

MINISTRY OF PUBLIC HEALTH OF UKRAINE
Ukrainian Medical Stomatological Academy

*Preparatory department for
foreign students*

Biology
Introductory course
Study guide for foreign students



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Preface

This manual is intended to students, who are prepared for medical universities. It contains adapted texts, exercises and tasks. The manual presents the basic biological terms, concepts that are necessary for mastering special biological disciplines. It is advisable to work with this manual when students are already familiar with the basics of the grammar of the Russian language and elementary scientific terminology.

Each lesson can be divided into a pretext and text part: the text is preceded by the work on the introduction and assimilation of new words, phrases and actual constructions for the theme.

All scientific texts (especially № 1-7) are maximally adapted in accordance with the curriculum and Russian language course. Some exercises suggest the development of elementary writing skills by students.

The material of the manual is presented in brief form and contains the basics of medical knowledge necessary for further study of biological disciplines by students of medical universities.

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Repeat.		

Class 1. Biology and its sections.

Task 1. Listen, read and repeat words and phrases.

animal	тварина, -ни	животное, -ые	animal	حيوان
virus	вірус, -и	вирус, -ы	virus	فيروس
mushroom, fungus	гриб, -и	гриб, -ы	champignon	فطر
function	функція, -ії	функция, -ии	function	وظيفة
botany	ботаніка	ботаника	butanique	علم النبات
anatomy	анатомія	анатомия	anatomie	علم التشريح
cytology	цитологія	цитология	cytology	علم الخلية
embryology	ембріологія	эмбриология	embryologie	علم الاجنة
tissue	тканина, -и	ткань, -и	tissue	نسيج
organism	організм, -и	организм, -ы	organisme	جسم
ecology	екологія	экология	ekologie	علم البيئة
each, every	кожний, -а, -е, -і	каждый, -ая, -ое, -ые	chaque	كل
hereditary	спадковість	наследственность	heridite	وراثة, وراثية
relation, interrelation	взаємовідношення	взаимоотношение	relation, changeable	علاقة تبادلية, تفاعل
environment	навколишнє середовище	окружающая среда	d'entourage	بيئة محيطة
plant	рослина, -и	растение, -ия		نبات
bacteria	бактерія, -ії	бактерия, -ии	bakterie	بكتيريا
structure, texture	будова, -и	строение, -ия	structure	تكوين
progress development	розвиток	развитие	crissanse	تطور, نمو
zoology	зоологія	зоология	zoologie	علم الحيوان
physiology	фізіологія	физиология	phisiologie	علم وظائف الأعضاء
histology	гістологія	гистология	histologie	علم الأنسجة
genetics	генетика	генетика	genetique	علم الوراثة
variability, variation	мінливість	изменчивость	variable	تبديلية
organ	орган, -и	орган, -ы	organe	عضو
origin	походження	происхождение	riferance, f'rigme	مصدر, منشأ, أصل
microbiology	мікробіологія	микробиология	microbiologie	علم الأحياء

Pay attention!

Form: [noun] [verb -s]

Biology studies the forms of living organisms.

Form: What is [noun]

What is biology?

Consist, comprise and compose are all verbs used to describe what something is 'made of'.

Biology consists of the following parts ...

Task 2. Listen, read and write down the text in the notebook.

Biology is the science of life. Its studies living organisms - plants, animals, bacteria, viruses, fungi. Biology studies the forms of living organisms, their structure, functions, origin, development and distribution on Earth.

It is a broad field including many branches and subdisciplines. Biology consists of the following parts: botany, zoology, genetics, microbiology, histology, molecular biology, biochemistry, anatomy, cytology, ecology, physiology. Below are the main branches of study included in this field.

Botany is the science of plant life.

Genetics is the study of genes, genetic variation, and heredity of living organisms.

Microbiology is the study of microorganism.

Histology is the study of the anatomy of cells and tissue of plants and animals using microscopy.

Biochemistry is the study of chemical processes within and relating to living organisms.

Molecular biology is the branch of biology that deals with the structure and function of the proteins and nucleic acids.

Zoology is the branch of biology that studies the animal kingdom.

Anatomy is the branch of biology that deals with the study of the structure of organisms and their parts.

Cytology is a branch of biology that studies the structure and function of the cell.

Ecology is the branch of biology which studies the interactions among organisms and their environment.

Physiology is the branch of biology that deals with normal functions of living organisms and their part.

Each of the main branches of biology include a number of biological disciplines.

Task 3. Do the exercises.

Exercise 1. Answer the following questions.

1. What does biology study?
2. What are the branches of biology?
3. What does microbiology study?
4. What does histology study?
5. What does cytology study?

Exercise 2. Complete the phrases. Write them down. Read them aloud.

1. Biology is the science ...
2. Anatomy is the branch ...
3. Biochemistry is the study...
4. Genetics is the study...
5. Ecology is the branch...

Exercise 3. Complete the sentences with the missing words:

1. Cytology is a branch of biology that studies the ... and ... of the cell.
2. Genetics is the study of genes, genetic ..., and of living organisms.
3. Histology is the study of the ... of cells and ... of plants and animals using microscopy.

Class 2. The concept of a cell.

Task 1. Listen, read and repeat words and phrases.

to form	утворювати	образовать	to form	نشأ، تكون
round	круглий, -а, -е	круглый, -ая, -ое	rond	دائري، مستدير
membrane	мембрана, -и	мембрана, -ы	membrane	غشاء
cytoplasm	цитоплазма, -и	цитоплазма, -ы	cytoplasme	سيتوبلازم
metabolism	обмін речовин	обмен веществ	metabolisme	أيض المواد
outside	зовні	снаружи	l'exterieur	خارجاً، من الخارج
body	тіло, -а	тело, -а	corp	جسم
dimension, size	розмір, -и	размер, -ы	taille	مقاسات، أقيسة
oval	овальний, -а	овальный, -ая	ovale	بيضوي
nucleus	ядро, -а	ядро, -а	noyau	نواة
originate, derive	походити	происходить	dexendant de	انحدر من
protective	захисний	защитный, -ая, -ое, -ые	protecteur	واق، حام، دفاعي
in, inside	всередині	внутри	de l'interieur	من الداخل

protoplast	протопласт	протопласт	protoplast	ما تحتويه الخلية
cubic	кубічний	кубический, -ая, -ое, -ие	cubique	تكعبي
cylindrical	циліндричний	цилиндрический, -ая, -ое, -ие	cylindrical	اسطواني
mechanical	механічний	механический, -ая, -ое, -ие	mecanique	ميكانيكي، الي
nerve cell	нервова клітина	клетка нервная	cellule nerveuse	خلية عصبية
plant cell	рослинна клітина	клетка растительная	cellule des plantes	خلية نباتية
animal cell	тваринна клітина	клетка животная	cellule animaluque	خلية حيوانية
stellar cells	зірчаста клітина	клетка звёздчатая	cellula etoilees	خلية نجمية

Pay attention!

Form: [noun] + [verb]

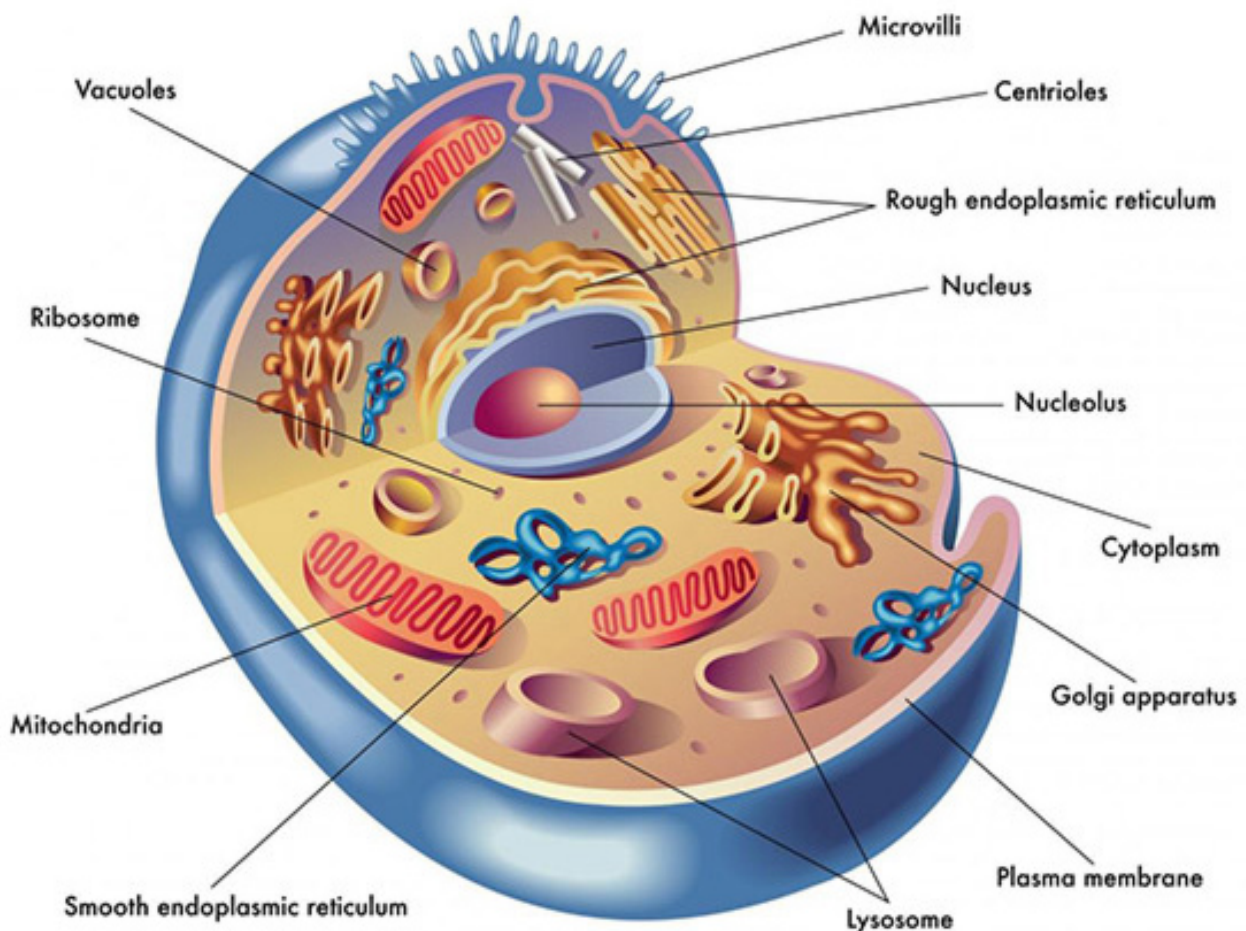
Cell forms tissue.

Form: [noun] is used to name a thing

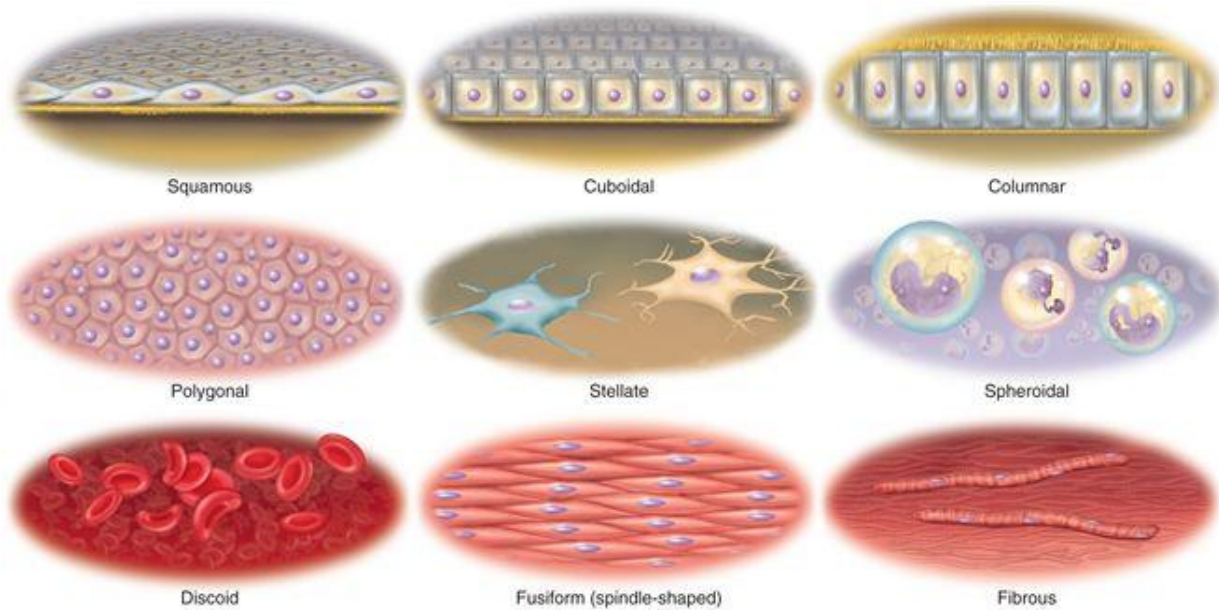
A cell is the smallest unit.

Task 2. Listen, read and write down the text in the notebook.

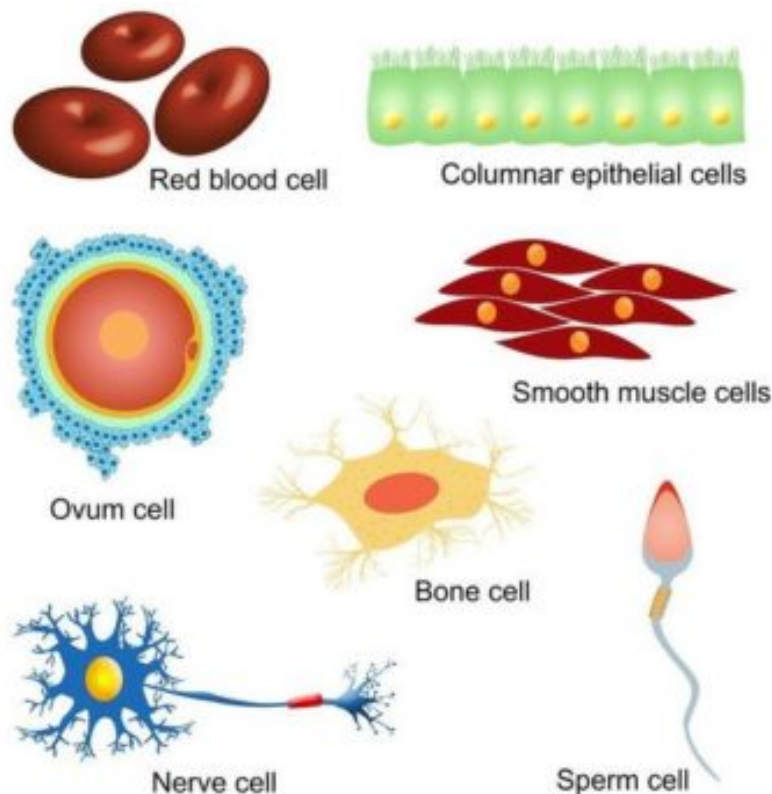
The **cell** is the basic structural, functional, and biological unit of all known living organisms. A cell is the smallest unit of life. Cell forms tissue, tissues form organs, organs form systems and systems form organisms. Tissue are made up of similar cells that carry out a common function. For example, muscle tissue is made up of many muscle cells groups.



Different cells within a single organism can come in a variety of sizes and shapes. They may not be very big, but their shapes can be very different from each other. A smaller cell is more effective and transporting materials, including waste products, than a larger cell. Cells come in many different shapes. The cells can be round, oval, cubic, cylindrical, satellite, and others. The size and shape of the cell depends on its function.



Cell shapes and sizes



The cell **membrane** is the protective barrier that surrounds the cell and prevents unwanted material from getting into it. The cell membrane has many functions, but one main function that it has is to transport materials (salts, electrolytes, glucose and other necessary molecules) into the cell to support necessary life functions. Cells have many structures inside of them called **organelles**. These organelles are like the organs in a human and they help the cell stay alive. Each organelle has its own specific function to help the cell survive. The **nucleus** of a eukaryotic cell directs the cell's activities and stores DNA.

In eukaryotes the **protoplasm** surrounding the nucleus is known as the cytoplasm and that inside the nucleus as the nucleoplasm.

Task 3. Do the exercises.

Exercise 1. Answer the following questions:

1. What forms do cells have ?
2. What are the cell sizes?
3. What do you know about the main parts of cells?
4. What is the covering around a cell called?
5. What is inside the cell?

Exercise 2. Complete the phrases. Write them down. Read them aloud.

1. The cell is the basic ...
2. Different cells within a single organism ...
3. The cells can be: ...
4. The cell membrane is ...
5. The nucleus of a eukaryotic cell ...

Class 3. Laboratory work №1. The structure of the microscope. Rules of microscope use.

Class 4. Metabolism in an organism.

Task 1. Listen, read and repeat words and phrases.

secretion	секреція	секреция	secretion	إفراز
synthesis	синтез	синтез	synthese	بناء، تركيب
connected	пов'язаний	связанный, -ая, -ое, -ые	dependant	مربوط
adapt oneself (to)	пристосуватися	приспособиться	adapt	كيف، وفق، طابق
constant/permanent	постійний	постоянный, -ая, -ое, -ые	constant	ثابت، دائم
assimilation	асиміляція	ассимиляция	assimilation	تمثيل، أيض ثنائي (عند الكائنات الحية)
splitting	розщеплення	расщепление	disintegration	إنشطار
secretion product	продукти виділення	продукты выделения	exocrine	إفراز، إخراج تام
metabolism	метаболізм (обмін речовин)	метаболизм (обмен веществ)	metabolisme	أيض المواد
opposite, contrary	протилежний	противоположный	oppose, anti-	مضاد، معاكس
inseparably linked processes	нерозривно пов'язані процеси	неразрывно связанные процессы		عمليات متواصلة مرتبطة
disintegration	розпад	распад	disintegration	انحلال، انشطار
transfer	перенос	перенос	transport, transfert	نقل
enzyme	фермент	фермент, -ы	ferment	انزيم
support	підтримувати	поддерживать	conserver	أبقى، حافظ على
secretion	виділення	выделение	secretion	إفراز، إخراج
absorption	поглинання	поглощение	absorption	امتصاص
biosynthesis	біосинтез	биосинтез	biosynthese	تخليق حيوي
dissimilation	дисиміляція	диссимиляция	desassimilation	

Pay attention!

Form: [noun] is used to name a thing.

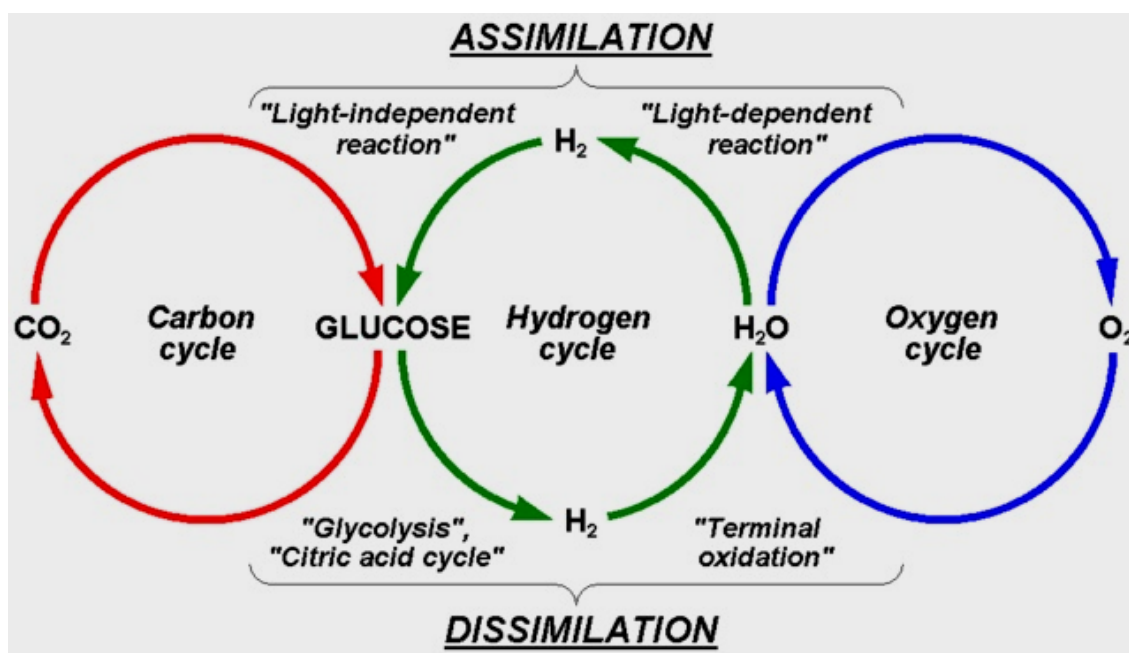
Metabolism, the sum of the chemical reactions that take place within each cell of a living organism and that provide energy for vital processes and for synthesizing new organic material.

Task 2. Listen, read and write down the text in the notebook.

The nutrients enter cell through the cell membrane and the products of secretory activity leave the protoplast. Nutrition is the key to metabolism. The pathways of metabolism rely upon nutrients that they breakdown in order to produce energy. This energy in turn is required by the body to synthesize new proteins, nucleic acids, etc.

Metabolism is the complex of the chemical reactions that take place within each cell of a living organism and that provide energy for vital processes and for synthesizing new organic material. Metabolism in cells occurs with the participation of enzymes. External conditions change the internal environment of the cell, but the cell can adapt to these conditions and maintain a constant composition. Metabolism is closely linked to nutrition and the availability of nutrients. Energy formation is one of the vital components of metabolism.

Assimilation is the complex of all biosynthetic reactions. It is the process through which an organism incorporates nutrients from outside its body to the more complex structures needed inside of it. All these reactions occur with the *absorption of energy*. Energy is necessary for all processes of vital activity of the cell and organism.



Dissimilation is the complex of all splitting reactions that occur in a living cell. It is the process of disintegration of organic compounds (proteins, fats, carbohydrates, etc.) on simple substances. All these reactions occur with the *release of energy*.

Task 3. Do the exercises.

Exercise 1. Answer the following questions:

1. What is metabolism?
2. What enters through the cytoplasmic membrane into the cell?
3. What are the opposite processes of metabolism?
4. What process occurs during dissimilation?

5. What is dissimilation?

Exercise 2. Complete the phrases. Write them down. Read them aloud.

1. Assimilation is ...
2. All the reactions of dissimilation occur ...
3. Metabolism is ...
4. Metabolism is closely linked to ...
5. Energy is necessary for ...

Class 5. Assimilation types.

Task 1. Listen, read and repeat words and phrases.

autotrophic organism	автотрофний організм	автотрофный организм	autotrophe	كائن ذاتي التغذية
heterotrophic organism	гетеротрофний організм	гетеротрофный организм	heterotrophe	كائن عضوي التغذية
photosynthesis	фотосинтезуючий	фотосинтезирующий	photosynthese	تركيب ضوئي
chemosynthesis	хемосинтезуючий	хемосинтезирующий		تخليص كيميائي
synthesize	синтезувати	синтезировать	synthetiser	ركب، جمع
dead	мертвий, -а, -е, -і	мёртвый, -ая, -ое, -ые	mort	ميت
pathogenic	патогенний, -а, -е, -і	патогенный, -ая, -ое, -ые	pathogene	ممرض
toxic	токсин	токсин	toxique	تكسين (سم)
violate, break	порушувати	нарушать/нарушить	troubler	اخر، خالف، خرق
parasite	паразит	паразит	parasite	متطفل
saprophyte	сапрофіт	сапрофит	saprophyte	رمام، عفن
undigested food fragments	неперетравлені рештки їжі	непереваренные остатки пищи		بقايا الغناء مهضوم

Pay attention!

lives on sth

to have (a particular food) as the only or main food that one eats

A saprophyte is an organism that lives on dead or decaying organic matter.

at the expense of sth

in a way that harms (something or someone)

A parasite lives at the expense of the host..

Task 2. Listen, read and write down the text in the notebook.

Organisms are divided into autotrophs and heterotrophs according to their energy pathways.

Autotrophs are those organisms that are able to make energy-containing organic molecules from inorganic raw material (water, carbon dioxide and mineral salts) by using basic energy sources such as sunlight. Plants are the prime example of autotrophs, using photosynthesis. Autotrophic organisms are divided into two groups:

1. *Photosynthetic* – convert solar energy into the chemical energy of a carbohydrate (all green plants).
2. *Chemosynthetic* – organisms whose primary source of energy comes from the chemical reactions of inorganic molecules (some bacteria).

All other organisms must make use of food that comes from other organisms in the form of fats, carbohydrates and proteins. These organisms which feed on others are called heterotrophs.

Heterotroph is an organism that cannot produce its own food, relying instead on the intake of nutrition from other sources of organic carbon, mainly plant or animal matter.

According to the types of food heterotrophic organisms are divided into two groups: saprophytes and parasites.

A **saprophyte** or *saprotroph* is an organism which gets its energy from dead and decaying organic matter. Fungi, bread mould, some protists and many bacteria are saprophytic in nutrition.

A **parasite** is an organism that lives in another organism, called the *host*, and often harms it. A parasite depends on its host for survival. The host is another organism. The parasite uses the host's resources to fuel its life cycle. It uses the host's resources to maintain itself. Parasites are not a disease, but they can spread diseases. Different parasites have different effects. Many types of parasites can affect humans. There are three main types of parasites.

Protozoa: Examples include the single-celled organism known as Plasmodium. A protozoa can only multiply, or divide, within the host.

Helminths: These are worm parasites. Examples include roundworm, pinworm, trichina spiralis, tapeworm, and fluke.

Ectoparasites: These live on, rather than in their hosts. They include lice and fleas.

Task 3. Do the exercises.

Exercise 1. Answer the following questions:

1. What is necessary for autotrophic organisms to sustain life?
2. What is the difference between photosynthetic and chemosynthetic organisms?
3. What are the different types of food?
4. Give an example of saprophytic organism.
5. Give an example of parasite.
6. What are the types of parasites?

Exercise 2. Complete the phrases. Write them down. Read them aloud.

1. Organisms are divided into autotrophs and heterotrophs according
2. Plants are the prime example of ...
3. According to the types of food heterotrophic organisms are
4. ... an organism that lives in another organism, called the host, and often ... it.

Exercise 3. Find unfamiliar words in the text, determine their meaning in the dictionary and write down the words and translation into the notebook.

Class 6. Reproduction of organisms.

Task 1. Listen, read and repeat words and phrases.

reproduction	розмноження	размножение	reproduction	تكاثر
sexual reproduction	статеве розмноження	половое размножение	reproduction sexuelle	تكاثر جنسي
asexual reproduction	нестатеве розмноження	бесполое размножение	reproduction asexuelle	تكاثر لا جنسي

vegetative reproduction	вегетативне розмноження	вегетативное размножение	reproduction vegetale	تكاثر خضري
any, everybody	будь-який, -а, -е, -і	всякий, -ая, -ое, -ие	chacun, toun	كل، كل واحد، أي
reproduction, replication	відтворення	воспроизведение	reproduction	استرجاع، اتحدثات
provide, ensure	забезпечити	обеспечить	garantier, assurer	ضمن، وقر، أمن
continuity	незпервність	непрерывность	continuite	استمرارية
specialized	спеціалізований	специализированный	specialiser	خاص، خصوصي
somatic cell	соматичні клітини	соматические клетки	cellule somatique	خلايا جسمية
sex cells	статеві клітини	половые клетки	cellule	خلايا تناسلية
maternal cell	материнська клітина	материнская клетка	cellule mere	خلية أم
spore	спора	спора, -ы	spore	بوغ
zoospore	зооспора	зооспора, -ы		بوغ حيواني
budding	брунькування	почкование	gemmiparite	تبرعم
knoll	бугорок	бугорок, -и		حدبة، نتوء
bud	брунька	почка, -и	bouton gemme	برعم
fertilization	запліднення	оплодотворение	fecondation	لقاح
parthenogenesis	партеногенез	партеногенез	parthenogenese	تكاثر بدون لقاح
egg cell	яйцеклітина	яйцеклетка, -и	ovule	بيضة، خلية التناسل الأنثوي
spermatozoa	сперматозоїд	сперматозоид, -ы	spermatozoide	حيوان منوي
testicule	сім'яник	семенник, -и	testicule	الغدد التناسلية الذكرية
ovary	яєчник	яичник, -и	Ovarie	مبيض
root	корінь	корень	racine	جذر
leaf/leaves	лист/листя	лист/листья	feuille	ورقة
bulb	цибулина	луковица		بصلة، بصيلة

Pay attention!

Subject + Can + verb

Ability: power or capacity to do or act

Reproduction is the ability to produce new individuals of ones own kind.

Based on

something is based on something else

Sexual reproduction is based on meiosis

Task 2. Listen, read and write down the text in the notebook.

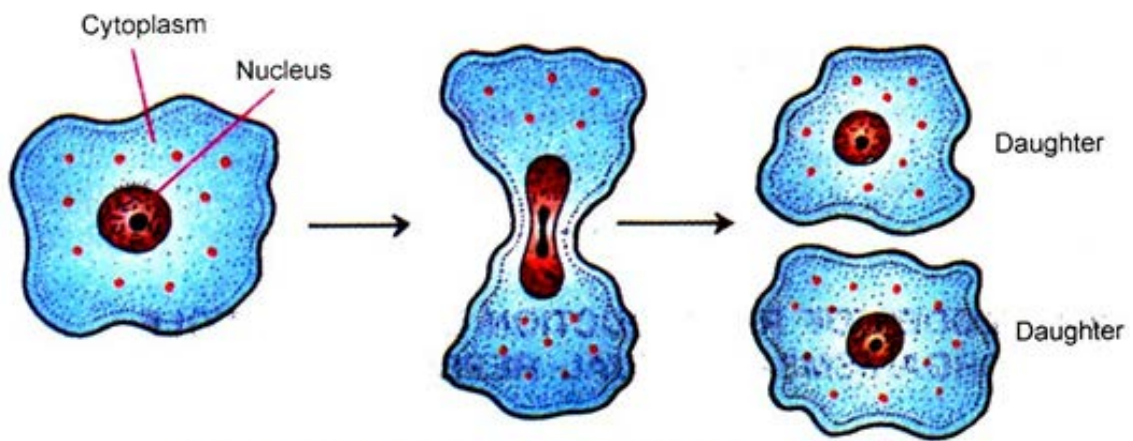
Reproduction is the biological process by which new individual organisms or "offspring" are produced from their "parents". Reproduction is a fundamental feature of all known life. Each individual organism exists as the result of reproduction.

There are two forms of reproduction: *asexual and sexual*.

Asexual reproduction is any method of producing new individuals that does not involve the fusion of gametes or nuclei of two cells and does not involve meiosis. So, at an asexual reproduction a new organism is formed with the help of somatic cells. In asexual reproduction, an organism can reproduce without the involvement of another organism. By asexual reproduction, an organism creates a genetically similar or identical copy of itself.

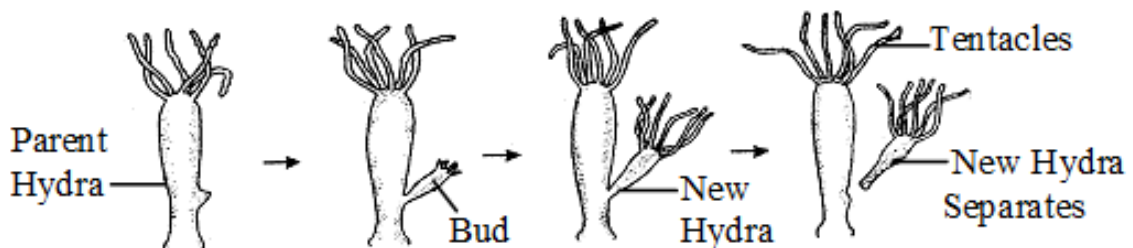
Types of asexual reproduction.

1. *Binary fission*. It is type of asexual reproduction in which parent organism simply divides into two daughter organisms. For example, Amoeba or Infuzoria simply divides through mitotic process to give rise to two new individuals, which grow and then redivide.



Binary fission in Amoeba

2. *Sporulation*, reproduction through spores. The process of formation of spores in biological systems is referred to as sporulation. Sporulation is the process of producing spores. Zoospore- an asexual spore produced by certain algae and some fungi, capable of moving about by means of flagella. Fungi, certain plants and bacteria also undergo sporulation, though the process usually refers to the process of bacteria forming spores.
3. *Budding*. Budding is a type of asexual reproduction in which new organism is produced as an outgrowth, called bud, on the body of new parent the bud separates and gives rise to a new individual. For example, Hydra, yeasts.



Budding in Hydra

4. *Vegetative reproduction*: new organism is formed by bunches of cells or multicellular germs, sometimes field of a body of the parent. It is form of asexual reproduction occurring in plants in which a new plant grows from a fragment of the parent plant or grows from a specialized reproductive structure (such as a stolon, bulb, ect.)

Sexual reproduction is a form of reproduction where two gametes (sperm and egg) fuse together. Each gamete contains half the number of chromosomes of normal cells. They are created by a specialized type of cell division, which only occurs in eukaryotic cells, known as meiosis. This produces offspring organisms whose genetic characteristics are derived from those of the two parental organisms.

Parthenogenesis is a special form of reproduction. There is a development of an organism from unfertilized ovum. It is observed, for example, in bees, ants, in which females are developed from fertilized eggs and males are developed from unfertilized ovum.

Task 3. Do the exercises.

Exercise 1. Make a text plan.

Exercise 2. Find unfamiliar words in the text and write them down.

Exercise 3. Answer the following questions:

1. What is reproduction?
2. What types of reproduction do you know?
3. What types of asexual reproduction do you know?
4. What is sexual reproduction?
5. What is parthenogenesis and how does it differ from sexual reproduction?

Class 7. System of the organic world.

Task 1. Listen, read and repeat words and phrases.

various, diverse	різноманітний	разнообразный	different, varie	مختلف
multiformity, variation	різноманітність	многообразие	diversite, variete	كثير، متعدد
fix, determine	встановлювати	устанавливать	etablir, au pont	وضع، أنشأ
classification	класифікація	классификация, -ии	classification	تصنيف
group of classification, taxon	таксон	таксон, -ы	groupe classifie	مجموعة التصنيف
availability, presence	наявність	наличие, -ия	presence, existence	وجود، توافر
absence	відсутність	отсутствие, -ия	absence	عدم وجود
prokaryote	прокаріот	прокариот, -ы	procaryotes	خلية بدون نواة
eukaryote	еукаріот	эукариот, -ы	eucaryotes	خلية بنواة
embryonic	ембріональний	эмбриональный, -ая, -ое, -ые	embryonalique	جيني
chromosome	хромосома	хромосома, -ы	chromosome	كروموسوم
nomenclature	номенклатура	номенклатура, -ы	nomenclature	علم المسميات

Pay attention!

Verb: [with object]

To classify

Arrange (a group of things) in classes or categories according to shared qualities or characteristics.

All living organisms are classified into groups based on very basic, shared characteristics.

Consist, comprise and compose are all verbs used to describe what something is 'made of'.

Plant Kingdom is the taxonomic kingdom comprising all living or extinct plants.

noun, plural: taxa; **singular:** taxon.

Any group or rank in a biological classification into which related organisms are classified.

Task 2. Listen, read and write down the text in the notebook.

All living organisms are very diverse and numerous. Currently, more than 1.5 million species of animals and 500 thousand species of plants are known.

Systematic is the science of naming and classifying organisms in regard to their natural relationships, deals with population, species and higher taxa. It is the study of the diversification of living forms, both past and present, and the relationships among living things through time. **Classification**, as a section of taxonomy, is a system of categorizing living things. There are seven divisions in the system: Kingdom; Phylum or Division (in Botany); Class; Order; Family; Genus; Species. The lowest division is species. Species are identified by two names (*binomial nomenclature*). The first name is the *genus* (plural, genera), the second is the *species*, which is unique for each species within the genus. Living organisms are classified according to the complexity of the organization (extracellular, cellular, multicellular), by the presence or absence of the nucleus (prokaryotes, eukaryotes), by method of nutrition and number of chromosomes.

These characters are distinguished by such taxa:

Three domains (or Empires)

(Eukaryotes, Bacteria, Archaea)

Kingdoms

(Animalia, Plantae, Fungi, Protista and Monera)

Phylum

Class

Order

Family

Genus

Species

The Swedish botanist Carl Linnaeus is regarded as the father of taxonomy, as he developed a system known as Linnaean taxonomy for categorization of organisms and binomial nomenclature for naming organisms. The Linnaean system has progressed to a system of modern biological classification based on the evolutionary relationships between organisms, both living and extinct.

For example: All people who inhabit the Earth now belong to the species **Homo sapiens** or "wise man" (Homo - the name of the Genus-people, sapiens – a wise, Species name). Homo sapiens is the systematic name used in taxonomy for the only extant human species.

Species	Homo sapiens Members of the genus Homo with a high forehead and thin skull bones.
Genus	Homo Hominids with upright posture and large brains.
Family	Hominids Primates with relatively flat faces and three-dimensional vision.
Order	Primates Mammals with collar bones and grasping fingers.
Class	Mammals Chordates with fur or hair and milk glands.
Phylum	Chordates Animals with a backbone.
Kingdom	Animals Organisms able to move on their own.

Task 3. Do the exercises.

Exercise 1. Set five questions and write them down.

Exercise 2. Complete the phrases. Write them down.

1. ... is the study of the diversification of living forms.
2. The first name is the ..., the second is the
3. Species are identified by ... (...).
4. The lowest division is
5. ..., as a section of taxonomy, is a system of categorizing living things.
6. There are ... divisions in the system.

Exercise 3. Answer the following questions:

1. What does systematic study?
2. What does classification study?
3. How many domains do you know?
4. How many kingdoms do you know?
5. What is the smallest unit of classification?
6. Which principle is used to denote species?

Class 8. Bacteria, their structure, vital activity, roles in nature and medicine.

Task 1. Listen, read and repeat words and phrases.

flagella	джгутик	жгутик, -и	flagellum	هدب، أهداب
mucous capsule	слизова капсула	слизистая капсула		مخاطية
twisted	звивистий	извитой		ملتوي
nucleoid	нуклеотид	нуклеонид	nucleide	الوسط المحيط بالنواة
colourless	безбарвний	бесцветный	incolore	عديم اللون
fermentation	ферментація	ферментация	fermentation	اختمار تخمر
diphtheria	дифтерія	дифтерия		مرض الدفتيريا
tetanus	правець	столбняк	tetanos	الكزاز
cholera	холера	холера	cholera	الكوليرا
dysentery	дизентерія	дизентерия	dysenterie	الزحار الدوزينطاري
plague	чума	чума	peste	الطاعون
botulism	ботулізм	ботулизм	toxication	تسمم وشيقي وشيقية
coccus	кок	кокк, -и	microcoques	بكتيريا مكورة الشكل
bacillus	бицила	бацилла, -ы	bacille	عصية، قسيمة
vibrio	вібріон	вибрион, -ы	vibron	جرثومة واوية
spirillum	спіріла	спирилла, -ы	spirille	بكتيريا حلزونية الشكل
spirochete	спірохета	спирохета, -ы	spirochete	بكتيريا لولبية الشكل
coloured	забарвлений	окрашенный, -ая, -ое, -ые	coloree	ملون
parasitize	паразитувати	паразитировать	contaminant	يعدى
favorable conditions	сприятливі умови	благоприятные условия	conditivus favorebles	شروط ملائمة
constrict/compress	стискати	сжимать	serrer	ضغط، عصر
resting state	стан спокою	состояние покоя	situation de stabilite	حالة السكون
to play an important role	відігравати важливу роль	играть важную роль		تلعب دور مهم
lactic acid	молочнокислий	молочнокислый, -ая, -ое, -ые	ferments lactiques	بكتيريا تخمر اللبن
pathogenic	патогенний	патогенный, -ая, -ое, -ые	pathogene	(ممرضة) مسبب الامراض
aerobe	аероб	аэроб, -ы	aerobies	بكتيريا هوائية
anaerobe	анаероб	анаэроб, -ы	anaerobies	بكتيريا لاهوائية
lose	втрачати	терять	perdre	يفقد
corpse	труп	труп, -ы	cadavre	جثة
toxin	токсин	токсин, -ы	toxine	تكسين (سم)

Pay attention!

Cause smt

cause is used in the active form to relate an effect, focuses on the source

Bacteria that cause disease are called pathogenic bacteria.

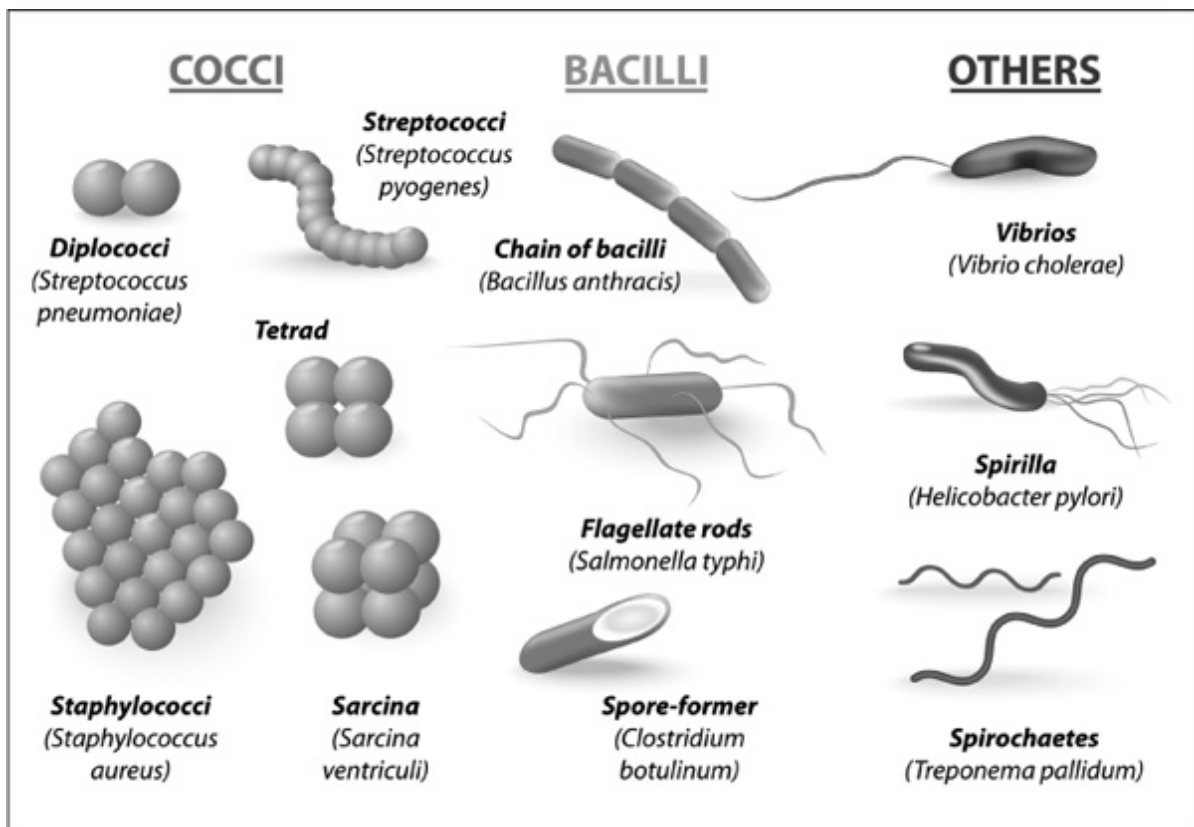
Verb: Cover (place over)

to put something over smt, or to lie on the surface of smt:

Bacterial cells are covered by a cell envelope.

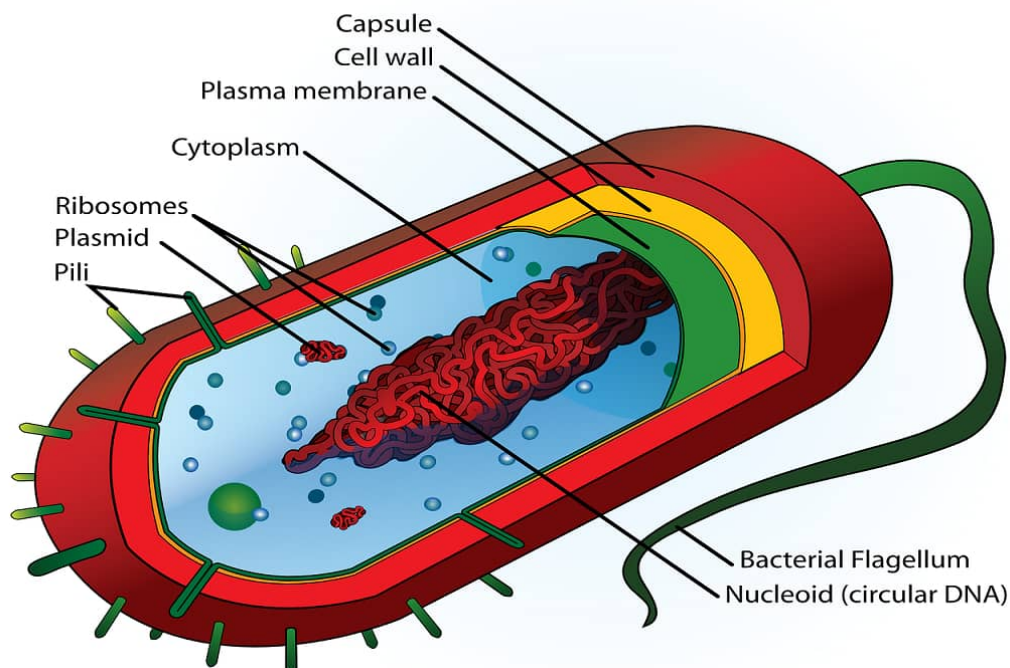
Task 2. Listen, read and write down the text in the notebook.

Bacteria are a large group of unicellular organisms. They usually have sizes from 0.2 to 10 µm, but sometimes reach a length of 30-100 µm. Bacteria are prokaryotic, unicellular microorganisms, which lack chlorophyll pigments. The cell structure is simpler than that of other organisms as there is no nucleus or membrane bound organelles. Due to the presence of a rigid cell wall, bacteria maintain a definite shape, though they vary as shape, size and structure. Most bacteria appear in variations of major shapes: the rod (bacillus), the sphere (coccus) and the spiral type (vibrio).



Some types of bacteria have flagellum (from 1 to 50) serving as an organ of locomotion.

Bacterial cells are covered by a cell envelope that is composed of a cell membrane. The cell membrane is a phospholipid bilayer that regulates the transport of molecules into and out of the cell. The cytoplasm, or protoplasm, of bacterial cells is where the functions for cell growth, metabolism, and replication are carried out. It is a gel-like matrix composed of water, enzymes, nutrients, wastes, and gases and contains cell structures such as ribosomes, a chromosome, and plasmids. The nuclear substance (DNA) in bacteria is in the special nuclear zone of the cell, which is called **nucleoid**. A nuclear membrane does not form around the nucleoid. All bacteria do not have a nucleolus.



Structure of bacteria

Most bacteria are colorless, but there are also colored - red and green bacteria. Bacteria capable of photosynthesis are **autotrophs** because they can make their own food. Most bacteria are **heterotrophs**; they have to get organic material from the environment to grow. According to the mode of respiration, bacteria can be **aerobic** (aerobic means “with air”) or **anaerobic**. Anaerobic respiration takes place in the absence of free oxygen.

Usually, bacteria reproduce asexually by dividing the mother cell into two daughter cells. The division takes place very quickly. Under favorable conditions, some bacteria are divided every 20-30 minutes. Under adverse conditions, many bacteria lose water and pass into a state of rest. Some types of bacteria under adverse conditions form spores.

In the life of animals, plants and humans, bacteria play an important role. Putrefying bacteria decompose animal dead bodies and plant remains and thus participate in the circulation of substances in nature. But putrefying bacteria cause decay of food products: meat, fish, butter, eggs.

Lactic acid bacteria cause fermentation of milk.

Nitrifying bacteria convert ammonia (NH_3), nitrogenous (HNO_2) and nitric (HNO_3) acids into nitrates that are absorbed by plants. Nitrogen-fixing bacteria assimilate nitrogen from the atmosphere.

Some pathogenic bacteria destroy host cells, but most cause disease, producing toxins that harm the host. Bacteria that cause diphtheria, tetanus, cholera, dysentery, plague and botulism, release toxins that spread in the body. But more often the toxins remain in the outer wall of the bacterial cell, cause a rise in temperature and damage the circulatory system of the host.

Task 3. Do the exercises.

Exercise 1. Make a text plan.

Exercise 2. Find unfamiliar words in the text and write them down.

Exercise 3. Answer the following questions:

1. What structure does the bacterial cell have?
2. What are the major features of the bacteria?
3. What are autotrophic bacteria?
4. What is the importance of bacteria?

Exercise 4. Complete the sentences.

1. Nucleoid is ...
2. Bacteria reproduce
3. Anaerobic respiration
4. According to the mode of respiration, bacteria
5. Lactic acid bacteria cause ... of milk.

Exercise 5. Draw the picture of the bacterial cell.

Class 9. Viruses, their structure and importance.

Task 1. Listen, read and repeat words and phrases.

parasite	паразит	паразит, -ы	parasite	معدى
parasitize	паразитувати	паразитировать	se parasiter	يعدي
fibre, filament	волокно	волокно, -а	fibre, filament	ألياف، اليف
immunity	іmunітет	иммунитет	immunite	المناعة
penetrate	проникати	проникать	penetrer	يتغلغل
dissolve	розчинити	растворить	dissoudre	يتحلل
infectious	інфекційний	инфекционный, -ая, -ое, -ые	infectieux	معدى
virus infection	вірусна інфекція	вирусная инфекция	infection dux virus	عدوى فيروسية
produce	виробляти	вырабатывать/выработать	elaborer, former	يفرز، ينتج
unsusceptible	несприйнятливий	невосприимчивый, -ая, -ое, -ые	inoensible	عديم الحسية
repeated	повторний	повторный, -ая, -ое, -ые	reiteratif	متكرر
bacterial environment	бактеріальне середовище	бактериальная среда	milieu bacterien	وسط بكتيري
outgrowth	відросток	отросток, -и	pousse, rejeton	نبتة، زائدة
pathogen	збудник	возбудитель, -и	agent morbifique	ناقل العدوى
bacteriophage	бактеріофаг	бактериофаг, -и	bacteriophage	ملتهم الجراثيم لاقم البكتيريا،
filament/fiber	нитка	нить, -и	fil, corde	حبل
content	вміст	содержимое	contenu	المحتوى
stick-shaped	палочкоподібний	палочковидный, -ая, -ое, -ые		عصوي الشكل
rounded	шароподібний	шаровидный, -ая, -ое, -ые		كروي الشكل
hydrophobia	сказ	бешенство	rage	داء الكلب
smallpox	віспа	оспа	variole	الجديري
influenza	грип	грипп	grippe	الإنفلوانزا
measles	кір	корь	rougeole	الحصبة
polio/poliomyelitis	поліомієліт	полиомиелит	poliomyelite	شلل الأطفال

Pay attention!

Verb: [with object]

to protect

The immune system protects organisms from infection.

Verb: to develop (grow)

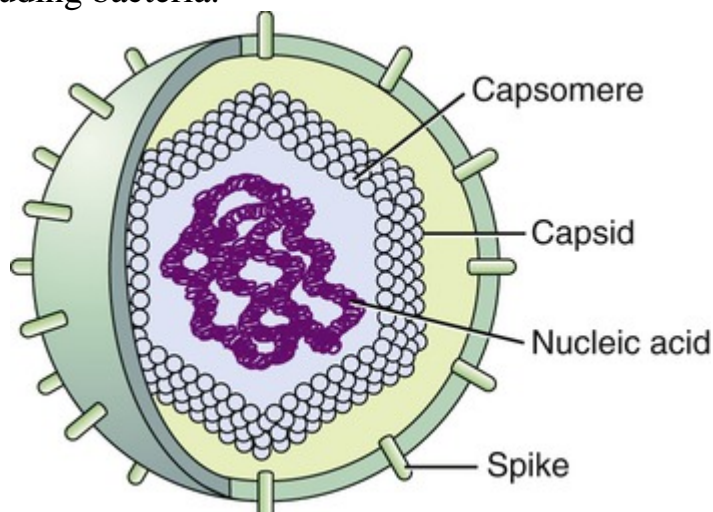
to (cause something to) grow

After infection, the host first develops an immune response.

Task 2. Listen, read and write down the text in the notebook.

A **virus** is a small microorganism (less than 200 nm) that replicates only inside the living cells of other organisms. Viruses can infect all types of life forms, from animals and plants to microorganisms, including bacteria.

Structure of a virus



Viruses are non-cellular organisms, which made up of genetic material and protein that can invade living cells. They can't survive or reproduce on their own, and are not made of cells.

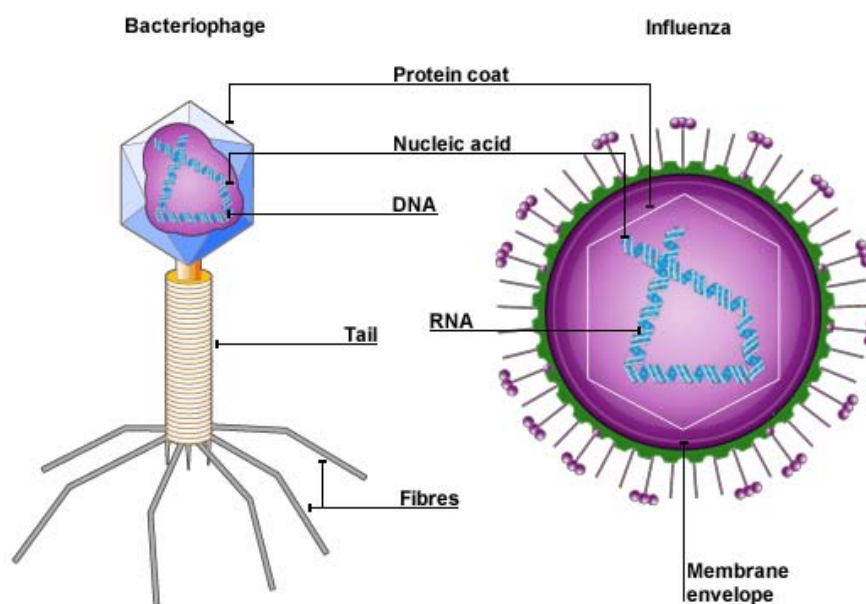
Noncellular forms were discovered in 1892 by the Russian botanist D.I. Ivanovsky. Bacteriophages was discovered by Felix d'Hérelle (1917). D'Hérelle coined the term *bacteriophage*, meaning "bacteria eater," to describe the agent's bacteriocidal ability. Outside a living cell, viruses can not reproduce.

There are plant viruses and animal viruses. Most viruses consist of nucleic acids and protein. Only some animal viruses contain more fats and carbohydrates.

Viruses are divided into two large groups: DNA-containing (smallpox viruses) and RNA-containing (influenza, measles, rabies viruses). The viruses are not the same shapes: there are rod-shaped or spherical. Viruses consist of two or three parts: a helical molecule, protein coat and sometimes a viral wrapper. A virus particle is called a *virion*. Outside, the virion is covered with a capsid - a protein coat. Viruses penetrate into living cells, where they reproduce in an unusual way. After reproduction, they enter the nuclei of host cells and build the nucleic acids of the virus, resulting in the formation of new virus particles in the cells.

Viruses are the causative agents of many infectious diseases of plants, animals and humans. In animals and humans in response to a viral infection the body develops immunity. **Immunity** is the quality or state of being immune. A condition of being able to resist a particular disease especially through preventing development of a pathogenic microorganism or by counteracting the effects of its products.

There are many human viral diseases: smallpox, rabies, flu, poliomyelitis. Viral diseases of plants are tobacco mosaic, cucumber mosaic. There are special viruses that live and parasitize on bacteria. Such viruses are called **bacteriophages**. Bacteriophages or phages are the most abundant organisms in the biosphere. Bacteriophages are widely distributed in locations populated by bacterial hosts, such as soil or the intestines of animals.



Bacteriophages are bacterial viruses that invade bacterial cells and, disrupt bacterial metabolism and cause the bacterium to lyse: the bacterial membranes dissolve and the bacteria die. In humans, after the disease, the number of bacteriophages increases.

Task 3. Do the exercises.

Exercise 1. Make a text plan.

Exercise 2. Draw the picture of bacteriophages

Exercise 3. Answer the following questions:

1. When and by whom were the virus discovered?
2. What infectious diseases are caused by viruses?
3. How do viruses reproduce?
4. What are viruses measure in?
5. Why are viruses considered non-living?

Class 10. Plants. Structure and vital function. Plants importance in nature and human life.

Task 1. Listen, read and repeat words and phrases.

habitation	існування	обитание	milieu de vie	إقامة، تاهيل، معيشة
consistent pattern	закономірність	закономерность, -и	regularite	قاعدة، حكم
evolutionary	еволюційний	эволюционный, -ая, -ое, -ые	developpant	تطوري
principle	переважно	преимущественно	principalement	بتفوق
dense	щільний	плотный, -ая, -ое, -ые	compact	كثيف
provide	забезпечити	обеспечить /обеспечивать	reserver	وفر، ضمن، أمن
osmotic	осмотичний	осмотический, -ая, -ое, -ие	osmotique	اوسموسي، تناضحي
store up	запасатися	запасаться	conserver, reserver	يحتاط
starch	крохмаль	крахмал	amidon	نشأ
move	рухатися	двигаться	se replacer	يتحرك
source	джерело	источник, -и	source	مصدر، منبع
raw material	сировина	сырьё	matieres	مادة خام
industry	промисловість	промышленность	industrie	صناعة
medicament/drug	ліки	лекарство, -а	medicament	دواء
paint,dye	барвник	краситель, -и	colorant	خضاب، صبغة
intensity	інтенсивність	интенсивность	intensite	شدة، حدة، تركيز
root	корінь/коріння	корень /корни	racine	جذر
stem, stalk	стебло/стебла	стебель /стебли	tige,tronc	ساق، عود، جذع
leaf, foliage	листя	лист /листья	feuille	ورقة

Pay attention!

Verb: [with object]

Provide smt to/for smt: to deliver or to give

Large vacuole provides support.

Store: keep or accumulate smt for future use.

Carbohydrates are typically stored as long polymers of glucose molecules.

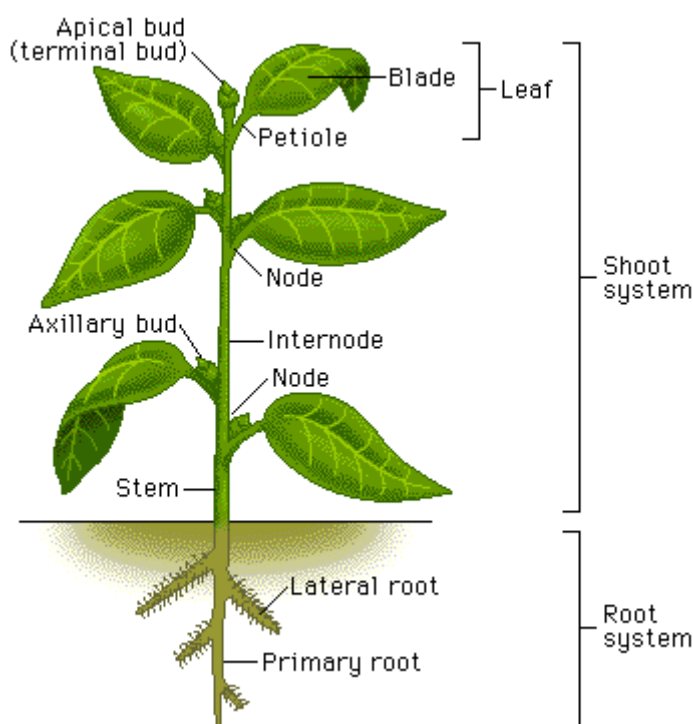
Task 2. Listen, read and write down the text in the notebook.

Botany is the branch of science dedicated to the study of plants. It is a branch of biology that deals with the study of plants, including their structure, properties, and biochemical processes.

The Kingdom of the plant unites about 500 thousand species of diverse plant organisms, which have some common features.

1. Plants are basically autotrophic organisms.
2. Plant cells have a dense cellulose membrane.
3. In plant cells, the vacuole system is well developed, which provides the osmotic properties of cells.
4. Plant cells contain special organelles - plastids.
5. Carbohydrates in plants are stored in the form of starch.
6. Plants can not actively move.

According to the level of organization all plants are divided into two large groups: Higher plants (Cormophyta) and Lower plants (Thallophyta). The plant body in higher plants consists of such organs: root and sprout. Sprout consists of one or more stems that carry leaves.



Plants are the only organisms that can convert light energy from the sun into food. Plants produce all of the food that animals, including people, eat. All of the oxygen available for living organisms comes from plants.

Many plants are important sources of products that people use, including food, fibers (for cloth), and medicines. Plants also help provide some of our energy needs. In some parts of the world, wood is the primary fuel used by people to cook their meals and heat their homes. Many of the other types of fuel we use today, such as coal, natural gas, and gasoline, were made from plants that lived millions of years ago.

Task 3. Do the exercises.

Exercise 1. Answer the following questions:

1. What does botany study?
2. What are the characteristic features of plants?
3. What is the feature of plant nutrition?
4. What are the roles of plants in the nature?
5. What is the importance of plants in human life?

Exercise 2. Complete the sentences.

1. Plant cells contain special organelles ...
2. In plant cells, the ... is well developed, which provides the osmotic properties of cells.
3. Carbohydrates in plants are stored in the form of ...
4. The plant body in higher plants consists of such organs: ... and ...

Exercise 3. Make a text plan.

Class 11. Animals. General and various structures of plants and animals. The importance of animals in nature and human life. Classification of animals. The concept of parasitology.

Task 1. Listen, read and repeat words and phrases.

vital activity	життєдіяльність	жизнедеятельность	vitalite	حيوية، نشاط
individual development	індивідуальний розвиток	индивидуальное развитие	development individuel	تطور ذاتي
environment	навколишнє середовище	окружающая среда	environnement	الوسط المحيط
consistent pattern	закономірність	закономерность, -и	regularite	شرعية، قاعدة
parasitize	паразитувати	паразитировать	se parasiter	
origin	походження	происхождение	origine	تناسل من
morphology	морфологія	морфология	morphologi	علم الشكل
excitability	збудливість	возбудимость	excitabilite	التهيج
principal/mainly	переважно	преимущественно	prinsipalement	المميز
raw material	сировина	сырьё	matieres	مادة خام
insect	комаха	насекомое, -ые	insecte	حشرات
pollinate/pollen	запилювати	опылять	feconder, polliniser	يلقح
filter, purify	очищувати	очищать	nettoyer, purifier	يصفى، ينقي
basin, reservoir	водойма	водоём, -ы	bassin	حوض الماء
destruction	знешкодження	уничтожение	destruction	يقتل
corpse	труп	труп, -ы	cadavre	جثة
flagella	джгутик	жгуттик, -и	flagelles	هدب، اهداب

Pay attention!

Verb: [differ]

to be not like something or someone else, either physically or in another way
Animals differ from plants and fungi because their cells don't have cell walls.

Task 2. Listen, read and write down the text in the notebook.

Zoology or animal biology is the branch of biology that studies the animal kingdom, including the structure, evolution, classification, habits and distribution of animals.

About 2 million species of animals are known. Animals differ in a way of life and structure. They have adapted to life on the surface of the Earth, in the soil, in air and water. Many species of animals parasitize in the body or on the organism of plants, animals and humans. The kingdom of animals includes more than 20 types, which combine into two subkingdoms: Unicellular and Multicellular.

Each of these subgroups are divided into phylum, classes, orders, families, genera and species. Because of the fact that animals and plants have a common origin, they have much in common in morphology and life.

1. Organisms of animals and plants consist of cells that form tissues, organs and organ systems.
2. The composition of cells of animals and plants includes fats, proteins, carbohydrates and other complex organic substances.
3. Animals and plants are characterized by a metabolism, which leads to self-restoration, nutrition, breathing, growth, reproduction, movement, excitability.

But there are important differences between plants and animals.

1. Most of the animal are heterotrophs, but plants are autotrophs. Animals give off carbon dioxide which plants need to make food and take in oxygen which they need to breathe.
2. Plants cells have cell walls and other structures differ from those of animals. Animal cells do not have plastids, vacuoles with cell sap and a dense cellulose membrane.
3. Carbohydrates in animals are stored in the form of glycogen, and in plants - in the form of starch.
4. Plant can not move from his place, whereas the animals are able to movement. Most animals have the ability to move freely. There are amoeboid, ciliary, flagellate and muscular types of movement.

Animals can be of great importance in the human life and our nature. They provide food and raw materials for industry. Many insects pollinate plants. Animals clean reservoirs, take part in soil formation, destruction of animal corpses and plant remains. A large group of animals live at the expense of other (host). When an animal lives on another organism from which it receives food and shelter without any compensation to it, then this association is called **parasitism**, and the animal, which derives advantage, is the **parasite**. There are ectoparasites (such as parasitic worms) and endoparasites (for example, fleas, mites, lice, and ticks).

Parasitology is the study of parasites, their hosts, and the relationship between them.

Task 3. Do the exercises.

Exercise 1. Find unfamiliar words in the text, determine their meaning in the dictionary and write down the words and translation into the notebook.

Exercise 2. Make a text plan.

Exercise 3. Answer the following questions:

1. What does zoology study?
2. How are animal kingdom classified?
3. What are the common features of animals and plants?
4. How animals differ from plants?
5. What are the roles of animals in the nature?
6. What is a parasite?
7. On what groups are parasites divided?

Class 12. Unicellular organisms.

Task 1. Listen, read and repeat words and phrases.

irritability	подразливість	раздражимость	irritabilite'
adaptation	адаптація	адаптация	daaptation
digestive vacuole	травна вакуоль	пищеварительная вакуоль	vacuole digestive
contractive vacuole	скоротлива вакуоль	сократительная вакуоль	vacuole contractile
pseudopodia	псевдоподія	псевдоподия, -ии	pseudopodes
digestion	травлення	пищеварение	digestion
excretion	виділення	выделение	excre'tion
mosquito	комар	комар, -ы	moustiques
alternation	чергування	чередование	alternation
conjugation	кон'югація	конъюгация	conjugaison
food capture	захоплення їжі	захват пищи	

Pay attention!

Phrases

be in the process of doing something

by the process of / the way of using smt

Waste materials are excreted out by the process of diffusion through general body surface.

Task 2. Listen and read the text.

A unicellular organism is an organism that consists of a single cell. This means all life processes, such as reproduction, feeding, digestion, and excretion, occur in one cell. Unicellular organisms can perform some of the same complex activities as multicellular organisms. Amoebas, bacteria, and plankton are just some types of unicellular organisms. Unicellular organisms live in water, soil, animal and human organisms. Many of them cause human diseases – malaria, amoebic dysentery, sleeping sickness and others. Unicellular organisms have different body shapes and sizes. In some animals, the shape of the body is constantly changing (amoeba).

A cell of unicellular organism has an outer membrane, a cytoplasm, and one or more nuclei. The cytoplasm of most protozoans consists of two layers: external - ectoplasm and internal - endoplasm. In the endoplasm are various organelles: mitochondria, ribosomes, endoplasmic reticulum, Golgi apparatus, digestive and contractile vacuoles. Unicellular organisms are moved by means of pseudopodia, cilia, flagella. Many have a cellular mouth. An important feature of unicellular organisms is the formation of cysts.

Subkingdom Protozoa are classified under main classes:

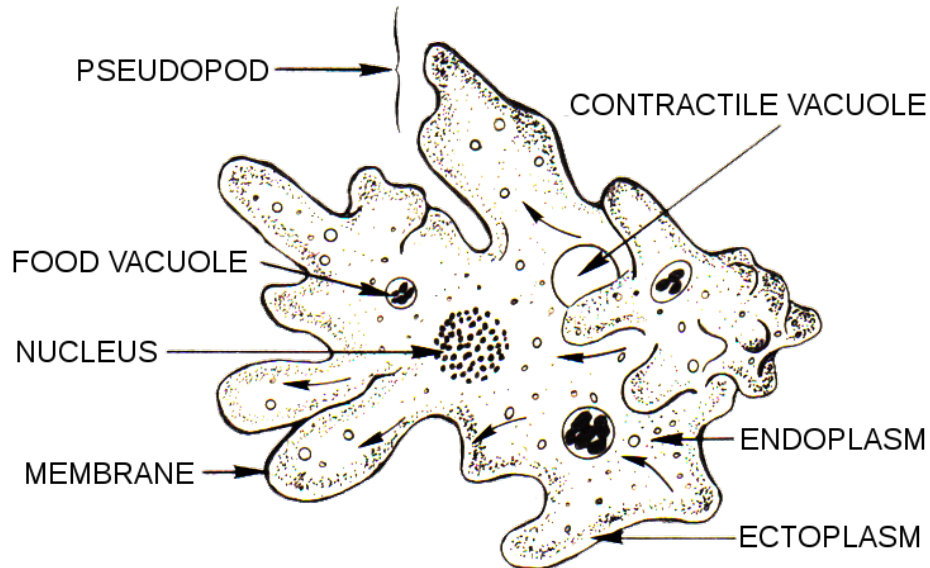
- Sarcodina;
- Flagellata;
- Sporozoa;
- Infuzoria.

Protozoa subkingdom consists of unicellular organisms. They come in many shapes and sizes, live in various environments, and have several different purposes. Some are completely harmless, but others can be parasitic and cause disease. One type of harmless protozoa is the **amoeba**. An amoeba is a unicellular predator that lives in wet environments, including decaying vegetation, wet soil, or inside humans. They obtain food by preying on smaller organisms, such as bacteria living on rotting vegetation. Amoebae have such great hunting skills because of their jellyfish-like tentacles called pseudopodia. They use these tentacles to move around, touch, and grab their prey. Once

the prey is engulfed, enzymes inside the amoeba digest it and then eliminate the waste by pushing it back through the membrane.

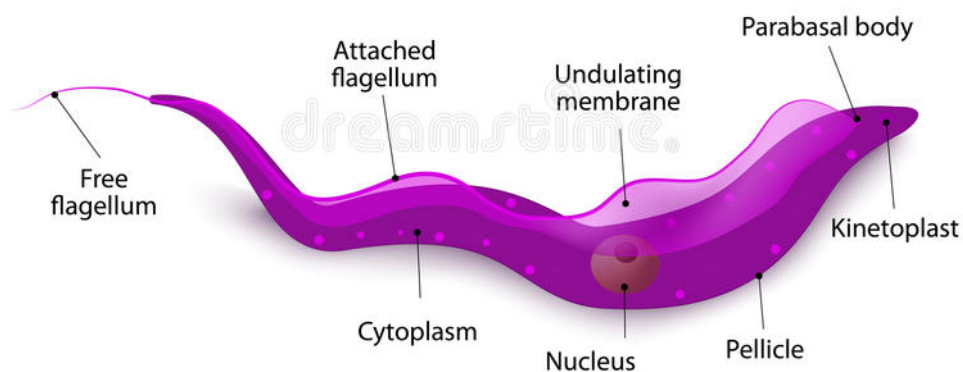
Amoebiasis, also known amoebic dysentery, is an infection caused by any of the amoebae of the Entamoeba group.

Structure of Amoeba



Euglena is the best known and most widely studied member of the class. Species of Euglena are found in fresh and salt waters. They are often abundant in quiet inland waters where they may bloom in numbers sufficient to color the surface of ponds and ditches green or red. Like algae and plants, Euglena cells contain chloroplasts that allow them to create food through photosynthesis.

Trypanosoma brucei

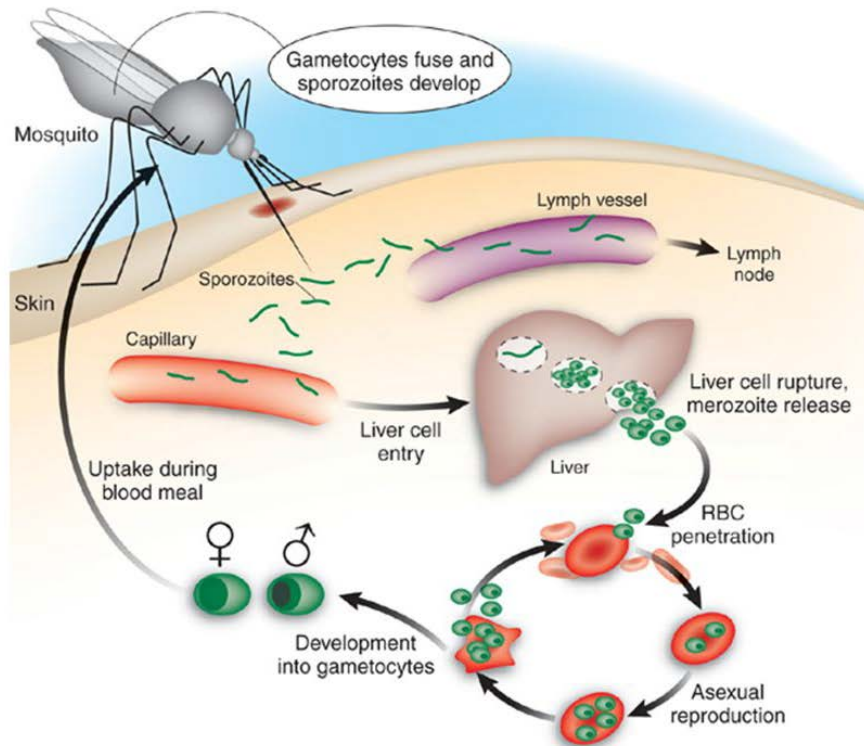


In the human body, the following Flagellata can parasitize: lamblia, trichomonas, trypanosoma, leishmania.

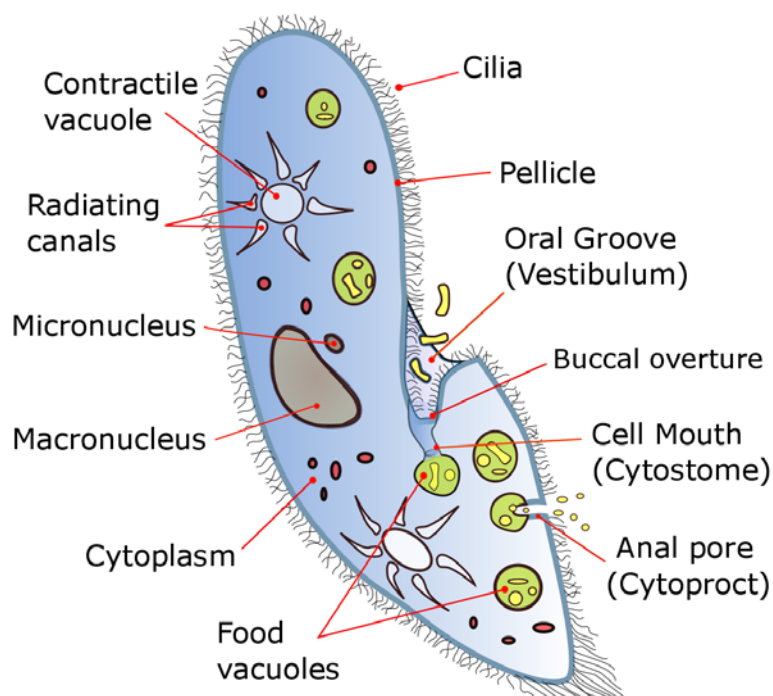
Sporozoans are types of protozoa that most people try to avoid. These protozoa are very parasitic, causing malaria in both birds and mammals. Sporozoans have no flagellated extensions for locomotion. The Sporozoa reproduction cycle has both asexual

and sexual phases. Host mosquitos already infected with malaria are responsible for injecting sporozoans into the bloodstream, causing malarial infection. *Toxoplasma gondii* also belongs to the class of Sporozoa. It is a single-celled parasite causes a disease known as toxoplasmosis.

Malaria life cycle



Infuzoria is a collective term for minute aquatic creatures such as ciliates, protozoa, unicellular algae and small invertebrate that exist in freshwater ponds. The body is covered with cilia, which perform the function of the organs of locomotion. The Infuzoria have two nuclei, the macronucleus and the micronucleus. Parasitic Infuzoria such as *Balantidium coli*, parasitizes in humans and pigs.



Task 3. Do the exercises.

Exercise 1. Answer the following questions.

1. Which organisms are called unicellular?
2. What is the structure of unicellular organism?
3. What are the layers of cytoplasm?
4. Which special organelles do the unicellular organisms have?
5. Name the organs of locomotion of unicellular organisms.
6. How are Protozoa classified?
7. Name the representatives of parasitic Sarcodina.
8. Name the representatives of parasitic Flagellata.
9. What diseases are caused by the Sporozoa representatives?
10. What is the structure of Infuzoria?

Exercise 2. Make a text plan.

Class 13. Multicellular organisms. Phylum Platyhelminthes (Flat worms).

Task 1. Listen, read and repeat words and phrases.

similar	подібний	сходный –ая, -ое, -ые	analogue
invertebrate	безхребетний	беспозвоночный, –ая, -ое, -ые	invertebreccouche
layer	шар	слой, -и	couche
skin	шкіра	кожа	peau
musculature	м'язи	мускулатура	musculature
parenchyma	паренхима	паренхима	parenchyme
interval/gap	проміжок	промежуток	intervalle
digestive system	травна система	пищеварительная система	
nervous system	нервова система	нервная система	systeme nerveux
excretory system	видільна система	выделительная система	systeme excreteus
circulatory system	кровоносна система	кровеносная система	appareil circulatoire
respiratory system	дихальна система	дыхательная система	appareil respiratoire
sensor organs	органи чуття	органы чувств	organes des sens
sucker	присоска	присоска, –и	susoir
neck	шия	шея	cou
to cover	покривати	покрывать/покрыть	couvrir, recouvrir
hermaphrodites	гермафродит	гермафродит, –ы	hermatophrodites
to fill	заповнювати	заполнять/заполнить	remplir, emplit
reproductive system	статева система	половая система	
absence	відсутність	отсутствие	manguer
cavity	порожнина	полость	cavite
epithelium	епітелій	эпителий	epithelial
connective tissue	сполучна тканина	соединительная ткань	conjunctif, connectif
muscular tissue	м'язова тканина	мышечная ткань	musculaire
nervous tissue	нервова тканина	нервная ткань	nerveux

Pay attention!

Verb: [with object]

Fill: cause a space to become full

A gut is filled with spongy cells (parenchyma)

Task 2. Listen and read the text.

The body of multicellular animals consists of a large number of cells and intercellular substance, which form various tissues and organs. Complexes of cells and intercellular substance, similar in structure, function and origin, form certain types of tissues.

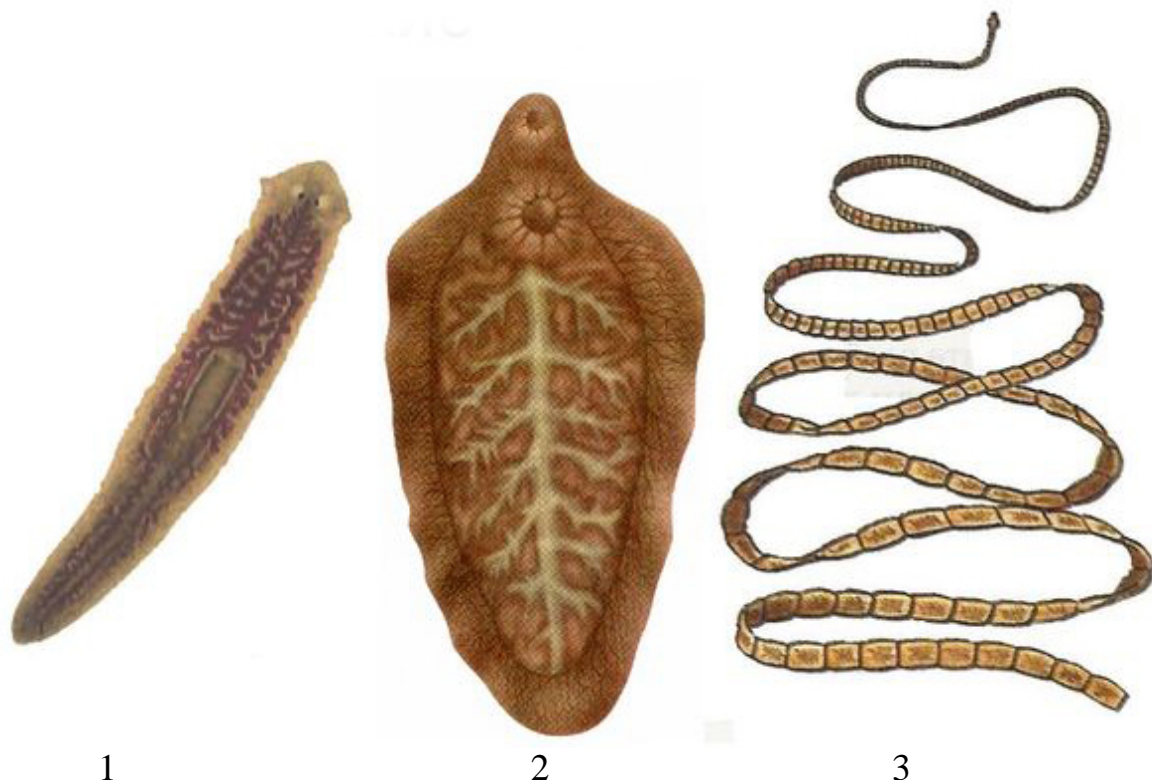
Tissues form organs and systems of organs. Each tissue has specific features, but in the body all tissues are closely related to each other. There are four types of animal tissues: epithelial, connective, muscular and nervous.

Worms are the large group of invertebrate animals. Their body consists of three layers of cells: ectoderm, mesoderm and endoderm. Worms have a bilateral symmetry of the body. The walls of the body consist of epithelium (skin) and musculature, which grow together and form a skin-muscular sac. The internal organs are located either in the body cavity or in the connective tissue - the parenchyma, which fills the spaces between the organs and the skin-muscular sac.

Worms live in the seas, in fresh waters, in the soil, and also parasitize the human body, animals and plants. Scientists divide worms into 5 phyla. The most common are three:

- Phylum Flat worms;
- Phylum Round worms;
- Phylum Ringed worm.

Flat worms are the animals that have a flat body. The body cavity is filled with the parenchyma, in which the internal organs are located. The digestive system looks like a tube. There is a nervous system, sensory organs and excretory system. The circulatory and respiratory systems are absent. Among the flatworms there are many parasites of animals and humans: liver fluke, pork tapeworm, beef tapeworm.



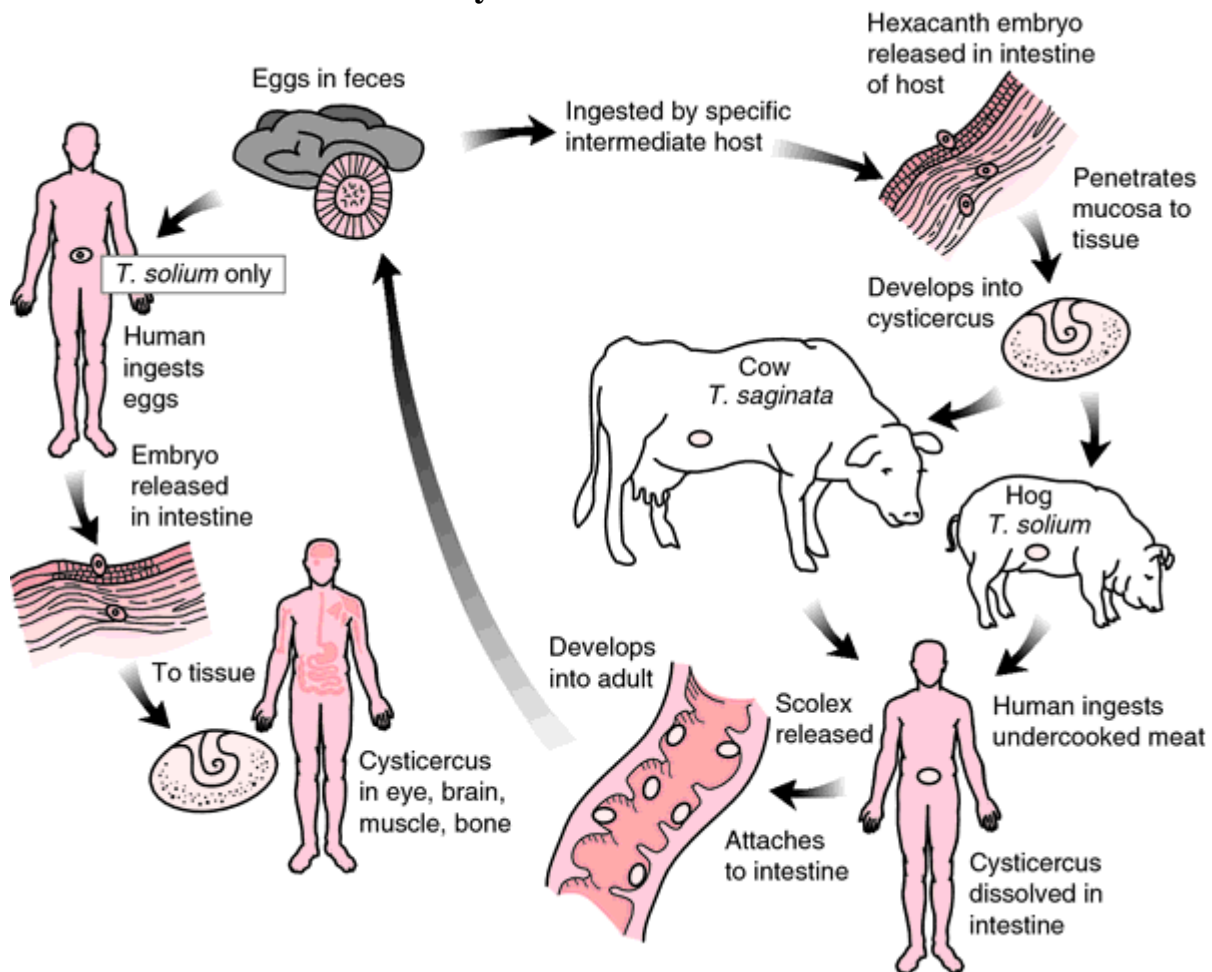
There are three major classes of phylum Flat worms:

1. Class Turbellaria: their body is covered with cilia (for example, planaria).
2. Class Flukes includes parasitic worms that have suckers. They live in the human body and animals body, causing severe illness. For example, the liver flukes, the cat's fluke.

3. Class Tapeworms includes parasites which are mostly ribbon-shaped. They consist of a head (scolex), neck and body (strobila). The strobila is formed by segments (proglottids). In connection with the parasitic way of life, tapeworms do not have a digestive system, but the reproductive system is well-developed. Tapeworms are hermaphrodites. Representatives of tapeworms: pork tapeworm, beef tapeworm, echinococcus, and so on.

Among the worms there are many parasites. All parasitic worms are called *helminths*. **Helminthology** is the study of parasitic worms (helminths), while helminthiasis describes the medical condition of being infected with helminths.

Life cycle of Taenia worms.



Task 3. Do the exercises.

Exercise 1. Answer the following questions:

1. What is a tissue?
2. What kinds of animal tissues do you know?
3. What are the characteristics of worms?
4. What is the name of science that studies parasitic worms?
5. What are the characteristics of flat worms?
6. What class of worms do the suckers have? Name the representatives of the class.
7. What is the structure of tapeworms?
8. Name the representatives of tapeworms.

Exercise 2. Make a text plan.

Exercise 3. Write out the answers to the questions 1, 4, 8.

Class 14. Phylum Roundworms. Phylum Ringed worms.

Task 1. Listen, read and repeat words and phrases.

elongated	видовжений	удлинённый -ая, -ое, -ые	allonge
cross-section	поперечний розріз	поперечный разрез	
cuticle	кутикула	кутикула	cuticule
lining	вистилати	выстилать/выстлать	couvrir
dioecious	роздільностатевий	раздельнополый -ая, -ое, -ые	donochorique
body	тулуб	туловище	tronc, torse
segmented	сегментований	сегментированный, -ая, -ое, -ые	
anal	анальний	анальный -ая, -ое, -ые	anal

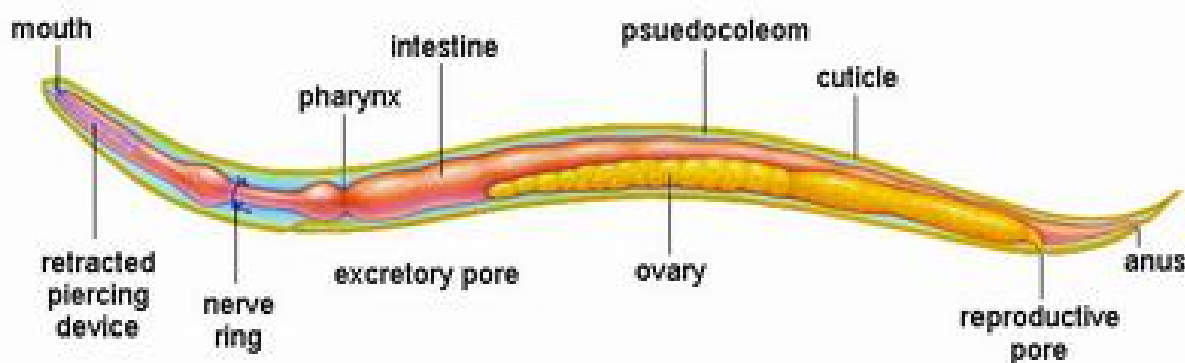
Pay attention!

Consist, comprise and compose are all verbs used to describe what something is 'made of'.

The body of ringed worms consists of the head part, trunk and anal section.

Task 2. Read the text.

Roundworms have an elongated, round body in cross section. They have a primary body cavity filled with liquid. The body of roundworms is covered with a dense cuticle. There are muscle cells under the cuticle, so roundworms can move. The walls of the body cavity on the inner side are not lined with epithelium.



Roundworms are dioecious. The circulatory and respiratory systems are absent. The worms can breathe through their skin or partially anaerobic. There are digestive, excretory and nervous systems. Roundworms are worms with a long round body. They vary in length from several millimetres to two metres. Among the roundworms there are free-living forms, as well as parasites of plants, animals and humans. For example, ascarids, pinworms, whipworms, trichinella are parasites of humans and animals.



Ringed worms have a more complex structure. They have an elongated body that consists of a head, a segmented body and an anal section. The ringed worms have a circulatory system. There are few parasites among ringed worms. Marine species are mostly blood-sucking parasites, mainly on fish, while most freshwater species are predators. For example, leeches are common parasites. They are mostly found in water. Leeches suck the blood of their host.



A leech



An earthworm

Earthworms are commonly found living in soil, feeding on live and dead organic matter. Earthworms are far less abundant in disturbed environments and are typically active only if water is present.

Task 3. Do the exercises.

Exercise 1. Answer the following questions:

1. What are the characteristics of roundworms?
2. Name representatives of the phylum Roundworms.
3. What organ systems do the roundworms have?
4. What are the characteristics of ringed worms?
5. Name representatives of the phylum Ringed worms.

Exercise 2. Make a text plan.

Exercise 3. Write out the answers to the questions 2, 3, 5.

Class 15. Phylum Arthropoda.

Task 1. Listen, read and repeat words and phrases.

chitine	хітин	хитин	chitin
limbs	кінцівка	конечность, -и	membres
head	голова	голова	tete
chest	груди	грудь	thorax, poitrine
abdomen	черевце	брюшко	abdomen
muscles	м'яз	мышца, -ы	muscles
differential	диференціювання	дифференциация	differentiation
mixed	змішаний	смешанный -ая, -ое, -ые	melange, mele
arthropoda	членистоногі	членистоногие	arthropodes
intermediate host	проміжний господар	промежуточный хозяин	hote intermediaire
larva	личинка	личинка, и	larve
pupa	лялечка	куколка, -и	chrysalide

Task 2. Read the text.

Phylum **Arthropoda** are the large group of invertebrate animals which have such features:

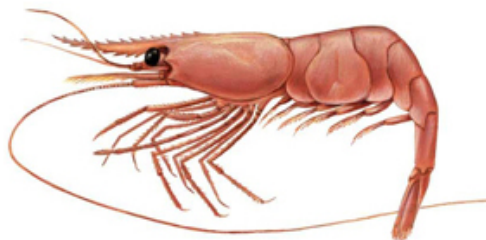
1. The body is covered with a special substance – chitin.
2. Arthropods are invertebrate animals having internally and externally segmented body.
3. All arthropods have jointed limbs attached to their hard exoskeletons that allow for flexibility and movement.
4. The body consists of such parts: head, thorax and abdomen, a chitinous exoskeleton and jointed legs and appendages.
5. Differentiation of muscles.
6. The presence of systems of organs: digestive, respiratory, excretory, blood, nervous, sexual, endocrine.
7. There is a mixed body cavity.

Arthropods, members of the phylum Arthropoda, are a diverse group of animals including insects, crustaceans, spiders, scorpions and centipedes.

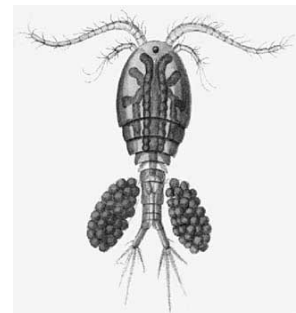
The class of crustaceans includes: crawfish, crab, shrimp, lobster, daphnia, cyclops.



crawfish



shrimp



cyclop

Respiration in all crustaceans occurs with the help of gills. Crustaceans have well-developed sense organs.

Daphnia are one of the several small aquatic crustaceans commonly called water fleas because their saltatory swimming style resembles the movements of fleas. Cyclops are crustaceans and related to lobsters, crabs and shrimp. The cyclops is often seen near water fleas or daphnia. Cyclops is an intermediate host for some parasitic worms. Spiders, phalanges, ticks and scorpions belong to the class of arachnids. Most representatives of arachnids live on land. Ticks are carriers or pathogens of some diseases (Ixodidae, Argasidae and Gamasidae ticks).



Tick



Spider



Scorpion

Class Insecta is the most numerous and diverse group: flies, lice, fleas, butterflies, mosquitoes, beetles, bees and others.



Fly

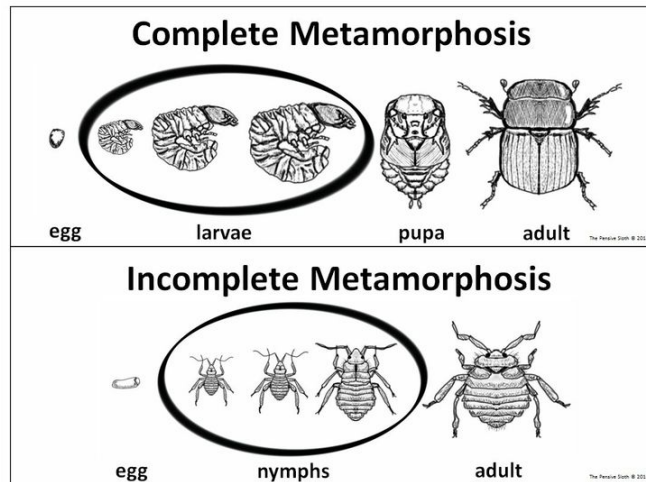


Flea



Louse

Many insects are carriers of pathogens (flies, lice, fleas, mosquitoes).
Metamorphosis: the changes in form that occur as an insect approaches adulthood.



When the immature insects and the adults have different forms, the process is called complete metamorphosis, and the worm, or grub, like juvenile insects are called larvae. After the last larval instar, the insect changes into a pupa. In this stage, the insect does not feed or move around much. It may be covered by a protective cocoon. Eventually the insect molts for the last time and emerges as an adult.

Exercise 1. Make a text plan.

Exercise 2. Answer the following questions:

1. What are the characteristics of arthropods?
2. What are the characteristics of crustaceans?
3. Name the representatives of the crustaceans.
4. What is the importance of crustaceans?
5. What are the features of arachnids?
6. Name the representatives of arachnids.
7. What features do insects have?
8. Name the representatives of insects. What is the importance of insects?
9. Describe the development of insects.
10. What diseases are transmitted by insects?

Exercise 3. Write down the answers for the following questions:

1. How does insect develop with complete metamorphosis?
2. How does insect develop with incomplete metamorphosis?

Class 16. Control work №1.

Repeat.

Task 1. Listen, read and repeat words and phrases.

habitation	існування	обитание	إقامة، تأهيل
pattern/regularity	закономірність	закономерность, -и	قاعدة، حكم
evolutional	еволюційний	эволюционный, -ая, -ое, -ые	تطوري
mainly/principally	переважно	преимущественно	المميز
dense	щільний	плотный, -ая, -ое, -ые	كثيف
ensure/provide	забезпечити	обеспечить/обеспечивать	ضمن، وفر، أمن
osmotic	осмотичний	осмотический, -ая, -ое, -ие	تناسحي
to store	запасатися	запасаться	يحتاط
starch	крохмаль	крахмал	نشا
to move	рухатися	двигаться	يتحرك
source/origin	джерело	источник, -и	مصدر، منبع
constructing	будівництво	строительство	تشبيد، إنشاء، بناء
raw materials	сировина	сырьё	مادة خام
industry	промисловість	промышленность	صناعة
medicine/drug	ліки	лекарство, -а	دواء
dye	барвник	краситель, -и	خضاب، صبغة
root	коріння	корень/корни	جذر
stem/stalk	стебло	стебель/стебли	ساق، عود، جذع
leaf / leaves	листя	лист/листья	ورقة

Exercise 2. Answer the following questions:

1. What does biology study?
2. What sections does biology have?
3. Name the main components of the cell.
4. What is metabolism?
5. What is dissimilation?
6. What is assimilation?
7. What types of assimilation do you know?
8. What are the shapes of cells?
9. What types of reproduction do you know?
10. What structure does the bacterial cell have?
11. What are the characteristics of bacteria?
12. What is the importance of bacteria in nature?
13. What is the importance of bacteria in human life?
14. What is the structure of bacteriophages?
15. What is the importance of viruses in nature and human life?
16. What are the common features of all plants?
17. What is the importance of plants?
18. What is the similarity of animals and plants?
19. What is the difference between animals and plants?
20. Which organisms are called parasites?
21. What does the animal importance?

Test tasks for self-control

Variant 1

1. Science, that studies a cell is:
a) cytology; b) histology; c) ecology.
2. The basic structural and functional unit of living nature is:
a) tissue, b) organism; c) cell.
3. The totality of all reactions of synthesis in the cell is:
a) metabolism; b) dissimilation; c) assimilation.
4. Female sex cells are:
a) ovaries; b) eggs; c) spermatozoa.
5. Bacteria that use free oxygen for breathing is:
a) aerobic; b) anaerobic; c) spirillae.
6. The smallest unit of classification of living organisms is:
a) phylum; b) species; c) class.
7. A special zone of a bacterial cell that contains DNA:
a) nucleus; b) nucleoli; c) nucleoid.
8. Carbohydrates in animals are stored in the form of:
a) glycogen; b) chitin; c) starch.
9. Parasites that live and feed on the host organism are:
a) ectoparasites; b) endoparasites.
10. The organs of locomotion in amoeba are:
a) pseudopodia; b) flagella; c) cilia.
11. Representatives of roundworms are:
a) amoeba; b) trichinella; c) beefworm.
12. Cyclop is a representative of class:
a) crustacea; b) roundworms; c) insects.

Variant 2

1. Science, that studies a tissue is:
a) cytology; b) histology; c) ecology.
2. Organisms that synthesize organic substances from inorganic are called:
a) autotrophic; b) heterotrophic; c) saprotrophic.
3. Living matter of the cell is:
a) protoplast; b) cytoplasm; c) nucleus.
4. A complex of chemical reactions in the cell that occur with the release of energy is:
a) metabolism; b) dissimilation; c) assimilation.
5. Organisms that live and feed inside the host organism are:
a) ectoparasites; b) endoparasites.
6. Specialized mobile cells of asexual reproduction:
a) zoospores; b) spores; c) endospores.
7. Bacteria that have the form of sticks:
a) bacilli; b) spirillae; c) spirochetes.
8. Bacteria reproduce by:
a) spores; b) simple cell division; c) budding.
9. Bacteriophages are:
a) bacteria; b) viruses; c) fungi.
10. A dense cellulose wall have:
a) cells of animals; b) plant cells.
11. The representatives of ringed worms are:
a) leeches; b) toxoplasma; c) liver fluke.
12. Representatives of the Flagellata are:
a) Infusoria; b) sporozoa; c) lamblia.

Test yourself:

Variant 1: 1a, 2c, 3a, 4b, 5a, 6b, 7c, 8a, 9a, 10a, 11b, 12a.

Variant 2: 1b, 2a, 3a, 4b, 5b, 6a, 7a, 8b, 9b, 10b, 11a, 12c.