətin vəziyyətdə
possess	malik olmaq, hiss etmək
reflect	əks etdirmək, düşünmək
organelle	orqanoid
endoplasmic reticulum	endoplazmatik şəbəkə
soya-bean	soyalı paxla, soya paxlası
clover	yonca
pea	paxla
clot	laxta; qatılaşmaq, qəlizləşmək
leprosy	cüzam
tetanus	tetanos(spazma)
whooping cough	göy öskürək, boğmaca
diphtheria	difteriya

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

Millions of species of living things; two major types of cells; the kingdom monera; single-celled organisms; a prokaryotic cell; lack of a nucleus; in a naked circular strand; by a nuclear membrane; membrane-bounded organelles; the simplest organisms living; including in our month; three shapes of bacteria; may adhere in small groups; form chains; grapelike bunches; pairs of bacilli; tiny commas; look wavy; corkcrews; can transmit; with an open symphilis sore; from mother to her fetus; a protective polysaccharide cell wall; surrounding the cell membrane; to maintain its shape; by binary fission; asexual reproduction; replication of their material; cell division; grows and elongates; pinch inward; obtaining energy from sunlight; to carry out photosynthesis; to build organic molecules; by oxidizing inorganic substances; food webs; to break down their food; to be reused by other living organisms; to cause disease in human; whooping cough; to provide nitrogen; to produce acids; nitrogen fixation; usable nitrogen; inside human; human's large intestine; in clotting of blood.

II. Find out corresponding equivalents of the following word combinations into English:

basillər cütlüyü; nüvədən məhrum edilmiş; həlqəvi bakteriyalar; silindrik bakteriyalar; spiral formalı bakteriyalar; bakteriyanın forması; üzüməbənzər şaxələr; stafilakokkların üzüməbənzər dəstəsi; cütlər və zəncirlər əmələ gətirmək; diplobasil adlanmaq; bakteriyaların bölgüsü; fotosintezi əhatə etmək; günəş enerjisindən istifadə edərək; karbon dioksidlərdən üzvi molekullar yaratmaq; eyni yolla.

III. Match the highlited words in the text to the correct meaning.

kingdom a. very small living organism
reflect b. be alive
possess c. opening and cavity in the lower part of the face
bacteria d. the highest category in taxonomic classification
mouth e. cause to pass on from one place or person to another
live j. have the appearance of somebody/ something
look like f. acquire or secure
tiny g. throw back without absorbing
transmit h. very small
obtain k. have belonging to one.

IV. Complete the sentences with a word and word combination from the list.

dead organisms; harmful, desease; to spoil; with food; organic molecules; bacteria; using bacteria; soybeans.

1. Some bacteria are heterotrops, obtaining their energy from -------.
2. Decomposers feed upon the remains of -------.
3. Some bacteria are -------- and cause ----- in human.
4. Bacteria also can cause food --------.
5. Many cheeses also are made ---------.
6. Certain bacteria live within the roots of plants, such as --------.
7. The plants provide the bacteria --------.
8. ------- also live inside humans.

V. Write translations and transcriptions, try to remember the words

reproduce decomposers
elongate food webs

pinch	spoil
inorganic	vinegar
chemicals	pickles

VI.Complete the sentences with *will* or *be going to,* as appropiate. Include any words in parentheses.

1. A: Excuse me water! This isn't what I ordered.
   I ordered a chicken salad.
   B: Sorry, sir, I ------ take this back and get your salad (will).
   A: Thank you.
2. A: Would you like to join Linda and me tomorrow?
   We ----- visit the natural history museum (are going to).
   B: Sure, I've never been there.
3. A: Where's the mustard?
   B: In the refrigerator, on the middle shelf.
   A: I've looked there.
   B: Okay. I ------ find it four you. (will). (are you going to).
4. A: What's all this paint for (you) ------- (are you going to).
   Paint your house? (are you going to).
   B: We ------ paint my, mother's house.
5. A: Paul, do you want to go with me to the shopping mall?
   B: No thanks! I have some things I have to do today,
   I -------   wash my car and then clean out the basement. (am going to).

Unit 8. ALGAE

Algae are unicellular or simple multicellular photosynthetic organisms. The term algae from the Latin word for "seaweed". Algae probably arose about 600 million years ago from photosynthetic protists. Algae live virtually all parts of water and sometimes on damp soil, rocks and trees. There are about 30 000 different kinds of algae. Some algae exist as single cells or live together as groups of cells. Other algae are large, multicellular organisms that do not have tissues or organs.

All algae contain the green pigment chlorophyll. Because algae have chlorophyll, they are photosynthetic.

Most algae contain other pigments in addition to chlorophyll. These pigments can mask the green color of chlorophyll. Botanists use these same pigments to distinguish between red, brown and green algae (figure 27).

Most species of green algae live in swallow, fresh-water environments or on moist rocks, trees and soil, although a few inhabit shallow ocean waters. Green algae usually occur as single cells or as multicelled threads, hollow balls or wide, flat sheets.

Interesting freshwater green algae is Volvox. Hundreds or thousands of cells make up one colony of Volvox. The cells are held together in a hallow ball by strands of cytoplasm. Each cell in the colony has two flagella. As the flagella beat, they send the colony spinning through the water.

Among the unicellular green algae, Chlamydomonas is a well-known genus. Individuals are microscopic, green, rounded and have two flagella at the anterior end. They move rapidly in water by beating their flagella in opposite directions. Each individual has light receiving organ – eyespot that is used by the algae to help direct its swimming.

Figure 27 *Types of algae*

Green Algae

Chlamydomonas reproduces asexually (by cell division) as well as sexually. Haploidic Chlamydomonas divide asexually, producing identical copies of themselves. In sexual reproduction, two haploid individuals fuse to form a four-flagellated zygote (2n). The zygote develops a thick, resistant wall, becoming a zygospore, in which the flagella disappear. Meiosis occurs at the end of this resting period and results in the production of four haploid cells. Because of the segregation during meiosis, two of these individuals are called the (+)

strain, the other two the (-) strain. Only + and – individuals are capable of mating with each other when syngamy (fertilization) does take place, although both may divide asexually to reproduce themselves (figure 28).

Red Algae

Most red algae are small, delicate organisms that occur as thin filaments or flat sheet with fanlike appearance and generally live in shallow tropical ocean waters.

Almost red algae are multicellular. Some, however, exist as a single or as cells associated in colonies. The characteristic colors of red algae result from phycoerythrin, a type of phycobilin pigment. Red algae produce a starchy substance (carrageen) that is used as a stabilizing agent in ice cream, pudding, cosmetics.

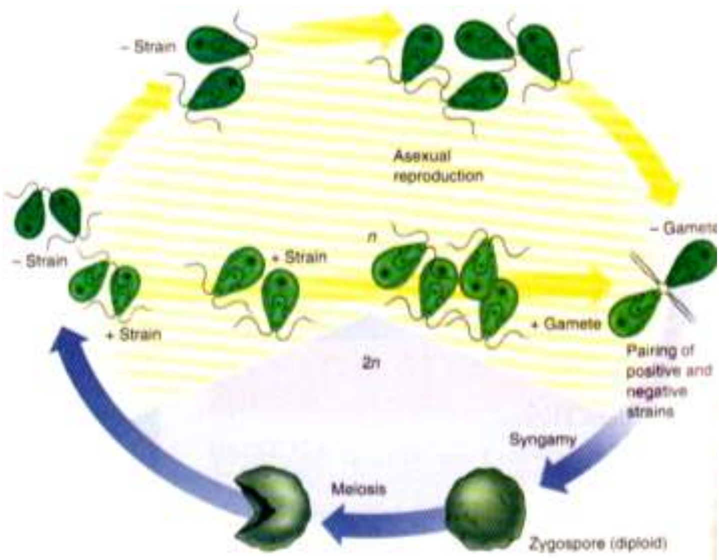

Figure 28 *Life cycle of Chlamydomonas*

Brown Algae

Most brown algae inhabit cool offshore waters. However, the largest members of the algal world are the multicellular kelps - brown algae that can grow 100 m long.

Many brown algae possess complex leaflike, stemlike and rootlike structures. These structures collect sunlight and produce sugars, support the algae vertically. Brown algae range from golden brown to dark brown to black because of pigments that collect the blue and violet light penetrating medium-deep water and pass it on to chlorophyll. These pigments explain why kelps can grow so tall – the sequoias of the sea.

New words and word combinations.

unicellular	birhüceyrəli, təkhüceyrəli
multicellular	çoxhüceyrəli
seaweed	yosun (dəniz yosunu)
protist	birhüceyrəli orqanizm
virtual	faktiki, həqiqi, real, virtual
virtually	həqiqətdə, virtual olaraq
exist	mövcud olmaq
to distinquish	ayırmaq, fərqləndirmək, seçmək
swallow	udmaq, gölməçə, göyərçin
inhabit	sakin
thread	sap, ip
flagellate(d)	qamçılılar
sugar	qənd, şəkər, şəkərli
genus	sinir, növ
anterior	öncəki
eyespot	gözcük
filament	közərmə, sap
associate	birləşdirmək, bağlamaq, əlaqə saxlamaq, münasibətdə olmaq, həmkar

carrageen (carrageen)	karragen
sequoias	sekvoya
stabilizing, stability	stabillik, möhkəmlik
hollow	oyuq, boş, çuxur
nesting hollow	içi boş oyuq, yuva
hollow-leaved	içi boş yarpaqlı
hollow-root	boş kök
hollow stalked	içi boş saplaq
hollow stemed	içi boş gövdə
meiosis	meyoz
strain	gərginlik
mate (mating)	yoldaş, cütləşmə

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

unicellular or simple multicellular; the term algae; photosynthetic protists; to live virtually; on damp soil; the green pigment chlorophyll; to distinguish between red, brown and green algae; in shallow; fresh-water environment; on moist rocks; shallow ocean waters to; occur as single cells, as multicelled thread; hollow balls; flat sheets; one colony of Volvox; to be held together; spinning through the water; in opposite directions; light receiving organ-eyespot; to reproduce asexually; two haploid individuals; resistant wall; because of the segregation; to be capable of mating with each other; fanlike appearance; to exist as a single; a starchy substance; stabilizing agent; cool offshore waters; multicellular kelps; rootlike structure; to range from golden brown to dark brown; penetrating medium-deep water; the sequoias of the sea.

II. Find out corresponding equivalents of the following word combinations into English:

Orta-dərin suya nüfuz edərək; dənizin sekvoyası; yosunların növləri; birhüceyrəlilər boyunca; sürətlə suya getmək; təmiz su; boş top; əks istiqamətdə; keçirici divar; fotosintetik protistlər; ikiqamçılı; anterior sonluqda; əks istiqamətlər; qalın liflər; birhüceyrəli və ya sadə çoxhüceyrəli; nəm torpaqda; dayaz okean suları; tək hüceyrə kimi olmaq.

III. Match the highlited words in the text to the correct meaning.

feature	a. a person, animal or plant that belongs to a particular group
cycle	b. a part of the earth's surface, that's not covered by water
member	c. grow or course to grow and become larger
leather	d. the lower extremely of the leg below the ankle
foot	e. measurement of heaviness of somebody
mold	f. only one; not one of several
single	g. a distinctive attribute or aspect
weight	h. a series of events that are regularly repeated on the same order
land	k. fine furry growth of fungi on old food
develop	t. material made from the skin of an animal by tanning or a similar process

IV. Complete the sentences with a word and word combination from the list.

1. The term algae from the Latin word for -------.
2. All algae ------ the green pigment chlorophyll.
3. Interesting freshwater green algae is ---------.
4. Almost red algae are -----------.
5. Most brown algae ------- cool off shore water.

6. Red algae produce ------ that is used as a stabilizing agent in ice cream, pudding, cosmetics.
7. Many brown algae possess complex -------, stemlike and rootlike structures.

Volvox; seaweed; multicellular; inhabit; contain; substance; leaflike.

V. Write translations and transcriptions try to remember the words

multicellular	thread
damp	eyespot
rock	delicate
contain	appearance
to distinguish	

VI. Complete the sentences with the correct future form of the verbs.

1. I ------- around the world after my studies. Travel – (a plan).
2. I ------- at a friend's house next week because they're painting mine. Stay (an arrangement).
3. I ------- the dinner tomorrow. Make (a promise).
4. That looks very heavy. ------- it for you? I / carry (an offer).
5. We --------- some friends after work tonight. Meet (an arrangement).
6. I -------- on a diet after Christmas. Go (an intention).
7. Look at the traffic. I don't think we ------ on time. Arrive (a prediction).

Unit 9. FUNGI

The fungi are a distinct kingdom of organisms, comprising about 100 000 species. Although fungi have traditionally been included in the plant kingdom, they lack chlorophyll and resemble plants only in their general appearance and lack of mobility. The differences between fungi and plants led botanists to rethink how fungi were classified. In 1969, the American ecologist Robert Whittaker suggested that fungi be classified in a separate kingdom.

Some fungi are free-living single cells. These include the yeasts that help create beer and wine. Other fungi are composed of many cells (toadstool, mushroom).

The body of multicellular fungus consists mostly of cells joined into filaments. These filaments are called <u>hyphae</u>. These hyphae may be divided into cells by crosswalls called septa. A mass of hyphae is called a <u>mycelium</u>. A mycelium grows and can penetrate the soil, resulting in a unique relationship between the fungus and its environment.

The cell wall of fungi is formed of polysaccharides and chitin, not cellulose like those of plants. Chitin is the substance that makes up the hard parts of animals such as crustaceans and insects.

Organisms of the kingdom Fungi are <u>heterotrophs</u> that absorb small molecules from their surroundings through their outer walls.

Most fungi are <u>saprophytes.</u> A saprophyte is an organism that feeds upon dead organisms. As fungi feed upon dead organisms, the remains of the organism are broken down into simpler substances. Fungi also are <u>decomposers.</u> A decomposer is an organism that breaks down complex substances into simpler substances. These simpler substances often can be used again by other living things.

Some fungi are <u>parasites</u>. They live on or in plants or animals. In people, parasitic fungi often cause diseases, such as athlete's foot.

Fungi are classified according to their structure and the way they produce spores. There are three phyla of fungi: Zygomycota (the zygomycetes), Ascomycota (the ascomycetes), Basidiomycota (the basidiomycetes).

Phylum Zygomycota (the zygomycetes)

The zygomycetes lack septa in the hyphae except when they form sporangia (formation of spores) or gametangia (formation of gametes). The phylum is named after a characteristic feature of the life cycle of its members, the production of structure called zygosporangia. The zygomycetes can be found in almost any area that is dark, warm and moist. For example, they can live in soil, on decaying matter, on leather and on foots.

Sometimes on the bread you can see grey-black fuzz. The fuzz that was growing on the bread is the mycelium of the bread molds (Rhizopus) that is species of the zygomycetes (figure 29).

In the life cycle of the Rhizopus, sexual reproduction occurs by the fusion of gametangia. These gametangia may be formed on hyphae of different mating types or on single hyphae. If both (+) and (-) mating strains are present in a colony, they may grow together and their nuclei may fuse. After fusing form diploid zygote which nuclei called zygosporangium. Meiosis occurs during the germination of the zygosporangium. From the haploid cells that result from meiosis grow haploid hyphae (figure 30).

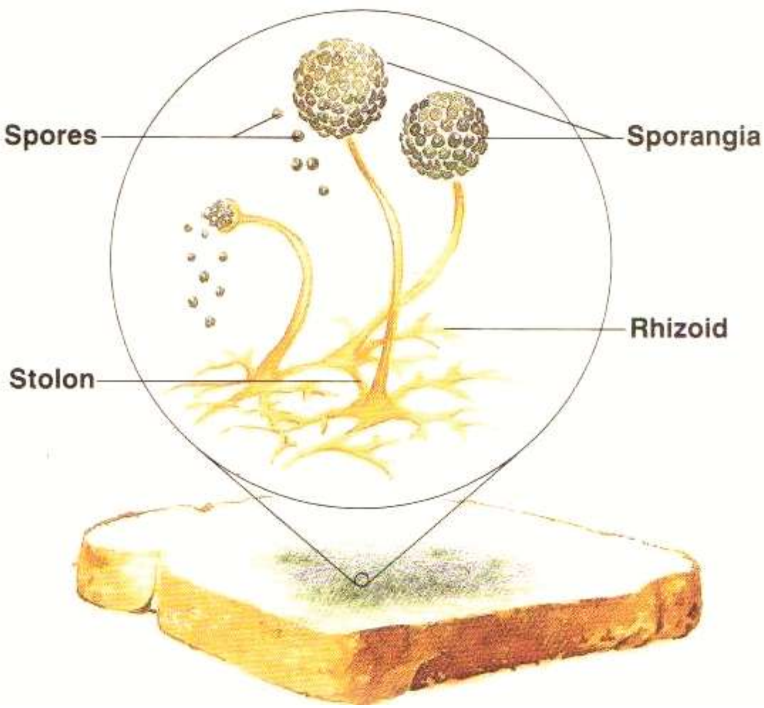

Figure 29 *Rhizopus (bread molds)*

During asexual reproduction, hyphae grow over the surface of the bread on which the fungus produce stalks, called sporangiophores, in clumps. The tips of the sporangiophores form sporangia. Haploid spores are produced within the sporangia. After maturation, spores eventually burst out of the sporangia. The spores of all fungi are light in weight. The lightweight spores can be carried easily by air currents. If growing conditions are good, each spore that lands on a food source can develop into a new fungus (figure 29).

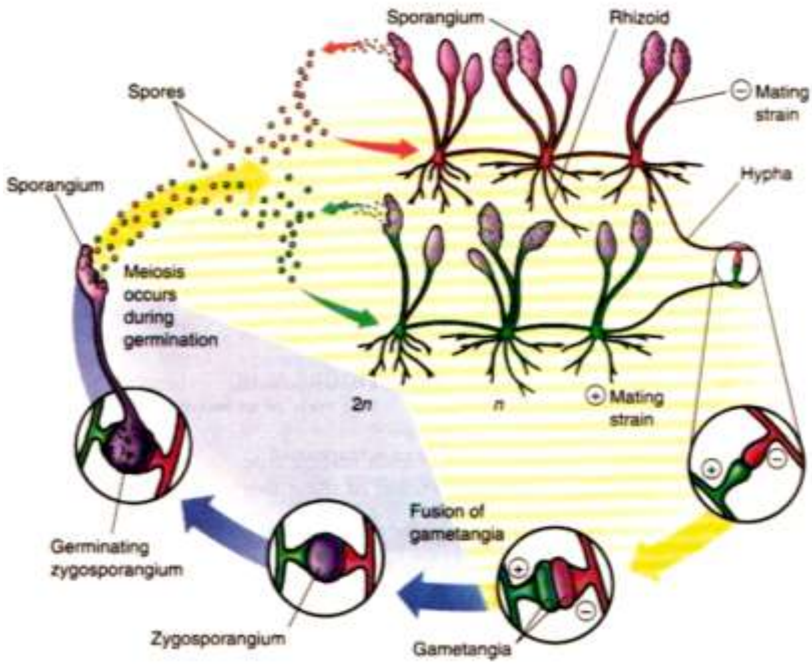

Figure 30 *Life cycle of Rhizopus*

Phylum Ascomycota (the ascomycetes)

The ascomycetes are named for their characteristic reproductive structure sac-like ascus (figure 31). These fungi house a series of little sacs or asci. Meiosis within each sac produces spores. These spores blow about, germinate and grow into new sac fungi.

Yeasts are single-celled ascomycetes. Unlike most organisms, yeasts obtain their energy through a respiratory process called fermentation. During fermentation, sugars and starches are broken down into alcohol and carbon dioxide gas. At the same time, energy is produced.

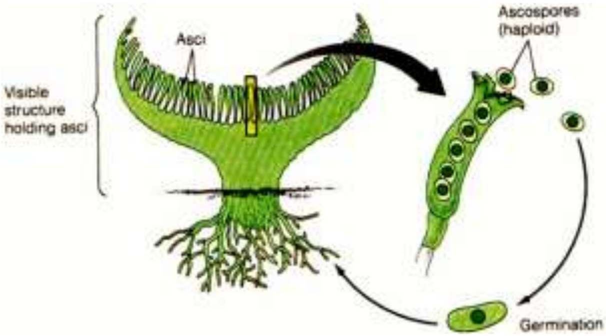

Figure 31 *Sac fungi*

There are 350 species of yeasts. Most of their reproduction is asexual by budding. Budding occurs when a small part of a cell breaks off to form a new organism. The cells tend to hang together on chain (figure 32).

Sometimes two yeast cells will fuse, forming one cell containing two nuclei. This cell may then function as an ascus, with syngamy (fertilization) followed immediately by meiosis. The resulting ascospores function directly as new yeast cells.

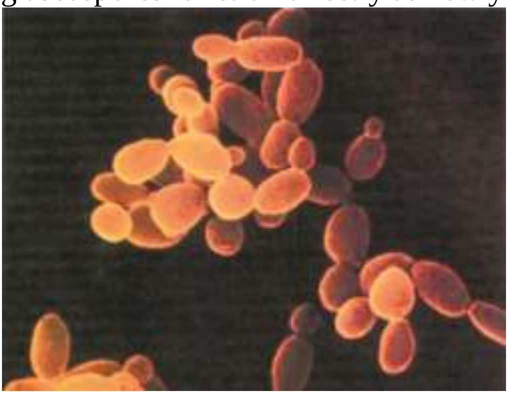

Figure 32 *Budding of yeasts*

Phylum Basidiomycota (the basidiomycetes)

The most familiar fungi – mushrooms, bracket fungi, puffballs, coral fungi, rusts and smuts are common examples of the basidiomycetes or club fungi. Club fungi are used as food by humans and other organisms.

Basidiomycetes are named for their characteristic sexual reproductive structure, the basidium. The word “basidium” comes from Greek word meaning “club”. A basidium is club-shape. Syngamy occurs within the basidium, giving rise to the diploid zygote. After the formation of the zygote immediately occurs meiosis and in result forms four haploid basidiospores. The basidiospores are born at the end of basidia called sterigmata. The life cycle of a basidiomycete continues with the production of monokaryotic hyphae which called primary mycelium after spore germination. Different types of monokaryotic hyphae may fuse, forming a dikaryotic or secondary mycelium. Such a mycelium is heterokaryotic, with two nuclei, representing the two different types, between each pair of septa. The basidiocarps or mushrooms, are formed entirely of secondary mycelium. The underside of a mushroom cap is lined with gills. The basidia of the mushroom which located on the gills again form many spores (figure 33).

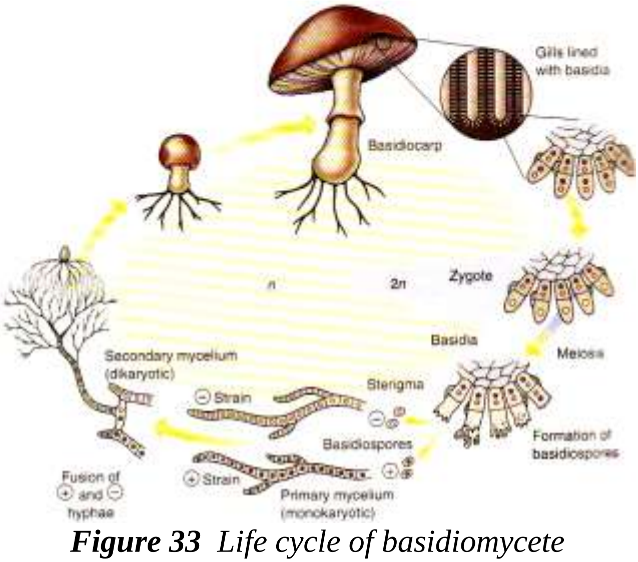

Figure 33 *Life cycle of basidiomycete*

New words and word combinations.

comprise	ibarət olmaq
tradition	adət, ənənə
traditional	ənənəvi
include	daxil etmək
lack	çatışmazlıq, çatışmamaq, kifayət etməmək
resemble	oxşamaq, bənzəmək
to rethink	təkrar düşünmək, ətraflı düşünmək
yeast	maya
beer	pivə
wine	çaxır
filament	lif
hyphae	kif
septa	bölmə, arakəsmə
mycelium	mitseli, hif(kök)
polysacharide	polisaxarid
chit	cücərti
chitin	xitin
crustaceans	xərçəngkimilər
substance	maddə
fusion	qovşaq, su qovuşan yer
heterotrophs	hetereti roflar
saprophytes	saprofitlər
decomposers	ayılan orqanizmlər
parasites	parazitlər
athlete	atlet
spore	spor
fuzz	tük, kif
mold	qəlib
gametangium	qametofit
diploid	cüt, iki qat

zigosporangia	ziqosporangi
sporangia	sporangilər
clump	ikiqat yığım
maturation	püxtələşmə,yetişmə
ascomycetes	askomisetlər
budding	tumurcuqlanma
ascus	asklar(spor növü)
bracket fungi	mantar göbələyi
puffballs	puf
coral	mərcan
smut(s)	göbələk papaqcığı
basidiomycetes	bazidiomisitlər
club fungi	sancaqşəkilli göbələk
sterigmata	steriqma
monokaryotic	bir nüvəli
dikaryotic	iki nüvəli
heterkaryotic	müxtəlif nüvəli, heterokariotik
basidiocarps	baziokarp
gill	mantarın alt hissəsi
mole	xal, köstəbək, kor siçan

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

Comprising about; resemble plants; lack of mobility; to be composed of many cells; resulting in a unique relationship; through their outer walls; to feed upon dead organisms; athlete's foot; to produce spores; a characteristic feature; decaying matter; grey-black fuzz; the mycelium of the bread molds; by the fusion of gametangia; mating types; single hyphae; in clumps; to form sporangia; by air currents; each spore; reproductive structure; sac-like ascus; to germinate and grow; single-celled ascomycetes; to obtain their energy; a respiratory process; 350 species of yeasts; by budding; the cells tend; resulting ascospores function; coral fungi; club fungi; the life cycle of a basidiomycete; primary mycelium; monokaryotic hyphae; secondary mycelium; each pair of septa; to be lined with gills.

II. Find out corresponding equivalents of the following word combinations into English:

Orqanizmlər aləmi; bitkilər aləminə daxil olmaq; oxşar bitkilər; hərəkətin olmamağı, hərəkətsizlik; ibarət olmaq; göbələklər və bitkilərin fərqi; təsrif olunmaq; ayrılmış aləmlərdə; onların ümumi görünüşü; xarici divarlardan; ölmüş orqanizmlərlə qidalanan; sporlar əmələ gətirmək; xarakterik xassələr; qalıq maddələr; bozumtul qara kif; cütləşən növlər; hava axını vasitəsilə; reproduktiv quruluş; cücərmək və böyümək; 350 növ maya; enerji əldə etmək; tənəffüs prosesi; tumurcuqlanaraq.

III. Match the highlited words in the text to the correct meaning.

fungi	a. make it easier to do something
appearance	b. be composed of
include	c. soak up
help	d. arrange into classes
consist	e. plant without leaves that grows on decaying matter
absorb	f. comprise or contain as port of a whole
classify	g. the way that someone or something appears
animal	h. a living organism

IV. Complete the sentences with a word and word combination from the list.

1. The fungi are a distinct ------ of organisms, comprising about 100 000 species.

2. Some fungi are free-living ----------.
3. These hyphae may be divided into cells by -------- called septa.
4. A saprophyte is an organism that feeds upon -------.
5. In the life cycle of the phizopus, sexual ------- occurs by the fusion of gametangid.
6. The lightweight spores can be carried easily by ------.

single cells; dead organisms; air current; crosswalls; reproduction; kingdom.

V. Write translations and transcriptions try to remember the words

mobility	relationship
suggest	crustaceans
separate	insect
penetrate	parasite

VI. Use Present perfect and past simple, circle the correct answer.

1. My best friend inherited / has inherited a lot of money last month.
2. We have used / used the same bank for the last ten years and don't want to change.
3. Have you paid / Did you pay back the money yet?
4. I took / have taken 100 out of the cash machine this morning.
5. Have you ever had / Did you ever have problems with a friend about money?
6. I've called / I called the bank yerterday and they are going to give us the loan.
7. The company hasn't given / didn't give us a pay rise last year.
8. When did she borrow / has the borrowed the money

from you?

Unit 10. LICHENS

One of the most unusual living things is the lichen. About 26 000 species of lichens exist.

Lichens are gray, orange or greenish crusts that grow on bark, soil or rock (figure 34). Lichens are symbiotic associations between fungus and an alga. They provide an outstanding example of mutualism, the kind of symbiotic association that benefits both partners. In lichen, the algae provide the fungus with nutrients. The fungus, in turn, provides the algae with the water and carbon dioxide needed for photosynthesis. In most cases the fungal part of the lichen is the ascomycetes (sac fungus), the algal part is the green algae.

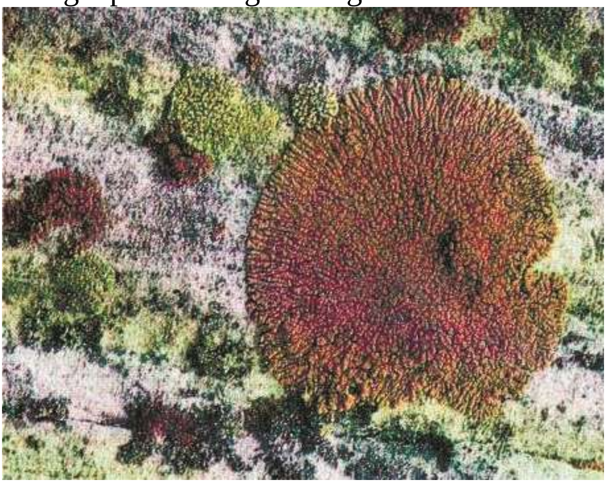

Figure 34 *Lichens on a rock*

The reproduction of lichens takes place by a combination of normal sexual processes: the formation of spores in the fungus and the reproduction, usually asexual, of the photosynthetic algae. These two components may come together under favorable conditions and produce a lichen body. Alternatively, lichens can simply break up into fragments, each containing both the fungal and photosynthetic algae, and give rise to a new individual.

New words and word combinations.

lichen	şibyə, dəmrov
crust	qabıq (çörəyin); yer qabığı
bark	ağac qabığı
symbiotic	simbioz
mutualism	mutualizm (qarşılıqlı yaşama)
favorable	əlverişli
alternatively	bir-birinin ardınca
fragment	fraqment, hissə

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

Unusual living things; greenish crusts; to grow on bark; to break up into fragments; an outstanding example; symbolic association; benefits both partners; needed for photosynthesis; the fungal part of the lichen; the algae part; to provide with nutrients; in most cases; to provide the fungus; in turn; the formation of spores; to produce a lichen body.

II. II. Find out corresponding equivalents of the following word combinations into English:

Qeyri-adi canlılar; yaşımtıl qabıqlar; ağac qabığında böyümək; görkəmli nümunələr; simbioz birləşmə; hər iki cüt üçün faydalar; fotosintezə ehtiyacı olan; şibiyənin göbələk hissəsi; yosun hissə; qidalarla təchiz etmək; əksər hallarda; mantarla təchiz etmək; əlverişli şəraitdə; hissələrə bölünmək; yeni fərdin yaranmasına imkan vermək.

III. Match the highlited words in the text to the correct meaning.

unusual	a. person who takes part in an activity with others
crust	b. advantage; gain
bark	c. one after the other
provide	d. require, want
need	e. not habitually or commonly done or occurring
turn	f. make available for use; supply
partner	g. hard surface
benefit	h. tough outer covering of a tree

IV. Complete the sentences with a word and word combination from the list.

1. One of the most unusual ------ is the lichen.
2. Lichens are symbiotic associations between --------- and an algae.
3. In lichen, the algae______ the fungus with nutrients.
4. About 26000 ------- of lichens exist.
5. In most cases the fungal part of the lichen is the ---------, the algae part is the green algae.

accomysetes; provide; fungus; species; living things.

V. Write translations and transcriptions, try to remember the words.

lichen	an algae
exist	benefit
gray	partner
orange	mutualism
symbiotic	rock

VI. Grammar – Complete the sentences use a Comparative.

1. People today aren’t very polite. In the past they were --------.

2. My job isn’t very interesting. I want to do something --------.
3. You plan isn’t very good. My plan is --------.
4. My bag isn’t very happy. You bag is --------.
5. London isn’t very beautiful. Pares is --------.
6. This knife isn’t very sharp. Have you got a --------.
7. David doesn’t work very hard. I work --------.
8. You are not very tall. Your brother is ------.

Unit 11. MOSSES

Mosses are bryophytes which live in very damp areas and close to the ground.

Mosses are small, velvetlike plants growing on rocks, trees or in sidewalk crack. Mosses have a short main stalk with flat, green, leaf-like structures growing around it (figure 35). These leaflike structures perform photosynthesis. At the base of the stalk are root-like structure called rhizoids. Rhizoids anchor the moss in soil and also absorb water and dissolved nutrients from the soil. However, mosses do not have vascular tissue to carry water and nutrients from the rhizoids up to the leaflike structures. Water and nutrients move from one cell to another by diffusion.

Figure 35 *Moss*

At the tip of stalk of mosses is a swollen structure called a spore case or sporangium. The spore case contains the reproductive cells or spores.

Mosses go through stages or generations during their life cycles. One generation is a sexual stage called the gametophyte.

The other generation is an asexual stage called the sporophyte. In mosses, the gametophyte generation is larger and longer-living plant (figure 36).

Mosses produce female archegonia (egg-producing organ) which may develop either on the same gametophyte (a leafy green plant) as the male antheridia (sperm-producing organ) or on separate plants. In the archegonium is produced a single egg while in the antheridium are produced numerous sperms. The damp areas in which the mosses live provide water in which the sperm swim to the tips of female plants, where the eggs are fertilized and form zygote. The zygote divides by mitosis and develops into the sporophyte. The sporophyte remains attached to the gametophyte. As the sporophyte grows, it makes spores.

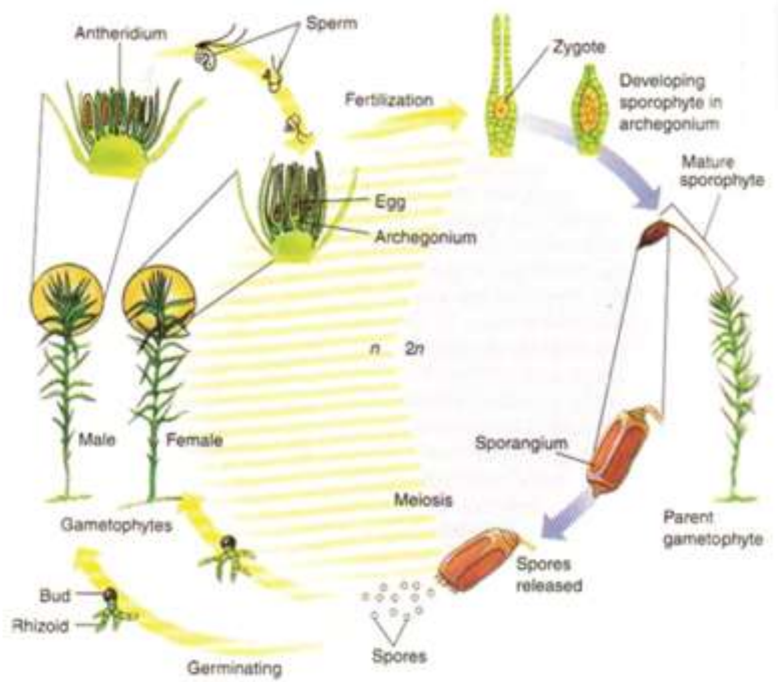

Figure 36 *Life cycle of moss*

Spore mother cells within the sporangium undergo meiosis, each becoming four haploid spores. When the spores are mature, they are released. These spores become new gametophytes.

Moss is useful to gardeners. Gardeners often mix dried peat moss into the soil. Dried peat moss is used by gardeners because its cells store a lot of water.

Peat moss has other uses, too. In some countries, dried peat moss is burned as fuel. Peat moss also is used to insulate homes. Peat moss also contains a germ-killing chemical. In fact, during World War I, peat moss was used on wounds when sterile cotton was not available.

New words and word combinations.

moss	mamır
bryophytic	briofit
velvetlike	məxmərə bənzər, məxmərə oxşar
crack	yarıq; şaqqıltı; mükəmməl
contain	saxlamaq, daxilində olmaq, ibarətdir
reproductive	məhsuldar
though	baxmayaraq, hətta, heç olmasa
component	component,
stalk	gövdə, saplaq
rhizoid	rizoid
anchor	lövbər
dissolve	həll etmək
nutrient	qidalı maddə
swollen	şişmiş
spore	spor
sporangium	sporangi
reproductive	reproduktiv, məhsuldar, çoxalan
peat	torf mamırı
insulate	izolyasiya etmək
available	mövcud olan, əldə olan, mümkün olan

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

to be bryophytes; velvetlike plants; sidewalk crack; main stalk; leaflike structure; at the base of; to anchor the moss; dissolved nutrients; by diffusion; a swollen structure; to go through stages; longer-living plant; numerous sperms; to the tip of female plants; to be fertilized; attached to the gametophyte; to be undergo meiosis; to be released; dried peat moss; burned as fuel; to insulate homes; to be available.

II. Find out corresponding equivalents of the following word combinations into English:

Briofit olmaq; məxmərəbənzər bitkilər; səkilərin yarıqları; əsas gövdə; yarpaqvari quruluş; əsasında; həll olunmuş qidalar; yayılmaqla; qabarıq quruluş; mərhələlərdən keçib getmək; uzunömürlü bitki; saysız spermalar; dişi bitkilərin ucuna; gübrələnmək; quru torf yosunu; yanacaq kimi yandırılmaq; evləri təcrid etmək; mümkün olmayan; buraxılmaq.

III. Match the highlited words in the text to the correct meaning.

small	a. move or transport from one place to another
rock	b. soft substance, white
crack	c. go in specified direction or manner
to carry	d. of a size that is less than normal or usual
move	e. make, manufacture, or create
produce	f. propel oneself through water by bodily
swin	g. the hard mineral material of the Earth
cotton	h. a narrow opening between two parts of something

IV. Complete the sentences with a word and word combination from the list.

1. Mosses are bryophytes which ------- in very damp areas close to the ground.
2. Mosses are small ---------, plants growing on rocks, trees or in sidewalk crack.
3. These ------- structures perform photosynthesis.
4. Moss is useful to -----------.
5. Peat moss also contains a germ-killing --------.
6. In some contries ------ moss is burned as fuel.

dried peat; gardeners; leaflike; live; verlvetlike; chemical.

V. Write translations and transcriptions, try to remember the words

sidewalk	gametophyte
dissolved	sporophyte
vascular	archegonia
nutrients	numerous

VI. Reguests and Permission.

a) Comlete the requests with the correct from of a verb in the list

1. Did you think you could ------ this Saturday?
2. Can you give me a ------ tomorrow?
3. Could I ------ you computer this afternoon? Mine's not working?
4. Would you mind ----- me an email about that?
5. Is it ok if I ------- Friday off?
6. Would you mind ------- me with this report?

b). Match the requests and responses.

a) I'm sorry, but we really need you.

b) I'm sorry but I need it. What's wrong with yours?
c) Sure, what time shall I phone?
d) I'm afraid I can't just now. Maybe Joe can help me.
e) Of course not.
f) Yes, of course. Shall I come in at ten o'clock?

take; book; use; send; call; help.

Unit 12. FERNS

Ferns are tracheophytes that have vascular tissue in their roots, stems and leaves. Ferns are seedless vascular plants. There are about 12 000 different kinds of ferns. Some ferns are treelike and grow to be more than 25 m tall. Other ferns are very small, only about 3 cm tall.

The stem of a fern called rhizome. A rhizome is underground organ. The roots of the fern grow downward from the rhizome. The roots absorb materials from the soil and also anchor the plant. The large leaves of a fern, called fronds, grow upward from the rhizome. Each frond is made up of blades. On the underside of blades, spore cases or sporangia develop (figure 37).

Figure 37 *Fern*

The life cycle of a fern involves alternation of generations: gametophyte and sporophyte (figure 38). Diploid spore mother cells in each sporangium undergo meiosis, producing haploid spores. At maturity the spores are released from sporangium which land in suitable damp location and germinate, producing heart-shaped gametophytes known as prothalli.

Archegonia (egg producing organ) and antheridia (sperm producing organ) are produced on the underside of prothalli. Fertilization takes place when a sperm cell which has flagella swims across the plant and unites with one of the egg cells, forming zygote. The zygote then develops into a new sporophyte that is attached to the gametophyte. The gametophyte supplies the growing sporophyte with water and nutrients. However, as the sporophyte matures, it makes its own food. Then, the gametophyte shrivels up and dies.

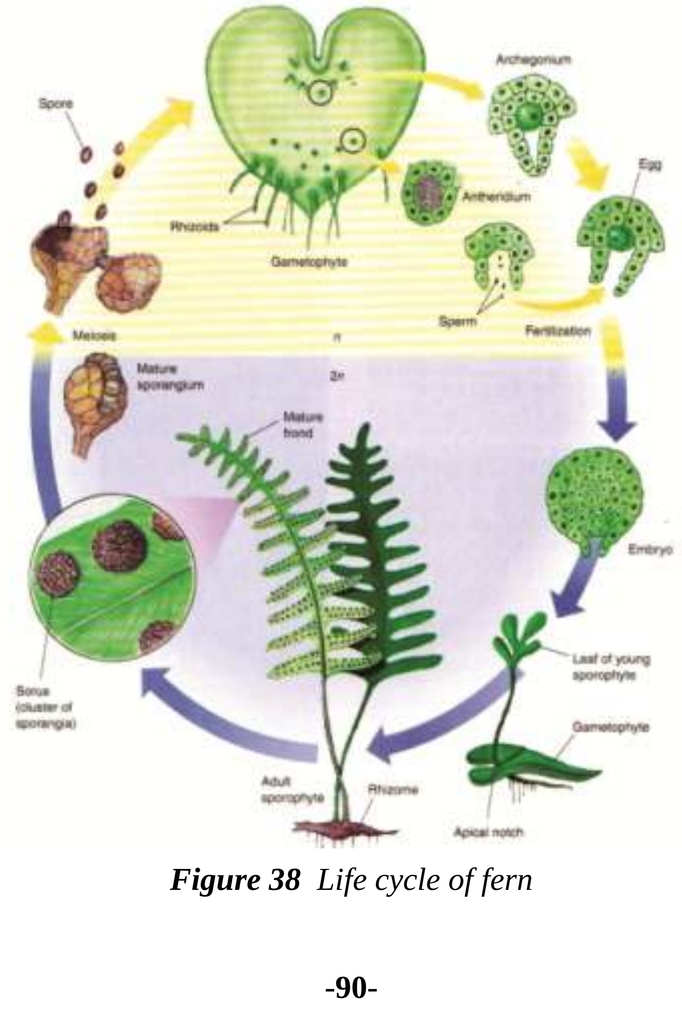

Figure 38 *Life cycle of fern*

New words and word combinations.

fern	qıjı, ayıdöşəyi
seedless	toxumsuz
rhizome	rizoma (şəkli dəyişmiş gövdə)
anchor	lövbər, lövbər salmaq
frond	yarpaq
blade	ülgüc, ağız, ot saplağı
sporangia	sporangi
mature	yetkin, yetişmiş, yetişmək
gametophyte	qametofit
shrivel	qırışmaq, bürüşmək
alternation	növbələşmə, əvəzetmə

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

to be seedless; different kinds of ferns; to be treelike; to grow downward; made up to blades; spore cases; alternation of generations; at maturity; suitable damp location; heart-shaped gametophytes; known as prothalli; egg cells; to supply the growing sporophyte; on the underside of prothalli.

II. Find out corresponding equivalents of the following word combinations into English:

Toxumsuz olmaq; müxtəlif növ qıjılar; üzüaşağı böyümək; saplaqlardan təşkil olunmuş; spor halda; nəsillərin növbələşməsi; yetkinlik dövründə; əlverişli nəm yer; ürək formalı qametofitlər; yumurta hüceyrələr; su və qida ilə təchiz etmək; öz qidasını hazırlamaq.

III. Match the highlited words in the text to the correct meaning.

seedless	a. under the earth's surface
fern	b. prevent from moving
underground	c. join together
anchor	d. the leaf or leaf-like part of a palm
unite	e. having no seeds.
upward	f. a flowerless vascular plant
frond	g. towards a higher point or level

IV. Complete the sentences with a word and word combination from the list.

1. Ferns are seedless ---------- plants.
2. The stem of a fern called --------.
3. Each frond is made up of --------.
4. Archegonia and antherida are produced on the ------- of prothalli.
5. The zygote then develops into a new sporophyte that is attached to the ------.
6. The gametophyte supplies the growing sporophyte with water and --------.

rhizome; blades; vascular; nutrients; underside; gametophyte.

V. Write translations and transcriptions, try to remember the words

fern	leave
tissue	treelike
root	rhizome
stem	upward

VI. Complete the sentences with must, might / may, or can't

1. They must be very happy --------- they've just won the lottery.
2. She -------- be the new boss – she's too young.
3. It ------- be a Roman plate, but I'm not sure.
4. That ----- be the same man – he looks completely different!
5. Look. He ------ be a doctor. Open the door.
6. I don't know where Jim is. He ------ be at the gym.
7. He __________ go there after work.

Unit 13. CLASSIFICATION OF SEED PLANTS

Biologists classify seed plants into two groups, based upon the appearance of their seeds. One group of seed plants is the gymnosperms which have uncovered seeds. The other group of seed plants is the angiosperms that have covered seeds.

Most gymnosperms have needlike leaves and cones. The seeds of gymnosperms lie uncovered on the flat scales of the cone. Gymnosperms have woody stems. Gymnosperms are tall trees, such as pine, spruce, fir and other. Woody stems of gymnosperms are nongreen stems that are harder and ticker than herbaceous stems. Unlike angiosperms, leaves of the gymnosperms grow throughout the year. For this reason, many gymnosperms commonly are called evergreen trees.

Unlike the seeds of gymnosperms, the seeds of angiosperms develop inside a covering called a fruit. Each fruit contains one or many seeds.

Herbaceous stems are a common characteristic of many angiosperms. For example, lilies, thistles, carnations and all species of grasses have herbaceous stems. Some angiosperms also have woody stems. Many woody angiosperms shed all their leaves each fall. These woody angiosperms are called deciduous plants. Oak and maple trees are deciduous plants.

Gymnosperms

There are about 720 species of gymnosperms. The most familiar gymnosperms are conifers, which include pines, spruces, firs, cedars, yews, larches and other. Conifers can live in many different environments. Some conifers grow in rocky and sandy soil. Other conifers grow in swamps, bogs and around the edges of lakes.

A pine produces two kinds of cones on the same tree.

Male cones are called pollen cones. The yellow or red colored pollen cones often grow in clusters of 30 to 70 at the tips of branches. Within each scale of pollen cones form a pair of sacs called microsporangia. Numerous microspore mother cells in the microsporangia undergo meiosis, each become four microspores. The microspores develop into four-celled pollen grains with a pair of air sacs that are released into the air.

Female cones are called seed cones (figure 39). Seed cones grow singly and are larger than the pollen cones. Seed cones also are wooder than pollen cones. Two ovules develop toward the base of each scale of seed cone. Each ovule contains a megasporangium. A single megaspore mother cell within each megasporangium undergoes meiosis. Three of the megaspores break down, but remaining one slowly develops into a female gametophyte with two to six archegonia. Each archegonium contains large egg. The archegonium is not mature until about a year later. When pollen grains are released into air, some of them land on the seed cones. While the pollen tube from pollen grain is growing, one of the pollen grain's four cells, the generative cell, divides by mitosis, with one of the resulting two cells dividing once more. These last two cells function as sperm. The germinated pollen grain with its pollen tube and two sperm is the mature male gametophyte.

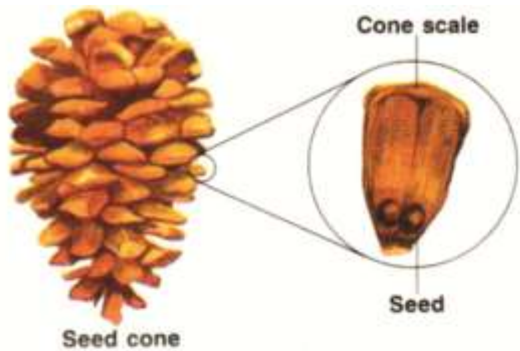

Figure 39 *Seed cone*

About 15 months after pollination one sperm unites with the egg, forming a zygote. The other sperm cell degenerate. The zygote develops into an embryo within a seed. After dispersal and germination of the seed, the young sporophyte of the next generation grows into a tree (figure 40).

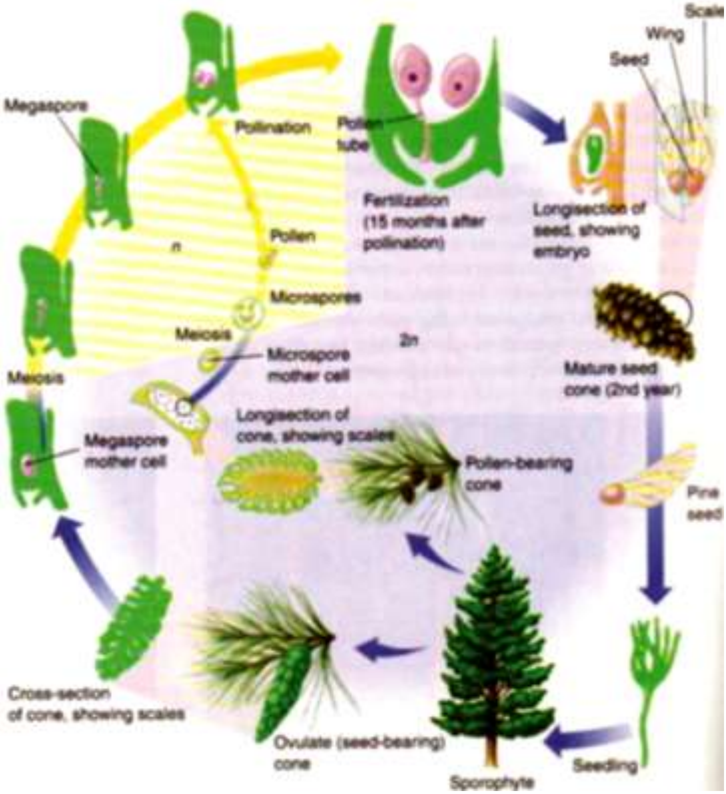

Figure 40 *Life cycle of a pine*

Angiosperms

There are more than 275 00 species of angiosperms. Most angiosperms produce a lot of seeds. Because they produce many covered seeds, angiosperms are a successful group of plants.

The first leaf of an angiosperm is called the cotyledon. Because a cotyledon develops inside a seed a cotyledon commonly is called a “seed leaf”. The number of cotyledons inside a seed determines how an angiosperm is classified.

Biologists classify angiosperms into two classes. One group of angiosperms is called the monocots. The seed of monocots have only one cotyledon. The other group is called the dicots. The seeds of dicots have two cotyledons (figure 41).

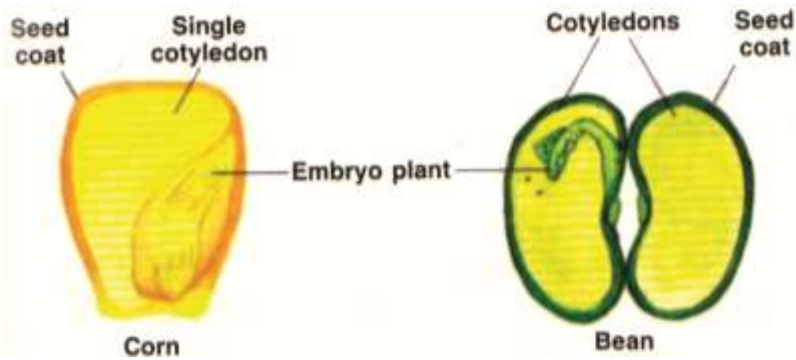

Figure 41 *Monocot (left) and Dicot (right)*

Angiosperms are vascular plants. The leaves of all vascular plants have veins that transport water and food throughout the leaf. The leaves of a monocot plant have parallel veins. The leaves of a dicot plant have branched or netlike veins (see p.21).

By counting the number of petals of a flower monocot differs from dicot. On the flowers of monocot plants, petals grow in groups of three. Petals in groups of four or five grow on the flowers of dicot plant (figure 42). Structure of flower see on the page 26.

Importance of Angiosperms. Angiosperms supply many of the foods that people eat every day. Angiosperms also are the sources of fruits and vegetables. Many people also use angiosperms for decoration. The tough fibres of some angiosperms are used by people to make clothing and other materials.

Figure 42 *Flowers of Dicot (left) and Monocot (right)*

Drugs and medicine also are made from angiosperms. The nightshade plant or belladonna, for example, is the source of a drug that relieves muscle spasms. The foxglove plant contains a substance that helps heart attack victims.

New words and word combinations.

gymnosperm(s)	çılpaq toxumlu(lar)
angiosperm(s)	örtülü toxumlu(lar)
(needlike) needle	iynəli, iynəvari
scale(s)	pulcuq, şkala, ölçü, miqyas
woody	oduncaq, ağac
pine	şam
spruce	küknar
fir	xəz
herbaceous	ot
carnatious	qərənfil
shed	anbar, dam, zirzəmi
deciduous	yarpağı tökülən, xəzanlı
oak	palıd
maple	qayınağacı
conifers	iynəyarpaqlı ağac

cedars	sidr, cökə
swamps	bataqlıq
pollen (cones)	tozluq
cluster(s)	toplaşmaq, yığılmaq
microsporangium	mikrosporangi
seed (cones)	toxum, çiyid
megasporangium	meqasporangi
megaspore	meqaspor
archegonium	arxeqoni
generative	məhsuldar, yaranan
generation	nəsil
mitosis	mitoz
gametophyte	qametofit
pollination	tozlanma
a zygote	ziqot
degeneracy	eybəcərliklər
vein	damar
supply	ehtiyat; təmin etmək, təchiz etmək
source	mənbə, qaynaq
taugh	cod, qaba, bərk, möhkəm, davamlı, çətin
drugs	dərman
nightshade	gecəkölgəsi
relieve	kömək etmək, yüngüllətmək
muscle	əzələ
spasm	qıcolma
attack	hücum etmək, həmlə etmək, tutma
victims	qurban

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

to classify seed plants; woody stems; needlike leaves; woody angiosperms shed; deciduous plants; familiar gynnosperms; to be conifers; sandy soil; around the edges of lakes; two kinds of cones; pollen cones; in clusters; a pair of sacs; to undergo meiosis; seed cones; each scale of seed cone; pollen grains; to be released into air; devided by mitosis; function as sperm; after pollination; an embryo within a seed; after dispersal; many covered seeds; a successful group of plants; the seed of monocots; to have two cotyledons;

II. Find out corresponding equivalents of the following word combinations into English:

Oxşar çılpaq toxumlular; iynəyarpaqlılar; qumlu yer; göllərin kənarı boyunca; iki növ qoza; tozcuq qozalar; salxımlarda; bir cüt torba; bitki toxumalarını təsnif etmək; ağac gövdələri; yarpaqlı bitkilər; toxum qozaları; toxum qozasının bir ölçüsü; tozcuq dənələri; havaya buraxmaq; mitoz vasitəsilə; sperma kimi fəaliyyət göstərmək; tozlanmadan sonra; toxumun içərisində rüşeym; dağılmadan sonra; toxumalarla ötürülmüş; ən uğurlu bitki qrupu; birhissəli bitki toxumu; ikihissəli toxuma malik olmaq.

III. Match the highlited words in the text to the correct meaning.

seed	a. be situated
base	b. time by the earth in making one orbit round sun, about 365
lie	c. well know to somebody
year	d. a cause, explanation, or just justification
reason	e. lowest part of smth. on which it stands
grass	f. a flowering plant's unit of reproduction
familiar	g. common wild short green plant eaten by cattle
land	h. solid dry part of the earth's surface

IV. Complete the sentences with a word and word combination from the list.

1. One group of seed plants is the gymnosperms which have uncovered --------.
2. Gymnosperms have ------- stems.
3. Unlike angiosperms, leaves of the gymnosperms ------ throughout the year.
4. Each fruit ------ one or many seeds.
5. Conifers can live in many different --------.
6. Female ------- are called seed cones.

environment; grow; seed; cones; woody; contains.

V. Write translations and transcriptions, try to remember the words.

veen	nightshade
netlike	relieve
supply	foxglove
drug	attack

VI. Circle the correct form. If both forms are possible, circle them both.

1. He can / is able to cook really well because he used to work in a restaurant.
2. To work for this airline you must can / must be able to speak English fluently.
3. I'm really sorry I couldn't / wasn't able to come to your party last Saturday.
4. If it doesn't rain, we can / we'll be able to go to the mountains tomorrow.
5. I've been so busy I haven't could / haven't been able to call him yet.
6. Can you / will you be able to help me tomorrow?

II

chapter

Z O O L O G Y

ZOOLOGY

Some microscopic organisms are neither plants nor animals. They are classified as protists. The protists are interesting because people usually think of living things as only plants and animals.

One group of protists is made up of unicellular organisms called protozoan. They are often called the animal-like protists. By studying the movement of protozoan, scientists have classified protozoan into three phyla: Sarcomastigophora, Sporozoa, Ciliates.

Unit 1. Phylum SARCOMASTIGOPHORA

This phylum is divided into two classes: the Sarcodina or amoebae, and the Mastigophora or flagellates.

Sarcodines

Hundreds of species of amoebae are found throughout the world in both fresh and salt waters. They move from place to place by using fingerlike projections of their cytoplasm – pseudopods – from Greek words means "false foot" (figure 1). The pseudopods of amoebae also are used for obtaining food. The pseudopods flow around a bacterium (food of amoebae) and trap it. After the bacterium is trapped, it is enclosed in a food vacuole. The food vacuole contains digestive enzymes that break down the food. The amoebae also have a contractile vacuole. It acts as a tiny cell pump, which pumps excess water and substances out of the cell.

Reproduction in amoebae occurs by binary fission, or the direct division into two cells of equal volume. During binary fission, the parent cell's hereditary material (DNA) duplicates. Then the parent cell divides into two daughter cells. Each of the two daughter cells has a complete set of DNA from the parent cell.

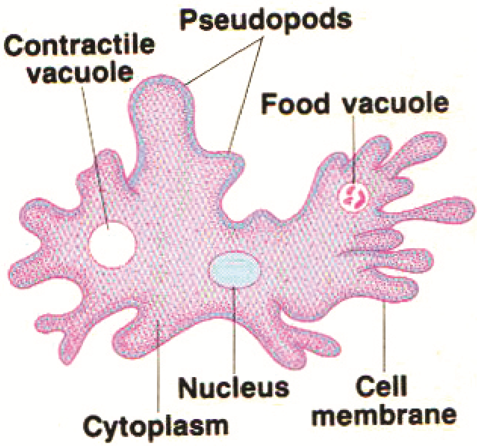

***Figure 1** Amoeba*

Flagellates

The Flagellates move by means of whiplike structures known as flagella. A flagellum is a long, threadlike extension of cytoplasm that functions as a means of propelling the organism. The number and position of flagella vary a great deal in different species. Outer hard covering of Flagellates is called pellicle.

Euglena is freshwater flagellate (figure 2). Two flagella are attached at the base of a flask-shaped opening called the reservoir, which is located at the anterior end of the cell. One of the flagella is long, a second – shorter flagellum which located within the reservoir but does not emerge from it.

Euglena is photosynthetic organism. Like a plant, Euglena contains green organelles called chloroplasts that convert solar energy into food energy. By red light-sensitive organ which called stigma Euglena can move toward light. Contractile vacuoles collect excess water from all parts of the organism and empty it into the reservoir, which apparently helps regulate the osmotic pressure within the organism. Euglena has paramylon granules. Paramylon granules are areas where food reserves are stored.

Reproduction in Euglena occurs by mitotic division of nucleus.

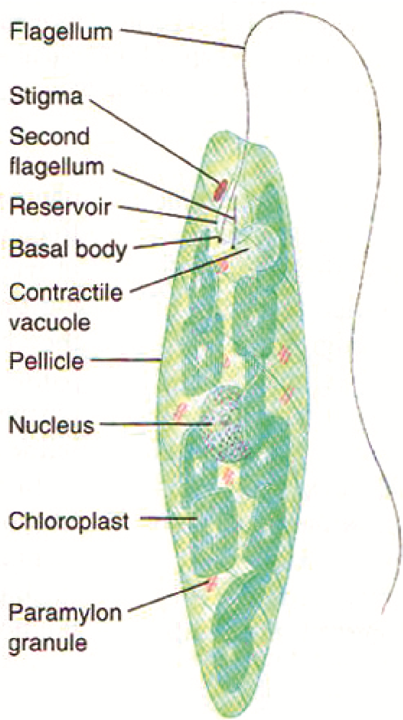

Figure 2 *Euglena*

New words and word combinations.

volume	həcm
ciliate	kirpikli

digestive	həzm
tiny	kiçik
reproduction	bərpa, çoxalma
protist	tək hüceyrəli orqanizm
flagellate	qamçılı
pellicle	şəffaf pərdə, təbəqə
flask-shaped	şüşəvari, şüşə formasında
stigma	ləkə (qırmızı gözcük)
mitotic	mitotic (mitozla əlaqədar)
contractile vacuole	ifrazat vakuolu
pseudopod	yalançı ayaq
food vacuole	həzm vakuolu
cell membrane	hüceyrə membranı
cytoplasm	sitoplazma
chloroplast	xloroplast
reservoir	su anbarı
regulate	nizamlamaq, tənzimləmək

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

to be neither plants nor animals; to be classified as protists; the animal-like protists; the movement of protozoan; throughout the world; fingerlike projections; for obtaining food; to be trapped; to be enclosed in; a contractive vacuole; a tiny cell pump; to pump excess water; by binary fission; hereditary material; to complete set of DNA; whiplike structures; threadlike extension; propelling the organism; position of flagella; in different species; outer hard covering; to be attached; a flask-shaped opening; to be located; at the anterior end of the cell; within the reservoir; to emerge from it; photosynthetic organism; to contain green organelles; to convert solar energy; into food energy; by red light-sensitive organ; to move toward light; contractile vacuoles; excess water; to empty it; apparently to help; to regulate the osmotic pressure; paramylon granules; to stored; food reserves; reproduction in Euglena; by mitotic division of nucleus.

II. Find out corresponding equivalents of the following word combinations into English:

Nə bitkidir nə də heyvan; təkhüceyrəlilər kimi təsnif olunmaq; heyvana oxşar təkhüceyrəlilər; protozanın hərəkəti; bütün dünya boyu barmağaoxşar çıxıntılar; xırda hüceyrəli sorucu; su tələb edən sorucu; iki hissəyə bölünərək; DNA zəncirini tamamlamaq; saxlamaq; ərzaq ehtiyatı; işığa doğru hərəkət etmək; onu boşaltmaq; qida enerjisinə.

III. Match the highlited words in the text to the correct meaning.

unicellular	a) equivalent to the division in botany
phylum	b) consisting of a single cell
fresh	c) common white substance obtained from mines and sea water
salt	d) passing on of characteristics from parents to children
trap	e) new or different device for
pump	f) catch (an animal) in a trap
hereditary	g) force to move in a particular direction
contractile	h) capable of or producing contraction

IV. Complete the sentences with a word and word combination from the list.

1. One group of protist is made up of --------- called protozoan.
2. Hundreds of species of amoebae are found throughout the world in both ------.
3. The pseudopods of amoebae also are used for ------.
4. -------- flow around a bacterium and trap it.

5. The food vacuole contains ------- that break down the food.

the pseudopods; digestive enzymes; unicellular organisms; fresh and salt waters; obtaining food

V. Complete the sentences with a word and word combination from the list.

microscopic	finderlike
protists	trap
unicellular	vacuole
protozoan	digestive
throughout	constructive

VI. Match the sentences halves.

1. I was very late for work.
2. I was so tired.
3. I'm frightened of flying.
4. I was so disappointed with the restaurant.
5. I didn't want to speak to anyone.
6. I was so worried about the exam.
   a. So I always travel by car.
   b. (that) I studied until 3.00 a.m.
   c. (that) I went straight to bed.
   d. So I took a taxi.
   e. (that) I never went there again.
7. So I turned off my mobile.

Unit 2. Phylum SPOROZOA

Members of this phylum are nonmotile, spore-forming parasites. Their spores are transported from host to host within the bodies of the animals they infect. Sporozoa have a complex life cycle with alternating sexual and asexual generations.

There are 3 900 described species of this phylum. Best known among them is malarial parasite, Plasmodium. There are two hosts in the life cycle of sporozoan Plasmodium. Its hosts are female Anopheles mosquito and a human. The life cycle of Plasmodium can be explained in next steps (figure 3).

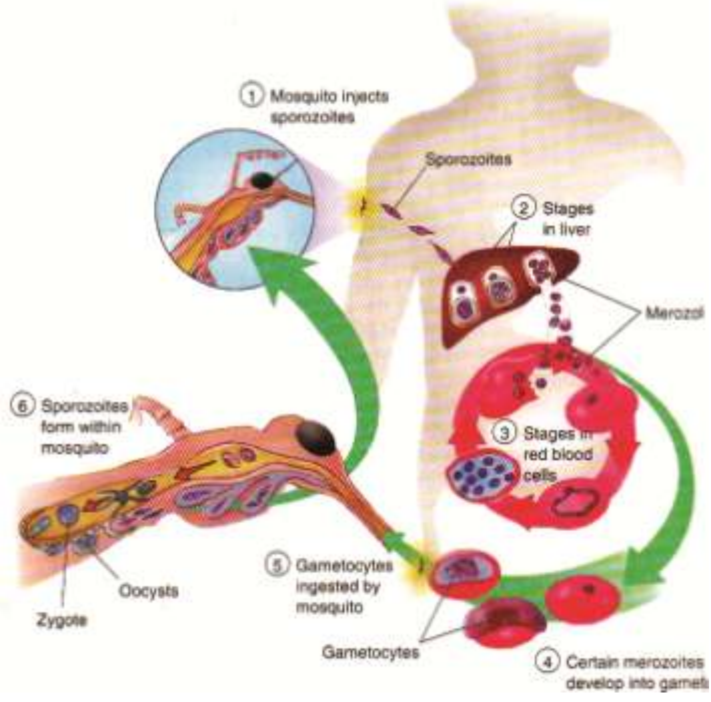

Figure 3 *The life cycle of Plasmodium*

When an Anopheles mosquito that carries Plasmodium (infected mosquito) bites human, it injects the <u>sporozoans</u> into the bloodstream of a human (step 1). The bloodstream carries Plasmodium cells to the liver where they reproduce asexually by cell division. After this division, merozoites, the next stage of the life cycle (step 2), form, either reinvading other liver cells or entering the human's bloodstream. In the bloodstream, they invade the erythrocytes (red blood cells), dividing rapidly within them and causing them to become enlarged and ultimately to rupture (step 3). This event releases toxic substances from erythrocytes, bringing about the well-known cycle of fever and chills that is characteristic of malaria. The cycle repeats itself regularly every 48 hours, 72 hours, or longer (it depend on species of Plasmodium).

Plasmodium enters a sexual phase when some merozoites develop into gametocytes: male and female (step 4). When the female mosquito bites an infected person, she draws into her stomach blood that may contain male and female gametocytes (step 5). Within the gut of the mosquito, the male and female gametocytes form sperms and eggs, after which occurs fertilization, forming a zygote. Zygote becomes elongated and is called oocysts. Within the oocysts, repeated mitotic divisions take place, producing large numbers of sporozoites (step 6). These sporozoites migrate to the salivary glands of the mosquito and all life cycle repeat.

New words and word combinations.

phylum	tip
sporoza	sporlular (tip)
nonmotile	hərəkətsiz
malaria parasite	malyariya paraziti
cycle	dövrü, dövr
Anopheles mosquito	Anofeles cinsindən olan ağcaqanad
inject	yeritmək, iynə vurmaq
asexual generation	qeyri-cinsi nəsil

bloodstream	qan dövranı
gametocytes	qametosit
liver	qaraciyər
toxic	zəhər, zəhərli
male	erkək
female	dişi
salivary gland	tüpürcək vəzi
phase	faza
fertilization	mayalanma
occur	baş vermək
merozoite	şizoqoniya nəticəsində çoxalan parazit hüceyrələrinə verilən ad, merozoit
stomach	mədə, qarın

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

to nonmotile; spore forming parasites; to be transported from host to host; to be infected; a complex life cycle; with alternating; asexual generations; to be described; species of this phylum; among them; a malaria parasite; two hosts; to be female; can be explained; in next steps; to bite human; to injects the sporozoans; into the bloodstream of a human; to the liver; to reproduce asexually; by cell division; either reinvading other liver cells; or entering the human’s bloodstream; to invade; the erythrocytes; causing them; to become enlarged; ultramately to rupture; to release toxic substances; fever and chills; to repeat itself regularly; early 48 hours; a sexual phase; to develop into; male and female; an infected person; to drow into; stomach blood; may contain; forming a zygote; to become elongated; mitotic divisions; to the salivary glands; all life cycle repeat.

II. Find out corresponding equivalents of the following word combinations into English:

Hərəkətsiz olmaq; spor-formalı parazitlər; sahibdən sahibə daşınmaq; yoluxdurmaqla; mürəkkəb həyyat (dövrü) sikli; təkrarlanaraq; qeyri-cinsi nəsil; təsvir olunmaq; bu tipin növləri; onlar arasında; dişi malyariya paraziti; izah oluna bilər; sonrakı mərhələdə; insanı dişləmək; sporozoları yeritmək; insanın qan dövranına; qaraciyərlərə; qeyri-cinsi yolla çoxalmağı; hüceyrə bölünməsi vasitəsilə; eritrositləri zəbt etmək; çoxaltmaq; nəticədə qırmaq; zəhərli maddələri buraxmaq; qızdırma və üşütmə; bunu mütəmadi təkrarlamaq; hər 48 saatdan bir; cinsi mərhələ (faza) erkək və dişi; mədə qanı; təşkil oluna bilər; uzanmaq; bütöv həyat (sikli) dövrü təkrarlamaq.

III. Match the highlited words in the text to the correct meaning.

breed	a) to reproduce
optimal	b) one half of the Earth
hemisphere	c) best; most favorable
species	d) type; a basic group in
windswept	e) biological classification
endure	f) to provide energy
fuel	g) to live under difficult conditions
aspect	h) upprotected from the wind
feat	k) a difficult act or achievement
	a part or feature

IV. Complete the sentences with a word and word combination from the list.

1. Members of this phylum are nonmotile, --------- parasites.
2. ------- have a complex life cycle with alternating sexual and asexual generations.
3. Plasmodium enters a sexual phase when some -----

develop into game to cytes: male and female.

4. Zygote becomes elongated and is called ------.
5. Within the oocysts; repeated ------- divisions take place.
6. These sporozoites --------- to the salivary glands of the mosquito and all life cycle repeat.

sporoza; oocysts; spore-forming; merozoites; imitotic; migrate.

V. Write translations and transcriptions, try to remember the words

nonmotile	reproduce
sporozoa	invade
generations	rupture
malaria	release
mosquite	bite

VI. Usually and used to use correct word.

1. **Did you used** to wear glasses?
Did you use to wear.

2. **I didn't use to like Callum** but now he's one of my best friends.

____

3. **I usually go swimming** before I go to work.

____

4. **He use to be very overweight** but then he went on a diet. Now he's very slim.

____

5. **Did you use the urgue** with your sister when you were little?

____

6. My wife **doesn't use to drive** to work. She normally walks or goes by bus.

____

7. Where **did you used to work** before you came here?

____

Unit 3. Phylum CILIATES

The Ciliates include a variety of free-living species. Locomotion is accomplished by means of cilia, relatively short threads of cytoplasm arising from small basal granules. Cilia are structurally similar to flagella but are usually shorter and more numerous.

Paramecium lives in fresh water (figure 4). The stiff but flexible pellicle gives the paramecium its slipperlike shape. As the Paramecium moves through the water, the beating cilia push food into the oral groove. The oral groove acts as the mouth of Paramecium. Food is then pushed into the gullet. At the end of the gullet, the food is enclosed in a food vacuole where occurs digestion. Undigested material is carried through the Paramecium to the special pore in the pellicle which called anal pore.

The two contractile vacuole (posterior and anterior), which function n in the regulation of water balance, periodically expand and contract as they empty their contents to the outside of the organism.

Paramecium has two nuclei, small micronucleus and larger macronucleus. The macronucleus controls most of the cell’s activities. It plays an essential role in routine cellular function, such as the production of mRNA to direct protein synthesis for growth and regeneration. The micronucleus controls reproduction.

Paramecium can reproduce asexually and sexually. Paramecium reproduces asexually by binary fission. In this process of cell division, the mitosis of the micronucleus proceeds normally, and the macronucleus divides by elongating and constricting. But before division of macronucleus within it occurs replication of DNA.

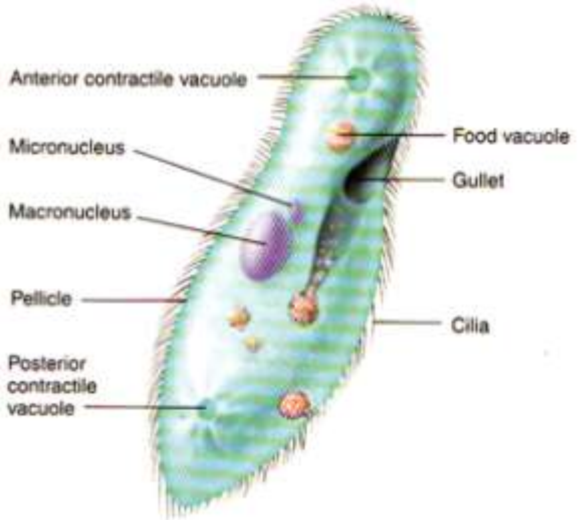

Figure 4 *Paramecium*

Sexual reproduction of Paramecium is called conjugation, in which two Paramecia join at their oral grooves. In each conjugating individual, two divisions in the micronucleus produce four micronuclei. Three of them are disintegrate; one nucleus again divided and in result in each partner forms two nuclei. They are sexual nuclei. One of them is motionless female nucleus, other is moving male nucleus. Through cytoplasmic bridge that appears between the two partners male nucleus of every partner goes to the next partner and fuse with female nucleus and in result form synkaryon. After conjugation, the macronucleus in each partner disintegrates, while the synkaryon in each partner divided three times, and in result forms eight nuclei. Three of them are disintegrate, four of them form macronucleus, and one is form micronucleus. Thus in each partner restores nuclear apparatus, the Paramecia separate and begin to live free.

New words and word combinations

locomotion	hərəkət
accomplish	bitirmək, tamamlamaq
thread	sap, yev, iplik
flexible	çevik
anal pore	anal dəlik
paramecium	infuzor tərlik
essential	əsas, vacib
mitosis	mitoz
conjugation	konyuqasiya, təsrif
macronucleus	iri nüvə
micronucleus	kiçik nüvə
disintegrate	dağılmaq
gullet	udlaq
synkaryon	ziqotun nüvəsi
cilia	kirpikcik
motionless	hərəkətsiz
separate	ayrı, ayrıca

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

to include a variety; free living species; to be accomplished; by means of cilia; short threads of cytoplasm; arising small basal granules; similar to flagella; more numerous; flexible pellicle; its slipperlike shape; through the water; the beating cilia; push food; into the oral groove; into the gullet; to be enclosed; to occur digestion; undigested material; to be carried through; to the special pore; anal pore; contractile vacuole; in the regulation of water balance; periodically expand and contract; to empty their contents; small micronucleus; cell's activity; to play an essential role; in routine cellular function; to direct protein synthesis; for regenetation; can reproduce asexually and sexually; by binary fission; by elongating and constructing; to occur replication of DNA; to be called conjugation; to be disintegrated; motionless female nucleus; cytoplasmic bridge; fuse with female nucleus; synkaryon in each parther; to restore nuclear apparatus; separate and begin to live free.

II. Find out corresponding equivalents of the following word combinations into English:

Çoxluğu (müxtəlifliyi) daxil etmək; sərbəst yaşayan növlər; bir yerdən başqa yerə hərəkət; kirpiklər vasitəsilə; sitoplazmanın qısa sapları; kiçik əsas qranulalardan törəmək; qamçıya bənzər; çoxlu saydadır; pellikula; onun tərliyəbənzər forması; su vasitəsilə; titrəyən kirpik; qidanı itələmək; qida borusuna; əhatə etmək; həzm baş verməsi; həzm olunmayan material; vasitəsilə daşımaq; xüsusi məsaməyə; anal məsamə; yığılan vakuol; su balansının tənzimlənməsi; periodik olaraq genişləmək; tərkibini (içərisindəkiləri) boşaltmaq; kiçik nüvə; hüceyrələrin fəaliyyəti; mühüm rol oynamaq; adi hüceyrə funksiyasında; zülal sintezini yönəltmək; regenerasiya üçün; qeyri-cinsi və cinsi yolla çoxala bilmək; ikiyə bölünmə yolu ilə; uzanma və sıxılma ilə; DNT-nin replikasiyasının (ikiləşməsi) baş verməsi; konyuqasiya adlandırılmaq.

III. Match the highlited words in the text to the correct meaning.

1. occupy	a). small in numbers or amount
2. sparse	b). strong; sudden and destructive
3. swing	c). very severe or difficult
4. violet	d). to be in a place; exist in
5. extreme	e). a sudden or big change
6. transitional	f). to grow well
7. fridge	g). relating to change from one type or another
8. diverse	h). to change to fit a situation or enviromment
9. adapt	i). the edge of something
10. thrive	j). varied; of many kinds.

IV. Complete the sentences with a word and word combination from the list.

1. Sexual reproduction of paramecium is called --------.
2. One of them is motionless female nucleus; other is ---------.
3. Paramecium can reproduce ------- and sexually.
4. Paramecium reproduces asexually by --------.
5. The Ciliates include a variety of ------.
6. -------- lives in fresh water.
7. Food is then pushed into ------.
8. The macronucleus control most of the ------.

asexually; the gullet; moving male nucleus; free-living species; binary fission; paramecium; cell's activity; conjugation.

V. Write translation and to try to remember the words:

reply noun (verb)	get to know (verb)
useful (adj)	make an excuse (verb)
break up (with) (verb)	realize (verb)
get in touch with (verb)	tend to (verb)
get rid of (verb)	wonder (verb)

VI. Complete the sentences with the correct form of <u>get</u> or a phrase with <u>get.</u>

1. Everyone <u>got</u> very excited when they were watching the match.
2. We ------- very well with our neighbours. In fact we are good friends now.
3. I ------ the party quite late because I missed my train.
4. How many emails do you everyday?
5. He's quite shy but when you ------ to know him. He's very nice.
6. Can we stop playing now? I'm ------- very tired.
7. I ----- my old car and I bought a new one.
8. I went to the friends reunited website because I wanted to try to ----- with an old school friend.

Unit 4. Phylum CNIDARIANS

The phylum Cnidarians includes more than 10 000 species of animals. All cnidarians live in water. They are basically gelatinous in composition. Cnidarians may have two basic body forms: polyp and medusa (figure 5). A polyp lives attached to a firm substrate. The mouth of a polyp is in an upward position. In contrast, medusa is free-swimming and is often umbrella-shaped. A medusa always has its mouth in a downward position.

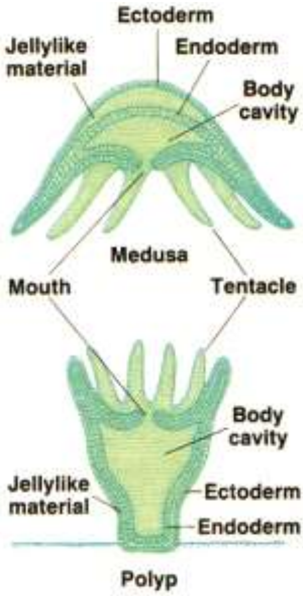

Figure 5 *Polyps and medusa*

All cnidarians have long armlike structures called tentacles (6-100), surrounding their mouths. Located on the tentacles are special stinging cells called cnidocytes (Cnidarians are named for the cnidocytes found on their tentacles). Cnidarians use their tentacles and cnidocytes to help them catch much larger organisms for food. Within each cnidocyte is nematocyst, a small but powerful “harpoon”. Each nematocyst features a coiled, threadlike tube. Cnidarians use nematocyst to spear their prey and then draw the harpooned prey back with the tentacle containing the cnidocyte. Food is taken in through the mouth and passes into the body cavity of the cnidarians. Inside the body cavity, food is digested, or broken down into usable forms. After the food is broken down, food particles are absorbed by the cells that line the body cavity. Undigested food is released through the mouth the cnidarians.

All cnidarians have radial symmetry. It means that all the body parts of cnidarians are arranged around its mouth much as the spokes of a bicycle wheel are arranged around its hub (figure 6).

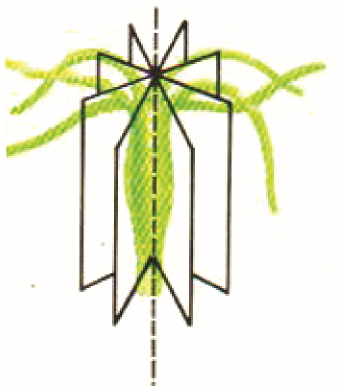

***Figure 6** Radial symmetry*

Hydra is small organism that lives in freshwater streams and ponds. Hydra is either white or brown (figure 7). Its length is about 1 cm, number of tentacles 6-12. Most of the time hydra lives as polyp attached to underwater objects. However, hydra can move from place to place by releasing air bubbles that loosen them from rocks on the pond floor. Once it is free, a hydra moves by floating upside down, sometimes with a somersaulting motion.

Hydra can reproduce asexually and sexually. Hydra reproduces asexually by budding. During budding, small bulges or daughter hydra forms on the outside of mother hydra's body. Daughter hydra grows and forms tentacles. Then daughter hydra breaks off and develops into new hydra.

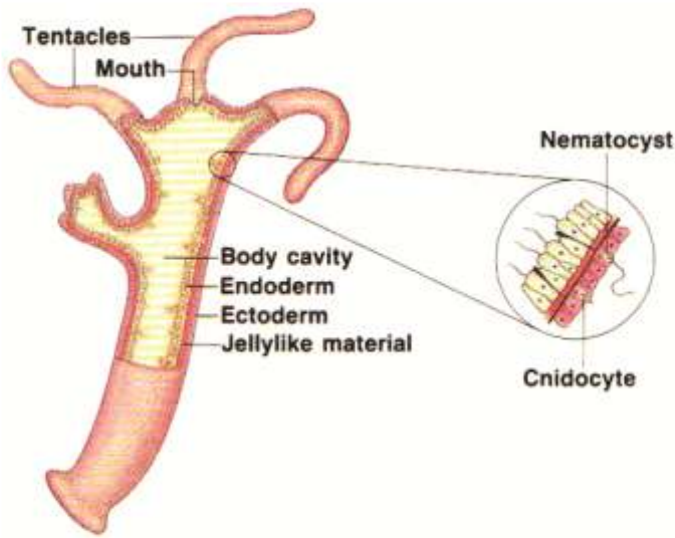

Figure 7 *Hydra*

During sexual reproduction, a hermaphroditic hydra that has produced sperm cells releases the sperm into the water. The sperm cells enter another hydra that produced egg cell. Fertilization takes place when sperm and egg join.

Hydra can regenerate itself. If hydra breaks off pieces, or fragments, each piece can develop into a new hydra. This kind of asexual reproduction is called <u>regeneration</u>.

New words and word combinations.

cnidarian	yandırıcı, dalayıcı
polyp	(çoxayaqlı) polip
jellylike	gelvari
cavity	boşluq
tentacle	(bığçıq) qolcuq
surround	əhatə etmək
stinging	dalayıcı
cnidocyte	(müdafiə və qidalanmadan ötrü xüsusi hüceyrələr), knidosit
nematocyst	(bağırsaq boşluqlularda yandırıcı hüceyrə), nematosist
threadlike	sapabənzər
digested	həzm (etmək) olunmuş
adsorbed	sorulmuş, udulmuş
radial symmetry	şüalı simmetriya
stream	axın
bulges	qabarıqlıq
bubble	köpük, qovuq
somersaulting	yumalanmaq
hermaphroditic	hermafrodit
regeneration	regenerasiya
locate	yerləşmək
gelatinous	jelatin
hub	mərkəz, orta
undigested	həzmedilməmiş
harpoon	harpoon, qarmaq

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

to be basically gelatinous; attached to a firm substrate; an upward position; in contrast; to be free-swimming; umbrella-shaped; in a downward position; armlike structures; surrounding their mouths; to be located on the tentacles; special stinging cells; to help them catch; powerful “harpoon”; each nematocyst features a coiled; threadlike tube; to spear their prey; to draw the harpooned prey back; containing the cnidocyte; cavity of the cnidarians; to be digested; broker down into usable forms; to be absorbed; undigested food; radial symmetry; to be arranged around its mouth; the spokes of a bicycle wheel; around its hub; freshwater streames and ponds; as polyp; to be attached to underwater objects; by releasing air bubbles; from rocks on the pond floor; by floating upside down; a somersaulting motion; by budding; small bulges; forms tentacles; hydra bready off; develop into new hydra; a hermaphroditic hydra; sperm cells; when fertilization takes place; sperm and egg cell; to regenerate itself; this kind of asexual reproduction; to be called regeneration.

II. Find out corresponding equivalents of the following word combinations into English:

Əsasən jelatinli olmaq; substrata bitişik olmaq; başı yuxarı mövqe; əksinə; sərbəst üzən; çətir formalı; aşağıya doğru mövqedə; qolşəkilli quruluşlar; ağzıyla əhatə olunmuş; palpları üzərində oturan; xüsusi iynələyici hüceyrələr; onlara tutmaqda kömək edən; güclü “qarpun”; nematosist; sarılmağı xarakterizə etmək; sapabənzər borucuq şikarını iynələri ilə sancmaq; şikarına arxadan qarpunları ilə hücum etmək; knidositlərdən ibarət; knidariya boşluğu; həzm edilən; daxilində istifadə oluna bilinən; absorbsiya olunmuş; aşağı əyilmiş; həzm olunmamış qida qalıqları; ağzı ətrafında düzülən radial simmetriya; velosiped təkəri; mərkəzi ətrafında; şirin su axını və göl; polip kimi; sualtı əşyalara bağlı; sərbəst hava qabarcıqları; göl qatlarının üzərindəki daşlardan; üst tərəfdən aşağıya üzən; akrobatik hərəkət; tumurcuqlanma ilə; balaca çıxıntılar; palp yaratmaq; bölünür; yeni hidranın daxilə doğru inkişaf etməsi; hərəkətsiz dişi nüvə; sitoplazmatik körpü; dişi nüvə ilə ərimək; hər fərddə sinkarion nuklein materialların bərpa olunması; ayrılmaq və sərbəst yaşamağa başlamaq.

III. Match the highlited words in the text to the correct meaning.

nocturnal	a) to decide
obscure	b) to gradually increase over time
get lost	c) to go to the correct way
diurnal	d) to make weaker by mixing with water
navigation	e) finding and following one's route
evaporation	f) to change from liquid to gas
dilute	g) active during the day
determine	h) active at night
accumulate	i) to make difficult to see stray

IV. Complete the sentences with a word and word combination from the list.

1. The Ciliates include a variety of -------------.
2. Paramecium lives in -----------.
3. The ------- acts as the mouth of paramecium.
4. Food is then pushed into ------------.
5. Paramecium has two ------, small micronucleus and larger macronucleus.
6. Hydra reproduces asexually --------------.
7. Fertilization -------- when sperm and egg join.
8. This kind of asexual reproduction is called ----------.

fresh water; oral grow; nuclei; species; the gullet; by budding; regeneration; takes place.

V. Write translations and transcriptions try to remember the words.

balance (n)	aim (verb)
flavour (n)	encourage (verb)
global (adj)	increase (verb)
organic (adj)	reduce (verb)
tragic (adj)	protect (verb)

VI. Match the sentence halves:

1. I don't mind	a) applying to smaller companies
2. He forgot	b) can be hard work
3. She would love	c) to tell the company he was getting married
4. I can't afford	d) getting sacked
5. He's afraid of	e) to get a good job as soon as you finish university
6. It's difficult	f) travelling a lot for my work
7. Why don't you try	g) to have more responsibility
8. Being self employed	h) to accept a lower salary

Unit 5. Phylum FLATWORMS

The Flatworms are multicellular animals characterized by a flat, bilaterally symmetric body and no body cavity.

Turbellarians, Flukes and Tapeworms are three classes of Flatworms.

Turbellarians

Turbellarians are free-living flatworms that live in the ocean or in fresh water. The planarian often is used as a model for describing all turbellarians (figure 8). The planarian’s body is made up of three layers – the ectoderm, mesoderm and endoderm. There is no body cavity or space between the layers.

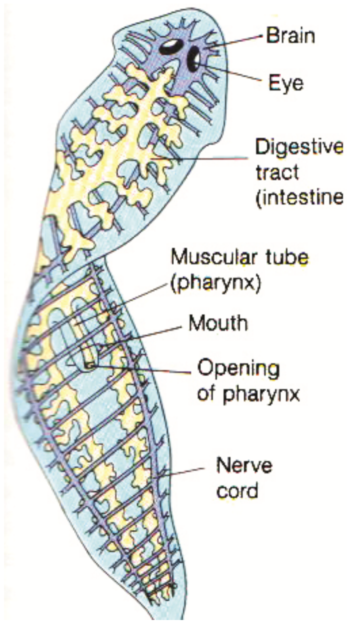

***Figure 8** Planarian*

The planarian has a one-way digestive system. The mouth and pharynx are located on the planarian's ventral surface. Food passes from the pharynx into the intestine, where it is digested and absorbed. Undigested food is excreted through the pharynx and the mouth. Liquid wastes and excess water are removed from a planarian by a series of branching tubes. These tubes have tiny cells called flame cells. Each flame cell has cilia. The beating cilia make the cells look like flames. The cilia move liquid wastes into the tubes and out of the pores in the ectoderm.

The planarian has a simple nervous system. The head region contains cells that are sensitive to touch, smell, and taste. The planarian also has two eyespots that are sensitive to light. Masses of nerve cells called ganglia are located near the eyespots. The ganglia form a simple brain. Two nerve cords are attached to the brain. The nerve cords are connected to each other by other nerves.

Planarian is hermaphroditic. However, a planarian cannot fertilize itself. Thus it can reproduce sexually. Two planarians fertilize each other. Once fertilization occurs, eggs are laid in protective capsules. New planarian hatch from the capsules in about two or three weeks.

Planarian also reproduces asexually. If planarian cut into pieces, each piece will grow into a new organism.

Flukes

Flukes are parasitic flatworms that possess attachment organs in the form of hooks or suckers. Flukes are very well adapted to a parasitic way of life. For example, flukes have a cuticle – is a nonliving layer produced by the fluke's outer cells. It protects the fluke from being digested by its host.

The human liver fluke is a large fluke, measuring as much as 3 cm long and nearly 1.5 cm in width. The adult worm resides in the larger biliary passages and the gallbladder of human and sheep, and produce large number of eggs. Eggs, each containing a complete, ciliated first stage larva, or mira-cidium, are passed in the feces (figure 9). If they reach water, they may be ingested by a snail. Within the snail an egg transforms into a sporocyst (second larva stage) – a baglike structure with embryonic germ cells. Within the sporocysts are produced rediae (third larva stage), which are elongated larvae. These larvae continue growing within the snail, giving rise to several individuals of the tadpole like next larval stage, cercariae (fourth larva stage). Cercariae escape into the water, where they swim about freely. Then cercaria encysts on aquatic vegetations as metacercaria. Human can infect by ingestion of metacercaria taken from water.

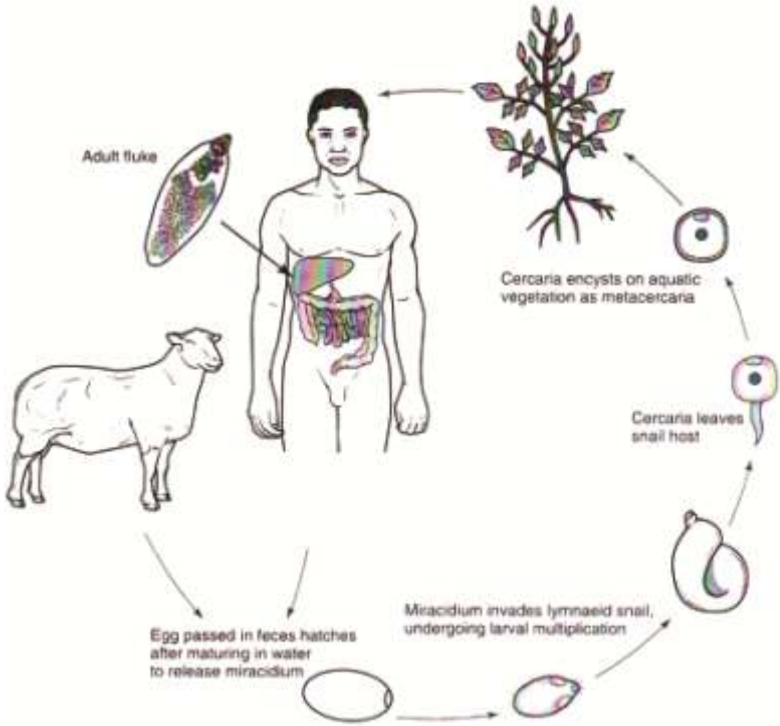

Figure 9 *Life cycle of liver fluke*

Tapeworms

Members of the class Tapeworms typically have an elongate, ribbonlike, segmented body that bears a specialized attachment organ, the scolex, anteriorly. Suckers and hooks are on the scolex. Behind the scolex are body sections called proglottids. A tapeworm does not have a digestive system, or a mouth. It absorbs nutrients from its host directly through its skin. All tapeworms inhabit the small intestine.

Most tapeworms have a life cycle that involves more than one host. For example, the beef tapeworm spends part of its life cycle in cattle and another part - in people. A mature adult beef tapeworm may reach a length of 10 meters or more. This worm attaches itself to the intestinal wall of host by a scolex with four suckers. Embryonated eggs, which contain larvae, are passed with the feces and must be ingested by cattle (figure 10).

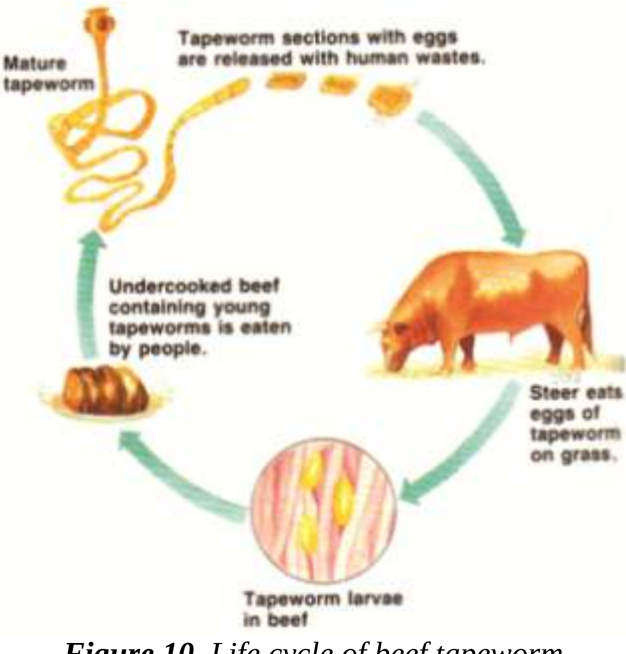

Figure 10 *Life cycle of beef tapeworm*

The larva hatch and enter the bloodstream of cattle. Then larva burrows into the muscle tissue where they form cysts. People become infected when they eat beef that has not been cooked enough to kill the larvae in the cyst. Inside the human intestine, the larvae are released from the cysts and develop into adult tapeworms. The cycle continues when proglottids and eggs are released with human wastes.

New words and word combinations.

bilaterally	ikitərəfli
layer	qat
space	boşluq; fəza
digestive	həzm
brain	baş beyin
mouth	ağız
nerve	sinir, əsəb
surface	səth
branching	şaxələnmə, budaqlanma
rediae	redi (sporosistada rüşeym hüceyrələri mayalanmadan partenogenez çoxalaraq çoxlu redilər əmələ gətirir)
infect	yoluxdurma, keçmək
liquid	maye
wastes	tullantılar
elongate	uzatmaq
attachment	əlavə, qoşma
beef	mal əti
cattle	mal-qara
hatch	yumurtadan çıxmaq
eyespot	gözcüq
cuticle	kutikula (qabaqüstü)
cercariae	serkari- (inkişafın 4-cü mərhələsidir (daha mürəkkəb quruluşa malikdir)

burrow	eşmək
intestine	bağırsaq

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

multicellular animals; characterized by a flat; bilaterally symmetric body; body cavity; free-living flatworms; to be made up; space between the layers; one-way digestive system; on the planarian's ventral surface; into the intestine; to be excreted; through the pharynx; excess water; to be removed from a planarian; by a series of branching tubes; flame cells; the beating cilia; to look like flames; out of the pores in the ectoderm; to be sensitive; two eyespots; masses of nerve cells; the ganglia form a simple brain; to be attached to the brain; to be connected to each other; to fertilize itself; in protective capsules; to hatch from the capsules; to cut into pieces.

Flukes; flatworms; hooks or suckers; nonliving layer; outer cells; liver fluke; the adult worm; biliary; the gallbladder of human and sheep; stage lavra; the feces; a baglike structure; elongated larvae; individual of the tadpole; parasitic way of life.

II. Find out corresponding equivalents of the following word combinations into English:

Çoxhüceyrəli heyvan; bədənin bilateral simmetriyası; bədən örtüyü; təşkil olunmaq; xüsusi olaraq qat; bir yolla həzm sistemi; planarinin ventral sahəsində; xaric olmaq; floema boruları; floemaya bənzəyən; həssas; ektodermadakı dəliklərdən xaric olmaq; bir-birilə əlaqəli olmaq; özlərini törədə bilməmək; qoruyucu kapsulaya qoyulan yumurtalar.

Sorucular; qurdlar; qarmaq ya sormaq; cansız qat; xarici hüceyrələr; qaraciyər sorucusu; yetkin qurd; öd kisəsi hissəsi;

insan və heyvanı öd kisəsi; sürfə mərhələsi; nəcis; çuvalabənzər quruluş; uzununa sürfələr; çömçəquyruq fərdlər; parazit həyat tərzi.

III. Match the highlited words in the text to the correct meaning.

bulky	well-know; important
prominent	person who does something for pleasure not as profession
obvious	easily seen or understood
variety	feeling or condition of being safe
valid	a number of different things
survive	a large; taking up much space
amateur	true; supported by facts
security	remain alive; live on

IV. Complete the sentences with a word and word combination from the list.

1. Turbellarians are ------- that live in the ocean or in fresh water.
2. The planarian's body is made up of three layers - the ectoderm, mesoderm and --------.
3. The beating cilia make the cells look like -------.
4. ------- form a simple brain.
5. Two nerve cords ------ to the brain.
6. However, a planarian cannot ----- itself.
7. Once fertilization occurs, eggs are laid ------.
8. If planarian cut into pieces, each piece will grow into --------.

a new organism	in protective capsules
are attached	fertilize
the ganglia	flames
endoderm	free-living flatworms

V. Write translations and transcriptions try to remember the words.

contestant	TV series
industry	pretend
judge	regret
marketing	seem
sales	afford

VI. Use simple present or the present progressive of the verbs in parentheses.

1. With / Do / live / you / mother
   Do you live with your mother?
2. Where / have / does / lunch / Kate
   ____
3. Go / do / to / cinema / when / you / the
   ____
4. Listen / you / in / the / the / Do / to / radio / morning
   ____
5. They / where / football / do / play
   ____
6. She / does / French / study
   ____
7. Brother / the / work / his / does / city / in / centref
   ____
8. Friends / when / do / play / your / tennis
   ____
9. Have / do / when / lunch / you
   ____
10. Work / in office / do / an / they

____

Unit 6. Phylum ROUNDWORMS

The roundworms are elongate, cylindrical worms which become thinner at the ends. A cuticle covers the outside of the body. The sexes are separate, the male smaller than female. A well-developed digestive tract is present. While most roundworms are free living, a large number of phylum parasitize humans.

One harmful roundworm parasite is called Ascaris. Female worms range from 20 to 40 cm in length, while male from 15 to 20 cm. Ascaris is intestinal roundworm that infects humans and some other animals (dogs, cats, pigs, cattle and horses). Its fertilized eggs pass out with feces and can remain viable in soil for years. In unsanitary conditions, the eggs may be ingested because of improper hand washing. Infective egg, containing fully developed larva, is ingested by human. Larva hatch in duodenum and then undergo migration through the body. The larvae first penetrate the wall of duodenum and enter blood or lymphatic vessels to be carried to the liver, to the heart, and then into the pulmonary circulation. They are filtered out by the capillaries of the lungs and break from them into the alveoli. There they grow and molt, and after about 20 days migrate through the respiratory passages to reach the esophagus and eventually once again the small intestine where develop to maturity. Two or three months after ingestion of the eggs, the mature worms commence egg laying in the intestine. Mature female Ascaris has been estimated to produce daily an average of 200 000 eggs (figure 11).

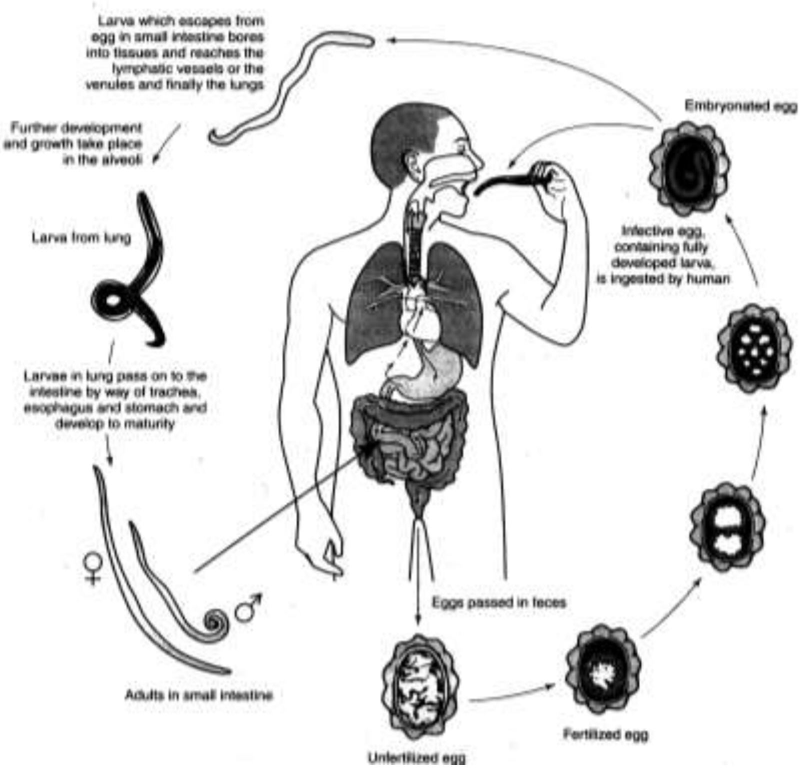

Figure 11 *Life cycle of Ascaris*

New words and word combinations.

roundworms	dəyirmi qurdlar
male	erkək, kişi cinsi
feces	nəcis
duodenum	onikibarmaq bağırsaq
larvae	sürfə, barama
penetrate	nüfuz
	anlamaq, bürümək
pulmonary	ağciyər, ciyər
circulation	dövriyyə, dövran

capillary	kapilyar
lung	ağciyər
molt	qabıqdan çıxmaq
esophagus	qida borusu
ascaris	askarid qurdu
embryonated egg	embrionlu yumurta
adults in small intestine	nazik bağırsaqdakı yetkin fərdlər
harmful	zərərli
maturity	yetkinlik
to undergo	məruz qalmaq
pig	donuz

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

Cylindrical worms; become thinner at the ends; smaller than female; free living; fertilized eggs; in insanitary conditions; infective egg; is ingested by human; lymphatic vessel; to be carried to the liver; pulmonary circulation; the capillaries of the lungs; respiratory passages; after ingestion of the eggs; mature female; has been estimated; an average off.

II. Find out corresponding equivalents of the following word combinations into English:

Silindirvari qurdlar; ucda nazikləşir; sərbəst yaşayan; yetkin qurdlar; insan tərəfindən qəbul edilən; limfa damarları; qaraciyərə daşınmaq; tənəffüs yolları; ciyər dövranı; ciyərlərin kapillyarları; yetkin dişi; qiymətləndirilə bilər; orta hesabla.

III. Match the highlited words in the text to the correct meaning.

elongate	a) the lover part of the alimentary canal from the end of the stomach to the anus.
the outside	b) movement to and from or around smth.

intestine	c) make or become longer
fertilize	d) go into to through pecially with force
conditions	e) the external side or surface of something
undergo	f) the state of something or someone
penetrate	g) make more fertile beg adding fertilizer.
circulation	h) experience or be subjected to

IV. Complete the sentences with a word and word combination from the list.

1. ------------ covers the outside of the body.
2. A well developed -------- tract is present.
3. One -------- roundworm parasite is called Ascaris.
4. Infective egg conaining fully developed larva, ----- by human.
5. There they grow and molt, and after about 20 days migrate throung ---------- passage.
6. Two or three months after ingestion of the eggs, the mature worms commence laying in the -------.
7. Mature female Ascaris has been estimated ------- daily an average of 200 000 eggs.
8. Larva hatch in duodenum and then undergo migration through ----------.

digestive; harmful; cuticle; respiratory; is ingested; to produce; intestine; the body

V. Write translations and transcriptions try to remember the words:

male	soil
female	blood
tract	heart
parasite	passage
viable	mature

VI. Write the plural form of each noun.

foot – feet
hero – heroes
knife –
quality –
doorway –
gentleman –
wolf –
quiz –
custom –
video –
potato –

deer -
ox -
donkey -
mystery -
chief -
thief -
flash -
memo -
memorandum -
crisis -
mouth -

Unit 7. Phylum MOLLUSKS

Mollusks have soft bodies that often are covered by a shell. Mollusks also have three distinct body parts: the head, the foot, and the visceral mass.

The head of mollusks contains the mouth. In some mollusks, the mouth is surrounded by one or more pairs of tentacles.

The foot of mollusks is muscular. In most mollusks, the foot is used for locomotion. Mollusks also may use its foot to burrow in sand or mud.

The visceral mass, or inside of mollusks, contains the digestive system, the excretory system, the reproductive organs and the heart. Covering the visceral mass is a thin membrane called the mantle. The mantle secretes calcium carbonate which forms the mollusks shell. The space between the mantle and the organs is called the mantle cavity. In some mollusks the mantle cavity acts as a lung; in others it contains gills. Gills are specialized portions of the mantle that usually consist of a system of filamentous projections rich in blood vessels.

Most mollusks have distinct male and female individuals, although a few bivalves and many gastropods are hermaphroditic. Even in hermaphroditic mollusks, cross-fertilization, rather than self-fertilization, is most common.

Many marine mollusks have free-swimming larva called trochophores. The trochophore is shaped like a top. The ring of cilia around the middle helps the larva move and obtains food.

Univalves

Mollusks with one shell are called univalves. Univalves also known as gastropods, that means “stomach-foot”. Univalves include snails and slugs. These animals live in water and on land. Snails move very slowly, at a rate of about 5 cm per minute (figure 12).

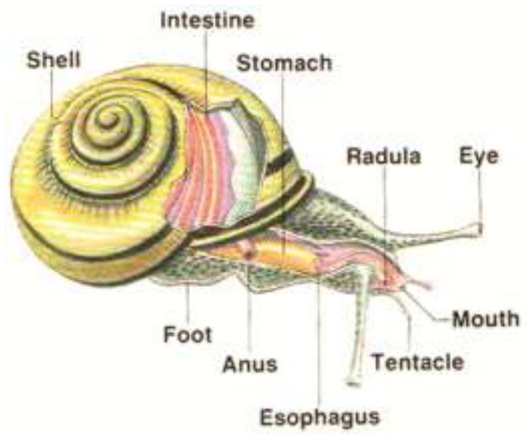

Figure 12 *Snail*

Most snails are plant eaters. They scrape food from plants with rough tongue called a radula (toothlike structures).

Two pairs of tentacles are located on the head of a snail. The longer pair of tentacles has eyes at the ends, and the shorter pair is sensitive to smell. The head also contains a mouth and jaw.

The foot of a snail is flat and muscular, and is used for movement. A layer of mucus is secreted by the foot. As the foot muscles contract, the snail moves smoothly over the layer of mucus.

Snails have heart and an open circulation system. In open circulation system, blood does not flow through tubes. Instead, blood flows into cavities in the body and bathes the body organs.

During the trochophore stage, the snail's visceral mass begins to grow upward. This growth is uneven on the right and left sides of the snail's body. As a result, the snail's body begins to twist. The snail's body rotates so that the back end comes to rest just behind the head.

Bivalves

Mollusks that have two shells are called bivalves. All bivalves live in the ocean or in fresh water.

Clams are members of bivalves which have two lateral (left and right) shells (figure 13). A ligament hinges the shells together and causes them to gape open.

Clams have a simple system for obtaining oxygen. Water enters the clam through an incurrent siphon, or incoming tube. Cilia push the water through the incurrent siphon and over the gills. The gills absorb oxygen from the water, and release carbon dioxide. The water then passes out of the clam through the excurrent siphon, or outgoing tube.

Because they filter food from ocean water, clams often are called "filter feeders". Mucus in the gills traps microorganisms living in the water. These microorganisms are food for the clam. Cilia move the food-carrying mucus from the gills toward the clam's mouth.

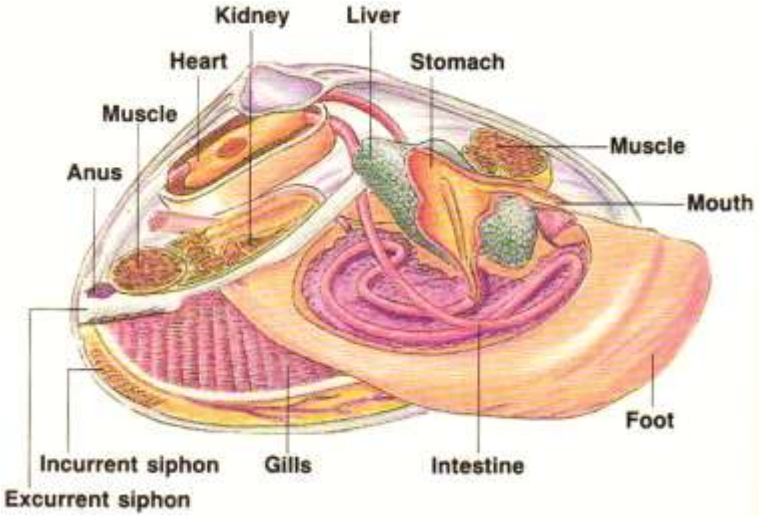

Figure 13 *Clam*

New words and word combinations.

visceral	visseral
excretory	ifrazat, ifrazatedici
mantle	mantiya, manto
bivalves	molyuskalar
cavity	boşluq
gastropods	qarınayaqlılar
snails	ilbizlər
shell	qabıq, təmizləmək, qabığını soymaq
eye	göz
radula	radula
foot	ayaq, piyada, dayaq, ətək, paça
anus	anus dəliyi
bathe	yuyunmaq, çimmək, çimdirmək
clams	sıxac, molyusk
ligament	bağ
siphon	sifon
hinges	ox
gills	qəlsəmə
muscle	əzələ
heart	ürək
kidney	böyrək
incurrent siphon	molyuskalarda borucuğa bənzər üzv, yəni giriş borucuğu

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

Soft bodies; visceral mass; to be surrounded by; for locomotion; to burrow in sand or mud; inside of mollusks; a thin membrane; excretory system; mantle cavity; in blood vessels;

female individuals; cross-fertilization; free-swimming larva; the ring of cilia; larva move; to obtain food; to be called univalves; plant eaters; with rough tongue; to be sensitive to smell; to contain a mouth and jaw; to be flat and muscular; a layer of mucus; as the foot muscles contract; an incurrent siphon; incoming tube; to release carbon dioxide; through excurrent siphon; the food-carrying mucus.

II. Find out corresponding equivalents of the following word combinations into English:

Yumşaq bədənlər; visseral kütlə; əhatə olunmaq; hərəkət üçün qum və ya palçığı eşmək; molyuskaların daxilində; nazik membran; ifrazat sistemi; mantiya boşluğu; qan damarlarında; dişi fərdlər; gübrələmə; sərbəst üzən sürfə; sürfənin hərəkət etməsi; qida əldə etmək; bitki yeyənlər; sürtgəc dişcikli dil vasitəsilə; iyləmək üçün həssasdır; ağız və çənədən ibarətdir; hamar və əzələli; selikli qişa; ayaq əzələləri; gərildiyinə görə; karbon dioksid buraxmaq; qida daşıyan seliklər.

III. Match the highlited words in the text to the correct meaning.

Distinct	a) the small black dots represent
Head	b) a slender flexible limb or appendage in an animal
Visciral	c) dig a hole
Tentacles	d) part of the body, that contains the eyes, nose, brain
To burrow	e) fine grains or crushed rock
Sand	f) greatest in number
Most	g) easily heard or seen
Shape	h) outer form or outline

IV. Complete the sentences with a word and word combination from the list.

1) Mollusks have soft bodies that often are covered by --------.
2) Mollusks also have three distinct body parts: the head, the foot and the ----------.
3) The -------- of mollusks contains the mouth.
4) In most mollusks, ---------- is used for locomotion.
5) Mollusks also may use its foot ------- in sand or mud.
6) Covering the visceral mass is a thin membrane called -----------.
7) ----------- is shaped like a top.
8) The ring of ------ around the middle helps the larva move and abtains food.

The mantle; the trochophore; cilia; visceral mass; a shell; the foot; to burrow; head

V. Write translations and transcriptions try to remember the words.

soft	to burrow
mouth	mud
tentaches	excretory
muscular	reproductive
locomotion	membrane

VI. Add apostrophes as necessary to mark a possessive noun or a contraction with a pronoun.

1. Mary’s father works at the Northgate Medical Center. He’s a dentist.
2. Jacks parents live in Georgia. His parents home is an Atlanta.
3. Our teachers last name is Wells. She’s one of the best teachers in the school.
4. Our teachers last names are Wells, Hunt and Moore. They’re all good teachers.

5. Ms. Wells husband is also a teacher. Ms. Hunts husband is an engineer.
6. It's well known that a bear likes sweet food. It's favorite food is honey.
7. Anns telephone number is 555-8989. Our is 555-8998. People often confuse hers with ours, go we get freguent calls for her.
8. The tiger is beautiful animal. It's coat is orange and white with black stripes.

Unit 8. Phylum ARTHROPODA

Arthropods are segmented and bilaterally symmetrical animals with a body enclosed in a stiff, chitinous covering or exoskeleton and bearing paired, jointed appendages. Arthropods use their appendages for movement, food-gathering, chewing, and defense.

The exoskeleton cannot grow as arthropods grow. Thus, arthropods must shed its exoskeleton as it gets bigger. The shedding process is called molting. As arthropods molts its exoskeleton, a new exoskeleton is formed. The new exoskeleton is soft. During the time the new exoskeleton takes to harden, arthropods are not protected from predators.

All arthropods have open circulatory system. The digestive system is well developed. Sexes are separate.

The phylum is subdivided into a number of classes, many of which are of medical importance.

Crustaceans

The crustaceans are large group of primarily aquatic organisms, consisting of some 35 000 species of crabs, crayfish, barnacles, water fleas, pill bugs and related groups.

Most crustaceans have separate sexes. Many different kinds of specialized copulation occur among the crustaceans, and the members of some orders carry their eggs with them, either singly or in egg pouches, until they hatch.

Crayfish have two main body parts: a head-chest part and an abdomen (figure 14). The head-chest region is covered by a part of the exoskeleton called the carapace.

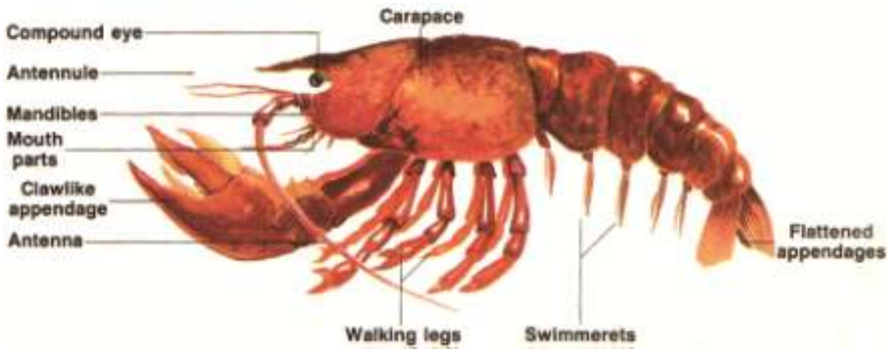

Figure 14 *Crayfish*

Crayfish have a pair of appendages attached to each body segment. The first two pairs of appendages are antennae. Antennae are sense organs used for taste and touch. Behind the antennae are the crayfish's mandibles, or jaws. The mandible tear, crush, and chew food. A crayfish also has large clawlike appendages. It uses these appendages for capturing food and for projection. Four pairs of walking legs are located behind the clawlike appendages. Attached to the abdomen are appendages used for reproduction and swimming. These are the swimmerets. At the end of the crayfish there are several flattened appendages. They also are used for swimming.

Crayfish have compound eyes. Compound eyes are made up of many light-sensitive parts which can detect changes in light and movement.

Crayfish takes in oxygen through gills. Gills are attached to each walking leg.

Arachnids

Arachnids are a class of arthropods that includes spiders, scorpions, ticks and mites.

The Arachnids possess a body divided into two parts: the head-chest and the abdomen. Arachnids have a pair of chelicerae, a pair of pedipalps, and four pairs of walking legs. Chelicerae are used for feeding upon or killing prey. Pedipalps have different jobs in different arachnids. In male spiders, pedipalps are specialized copulatory organs. In other groups of arachnids they may have a specialized sensory function.

Most arachnids have simple eyes at the front of their head. For example, a spider has eight simple eyes arranged in two rows of four. Simple eyes can see only changes in light.

Most arachnids are carnivorous. The main exception is mites which are largely herbivorous. Most arachnids can ingest only preliquified food which they often digest externally by secreting enzymes into their prey. They can then suck up the digested material with their pharynx.

Arachnids are primarily, but not exclusively, terrestrial. Some species of mites and one species of spider live in fresh water, and a few mites live in the sea. Arachnids breathe by means of tracheae, book lungs, or both.

There are about 40 000 species of *spiders*. These animals have a major role in the environment. By feeding mainly on insects, they help control insect populations (figure 15).

Spiders hunt their prey or catch it in silk webs. The silk is formed from a fluid protein that it forced out of spinnerets which are small tubelike structures located near the rear of the abdomen. Building sticky web is one way that spiders capture prey. However, not all spiders capture prey in webs. Some spiders actively chase their prey. Once spiders capture an insect, they use their chelicerae to kill it. The chelicerae are connected to poison glands. All spiders have poison, but only a few spiders are dangerous to people (black widow, brown recluse).

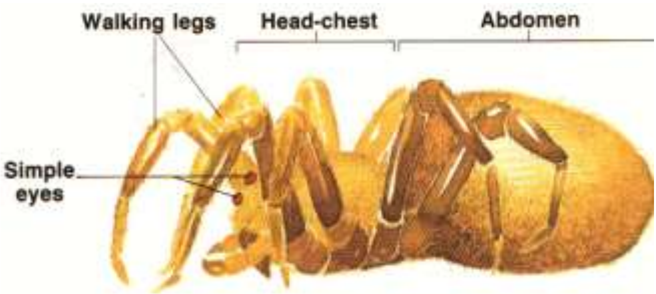

Figure 15 *Spider*

Scorpions are arachnids whose pedipalps are modified into claws. Scorpions capture prey and hold it with their claws. Then, they kill the prey by stinging it with poison. The stinging apparatus is located in the terminal segment of the abdomen. A scorpion holds its abdomen folded forward over its body when it is moving about.

Scorpions are the only arthropods that bear live young. After they are born the young scorpions are carried on their mother’s back until they molt for the first time (figure 16).

Figure 16 *Scorpion*

Most *mites* are small, less than 1 mm long. In mites, the head-chest and abdomen are fused into an unsegmented ovoid body. Mites pass through several distinct stages during their life cycle. Many mites are well known to human beings because of their irritating bites and the diseases they transmit. Follicle mites live in the hair follicles and wax glands of the human forehead, nose and chin, but usually cause no symptoms.

Mites are blood-feeding ectoparasites. When mites feed upon organisms, the mites can transmit diseases. Two diseases that mites transmit to people are Rocky Mountain spotted fever and Lyme disease.

Insects

The insects are largest group of organisms on Earth. Insects live on land, in fresh water, and a few have even invaded the sea. Most insects are relatively small, ranging in size from 0.1 mm to about 30 cm in length. Insects have three body sections: head, thorax, and abdomen. On head there is one pair of antennae (sense organs). The insect thorax consists of three segments, each with a pair of legs. The thorax is almost entirely filled with muscles that operate the legs and wings.

Insects may have one or two pairs of wings. If two pairs of wings are present, they attach to the middle and posterior segments of the thorax. If only one pair of wings is present, it usually attaches to the middle segment.

Grasshoppers often are studied as model for all insects (figure 17). The head of a grasshopper has simple eyes, compound eyes, and two antennae. The grasshopper also has mandibles which it uses to chew food. Other appendages around the mouth help hold the food. Sound, which is of vital importance to insects, is detected by tympanum.

The trachea of grasshopper extends throughout the body and dilated in various parts of the body, forming air sacs. The spiracles, or small opening, are connected to trachea tubes that carry air into and out of an insect's body. Spiracles are paired and located on or between the segments of the thorax and abdomen.

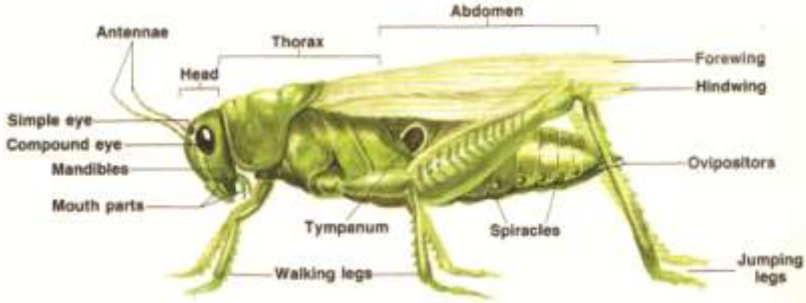

Figure 17 *Grasshopper*

Young insects hatch from fertilized eggs laid outside their mother's body. As an insect develops into an adult, it changes in form and size. The series of change an insect undergoes as of develops into an adult is called metamorphosis. There are two kinds of metamorphosis in insects: incomplete and complete metamorphosis. Incomplete metamorphosis has three stages – egg, nymph, and adult (figure 18). Complete metamorphosis has four stages – egg, larva, pupa, and adult (figure 19).

Most insects live alone in their environment. However, some insects live in colonies.

Honeybees are social insects that live in colonies. There are three kinds of bees in a colony – worker bees, drones, and a queen bee. Each of the honeybees has a special job to do. Worker bees are female bees that protect and build the hive. They also find and gather flower pollen and nectar and feed the larvae, the queen bee, and the drones. Drones are male bees whose only job is to fertilize the queen. When drones are no longer needed, they are either driven from the hive or killed by the workers. The queen's only function is to lay eggs.

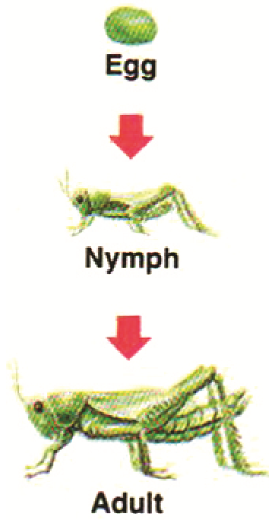

Figure 18 *Incomplete metamorphosis*

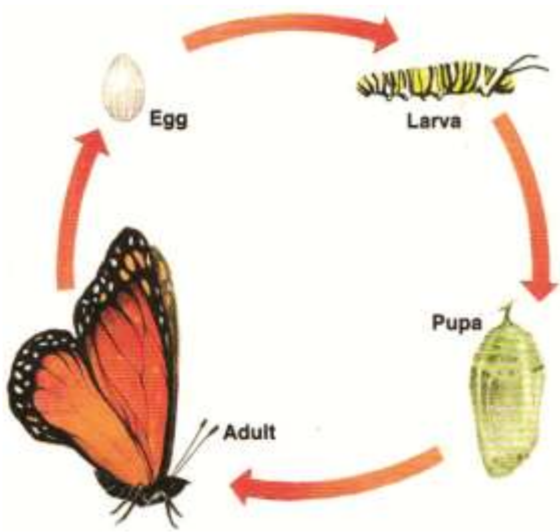

Figure 19 *Complete metamorphosis*

New words and word combinations

arthropoda	buğumayaqlılar
appendage	əlavə
food-gathering	qida toplanması
chew	çeynəmə, gövşəmə
crustaceans	xərçəngkimilər
crayfish	xərçəng
copulation	birləşmə
head-chest	baş-döş
flat	yastı, düz
walking legs	yerimə ayaqları
antennae	bığçıq
compound eye	mürəkkəb göz
mouth parts	ağız hissələri
attached	əlavə, ilişikli
prey	yırtıcı, vəhşi, yem
tick	gənə, parazit
pedipalp	pedipalp
carnivorous	ətyeyən
herbivorous	otyeyən
enzyme	ferment
terrestrial	yer
tracheae	traxeya
environment	ətraf mühit
spotted	çil, ləkələnmiş
wing	qanad
grasshopper	çəyirtkə, şala, cırcırama
spiracle	göz arxasında dəlik
paired	qoşalaşmış
metamorphosis	metamorfoz
worker bees	işçi arılar
drone	vızıltı, uğultu
a queen bee	ana arı
nymph	pup, pəri, huri
adult	yaşlı, yetkin

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

to be segmented; jointed appendages; food-gathering; to be called molting; open circulatory system; head-chest part; clawlike appendages; pair of pedipalps; sensory function; pre-liquified food; to help control insect population; to chase their prey; to be connected to poison glands; to be dangerous to people; to be blood-feeding ectoparasites; to transmit diseases; to operate the legs and wings; to be detected by; forming air sacs; social insects; flower pollen; to lay on egg.

II. Find out corresponding equivalents of the following word combinations into English:

qabıqdan çıxma adlanmaq; açıq qan-damar sistemi; pedipalp cütləri; çiçək tozcuğu; insanlar üçün təhlükəli olmaq; sosial həşəratlar; həşərat populyasiyasının tənzimlənməsinə kömək etmək; xəstəlikləri yaymaq; zəhər vəzilərinə birləşdirilmək; duyğu funksiyası; baş-döş hissə; əvvəlcədən hazırlanmış qida; hava kisələri yaratmaq; buğumayaqlılar; yumurta qoymaq; şikarını təqib etmək; ayaq və qanadları hərəkətə gətirmək

III. Match the highlited words in the text to the correct meaning:

segment	a) hot easily bent folded
stiff	b) crush with the teeth
chewing	c) defending from attack
defense	d) a rigid external covering for the body in some invertebrate
predators	e) an animal that naturally preys on others
crayfish	f) land crabs, river crayfish

g) having a great effect or valve
h) part of something esp. of a circle, marked off or cut off

IV. Complete the sentences with a word and word combination from the list:

1. The exoskeleton cannot grow as --------- grow.
2. All arthropods have open ------------- system.
3. ---------- have two main body parts.
4. ---------- are sense organs used for taste and touch.
5. Crayfish have ------ eyes.
6. ------- are a class of arthropods that includes spiders scorpions, ticks and mites.
7. There are about 40 000 species of --------.
8. Insects may have one or two pairs of --------.

wings;	spiders
Arachnids;	compound
circulatory	anthropods
antennae	crayfish

V. Write translations and transcriptions try to remember the words:

appendages	population
molting	environment
protect	abdomen
thorax	possess
perch	hatch

VI. Use any appropriate tense for the verbs in parentheses.

1. My grandfather (fly, never) ------- in an airplane, and he has no intention of ever doing so.
2. Jane isn’t here yet. I (wait) ------- for her since noon,

but she still (arrive, not) ----------.

3. In all the world, there (be) ------- only 14 mountains that (reach) ---------- above 8.000 muters (26.247 feet).
4. I have a long trep ahead of me tomorrow, so I think I’d better go to bed. But let me say good bye now because I won’t see you in the morning. I (leave, already) -------- by the time you (get) ------- up.
5. Right now we (have) -------- a heat wave. The temperature (be) ---------- in the upper 90s (upper 30s Celsius) for the last six days.
6. Last night 0 (go) ------- to a party. When I (get) ------- there, the room was full of people. Some of them (dance) ------- and others (talk) --------. One young woman (stand) ---------- by herself, I (meet, never) -------- her, so I (introduce) -------- myself to her.

Unit 9. Phylum CHORDATES

The chordates are characterized by a single, hollow dorsal nerve cord and by the presence, at least early in development, of a notochord, pharyngeal slits, and a postanal tail. In addition to these four principal features, a number of other characteristics distinguish the chordates fundamentally from other animals. Chordates have a more or less segmented body plan, and distinct blocks of muscles can often be early seen in embryos of this phylum. Most chordates have an internal skeleton against which the muscles work.

Nonvertebrate Chordates

Nonvertebrate chordates, including lancelets and tunicates, lack a backbone. But, at least when they are young, they have all five chordate traits: notochord, nerve cord, gill slits, muscle blocks, and tail.

Lancelets are scaleless, fishlike marine chordates a 5-8 cm long (figure 20). Lancelets were given their English name because of their similarity in appearance to a lancelet – surgical knife. Lancelets spend most of time partly buried in sandy substrates, with only their anterior ends protruding. Their muscles can easily be seen as a series of discrete blocks. Lancelets have more than 100 pairs of pharyngeal gill slits. They lack pigment in their skin. The lancelet body is pointed at both ends. There is no distinguishable head or separate eyes, nose, or ears, although there are pigmented light receptors. Notochord and nerve cord of lancelet extend the length of body and persist in adult. Lancelets feed on microscopic organisms, filtering them through a current created by beating cilia that line the gill slits at the anterior end of their alimentary canal. They have an oral hood that projects beyond the mouth and bears sensory tentacles. Males and females are separate, but no obvious external differences exist between them.

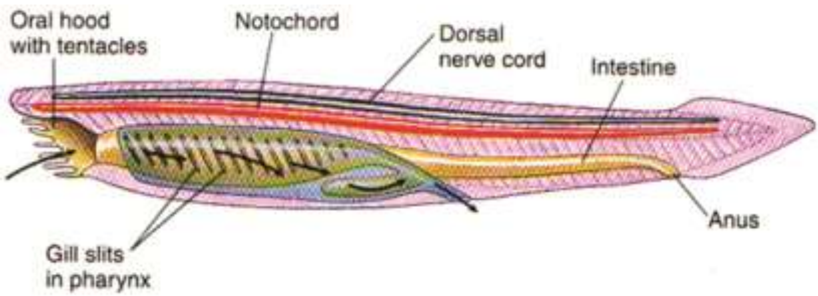

Figure 20 *Lancelet*

New words and word combinations.

chordates	xordalılar
scaleless	pulcuqsuz
protruding	irəli çıxmaq, çıxmaq, nəzərə çarpmaq
distinguishable	seçilən, gözəçarpan
dorsal nerve cord	bel sinir ipi
lancelet	neştərçə

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

Nonvertebrate chordates; marine chordates; gill slits; nerve cord; lack pigement; separate eyes; anterior ends; surgical knife; microscopic organisms; length of body; external differences; male and female; light receptors; both ends; easily be seen; their muscles; scaleless; fishlike; English name; lack a backbone;

II. Find out corresponding equivalents of the following word combinations into English:

Onurğasız xordalılar; su xordalıları; qəlsəmə yarıqları; sinir düyünləri; rəngsiz piqment; ayrılmış gözlər; anterior sonluqlar; cərrahi bıçaq; mikroskopik orqanizmlər; bədənin uzunluğu; xarici müxtəlifliklər; dişi və erkək; işıq reseptorları; hər iki sonluqlar; asanlıqla görünən; onların əzələləri; pulcuqsuz; balığabənzər; ingilis adı; onurğa sütunu olmayan.

III. Match the highlited words in the text to the correct meaning.

single	a) great in power ufluence or ability
tail	b) only one
against	c) long movable part at the end of the body of an animal
block	d) fully grown and developed
scarecrow	e) an organ or cell responds to external stimuli and transmits, signals to a sensory nerve receptor
	f) figure dressed in old clothes to scare birds away from crops
adult	g) large solid piece.
strong	h) in opposition to.

IV. Complete the sentences with a word and word combination from the list.

1. Chordates have a more or less segmented ________.
2. Most chordates have an internal _____ against which the muscles.
3. Nonvertebrate chordates, uncluding lancelets and tunicates, lack -_______.
4. Lancelets have more than 100 pairs of ________ fill slits.
5. There is no distinguistable head or separate eyes,

nose or ______.

6. Lancelets feed on _______ organisms.
7. They have an oral hood that projects beyond the mouth and bears _______ tentaches.
8. Males and females are _______, but no obvious external differences exist between them.

Backbone; pharyngeal; ears; body plan; microscopic; sensory; separate; skeleton

V. Write translations and transcriptions try to remember the words

postanal	notochord
principal	non-vertebrate
fundamentally	pigment
distinct	distinguishable
museles	sensory

VI. Comlete the questions with currect words:

Good evening, ma’am – good evening.

----------- are you arriving from? – From London.

----------- the purpose of your visit? – Business. I’m here for a conference.

---------- long are you staying in the US? – It week.

---------- are you staying? – In San Francisco. At the Pacific View.

---------- you know any body here? – Yes, Mark Ryder.

---------- he family or a friend? – He’s a colleague and a friend.

---------- you have his phone number? – Yes, his mobile is 405 655 7182.

---------- this your first visit to the US? – Yes, it is.

Enjoy your stay in San Francisco – Thank you.

Unit 10. Vertebrate Chordates

Vertebrates are animals with backbones. In addition to a backbone, all vertebrates have a nerve cord. The nerve cord is protected by vertebrae.

All chordates have notochord which is strong, flexible support rod just below the nerve cord. In adult vertebrates, the notochord is replaced by the backbone.

In all vertebrates there is a distinct and well-differentiated head, with a skull and brain. For this reason, the vertebrates are sometimes called the craniate chordates.

Fishes

Fishes are the most numerous group of vertebrates. Fishes live in the deepest, coldest parts of the ocean as well as in shallow freshwater streams and ponds. Each kind of fish is adapted to its own environment. Fishes are cold-blooded. Their body temperature is about the same as the temperature of its surroundings.

There are three major subclasses of fishes: jawless fishes, cartilaginous fishes, and bony fishes.

Jawless fishes (lamprey, hagfish) do not have true jaws. These fishes are direct descendents of the oldest fossil fish.

Cartilaginous fishes (shark, rays, skates) have jaws, and a skeleton made of cartilage which is a flexible bonelike tissue.

Bony fishes, like the cartilaginous fishes, have an upper and a lower jaw but the skeleton of bony fishes is made of bone, not cartilage.

The *perch* often is used as a model for all bony fishes (figure 21). Perch have a head, trunk, tail and may grow to a length of 46 cm. The mouth, eyes and nostrils are found on the head. The body of perch is covered with overlapping scales. The fish secretes slimy mucus which lubricates the scales and helps the fish flex its body while swimming.

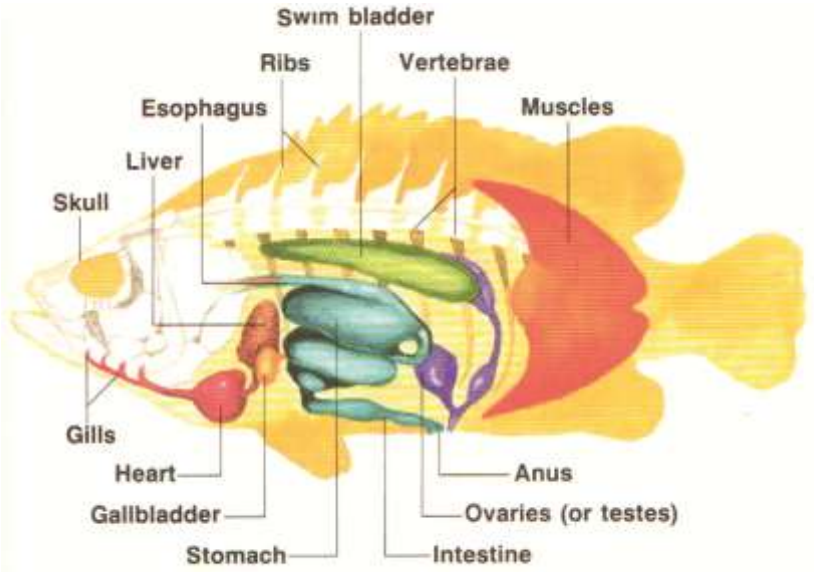

Figure 21 *Internal structures of fish*

Perch have lateral line system which consists of a series of sensory organs that project into a canal beneath the surface of the skin from the head to the tail and used to sense movement in the water.

Unlike the cartilaginous fishes, perch (bones of which are heavier than cartilaginous skeletons) have a swim bladder. The swim bladder is a gas-filled organ inside the fish. The fish can control the amount of gas in swim bladder to equal the pressure of the water. The swim bladder removes oxygen, carbon dioxide, and nitrogen from the blood of a fish. The gases are pumped into or out of the swim bladder as the fish changes depth. Therefore, as a fish changes depth, the swim bladder is inflated or deflated. The response is automatic.

Perch have an endoskeleton. Small vertebrae form a backbone that protects the spinal cord. Because the backbone is not a solid rod, the fish can move its trunk and tail easily as it swims.

Perch have highly mobile fins, very thin scales, and completely symmetrical tails, which keep the fish on a straight course as it swims through the water. On the trunk of perch are the paired pelvic fins and pectoral fins. Dorsal fins are on the top of the trunk. The anal fin is near the opening of the anus. At the end of the trunk is the tail. The muscular tail helps push the fish through the water. A stiff caudal fin, or tail fin, acts as a paddle for swimming.

Respiration of perch takes place in the gills. The gills are made up of flat gill filaments surrounded by tiny blood vessels. Oxygen and carbon dioxide are exchanged across the gill filaments. Operculum, or gill cover, protect the gills on each side of the head. When the mouth is open, closing the operculum increases the volume of the mouth cavity, so that water is drawn into the mouth. When mouth is closed, opening the operculum decreases the volume of the mouth cavity, forcing water past the gills to the outside.

Perch have a single-loop blood circulation. The heart of perch is a muscular tube-pump made of two chambers that contract in sequence. Blood is pumped from the heart to the gills. From the gills, the oxygenated blood passes to the rest of the body, then return to the heart.

Perch reproduce sexually. The male fish produces sperms in testes. The female fish produces eggs in ovaries. After the female fish deposits her eggs, the male spreads milt (milky fluid) over the eggs. Milt is a milky fluid containing sperms. Most bony fishes breed, or spawn, once or twice a year, usually in the spring.

New words and word combinations.

addition	əlavə, toplama
skull	kəllə
descendents	nəsillər

brain	beyin
overlapping	üst-üstə düşən
ribs	qabırğa
swim bladder	üzmə qovuğu
vertebra	fəqərə, onurğa
ovaries	yumurtalıqlar
gallbladder	öd kisəsi, ödlük
beneath	altda, aşağıda
paddle	avar çəkmək, avar

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

Jawless fishes; cartilaginous fishes; flexible bonelike; bony fishes; overlapping scales; lateral line; swim bladder; pelvic fins; paddle for swimming; vertebrate; mouth cavity; sensory organs; surface of the skin; canal beneath; the male fish; the female fish; spinal cord; muscular tube; gill filaments; sense movement; blood; backbone; solid rod; blood circulation; spawn; nostrils; cold-blooded; lamprey; shark; rays; skates.

II. Find out corresponding equivalents of the following word combinations into English:

Qığırdaqlı-sümüklü balıqlar; qığırdaqlı balıqlar; elastik qığırdaq; sümüklü balıqlar; ortük pulcuqlar; yan xətt sistemi; üzmə qovuğu; qurşaq üzgəci; üzmək üçün avar çəkmək; xorda; ağız boşluğu; duyğu orqanları; dəri səthi; erkək balıq; dişi balıq; onurğa sütunu; əzələvi kanal; qəlsəmə lifləri; hissi hərəkət; bel sümüyü; bərk tilov; qan dövranı; kürü tökmək; burun dəliyi; soyuqqanlı; ilanbalığı; köpəkbalığı; şüalılar; skat balıqları.

III. Match the highlited words in the text to the correct meaning.

protect	a) consisting of many members
flexible	b) bear the weight of
support	c) the natural word, especially as affected by human activity
reason	d) an act of moving
numerous	e) a cause, explanation
environment	f) easily changed, without breaking
temperature	g) keep safe from harm, infury
movement	h) the degree or intensity of heat present in a substance or object

IV. Complete the sentences with a word and word combination from the list.

1. Vertebrates are animals with ---------.
2. Fishes are -----------.
3. Jawless fishes do not have ---------.
4. These fishes are direct ------- of the oldest fossil fish.
5. ----------- often is used as a model for all bony fishes.
6. The body of perch is covered with -------- scales.
7. Unlike the cartilaginous fishes, perch have -------.
8. The female fish ---- eggs in ovaries.

a swim bladder; produces; discendents; cold-blooded; backbones; the perch; overlapping; true jaws.

V. Write translations and transcriptions try to remember the words.

vertebrae	trunk
well-differented	filaments
surrounding	respiration
remove	volume
to be pumped into	exchange

VI. Make up questions:

1. He watered the plants in the garden on Monday.
   Who ....?
   Where ....?
   What .... ?
   When ....?
2. She got up at 10 o'clock on Sunday.
   Who .... ?
   What time .... ?
   When .... ?
   Did .... ?
3. We were in the cinema last week?
   Who ...... ?
   Where .... ?
   When .... ?
4. Tom is playing football in the yard.
   Where .... ?
   Who .... ?
   What .... ?
5. Mike helps mother every day.
   What .... ?
   When .... ?
6. I can play chess very well.
   How .... ?
   Who .... ?
   What .... ?

Unit 11. Amphibians

Amphibians are the first vertebrates to walk on land. During its life cycle, the amphibian changes its appearance and its way of life. For example, in the early stages of development, amphibians (tadpole) live in the water. The breath occurs with gills. As an adult, an amphibian lives on land and uses lungs to breathe. The process by which a young amphibian changes into an adult is called metamorphosis.

Frogs are the most common amphibian alive today. Frogs are easy to recognize and to find. For this reason, the frog is often used as a model for all amphibians (figure 22). The external structures of a frog are adapted to the frog's double life in water and on land. Frog has two bulging eyes on top of its head. Each eye is covered with a third eyelid called a nictitating membrane, which protect the eyes and keep them moist. The nictitating membrane is transparent so the frog can see through them.

Frog does not have external ears. Instead, just behind each eye is round structure called a tympanum which is the frog's eardrum. The tympanum allows a frog to hear well in both air and water. Hearing is important during the mating season because male frogs use sound to attract females.

Frogs have smooth, moist skin. Because a frog uses its skin for respiration, the skin must be kept moist. When a frog is in the water, the skin is moist. However, when the frog leaves the water, its skin must be kept from drying out. Mucus glands scattered over the frog's skin secrete a slimy fluid that helps keep the skin moist.

Frogs have two sets of limbs. The front limbs are attached to the skeleton by the pectoral girdle. The hind limbs are attached by the pelvic girdle. The hind limbs are strong and muscular, and allow the frog to move and jump.

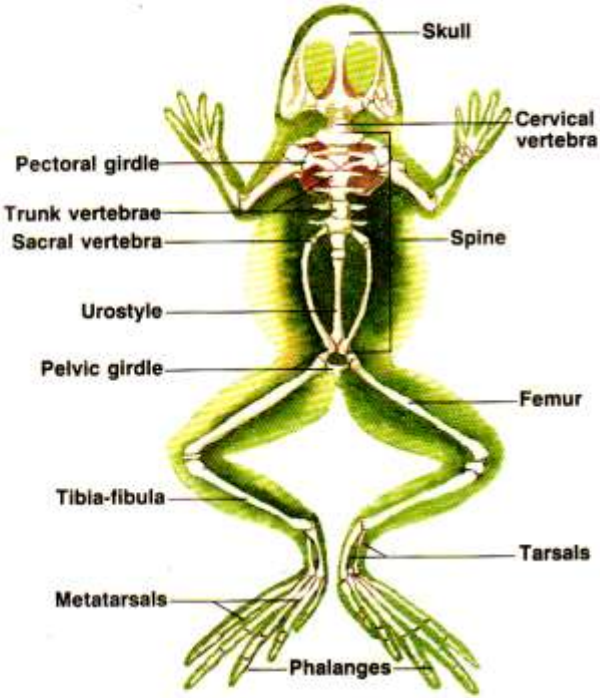

Figure 22 *Skeleton of frog*

Frogs have a three-chambered heart which circulates their blood: the left atrium, the right atrium, and the ventricle. Oxygen-rich blood from the lungs enters the left atrium. Oxygen-poor blood from the body enters the right atrium. Blood from both, the left and right atrium, empties into the ventricle. The ventricle pumps oxygen-poor blood to the lungs and skin, mixed blood to the body, oxygen-rich blood to the head.

Adult frogs take in oxygen through the lungs, mouth, and skin. When a frog lowers the floor of its mouth, air enters the nostrils. The frog then raises the floor of its mouth and closes the nostrils. Air is forced through the glottis – tube between the throat and the lungs - into the lungs. Some oxygen is absorbed by the moist lining of the frog's mouth (mouth breathing) which provides only a small amount of oxygen for the frog.

When a frog is underwater, it takes in oxygen through its skin alone. For example, during the winter, frogs often remain buried in mud for months. Respiration through the skin keeps the frog alive during this time.

Digestive system of frog begins from the mouth. The frog uses its long sticky tongue to catch its prey and bring the prey back into its mouth. Small teeth line the upper edge of the mouth. Two the other teeth are on the roof of the mouth. These teeth help frog hold its prey.

When frog swallows, the food enters the esophagus, from which moves into the stomach where occurs digestion of food by help of enzymes. The digested food leaves the stomach and enters the small intestine. Nutrients are absorbed in the small intestine. Waste material then moves into the large intestine. The remaining waste material leaves the frog's body through the cloaca.

The kidneys are excretory organs of frog. Wastes and excess water are removed from the blood by the kidneys. Together, the waste materials and water form urine which lead from the kidneys into the urinary bladder and leaves the frog's body through the cloaca.

Frogs reproduce sexually. The female frog produces eggs in two ovaries. When the eggs are mature, they pass into the oviducts. As the eggs move through the oviducts, the eggs are covered with a jellylike material. The male frog produces sperm in two testes after that they move into storage organ, where they remain until mating. Fertilization takes place outside of body.

New words and word combinations.

amphibian	amfibiya
spine	bel, onurğa, bel sütunu, bel sümüyü
femur	bud sümüyü, ələngə

tarsals	tarsal
metatarsals	metaltarsals sümüklər
eardrum	qulaq pərdəsi
maning	cütləşmək
moist	nəmli, rütubətli
limb	üzv
ventricle	mədəcik
nutrient	qida
bladder	qişa, kisə

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

First vertebrates; to walk on land; life cycle; way of life; changes its appearance; in the early stages of development; to live in the water; to live on land; to use lungs to breath; metamorphosis; easy to recognize; used as a model; bulging eyes; nictitating membrane; external ears; structure a tympanum; to be important; mating season; to attract females; male frogs; skin for respiration; moist swin; sets limbs; pectoral girdle; hind limbs; strong and muscular; to circulate their-blood; three-chambered heart; the left atrium; the right atrium; ventricle; mixed blood; oxygen-poor blood; oxygen-rich blood; digestive system; kidney; excretory organ; reproduce sexually; jelly like material; storage organ; fertilization.

II. Find out corresponding equivalents of the following word combinations into English:

Torpaq üzərində gəzmək; ilk onurğalılar; həyat dövrü; həyat yolu; görünüşünü dəyişmək; inkişafın ilkin mərhələləri; suda yaşamaq; qəlsəmə ilə nəfəsin meydana çıxması; torpaqda yaşamaq; ağciyər nəfəsindən istifadə; metamorfoz; asan tanımaq; model kimi istifadə; gözlərin şişməsi (bərəlməsi); qişa membranı – gözqırpma membranı; xarici qulaqlar; timpan strukturu; eşitmənin vacibliyi; dövr mövsümü; dişiləri cəlb etmək; erkək qurbağaların səsi; dəri tənəffüsündən istifadə; nəmli dəri; əlamətləri müəyyən etmək; pektoral kəmər (südəmər kəmər); arxa ayaqlar; güclü və əzələli; qan dövranı; üç kameralı ürək; sağ qulaqcıq; sol qulaqcıq; mədəcik; qarışıq qan; oksigenlə kasıb qan; oksigenlə zəngin qan; həzm sistemi; böyrək; ifrazat orqanı; cinsi çoxalma; geləbənzər maddə; saxlama orqanı; mayalanma.

III. Match the highlited words in the text to the correct meaning:

work	a) fully grown or developed
adult	b) an outer layer or covering in particular
double	c) undergo natural development by increasing
skin	d) a red liquid that circulates in the arteries and veins
to hear	e) consisting of two equal, identical or similiar parts or things to attract
to eat	f) a task or tasks to be undertaken
blood	g) put into mouth,chew and swallow it
to grow	h) perceive with the ear the sound made by

IV. Complete the sentences with a word and word combination from the list:

1. Amphibians are the first ------- to walk on land.
2. -------- are the most common amphibian alive today.
3. Frog has two bulging eyes on top of its --------.
4. ------- allows a frog to hear well in both air and water.
5. Frogs have smooth, moist -------.
6. Frogs have ------- heart which circulates their blood.
7. ------- through the skin keeps the frog alive during this time.
8. ------- system of frog begins from the mouth.

frogs;	digestive;	respiration;
skin;	head;	vertebrates;
	a three-chambered;	the tympanum;

V. Write translations and transcriptions try to remember the words:

eardrum	allow
appearance	girdle
breathe	ventricle
alive	oxygen
transparent	fertilization

VI. Complete the sentences with the words in parentheses. Put brackers around the *since*-clauses.

1. I know have known Mark Miller [ever since* we (be) were in college].
2. Pedro (change) --------- his major three times since he (start) ------ school.
3. Ever since I (be) -------- a child, I (be) -------- afraid of snakes.
4. I can't wait to get home to my own bed. I (sleep, not) ------ well since I (leave) -------- home three days ago.
5. Ever since Danny (meet) ------- Nicole, he (be, not) ----- able to think about anything or anyone else.
6. Otto (have) ---------- a lot of problems with his car ever since he (buy) ---------- it. It's a lemon.
7. A: What (you, eat) ------------ since you (get) ------- up this morning?
   B: I (eat) ------- a banana and some yogurt. That's all.
8. I'm eighteen. I have a job and am in school. My life is going okay now, but I (have) --------- a miserable home life when I (be) ------ a young child. Ever since I (leave) ------- home at the age of fifteen, I (take) -------- care of myself. I (have) ------- some hard times, but I (learn) ------- how to stand on my own two feet.

Unit 12. Reptiles

The first reptiles appeared on Earth about 310 million years ago. Unlike amphibians, early reptiles did not have to return to the water to keep their skin moist and to lay their eggs. The reptiles could live entirely on land. For millions of years, reptiles ruled the Earth. This period of time is called the Age of Dinosaurs.

Like the amphibians, reptiles are cold-blooded vertebrates. Because they are cold-blooded, most reptiles live in warm, tropical environments.

Reptiles have several characteristics that allowed them to adapt to life on land. First, reptiles have dry skin that is covered with scales. This skin prevents the loss water from the reptile’s body. Second, reptiles developed pulmonary breathing, expanding and contracting the rib cage to suck air into the lungs and force it out. The capacity of this system is limited only by the volume of the lungs. Third, through the heart and circulatory system of reptiles flow separated oxygenated and deoxygenated blood. It allowed more oxygen to reach body tissues. Fourth, fertilization of reptiles takes place inside the body of the female. Reptiles lay watertight, hard-shelled eggs that contain a food source, the yolk, and four membranes – the amnion, the yolk sac, the allantois, and the chorion (figure 23). The fluid-filled amnion holds the embryo. The fluid in the amnion supports and cushions the embryo. The yolk sac provides stored food for the embryo via blood vessels connecting to the embryo’s gut. Wastes produced by the embryo are collected and kept separate from the embryo in the allantois. The chorion lines the inside of the shell. Both the chorion and the allantois control the exchange of oxygen and carbon dioxide through the shell.

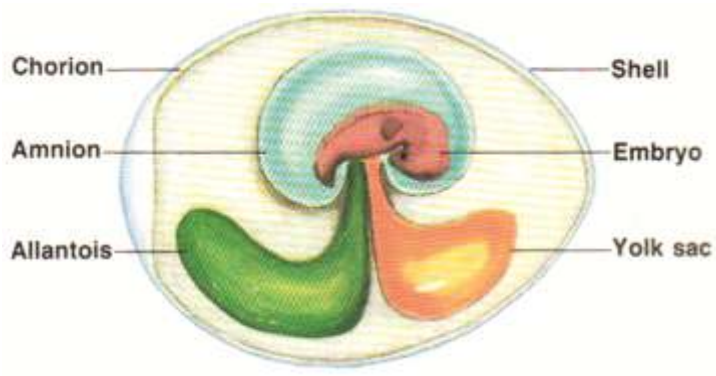

Figure 23 *Amniote egg of reptile*

About 7000 species of reptiles that make four orders are living today. The four living orders of reptiles include the turtles, lizards and snakes, tuataras, and crocodiles.

Turtles have solid skulls much like those of the first reptiles. The most obvious feature of turtles is a shell. The shell is made up two separate halves that are covered with modified scales called scutes.

Lizards and *snakes* are classified in the largest order of reptiles (about 4500 species). A major difference between snakes and lizards is that snakes do not have legs. One of the most interesting characteristics of lizards is regeneration. Regeneration is the ability of an organism to replace lost body parts.

Tuataras have changed very little since they first appeared over 200 million years ago. Tuataras grow to about 60 cm in length and resemble lizards. One of the most unusual features of the tuataras is a third eye, called a parietal eye which found on top of the tuatara's head. Scientists know that tuataras do not use the parietal eye for seeing, but they are not sure what its function really is.

Crocodiles resemble birds far more than other living reptiles. Alone among living reptiles, crocodiles care for their young and have a four-chambered heart, as birds do. There are also many other points of anatomy in which crocodiles differ from all living reptiles and resemble birds.

New words and word combinations.

reptiles	sürünənlər
expanding	genişləndirilməsi, genişlənmək
source	mənbə, qaynaq, baza
yolk	yumurta sarısı
halves	yarım, yarısı
lizard	kərtənkələ
resemble	xatırlatmaq, oxşamaq

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

to lay eggs; cold-blooded vertebrates; tropical environmental; to adapt to life; pulmonary breathing; deoxygenated blood; fertilization of reptiles; early reptiles; unlike amphibians; hardshelled eggs; separate halues; regeneration ability; modified scaled; unusual features; four chambered heart; blood vessels; oxygenated blood; body tissues; loss water; several characteristics; age of Dinosaurs.

II. Find out corresponding equivalents of the following word combinations into English:

Yumurta qoymaq; soyuqqanlı onurğalılar; tropik mühit; həyata uyğunlaşma; ağciyər tənəffüsü; oksigensiz qan; sürünənlərdə mayalanma; ilkin sürünənlər; suda-quruda yaşayanlardan fərqli olaraq; sərtqabıqlı yumurta; ayrılmış hissələr; regenerasiya qabiliyyəti; dəyişmiş pulcuqlar; qeyri-adi xüsusiyyət; dörd kameralı ürək; qan damarları; oksigenli qan; bədən toxumaları; su itkisi; bir neçə xüsusiyyətlər; Dinazavırların Dövrü.

III. Match the highlited words in the text to the correct meaning.

appear	a) bring or gather together
environment	b) the natural world
collect	c) different, distinct
separate	d) a thick dry flake or skin
food	e) a reptile that has a long body or tail
scale	f) skill or talent
lizard	h) come into sight
ability	g) any nutritious substance

IV. Complete the sentences with a word and word combination from the list.

1. The reptiles could live entirely --------------.
2. Like the amphibians, reptiles are -------- vertebrates.
3. -------- prevents the loss water from the reptiles body.
4. About 7000 ------- of reptiles that make four orders are living today.
5. The most obvious feature of turtles is ---------.
6. --------- grow to about 60 cm in lenght and resemble lizards.
7. Crocodiles resemble -------- far more than other living reptiles.
8. Crocodile care for their young and have -------- heart as birds do.

a four-chambered heart; cold-blooded; species; birds; on land; this skin; a shell; tuataras

V. Write translations and transcriptions try to remember the words.

to adapt	circulatory
to suck	vessel
breanding	connecting
expanding	turtles
contracting	lizards

VI. Complete the sentences with prepositions.

1. Tom is devoted <u>to</u> his family.
2. I'm afraid I don't agree --------- you.
3. I wasn't aware -------- the problem.
4. I'm excited --------- the concert.
5. Are you satisfied -------- your progress?
6. She warned us -------- the coming storm.
7. What's the matter -------- him.
8. It doesn't matter ------- me.
9. I got rid ------- my old bicycle.
10. I don't approve -------- my old bicycle.

Unit 13. Birds

There are about 9 000 species of birds alive today.

Modern birds lack teeth and have only vestigial tails, but they still retain many reptilian characteristics. For example, both birds and reptiles have amniote eggs, although the shells of bird eggs are hard rather and leathery. Also, reptilian scales are present on the beak and legs of birds.

Birds are warm-blooded (body temperature ranging from 40^0 C to 42^0 C). The body of birds is adapted for light. For example, the bird's body is streamlined to reduce air resistance. Its wings fan the air and can be used to soar or glide. The tail is used for steering and balance. Birds also have lightweight bodies covered with feathers. In most birds, feathers also aid in flight.

Feathers are modified reptilian scales that providing lift for flight and conserving heat. Feathers develop from tiny pits in the skin called follicles. Two main kinds of feathers on bird's body are contour feathers and down feathers. <u>Contour feathers</u> cover the body and give the bird its shape. <u>Down feathers</u> are small fluffy feathers that close to a bird's skin. Often contour feathers become worn and damaged. They are replaced at least once a year in a process called molting.

Birds take good care of their feathers. A common activity among birds is preening. During preening, a bird uses its beak to take oil from a gland at the base of its tail and apply the oil to its feathers and prevent from drying out and breaking.

The bones of birds are thin and hollow which reduce their weight. The power for active flight comes from large breast muscles that can make up 30% of a bird's total body weight.

The digestive system of birds works rapidly (figure 24). The rapid burning of food in the body cells produces large amounts of energy. Much of this energy is used for flight. The bird eats quickly until its crop (organ that stores food) is full. Then the bird moves to a safe place to digest the food. Food moves from the crop to the stomach. Because birds do not have teeth, the gizzard (part of stomach) grinds the food. Birds swallow small stones or grit to help crush the food in the gizzard. Digested food is then absorbed by the intestine.

The excretory system of birds consists of two kidneys that filter uric acid from the blood. The uric acid from the kidneys is combined with solid wastes from the digestive system and excreted together from cloaca.

Birds have a four-chambered heart that completely separates oxygenated and deoxygenated blood, so only blood with plenty of oxygen reaches body tissues.

The respiratory system in birds is very efficient. In addition to lungs, a bird's respiratory system also has air sacs connected to the lungs. Air sacs help supply the large amounts of oxygen needed by a flying bird. Air sacs also help regulate the body temperature of a bird by absorbing excess heat. This heat is excreted along with carbon dioxide when the bird exhales.

Birds can sing because of a structure called syrinx, or song box which located at the base of the trachea.

Birds have well-developed cerebrum (control center for muscle and behavior), cerebellum (control center for balance and coordination), and optic lobes (control center for vision).

Singing, defending territories, and display of plumage are bird behaviors related to reproduction. When birds mate, sperm are transferred from the male’s cloaca to the female’s cloaca. Formation of a finished egg takes about two days. A fertilized bird egg includes an embryo, a food supply, membranes, and a hard outer shell. After an egg lay, the bird embryo develops quickly. The embryo is supplied with food by the yolk and albumen, or egg white. A complete group of eggs laid by one female bird is called a clutch. A clutch of eggs usually hatches from two to four weeks after the eggs are laid. Hatching is aided by a sharp, tiny structure on the tip of the beak called the egg tooth. The baby bird uses the egg tooth to break the shell and free itself. The egg tooth disappears soon after hatching.

New words and word combinations

beak	dimdik
streamblind	rasional, səmərələşdirmək
damaged	zədəli, zədələnmiş
molting	tük tökmək, lələk tökmək, qabıqdan çıxmaq
bone	sümük
hollow	içiboş, puç, çuxur
amount	məbləğ, miqdar
swallow	udmaq, xortumuna çəkmək
uric	sidik
waste	tullantı
plenty	çox, külli, bolluq
excess	ifrat, artıq
lobe	ləpə, dilim
trachea	nəfəs borusu
cerebrum	beyin
crop	məhsul, bəhrə
gizzard	pətənək

plumage	lələk
behaviors	davranışları, rəftar, əməl
albumen	zülal
clutch	mufti, tıxac

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

Defending territories; reproduction; cloaca; fertilized; embryo; supply; yolk; albumen; cluth of egg; hatch of egg; alive; lack teeth; vestigial tails; reptilian characteristics; amnion eggs; shells of hards; leathery; warmblooded; streamlined; resistance; soar; glide; steering; lightweight bodies; conserving heat; follicles; main kinds of feathers; confour feathers; down feathers; damaged; molting; preening; gland; bones; hollow; breast muscles; total body; digestive system; rapidly; crop; to digest; the gizzard; grinds; swallow; absorbed; intestine; excretory; uric; excreted; four-chambered; plenty; lung; sacs; excess; syrinx; to locate; the base of the trachea; cerebrum; cerebellum; optic lobes; sharp; aid; tiny; beak; shell; to disappear.

II. Find out corresponding equivalents of the following word combinations into English:

Ərazilərin qorunması; artma, törəmə; kloaka; qidalanmış, mayalanmış; rüşeym, embrion; təhciz etmək, elastik; yumurta sarısı; albumin zülalı; yumurta kisəsi; bala çıxarmaq; canlı; əksik dişlər; qalıq dırnaqlar; sürünənlərin xüsusiyyətləri; amniotic yumurtalar; quşların xarici örtüyü; dərili; istiqanlı; rasional, səmərələşdirilmiş; müqavimət; uçmaq; süzülmək; sükan arxasında oturma; olduqca yüngül bədənlər; istiliyin mühafizəsi; follikullar; lələklərin əsas növləri; kontur lələklər; aşağı lələklər; zərərli; qabıqdan çıxma; dimdik ilə düzəltmə; vəzi;

sümüklər; içiboş; döş əzələləri; ümumi bədən; həzm sistemi; sürətli; məhsul, dənlik; həzm etmək; pətənək, daşlıq; üyütmək, əzmək; udma; udulmuş; bağırsaq; ifrazat; sidik; ifraz olunmuş; dörd kameralı;çox, külli miqdarda; ağciyər; ifrat, artıq; nəfəs borusu; yerləşmək; traxeyaların əsası; beyin; beyincik; optik dilimlər, optik ləpələr; kəskin; kömək etmək; kiçik; dimdik; qabıq; yox olmaq.

III. Match the highlited words in the text to the correct meaning.

hard	a) very small
temperature	b) activity
tiny	c) make or become smaller or less in amount, degree or size
work	d) the degree or intensity of heat present in a substance
reduce	e) a viscous luquid derived from petroleum
oil	f) solid, firm and rigid
territory	h) moving fast or doing something in a short time
quickly	g) an area under the jurisdiction of a ruler or state

IV. Complete the sentences with a word and word combination from the list.

1. Modern birds lack teeth and have only -------- tails.
2. Both birds and reptiles have ------- eggs.
3. Birds are -------.
4. The tail is used for ------ and balance.
5. Birds take good care of their --------.
6. The -------- system of birds works rapidly.
7. Birds have a four-chambered ---------.

8. Birds can sing because of a structure called----------.

warm-blooded; steering; syrinx; feathers; digestive; heart; amniote; vestigial

V. Write translations and transcriptions try to remember the words.

streanblined	absorbed
resistance	tissues
feathers	efficient
lightweight	regulate

VI. Comlete the sentences. Use the present progressive or the present perfect progressive.

1. I (sit) <u>am sitting</u> in class right now. I (sit) <u>have been sitting</u> here since one o'clock.
2. Kate is standing ar the corner. She (wait) -------- for the bus. She (wait) ------- for the bus for twenty minutes.
3. Scott and Rebecca (talk) -------- on the phone right now. They (talk) -------- on the phone for over an hour.
4. Right we're in class. We (do) -------- an exercise. We (do) ------- this exercise for a couple of minutes.
5. A: You look busy right now. What (you, do) ----------?

   B: I (work) --------- on my physics experiment. It's a long and difficult experiment.

   A: How long (you, work) ---------- on it?

   B: I started planning it last January. I (work) ----- on it since then.

Unit 14. Mammals

There are about 4 500 living species of mammals.

Mammals have certain characteristics that allow them to live and reproduce in many different environments. For example, mammals are warm-blooded vertebrates. Because they are warm-blooded, mammals can live in both hot and cold areas of the Earth.

Mammals are the only vertebrates that possess hair and milk glands. A covering of body hair can help a mammal stay warm. Another function of hair is camouflage.

All female mammals possess mammary glands that secrete milk. Newborn mammals, born without teeth, suckle this milk. Even baby whales are nursed by their mother’s milk.

Mammals have different types of specialized teeth. These teeth are adapted to mammal’s diet. Most mammals are either carnivores or herbivores. In carnivores such as the dog, canine teeth are able to rip food. Herbivores, such as deer, have incisors to chisel off vegetation and molars to grind up the plant material.

Mammals also have well-developed brains that allow them to learn the behavior patterns necessary for survival.

Biologists classify mammals into three major groups based upon the way in which the young develop.

Monotremes, or egg-laying mammals. The duck-billed platypus and two species of echidna are the only living monotremes. Among living mammals, only monotremes lay shelled eggs.

Monotremes are similar to reptiles in some ways: legs of monotremes are attached to the sides of its body; monotremes lay eggs; monotremes have cloaca.

Monotremes have three important characteristics of mammals: hair covering of body, warm-blooded, and mammary glands.

Marsupials, or pouched mammals. Kangaroos are examples of marsupial mammals. Young marsupials develop differently from any other mammals. The young develop inside the mother's body for only a short time. Unlike most mammals, a young marsupial is not fully developed when it is born. At birth, a young marsupial is weak, blind, and hairless. It crawls through the mother's fur until it reaches the pouch. Mammary glands of marsupials are inside the female's pouch. Once inside the pouch, a young marsupial attaches itself to a nipple. It remains in the pouch and nurse until it is fully developed.

Placental mammals. Most species of mammals living today, including human, are placental mammals. A placental mammal develops entirely within the body of its mother. Soon after an embryo begins to develop, it enters the uterus. The embryo remains in the uterus until it is fully developed. The embryo causes a placenta to form (figure 25). The placenta forms from the membranes of the chorion and allantois.

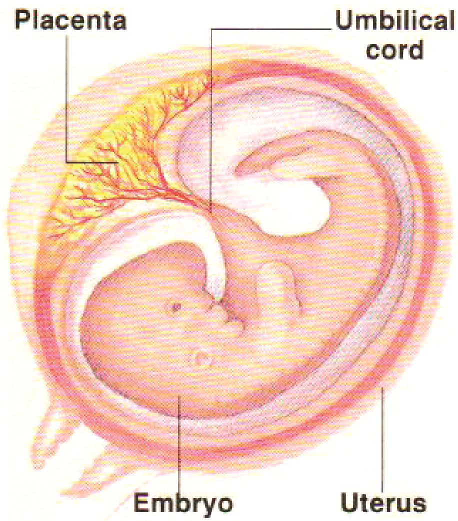

Figure 25 *Placenta*

Major orders of Placentals. Biologists classify placental mammals into orders according to the adaptations that help the animals live in their environments.

Insect-eating mammals (moles, shrews) are small and very active. They have well-developed claws (for digging). They feed on insects and worms.

Flying mammals (bats) fly by flapping their wings as birds do. The wing is made up of skin stretched over very long finger bones.

Toothless mammals are armadillos, sloths, and anteaters. They feed mainly on insects.

Gnawing mammals are called rodents. About 40% of all mammals are rodents. They have teeth adapted for gnawing.

Aquatic mammals (dolphins, whales and porpoises) use lungs to breathe air. For example, whales take in air through a blowhole located on top of the head.

Trunk-nosed mammals (elephant) have long trunk which is modified nose and upper lip.

Carnivorous mammals (dogs, bears) are animals that eat other animals. Some carnivorous, such as bears, also eat plants.

Hoofed mammals (camels) are herbivores (they eat only plants). To support their weight, hoofed mammals have toes that end in a hard covering called a hoof.

Primates (monkeys) are omnivores (animals that eat plants and other animals) and herbivores. With exception of gorillas, baboons, most primates live in trees.

New words and word combinations.

possess	malik, malik olmaq
canine	köpək
marsupials	kisəlilər
placental	cift
uterus	uşaqlıq, balalıq, bətn

embryo	rüşeym, embrion
umbilical cord	göbək ipi, bağı
claw	caynaq, pəncə
sloths	sıxlıq
anteaters	qarışqa yeyənlər
roolents	gəmiricilər, kəsəyən
baboons	əntər
primate	primat

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

Living species of mammals; many different environments; warm-blooded vertebrates; cold areas of the Earth; hair and milk glands; all female mammals; carnivores or herbivores; canine teeth; egg-laying mammals; duck billed platyplus; pouched mammals; the membranes of the charian; insert eating mammals; flying mammals; gnawing mammals; trunk nosed mammals; modified nose; hoofed mammals; certain characteristics; aquatic mammals.

II. Find out corresponding equivalents of the following word combinations into English:

Məməlilərin canlı növləri; çoxlu müxtəlif mühitlər; istiqanlı onurğalılar; yer kürəsinin soyuq əraziləri; tük və süd vəziləri; bütün dişi məməlilər; ətyeyənlər yaxud otyeyənlər; köpək dişləri; yumurta qoyan məməlilər; ördəkburun; kisəli məməlilər; rüşeymin membranları; həşəratyeyən məməlilər; uçan məməlilər; gəmirici məməlilər; xortumlu məməlilər; şəkildəyişməsi; dırnaqlı məməlilər; müəyyən xüsusiyyətlər; su məməliləri.

III. Match the highlited words in the text to the correct meaning.

allow	a) produce a copy of
to live	b) existing as a result of birth
reproduce	c) commit to memory
born	d) the way in which someone behaves
to learn	e) remain alive
behavior	f) let have or do something
important	g) a curved, peinted berny nail on each digit of the foot in birds
claw	h) of great significance or value

IV. Complete the sentences with a word and word combination from the list.

1. Mammals have certain -------- that allow them to live and reproduce in many different environments.
2. All female mammals possess mammary glands that ------ milk.
3. Mammals have different types of -------- teeth.
4. Most mammals are either ------- or her bivores.
5. Mammals also have ------- brands.
6. Kangaroos are examples of marsupial -----------.
7. ----------- marsupials develops differenrtly from other mammals.
8. Most species of mammals living today, including human, are -----mammals, young.

specialized; carnivores; well-developed; characteristics; secrete; mammals; placental.

V. Write translations and transcriptions try to remember the words.

warmblooded
covering
camouflage
herbivores
monotremes
cloaca
mammals
support

VI. Complete the sentences with *other(s)* or *the other(s).*

1. Birds have different eating habits. Some birds eat insects.
2. -------- birds get their food chifly from plants.
3. -------- eat only fish.
4. -------- hunt small animals like mice and rabbits.

-------- birds prefer dead and rotting flesh.

III
chapter

HUMAN BIOLOGY

Unit 1. HUMAN BIOLOGY

Anatomy is the science that studies the structure of the body while *physiology* is science that studies how these structures work.

All organisms include six groups of components (in order of size): atoms, molecules, cells, tissues, organs and organ systems.

Atoms are the smallest components of living things. Molecules are combination of atoms. Most of the atoms in any living thing happen to be hydrogen and oxygen combined in the ratio of 2:1 to form molecules of water.

All living things consist of one or more compartments called cell. Cells are the building blocks of all living things. There are two major types of cell: prokaryotic and eukaryotic. Prokaryotic cells are more primitive than eukaryotic cells. Prokaryotic cell is a cell in which the DNA is not bound by membrane. A eukaryotic cell is organized into three principal parts: the nucleus, the cytoplasm and the plasma membrane. In the cytoplasm of eukaryotic cells are located numerous organelles, which perform specific functions for the cell.

Groups of cells that look alike and do the same job are organized into <u>tissues</u>. The cells of animals are organized into four main tissues: epithelial tissue (sheets of cells which cover body surfaces), connective tissue (which bind other tissues together and support flexible body part), muscular tissue (which by contracting, enables the organism to move) and nervous tissue (which transmits electrochemical impulses).

An <u>organ</u> is a unit composed of two or more tissues that together perform a certain function. Several organs may work together to form an <u>organ system</u> which is defined as two or more interrelated organs that serve a common function. For example, the digestive system is composed of the digestive tract, liver, gallbladder and pancreas. These organs cooperate in the digestion of food and the absorption of the digestion products into blood.

The vertebrate body contains 10 organ systems: skeletal, muscular, circulatory, lymphatic, respiratory, digestive, excretory, nervous, endocrine and reproductive. Collectively, all the organ systems make up an organism.

New words and word combinations.

prokaryotic	prokariot
eukaryotic	eukariot
sheet	vərəq
tissue	toxuma
component	element, tərkib hissə
pancreas	mədəaltı vəz
include	daxil etmək
numerous	çoxsaylı
reproductive	törədici
ratio	nisbət

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

Structure of the body; smallest components; living things; major types; digestive system; vertebrate body; more tissues; digestive tract; cooperate; gallbladder; organ system; epithelial tissue; certain function; connective tissue; eukaryetic cells; prokaryotic cells; muscular tissue; digestion products; nervous tissue; groups of cells; specific function.

II. Find out corresponding equivalents of the following word combinations into English:

Bədənin quruluşu; kiçik hissəciklər; canlı varlıqlar; əsas hissələr; həzm sistemi; onurğalı bədəni; vahid orqan; daha çox toxumalar; həzm kanalı; əməkdaşlıq etmək; öd; orqan sistemi; epitel toxumaları; müəyyən funksiya; birləşdirici toxuma; eukariot hüceyrə; prokariot hüceyrə; əzələvi toxuma; həzm edilmiş hissəciklər; sinir toxuması; hüceyrələr qrupu; spesifik funksiya.

III. Ask and answer questions about outstanding people in diferent fields of human activity using following nouns and adjectives.

archiment	musician	philologist
artist	composer	physiologists
attorney	actor	botanist
lawyer	inventar	biologist
solicitor	philosopher	archaeologists
barrister	poet	astronomer
judge	writer	biochemist
jury	scientist	doctor
chemist	historian	journalist
mathematician	physicist	scriptwriter
founder	author	discoverer
famous	world-known	world-famous
eminent	outstanding	distinguished
prominent		

For.ex. Was Shakespeare a poet?
Yes, he was a famous poet.
Was Columbus a scientist?
No, he wasn't. He was a prominent discoverer.

IV. Use the following words in sentences:

an applicant	first year student
entrance exams	graduater
final exams	post graduate
tutorial	researcher
specially	theoretical
equipped	classrooms
lecturer	experimental

For.ex. To my mind, Dr.Abdullayev is disunguished for his scientific research in theoretical physics.

V. Define the tense of the predicate and put the sentences into the interrogative and negative forms:

1. I am studying biology. 2. He has solved this difficult problem. 3. He is a good biologist. 4. My teacher developped a new plant. 5. These scientists work at a very interesting problem. 6. They began to investigate this problem last year. 7. Animals and plants under diferent conditions. 8. Life exists in many places on the earth. 9. Some animals can exists the immense pressure of the deep seas. 10. Students of the biological faculty study diferent subjects.

Unit 2. SKELETAL SYSTEM

There are three types of skeletal systems in the animal kingdom: hydrostatic skeleton, exoskeleton and endoskeleton.

Hydrostatic skeleton - the simplest type of skeleton – are found in soft-bodied invertebrates (earthworms, jellyfish). It consists of liquid within a layer of flexible tissue. A fluid-filled cavity is encircled by muscle fibers that raise the pressure of the fluid when they contract.

Exoskeleton surrounds the body of most animals (Arthropods). It consists of solid structures to which muscles can attach. Exoskeleton is made up of chitin, an organic material that is secreted by a layer of cell just underneath the exoskeleton. Exoskeleton can grow as an organism grows. But in adult animal an exoskeleton cannot get too large because its exoskeleton would have to become thicker and heavier. Organisms with a chitin exoskeleton may change their exoskeleton a few times during their life. This process is called molting.

Endoskeleton is found in human and vertebrate. The endoskeleton is composed of bone. The endoskeleton has several important jobs:

- supports body and gives it shape;
- covers and protects certain body organs;
- many bones of the endoskeleton work with muscles to make movement possible;
- some bones of endoskeleton make blood cells;
- bones of endoskeleton store minerals such as calcium and phosphorous that the body needs.

The human skeleton

The human skeleton is divided into an axial and an appendicular skeleton (figure 1).

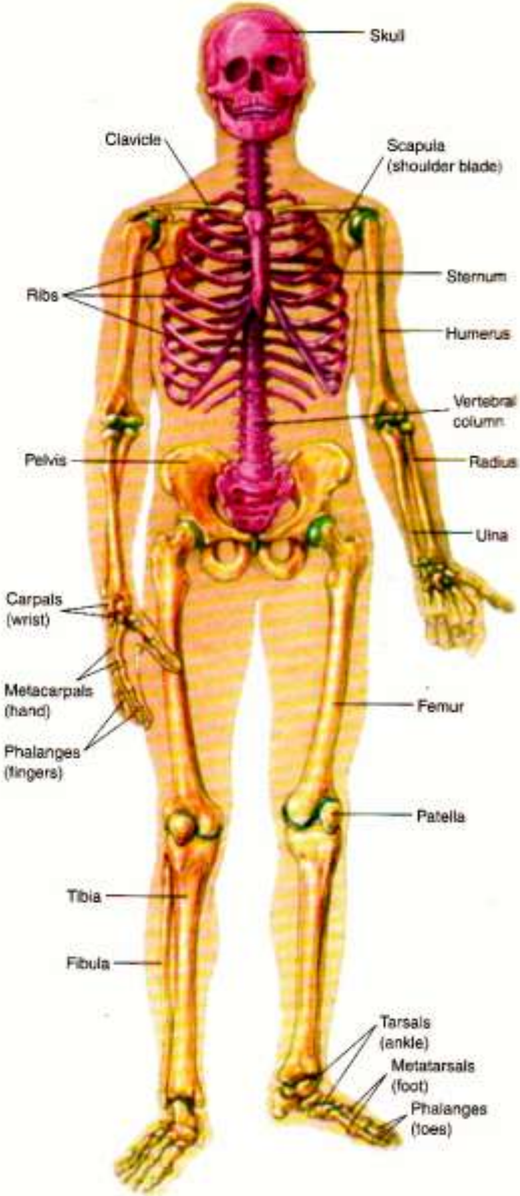

Figure 1 *Human skeleton*

The skull, vertebral column and rib cage make up the axial skeleton. Axial skeleton contains 80 bones. The appendicular skeleton which contain 126 bones include the bones of the limbs and the pectoral (support the forelimbs) and pelvic (support hind limbs) girdles that attach them to the axial skeleton. Together, these two skeletons have 206 bones.

Structure of bone. Bone is a special form of connective tissue. Bone is covered with a thin membrane called the periosteum. The periosteum has many blood vessels that supply bone cells with blood. The hardest part of a bone is under the periosteum. This dense part of a bone is called compact bone. The microscopic structure of compact bone consists of repeating units called Haversian systems (osteon) (figure 2). Through these systems, living bone cells, or osteocytes, receive nourishment by way of blood vessels. The osteocytes reside in spaces in the bone tissue called lacunae. Small tunnels connect neighboring lacunae. Each system has circular layers of mineralized matrix deposited around the Harvesian canal, which contains the blood vessels and nerves servicing the bone. This matrix, a mixture of the protein collagen and calcium phosphate, is deposited by the osteocytes. The combination of flexible collagen and hard mineral makes the bony material sturdy yet flexible without being brittle.

There are two types of osteocytes – one that builds bone (osteoblasts) and one that destroys bone (osteoclasts). These cells constantly replace the bone material and keep the bones in good repair.

The ends of bones are made up of spongy or cancellous bone. Spongy bone has many spaces. The structure of spongy bone adds strength to bone without adding much weight. Strong, lightweight bones are important because bones need to be strong enough to support our body weight, but light enough to move easily.

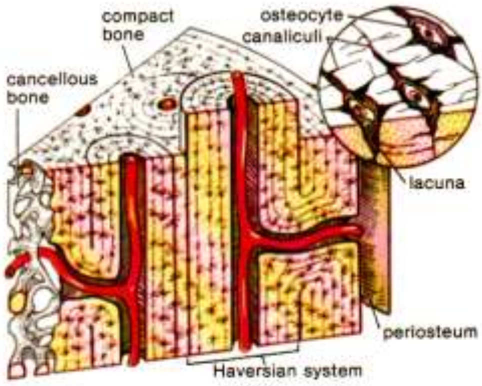

Figure 2 *The structure of bone*

The long part of bone is known as the shaft. The hollow tubes of shaft and the spaces in spongy bone contain a specialized connective tissue called marrow. Red marrow in spongy bone spaces produces red blood cells. The yellow marrow in long bone shafts serves as fat storage tissue.

A growth hormone produced in the pituitary gland (see endocrine system) governs the overall growth of the skeleton. A deficiency in this hormone in childhood will result dwarfism where the individual may become exceptionally short. An excess amount of this hormone, also in childhood, causes gigantism where the individual become extremely tall.

How do human bones develop? As a developing baby, skeleton was made up mostly of cartilage. However, during the second and third months of development, bones began to form. During this process, bone cells replaced cartilage and calcium compounds were deposited. Eventually most of the cartilage was replaced or ossified (change to bone) by bone.

Blood vessels are not found in cartilage, but with the initiation of ossification, they start to penetrate the tissue.

Growth in length occurs at the rounded ends of the bone. The rounded end of a bone is an area of cartilage that produces new bone tissue. Bone growth continues until the cartilage is replaced by bone. This process is a slowly process that will be at around the age of 24.

Vitamins A, C and D play important roles in the formation of bone. When vitamin D is lacking, calcium and phosphate absorption decreases. With vitamin A deficiency, the growth rate of the bones decreases. Deficiency of vitamin C causes weak and fragile bones (osteoporosis).

Types of bones. There are three types of bone in human skeleton: long bone, short bone and flat bone.

Long bones are femur, fibula, tibia, humerus, radius and ulna.

Flat bones are sternum, ribs, hip bones, patella, scapula and the bones of skull.

Short bones are wrist bones, ankle bones, finger bones and vertebrae bones.

Joint is place where two or more bones meet. Bones at these joints are separated by a cavity and are held together by flexible connective tissue called ligaments (figure 3).

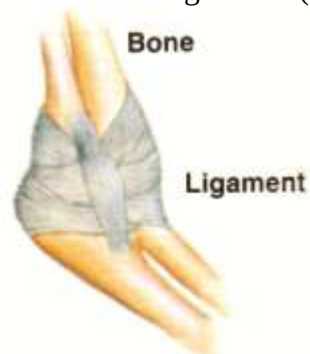

Figure 3 *Ligaments join bones together*

There are three kinds of joints.

1. Immovable joints do not move at all. All cranial and facial bones with the exception of the mandible (low jaw) are immovable (figure 4a).

2. Slightly movable joints allow only a little movement. Examples include cervical, thoracic and lumbar vertebrae. The joints where ribs join breastbone also move a little during breathing (figure 4b).
3. Movable joints include most joints of the body (figure 4c):

Hinge joint allows bones to move backward and forward in only one direction. Example includes elbow and knee.

Ball and socket joints connect upper arm to shoulder and upper leg to pelvis. The ball and socket joints in these places permit movement in all directions.

Pivotal joint is place where the skull joins the first vertebra of backbone (atlas). A pivotal joint allows both side-to-side and up and down movements.

Gliding joints allow some movement of wrist and ankle in all directions.

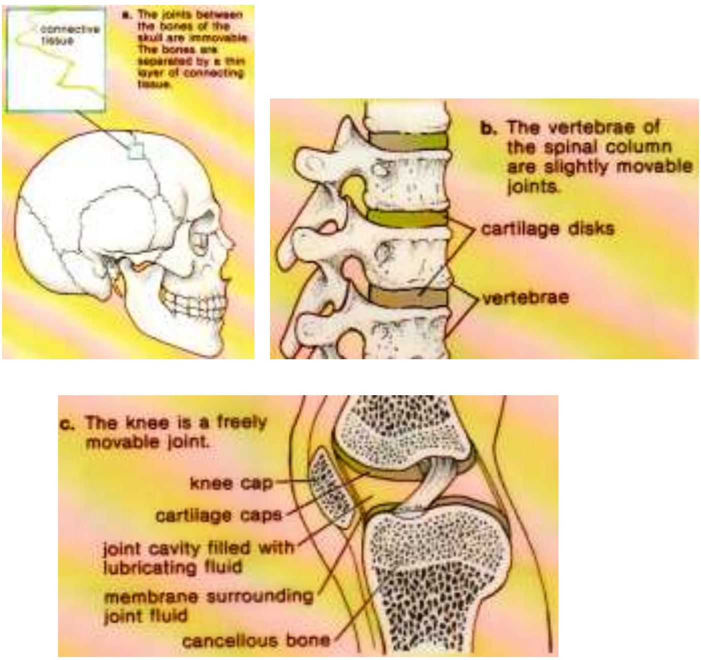

Figure 4 *Types of joint*

Parts of human skeleton:

Skull is composed of 8 cranial bones and 14 facial bones (figure 5). The cranial bones are one pair of parietal bones, one pair of temporal bones, single frontal bone, single occipital bone, single sphenoid bone and single ethmoid bone. The facial bones are one pair of lacrimal bones, one pair of zygomatic bones, one pair of nasal bones, one pair of nasal concha, one pair of maxilla (upper jaw), one pair of palatine bones, single vomer and single mandible (low jaw).

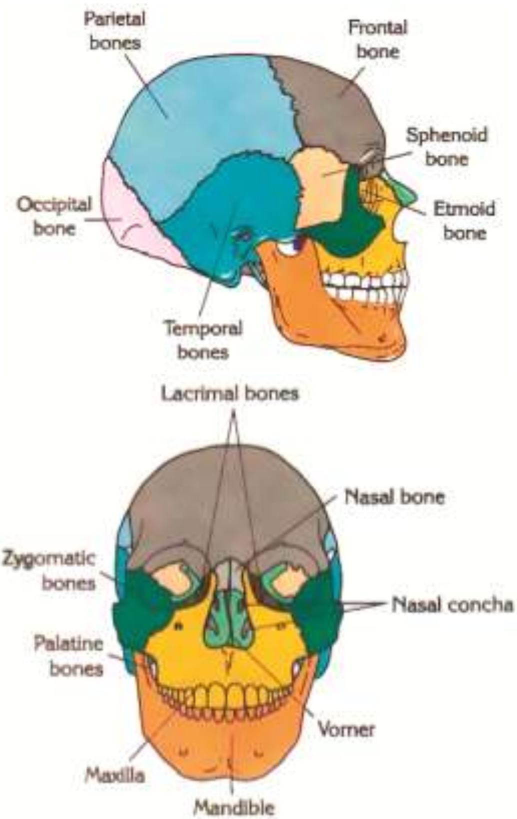

Figure 5 *Skull bones*

Vertebral column consists of 33 vertebrae. It has 'S' shape and length 70-75 cm. The vertebral column has seven parts: 7 cervical vertebrae, 12 thoracic vertebrae, 5 lumbar vertebrae, 5 fused sacral vertebrae, 3-5 fused vertebrae of coccyx.

Thorax or *chest* protects main organs of human such as heart, lungs. It consists of 12 pairs of ribs and a breastbone (sternum) (figure 6). Seven pairs of ribs are true ribs because they are joined directly to the sternum. Eighth, ninth, tenth pairs of ribs are false ribs – they are joined via the seventh ribs. Eleventh and twelfth pairs of ribs are floating ribs – they are not connected to the sternum.

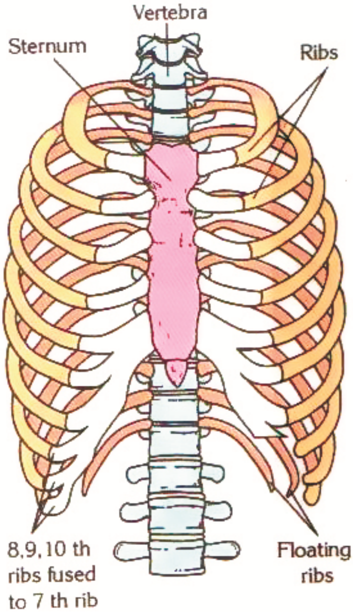

***Figure 6** Rib cage*

Pectoral girdle includes two clavicles which are joined to the sternum and two scapulas (see figure 1).

Pelvic girdle includes ilium, ischium, pubis, sacrum and coccyx (figure 7).

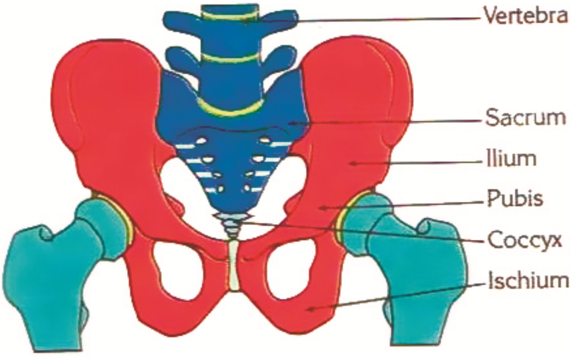

Figure 7 *Pelvic girdle*

Upper extremities are composed of 3 arm bones and 27 hand bones. The arm bones are humerus, ulna and radius (see figure 1). The hand bones are 8 bones of carpals, 5 bones of metacarpals and 14 bones of phalanges (figure 8).

Figure 8 *Hand bones*

Lower extremities are composed of 4 leg bones and 26 foot bones. The leg bones are femur, tibia, fibula and patella (see figure 1). The foot bones are 7 bones of tarsal, 5 bones of metatarsals and 14 bones of phalanges (figure 9).

Figure 9 *Foot bones*

New words and word combinations.

axial	ox
appendicular	əlavə
clavicle	körpücük sümüyü
pelvis	çanaq
patella	diz qapağı
scapula	kürək
rib	qabırğa
ulna	dirsək sümüyü
wrist	bilək
metacarpals	əl darağı
spondy	süngər
pituitary gland	hipofiz vəzi
cartilage	qığırdaq
initiation	başlanğıc
lacking	əksik, çatışmamazlıq
deficiency	əksiklik
phosphate absorption	fosfat udulması
fragile bone	kövrək sümük
elbow	dirsək
socket	yuva
ankle	topuq
gliding	sürüşmə

movable	hərəkətli
slightly	bir az
temporal	müvəqqəti
maxilla	çənə
coccux	büzdüm

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

Hydrostatic skeleton; exoskeleton; endoskeleton; the simplest type of skeleton; soft-bodied invertebrates; layer of flexible tissue; fluid-filled cavity; muscle fibers; made up of chitin; secreted by a layer of cell; molting; found in human and vertebrate; several important jobs; supports and gives it shape; make blood cells; connective tissue; blood vessels; supply bone cells with blood; compact bone; Haversian system; neighboring lacune; nerves servicing; mixture of the protein collagen and calcium photosphate; deposited by the osteocytes; builds bone and destroys bone; ends of bones; spongy or cancellous; strong and lightweight; red marrow bone; yellow marrow bone; growth hormone; pituitary gland; bone cells replaced cartilage; play important roles in the formation of bone; vitamin D is lacking; absorption decreases; vitamin A deficiency; growth rate of the bones; wrist bone; flexible connective tissue; lumbar vertebrate; immovable joints; slightly movable joints; pivotal joints; cranial bones; vertebral column; pectoral girdle; pelvis girdle; false ribs; floating ribs; upper extremities; lower exhemities; metacarpals; metatarsals; sternum; scapula; thorax.

II. Find out corresponding equivalents of the following word combinations into English:

Hidrostatik skelet; ekzoskelet (xarici skelet); endoskelet (daxili skelet); skeletin ən sadə tipi; onurğasızların yumşaq bədəni; elastiki toxuma qatı; maye dolu boşluq; əzələ fibrilləri; xitindən ibarətdir; birqat hüceyrə vasitəsiylə qorunur; qabıqdəyişmə; insan və onurğalılarda tapılır; bir neçə vacib vəzifələr; dəstəkləyir və forma verir; qan hüceyrələri əmələ gətirir; birləşdirici toxuma; qan damarları; sümük hüceyrələrini qan ilə təmin edir; sıx sümük; Havers sistemi; qonşu lakunlar; sinir təchizatı; kolloid zülal və kalsium fosfat qarışığı; osteositlər tərəfindən hopdurulur; sümük quran və dağıdan; sümük ucları; süngər yaxud törədici sümük; güclü və yüngül sümüklər; qırmızı ilik sümüyü; sarı ilik sümüyü; böyümə hormonu; hipofiz vəzi; sümük hüceyrələri qığırdağın yerini alır; sümüklərin formalaşmasında vacib rol oynayır; vitamin D olmaması; adsorbsiya azalır; vitamin A çatışmazlığı; sümüyün böyümə sürəti; bilək sümüyü; birləşdirici toxuma; bel fəqərəsi; hərəkətsiz oynaqlar; yarımhərəkətli oynaqlar; əsas oynaqlar; kəllə sümükləri; onurğa sütunu; döş qəfəsi və ya döş qurşağı; çanaq qurşağı; yalançı qabırğalar; sərbəst qabırğaları; yuxarı ətraf; aşağı ətraf; əldarağı arxası; ayaqdaraq arxası; körpücük sümüyü; kürək sümüyü; döş sümüyü.

III. Insert the definite or the indefinite article, read the sentences aloud and translate.

1. Lomonposov was ... founder.
2. Newton is known as ... discoverer of the laws of Motion.
3. Popov is ... inventar of radio.
4. Do you happen to know who was ... author of modern quantum meechanics?
5. My scientific adviser is ... distigueished scientist.
6. Hofkins was ... outstanding biochemist.
7. Bohr is one of ... most ingenious interpreters of his generation ... problems of modern theoretical physics.
8. Bohr’s great achievement was recognized internatio-

nally by ... Nobel prize award to him.

9. Mendeleyev discovered ... law of periodicity.
10. Copernicus developed his ... famous hypothesis.

IV. Answer the following questions:

For.ex. Guttenberg was the inventar of printing, wasn't he?

Yes (you're right; that's exactly), he is famous as the inventar printing.

1. Did Leo Tolstoy many novels?
2. Stratford – on – Avon is Shakespeare's birthplace isn't he?
3. Is Schroenger the creator of wave mechanics?
4. Did academician Pavlov advance the theory of conditioned reflexes?
5. Your native town has very beautiful architecture, hasn't it?

V. Translate the text without a dictionary trying to guess the meaning of the unfamiliar words from the context:

Biology gives as an acquaintance with the world of living things and an understanding of some of the great fundamental laws and processes of nature. There are many special fields of knowledge and many phases and priniciples to which elementary training in general biology is essential.

These include medicine, physiology, agriculture, horticulture, forestry, sanitation, hygiene and many others. Because man is an organism subject to the same laws which govern all living things and us built according to the same plan as higher animals, an elementary knowledge of biology gives us a basis for an understanding of our own body.

Movement in humans and other vertebrates is accomplished through the use of muscles that move parts of skeleton. Of the three general types of muscle tissue – cardiac, smooth and skeletal – only skeletal muscle is used for locomotion.

Muscles that move bones are called skeletal muscles. Two ends of a skeletal muscle are attached to bones. The attachments to bone are made by dense connective tissue straps called tendons. One attachment of the muscle, the origin, remains relatively stationary during a contraction. The other end of the muscle, the insertion, is attached to the bone that moves when the muscle contracts.

Muscles that cause the same action at a joint are synergists, while those that produce opposing actions are antagonists. Skeletal muscles usually act in opposing, or antagonistic, pairs. Figure 10 illustrates an example of such a pair in the combination of a flexor muscle (that bends a joint) and an extensor muscle (that straightens a joint) in the upper arm.

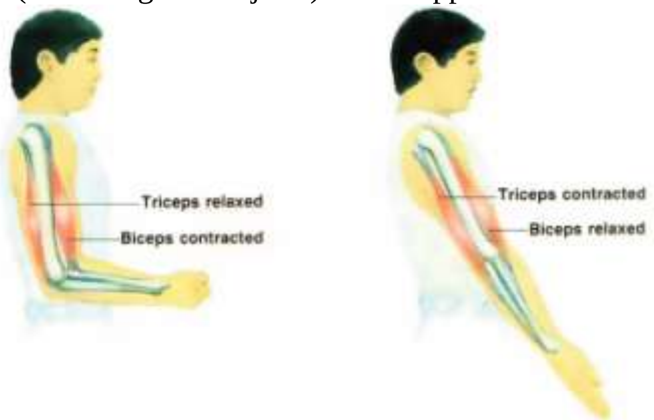

Figure 10 *Muscle actions*

The two muscles in the upper arm are biceps which is in the front of the arm, and triceps which is in the back of the arm. When one of the muscles contracts, the other muscle must relax so that movement can occur.

Types of muscles. The human body has three different kinds of muscle tissue. In addition to skeletal muscles, there are two other types of muscle: cardiac muscle and smooth muscle. Each kind of muscle tissue looks different and has a different job in the body (figure 11).

a) ***b)*** ***c)***

Figure 11 *Types of muscle: (**a**) skeletal muscle; (**b**) smooth muscle; (**c**) cardiac muscle*

Smooth muscle cells are named for their appearance. They are long and sharp-ended with a single central nucleus. Smooth muscle is found in the wall of blood vessels, the stomach, intestine and other internal organs (figure 11b). The contractions of smooth muscle are slow. Normally smooth muscles are involuntary. They are not controlled by brain. For example, we cannot make our stomach muscles work harder to digest food.

The walls of the heart are made up of cardiac muscle (figure 11c). Cardiac muscles pump blood through the heart and the rest of the body. Cardiac muscles perform their functions involuntary, similar to smooth muscle. Cardiac muscle constantly contracts and relaxes in a continuing rhythmic pattern. During the entire life of an individual, the only time that cardiac muscle rests is during a momentary pause before each contraction.

Cardiac muscle has no capacity to divide or regenerate. If damage occurs to the muscle, it is substituted by connective tissue.

Skeletal muscle (figure 11a) is often called striated muscle because of the presence of small cross stripes. The tissue of skeletal muscle consists of long, continuous fibers without clear separations between the cells. Skeletal muscle contracts more rapidly than cardiac or smooth muscle, and contractions are under voluntary control of brain. Each skeletal muscle contains numerous muscle fibers (figure 12a). Each muscle fiber encloses a bundle of 4 to 20 elongated structures called myofibrils (figure 12b). Each myofibril, in turn, is composed of filaments of the protein actin and myosin.

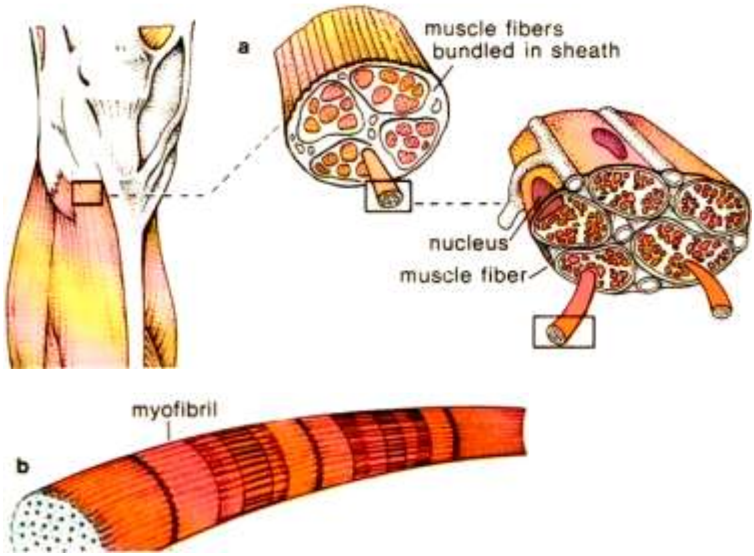

Figure 12 *The structure of skeletal muscle*

Muscular contraction occurs in three periods: latent period (the interval between the stimulation of muscle and the initiation of contraction), contraction (the interval between the initiation of contraction and the initiation of relaxation), relaxation (the interval between the initiation of relaxation and restoration of the original position).

New words and word combinations

accomplish	yerinə yetirmək
opposing	qarşıdurma
smooth	hamar
origin	mənşə
appearance	görünüş
involuntary	məcburi
fiber	lif
myofibril	miofibril
cardiac muscle	ürək əzələsi
enclose	dövrələmək
perform	yerinə yetirmək

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

Movement in humans; accomplished; cardiac; skeletal; muscles that move bones; attached to bones; dense connective tissue; the insertion; the muscle; synergists; flexor muscle; an extensor muscle; muscle contracts; types of muscles; human body; muscle tissue; cardiac muscle; smooth muscle; appearance; sharp; blood vessels; internal organ; involuntary; digest food; smooth muscles; pump blood; continuing rhythmic pattern; connective tissue; small cross shipes; separations; numerous muscle; encloses a bundle; elongated structures; composed of filaments; the initiation; contraction; relaxation; original position.

II. Find out corresponding equivalents of the following word combinations into English:

İnsanlarda hərəkət; həyata keçirildi; ürək; skelet əzələsi; sümükləri hərəkətə gətirən əzələlər; sümüklərə əlavə olunmuşdur; sıx bağlayıcı toxuma; yerləşdirmə; əzələ bağlayıcıları; sinerqistlər; saya əzələ; eninə zolaqlı əzələ; əzələ bağları; insan bədəni; əzələ toxuması; ürək əzələsi; saya əzələ; görünüş; kəskin; qan damarları; daxili orqan; məcburi; yemək yemək; mədə əzələsi; qan nasosu; davam edən vitamin naxış; əlaqəli toxuma; eninəzolaqlı əzələlər; ayrılıqları; çoxsaylı əzələ; uzununa quruluş; filamentlərdən təşkil olunması; daralma; istirahət; əvvəlki vəziyyət.

III. Answer the following questions using the words in brackets. Begin your answers with phrases as: as for as I remember; to my mind; certainly; it's hard to tel; probably; to tell the truth; of course; if I am not mistaken; as far as I know.

For.ex; Do you work hard? (be associated with).

Of course, I do. I'm associated with a team of researchers and all of us was rather hard.

1. What is Newton's main contribution to sciensce? (establish).
2. What activities is your scientific adviser engaged in (be head of; give lectures; write papers).
3. What is the main problem you're working at? (be concerned with; work under somebody).
4. What is Mendeleyev famous for? (advance, propose).
5. Are you working at this problem alone? (in collaboration with; research team).

IV. Answer the following questions.

1. Where were you educated?

2. Did you do further studies after graduation?
3. Did you move anywhere after graduation?
4. Have you ever given any lectures?
5. What part do you take in research carried on at your laboratory?
6. Who is head of your laboratory?
7. What is he distinguished for?
8. Is he received any awards?
9. What are your plans for the nearest future?

V. Translate the following sentences into Azerbaijani paying attention to the various meanings of "to have", "to be".

a) We are selecting seeds. These plants are improved by us. Variation in plants are the basis for plant improvement. They are at the University now but they are to meet here. The crop yields are to be increased this year.

b) He has made a very good report. He has a lot of literature on this subject. He has to translate a new article so he will have to work the whole evening.

c) You must read this book. You have to read this book. You should read this book. You are to read this book. You ought to read this book.

Unit 4. CIRCULATORY SYSTEM

The human circulatory system is made up of heart, blood vessels and blood.

Heart. At the center of the circulatory system lies the heart (figure 13). Weigh of heart in adult male approximately 280-340 gram, in female – 230-280 gram. Every day the human heart pumps 7200 liters of blood through the body.

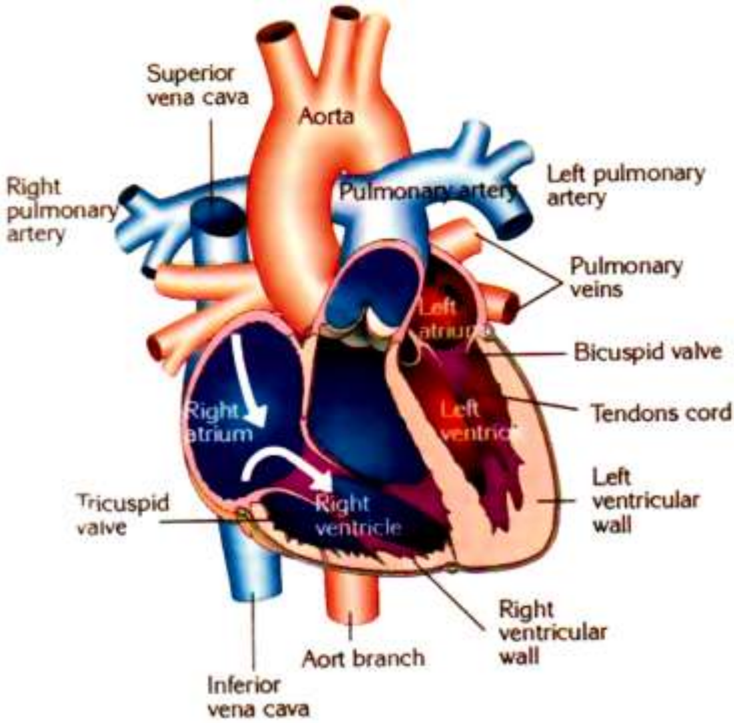

Figure 13 *The structure of heart*

The human heart is divided into left and right hemispheres separated by a thick muscular wall called the septum. Each side of the heart has an atrium, or upper chamber, and a ventricle, or lower chamber. The heart also has two pairs of valves. One pair is atrioventricular valves (AV), controls the opening between the atria and ventricles. The AV valve on the right side is the tricuspid valve, and the AV on the left side is the bicuspid valve. Another pair of valves together called the semilunar valves that control the exits of the ventricles to the arterial system. The pulmonary valve is located at the exit of the right ventricle. The aortic valve is located at the exit of the left ventricle. The function of all the valves is to prevent the backflow of blood and to keep the blood moving in one direction.

The heart is composed of three main layers: endocardium (inner layer of heart which prevents the erosion of heart during contraction and relaxation), myocardium (middle layer of heart which thicker on the left ventricle than on the right ventricle), pericardium (outer layer of heart which protects it from external hazards).

Heart is a hardworking organ that is pumping blood all the time. It relaxes and contracts in order to send blood to the tissues. Relaxation of the heart is known as diastole, while its contraction is termed systole. Each contraction and relaxation sequence of the atria and ventricles makes up a single heartbeat and is called the cardiac cycle. The contraction of the atria and ventricles is reversed: the atria relax when the ventricles contract. Likewise, the ventricles relax when the atria contract. Contraction of the right and left atria occurs at the same time. The contraction of ventricles is characterized by similar events.

Heartbeat rate can be determined by measuring the pulse rate because the two rates are equal. At rest, pulse rate is about 72 beats per minute. However, pulse rate may vary from person to person.

<u>Blood vessels</u>. Circulatory system has three kinds of blood vessels: arteries, veins and capillaries (figure 14).

Arteries have thick muscular wall that are strong and elastic. Each time the heart beats, blood is pushed through the arteries under high pressure. The elastic structure of arteries allows them to stretch as blood flows through. Their strong walls prevent blood pressure from bursting the arteries. All arteries, with the exception of the pulmonary arteries, carry oxygenated blood.

Veins have thinner walls than arteries. They are less muscular. The veins force the blood to move in one direction due to the presence of valves, and are located close to the body surface. The veins carry deoxygenated blood toward the heart.

Capillaries are non-muscular microscopic blood vessels with wall that are only one cell thick. Small molecules diffuse easily into or from the capillaries through this wall. Huge proteins such as plasma proteins cannot diffuse but may ooze into cells. Material exchange between blood and tissue is carried out at the capillaries.

Figure 14 *Blood vessels*

Types of circulation. There are two types of circulation in human: pulmonary and systemic (figure 15).

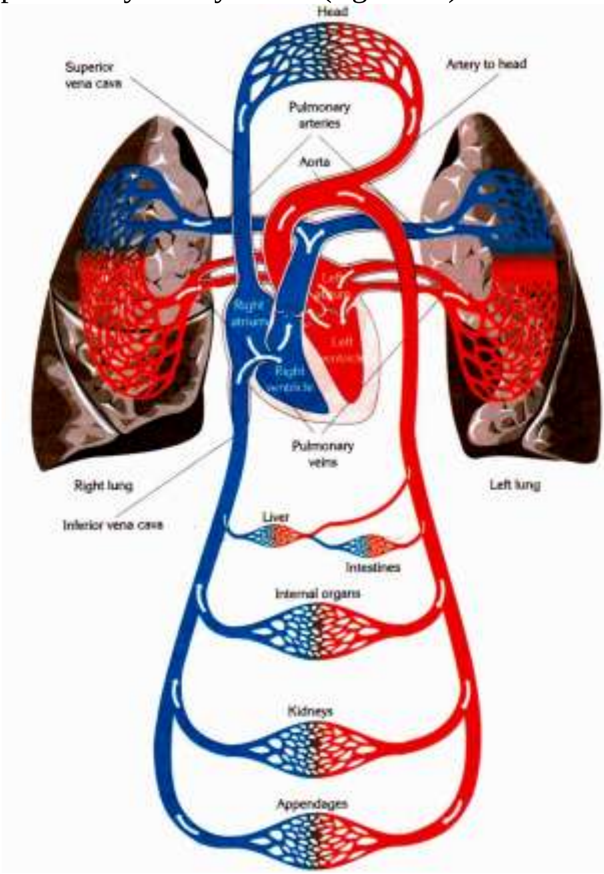

Figure 15 *Pulmonary and systemic circulation*

Pulmonary circulation of the blood occurs between the heart and the lungs. It is initiated with the contraction of the right ventricle and the pumping of deoxygenated blood into the pulmonary artery. Branches of the pulmonary artery transport blood into both lungs. In the lungs, CO_2 diffuses out of the blood onto the lungs, while O_2 diffuses in. The oxygenated blood is then carried into the left atrium by the pulmonary veins.

Systemic circulation of the blood occurs between the heart and all other parts of the body (except the lungs). It is initiated with the contraction of the left ventricle and the transport of oxygenated blood into the aorta, the largest artery in the body. The aorta branches off into arteries which carry blood to all parts of the body: carotid artery carries blood to the neck and head; femoral artery – to leg; brachial artery – to arm; renal artery – to kidneys; coronary artery – to heart. The deoxygenated blood is then transported by the superior and inferior vena cava into the right atrium.

Blood. Human has about 5 liters of blood in body. Blood consists of 55% plasma and 45% cells. The liquid part of the blood is called *plasma*. Plasma is a straw-colored liquid that is 90% water, 7-9% plasma proteins and 1% is amino acids, carbohydrates, lipids, hormones, salts, sugars and other substances.

Erythrocytes or *red blood cells* number about 5 million in 1 cubic millimeter (mm^3) of blood. Their red color comes from a red, iron-containing molecule called hemoglobin that forms a temporary chemical band with oxygen and transports it to body cells (figure 16).

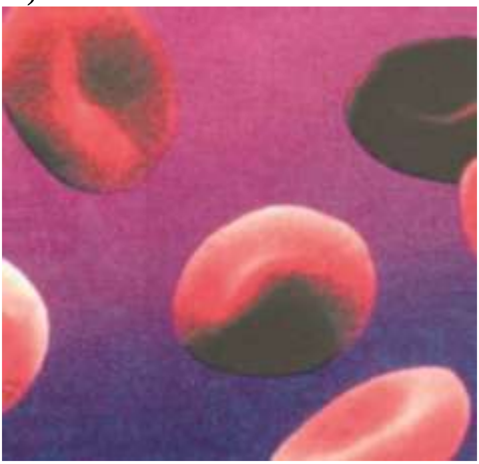

Figure 16 *Erythrocytes*

Erythrocytes live only about four months, so their numbers must be renewed constantly. New erythrocytes are produced in the red bone marrow of the long bones. When erythrocytes first form, they have all cell parts. However, as erythrocytes mature, they lose their nuclei, mitochondria, Golgi apparatus and endoplasmic reticulum. The lack of these organelles decreases the metabolism of the cell and increases cell's oxygen-carrying capacity. Since erythrocytes cannot renew they are removed from the circulation by the spleen and liver.

Leukocytes or *white blood cells* are larger than erythrocytes, have nuclei, almost colorless and do not have a definite shape (figure 17). Leukocytes are less than 1% of the cells in human blood. For every 1000 erythrocytes, there are only 1 or 2 leukocytes. Each cubic millimeter of blood contains about 6 thousands leukocytes. Leukocytes can migrate out of the capillaries into the tissue fluid. It allows them to defend the body against invasions by microorganisms and other foreign substances.

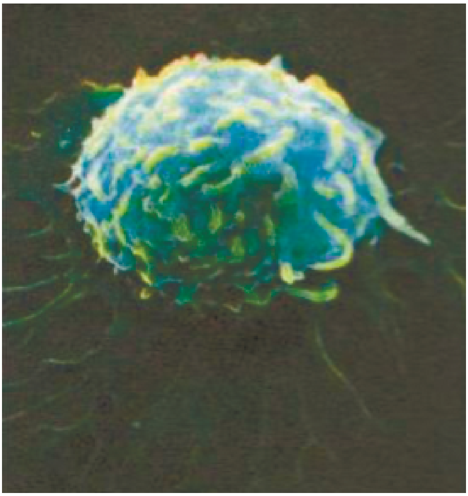

Figure 17 *Leukocyte*

There are two main groups of leukocytes according to their size, the shape of their nucleus and granules found in their cytoplasm: granular and nongranular.

Granular leukocytes include neutrophils, eosinophils and basophils, which are named according to the staining properties of granules in their cytoplasm.

Nongranular leukocytes include monocytes and lymphocytes.

All groups of leukocytes live 2-4 days and are produced in red bone marrow, spleen and in lymph nodes. Destroying of leukocytes occur in spleen and in the source of inflammation.

Neutrophils are the most numerous (60-70%) of the leukocytes, followed in order by lymphocytes, monocytes, eosinophils and basophils. When tissue is damaged, neutrophils leave the blood capillaries and accumulate at the site of injury. They are soon joined by monocytes which change into macrophages (large phagocytic cell) within the loose connective tissues. Phagocytosis (destroying pathogens) by the neutrophils and macrophages helps to eliminate many disease-causing organisms that may have entered the body through the wound.

The lymphocytes are active in the immune responses that protect the body against infectious agents and foreign substances (transplanted organs).

Eosinophils aid in defense against parasitic infections and play a role in allergic responses.

Basophils cannot phagocytose particles, but can secrete heparin and histamines. These chemicals are released during the long-term inflammation.

Thrombocytes or *platelets* number about 250 thousands cell in 1 mm^3 of blood. They originate from red bone marrow and destroy in spleen. Thrombocytes live 8-11 days. They are non-nucleated and white in color.

Thrombocytes play an important role in blood clotting. When a blood vessel is broken, the injured cells send out chemical signals. The chemicals cause thrombocytes to go to the injured area. Clotting begins when thrombocytes come in contact with a torn tissue. The thrombocytes become sticky and attract more thrombocytes, forming a plug that partially seals the wound. The thrombocytes also release substances that, acting with chemicals in the plasma known as clotting factors, begin the chain of reactions (figure 18). As a result of these reactions, a substance called prothrombin activator is formed. In the presence of calcium ions prothrombin activator catalyzes the conversion of prothrombin (plasma protein) to thrombin. Clotting is made possible by globular proteins, synthesized in the liver, known as fibrinogen. Thrombin then acts as an enzyme to convert the soluble plasma protein fibrinogen to its insoluble form, fibrin. Fibrin forms a network of threads that trap additional thrombocytes that form the clot.

Blood groups. The four main blood types in human are I (O), II (A), III (B), IV (AB). Blood type depends on the presence or absence of antigens on the membrane of erythrocytes and antibodies in the plasma of blood.

I (O) blood group: erythrocytes have not antigen, plasma has antibodies *a* and *b*.

II (A) blood group: erythrocytes have antigen *A*, plasma has antibody *b*.

III (B) blood group: erythrocytes have antigen *B*, plasma has antibody *a*.

IV (AB) blood group: erythrocytes have antigens *A* and *B*, plasma has not antibody.

If certain blood types are mixed together, the antibodies and antigens join together and form clumps. For example, if type A blood is mixed with type B blood, antibody *b* clumps with antigen *B* and antibody *a* clumps with antigen *A*. The clumps can block blood vessels and lead to death.

I (O) blood group can be given to all other groups because it has no antigens to be destroyed. This blood group is known as universal donor.

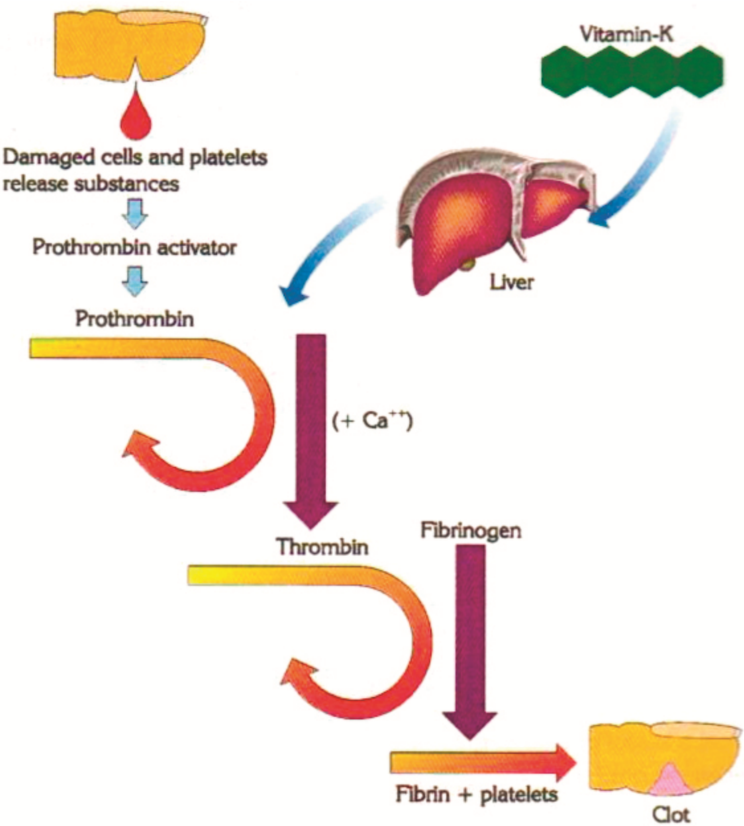

***Figure 18** Mechanism of blood clotting*

IV (AB) blood group can receive any type of blood because it has no antibodies in the plasma. This blood group is known as universal recipient.

Lymphatic system. As blood flows through the capillaries, it loses fluid. Some of this fluid does not return to the circulatory system but is, instead, picked up by the lymphatic system. The fluid in the lymphatic system which contains water, large protein molecules, fats, salts and other substances, is called lymph. Lymph fills the spaces between and around all of body cells. Lymph has a different makeup from plasma because some of the substances in plasma cannot pass though the capillary walls.

The lymphatic system is made up of the lymph nodes, lymph capillaries and lymph vessels. Lymph passes through the walls of small lymph capillaries into larger lymph vessels. Finally, all of the lymph fluid empties from the two largest lymph vessels into the bloodstream at veins near the heart (figure 19). Scattered along the tubes of the lymphatic system are small bean-shaped structures called lymph nodes. The lymph nodes clean and filter lymph before it returned to the blood. The lymph nodes also produce white blood cells that fight disease. When organism has an infection, the lymph nodes get bigger because they are producing more white blood cells.

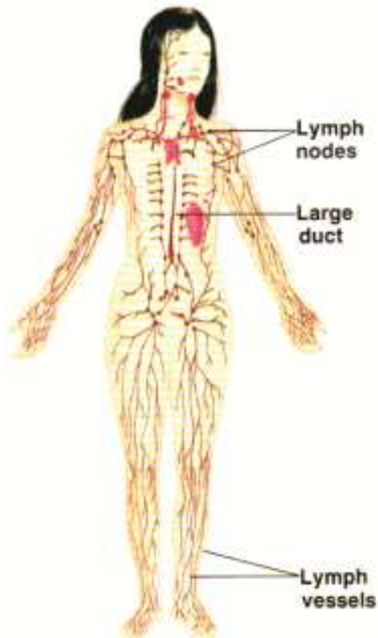

Figure 19 *Lymphatic system*

New words and word combinations.

hemisphere	yarımkürə
chamber	kamera (ürəkdə)
aorta	aorta
pulmonary artery	ağciyər arteriyası
pulmonary veins	ağciyər venası
branch	şöbə, hissə
ventricular wall	mədəciyin divarı
pulse	nəbz
thinner	nazik
vessel	damar
prevent	qarşısını almaq
external hazard	xarici təhlükə
non-muscular	qeyri əzələli
valve	klapan, qapaq
carotid artery	yuxu arteriyası
renew constantly	davamlı yenilənmə
spleen	dalaq
inflamination	iltihab
lymph nodes	limfa düyünləri
fluid	maye
disease	xəstəlik

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

Circulatory system; blood vessets; atrioventricular valves (AV); aortic valve; the function of the valves; relaxation of the heart; cardiac cycle; blood vessels; thick muscular wall; high pressure; pulmonary arteries; exception of the pulmonary arteries; non-muscular; cell thick; huge proteins; plasma proteins; types of circulation; pulmonary circulation of the blood; all the part of the body; the largest artery; superior vena; inferior vena; liquid part of blood; red blood cells; chemical band; body cells; long bones; bone marrow; Golgi apparatus; Endoplasmatic reticulum; as erythrocytes mature; white blood cells; tissue fluid; lymh nodes; source of inflamination; blood clotting; clotting factor; blood groups; antibodies in the plasma of blood; universal donor; universal recipient; lymph-capillaries; lymph vessels; blood stream; bean shape.

II. Find out corresponding equivalents of the following word combinations into English:

Qan-damar sistemi; qan damarları; Atrioventikulyar qapaq; aorta aypara qapağı; qapaqların funksiyası; ürəyin istirahəti; ürək tsikli (ürək döyüntüsü, nəbz); qan damarları; nazik əzələ divarı; yüksək təzyiq; ağciyər arteriyası; ağciyər arteriyası istisna olmaqla; əzələsiz; hüceyrə divarı; iri zülallar; plazma zülallar; qan dövranın tipləri; kiçik qan dövranı; bədənin bütün hissələri; ən böyük arteriya; yuxarı vena; aşağı vena; qanın maye hissəsi; qırmızı qan hüceyrələri; kimyəvi rabitə; bədən hüceyrələri; uzun sümüklər; sümük iliyi; Holci aparatı; Endoplasmatik şəbəkə; eritrositlər yetişən kimi; ağ qan hüceyrələri; toxuma mayesi; limfa düyünü; iltihab qaynağı; qanın laxtalanması; laxtalanma faktoru; qan qrupları; qan plazmasının anticismi; universal donor; universal resipient; limfa kapilyarları; limfa damarları; qan axını; lobya şəkilli.

III. Answer the questions using the verb attend or visit:

1. How many people were present at the lecture on polymers?
2. Are you going to be present at the next seminar on Dickens?
3. Have you called on your collague at the hospital?
4. Have you seen the new exhibition?
5. Did you go to English classes last year?

IV. Insert the verbs attend or visit, advise or consult:

1. All children over seven must … school.
2. Have you … this exhibition?
3. Many foreign tourists … our country every you ear.
4. The problem you are studying is rather difficult. Did you … your scientific adviser on this point? What did he … you?
5. Who … you to use this method?
6. Did your supervisor /// you to read your paper at the conference?
7. Did the doctor … you to take your leave now?
8. Are you going … your scientific adviser on how to do the calculations?

V. Find the subject and the predicate and put questions to all parts of the sentence:

1. Most of the animals have great importance for man.
2. Bodies of plants and animals contain inorganic substances.
3. We shall consider plants and animal together.
4. Biology has become more dependent on other sciences.
5. Certain vital processes take place in plant body every season.
6. These plants differ greatly in size.

Unit 5. RESPIRATORY SYSTEM

Respiration is the exchange of gasses between an organism and its environment.

Respiration and breathing are related, but they are not the same process. Respiration is a chemical process in which oxygen combines with food to produce energy. Breathing is a mechanical process in which air enters and leaves the body. The organs that make breathing possible are the rib muscles and the diaphragm (muscle located between the chest cavity and the abdomen). These muscles act together to change the size of the chest cavity. Changes in the size of the chest cavity affect gas pressure in the lungs. As the volume of the chest cavity increases, the air pressure within the chest cavity decreases. The air pressure inside the chest cavity becomes much lower than the air pressure outside the body. Air rushes in to fill the lungs. The lungs stop filling with air when the air pressure inside the chest cavity is equal to the air pressure outside the body.

When we breathe, the amount of air moved in (inhale) and out (exhale) with each breath is called the tidal volume. Normally, the tidal volume is approximately 500 ml. But we can increase the amount of air by deep breathing. The maximum volume of air which can be moved in and out with each breath is called vital capacity. Inside the lungs may stay 1000-1500 ml of air (residual air) after exhaling. Inspiration volume can be increased up to 3100 ml. After normal exhaling we can exhale reserve volume is about 1000-1400 ml. Vital capacity is the sum of all volumes is about 5-6 liters.

The human respiratory system is made up of the lungs and the tubes and passageways through which air moves (figure 20).

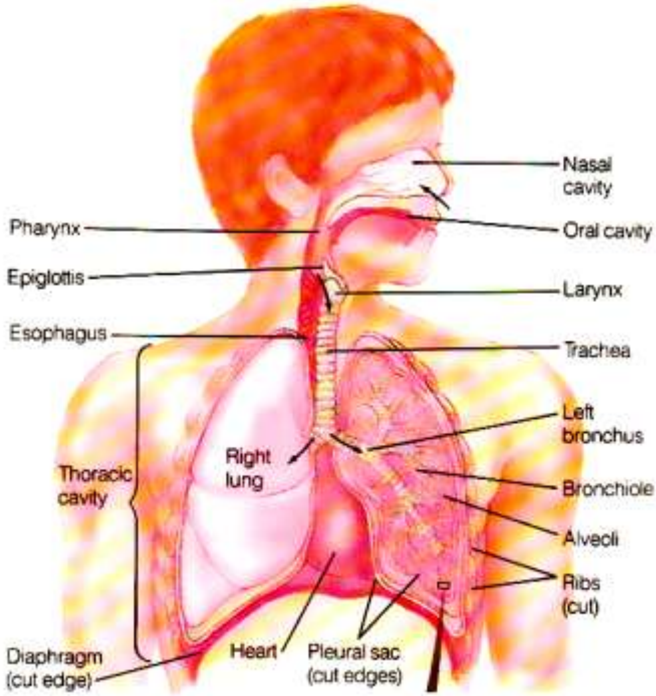

***Figure 20** The human respiratory system*

Atmospheric air is usually dry, sometimes cold and often dirty. Air moving through the nasal cavity is filtered and moistened. The nasal cavity is lined with two kinds of cells. One kind of cell secretes mucus which traps dirty particles in the air and also protects the respiratory tissues from drying out. The second kind of cell in the nasal cavity is lined with tiny hairlike structures called cilia. As the cilia move back, mucus is pushed back toward the nostrils.

Air that has passed through the nose or mouth enters the pharynx, or throat. The pharynx is a pathway for food and air. The pharynx branches into a pair of tubes: one, the esophagus, leads to the stomach, other, the windpipe, or trachea, leads to the lungs.

At the top of trachea lies the larynx, or voice box. It is made of cartilage. The larynx contains two vocal cords. The voice is produced by the vibration of the vocal cords when air flows over them. In speech, the vocal cords move closer to each other, whereas they move away from each other when speech is finished (figure 21).

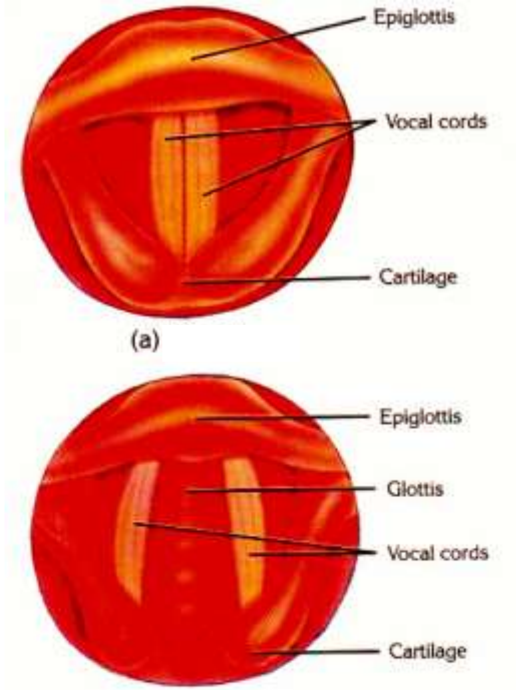

Figure 21 *Position of larynx*

The larynx is constantly open, except during swallowing, when the epiglottis (flap of tissue) lowers and covers the trachea to prevent food from entering it. When we inhale, the epiglottis raises and air move into the trachea.

Air that has passed through the larynx enters the windpipe, or trachea which is made up of rings of cartilage and smooth muscle. The trachea, like the nasal cavity, is lined with two kinds of cells. Function of these cells same as in nasal cavity.

The lower end of the trachea divides into two hollow passageways called bronchi. Walls of the bronchi contain rings of cartilage and smooth muscle. Each bronchus extends into a lung. The lungs are located in the thorax. The right lung has three lobes, whereas the left lung has two. Both lungs are surrounded by thin membrane known as pleura. Within the lung, the bronchus branches into bronchioles the walls of which are made only of smooth muscle. Each bronchiole ends in a cluster of tiny air sacs, the alveoli. Each lung has million of these alveoli, and the walls of the alveoli are richly supplied with capillaries.

The important part of the respiratory process is exchange of gases (oxygen and carbon dioxide) between the alveoli and the bloodstream (figure 22). The air coming into the alveoli of the lungs has high concentration of oxygen and a low level of carbon dioxide, so oxygen diffuses from the alveoli into the blood. As the iron atoms in the hemoglobin molecules combine with oxygen, the hemoglobin becomes bright red and is called oxyhemoglobin. Oxyhemoglobin is transported to the tissues. When the concentration of oxygen in the intercellular spaces is low, oxygen is released from its weak chemical combination with hemoglobin, leaves the erythrocytes, and diffuses into the tissues. At the same time, carbon dioxide produced during respiration diffuses out of the body cells. About 10% of carbon dioxide dissolves in the plasma. The rest is picked up by the erythrocytes, combines with hemoglobin to form carboxyhemoglobin. The hemoglobin becomes darker red in color. The carboxyhemoglobin is then carried by the blood back to the lungs. It diffuses into the alveoli and is exhaled to the external environment.

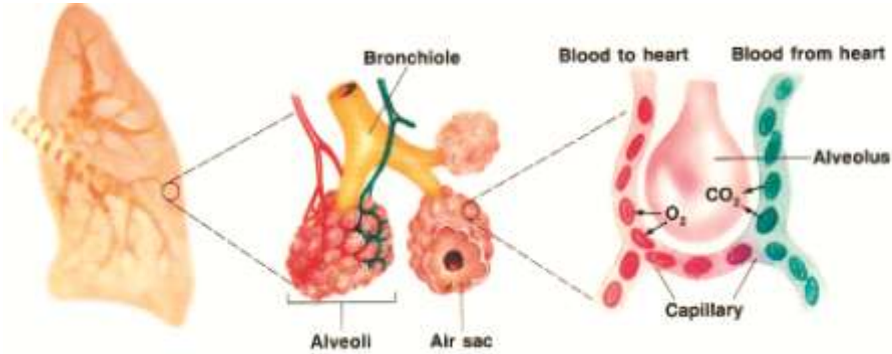

Figure 22 *Gas exchange in the lungs*

New words and word combinations.

respiratory	nəfəs, tənəffüs
breathing	nəfəs almaq
fill	doldurmaq
approximately	təxmini
vital	mühüm, həyati
exhale reserve	nəfəs ehtiyatı
nasal cavity	burun boşluğu
oral cavity	ağız boşuluğu
larynx	qırtlaq
trachea	nəfəs borusu
pleural sac	plevra qişası
thoracic cavity	döş boşluğu
vocal cords	səs telləri
windpipe	nəfəs borusu
air sacs	hava kisəcikləri
mucus	selik
nostril	burun deşiyi
exhale	buxarlanmaq
diffuse	diffuz

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

Respiratory system; breathing related; tidal volume; vital capacity; exhale reserve volume; nasal cavity; oral cavity; larynx; pharynx; epiglottis; right lung; left bronchus; bronchiole; alveoli; pleural sac; diaphragm; mucus is pushed; windpipe; vocal cords; cartilage; trachea; smooth muscle; bronchi; lung; air sacs; iron atoms; hemoglobine; oxyhemoglobin; carboxyhemoglobin; exhaled; external environment; darker red; blood; carbon dioxide; bloodstream; erythrocytes; body cells; left lung.

II. Find out corresponding equivalents of the following word combinations into English:

Tənəffüs sistemi; tənəffüslə bağlıdır; dəyişən həcm; həyat tutumu; ehtiyat hava həcmi; burun boşluğu; ağız boşluğu; qırtlaq; əsnək; qırtlaq qapağı; sağ ağciyər; sol bronx; bronxiol; alveol; plevra qişası; diafraqma; itələnən selik; nəfəs borusu; səs telləri; qığırdaq; traxeya; saya əzələ; bronx; ağciyər; hava kisələri; dəmir atomları; hemoqlobin; oksihemoqlobin; karboksihemoqlobin; buxarlandırmaq; xarici mühit; tünd qırmızı; karbon qazı; qan axını; eritrositlər; bədən hüceyrələri; sol ağciyər.

III. Translate the following sentences:

1. I was greatly impressed by what I heard in your talk.
2. We were greatly impressed by the way he conducted his experiment.
3. I was greatly impressed by the sights of your city.
4. Am I to understand that your scientific adviser is on leave now?
5. For all I know he is an exhibition to the North.

IV. Answer the following questions:

1. What do you do to learn philosophy?
2. What do you do if you feel unwell?
3. What do you do if you encounter difficulties when solving some problem?
4. What Institute did you graduate from?
5. How long have you been working at this lab?
6. When did you finish school?
7. What do you do if you come across an unfamiliar word in your text?
8. Are you familiar with modern views on atomic structure?
9. When did you get acquainted with this thesis?
10. Did the speaker impress the audience?

V. Read the text; guess the meaning of the unfamiliar words from the context:

In external appearance, plants are usually green. Some plants have and colourful flowers and others have no apparent blossoms. Among animals there is great variety of sizes, shapes and colours. The basic difference between plants and animals lies in the unit of structure and function of each, namely, the cell. Plant cells have a cell wall which is actually non-living in chemical nature. Animal cells do not have this.

Unit 6. DIGESTIVE SYSTEM

Digestion is the mechanical and chemical breakdown of food into small molecules that the organism can absorb and use. The physical breakdown of food into small pieces is called mechanical digestion. Chemical digestion is the process by which large food molecules are broken down into smaller molecules.

In the digestive system, enzymes (proteins) control chemical reaction in the body, including chemical digestion of food. Enzymes speed up chemical digestion. It combines temporarily with the large molecules in food and breaks them apart into smaller molecules. Each enzyme can break down only one specific kind of food molecule. For example, enzymes which break down fats have no effect on carbohydrates and proteins. In the digestive system, enzymes are produced in liquids called digestive juice.

The digestive system is made up of organs located in the alimentary canal and other organs that aid in digestion (figure 23). Alimentary canal is made up of five parts: mouth, esophagus, stomach, small intestine and large intestine. Other digestive organs, such as salivary glands, liver, pancreas and gallbladder do help with digestion. They are called accessory digestive organs.

Food enters the digestive system through the oral cavity, which is bounded by teeth, tongue and palate. Here the chewing action of teeth begins the mechanical breakdown of food.

Human has four different kinds of teeth: incisors, canines, premolars and molars (figure 24).

Each kind of tooth has a different function. The incisors and canines cut and tear food. The premolars and molars grind and crush food. The final molars to emerge at the age of 20, and are known as the wisdom teeth. An adult has a total of 32 teeth.

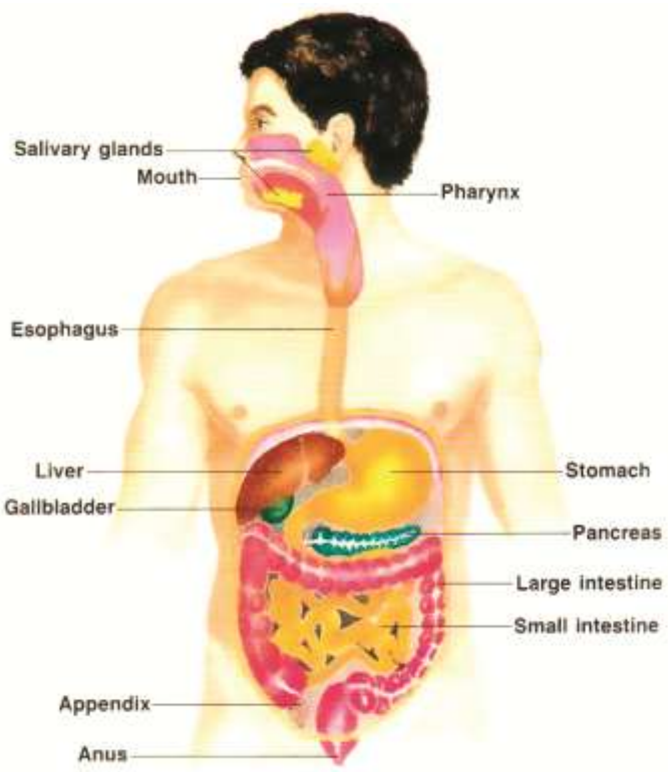

Figure 23 *Digestive system*

The tongue mixes food with a mucous solution, saliva. Three pairs of salivary glands secrete saliva into the mouth through salivary ducts (figure 25). They are sublingual glands (under the tongue), parotid glands (near the ear), and submandibular glands (under the low jaw). 1000-1500 ml of saliva is secreted from these glands every day. Saliva contains primarily mucus and water which moistens and lubricates the food so that it is easier to swallow. Saliva also contains the enzyme salivary amylase, which initiates the breakdown of the polysaccharide starch into the disaccharide maltose.

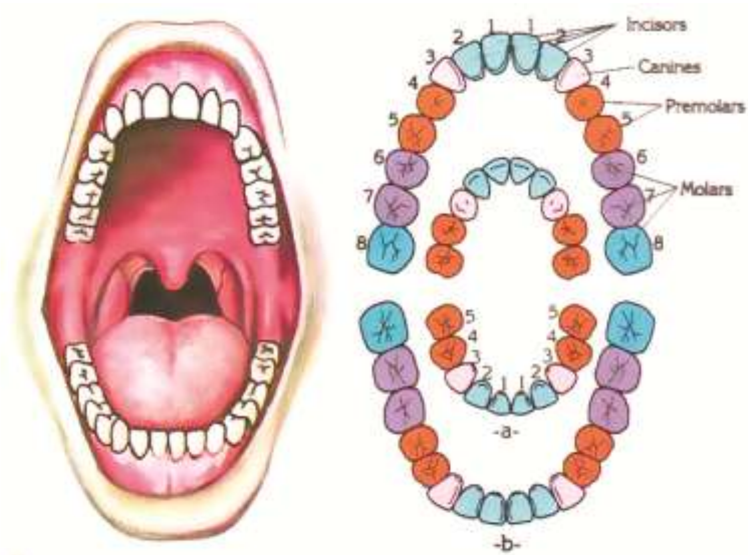

Figure 24 *Position of teeth: (**a**) milk teeth; (**b**) adult teeth*

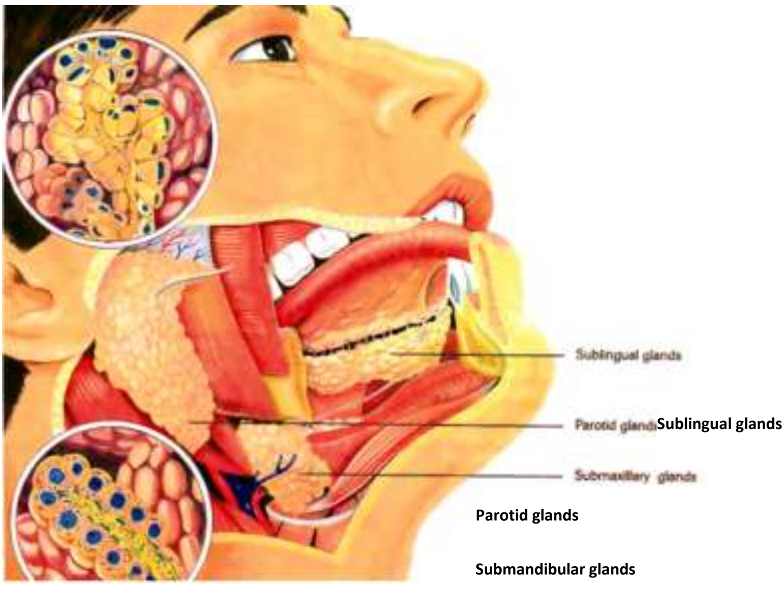

Figure 25 *Position of salivary glands*

When food is swallowed, it enters the pharynx or throat. The pharynx is a passageway for both food and air. A flap of tissue called the epiglottis is located at the end of pharynx. During swallowing epiglottis lowers and covers the opening to the trachea and food enters the esophagus (figure 26). Length of esophagus is about 25 cm. The wall of esophagus is lined with cells that secrete mucus. Mucus helps food move easily through the esophagus. Rhythmic and wavelike contraction of muscles move the food to the stomach through a process called peristalsis.

Figure 26 *Position of epiglottis*

The stomach is a large, J-shaped, baglike portion of the digestive tract (figure 27). The point where the stomach and the esophagus are connected is known as cardiac sphincter is a valve through which food enters the stomach.

In the stomach take place mechanical and chemical digestion. The stomach wall has three layers of smooth muscles: circular, longitudinal and oblique. Each layer contracts in different direction, causing the stomach to twist and churn its contents. These actions help break up food into smaller pieces (mechanical digestion).

The strong churning action of the stomach also mixes food with gastric juice which made by the stomach (chemical digestion). Gastric juice contains three substances: mucus, pepsin and hydrochloric acid. Pepsin is an enzyme that begins the chemical digestion of proteins. Hydrochloric acid is a strong acid. It is needed for pepsin to work because pepsin can only work in an acid environment. Hydrochloric acid also kills bacteria in the stomach and helps to break up food. Mucus protects the lining of the stomach from both hydrochloric acid and pepsin. Food leaves the stomach in the souplike form called chyme. The point where the stomach and the small intestine are connected is known as pyloric sphincter which regulates the movement of chyme into the duodenum.

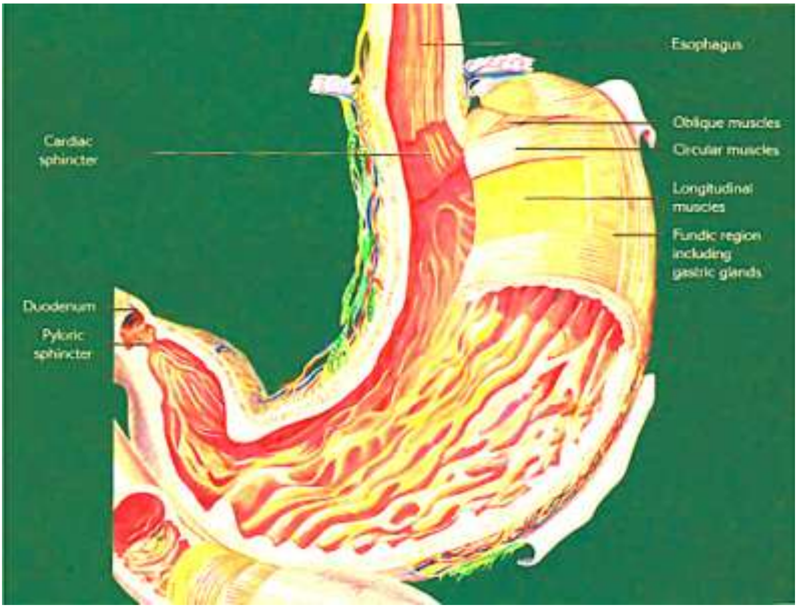

Figure 27 *The structure of stomach*

Most of the chemical digestion of food and some of the absorption of nutrients take place in the small intestine. It is a coiled tube that is about 6 m long and 2.5 cm in width. Chyme moves through the muscular wall of small intestine by peristalsis.

The small intestine is divided into three parts: duodenum, jejunum and ileum.

The duodenum is most active digestive part of the small intestine. The ducts from the pancreas and liver are attached to duodenum.

When chyme enters the duodenum, a hormone called secretin is secreted by the cells of the duodenum. This hormone enters the bloodstream and circulates to the pancreas where is stimulates the gland to produce and secrete pancreatic juice. Enzymes of pancreatic juice help break down proteins, fats and carbohydrates into simpler forms: trypsin breaks down proteins, lipase – fats and amylase – carbohydrates (table 1).

Table 1

Carbohydrates	→	change to	→	simple sugars
Proteins	→	change to	→	amino acids
Fats	→	change to	→	fatty acids and glycerol

Liver is the largest gland in human body. It weighs about 2 kg. One of the liver's most important functions is to produce bile which is stored in the gallbladder, a small, pear-shaped sac on the underside of the liver. Bile contains bile pigments and bile salts which emulsify fat. Because fats are insoluble in water, they enter the duodenum as drops within the watery chyme. The bile salts which are partly lipid-soluble and partly water-soluble, work like detergents, dispersing the large drops of fat into smaller droplets. This emulsification process produces a greater surface area of fat upon which the lipase enzyme (pancreatic enzyme) can act and splits fat into fatty acids and glycerol.

The jejunum is located directly after the duodenum. The important function of the jejunum is the absorption of nutrients into the blood. The inner lining of the jejunum is folded. The folds have million of tiny fingerlike projections called villi. The many folds and villi increase the surface area for absorption. Each villus contains capillaries and lymph vessels (figure 28). Simple sugars, amino acids, minerals and vitamins pass through the cells of the villi and enter the capillaries by active transport and diffusion. The products of fat digestion also pass through the cells of the villi but they enter the lymph instead of the capillaries. Bile salts aid in the absorption of fatty acids by the lymph vessels. Eventually the lymph vessels conduct the fatty acids into the bloodstream.

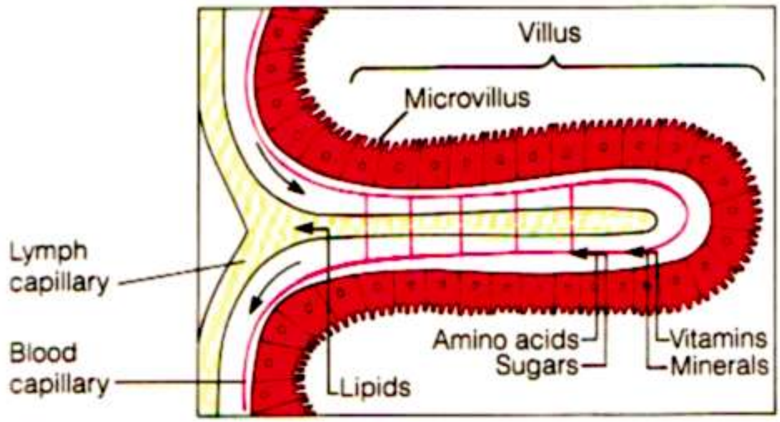

Figure 28 *The structure of villus*

The ileum is the final part of the small intestine where it connects to the large intestine. The ileum and large intestine are separated by a valve which prevents the back flow of food from the large intestine to the small intestine.

The large intestine, or colon, is much shorter (2m) than small intestine. It is called "large" only because of its larger diameter. The large intestine starts with the cecum which is relatively small in humans compared with that in other mammals. A vestigial structure called the appendix extends from the cecum (figure 29). The undigested material that enters the large intestine contains a lot of water and minerals. In the large intestine, water and minerals are absorbed into the blood. The feces, or remaining solid waste materials, move into the lower part of the large intestine called rectum. Wastes are stored temporarily in the rectum until they are eliminated from the body through the anus.

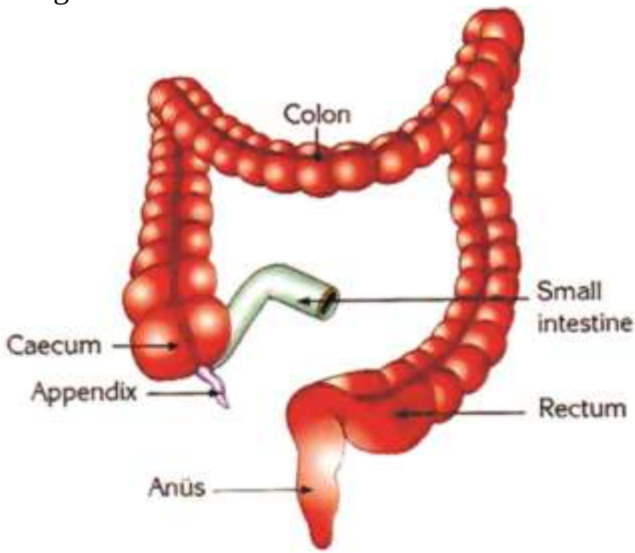

Figure 29 *The structure of large intestine*

Vitamins

Vitamins are organic compounds that found naturally in many foods. They do not supply energy. Human needs vitamin in small amounts for normal growth and metabolism.

Vitamins are placed in two categories depending on whether or not they can be dissolved in water. The water-soluble vitamins which usually are not retained in the body are B-complex vitamins and vitamin C. The fat-soluble vitamins which can be retained in the body are vitamins A, D, E and K (table 2). With the exception of vitamins D, vitamins can not be synthesized in the human body, and must be directly absorbed to the blood without undergoing a chemical change. Vitamin D is made by human body from ultraviolet rays of sun.

Table 2

FAT-SOLUBLE VITAMINS		
Vitamin	Needed for:	Best Sources
A (retinol)	Healthy teeth, bones, skin, and eyes	Orange and dark green vegetables, eggs, fruit, liver, milk
D (calciferol)	Strong bones and teeth	Eggs, milk, made by the skin in sunlight
E (trocopherol)	Formation of blood cells; reproduction	Leafy vegetables, vegetable oils
K	Blood clotting	Green vegetables, tomatoes
WATER-SOLUBLE VITAMINS		
C (ascorbic acid)	Healthy bones and skin; healing	Citrus fruits, dark green vegetables
B_1 (thiamine)	Use of carbohydrates; healthy heart and nerves	Liver, pork, whole grain foods
B_2 (riboflavin)	Use of nutrients, growth	Eggs, green vegetables, milk
B_3 (niacin)	Use of protein; energy	Beans, chicken, eggs, tuna
B_6 (pyridoxine)	Formation of red blood cells; healthy nervous system	Bananas, fish, spinach, whole grain foods
B_{12} (cobalamin)	Formation of red blood cells; healthy nervous system	Eggs, meat, milk

New words and word combinations.

breakdown	bölmək, qırmaq
enzyme	ferment
molar	azı dişi
canine	köpək dişi
pepsin	pepsin (ferment)
incisor	kəsici diş
fatty acid	yağ turşusu
jejunum	nazik bağırsaq
bile	öd
colon	bağırsaq
villus	bağırsaq xovu
fold	büküş, qat
fingerlike	barmaqvari
surface	səthi
mammals	məməlilər
rectum	düz bağırsaq
fat soluble	yağda həll olan
dissolve	həll etmək

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

Breakdown of food; speed up; temporarily; made up; alimentary canal; small intestine; salivary gland; gallbladder; accessory digestive system; oral cavity; mucous solution; secreted from; salivary ducts; sublingual glands; inhitates; passageway; wavelike; contraction; J-shaped; baglike; portion; cardiac; valve; take palace; smooth; circular; longitudinal; oblique; contract; twist; churn; content; break up; chewing action; hydrochloric acid; having; souplike; regulate; movement; duodenum; nutrients; coiled tube; bloodstream; insoluble; liquid-soluble; dispersing; droplets; emulsication; surface area; fingerlike; projections; increase; lymph vessels; pass through; instead of; back flow; vestigial structure; undigested material; remaining; water-soluble.

II. Find out corresponding equivalents of the following word combinations into English:

Qəza, sürət, təcili; müvəqqəti, keçici; ayrı-ayrı, yanaşı; yağ; maye cisim; qida borusu, qidalanma; qida borusu; nazik bağırsaq; tüpürcək; öd kisəsi; həzm sistemi; ağız boşluğu; kəsici dişlər; köpək dişlər; kiçik azı dişlər; selikli məhlul; ifraz etmək; ağız suyu axacaqları; əsasən; nəmlətmək; məlhəm; udmaq; başlanğıcını qoymaq; nişasta; əsnək; boğaz; keçid yolu; ahəngdar, ritmik; dalğavari; daralma; J-formalı; kisə kimi; iştirak etmək; hamar, düzəltmək; həlqəvi; uzununa; çəpinə; müqavilə, daraltmaq; qıvrılmaq, büküm; məzmun, kifayətləndirmək; altdan yuxarı qırmaq; çalxalama hərəkəti; sup kimi; nizamlamaq; hərəkət; onikibarmaq bağırsaq; qidalandırıcılar; qırılmış boru; en; öd əmələ gətirmək; acı bağırsaq; qalça bağırsaq; kanallar; hormonal; ifraz etmək; saxlamaq, ehtiyat görmək; armud formalı; kisə; emulsiya olunmaq; həll olunmayan; əridilə bilən, həll olan; damlacıqlar; yerüstü sahələr; üzərinə, əsasən; akt, hərəkət etmək; barmaq kimi; çıxıntılar; artırmaq, çoxaltmaq; limfa damarları; içindən keçmək; zülalların kimyəvi həzm olunması; yağ turşuları; qarşısını almaq, hidroxlorid turşusu; axına əks, cərəyana əks; qalın bağırsaq; suda həll olmuş müqayisə etmək, qarşılaşdırma; qalıq quruluşlar; üzvi maddələr; həzm olunmayanlar, nəcis; qalıqlar; normal inkişaf; tullantılar; azaltmaq; düz bağırsaq; müvəqqəti; aradan qaldırmaq; kimyəvi dəyişikliyə məruz qalaraq; suda həll olan; məruz qalmaq; davam gətirmək; ultrabənövşəyi şüalar

III. Using the questions make up a talk about yourself.

1. When were you born?
2. Who were your parents?
3. Where and when did you attend school?
4. When did you graduate from the Institute?
5. How did you study at the University?
6. When did you get familiar with … views on …?
7. Have you already collected and arranged necessary data (facts, observations).
8. When do you usually consult your scientific adviser?
9. Are you always for the same opinion on all the problems concerning your field or do your opinions sometimes differ?
10. Do you correspond with any foreign scientist?
11. You attend all the laboratory seminars, don't you?
12. Are you familiar with current problems discussed at these seminars?
13. What problems are you especially interested in?
14. Have you written any joint papers with any of your colleagues?
15. Did you take part in the work of the student's learned society when an undergraduate?

IV. Using the phrases give a survey of your current research.

1. spend some years in the study of …
2. devote oneself to …,
3. be appointed.
4. with rich stores of knowledge.
5. be impressed by
6. abandon ideas as to the causes of
7. correspond with…

8. write an outline on …
9. explain one's view
10. work independently of each other
11. develop identical theories
12. read a joint paper
13. differ in some opinion
14. collect and arrange facts
15. base the theory of … on …

V. Translate the text into Azerbaijani and then back into English, compare your version with the original:

Living things are all about us. More than a million different kinds of plants and animals inhabit the earth. Some are our friends, others are our enemies. Some are very large and some are very small. Yet each is a distinct organism, and each has its own way of living.

Suppose you were asked to learn the names, of all the living things on the earth. Try to do it. No, you couldn't do it; no one could. Fortunately, there are groups of animals and groups of plants that greatly resemble each other. Because of this fact living things may be classified into large groups.

To study living things, it is necessary to sort them into groups. About a million and a half different kinds of plants and animals have already been studied, identified and named. In fact, for people who have not studied biology, the living world is a hopeless conglomeration of individual plants and animals.

Unit 7. EXCRETORY SYSTEM

Excretion is the process by which waste products are removed from the body. Wastes are made as a result of chemical processes in cells.

In the excretion of wastes take part kidneys, lungs, intestine and skin.

The human excretory system is composed of kidneys, ureter, urinary bladder and urethra (figure 30).

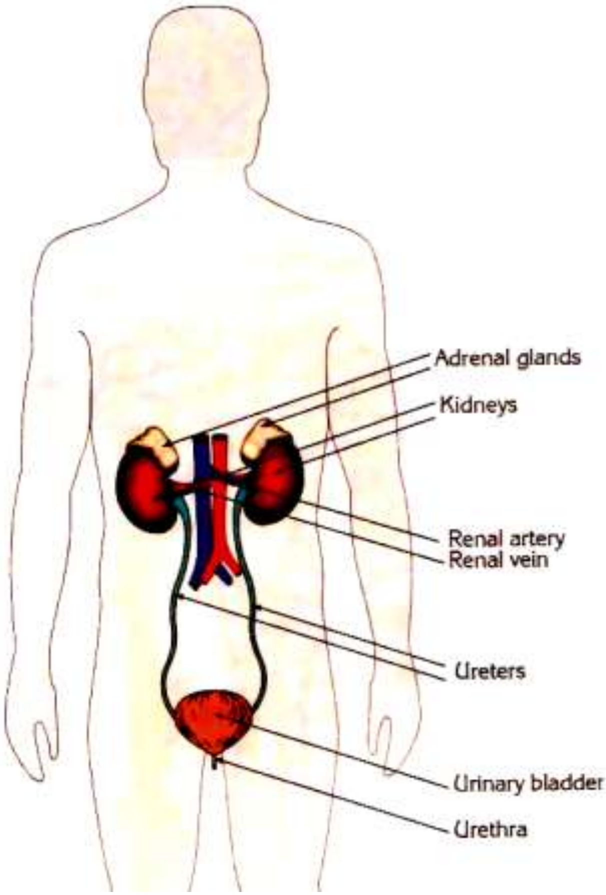

Figure 30 *The structure of excretory system*

With a mass about 0.3 kg (each kidney mass about 150 gr), the fist-shaped kidneys are located in the lower thoracic region of the back. The upper of each kidney is covered by an adrenal gland.

Kidney has three distinct visible zones (figure 31):

1. *Renal cortex* or *capsule* is an outer layer of connective tissue that encircles the kidneys;

2. *Renal medulla* is an inner layer which found beneath the cortex. It is divided into a number of fan-shaped pyramid regions (15-20 pyramids in each kidney) that help conserve water and valuable solutes;

3. *Renal pelvis* is a hollow chamber which joins the kidneys with ureter.

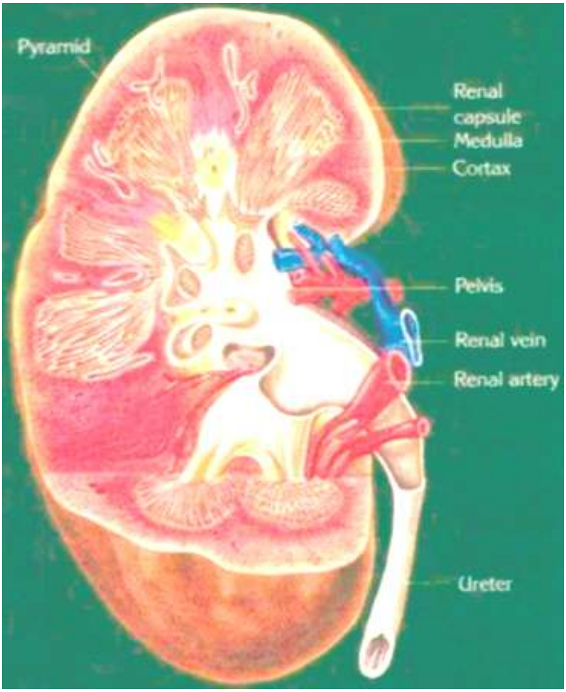

Figure 31 *The structure of kidney*

Each kidney contains about one million functioning units known as nephrons (figure 32). Nephron is a long, coiled structure with one end fashioned as a cup that fits over a mass of capillaries. The other end of the nephron opens into a duct that collects urine. The tubule of the nephron is closely associated with a network of capillaries along its entire length.

The nephron's specialized shape enables it to carry out three main processes – filtration of small molecules from the blood, reabsorption of useful molecules from the urine back into the blood, and secretion of ions and some drugs from the blood into the urine.

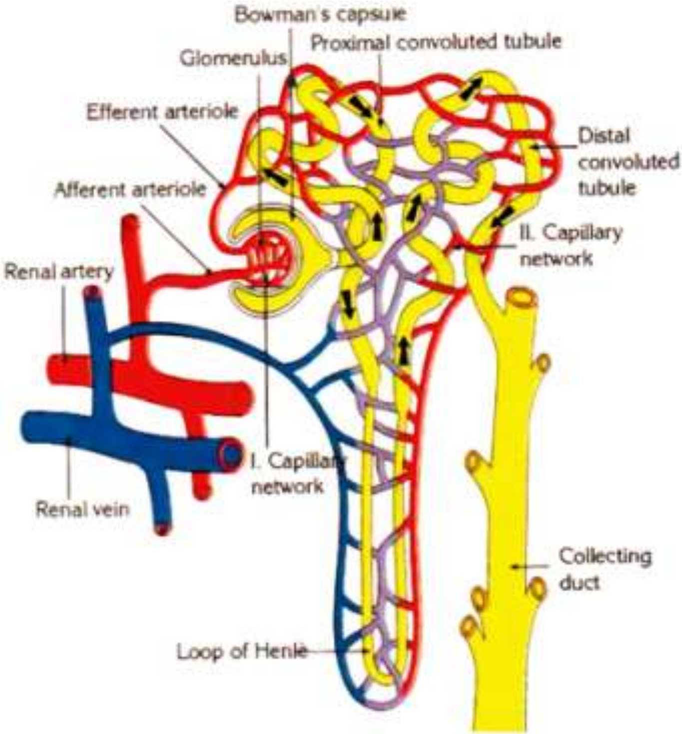

Figure 32 *The structure of nephron*

The portion of the nephron that filters water and solutes from the blood is the enlarged, cuplike Bowman's capsule in the kidney's outer cortex. The ball of capillaries within the Bowman's capsule is called a glomerulus. Each glomerulus is formed by capillaries from branch of afferent renal arteriole. Filtration occurs in the glomerulus where the fluid portion of the blood is forced into the Bowman's capsule. Blood cells and most of the plasma proteins are retained in the capillaries of the glomerulus. The filtrate includes the blood plasma, nitrogenous wastes (urea) from cells, salts, ions, glucose, vitamin, minerals and amino acids. Blood leaves the glomerulus by way of efferent arterioles.

As the filtrate leaves the Bowman's capsule, it enters to the part of the nephron's twisted tubule known as the proximal convoluted tube. There, reabsorption begins and returns to the circulation useful substances such as most of water, the sodium and chloride ions, the sugars and the amino acids that were just filtered out of the blood in the Bowman's capsule.

The fluid then moves down into the medulla and back up again into the cortex in a loop of Henle. Water leaves the loop of Henle by osmosis and reenters the blood of the capillaries surrounding the tubule. At the turn of loop, the wall of tube becomes more permeable to salts and less permeable to water. In result, salts diffuse out into the fluid.

After leaving the loop, the fluid is delivered to a distal convoluted tubule in the cortex. Secretion occurs as the filtrate move through this tubule. Cells of the tubule wall selectively remove substances such as salt, potassium ions, water, hydrogen ions, bicarbonate ions, uric acid and ammonia from surrounding capillaries.

The last part of a nephron is collecting duct. As the name suggests, the collecting duct collects urine from nephron and merges in the pelvis of the kidney.

Urine is transported into the urinary bladder by the ureter of each kidney. The urinary bladder is a muscular sac that stores urine. When the urinary bladder is filled, muscles of the bladder are contract. Urine is then forced out of the urinary bladder and passes into a tube called the urethra. The urethra carries urine to the outside of the body. Approximately 180 liter of fluid enters the nephrons every day and only about 1.5 liter of urine is removed from the bladder.

Skin

Skin is made up of two layers called the epidermis and dermis (figure 33).

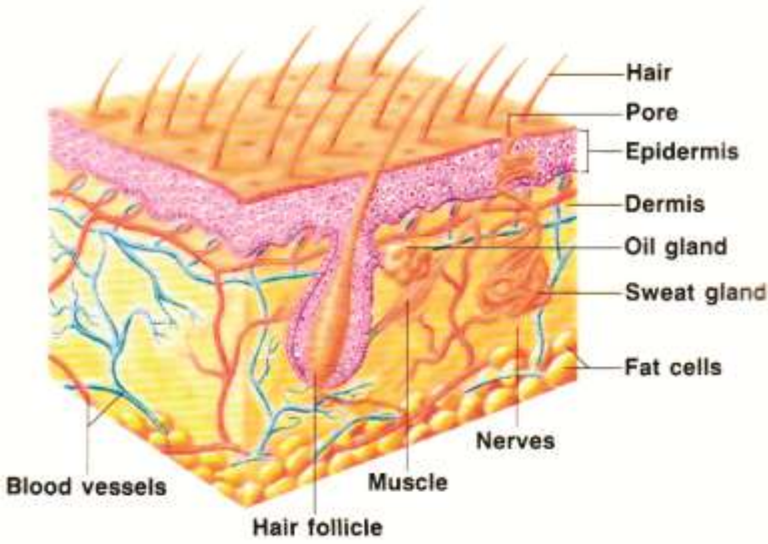

Figure 33 *The structure of skin*

Epidermis is the outermost layer of the body. It protects body from physical and chemical hazards.

The living cells beneath the epidermis make up the second layer of the skin, dermis. The dermis contains many different kinds of nerve endings and blood vessels. The receptors located in the skin are connected to these nerve ending. Blood vessels are involved in supplying nutrients to cells and in thermoregulation.

Several other structures also are found in the dermis. One of these structure is the hair follicle. Each hair that grows on the body grows from a follicle.

The dermis also contains oil glands. Oil glands usually are found near the hair follicles. Oil glands secrete an oil that helps soften the skin and keep it waterproof.

Another structure in the dermis is sweet gland. The dermis contains more than two million sweat glands. Sweat glands excrete waste products in the form of perspiration. Perspiration is a liquid waste made up of water, salts and a small amount of urea. Each sweet gland has a small tube leads to the surface of the skin. The tiny opening at the surface of the skin is called a pore. Sweat leaves the body through these pores.

Sweat that reaches the skin's surface quickly evaporates. The evaporation of sweat cools the body. Excess heat is removed from the body as it is cooled. The removal of excess heat helps to regulate body temperature. Regulating body temperature also is a function of the skin.

New words and word combinations.

waste	tullantılar
excretion	atılma
skin	dəri
urinary bladder	sidik kisəsi
uretha	sidik kanalı
mass	kütlə
nephron	nefron
urine	sidik
drug	dərman

duct	kanal
portion	hissə
filtrate	filtrasiya
loop	ilmə
bladder	qişa
sweat	tər
pore	məsamə
follicle	follikul
amount	miqdar

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

Outermost layer; protects body; second layer; sweet gland; convoluted tubule; oil glands; hair follicle; collecting duct; loop of Henle; from surrounding; kidney's outer cortex; blood cells; physical and chemical hazards; keep it waterproof; connective tissue; form of perspiration;waste products; urinary bladder; approximately; in result; permeable to water; blood vessels; nonfunctional; by the ureter; small amount; nerve endings; valuable solutes; muscular sac.

II. Find out corresponding equivalents of the following word combinations into English:

Xarici qat; bədəni qoruyur; ikinci qat; tər vəziləri; buxarlanma; piy toxumaları; tük soğanaqları; keçirici; yığıcı borucuqlar; Henle ilgəyi; əhatə etmək; böyrək; ifrazat; bağırsaqlar; yumruqşəkilli; birləşdirici toxuma; yelpikşəkilli; sidik kisəsi; sidik; təxminən; nəticəsə; yetkinlik; funksiyasız; raxit; tənzim etmək; kiçik hissəciklər; sinir ucluqları; həll olunan birləşmələr; sidik axarcıqları; sidik kanalı.

III. Insert prepositions where necessary:

My manager is an authority ... genetics (theoretical physics, chemistry).

As to me, I am interested ... mathematics (biology, statistics, mechanics).

My brother showed interest ... geology (geology, archaelogy) while an undergraduate.

His interest is centred ... problems ... biochemical processes.

I do my postgraduate work ... the Institute ... geology ... National Academy of Sciences. I did my postgraduate work ... the Institute ... progessor Abdullayev.

The theoretical staff ... our departament are ... work summarizing the results ... their calculations.

I am expected to base my investigation ... experimental evidence and theoretical reasoning.

His studies formed a basis ... further investigation ... botany.

He returned ... his work ... 2008.

Thomas Hunt Morgan was awarded a Nobel Prize ... physiology ... his outstanding discoveries ... the laws of heredity.

IV. Agree or disagree with the following statements:

For.ex: I know (that) your Institute trains postgraduate students.

a) Yes, you are right. Besides our Institute does research.
b) No, I see you are misinformed. Our Institute does not train postgraduate students. It trains only undergraduates.

1) We know that the evolution theory is generally accepted in this country.
2) I found that almost all researchers combine activi-

ties in research with social work.

3) I believe you base your experiments on theoretical considerations.
4) The head of your laboratory is an authority; mathematics (physics, biology, etc.) isn't he?
5) My scientific adviser was awarded the Nobel prize for his outstanding contribution to playma physics.

V. Read the following text and be ready to answer questions about it.

By examining water from a lake or stream we will find that it is full of life. If you look carefully, you may find there the simplest animal, the ameba. It is a tiny mass of jelly usually about 1/50 of an inch long. The ameba is surrounded by a very thin cell membrane, which is quite elastic. At times, a part of the membrane will push out, forming a false foot. The rest of the ameba will then flow into it. In this way, the little animal moves slowly about in its watery world.

Unit 8. SENSE ORGANS

Human detects information about environment by sense organs. The five senses are vision, hearing, touch, taste and smell. Each sense organ has receptor cells which send impulses to the brain.

The structure of eye

The eye sphere of human consists of sclera, choroid and retina (figure 34).

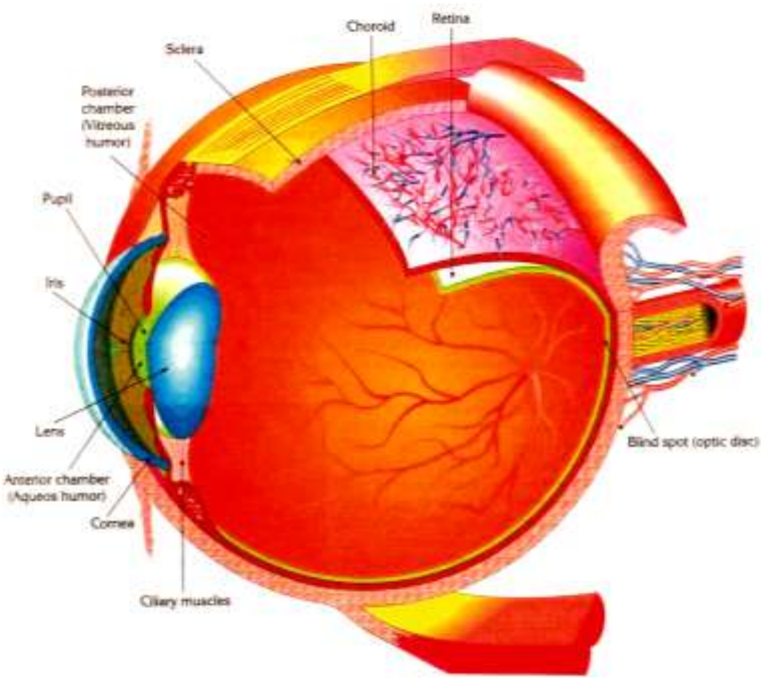

Figure 34 *The structure of eye*

The part of the sclera in front of the eye is transparent and is called cornea. A chamber behind the cornea is filled with a fluid called the aqueous humor. This fluid nourishes both the cornea and the lens. In addition to aqueous humor, a clear, gelatinous material, the vitrous humor, fills the posterior (back) cavity behind the lens. It makes a pressure within the eyeball that maintains the eyeball's shape.

Light waves first passes through the cornea which begins to focus the light. This occurs because light is refracted when it travels into a medium part of eye, choroid. Choroid is rich in blood vessels. The colored portion of the eye is the iris which is located behind the cornea. Pigments are located in iris, giving each individual an eye color (brown, blue, green and grey). The opening in the middle of the iris is called the pupil. In dim light, the iris widens to allow more light to enter the eye. This makes the pupil larger. In bright light, the iris narrows to permit less light to enter. This makes the pupil smaller.

Light that has passed through the pupil enters the lens. Ciliary muscles attached to the lens cause the lens to change shape to focus incoming light. When muscle contracts, the lens becomes more rounded and powerful. This is required for close vision. In far vision, the muscle relaxes, moving away from the lens. The lens becomes more flattened and less powerful.

The innermost layer of the eye sphere, the retina includes two main types of receptors, rod and cone. Rods are sensitive to dim light. They can detect only black and white. Cones are sensitive to bright light and allow to see different colors.

There are approximately 130 million rods and 7 million cones. Most of the cones are located in the central region of the retina known as the fovea where the eye forms its sharpest image.

When light strikes the rods and cones, impulses are produced. The impulses are carried by the optic nerve to the brain where they are interpreted. There are not rods or cones where the optic nerve passes through the retina, and vision here is impossible. This part of the retina is called blind spot.

The structure of ear

The ear is divided into three main parts: outer ear, middle ear and inner ear (figure 35).

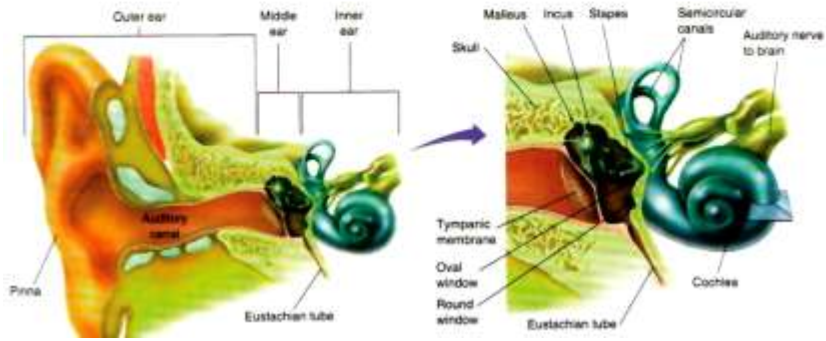

Figure 35 *Parts of ear*

<u>Outer ear</u> is composed of pinna, external auditory canal and eardrum. Sound waves collected by cartilaginous pinna travel down the auditory canal and strike the eardrum. The skin of the external auditory canal contains glands that produce a waxlike structure. Furthermore, the entrance of the canal is lined with hairs which filter dust and solid particles.

The eardrum or tympanic membrane is a thin membrane separating the ear canal from the middle ear. When sound waves hit the eardrum, it begins to vibrate. Each sound has a particular vibration. Then these vibrations are passed on to three small bones (ossicles) in the <u>middle ear</u>: hammer (malleus), anvil (incus) and stirrup (stapes). These bones are attached to each other by moveable joints.

The middle ear is connected to the throat by the Eustachian tube which equalizes the air pressure between the middle ear and the external environment.

Vibrations pass along the middle ear bone – stirrup – to another thin membrane, oval window which leads into the inner ear. The oval window transfers vibrations to a coiled fluid-filled structure called cochlea. Cochlea and semicircular canals are parts of inner ear.

The cochlea has a snaillike shape. Three fluid-filled canals are located within the tubular cochlea: vestibular canal, cochlea canal and tympanic canal. The oval window opens to the upper vestibular canal, so that when the stirrup causes it to vibrate, it produces pressure waves of fluid. These pressure waves travel down to the tympanic canal, pushing another membrane, the round window, that transmits the pressure back into the middle ear cavity (figure 36).

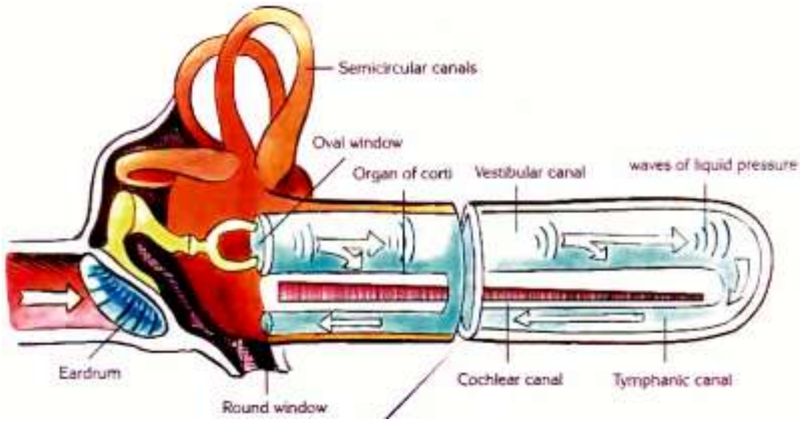

Figure 36 *The structure of inner ear*

The bottom of the cochlear canal, called the basilar membrane, contains sensory hair cells with associated sensory neurons, and tectorial membrane, is known as the organ of Corti. The organ of Corti is sensitive to sounds waves and provides hearing. As sound waves vibrate the three bones of the middle ear they begin to move and then compress the fluid in the cochlea. This, in turn, causes the hair cells to bend. That bending generates a nerve impulse that sends a message to the brain by the auditory nerve.

While hair cells are important to hearing, they also take part in the detection of the body's position in space. The semi-circular canals are the part of inner ear responsible for equilibrium. There are three semicircular canals, each of which is oriented in a different plane in space. Every canal is filled with fluid and contains hairlike receptors. Every time we move head, the fluid inside these tubes moves. The hairlike receptors in each tube sense the change in the position of head. Vestibular nerve carries messages of the exact position of head to brain.

Smell

The sense of smell or olfaction involves chemoreceptors or olfactory cells located in the upper portion of nasal passages. Number of olfactory cells in human is about 25 million, whereas a dog contains 220 million.

Olfactory cells respond to gas molecules. When gas molecules dissolve in the mucus layer inside the nose, the molecules are detected by olfactory cells. By means of olfactory nerve, the impulses travel to the brain.

Taste

Receptors for taste are located on the taste buds found on tongue. When food molecules mix with saliva in mouth, they activate the receptor cells in taste buds. Nerve impulses then are sent to the brain where they are interpreted as taste.

Taste buds of the tongue can detect only four tastes: sweet, sour, salty and bitter (figure 37). Since most foods have a blend of these tastes, food tends to stimulate more than one kind of receptor at the same time.

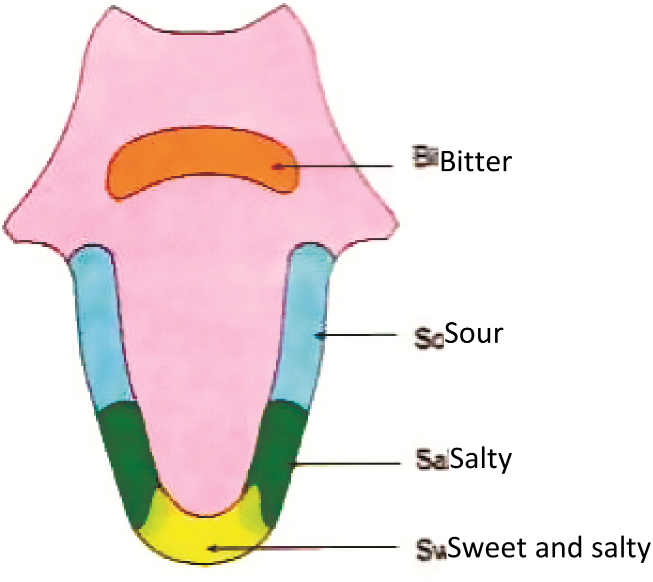

Figure 37 Tongue

New words and word combinations.

detect	aşkar etmək
sense	hissiyyat
vision	görmə
maintain	qorumaq, saxlamaq
choroid	koroid, retina ilə sclera arasında piqmentli damar qatı
retract	qırılma
pupil	bəbək
iris	göz qişası
blind spot	kor ləkə
requir	tələb etmək
rod	çubuq

optic nerve	optic sinir
outer ear	xarici qulaq
middle ear	orta qulaq
inner ear	daxili qulaq
equalize	bərabərləşdirmək
shaillike	iblizvari
bottom	alt, dib
semicircular	yarımdairəvi
bud	tumurcuq
tongue	dil
bitter	acı

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

Sense organs; receptor cells; the eye sphere of human; the part of the sclera; the aqueous humor; a medium part of eye; the colored portion of the eye; in dim light; in bright light; close vision; far vision; the innermost layer of the sphere; two main types of receptors; the optic nerve; blind spot; the part of the retina; taste buds of the tongue; waxlike structure

II. Find out corresponding equivalents of the following word combinations into English:

Hiss orqanları; reseptor hüceyrələr; insanın göz alması; lifli qişa; maye hal; gözün orta hissəsi; qan damarları; gözün rəngli hissəsi; zəif işıqda; gur işıqda; yaxın görmə; uzaq görmə; göz almasının daxili qatı; reseptorların iki əsas tipi; göz siniri; kor ləkə; torlu qişanın hissəsi.

III. Insert one of the words given in brackets.

1. Mathematics is very … . I am greatly … in it. (interesting, interested).

2. The sing of the mountains was very … . I got much … by it (impressive, impressed).
3. I got deeply … in chemistry. I find it very … (interesting, interested).
4. The number of people present was … . Everybody was … by his speech (impressive, impressed).
5. I am really deeply … in the results of your experiments. They are very … (interesting, interested).

IV. Fill in the blanks with <u>interest,</u> <u>interesting,</u> <u>interested.</u>

1. I got interested in the subject of your work.
   - I am glad you found it … .
2. My teacher encouraged my interest in physics when I was at school.
   - It's good that you got … in physics while still at school.
3. Did you find this book interesting?
   - Yes, I read it with great … from the first page.

V. Read and translate the text into Azerbaijani:

Darwin and evolution

A hundred years ago people believed that plants and animals had always been as they are now. They thought that all the different sorts of living things, including men and women, had been put here by some mysterious power, a few thousand years ago.

It was Charles Darwin, born at Shrewsbury on February 12, 1809, ho showed that this was just a legend. As a boy Darwin loved to walk about the countryside collecting insects, flowers and minerals. He enjoyed helping his elder brother at chemical experiments in a shed at the far end of their garden.

Because of this, his school friends called him "Gas". These hobbies interested him much more than Greek and Latin, which were his man lessons at school. His father, himself a doctor, sent Charles to Edinburgh University to study medicine. But Charles disliked this work. He spent a lot of time with a zoologist friend, watching birds and other animals, and collecting insects in the surrounding countryside.

Then his father sent him to Cambridge to be trained as a clergyman. Darwin didn't want to be a doctor or a clergyman. He wanted to be a biologist.

Unit 9. NERVOUS SYSTEM

The nervous system is composed of an organized network of nerve cells, or neurons. Neurons are specialized for three major functions: responding to chemical and physical stimuli, conducting impulses and releasing chemical regulators.

Neurons are organized into the central nervous system and the peripheral nervous system (figure 38).

The central nervous system (CNS) consists of the nerves of the brain and spinal cord and acts as a coordinating centre for incoming and outdoing information.

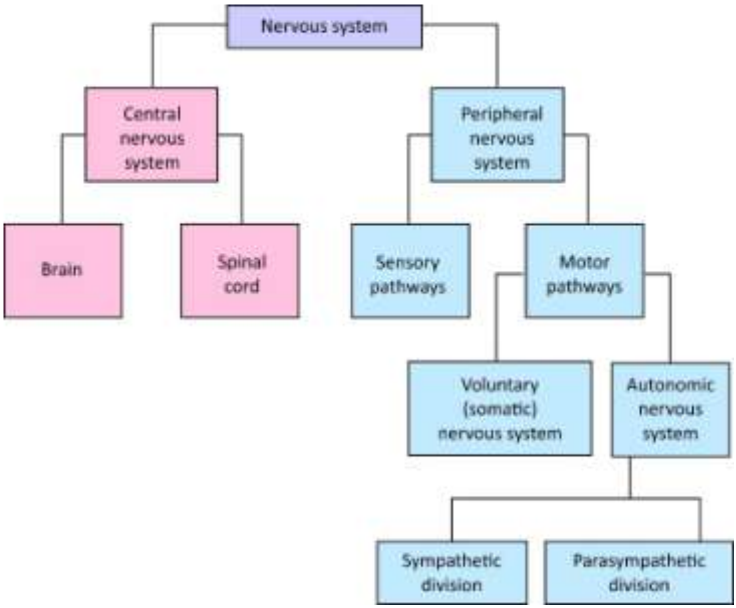

Figure 38 *Main division of the nervous system*

The peripheral nervous system (PNS) includes sensory pathways which carry information about the environment to the CNS, and motor pathways, which convey information from the CNS to muscles and glands and trigger some activity.

The motor pathways can be further subdivided into somatic and autonomic nerves. The somatic nervous system controls the skeletal muscles. The autonomic nervous system controls all internal organs of body.

The two divisions of the autonomic system are sympathetic nervous system and the parasympathetic nervous system. Most internal organs are connected to both systems. When sympathetic and parasympathetic nerves stimulate the same organ, they often (but not always) have opposite effects. For example, the sympathetic nervous system speeds up the heart rate in emergencies and the parasympathetic system slows it down again.

The functional unit of nervous system is a neuron. A neuron contains cell body, dendrites and axon (figure 39). The cell body of neuron contains the nucleus and most of the cytoplasm. Short, threadlike dendrites branch from the cell body. Dendrites receive stimuli and conduct impulses toward the cell body. A long, thin fiber called the axon extends from the cell body. It carries messages away from the cell body. The axon often is covered by a fatty membrane, myelin sheath that insulates and protects the axon. The myelin sheath is formed by Schwann cells which wrap tightly around the axon many times, squeezing the cytosol (semifluid portion of cytoplasm) into the spaces between Schwann cells. The nodes of Ranvier are the bare patches of axonal membrane that lie between the Schwann cells.

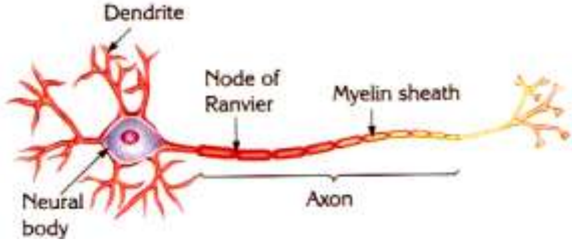

Figure 39 *The structure of neuron*

In the CNS axons form the white matter, dendrites and cell bodies form the grey matter. In the PNS bundles of axons form nerves.

There are three kinds of neurons in nervous system. Each kind of neuron has a special function. For example, sensory neurons carry messages from the sense organs to the spinal cord and brain. Motor neurons carry messages from the brain and spinal cord to muscles or glands. Associative neurons connect sensory neurons to motor neurons.

Brain

The brain is protected by the skull. The approximate weight of the brain is 1100-1700 g (newborn's brain is 330-400 gr). From the brain extend 12 pair of cranial nerves.

The brain has three interconnected regions: forebrain, midbrain and hindbrain.

The forebrain is composed of cerebrum and diencephalon. Cerebrum is large, upper portion of the brain. The surface of the cerebrum, known as cerebral cortex, has many folds that increase surface area.

Cerebrum is divided into two cerebral hemispheres: left and right. Each hemisphere controls the activities of the opposite side of the body: right hemisphere controls left part of body, left hemisphere – right part of body. The left hemisphere is generally associated with verbal and analytical skills such as reading, speech, writing, mathematics and logic. The right hemisphere is associated with spatial relationships and artistic skills such as music and art. Both of hemispheres are connected by bundle of nerves called corpus callosum (figure 40).

The hemispheres are divided into the frontal, parietal, temporal and occipital lobes. Figure 41 illustrates functions of each of the lobes.

The diencephalon consists of the thalamus and hypothalamus. Thalamus is located below the cerebrum, and immediately below the thalamus is the hypothalamus.

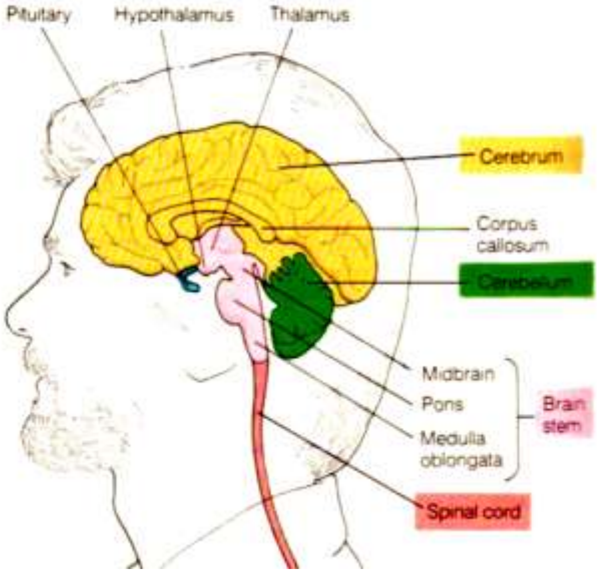

Figure 40 *Major regions of brain*

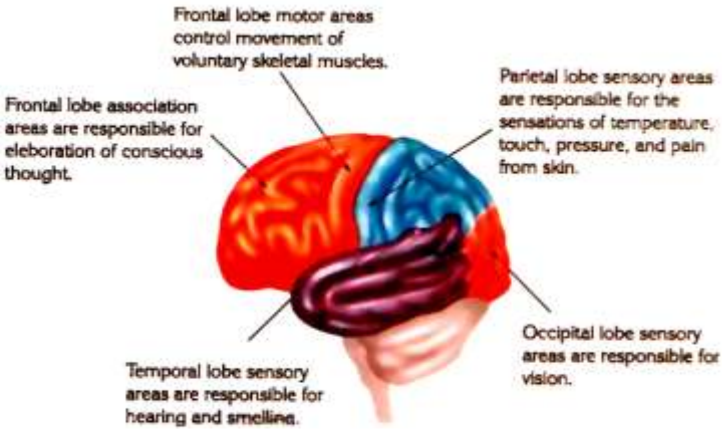

Figure 41 *Cerebral cortex*

The thalamus is an integrating and relay center between incoming sensory information and the cerebrum. If received messages from the spinal cord and certain parts of the brain and sent they to the appropriate areas of the cerebrum.

The hypothalamus integrates the visceral activities. It helps regulate body temperature, hunger and satiety, thirst and various emotional states. The hypothalamus also controls the pituitary gland which regulates many of the other endocrine glands of the body.

The midbrain is less developed than forebrain. It acts as a relay center for some eye and ear reflexes.

The hindbrain, as the name suggests, is found posterior (back) to midbrain and joins with spinal cord (see figure 40). The cerebellum, pons and medulla oblongata are the regions of the hindbrain. They are form the brain stem.

The cerebellum which located beneath the cerebrum is the largest region of hindbrain. Like the cerebrum, the surface area of the cerebellum is increased by folds. The cerebellum controls limb movements, balance and muscle tone.

The pons, meaning “bridge”, acts as a relay station by sending nerve messages between the cerebrum and between the cerebellum and the medulla.

The posterior region of the hindbrain is the medulla oblongata. It connects the brain to the spinal cord. The medulla oblongata controls many involuntary actions of the body such as digestion, breathing, blood pressure and heart rate. Other functions include the control of coughing, sneezing, swallowing and vomiting.

Spinal cord

Spinal cord extends downward through a canal within the backbone. Its length is about 41-45 cm. 31 pairs of nerves extend from the spinal cord: 8 pairs of them extend from the cervical region, 12 pairs from the thoracic region, 5 pairs from the lumbar, 5 pairs from the sacral region, 1 pair from the coccyx.

A cross section of the spinal cord reveals a butterfly-shaped core of grey material surrounded by bean-shaped field of white (figure 42).

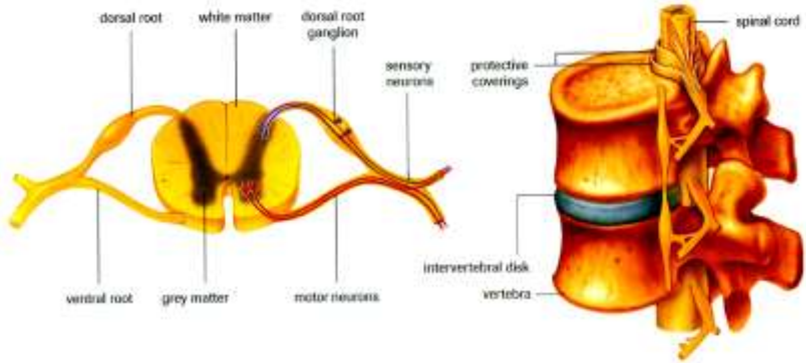

Figure 42 *Spinal cord*

The white material of the spinal cord consists mainly of thin axons that transport information long distances up and down the spinal cord to and from the brain. Since these long axons are insulated with a white, fatty myelin sheath, the entire region has a whitish color. The grey material contains neuron cell bodies and dendrites that not surrounded by a myelin sheath. It is zone of many synapses.

<u>Synapse</u> is a junction between a neuron and another cell which can be a muscle cell, a gland cell or another neuron. The projection of neuron that carries the impulse to the synapse is called presynaptic, while the projection on the other end of the synapse which receives impulse is called postsynaptic. Presynaptic and postsynaptic projections do not make contact. There is a little gap between them. When an impulse reaches the end of presynaptic projection, this projection releases chemicals into synapse. The chemicals join with molecules in the postsynaptic pro-

jection (figure 43).

Figure 43 *Synapse*

The grey material has two ventral nerve roots and two dorsal nerve roots. A dorsal nerve root brings sensory information into the spinal cord, while a ventral nerve root carries motor information from the spinal cord to the peripheral muscles, organs and glands.

New words and word combinations.

nerve	sinir
major	əsas, böyük
physical stimuli	fiziki amil
spinal cord	onurğa beyni
respond	cavab vermək
peripheral	periferik
division	bölmə

internal	daxili
opposite	əksinə, qarşı
conduct	davranış
sheath	qın
squeeze	sıxmaq
bare	çılpaq
bundle	büküş
associative	birləşmə
verbal	şifahi
logic	məntiq
pressure	təzyiq
heart rate	ürək döyüntüsü
target	hədəf

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

Nerve cells; neurons; the central nervous system (CNS); the Peripheral Nervous System (PNS); muscles and glands; sympathetic and parasympathetic; dendrites and axon; thread-like; fatty membrane; myelin sheath; Schwann cells; spinal cord and brain; brain; cranial nerves; forebrain; midbrain; hindbrain; vertebrum; diencephalon; frontal; parietal; temporal; occipital lobes; thalamus; hypothalamus; visceral; endocrine; cerebellum; pons; medulla oblongata; blood pressure; spinal cord; cervical; thoracic; lumbar; sacral; coccyx; butterfly-shaped; synapses; roots; ventral root; dorsal nerve root; conditional; nonconditional; stimules; lobes; presynaptic; postsynaptic; instinctive.

II. Find out corresponding equivalents of the following word combinations into English:

Sinir hüceyrələri; neyronlar; Mərkəzi Sinir Sistemi; Periferik Sinir Sistemi; əzələlər və vəzlər; simpatik və parasimpatik; dendrit və akson; çıxıntı; yağlı örtük; miyelin qişa; Şvan hüceyrələr; onurğa və baş beyin; beyin; sinir düyünü; ön beyin; orta beyin; arxa beyin; beyin yarımkürələri; beyin kötüyü; alın; təpə; ənsə; gicgah payı; talamus; hipatalamus; visseral; endokrin vəzlər; beyincik; ara beyin; uzunsov beyin; qan təzyiqi; onurğa beyni; boyun; döş; bel; omba; büzdüm; kəpənək formalı; sinapslar; köklər; ön kök; arxa sinir kök; şərti; şərtsiz; qıcıqlar; paylar; presinaptik; postsınaptik; instinktiv.

III. Answer the questions using the adverb or the adjective given in brackets.

For.ex: Are you interested in biology (great, greatly).
- Yes, I am greatly interested in it.

1. Did you study the phenomena involved in metabolisin (through thoroughly).
2. Do you make a study of these processes? (through, thoroughly).
3. Have you made any mention of our work? (brief, briefly).
4. Did Pavlov’s work influence experimental physiology? (profound, profoundly).
5. Do your results show agreement with the theory? (good, well).
6. Did Morgan’s work contribute to the development of natural sciences? (large, largely).
7. Does you friend take any interest in physics? (great, greatly).
8. Does your hypothesis agree with theory? (good, well).

9. Are you interested in research? (deep, deeply).
10. Has the speaker metioned your experiments? (brief, briefly).

IV. Using the phrases give a talk about your own research.

show interest in
graduate from
study under
be appointed professor of
carry on (out) experimental studies
analyze thoroughly
lay the main outlines of theory of
form a basis for
constitute the chief subject of one's research
be the most important step in
list the new principles of
be awarded a prize
win a medal
be concerned with
collect data
make observations
measure
calculate
investigate
arrange new facts
read a paper
joint paper
agree with
the method proved fruitful
interest is concentrated on
form a basis for
an important step in the development of

be responsible for

V. Translate into Azerbaijani paying attention to participles.

a) 1. He is doing research in the field of biology. 2. While doing research he suggested a new theory. 3. The leading scientists of the world doing research in this field came to the conference. 4. The technology applied improved the quality of the experiment. 5. The result obtained showed that I was right. 6. The invited delegates were told about the work of our institute. 7. The data collected helped me in my work. 8. He was invited to this conference. 9. When invited I always came. 10. Having been invited beforehand he had a lot of time to prepare his report.

Reflex

A reflex is the transmission of impulses, generated by receptors, to the target, where a sudden response is generated. Reflexes allow body to react quickly to painful or dangerous situations.

There are two types of reflexes: conditional and non conditional.

Conditional reflexes are nonhereditary and is formed based on the non conditional reflex in individual life, or trained through experiments.

Non conditional reflex is automatic, instinctive, unlearned reaction to a stimulus. Non conditional reflex is hereditary, therefore it is not gained through experience.

The path of a reflex is called the reflex arc. It allows to reacts rapidly to external and internal stimuli. Reflex arc involves both peripheral and central nervous system. A reflex arc is an automatic, involuntary response to a stimulus. The reflex arc involves a receptor, a sensory neuron, a motor neuron, and the organ or muscle to which the motor neuron is connected.

Unit 10. ENDOCRINE SYSTEM

Along with the nervous system, the endocrine system controls all of body's activities.

The endocrine system is made up of a group of glands that secretes a regulatory chemical called hormone (figure 44).

A ductless gland that releases hormones directly into the bloodstream is called an endocrine gland. The bloodstream carries these hormones to every cell in the body, but only the cells of target organ for given hormone can respond to it. The endocrine glands are pineal gland, hypothalamus, pituitary gland, thyroid gland, parathyroid glands, thymus gland, pancreas, adrenal glands, ovaries and testes, intestinal and gastric glands.

In contrast, a gland that dumps substance into a duct that generally leads out of the body is called an exocrine gland. Mammary glands and salivary glands are two well-known examples of exocrine glands.

Some glands are complex or compound (both endocrine and exocrine). Some hormones of these glands enter directly into the blood, and some move through ducts. The stomach and small intestine are compounds glands. Their exocrine secretions are the digestive enzymes that are delivered through ducts to where they are used. Their endocrine secretions are the hormones gastrin (in stomach) and secretin (in small intestine), which are released directly into the bloodstream and cause additional secretions of digestive enzymes by other organs (see digestive system).

The length of time a hormone is effective can be as short as 2 minutes, or as long as several hours. Hormones are constantly being removed from the body by target organs, excreted by the kidneys, or broken down to simpler compounds by the liver.

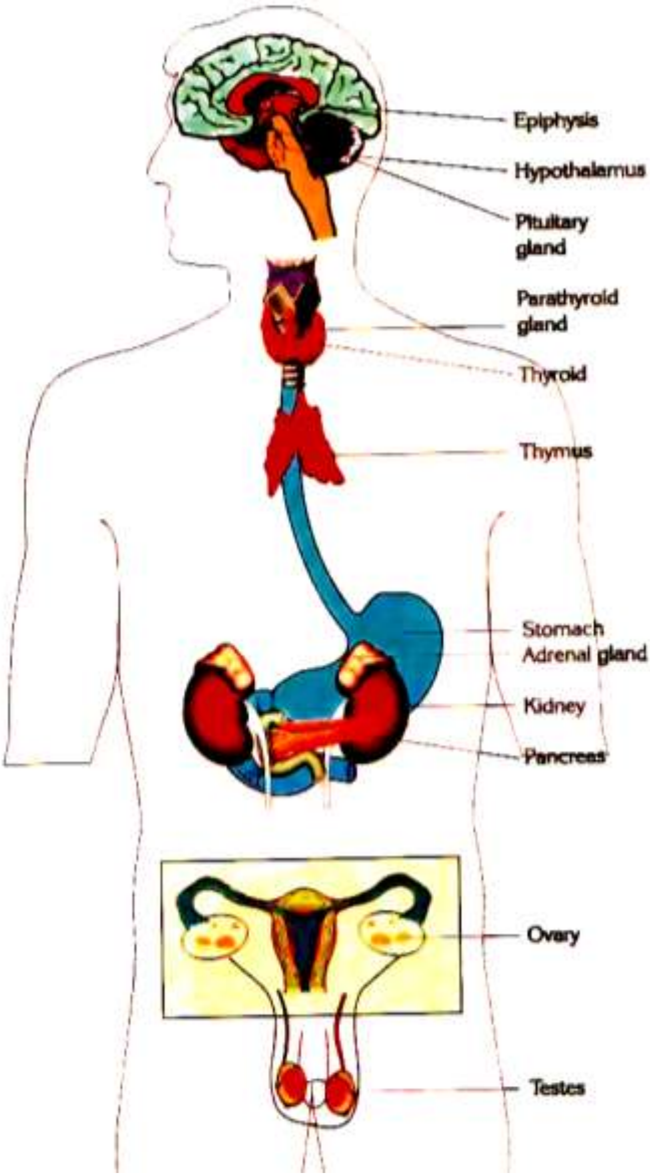
Epiphysis
Hypothalamus
Pituitary gland
Parathyroid gland
Thyroid
Thymus
Stomach
Adrenal gland
Kidney
Pancreas
Ovary
Testes

Figure 44 *Endocrine glands*

Endocrine glands

The pineal gland, or epiphysis, is lying deep in the brain, between the hemispheres of cerebrum and protrudes onto the upper surface of the hypothalamus. It is about the size of pea and its shape like pinecone (hence its name).

Melatonin is secreted by the pineal gland. In human, melatonin may influence reproduction, puberty and moon. Its secretion is inhibited by light and is most abundant at night. The secretion of melatonin reaches its lower level after the onset of puberty, an observation that has led some researches to conclude that the secretion of melatonin somehow inhibits the hormones of gonads.

Melatonin may have yet another effect. Its level is blamed for seasonal affective disorder syndrome. Some people experience profound depression, oversleeping, weight gain, tiredness and sadness when the days grow short in winter, then a rebound of better spirit in spring. Sufferers by this disorder have been successfully treated by exposure to bright lights for several hours per day in winter.

The hypothalamus is a structure in the diencephalon (see nervous system), but it plays a key role in many of the homeostatic functions of the endocrine system through its interaction with the pituitary gland. Neurons in the hypothalamus secrete releasing and inhibiting hormones onto bloodstream that go directly to the anterior (front) lobe of the pituitary gland. These hypothalamic hormones control the release of other hormones from the anterior pituitary.

Neurons in another part of the hypothalamus secrete two other hormones directly into the posterior lobe of the pituitary which acts as a storage organ for them.

The hormones of hypothalamus are corticotropin-releasing hormone (CRH), gonadotropin-releasing hormone (GnRH), prolactin-inhibiting hormone (PIH), thyrotropin-releasing hormone (TRH) and somatostatin.

Pituitary gland

The pituitary gland is often referred to as the “master gland” because it exercises control over endocrine glands.

The pituitary gland is attached to the underside of the hypothalamus by thin stalk. It consists of two lobes: anterior and posterior.

The anterior pituitary lobe stores six hormones and the posterior pituitary lobe stores two hormones, releasing them into the blood when necessary.

Table 3 shows list of these hormones and their function.

Table 3

Hormone	Target	Primary function
Anterior lobe		
thyroid-stimulating hormone (TSH)	thyroid gland	• stimulates release of thyroxine from thyroid • thyroxine regulates cell metabolism
adrenocorticotropic hormone (ACTH)	adrenal cortex	• stimulates release of hormones involved in stress responses
somatotropin (STH), or growth hormone (GH)	most cells	• promotes growth
follicle-stimulating hormone (FSH)	ovaries, testes	• in females, stimulates follicle development in ovaries • in males, promotes the development of sperm cells in testes
luteinizing hormone (LH)	ovaries, testes	• in females, stimulates ovulation and formation of the corpus luteum • in males, stimulates the production of the sex hormone testosterone
prolactin (PRL)	mammary glands	• stimulates and maintains milk production in lactating females
Posterior lobe		
oxytocin	uterus, mammary glands	• initiates strong contractions • triggers milk release in lactating females
antidiuretic hormone (ADH)	kidneys	• increases water reabsorption by kidneys

Thyroid gland

The thyroid gland lies below the larynx at the front of the neck (figure 45). It secretes thyroxine and smaller amounts of triiodothyronine which regulate body metabolism and the growth and differentiation of tissues. The synthesis of thyroxine is regulated by TSH secreted from the anterior lobe of the pituitary gland.

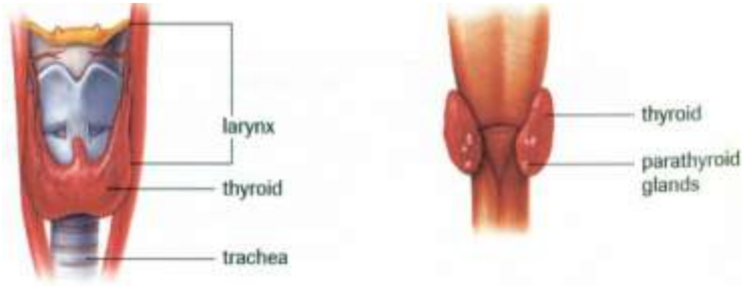

Figure 45 *Thyroid and parathyroid glands*

Thyroxine and triiodothyronine are iodinecontaining hormones. When the diet lacks iodine, not enough iodine will be available, the thyroid gland cannot produce its hormones, and the thyroid swell. This condition is called goiter (figure 46).

Figure 46 *Goiter*

The thyroid gland also secretes calcitonin which regulates the calcium level in the blood and body tissues.

Parathyroid gland

Parathyroid glands are four small glands attached to the thyroid (see figure 45). These tiny glands secrete parathyroid hormone (PTH) which regulates the level of calcium in the blood. As the level of blood calcium rises, less PTH is secreted by the parathyroid glands, as the level of blood calcium drops, more PTH is secreted.

PTH stimulates the release of calcium from the bones and the conservation of calcium by the kidneys. It also causes the activation of vitamin D (vitamin D in the skin which form by striking sunlight is inactive). Low levels of vitamin D can cause a disease called rickets (figure 47). With this disease, too little calcium are absorbed from foods and the bones develop improperly.

Figure 47 *Rickets*

Thymus

The thymus is a soft, V-shaped gland located at the base of the neck in front of the aorta. The function of thymus is the maturation of T cells (type of lymphocytes) in the immune system. As the pineal gland, the thymus is larger in children than in adults and decreases in size after the onset of puberty, indicating a possible role in puberty. In adulthood it is replaced by fat and connective tissue and becomes nonfunctional.

Adrenal gland

The adrenal glands are located just above each kidney. Each gland is composed of an inner portion, the adrenal medulla, and an outer layer, the adrenal cortex (figure 48).

The adrenal medulla produces two hormones: epinephrine (also known as adrenaline) and norepinephrine (noradrenaline). Both hormones help increase mental alertness, increase heartbeat rate, dilate coronary blood vessels, increase the respiratory rate, and speed up the rate of metabolism for the entire body.

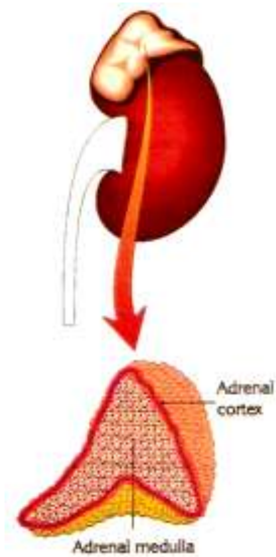

Figure 48 *The structure of adrenal gland*

The adrenal cortex makes up most of the mass of the adrenal glands and secretes a group of hormones called corticosteroids. There are three categories of corticosteroid hormones:

1.Gonadocorticoids are combination of androgens (male hormones) and estrogens (female hormones) that supplement the action of sex hormones secreted by the gonads.

2.Mineralocorticoids, such as aldosterone, help regulate mineral balance of the body.

3.Glucocorticoids fight inflammation and help regulate the metabolism of proteins, fats and carbohydrates.

Pancreas

Pancreas is a compound gland. It is located adjacent to the stomach and is connected to the duodenum of the small intestine by pancreatic duct.

Endocrine secretion on the pancreas is performed by the islets of Langerhans. The islets produce two hormones: insulin which decreases blood glucose, and glucagons which increases blood glucose.

Insulin reduces the level of glucose in the blood, by allowing glucose to enter body cells (liver, muscles) from the blood. In the liver, the glucose is converted into glycogen. In this way, insulin enables the blood sugar level to return to normal.

If too little insulin is produced by the pancreas, an excess of sugar build up in the blood. This condition is called diabetes mellitus.

Glucagons act antagonistically (opposite) to insulin. When the level of blood glucose is low, the pancreas secretes glucagons, which causes an increased rate of conversion of glycogen to glucose in the muscles and liver. In result glucagons secretion is inhibited and glucose is released into the blood (figure 50).

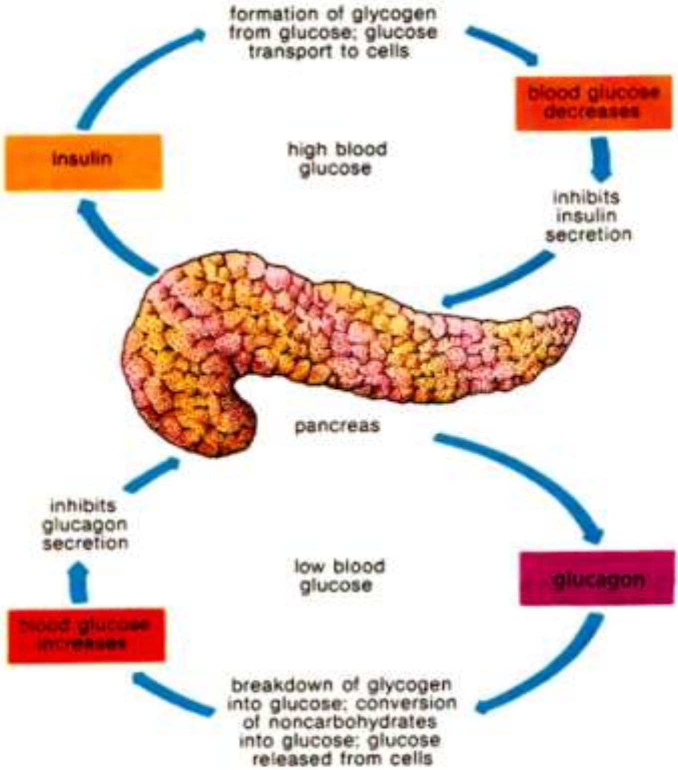

Figure 49 *Functions of insulin and glucagons*

Gonads

The male gonads or <u>testes</u>, and female or <u>ovaries</u>, are important endocrine glands, producing sex hormones. The hypothalamus and the pituitary gland in the brain control the production of male sex hormones in the testes. GnRH from the hypothalamus stimulates the pituitary gland to release follicle-stimulating hormone (FSH) and luteinizing hormone (LH) which in the male stimulate various functions in the testes.

The FSH acts directly on the sperm-producing cells, while LH produces testosterone. In turn, testosterone itself increases sperm production.

Testosterone also influences the development of secondary male sexual characteristics such as development of facial and body hair, growth of the larynx, which causes the lowering of the voice, the strengthening of muscles, and the secretion of body oil (development of acne in boys as they reach puberty).

The hypothalamus-pituitary complex (GnRH-female FSH and LH) regulates the production of estrogen and progesterone, the hormones of the ovary.

Estrogen is secreted by follicular cells of the ovaries in response to stimulation by FSH. Estrogen activates the development of female secondary characteristics, including development of the breasts and body hair.

Progesterone is secreted by the follicle cells (when the egg leaves the ovary) that form the corpus luteum or yellow body. Corpus luteum cells continue to secrete estrogen, but they now begin producing large quantities of progesterone as well. Progesterone helps prepare the uterus for implantation of a fertilized egg. If the egg is not fertilized, the corpus luteum starts to degenerate, and the levels of progesterone and estrogen drop.

New words and word combinations.

along	boyunca
regulatory	tənzimləmə, nizamlı
ovaries	yumurtalıqlar
gastric	mədə
thymus	timus vəzi
epiphysis	epifiz
testes	toxumluq
puberty	cinsi yetkinlik
disorder	pozğunluq
weight gain	kökəlmək
corticotropin-releasing	kartikotropun sərbəst buraxılması

hypothalamus	hipotalamus
iodinecontaining	yod tərkibli
swell	şişmək, qabarmaq
dilate	genişlənmək
glucose	qlükoza
bloodstream	qanyaxması

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

Endocrine system; nervous system; regulatory system; bloodstream; endocrine gland; pituitary gland; thyroid gland; hypothalamus; thymus gland; pancreas; adrenal gland; ovaries; intestinal; gastric; mammary gland; salivary gland; stomach; compound glands; digestive enzymes; secretion gland; target organs; hemispheres brain; upper surface; pea; melatonis secretion; puberty; gonadotropin releasing hormone; trachea; iodine containing; body tissues; inodine deficiency; exocrine glands; to move through ducts; from the anterior pituitary

II. Find out corresponding equivalents of the following word combinations into English:

Endokrin sistemi; sinir sistemi; kimyəvi tənzimləmə; qan axını; endokrin vəzi; hipofiz vəzi; qalxanvari vəzi; hipotalamus; timus vəzi; mədəaltı vəz; böyrəküstü vəz; yumurtalıq; bağırsaq; mədə yarası; məmə vəzi; tüpürcək vəzi; mədə; mürəkkəb vəzilər; həzm fermentləri; sekresiya vəzi; hədəf orqanlar; böyrək; beyin; beyin yarımkürəsi; üst səth; noxud; melatonik sekresiyası; cinsi yetkinlik; qonadotropin azad edilməsi; traxeya; yod tərkibi; bədən toxuması; yod çatışmazlığı.

III. Using the following statements answer to the questions: you are not quite right; you are mistaken; you are wrong; it is not quite so, it would be wrong to say so; I can't agree with you just the reverse; On the contrary; you are mistaken.

For.ex. If I am not mistaken. Hopkins was a wll-known chemist.

No, it's not quite so. As far as I know (as a matter of fact) Hopkins wasn't a chemist. He was engaged in biochemistry and was a famous biochemist.

1. Can you clear up one point to me? Did Hopkins really come to work at the medical school of Guy's hospital before graduation?
2. Did Niels Bohr contribute to the study in genetics?
3. Did you study all the literature in your field before writing your thesis?
4. As far as I know Hopkins is regarded as the father of vitamin chemistry.
5. I was of the opinion that biochemistry enters its modern phase nowadays.

IV. Use the phrases in sentences:

Make a contribution (on)
Make an impression
Make a mistake
Make a study of
Make use of
Make experiments
Make a summary
Make a discovery

V. Read and translate the following text without a

dictionary and guess the meaning of the unflamiliar words:

Very little can be seen in living cells with the ordinary light microscope. The structure of the cells has been made visible by various procedures: killing the cells, fixing their components so that their structural details may be observed. Cell material was embedded in a substance, which can be cut in very thin sections for viewing. The development of the light microscope has been paralleled by the development of method for preparing cells for study. By 1920 all the major components of cell which can be demonstrated with the light microscope have been described.

Unit 11. REPRODUCTIVE SYSTEM

The function of reproductive system is to produce offspring. Unlike most organ system, the reproductive system differs in men and women. These differences become noticeable as early as six weeks after an embryo begins to develop.

Male reproductive system

The male reproductive system includes sex organs and testes (male gonads) (figure 50). Two egg-shaped testes are located outside of the body cavity, in the scortum. Sperms are produced in the coiled tubes (seminiferous tubules) of the testes, and are stored in the epididymis, a coiled part of the vas deferens adjacent to the testes. One end of the epididymis connects to the testes. The other end connects to a longer tube called the vas deferens. The vas deferens extends upward into the body cavity from the testes.

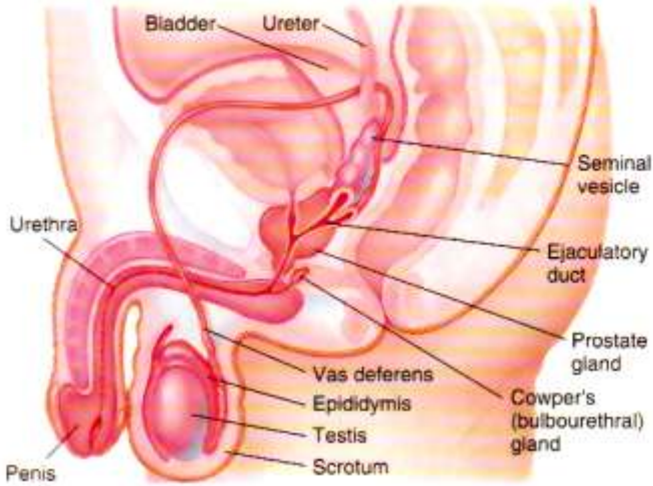

Figure 50 *The male reproductive system*

Additional structures, the prostate gland and seminal vesicles, or Cowper's gland produce fluid called semen, which serves for the transport of sperm. The fluid also contains high levels of fructose, a sugar that provides energy for the sperm. During ejaculation, the sperm, along with the liquid semen, travel through the ejaculatory duct and out of the body through the urethra. The urethra is surrounded and protected by the penis. If the sperm are not ejaculated, they eventually are reabsorbed by the tissues in the male reproductive system.

Female reproductive system

The female reproductive system includes sex organs and ovaries (female gonads) (figure 51). Two solid, almond-shaped ovaries are located inside the body cavity. Eggs, which are smaller than a pin head, are normally discharged from the ovaries one at time. The egg enters one of the two tubular structure called the oviducts, or Fallopian tubes. At the end of the oviduct are fingerlike projections. The opposite end of oviduct leads into the uterus, or womb. The uterus is a muscular, pear-shaped organ where the fertilized egg develops until birth. The narrow end of the uterus is called the cervix. The cervix extends downward into the vagina, or birth canal. The vagina serves three general purposes:

1. Vagina is a pathway through which a baby passes during birth;
2. Through the vagina the menstrual flow passes to the outside of the body;
3. Vagina is where male penis deposits sperm during intercourse.

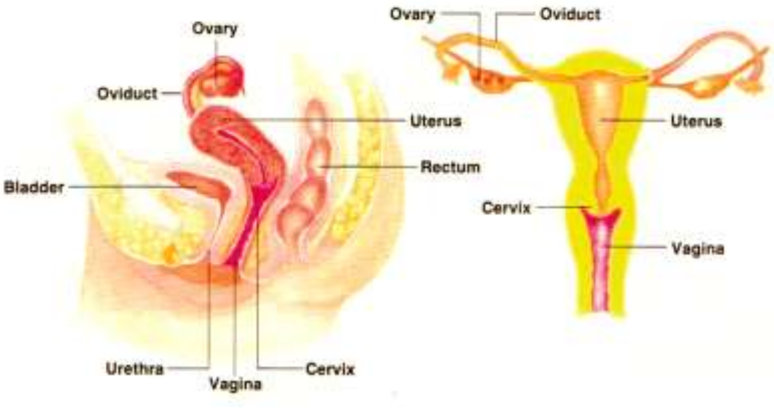

Figure 51 *The female reproductive system*

The production of egg begins before a girl is born. A baby girl is born with 300 000-400 000 of egg cells. However these eggs are not mature cells. Egg cells begin to mature, one by one, at the onset of puberty. Number of egg cells at the beginning of puberty period is about 100 000. Among these egg cells only 300-400 cells develop from the first menstruation until last one.

Girls usually reach puberty between the ages of 10 and 14. At this time, egg development begins. The eggs in each ovary are enclosed within a tiny capsule. Hormones of pituitary gland and ovaries (FSH, LH and estrogen) stimulate some of the capsules to grow. One capsule usually grows faster than others. This fluid-filled capsule begins to move to the surface of the ovary. The capsule continues to grow for 9 to 10 days.

LH hormone from the pituitary gland stimulates the capsule to burst. The egg inside the capsule is then released and moved into the oviduct. The release of the egg occurs about 14 days after the capsule begins to grow. The release of the egg from its capsule is called ovulation.

After ovulation egg begin to move through oviduct. If the egg is not fertilized by a sperm cell, it begins to break down, and the levels of progesterone and estrogen (hormones of ovaries) decrease. About after 14 days after ovulation, tissue lining and excess blood leave the uterus through the vagina. This process is called menstruation. An average length for the menstruation is 28 days.

New words and word combinations.

offspring	nəsil
noticeable	diqqətəlayiq, nəzərəçarpan
scortum	xayalıq
adjacent	bitişik
semen	toxum
vagina	uşaqlıq yolu
pathway	yol
mature	yetkin
ovulation	ovulyasiya
urethra	sidik kisəsi
uterus	uşaqlıq
muscular	əzələvi
cervix	uşaqlıq boynu
oviduct	yumurta borusu
tubular	boruşəkilli
ejaculation	eyakulyasiya
vesicles	vezikula

Exercises.

I. Find out corresponding equivalents of the following word combinations in your native language:

Egg yolk; pear-shaped; sperm duct; bladder; uterus; ovary; rectum; blind gut; mature cells; uterus womb; puberty period; prostate gland; scrotum; vas deferens; prostate canner;

almond-shaped; body cavity; pituitary gland; blood loss; blood lad; offspring; male reproductive system; fertilize egg; male sexual; scortum; follicle cells.

II. Find out corresponding equivalents of the following word combinations into English:

Yumurta sarısı; armud şəklində; sperma kanalı; qişa; balalıq; yumurtalıq; düz bağırsaq; kor bağırsaq; yetkin hüceyrələr; bətn; yetkinlik dövrü; prostat vəzi; prostat xərçəngi; badam şəklində; bədən boşluğu; hipofiz vəzi; qan itkisi; qan bağı; nəsil; kişi cinsiyyət sistemi; mayalanmış yumurta; kişi cinsi; xayalıq; follikul hüceyrələri.

III. Using words in backets answer to the questions.

1. What did your friend do after he graduated from the University? (call, become a member of the staff; work in the field of ...; combine research with teaching).
2. Why have you decided to take up biology? (physics, chemistry).
3. How is your work progressing? (quite well; succed on base; work in collaboration with ..., joint paper).
4. İs you scinetific advice a prominent scientist? (yes; rather; hold honorary degree; make a contribution to do research into ...; create).
5. Have you got much work to do at present? (yes; rather; uregent; take postgraduate studies; combine one’s studies with research).

IV. Using questions make up a talk.

1. Where did you receive education?
2. Did you join any scientific (learned) society while at the University?

3. Where did you take your first training in ... ?
4. What University did you come to work at after graduation?
5. What activities are you engaged in at present?
6. In what field of science do you carry on research?
7. What do you base your experiments (calculations theoretical considerationas) on (upon)?
8. Do you combine theoretical research with applied studies?
9. How do you plan your experiments?
10. Do you work alone or in collaboration with your collegues?

V. Translate the text into Azerbaijani and then bac into English, compare your version with the original:

Robert Hooke, an English scientist, who lived at the same time as Leeuwenhoek also made and used microscopes. One day, he cut a very thin slice of cork and put it under his lenses. He noticed that it was made of “a great many little boxes” separated by walls. He compared these to the cells of honey comb. All of the cells were field with air. This explained why cork was light and why it floated so easily.

The piece of cork that Hook examined was not alive. At one time, each “cell” had contained living matter, but the living material had died. As scientists continued to examine living things under the microscope, they slowly came to realize, that both plants and animals were made up of cells. One can easily see living plant ceels in a very thin strip of onion. These ceels fit together much like the bricks in a house. They have a cell wall made of non-living woody matter.

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Glossary

A

abacus [ˈæbəkəs]	hesab, sayqac
abbey [ˈæbi]	monastır,abbatlıq
abdomen [ˈæbdəmɛn]	qarın
abdominal cavity [æbˈdɒmɪnl ˈkævɪti]	qarın boşluğu
abolition [ˌæbəʊˈlɪʃ(ə)n]	ləğv etmə
absorb [əbˈsɔːb]	hopdurmaq, canına çəkmək
accompany [əˈkʌmpəni]	müşaiyət etmək
accomplish [əˈkɒmplɪʃ]	bitirmək, tamamlamaq
addiction [əˈdɪkʃ(ə)n]	aludəçilik, narkomaniya
addition [əˈdɪʃ(ə)n]	əlavə, toplama
adhere [ədˈhɪə]	yapışmaq
adjacent [əˈʤeɪsənt]	bitişik
adopt [əˈdɒpt]	mənimsəmək, götürmək
adult [ˈædʌlt]	yetkin
advancement [ədˈvɑːnsmənt]	irəliləmə
affectionate [əˈfɛkʃnɪt]	şəfqətli, mehriban
agile [ˈæʤaɪl]	cəld
agriculture [ˈægrɪkʌlʧə]	kənd təsərrüfatı
aid [eɪd]	kömək
aid man [eɪd mæn]	sanitar
air [eə]	hava
air medicine [eə ˈmɛdsɪn]	aviasiya tibbi
air sacs [eə sæks]	hava kisəcikləri
albumen [ˈælbjʊmɪn]	zülal
alga [ˈælgə]	yosun
alive [əˈlaɪv]	canlı, diri
alkaline [ˈælkəlaɪn]	qələvi
alloy [ˈælɔɪ]	ərinti
alter [ˈɔːltə]	dəyişmək
alternate [ɔːlˈtɜːnət]	əvəzedici

alternation [ˌɔːltəˈneɪʃ(ə)n] dəyişiklik, əvəz etmə
amount [əˈmaʊnt] məbləğ, miqdar
amphibian [æmˈfɪbɪən] amfıbıya
amputate [ˈæmpjʊteɪt] amputasiya
amuse [əˈmjuːz] əyləndirmək
anal [ˈeɪnəl] anal
anal pore [ˈeɪnəl pɔː] anal dəlik
analogue [ˈænəˌlɒg] eynilik, analoq
ancestor [ˈænsɪstə] əcdəd
anchor [ˈæŋkə] lövbər, lövbər salmaq
ancient [ˈeɪnʃ(ə)nt] qədim
anemia [əˈniːmɪə] qan azlığı
animate [ˈænɪmeɪt] canlandırmaq
ankle [ˈæŋkl] topuq
annual [ˈænjʊəl] hər il
ant [ænt] qarışqa yeyənlər
antennae [ænˈtɛniː] bığçıq
anterior [ænˈtɪərɪə] öncəki
anther [ˈænθə] tozluq
antler [ˈæntlə] maral buynuzu
anus [ˈeɪnəs] anus dəliyi
aorta [eɪˈɔːtə] aorta
apathy [ˈæpəθi] apatiya, etinasızlıq
aphides [ˈeɪfɪdiːz] bitkibiti
apical [ˈæpɪkəl] təpə, uc
appearance [əˈpɪərəns] görünüş
appendage [əˈpɛndɪʤ] əlavə
approximately [əˈprɒksɪmɪtli] təxmini, təqribi, yaxınlaşma
apricot [ˈeɪprɪkɒt] ərik
aqua [ˈækwə] su, maye
aqueduct [ˈækwɪdʌkt] su borusu
arch [ɑːtʃ] əymə, arka
arid [ˈærɪd] quru, quraq, susuz
armour [ˈɑːmə] zireh

arrange [əˈreɪnʤ]	düzmək, təşkil etmək
arrangement [əˈreɪnʤmənt]	tərtibat, razılaşma
arsenic [ˈɑːsnɪk]	mərgümüş
artificial [ɑːtɪˈfɪʃ(ə)l]	süni
aseptic [æˈsɛptɪk]	aseptik, steril
ass [æs]	eşşək
associate [əˈsəʊʃieɪt]	birləşdirmək, bağlamaq
athlete [ˈæθliːt]	atlet
attach [əˈtæʧ]	bərkitmək, yapışdırmaq
attachment [əˈtæʧmənt]	əlavə, qoşma, bağlılıq
attack [əˈtæk]	hücum etmək, həmlə
attempt [əˈtɛmpt]	cəhd
available [əˈveɪləbl]	mövcüd olan, mümkun olan
axial [ˈæksɪəl]	balta
axilla [ækˈsɪlə]	qoltuq altı, qoltuq

B

baboon [bəˈbuːn]	əntər
bacillus [bəˈsɪləs]	çöp, basil
back [bæk]	arxa, kürək
backache [ˈbækeɪk]	kürək ağrısı
backbone [ˈbækbəʊn]	onurğa
background[ˈbækgraʊnd]	arxa plan, zəmin
badger [ˈbæʤə]	porsuq
barb [bɑːb]	tikan
barberry [ˈbɑːbəri]	zirinc
bare [beə]	çılpaq
bark [bɑːk]	ağac qabığı
bathe [beɪð]	yuyunmaq,çimmək
beak [biːk]	dimdik
beam [biːm]	şüa
bean [biːn]	paxla, lobya
beast [biːst]	heyvan
beaver [ˈbiːvə]	bəbir

bee [biː]	arı
beef [biːf]	mal əti
beer [bɪə]	pivə
beet [biːt]	şəkər çuğunduru
behavior [bɪˈheɪvjə]	davranış, rəftar
belly [bɛli]	qarın, mədə
belly button[ˈbɛli ˈbʌtn]	göbək
bend [bɛnd]	əyilmə
berry [ˈbɛri]	giləmeyvə
bilateral [baɪˈlætərəl]	ikitərəfli
bile [baɪl]	öd, səfra
binary [ˈbaɪnəri]	ikili
bishop [ˈbɪʃəp]	yepiskop
bilious [ˈbɪliəs]	öd
biliousness [ˈbɪliəsnəs]	sarılıq
bitter [ˈbɪtə]	acı
blacksmith [ˈblæksmɪθ]	dəmirçi
bladder [ˈblædə]	qişa
blade [bleɪd]	tiyə, bıçaq,
bleed [bliːd]	qanaxma
blind [blaɪnd]	kor
blob [blɒb]	damcı
blood [blʌd]	qan
bloodstream[ˈblʌdˌstriːm]	qan dövranı
blotch [blɒʧ]	sızanaq, ləkə
board [bɔːd]	taxta, lövhə
bog [bɒg]	bataqlıq, lehmə
bone [bəʊn]	sümük
booth [buːð]	kiosk, köşk
border [ˈbɔːdə]	sərhəd
borer [ˈbɔːrə]	qazmaçı, burğu
bottom [ˈbɒtəm]	alt, dib
boulder [ˈbəʊldə]	qənbər
brain [breɪn]	beyin

branch [brɑːnʧ]	şöbə, hissə
brass [brɑːs]	sarı mis
brave [breɪv]	cəsarətli, igid
break [breɪk]	fasilə, sınıq
breakdown[ˈbreɪkˌdaʊn]	zəifləmə, qəza
breath [brɛθ]	nəfəs almaq
bridge [brɪʤ]	körpü
brine [braɪn]	şoraba
broad [brɔːd]	geniş
bronze [brɒnz]	bürünc
brood [bruːd]	körpə
bubble [ˈbʌbl]	köpük, qovuq
bud [bʌd]	tumurcuk, qönçə
buffalo [ˈbʌfələʊ]	camış
bulge [bʌlʤ]	qabarıqlıq
bunch [bʌnʧ]	dəstə, salxım
bundle [ˈbʌndl]	büküş
burrow [ˈbɜːrəʊ]	eşmək, dəmək
bury [ˈbɛri]	gömmək
bush [bʊʃ]	kol

C

cabbage [ˈkæbɪʤ]	kələm
cactus [ˈkæktəs]	kaktus
calculate [ˈkælkjʊleɪt]	hesablamaq
calico [ˈkælɪkəʊ]	kolenkor
calve [kɑːv]	buzovlamaq
camel [ˈkæməl]	dəvə
camouflage [ˈkæmʊflɑːʒ]	maskalanmaq,hiylə
canine [ˈkeɪnʌɪn]	köpək dişi
capillary [kəˈpɪləri]	kapilyar
capital [ˈkæpɪtl]	paytaxt
capture [ˈkæpʧə]	ələ keçirmək
caribou [ˈkærɪbuː]	şimal maralı

carnation [kɑːˈneɪʃən]	qərənfil
carnivorous [kɑːˈnɪvərəs]	ətyeyən
carotid [kəˈrɒtɪd]	yuxu arteries
carpenter [ˈkɑːpɪntə]	dülgər
carrageen [ˈkærəgiːn]	inci mamır
carrot [ˈkærət]	yer kökü
cart [kɑːt]	araba, daşımaq
cartilage [ˈkɑːtɪlɪʤ]	qığırdaq
cast [kɑːst]	atmaq, tökmək
cattle [ˈkætl]	mal-qara
cave [keɪv]	mağara
cavity [ˈkævɪti]	boşluq
caw [kɒ]	qarıldamaq
cease [siːs]	dayandırmaq
cedar [ˈsiːdə]	sidr, kökə
cell [sɛl]	hüceyrə
cell wall [sɛl wɔːl]	hüceyrə divarı
cereal [ˈsɪərɪəl]	taxıl
cerebrum [ˈsɪərɪəl]	beyin
cervix [ˈsɜːvɪks]	uşaqlıq boyunu
chalk [ʧɔːk]	tabaşir
chapel [ˈʃæpəl]	ibadətgah
chamber [ˈʃæpəl]	kamera (ürəkdə)
charity [ˈʧærɪti]	xeyriyyəçilik
chase [ʧeɪs]	izləmək
chastity [ˈʧæstɪti]	ismət, ismətlilik
chemical [ˈkɛmɪkəl]	kimyəvi maddə
chew [ʧuː]	çeynəmə, gövşəmə
chief [ʧiːf]	əsas, aparıcı
chimney [ʧiːf]	tüstü borusu
chit [ʧɪt]	cücərti
chloroplast[ˈklɔːrə(ʊ)plast]	xloroplast
choir [ˈkwaɪə]	xor
choreography [kɒrɪˈɒgrəfi]	xoreoqrafiya

cilia [ˈsɪlɪə]	kirpikcik
cinnamon [ˈsɪnəmən]	darçın
circulate [ˈsɜːkjʊleɪt]	dövr etmək
clam [klæm]	mollyusk
classification[klæsɪfɪˈkeɪʃə]	təsnifat
clavicle [ˈklævɪkl]	körpücük sümüyü
claw [klɔː]	caynaq, pəncə
clay [kleɪ]	gil
clean [kliːn]	təmiz
cliff [klɪf]	sıldırım qaya
climb [klaɪm]	dırmaşmaq
cling [klɪŋ]	yapışmaq
clot [klɒt]	laxta, qatılaşmaq
cloth [klɒθ]	parça, paltar
clover [ˈkləʊvə]	yonca
clove [kləʊv]	mixək
clumsy [ˈklʌmzi]	yöndəmsiz
cluster [ˈklʌstə]	salxım, dəstə
clutch [klʌʧ]	mufti, qısqac, sıxac
coal [kəʊl]	kömür
coast [kəʊst]	sahil
coax [kəʊks]	razılaşdırmaq
cockroach [ˈkɒkrəʊʧ]	tarakan
collaps [kəˈlæps]	dağılmaq
colon [ˈkəʊlən]	bağırsaq
combination[kɒmbɪˈneɪʃən]	birləşmə
community [kəˈmjuːnɪti]	icma, ictimaiyyət
component [kəmˈpəʊnənt]	element, tərkib
compound [ˈkɒmpaʊnd]	mürəkkəb
comprise [kəmˈpraɪz]	ibarət olmaq
concern [kənˈsɜːn]	qayğı, şamil
conduct [kənˈdʌkt]	davranış
cone [kəʊn]	şkala, ölçü, miqyas
conifer [ˈkəʊnɪfə]	iynəyarpaqlı ağac

conjugation[kɒndʒʊˈgeɪʃən]	təsrif
connect [kəˈnɛkt]	əlaqələndirmək
conquere [ˈkɒŋkə]	fəth etmək
considerable [kənˈsɪdərəbl]	xeyli, əhəmiyyətli
constant [ˈkɒnstənt]	daimi, sabit
contain [kənˈteɪn]	daxilində olmaq
contractility [kɒntrækˈtɪlɪti]	müqavimət
convent [ˈkɒnvənt]	qadın monastırı
convert [kənˈvɜːt]	dönüşmək, çevirmək
copper [ˈkɒpə]	mis
copulate [ˈkɒpjʊleɪt]	birləşmə
coral [ˈkɒrəl]	mərcan
cord [kɔːd]	sim
cork [kɔːk]	mantar, tıxac
corn [kɔːn]	dən, taxıl, qarğıdalı
corrode [kəˈrəʊd]	paslanmaq
cortex [ˈkɔːtɛks]	qabıq
council [ˈkaʊns(ə)]	məclis, şura
count [kaʊnt]	hesablamaq
courtier [ˈkɔːtɪə]	saray əhli
crack [kræk]	yarıq, çatlaq
craft [krɑːft]	sənətkarlıq
crash [kræʃ]	qəza
crayfish [ˈkreɪfɪʃ]	xərçəng
creature [ˈkriːʧə]	məxluq
crevasse [krɪˈvæs]	buzlağda bir yarğan
crew [kruː]	ekipaj, briqada
crop [krɒp]	məhsul, bəhrə
cross [krɒs]	keçmək, kəsişmək
crow [krəʊ]	qarğa
crude [kruːd]	yetişməmiş
crust [krʌst]	qabıq, yer qabığı
crustaceans [krʌˈsteɪʃənz]	xərçəng kimilər
cuckoo [ˈkʊkuː]	ququ quşu

cultivate [kʌltıveıt]	yetişdirmək, becərmək
cure [kjʊə]	müalicə, sağaltmaq
curiosity [kjʊərıˈɒsıti]	maraq, qəribəlik
current [ˈkʌrənt]	cərəyan, axın
custom [ˈkʌstəm]	adət
cuticle [ˈkjuːtıkl]	qabıqüstü, kutikula
cycle [ˈsaıkl]	dövrü, dövr
cytoplasm [ˈsaıtəplæzm]	sitoplazma

D

damage [ˈdæmıʤ]	zədə, ziyan
damp [dæmp]	nəm
dandelion [ˈdændılaıən]	zəncirotu
deal [diːl]	anlaşma
decay [dıˈkeı]	çürümək
deciduous [dıˈsıdjʊəs]	yarpaqlı
decompose [diːkəmˈpəʊz]	çürümək
decorate [ˈdɛkəreıt]	bəzəmək
deep [diːp]	dərin
defeat [dıˈfiːt]	məğlub olmaq
defense [dıˈfɛns]	müdafiə
demand [dıˈmɑːnd]	tələb etmək
depth [dɛpθ]	dərinlik
desert [ˈdezət]	səhra
destroy [dısˈtrɔı]	məhf etmək
destruction [dısˈtrʌkʃən]	dağıntı
detect [dıˈtɛkt]	aşkar etmək
determine [dıˈtɜːmın]	müəyyən etmək
devour [dıˈvaʊə]	acgözlüklə yemək
differ [ˈdıfə]	fərqlənmək
difference [ˈdıfrəns]	fərq
diffusion [dıˈfjuːʒən]	diffuziya, yayılma
digest [daıˈdʒest]	həzm etmək,

sinirmək

digestion [dɪˈʤɛsʧən]	həzm
dilate [daɪˈleɪt]	genişlənmək
diphtheria [dɪfˈθɪərɪə]	difteriya
direct [dɪˈrɛkt]	birbaşa
disease [dɪˈziːz]	xəstəlik
distinguished [dɪsˈtɪŋgwɪʃt]	görkəmli, seçilən
distortion [dɪsˈtɔːʃən]	təhrif
dock [dɒk]	turşəng
domesticate [dəʊˈmɛstɪkeɪt]	əhliləşdirmək
dominate [ˈdɒmɪneɪt]	ağalıq etmək
doom [duːm]	əcəl
drain [dreɪn]	qurutmaq
draught [drɑːft]	layihə, çertyoj
dread [drɛd]	dəhşətli
drench [drɛnʧ]	islatmaq
drone [drəʊn]	vızıltı, uğultu
drop [drɒp]	damcı
drug [drʌg]	dərman
duct [dʌkt]	kanal
dye [daɪ]	boya

E

ear [ɪə]	qulaq
eardrum [ˈɪədrʌm]	qulaq pərdəsi
eclipse [ɪˈklɪps]	tutulma
efficient [ɪˈfɪʃənt]	səmərəli, məhsuldar
effort [ˈɛfət]	səy, cəhd
elbow [ˈɛlbəʊ]	dirsək
embroidery [ɪmˈbrɔɪdəri]	tikmə, naxış
embryo [ˈɛmbrɪəʊ]	rüşeym, embrion
enamel [ɪˈnæməl]	mina, diş minası
enclose [ɪnˈkləʊz]	dövrələmək
energy [ˈɛnəʤi]	enerji

enormous [ɪˈnɔːməs]	çox böyük
entertain [ˌɛntəˈteɪn]	əyləndirmək
environment[ɪnˈvaɪərənmənt]	ətraf mühit
enzyme [ˈɛnzaɪm]	ferment
equal [ˈiːkwəl]	bərabər, tən
equalize [ˈiːkwəlaɪz]	bərabərləşdirmək
essential [ɪˈsɛnʃəl]	əsas, vacib
estuary [ˈɛstjʊəri]	mənsəb
evaporation [ɪˌvæpəˈreɪʃən]	buxarlanma
evolve [ɪˈvɒlv]	inkişaf etmə
excavate [ˈɛkskəveɪt]	qazımaq
excess [ɪkˈsɛs]	ifrat, artıq
excite [ɪkˈsaɪt]	həyəcanlanmaq
excrete [ɛksˈkriːt]	ifraz etmək
excretory [ɛksˈkriːtəri]	ifrazat, ifrazedici
exhale [ɛksˈheɪl]	nəfəs almaq
exist [ɪgˈzɪst]	mövcud olmaq
expand [ɪksˈpænd]	genişləndirmək
explore [ɪksˈplɔː]	araştırmaq
explorer [ɪksˈplɔːrə]	tədqiqatçı
explosion [ɪksˈpləʊʒən]	partlayış
expose [ɪkˈspəʊz]	düçar etmək
extent [ɪksˈtɛnt]	genişləndirmək
external [ɛksˈtɜːnl]	xarici
eye [aɪ]	göz
eyespot [ˈʌɪspɒt]	göz qapağı

F

fade [feɪd]	solmaq
fat [fæt]	yağ, piy
fatal [ˈfeɪtl]	ölümcül
feast [fiːst]	ziyafət, bayram
feather [ˈfɛðə]	lələk
feature [ˈfiːʧə]	xüsusiyyət

feces [ˈfiːsiːz]	nəcis
female [ˈfiːmeɪl]	dişi
femur [ˈfiːmə]	bud sümüyü, ələngə
fern [fɜːn]	qıcı, ayıdöşəyi
ferocious [fəˈrəʊʃəs]	şiddətli
ferrous metal [ˈfɛrəs ˈmɛtl]	qara metal
fertile [ˈfɜːtaɪl]	bəhrəli, zəngin
fertilize [ˈfɜːtɪlaɪz]	mayalandırmaq
fertilizer [ˈfɜːtɪlaɪzə]	gübrə
fetch [fɛʧ]	gətirmək
fiber [faɪbə]	lif
fig [fɪg]	əncir
fill [fɪl]	doldurmaq
fin [fɪn]	üzgəc
finger [ˈfɪŋgə]	barmaq
flagellate [ˈflæʤɛleɪt]	qamçılamaq
flap [flæp]	əl çalmaq
flat [flæt]	düz, düzənlik
flax [flæks]	kətan
fleck [flɛk]	ləkə
flee [fliː]	qaçıb xilas olmaq
fleet [fliːt]	donanma
flesh [flɛʃ]	ət, bədən
flexible [ˈflɛksəbl]	çevik
flint [flɪnt]	çaxmaq
float [fləʊt]	üzmək
flock [flɒk]	Sürü
flour [ˈflaʊə]	Un
flourish [ˈflʌrɪʃ]	inkişaf
fluid [ˈflu(ː)ɪd]	maye
foe [fəʊ]	düşmən
fold [fəʊld]	büküş, qat
follicle [ˈfɒlɪkl]	folekul
follow [ˈfɒləʊ]	ardına düşmək

follower [ˈfɒləʊə]	davamçı, xələf
food [fuːd]	qida
food stuff [fuːd stʌf]	qida məhsulları
foot [fʊt]	ayaq, piyada
forbid [fəˈbɪd]	qadağan etmək
forecast [ˈfɔːkɑːst]	proqnozlaşdırmaq
forehead [ˈfɔːhɛd]	alın
foretell [fɔːˈtɛl]	proqnozlaşdırmaq
fossil [ˈfɒsl]	qazıntı
found [faʊnd]	yaratmaq
foundation [faʊnˈdeɪʃən]	təməl
fragile [ˈfræʤaɪl]	kövrək, davamsız
fragment [ˈfrægmənt]	fraqment, hissə
freed [friːd]	azad etmək
freeze [friːz]	donmaq
frost [frɒst]	şaxta
fuel [fjʊəl]	yanacaq
fungus [ˈfʌŋgəs]	göbələk
fur [fɜː]	xəz
furnace [ˈfɜːnɪs]	odluq, peç
fusion [ˈfjuːʒən]	qovşaq
fuzz [fʌz]	tük, lələk

G

gallbladder [ˈgɔːlˌblædə]	öd kisəsi, ödlük
gargle [ˈgɑːgl]	qarqara
gate [geɪt]	darvaza
gather [ˈgæðə]	toplamaq
gelatinous [ʤɪˈlætɪnəs]	jelatin
generation [ʤɛnəˈreɪʃən]	nəsil
genus [ˈʤiːnəs]	sinir, növ
germ [ʤɜːm]	mikrob
gild [gɪld]	zərləmək
gill [gɪl]	qəlsəmə

ginger [ˈʤɪnʤə]	zəncəfil
gizzard [ˈgɪzəd]	pətənək
glee [gliː]	şənlik
glide [glaɪd]	sürüşmək
glory [ˈglɔːri]	şöhrət
glossy [ˈglɒsi]	parlaq
glucose [ˈgluːkəʊs]	qlükoza
gnaw [nɔː]	deşmək, gəmirmək
goat [ʤiːəʊtiː]	keçi
gorge [gɔːʤ]	dərə, qobu
governor [ˈgʌvənə]	qubernator
grace [greɪs]	zəriflik
grain [greɪn]	toxum
grass [grɑːs]	ot (yaşıl), çəmən
grasshopper [ˈgrɑːsˌhɒpə]	çəyirtkə, cırcırama
grate [greɪt]	barmaqlıq
gravel [ˈgrævəl]	çınqıl
gravity [ˈgrævɪti]	cazibə qüvvəsi
graze [greɪz]	otarmaq
ground [graʊnd]	yer, torpaq
grove [grəʊv]	ağaclıq
grub [grʌb]	sürfə
guard [gɑːd]	qorumaq, gözətçı
gullet [ˈgʌlɪt]	udlaq, xirtdək
gum [gʌm]	damaq
gun [gʌn]	silah
gunpowder [ˈgʌnˌpaʊdə]	barıt

H

hail [heɪl]	dolu, yağmaq
hair [heə]	saç
hammer [ˈhæmə]	çəkic
handsome [ˈhænsəm]	yaraşıqlı
harbor [ˈhɑːbə]	sığınacaq

hare [heə]	dovşan
harm [hɑːm]	zərər, ziyan
harpoon [hɑːˈpuːn]	qarpun
harvest [ˈhɑːvɪst]	məhsul, biçin
hatch [hæʧ]	yumurtadan çıxmaq
haul [hɔːl]	daşıma, ov
heart [hɑːt]	ürək
heart rate [hɑːt reɪt]	ürək döyüntüsü
hedge [hɛʤ]	çəpər
heel [hiːl]	daban
helmet [ˈhɛlmɪt]	kaska, dəbilqə
hemisphere [ˈhɛmɪsfɪə]	yarımkürə
herd [hɜːd]	Sürü
hero [ˈhɪərəʊ]	qəhrəman
hibernate [haɪbɜːneɪt]	qışlamaq
hill [hɪl]	təpə
hillside [ˈhɪlˌsaɪd]	yamac
hollow [ˈhɒləʊ]	oyuq, boş, çuxur
holy [ˈhəʊli]	müqəddəs
horn [hɔːn]	buynuz
hub [hʌb]	mərkəz, orta
huge [hjuːʤ]	çox böyük, nəhəng
hump [hʌmp]	donqar
hung [hʌŋ]	asılmaq, sallamaq
hut [hʌt]	daxma

İ

immense [ɪˈmɛns]	böyük, möhtəşəm
impress [ɪmˈprɛs]	təsir etmək
improve [ɪmˈpruːv]	təkminləşdirilmə
incisor [ɪnˈsaɪzə]	kəsici diş
include [ɪnˈkluːd]	daxil etmək
increase [ɪnˈkriːs]	artırmaq
infect [ɪnˈfɛkt]	yoluxdurma

inflammation [ɪnfləˈmeɪʃən]	iltihab
influence [ˈɪnflʊəns]	təsir
inhabit [ɪnˈhabɪt]	yaşamaq
inhabitant [ɪnˈhæbɪtənt]	sakin
inhale [ɪnˈheɪl]	nəfəs almaq
initiate [ɪˈnɪʃieɪt]	başlamaq
inject [ɪnˈdʒɛkt]	iynə vurmaq
injure [ˈɪndʒə]	xətər yetirmək
ink [ɪŋk]	mürəkkəb
inner [ɪŋk]	daxili
inspire [ɪnˈspʌɪə]	ruhlandırmaq
insulate [ˈɪnsjʊleɪt]	izolyasiya etmək
insurance [ɪnˈʃʊər(ə)ns]	sığorta
interior [ɪnˈtɪərɪə]	interyer
internal [ɪnˈtəːn(ə)l]	daxili
intestine [ɪnˈtɛstɪn]	bağırsaq
introduce [ɪntrəˈdjuːs]	təqdim etmək
intruder [ɪnˈtruːdə]	çağırılmamış qonaq
invasion [ɪnˈveɪʒ(ə)n]	işğal
invent [ɪnˈvɛnt]	kəşf etmək
invisible [ɪnˈvɪzɪb(ə)l]	görünməz
involve [ɪnˈvɪzɪb(ə)l]	daxil etmək
iris [ˈaɪərɪs]	göz qişası
iron [ˈaɪən]	dəmir
irrigate [ˈɪrɪgeɪt]	suvarmaq
ivory [ˈaɪvəri]	fil sümüyü

J

jaw [ʤɔː]	çənə
jejunum [ʤɪˈʤuːnəm]	nazik bağırsaq
jelly [ˈʤɛli]	jele
jitter [ˈʤɪtə]	sarsılmaq
join [ʤɔɪn]	qoşulmaq
joint [ʤɔɪnt]	oynaq, birləşmə

joint cavity [ʤɔɪnt ˈkævɪti]	oynaq boşluğu

K

kindred [ˈkɪndrɪd]	qan qohumluğu
kangaroos [ˌkæŋgəˈruːz]	kenquru
kidney [ˈkɪdni]	böyrək
kinsmen [ˈkɪnzmən]	əqraba
knee [niː]	diz
knee cap [niː ˈkæp]	diz qapağı
knight [naɪt]	cəngavər
knob [nɒb]	düyün, şişkinlik

L

label [ˈleɪbl]	yarlıq, birkalamaq
lack [læk]	catışmamazlıq
land [lænd]	enmək
lark [lɑːk]	torağay
larva [ˈlɑːvə]	sürfə, barama
larynx [ˈlærɪŋks]	qırtlaq
lash [læʃ]	kirpik
lateral [ˈlætərəl]	yan tərəf
layer [ˈleɪə]	qat, təbəqə
lax [læks]	zəif, cansız
lead [liːd]	qurğuşun
leaf [liːf]	yarpaq
leap [liːp]	tullanmaq
leather [ˈlɛðə]	dəri
leg [lɛg]	ayaq
leprosy [ˈlɛprəsi]	cüzam
lethargy [ˈlɛθəʤi]	uzun sürən yuxu
letter [ˈlɛtə]	hərf, məktub
leukemia [ljuːˈkiːmɪə]	ağqanlılıq
lichen [ˈlaɪkən]	dəri xəstəliyi
lid [lɪd]	göz qapağı

light [laɪt]	Işıq
lighthouse [ˈlaɪthaʊs]	mayak
lily [ˈlɪli]	zanbaq
limb [lɪm]	bədən üzvü
lymph [lɪmf]	limfa
link [lɪŋk]	əlaqə, birləşmə
liquid [ˈlɪkwɪd]	maye
liver [ˈlɪvə]	qara ciyər
lizard [ˈlɪzəd]	kərtənkələ
locate [ləʊˈkeɪt]	yerləşdirmək
logic [ˈlɒʤɪk]	məntiq
loop [luːp]	ilmə
lumber [ˈlʌmbə]	ləngər
lung [lʌŋ]	ağciyər
luscious [ˈlʌʃəs]	şirəli
lymph [lɪmf]	limfa
lymph nodes [lɪmf nəʊdz]	limfa düyünləri

M

mace [meɪs]	gürz, toppuz
magnificent [mægˈnɪfɪsnt]	möhtəşəm
magnify [ˈmægnɪfaɪ]	yüksəlmək
magpie [ˈmægpaɪ]	sağsağan
maintain [meɪnˈteɪn]	qorumaq, saxlamaq
maize [meɪz]	qarğıdalı
major [ˈmeɪʤə]	əsas, böyük
majority [məˈʤɒrɪti]	əksəriyyət, çoxluq
male [meɪl]	erkək
mammals [ˈmæməlz]	məməlilər
mantle [ˈmæntl]	mantiya, manto
maple [ˈmeɪpl]	qayınağacı
marble [ˈmɑːbl]	mərmər
mare [meə]	dişi inəy
marsh [mɑːʃ]	bataqlıq

marsupials [mɑːˈsuːpiəlz]	kisəlilər
marvel [ˈmɑːvəl]	möcüzə
mass [mæs]	kütlə
mate [meɪt]	yoldaş, cütləşmə
matter [ˈmætə]	maddə, iş
mature [məˈtjʊə]	yetkin
maturate [ˈmætjʊəreɪt]	yetişmək
maxilla [mækˈsɪlə]	çənə
medicine [ˈmɛdsɪn]	tibb
melt [mɛlt]	ərimək, ərinti
merchant [ˈmɜːʧənt]	tacir
merely [ˈmɪəli]	təkcə, ancaq
merge [mɜːʤ]	birləşmək, qatımaq
mild [maɪld]	yumşaq
millet [ˈmɪlɪt]	darı, suluf
minstrel [ˈmɪnstrəl]	menestrel
moisture [ˈmɔɪsʧə]	rütübət, nəmlik
molar [ˈməʊlə]	azıdişi
mold [məʊld]	qəlib, kif
mole [məʊl]	xal, köstəbək
molt [məʊlt]	qabıqdan çıxmaq
monk [mʌŋk]	rahib
mosque [mɒsk]	məscid
mosquito [məsˈkiːtəʊ]	ağcaqanad
moss [mɒs]	mamır
mouth [maʊθ]	ağız
move [muːv]	hərəkət etmək
mucus [ˈmjuːkəs]	selik
multiply [ˈmʌltɪplaɪ]	çoxalmaq
muscle [ˈmʌsl]	əzələ
mustard [ˈmʌstəd]	xardal
mutton [ˈmʌtn]	qoyun

N

narrow [ˈnærəʊ]	dar, daraltmaq
nasal [ˈneɪzəl]	burun
native [ˈneɪtɪv]	doğma
nectar [ˈnɛktə]	nektar
needle [ˈniːdl]	iynə, iynələmək
neglect [nɪˈglɛkt]	laqeydlik, sahibsizlik
neighbor [nɪˈglɛkt]	qonşu
nerve [nɜːv]	sinir
nest [nɛst]	yuva
net [nɛt]	təmiz, duru
network [ˈnɛtwɜːk]	şəbəkə
night [naɪt]	gecə
nitrogen [ˈnaɪtrəʤən]	azot
noble [ˈnəʊbl]	zadəgan
nonsense [ˈnɒnsəns]	cəfəngiyat
notice [ˈnəʊtɪs]	görmək, sezmək
nourish [ˈnʌrɪʃ]	qidalandırmaq
nuclear [ˈnjuːklɪə]	nüvə
numerous [ˈnjuːmərəs]	çoxsaylı
nutmeg [ˈnʌtmɛg]	yer fındığı
nutrient [ˈnjuːtrɪənt]	qida
nutrition [nju(ː)ˈtrɪʃən]	qidalanma, qidalı
nymph [nɪmf]	pəri, huri

O

oak [əʊk]	Palıd
observe [əbˈzɜːv]	müşahidə etmək
occur [əˈkɜː]	baş vermək
oil [ɔɪl]	yağ, neft
oil well [ɔɪl wɛl]	neft buruğu
oppose [əˈpəʊz]	qarşı durmaq
opposite [ˈɒpəzɪt]	əksinə, qarşı
orchid [ˈɔːkɪd]	orxideya, səhləb

ore [ɔː]	filiz
origin [ˈɒrɪʤɪn]	mənşə, mənbə
originate [əˈrɪʤɪneɪt]	yaratmaq
ornament [ˈɔːnəmənt]	bəzək, naxış
otherwise [ˈʌðəwaɪz]	əks halda
otter [ˈɒtə]	susamuru
ovarian [əʊˈvɛːrɪən]	yumurtalıq
oxen [ˈɒksən]	öküz

P

paddle [ˈpædl]	avar çəkmək, avar
paint [peɪnt]	boyamaq, rəngləmək
pancreas [ˈpæŋkrɪəs]	mədəaltı vəz
parasite [ˈpærəsaɪt]	parazit, tüfeyli
parasol [ˈpærəsɒl]	çətir
parr [pɑː]	gənc qızıl balığ
parsnip [ˈpɑːsnɪp]	yabanı kök
pasture [ˈpɑːsʧə]	otlaq
patche [patʃ]	yamaq, taxta
patella [pəˈtɛlə]	diz qapağı
path [pɑːθ]	yol
pathway [ˈpɑːθweɪ]	yol, cığır
paw [pɔː]	pəncə
pea [piː]	noxud
peach [piːʧ]	şaftalı
peak [piːk]	zirvə
pear [peə]	armud
pearly lining [pɜːli ˈlaɪnɪŋ]	inci astarlı
peasant [ˈpɛzənt]	kəndli
peat [piːt]	torf mamuru
pebble [ˈpɛbl]	çınqıl
peel [piːl]	soymaq
pelvis [ˈpɛlvɪs]	çanaq
perch [pɜːʧ]	qonmaq

perfom [pəˈfɔːm]	yerinə yetirmək
permanent [ˈpɜːmənənt]	daimi
petal [ˈpɛtl]	ləçək
petiole [ˈpɛtɪəʊl]	yarpaq sapı
phase [feɪz]	faza
phylum [ˈfaɪləm]	tip
pig [pɪg]	donuz
pigment [ˈpɪgmənt]	pigment, boya
pilgrimage [ˈpɪlgrɪmɪʤ]	ziyarət, ibadətçilik
pinch [pɪnʧ]	sıxmaq, çimdik
pine [paɪn]	Şam
pipe [paɪp]	boru, tütək
pistil [ˈpɪstɪl]	dişicik
pith [pɪθ]	məğz, özək
pithy [ˈpɪθi]	məzmunlu, maraqlı
plain [pleɪn]	Düz
plant [plɑːnt]	Bitki
plaster [ˈplɑːstə]	malalamaq
pleas [pliːz]	istək
plentiful [ˈplɛntɪf(ə)l]	bol, bərəkətli
plenty [ˈplɛnti]	çox, külli, bol
plot [plɒt]	Süjet
plough [plaʊ]	şumlamaq
pluck [plʌk]	toplamaq, dərmək
plum [plʌm]	gavalı
plumage [ˈpluːmɪʤ]	lələk
poison [ˈpɔɪzn]	zəhər
pollen [ˈpɒlɪn]	tozcuq
pollination [pɒlɪˈneɪʃən]	tozlanma
polyp [ˈpɒlɪp]	Polip
pore [pɔː]	məsamə
portion [ˈpɔːʃən]	hissə, pay
possess [pəˈzɛs]	sahib olmaq
potash [ˈpɒtæʃ]	kalium karbonat

pound [paʊnd]	narınlamaq
pray [preɪ]	dua etmək
pressure [ˈprɛʃə]	təzyiq
prevent [prɪˈvɛnt]	qarşısını almaq
prey [preɪ]	yırtıcı, vəhşi, yem
prickle [ˈprɪkl]	tikan
priest [priːst]	keşiş
primary [ˈpraɪməri]	ilk, əvvəl, əsas
primate [primate]	primat
prisoner [ˈprɪznə]	məhbus
prong [prɒŋ]	diş
proof [pruːf]	sübut
proper [ˈprɒpə] spɛk	müvafiq
prophet [ˈprɒfɪt]	peyğəmbər
protect [prəˈtɛkt]	müdafiə etmək
protector [prəˈtɛktə]	müdafiəçi
psychologist [saɪˈkɒlədʒɪst]	psixoloq
puberty [ˈpjuːbəti]	cinsi yetkinlik
pulmonary [ˈpʌlmənəri]	ağciyər, ciyər
pulse [pʌls]	nəbz
pump [pʌmp]	sourmaq
pumpkin [ˈpʌmpkɪn]	balqabaq
pupil [ˈpjuːpl]	bəbək, gilə, şagird

Q

quantity [ˈkwɒntɪti]	miqdar
quicksilver [ˈkwɪkˌsɪlvə]	civə
quarry [ˈkwɒri]	karxana

R

race [reɪs]	irqi
radiate [ˈreɪdieɪt]	parıltı
raid [reɪd]	reyd, basqın
rain [reɪn]	yağış

ram [ræm]	qoç
rapid [ˈræpɪd]	tez, cəld, sürətli
ratio [ˈreɪʃɪəʊ]	nisbət
ray [reɪ]	şüa
reach [riːʧ]	gəlib çatmaq
realise [ˈrɪəlaɪz]	anlamaq
admiral [ˈædmərəl]	admiral
rear-admiral [ˈrɪəˈædmərəl]	kont-admiral
receptacle [rɪˈsɛptəkl]	yuva
rectangle [ˈrɛkˌtæŋgl]	düzbucaq
rectum [ˈrɛktəm]	düz bağırsaq
reduce [rɪˈdjuːs]	azaltmaq
reed [riːd]	qamış
refer [rɪˈfɜː]	yönəltmək
reflect [rɪˈflɛkt]	əks etdimək
regard [rɪˈgɑːd]	münasibət
regenerate [rɪˈdʒenəreɪt]	yenilənmək
regulate [ˈrɛgjʊleɪt]	tənzimləmək
reign [reɪn]	səltənət sürmək
reindeer [ˈreɪndɪə]	şimal maralı
remain [rɪˈmeɪn]	qalmaq
reptiles [ˈrɛptaɪl]	sürünən heyvan
require [rɪˈkwaɪə]	tələb etmək
rescue [ˈrɛskjuː]	xilas etmək
resemble [rɪˈzɛmbl]	bənzəmək
reservoir [ˈrɛzəvwɑː]	su anbarı
respiratory [rɪˈspɪrət(ə)ri]	nəfəs, tənəffus
respond [rɪsˈpɒnd]	cavab vermək
responsible [rɪsˈpɒnsəbl]	məsul, cavabdeh
reticulum [rɪˈtɪkjʊləm]	oxşar şəbəkə quruluş
retract [rɪˈtrækt]	geri çəkilmək
rhizoid [ˈrʌɪzɔɪd]	kökəbənzər
rhizome [ˈrʌɪzəʊm]	ana kök
rib [rɪb]	qabırğa

rice [raɪs]	düyü
riddle [ˈrɪdl]	müəma
rigid [ˈrɪʤɪd]	qatı, sərt
rind [raɪnd]	qabıq, dəri
ring [rɪŋ]	üzük, həlgə
ripe [raɪp]	yetişmiş
rivalry [ˈraɪvəlri]	rəqabət, rəqiblik
rod [rɒd]	çubuq
rodent [ˈrəʊdənt]	gəmirici, kəsəyən
rook [rʊk]	zağca, qarğa
rot [rɒt]	çürütmək, çürümək
row [raʊ]	sıra, cərgə
rudder [ˈrʌdə]	sükan
rust [rʌst]	pas
rye [raɪ]	çovdar

S

sac [sæk]	çuval
sack [sæk]	turba
sacred [ˈseɪkrɪd]	müqəddəs
sail [seɪl]	yelkənlə üzmək
saliva [səˈlaɪvə]	tüpürcək
salmon [ˈsæmən]	qızıl balıq
sandal [ˈsændl]	səndəl
sap [sæp]	şirə
sapling [ˈsæplɪŋ]	fidan
savage [ˈsævɪʤ]	vəhşi, qəddar
scale [skeɪl]	miqyas
scapula [ˈskæpjʊlə]	kürək
scarlet [ˈskɑːlɪt]	qırmızı
scatter [ˈskætə]	səpələmək
scenery [ˈsiːnəri]	mənzərə
scrape [skreɪp]	sıyırmaq, qaşımaq
screen [skriːn]	ekran, pərdə

scribe [skraɪb]	katib
scum [skʌm]	lığa, kəf
seal [siːl siːl siːl]	möhür
sea [siː]	dəniz
seaweed [ˈsiːwiːd]	yosun
seed [siːd]	toxum
seek [siːk]	axtarmaq
semen [ˈsiːmɛn]	toxum
sense [sɛns]	hiss
sepal [ˈsɛpəl]	çanaq yarpağı
separate [ˈseprət]	ayrı, ayrıca
septa [ˈsɛptə]	bölmə, arakəsmə
sequence [ˈsiːkwəns]	ardıcıllıq
sequoia [sɪˈkwɔɪə]	sekvoya
serpent [ˈsɜːpənt]	ilan
settle [ˈsɛtl]	məkan salmaq
shape [ʃeɪp]	forma
sheath [ʃiːθ]	qın, qab
sheet [ʃiːt]	vərəq
shell [ʃɛl]	qabıq
shelter [ˈʃɛltə]	sığındırmaq
shield [ʃiːld]	qalxan
shoot [ʃuːt]	güllələmək
shooting stars [ˈʃuːtɪŋ stɑːz]	ulduz axını
shrine [ʃraɪn]	məqbərə, kilsə
shrink [ʃrɪŋk]	büzülmək, qısalmaq
shrivel [ˈʃrɪvl]	qırışmaq, bürüşmək
shrub [ʃrʌb]	çalı, kol
siege [siːʤ]	mühasirə
sinew [ˈsɪnjuː]	əzələ, vətər
siphon [ˈsaɪfən]	sifon
sketch [skɛʧ]	cizgi, eskiz
skin [skɪn]	dəri
skull [skʌl]	kəllə, qafatası

slave [sleɪv]	qul
sleet [sliːt]	sulu qar
slender [ˈslɛndə]	nazik, zərif
slice [slaɪs]	dilimləmək
slight [slaɪt]	həfif, yüngül
slope [sləʊp]	yamac, eniş
sloth [sləʊθ]	kəsalət, ətalət
slough [slaʊ]	bataqlıq
slug [slʌg]	çılpaq ilbiz
smooth [smuːð]	hamar
smut [smʌt]	göbələk papaqcığı
snail [sneɪl]	ilbiz
snap [snæp]	şıqqıldatmaq
snow [snəʊ]	qar
snowflake [ˈsnəʊfleɪk]	qar yağışı
soap [səʊp]	sabun
socket [ˈsɒkɪt]	yuva
sodium [ˈsəʊdiəm]	natrium
soil [sɔɪl]	torpaq
solemn [ˈsɒləm]	təntənəli
solid [ˈsɒlɪd]	bərk, möhkəm
somersault [ˈsʌməsɔːlt]	yumbalanmaq
soot [sʊt]	his
source [sɔːs]	mənbə, qaynaq
space [speɪs]	boşluq, fəza
spare [speə]	ehtiyat, boş
spare time [speə taɪm]	boş vaxt
spasm [ˈspæzm]	qıcolma
spawn [spɔːn]	kürü tökmək
spear [spɪə]	nizə
specific [spɪˈsɪfɪk]	xüsusi
specify [ˈspɛsɪfaɪ]	müəyyən etmək
specimen [ˈspɛsɪmɪn]	nümunə
speck [spɛk]	ləkə

spectator [spɛkˈteɪtə]	tamaşaçı
spice [spaɪs]	ədviyya
spider [ˈspaɪdə]	hörümçək
spin [spɪn]	fırlatmaq, burulmaq
spinal cord [ˈspaɪnl kɔːd]	onurğa beyni
spine [spaɪn]	onurğa, bel sütunu
spite [spaɪt]	kin, hirs
spleen [spliːn]	dalaq
sponge [spʌnʤ]	qubka, süngər
spot [spɒt]	ləkə
spruce [spruːs]	yamac ağacı
spurt [spɜːt]	sıçramaq
squeeze [skwiːz]	sıxmaq
squire [ˈskwaɪə]	meydan, kvadrat
stability [stəˈbɪlɪti]	stabillik, möhkəmlik
staff [stɑːf]	heyət
stain [steɪn]	ləkə, ləkələnmək
stalk [stɔːk]	gövdə, saplaq
stamen [ˈsteɪmɛn]	erkəkcik
starch [stɑːʧ]	nişasta
steam [stiːm]	buxar
steep [stiːp]	kəskin, dik
stem [stɛm]	saplaq
stiff [stɪf]	sərt
stigma [ˈstɪgmə]	ləkə, damğa
sting [stɪŋ]	sancmaq
stoat [stəʊt]	qaqum
stomach [ˈstʌmək]	mədə, qarın
stomata [ˈstəʊmətə]	ağızcıq
store [stɔː]	ehtiyat, ambar
stork [stɔːk]	hacıleylək
stout [staʊt]	qalın
stove [stəʊv]	soba, peç
strain [streɪn]	gərginləşdirmək

strand [strænd]	saç,tel,tip
strawberry [ˈstrɔːbəri]	çiyələk
streak [striːk]	zolaq
stream [striːm]	axın
strife [straɪf]	fitnə
stroke [strəʊk]	zərbə, tumarlamaq
strong [strɒŋ]	güclü, möhkəm
stronghold [ˈstrɒŋhəʊld]	qala
structure [ˈstrʌkʧə]	quruluş, struktur
struggle [ˈstrʌgl]	mübarizə
style [staɪl]	üslub, dad, moda
substance [ˈsʌbstəns]	maddə
sugar [ˈʃʊgə]	qənd, şəkər
sugar beet [ˈʃʊgə biːt]	şəkər çuğunduru
sugar cane [ˈʃʊgə keɪn]	şəkər qamışı
sundew [ˈsʌndjuː]	ənbəriyyə
sunk [sʌŋk]	enmək
sun [sʌn]	günəş
sunlight [ˈsʌnlaɪt]	günəş işığı
superstition [ˌsjuːpəˈstɪʃən]	xurafat, mövhumat
supply [səˈplʌɪ]	təmin etmək
support [səˈpɔːt]	müdafiə etmək
supreme [sju(ː)ˈpriːm]	Ali
surface [ˈsɜːfɪs]	yerüstü, səth
surgeon [ˈsɜːʤən]	cərrah
surround [səˈraʊnd]	əhatə etmək
survive [səˈvaɪv]	sağ qalmaq
swallow [ˈswɒləʊ]	qaranquş, udmaq
swamp [swɒmp]	bataqlıq
sweat [swɛt]	tər
swell [swɛl]	şişmək, qabarmaq
swift [swɪft]	cəld, iti
swollen [ˈswəʊlən]	şişmək, qabarmaq
sword [sɔːd]	qılınc

sword-fish [ˈsɔːdfɪʃ]	qılıncbalığı
sycamore [ˈsɪkəmɔː]	çinar
syllable [ˈsɪləbl]	heca

T

table [ˈteɪbl]	masa, stol
tableland [ˈteɪbllænd]	yaylaqlıq
tame [teɪm]	əhliləşdirmək
tapioca [ˌtæpɪˈəʊkə]	taxıl
taproot [ˈtæpruːt]	əsas kök
target [ˈtɑːgɪt]	hədəf
teak [teak]	tik ağacı
teasel [ˈtiːzl]	xovlayıcı
teem [tiːm]	bol olmaq
temperate [ˈtɛmpərɪt]	mülayim
temple [ˈtɛmpl]	ibadətgah
temporal [ˈtɛmpərəl]	müvəqqəti
tent [tɛnt]	çadır
tentacle [ˈtɛntəkl]	bığcıq, qolcuq
terrestrial [tɪˈrɛstrɪəl]	Yer
thatch [θæʧ]	çəmənlik, kövşən
thick [θɪk]	sıx, qalın
thin [θɪn]	nazik
thread [θrɛd]	sap, ip
thresh [θrɛʃ]	taxıl döymək
thrill [θrɪl]	həyəcan
thrush [θrʌʃ]	qaratoyuq
thunder [ˈθʌndə]	şimşək
tick [tɪk]	gənə, parazit
timber [ˈtɪmbə]	meşə materialı
timid [ˈtɪmɪd]	qorxaq, utancaq
tiny [ˈtaɪni]	kiçik
tip [tɪp]	uc, ucluq
tissue [ˈtɪʃuː]	toxuma

tomb [tuːm]	türbə, qədir
tongue [tʌŋ]	dil
tonsillitis [ˌtɒnsɪˈlaɪtɪs]	tonzilit, angina
tool [tuːl]	alət
torpid [ˈtɔːpɪd]	ləng
tortoise [ˈtɔːtəs]	tısbağa
toxic [ˈtɒksɪk]	zəhər, zəhərli
trachea [trəˈki(ː)ə]	nəfəs borusu
trade [treɪd]	ticarət
tradition [trəˈdɪʃən]	adət, ənənə
trail [treɪl]	sürünmək
transport [ˈtrænspɔːt]	daşıma, daşınma
tremendous [trɪˈmɛndəs]	möhtəşəm, yekə
treasuare [ˈtrɛʒə]	xəzinə
triangular [traɪˈæŋgjʊlə]	üçbucaqlı
tribe [traɪb]	tayfa, qəbilə
trickle [ˈtrɪkl]	damlamaq
trunk [trʌŋk]	gövdə
tungsten [ˈtʌŋstən]	volfram
turnip [ˈtɜːnɪp]	şalğam, ağ turp
tusk [tʌsk]	fil dişi, heyvan dişi
twig [twɪg]	çubuq, budağcıq
typhoid [ˈtaɪfɔɪd]	yatalaq
typhoid fever [ˈtaɪfɔɪd ˈfiːvə]	qarın yatalağı

U

adult [ˈædʌlt]	yetkin
ulna [ˈʌlnə]	dirsək sümüyü
umbilicus [ʌmˈbɪlɪkəs]	göbək
uric [ˈjʊərɪk]	sidik
urethra [jʊəˈriːθrə]	sidik kanalı
urine [ˈjʊərɪn]	sidik
utensil [ju(ː)ˈtɛnsl]	ləvazimət
uterus [ˈjuːtərəs]	uşaqlıq

utter [ˈʌtə]	səs çıxartmaq
V	
vacuous [ˈvækjʊəs]	boş
vagina [vəˈʤaɪnə]	uşaqlıq yolu
valve [vælv]	klapan, qapaq
vascular [ˈvæskjʊlə]	vaskular, damarlı
vast [vɑːst]	geniş, çox böyük
vein [vein]	damar
venom [ˈvɛnəm]	zəhər, zəhrimar
ventricle [ˈvɛntrɪkl]	mədəcik
verbal [ˈvɜːbəl]	şifahi
vertebral [ˈvɜːtɪbrəl]	fəqərə, onurğa
vertebrates [ˈvɜːtɪbrɪts]	omurqalılar
vessel [ˈvɛsl]	damar, gəmi
victim [ˈvɪktɪm]	qurban
victory [ˈvɪktəri]	qələbə
villus [ˈvɪləs]	bağırsaq xovu
virtual [ˈvɜːtjʊəl]	factiki, həqiqi
visceral [ˈvɪsərəl]	visseral, hissiyatlı
vision [ˈvɪʒən]	görmə
vital [ˈvaɪtl]	mühüm, həyati
vocal [ˈvəʊkəl]	səs
vocal cords [ˈvəʊkəl kɔːd]	səs teli
volume [ˈvɒljʊm]	həcm
W	
walrus [ˈwɔːlrəs]	morj
war [wɔː]	müharibə
warbler [ˈwɔːblə]	çalıquşu
warrior [ˈwɒrɪə]	döyüşçü
waste [weɪst]	tullantı
water [ˈwɔːtə]	Su
waterfall [ˈwɔːtəfɔːl]	şəlalə
water-flea [ˈwɔːtə-fliː]	su birəsi

wave [weɪv]	dalğa, dalğalanmaq
wax [wæks]	bal mumu
wealth [wɛlθ]	sərvət
web [wɛb]	tor
weird [wɪəd]	qəribə
wet [wɛt]	yaş, nəm
whale [weɪl]	balina
wheat [wiːt]	buğda
white [waɪt]	Ağ
whitish [ˈwaɪtɪʃ]	ağımtıl
width [wɪdθ]	en, enli
wild [waɪld]	vəhşi, yabanı,
willow [ˈwɪləʊ]	söğüd
wind [wɪnd]	külək
windpipe [ˈwɪndpaɪp]	nəfəs borusu
wine [waɪn]	çaxır
wing [wɪŋ]	qanad
wire [ˈwaɪə]	sim, məftil, tel
wold [wəʊld]	çöl
wood [wʊd]	ağac, odun
word [wɜːd]	söz
worship [ˈwɜːʃɪp]	sitayiş etmək
wound [wuːnd]	yara
wriggle [ˈrɪgl]	əzilib-büzülmək
wrist [rɪst]	bilək

X

x-axis [ˈɛksˈæksɪs]	rentgen
xenon [ˈzɛnɒn]	lyuk, işıqlar
xylem [ˈzahy-luhm,-lem]	ksilema

Y

yeast [jiːst]	maya
yield [jiːld]	məhsul, bəhrə

yogurt [ˈjɒgə(ː)t]	süzmə, kefir
yolk [jəʊk]	yumurta sarısı

Z

zebra [ˈziːbrə]	Zebr
zero [ˈzɪərəʊ]	Sıfır
zinc [zɪŋk]	sink
zing [zɪŋ]	vızıltı
zoology [zəʊˈɒləʤi]	zoologiya

CONTENTS

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