

МИНИСТЕРСТВО СЕЛЬСКОГО ХОЗЯЙСТВА И ПРОДОВОЛЬСТВИЯ
РЕСПУБЛИКИ БЕЛАРУСЬ

УЧРЕЖДЕНИЕ ОБРАЗОВАНИЯ
«ВИТЕБСКАЯ ОРДЕНА «ЗНАК ПОЧЕТА» ГОСУДАРСТВЕННАЯ
АКАДЕМИЯ ВЕТЕРИНАРНОЙ МЕДИЦИНЫ»

Т. Н. Крученкова, А. И. Картунова

АНГЛИЙСКИЙ ЯЗЫК. ANIMAL SCIENCES

*Рекомендовано учебно-методическим объединением
в сфере высшего образования Республики Беларусь
по образованию в области сельского хозяйства в качестве
учебно-методического пособия для студентов учреждений
образования, обеспечивающих получение специального высшего
образования по специальности 7-07-0841-01 «Ветеринарная медицина»*

Витебск
ВГАВМ
2026

УДК 811.111'276.6:636

ББК 81.2 Англ – 9

К84

Рекомендовано учебно-методическим объединением
в сфере высшего образования Республики Беларусь по образованию
в области сельского хозяйства от 17 декабря 2025 г. (протокол № 2)

Авторы:

заведующий кафедрой *Т. Н. Крученкова*;
старший преподаватель *А. И. Картунова*

Рецензенты:

заведующий кафедрой белорусской и русской филологии
УО «Витебский государственный университет им. П. М. Машерова,
кандидат филологических наук, доцент *Т. П. Слесарева*; заведующий
кафедрой германской филологии УО «Витебский государственный
университет им. П. М. Машерова», кандидат филологических наук,
доцент *О. В. Шеверина*

Крученкова, Т. Н.

Английский язык. Animal sciences : учебно-методическое пособие
К84 для студентов учреждений образования, обеспечивающих получение
специального высшего образования по специальности 7-07-0841-01
«Ветеринарная медицина» / Т. Н. Крученкова, А. И. Картунова. –
Витебск : ВГАВМ, 2026. – 96 с. – ISBN 978-985-591-308-6.

Учебное издание подготовлено в соответствии с учебной
программой по дисциплине «Иностранный язык (английский)» для
специальности 7-07-0841-01 «Ветеринарная медицина». Целью
данного пособия является развитие у обучающихся языковых и
коммуникативных навыков и умений, а также методическое
обеспечение изучения дисциплины, контроля и самоконтроля в ходе
автономной учебной деятельности.

УДК 811.111'276.6:636

ББК 81.2 Англ – 9

ISBN 978-985-591-308-6

© УО «Витебская ордена «Знак Почета»
государственная академия ветеринарной
медицины», 2026

ПРЕДИСЛОВИЕ

Introduction

Настоящее учебно-методическое пособие является одним из компонентов учебно-методического комплекса по дисциплине «Иностранный язык (английский)» для студентов, обучающихся по специальности «Ветеринарная медицина». Данный сборник учебных текстов предназначен для профессионально ориентированного обучения иностранным языкам, соответствует программным требованиям для студентов неязыковых факультетов. Учебные тексты и упражнения данного пособия тематически связаны с содержанием учебного издания «Английский язык/English», с материалами грамматического справочника, включенного в учебно-методический комплекс.

Содержательное наполнение учебных текстов способствует расширению профессионально ориентированного лексического запаса студентов, позволяет совершенствовать навыки различных видов чтения, понимания, говорения на иностранном языке, способствует формированию языковых и профессиональных компетенций обучающихся. Учебные материалы пособия предваряют переход к работе с оригинальными текстами более узкой специализации.

Пособие может быть рекомендовано для работы в аудитории, а также для самостоятельной внеаудиторной работы обучающихся.

CONTENTS

Introduction	3
Unit 1	5
Unit 2	10
Unit 3	16
Unit 4	21
Unit 5	28
Unit 6	33
Unit 7	38
Unit 8	43
Unit 9	48
Unit 10	55
Unit 11	61
Unit 12	67
Supplementary reading	72
Vocabulary	83
References	94

UNIT I

LIVING AND NON-LIVING MATTER

Topic vocabulary

- | | |
|---|---|
| 1. <i>to distinguish</i> – различать | 14. <i>feature</i> – характерная черта |
| 2. <i>substance</i> – вещество | 15. <i>respect</i> – аспект |
| 3. <i>matter</i> – материя, вещество | 16. <i>grain</i> – зерно, зернышко, песчинка |
| 4. <i>subject matter</i> – предмет обсуждения | 17. <i>cell</i> – клетка |
| 5. <i>to arrange</i> – организовывать | 18. <i>stimulus /pl. stimuli</i> – стимул, раздражитель |
| 6. <i>individual</i> – индивид, индивидуальный | 19. <i>irritability</i> – раздражимость, возбудимость |
| 7. <i>living thing</i> – живое существо, живой организм | 20. <i>to adjust</i> – приспособляться |
| 8. <i>whale</i> – кит | 21. <i>adaptability</i> – способность адаптироваться |
| 9. <i>flea</i> – блоха | 22. <i>size</i> – размер |
| 10. <i>environment</i> – окружающая среда | 23. <i>metabolism</i> – обмен веществ, метаболизм |
| 11. <i>common</i> – обычный, широко распространенный | 24. <i>reproduction</i> – размножение, воспроизводство |
| 12. <i>to recognize</i> – распознавать, признавать | 25. <i>growth</i> – рост |
| 13. <i>intake of food</i> – потребление, прием пищи | 26. <i>life cycle</i> – жизненный цикл |

Text

LIVING AND NON-LIVING MATTER

Most living organisms, animals or plants, can usually be distinguished from non-living or inorganic material, but this is not easy with some lower forms of life. Non-living things are lifeless objects that do not perform metabolic processes. The main differences between living and non-living things include:

1. Form and size of organism. Each kind of living organisms is usually of a definite form and characteristic size. Most of them are also arranged as different individuals. A whale, a flea or any common plant is recognized by such features. Non-living materials vary widely in such respects as from a sand grain to a mountain or from a drop of water to an ocean.

2. Organization. The parts of each living organism are composed of microscopic cells as basic units of life, and these are assembled into interrelated systems for performing life processes. Living things are capable of metabolism, growth, reproduction and movement.

3. Metabolism. Various vital processes, collectively known as metabolism, are constantly in progress within living organism including the intake and use of

food, respiration, secretion, excretion etc. Living things require energy and use food to obtain it.

4. Irritability and adaptability. Living organisms react to changes in their environment, they can adapt to these changes responding to different stimuli. The stimuli may be external (heat, light, moisture, pressure or contact) or internal (hunger, thirst, pain etc.). All living things interact and adjust to their environment. Non-living things are relatively stable.

5. Reproduction. All living organisms give rise to organisms of the same kind – they reproduce. Organisms reproduce by using materials within their bodies produced by metabolism. They reproduce both sexually and asexually. An organism passes on its genetic information to its offspring through reproduction. Non-living things cannot reproduce.

6. Growth and life cycle. All living organisms grow, they do so by the development of new parts between or within older ones and may replace parts during life. Non-living things can increase by external addition as (e.g. crystals). Each individual has a definite life cycle as follows: birth, growth, stage of maturity, and death.



Learning Activities

1. Guess the meaning.

Organism, matter, virus, characteristics, form, individual, ocean, complex, organic, molecule, proportion, phosphorus, collectively, living substance, protoplasm, microscopic, system, organization, reaction, material, crystal, stimulus, progress.

2. Based on the words below choose what topic will be discussed in the text:

a) music; b) social development; c) biology; d) sports.

3. True or false.

1. It is always easy to distinguish between living and non-living things.
2. All living things have the same size and form.
3. Most living organisms are arranged as definite individuals.
4. Food intake, respiration, excretion, secretion are constantly in progress in living organisms.
5. The protoplasm and living organisms never react to changes in the environment.
6. Non-living things can reproduce.
7. Each individual has a definite life cycle.

4. Choose which of the following is used in the text:

Alive – living	Replace parts – change parts
Person – individual	Type of animal – species of animals
Multiplication – reproduction	Respond to changes – react to changes
Shape – form	Usual plant – common plant
Consists of – is composed of	Grow by development – enlarge by development
Small amount – small quantity	Non-living – inanimate
Organization – structure	Living beings – living organism
Children – offspring	A whale – a seal

5. Match nouns with corresponding adjectives.

	<i>Adjective</i>		<i>Noun</i>
1	Formal	a	organism
2	Common	b	character
3	Quantitative	c	form
4	Definite	d	analysis
5	Old	e	size
6	Vital	f	part
7	Individual	g	molecules
8	Definite	h	processes
9	Characteristic	i	animal
10	External	j	amount
11	Internal	k	characteristics
12	Organic	l	complex

6. Insert prepositions. Compare your answer with your partner's one.

(Prepositions: with, within, by, to, of, between, into, either ...or)

1. This is not easy ... some forms ... life.
2. There are differences ... living and non-living things.
3. Each kind ... living organisms has a definite form.
4. The protoplasm and living organisms react ... changes.
5. Cells are assembled ... interrelated systems.
6. The parts ... each living organism are composed ... microscopic cells.
7. Organisms reproduce ... using materials ... their bodies produced ... metabolism.
8. Living things reproduce ... sexually ... asexually.

7. Match the parts of the table. Discuss the results with your partner.

1.	Metabolism	a	The cycle refers to the stages of growth, development and reproduction that an organism goes through from birth to death.
2.	Reproduction	b	Anything that has a fixed life cycle.

3.	Living thing	c	It is the biological process by which new individuals (offspring) are produced.
4.	Life cycle	d	Is the sum of all chemical reactions required to support cellular function and the life of all organisms.

8. Give English equivalents.

Более низкая форма жизни; низшая форма жизни; живая материя; неживая материя; обычное растение; невидимые под микроскопом; видимые под микроскопом; организмы состоят из; простые молекулы; сложные органические молекулы; образуют комплекс; жизненно важный процесс.

9. Place the following words under the list A (living things) or B (non-living things). Discuss the results with your partner.

Animals, oil seed, seed oil, green leaf, a flower in the field, a flower in a vase, a car, a worm, a sand grain, a germ, a fish, a bacterium, a tree, a log, bread, a cow, a chicken, chicken soup, fish, ocean, water, air, the Earth.

№	A. Living things	B. Non-living things

10. Make the following sentences negative.

1. Materials are organized into organic molecules.
2. This is easy with some lower forms of life.
3. Inanimate materials increase by external addition.
4. Cells can reproduce.
5. Inanimate materials must adjust to the environment.

11. Make the following sentences interrogative.

1. Viruses are invisible under the microscope.
2. Non-living materials vary widely.
3. A whale is recognized by certain features.
4. Each individual has a definite life cycle.
5. Non-living things cannot reproduce.
6. The protoplasm reacts to changes.

12. Translate into English.

1. Легко ли отличить живую материю от неживой?
2. Сложные молекулы образуют живые существа.
3. Живые организмы реагируют на изменения окружающей среды.
4. Живые существа имеют разные размеры и форму.
5. Неживые материалы не размножаются.
6. Метаболизм – это различные жизненные процессы в организме.

13. Express briefly the general idea of the text “Living and Non-living Matter”.

14. Read the following text and find the description for: population, communities, ecosystems, biosphere. Ask your partner to explain difficult words.

UNIVERSITY AND DIVERSITY

The diversity of living things is astonishing. Biologists estimate that from 5 million to 30 million different species exist on the Earth. Unfortunately, many species are becoming extinct or dying out as their habitats are destroyed before scientists can study and classify them.

Living things interact with each other and with their environment. The interactions between the organisms and their environment are classified as **populations, communities, ecosystems** and the **biosphere**.

A **population** consists of the individuals of a given species that occur together at one place and at one time. Populations of different species, which interact with one another, make up a **community** of organisms. Within the community, populations of different species interact with one another in a particular place. For instance, a forest community may be made up of populations of bacteria, fungi, earthworms, insects, mice, deer, frogs, foxes, snakes, trees, grasses etc.

An **ecosystem** is a community of plants, animals and microorganisms that interact with one another and their environments and that are interdependent. The forest ecosystem includes all living organisms as well as non-living components of the environment, which contribute substances needed for the ecosystem to function.

The biosphere is a part of the Earth where biological activity exists. Within this global environment living things interact with each other and with non-living resources in a great number of ways.

15. Find the key sentence in each paragraph of the text “University and Diversity”. Make a plan of the text in writing. Get ready to speak about university and diversity in the natural environment according to your plan.

Words to remember

Adapt, cell, diversity, environment, extinct, external, internal, feature, food, growth, intake, interact, life, live, living, non-living, matter, reproduce, substance, offspring.

CHECK POINT

1. Translate into Russian.

Living, non-living, matter, inorganic, substance, food, adapt, respond, common, recognize, irritability, growth, life cycle, adaptability, food intake, reproduction.

2. Progress questions.

1. What are the main differences between living and non-living matter?
2. Do inanimate things react to environmental changes?
3. What internal stimuli within a living thing do you know?
4. What external stimuli can you mention?
5. Name the stages of the animal life cycle, will you?
6. What is metabolism?
7. Have all living things been classified by scientists?

3. Put possible questions to the answers.

1. Yes, the parts of each living organism are composed of microscopic cells.
2. Each kind of living organisms is usually of a definite form and of a characteristic size.
3. No, non-living materials vary widely in form and size.

4. Translate into English.

1. Живая материя – это органическая материя.
2. Живая материя имеет характерные свойства.
3. Живые организмы имеют определенный размер и форму.
4. Метаболизм – это свойство живой материи.
5. Неживые вещества не могут размножаться.
6. Различные биологические виды взаимодействуют друг с другом.
7. К сожалению, многие виды становятся вымирающими.

5. Write 3 things that you have learnt about living and non-living matter. Complete the chart. Discuss the results with your group.

#	Living matter	Non-living matter
1		
2		
3		

UNIT 2

PROTOPLASM

Topic vocabulary

- | | |
|--|-------------------------------------|
| 1. <i>compound</i> – соединение, составной, сложный | 6. <i>transparent</i> – прозрачный |
| 2. <i>semifluid</i> – полужидкий | 7. <i>composition</i> – состав |
| 3. <i>property</i> – свойство, качество | 8. <i>compound</i> – соединение |
| 4. <i>species</i> – вид (биологический) | 9. <i>mixture</i> – смесь |
| 5. <i>to differentiate</i> – дифференцировать, различать | 10. <i>to contain</i> – содержать |
| | 11. <i>carbohydrate</i> – углевод |
| | 12. <i>protein</i> – белок, протеин |

- | | |
|---|---|
| 13. <i>nucleic acid</i> – нуклеиновая кислота | 19. <i>peculiar</i> – особенный, характерный |
| 14. <i>to get rid of</i> – освобождаться, избавляться от | 20. <i>average</i> – средний |
| 15. <i>to exhibit</i> – показывать, обнаруживать, проявлять | 21. <i>percentage</i> – процент, процентное отношение |
| 16. <i>movement</i> – движение | 22. <i>waste</i> – отходы, выделения организма |
| 17. <i>contractile ability</i> – сократительная способность | 23. <i>chemical property</i> – химическое свойство |
| 18. <i>tissue</i> – ткань | |

Text

PROTOPLASM

With the introduction of the microscope, it became possible to study the finer details of structure of organs and tissues and minute organisms. Protoplasm is the living material within cells, it may be called the “physical basis of life“. Protoplasm is the semifluid cell content including the cell organelles and nucleus of the cell. Protoplasm is a complex mixture of many substances including water, mineral salts and many organic compounds. Protoplasm serves as the substance in which all processes of living cells are carried out.

In different species and in parts of any one animal the protoplasm differs in its chemical, physical and biological properties. However, it has certain common characteristics. It can be differentiated into cytoplasm and the nucleus.

Protoplasm is a transparent, jelly-like material, the consistency varying from the more liquid, slightly gelatinous white of a fresh egg to that of semi-solidified gelatin of jelly. It contains cell organelles but no nucleus.

Protoplasm includes both inorganic and organic substances. Inorganic substances are water, which makes up 90% of the protoplasm, mineral salts, such as NaCl-salt, and gases like oxygen and carbon dioxide. Organic substances include proteins, carbohydrates, lipids, nucleic acids and enzymes.

Many functions are carried out inside the cell. The living protoplasm responds to stimuli, organisms must get rid of excretory wastes; cells divide to form identical daughter cells, growth follows on cell division; there is an assimilation of protoplasm and an increase in size. Certain cells exhibit movement (e.g. unicellular organisms), and the protoplasm of these cells has a contractile ability.

Chemical composition. Protoplasm contains about 20 known chemical elements the proportion of which varies, and the specific compounds into which these elements are organized differ in various elements and in the different cells and tissues of the same animal. These elements are most common in soils and waters of the Earth. They are present in foods taken by animals, in products of their secretion and wastes. No chemical element is peculiar to living things. An average percentage in chemical composition of animal protoplasm is as follows:

#	Chemical element	Symbol	%	#	Chemical element	Symbol	%
1	Oxygen	O ₂	76.0	7	Magnesium	Mg	0.02
2	Carbon	C	10.5	8	Calcium	Ca	0.03
3	Hydrogen	H	10.0	9	Sulfur	S	0.5
4	Nitrogen	N	2.5	10	Phosphorus	P	0.3
5	Potassium	K	0.3	11	Sodium	Na	0.05
6	Iron	Fe	0.01	12	Chlorine	Cl	0.10



Learning Activities

1. *Guess the meaning.*

Organ, organelle, salt, biological, to control, characteristics, basis, membrane, physical, gelatin, gases, protein, enzyme, identical, principal, chemical elements, organic, inorganic, jelly, mineral, secretion.

2. *True or false.*

1. With the introduction of mobile phones, it became possible to study the finer details of organisms.
2. Nucleus is called the “physical basis of life“.
3. Protoplasm contains neither inorganic nor organic substances.
4. Organic substances include proteins, carbohydrates, lipids, nucleic acids and enzymes.
5. Water and mineral salts are inorganic substances that protoplasm contains.
6. Specific compounds of protoplasm differ in the cells of different animals and in different parts and tissues of the same animal.

3. *Complete the sentences.*

1. Protoplasm is the living material ...
2. Protoplasm is the semifluid cell content including the cell organelles ...
3. Certain ... exhibit movement.
4. Protoplasm contains about 20 ...
5. These elements are most common in ... and ... of the Earth.

4. *Read the sentences. Write what comes first. Compare you answers with your partner's.*

1. Growth follows on cell division. (Growth or cell division?)
2. Response follows on stimuli actions. (Stimuli action or response?)
3. Cell movement follows on protoplasm contraction. (Movement or contraction?)
4. Practice follows on theory. (Theory or practice?)

5. Form nouns from the verbs.

Model: to mix – mixture

to grow, to secrete, to differ, to study, to move, to introduce, to produce, to function, to compose, to form, to respond, to serve.

6. Give Russian equivalents.

1	Cell structure	
2	Body parts	
3	Cell nucleus	
4	Protoplasm assimilation	
5	Body wastes	
6	Animal tissues	
7	Stimuli action	
8	Protoplasm contraction	
9	Cell movement	
10	Protoplasm characteristics	

7. Match the words with their definitions. Compare your results with your partner's ones.

1	Species are	a	living things.
2	Protoplasm is		a microscopic mass of protoplasm.
3	Organisms are	b	the most narrow and specific taxonomic classification.
4	A cell is	c	groups of similar cells that work together to perform a function.
5	Tissues are	d	the physical basis of life.

8. Supply prepositions (into, from, in, of, to, about).

1. Organisms are very different ... one another.
2. The ultimate living substance ... the cells ... all plants and animals.
3. Protoplasm is a complex mixture ... many substances.
4. The consistency varies ... semi-liquid ... solid.
5. Protoplasm contains ... 20 known chemical elements.
6. Cells must get rid ... excretory wastes.
7. The cell membrane can be differentiated ... protoplasm and nucleus.
8. Living protoplasm responds ... stimuli.

9. Choose the correct form of the verb. Discuss your answers with your partner.

1. Organic substances (include, includes) proteins, carbohydrates, lipids, nucleic acids and enzymes.
2. The living protoplasm (responds, respond) to stimuli, e.g. retinal cells in the eye respond to light.
3. All these functions (are, is) carried out inside the cell.

4. Movement (is, are) exhibited by certain cells.
5. Protoplasm (contain, contains) about 20 known chemical elements.
6. The protoplasm of these cells (has, have) a contractile ability.
7. These elements (is, are) most common in soils and waters of the Earth.

10. Put the missing verb in the Past Tense form.

1. The ultimate living substance in the cells of all plants and animals ... called protoplasm. (*is, was, were*)
2. The living protoplasm ... to stimuli. (*respond, responds, responded*)
3. Certain elements present in foods taken by animals, in products of their secretion and wastes. (*is, will be, were, was*)
4. No chemical element ... peculiar to living things. (*is, was, were, will be*)
5. There ... an assimilation of protoplasm and an increase in size. (*was, will be, were*)

11. Read the sentences. Say what comes first.

Model: Growth follows on cell division. – Cell division comes first.

1. Practice follows on theory.
2. Response follows on stimuli.
3. Absorption follows on the intake.

12. Make the sentences negative.

1. Protoplasm is a transparent and jelly-like material.
2. The chemical properties of protoplasm can be divided.
3. Cells divide to form identical daughter cells.
4. All these functions are carried out inside the cell.
5. Cells must get rid of excretory wastes.
6. Protoplasm contains about 20 known chemical elements.

13. Make the sentences interrogative.

1. These organisms are very different.
2. The diversity or variety of living things is astonishing.
3. Other types of interaction may exist within the community.
4. Protoplasm has a contractile ability.
5. Some elements are the most common in soil.
6. Protoplasm has certain common characteristics.

14. Write down the elements designated by their symbols. Exchange the results with your partner, correct the mistakes if needed. O; C; Cl; H; N; K; Mg; Ca; P; S; Na; Fe.

15. Complete the chart. Write the symbols of chemical elements according to your knowledge. Discuss the results with the group.

1	Iron	Sulphur
2	Copper	Cobalt
3	Zinc	Selenium
4	Silver	Nitrogen
5	Iodine	Oxygen
6	Aluminum	Sodium
7	Manganese	Potassium
8	Fluorine	Gold

16. Match the element and their explanation according to your knowledge. Discuss the results with the group.

1	Oxygen	a	Iron carrier, component of water and most organic molecules.
2	Hydrogen	b	Necessary for cellular respiration, component of water.
3	Carbon	c	Backbone of organic molecules.
4	Calcium	d	Critical component of hemoglobin in the blood.
5	Iron	e	Component of bones and teeth.

17. Answer the questions.

1. When did it become possible to study the finer details of organs and tissues?
2. What is protoplasm?
3. Is protoplasm the same in every species?
4. What elements does protoplasm contain?
5. Can protoplasm reproduce?
6. What are inorganic substances of protoplasm?
7. What organic substances of protoplasm do you know?
8. Can protoplasm be found in non-living things?

Words to remember

Introduction, plant, animal, body, nucleus, composition, compound, biological properties, salt, Oxygen, Hydrogen, Nitrogen, Calcium, Potassium, Sodium, Sulphur, organic properties, chemical elements, species, fluid.

CHECK POINT

1. Give English equivalents.

Смесь, соединение, состав, состоит из, вид животного, сократительная способность, кислород, водород, азот, химическое свойство, углеводы, белок, жир, полужидкий, органическое соединение, неорганическое соединение, химические элементы.

2. Progress questions.

1. What is protoplasm?
2. Is protoplasm the same in every species?
3. How many elements does protoplasm contain?
4. Can protoplasm reproduce?
5. What are inorganic substances of protoplasm?
6. Is water organic or inorganic substance of protoplasm?
7. Can protoplasm be found in non-living things?
8. What is called the “physical basis of life”?

3. Put questions to the following answers.

1. I have never seen a living substance under the microscope.
2. Yes, protoplasm is a complex mixture of many substances.
3. Yes, every veterinary student studies the chemical composition of protoplasm.

4. Translate into English.

1. Протоплазма – это живая субстанция клетки.
2. Все животные и растения содержат протоплазму.
3. Не существует типичной клетки – все клетки разные.
4. Вы знаете об органических свойствах протоплазмы, не так ли?
5. Неживая материя не имеет ни клеток, ни протоплазмы.

UNIT 3

CELL

Topic vocabulary

- | | |
|---|--|
| 1. <i>maintenance</i> – поддержание, содержание | 13. <i>succeeding</i> – последующий |
| 2. <i>reproduction</i> – воспроизводство, размножение | 14. <i>generation</i> – поколение, генерация |
| 3. <i>to enclose</i> – вмещать, включать | 15. <i>to carry out</i> – выполнять |
| 4. <i>multicellular</i> – многоклеточный | 16. <i>passage</i> – прохождение |
| 5. <i>unicellular (single-celled)</i> – одноклеточный | 17. <i>site</i> – место |
| 6. <i>vessel</i> – сосуд | 18. <i>to determine</i> – определять |
| 7. <i>view</i> – рассматривать | 19. <i>distinct</i> – отдельный, четко выраженный |
| 8. <i>carry out</i> – выполнять | 20. <i>double helical macromolecule</i> – макромолекула с двойной спиралью |
| 9. <i>simultaneously</i> – одновременно | 21. <i>threads of chromatin</i> – хроматиновые нити |
| 10. <i>tissue</i> – ткань (организма) | 22. <i>hereditary information</i> – наследственная информация |
| 11. <i>sustain</i> – поддерживать | |
| 12. <i>helical</i> – спиральный, спиралевидный | |

23. *activities of the cell* –

деятельность клетки

24. *transfer* – перенос

25. *to utilize* – использовать

26. *to convert* – преобразовывать

27. *raw materials* – сырье

28. *mitochondrion /pl. mitochondria* –
митохондрия (мн.ч. митохондрии)

29. *vary* – варьируют, изменяются

Text

CELL

A cell is a functional unit of all living organisms in which all the chemical reactions necessary for the maintenance and reproduction of life take place. Cell is a mass of protoplasm enclosed in a membrane and containing nucleus. As an individual unit, the cell is capable of metabolizing its own nutrients, synthesizing many types of molecules, providing its own energy, and replicating itself in order to produce succeeding generations.

In a multicellular organism, cells become specialized to perform different functions, each cell keeps in constant communication with its neighbors. It can be viewed as an enclosed vessel, within which innumerable chemical reactions take place simultaneously. Collections of similar cells form tissues, and a cooperation between tissues in turn forms organs, which carry out the functions necessary to sustain the life of an organism.

A cell consists of three parts: the cell membrane, the nucleus, and, between the two, the cytoplasm. The cytoplasmic membrane regulates the passage of materials into and out of the cell. The nucleus formed by a nuclear membrane around a fluid nucleoplasm is the control center of the cell. Threads of chromatin in the nucleus contain deoxyribonucleic acid (DNA), the genetic material of the cell.

The nucleolus is a dense region of ribonucleic acid (RNA) in the nucleus and is the site of ribosome formation. The nucleus determines how the cell will function, as well as the basic structure of that cell.

Within the cytoplasm lay thousands of distinct structures called organelles. Cytoplasmic organelles are "little organs" that are suspended in the cytoplasm of the cell. Each type of organelle has a definite structure and a specific role in the function of the cell. Examples of cytoplasmic organelles are mitochondrion, ribosomes, endoplasmic reticulum, Golgi apparatus, and lysosomes.

Each cell contains hereditary information stored in a double helical macromolecule of DNA (deoxyribonucleic acid). All life is based on a fundamental molecule, deoxyribonucleic acid, DNA directs the activities of the cell. The transfer of genetic information from DNA causes the formation of another informational molecule, RNA (ribonucleic acid).

Each cell utilizes energy from ATP (adenosine triphosphate). Energy is needed to convert raw materials obtained from the cell surroundings into cellular structures. Mitochondria are the power stations of the cell.

Because cells vary so much in form and function there is no typical cell existing. Most cells are small and can be seen only with the help of a microscope, with some exceptions (e.g. the eggs of most vertebrates: fishes, amphibians and birds, and some long nerve cells).



Learning Activities

1. Guess the meaning.

Functional, mass, oval, genetic, central, to organize, to regulate, passage, structure, macromolecule, ribosome, synthesis, energy, form, microscope, amphibians, nerve.

2. Give the plural for the nouns.

Bacterium, information, knowledge, cell, nucleus, vertebrate, mitochondrion, fish, amphibian, bird, acid.

3. Insert prepositions and conjunctions. Compare your results with your partner's.

(of, with, both... and..., as well as, by, within, on, in).

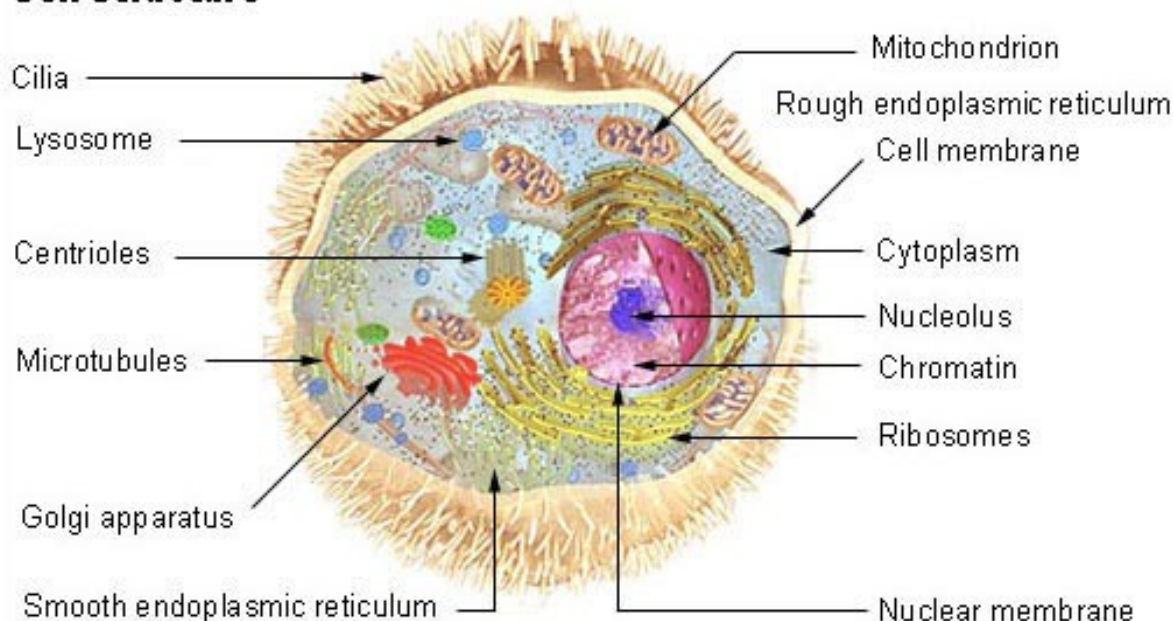
1. A cell is a mass ... protoplasm.
2. A cell is enclosed ... a membrane.
3. ... a multicellular organism, cells become specialized to perform different functions.
4. All life is based ... a fundamental molecule, deoxyribonucleic acid.
5. ... the cytoplasm lay thousands ... distinct structures called organelles.
6. Because cells vary so much ... form and function there is no typical cell existing.
7. Most cells are small and can be seen only ... the help ... a microscope.
8. The nucleus determines how the cell will function ... the basic structure ... that cell.

4. Make the sentences negative and interrogative.

1. A cell is a functional unit.
2. Energy is needed to convert raw materials.
3. Most cells can be seen only with the help of a microscope.
4. The nucleus determines how the cell will function.
5. A cell contains hereditary information in molecules of DNA.
6. Cells utilize energy from ATP.
7. The cytoplasmic membrane regulates the passage of materials.
8. Cells become specialized to perform different functions.
9. Each cell has thousands of small structures called organelles.

5. Study the picture of the cell structure. Translate the elements into Russian. Choose which of these elements are mentioned in the text.

Cell Structure



6. Read the text. Do the tasks below.

Cells

A cell is a microscopic mass of protoplasm, a chemically active mixture of complex substances suspended in water that is bounded by a membrane and contains hereditary material. Until the invention of the microscope around 1600, naturalists could not probe this invisible level of organization of living things.

It was not until the mid of 1800-s when advances in the technology of the microscope allowed botanist Matthias Schleiden and zoologist Teodor Schwann to determine that the unit of structure of all living things is the cell.

Living things or organisms are either multicellular, or unicellular. Although cells are much larger than atoms, they are still very small. The smallest known cells are a group of tiny bacteria called mycoplasmas; some of these single-celled organisms are spheres as small as 0.2 μm in diameter.

Tasks:

a) Translate into English.

1. Клетка – это микроскопическая масса протоплазмы.
2. Ботаник Маттиас Шлейден и зоолог Теодор Шванн определили, что единицей строения всего живого является клетка.
3. Самые маленькие из известных клеток – это группа крошечных бактерий, называемых микоплазмами.
4. Живые существа или организмы могут быть как многоклеточными, так и одноклеточными.

b) Answer the questions.

1. When was the first microscope invented?
2. What scientists stood in the origin of the cell theory?
3. Does the word multicellular mean a protozoa or more complex animal?

c) Together with your fellow-student develop the explanation for the following:

- 1) a single-celled organism.
- 2) a multicellular organism.

Words to remember

functional unit, nucleus/nuclei, cell membrane, unicellular, single-celled, multicellular, cellular structure, hereditary material, organelles, genetic material, to enclose, generation, to transfer, to carry out, raw material, mitochondrion (ia)

CHECK POINT

1. Give English equivalents.

Клетка, клеточная мембрана, деление клетки, наследственная информация, ядро, многоклеточные животные, одноклеточные организмы, иметь структуру, выполнять функцию, свойства клетки, ДНК, РНК.

2. Choose which is correct.

- a) This text describes the cell both as an individual unit and as part of a larger organism.
- b) The text describes the cell as non-living part of nature.

3. Put 3 questions to each sentence.

1. Cell is a functional unit of all living organisms.
2. The cytoplasm consists of a solution called the cytosol.
3. Chemical reactions take place in the cytoplasm.

4. Translate into English.

1. Клетка – это функциональная единица живых организмов.
2. Как ядро, так и цитоплазма появляются путем деления элементов предшествующей клетки.
3. Химические реакции происходят в цитоплазме.
4. РНК передает генетическую информацию рибосомам.
5. Существует много разных видов клеток, но не существует типичной клетки.

5. Tell the group what 3 main things you remember about a cell.

UNIT 4

TISSUES

Topic vocabulary

1. *germ* – зародыш, семя, микроорганизм
2. *germ cells* – половые, зародышевые клетки
3. *somatic cells* – соматические клетки
4. *connective tissue* – соединительная ткань
5. *supportive tissue* – опорная ткань
6. *muscle tissue* – мышечная ткань
7. *to line* – выстилать
8. *lining* – выстилка
9. *to cover* – покрывать
10. *sensory reception* – чувственное восприятие
11. *process* – процесс, отросток
12. *extension* – распространение, выпячивание
13. *layer* – слой
14. *stratified* – многослойный
15. *flat* – плоский
16. *stratified squamous epithelium* – многослойный плоский эпителий
17. *to suspend* – находиться во взвешенном состоянии
18. *cuboidal* – кубический
19. *columnar* – цилиндрический
20. *cilium /pl. cilia* – ресничка/реснички
21. *loose connective tissue* – рыхлая соединительная ткань
22. *fibrous connective tissue* – волокнистая соединительная ткань
23. *adipose tissue* – жировая ткань
24. *cartilage tissue* – хрящевая ткань
25. *cardiac muscle* – сердечная мышца
26. *bone tissue* – костная ткань
27. *blood* – кровь
28. *to conduct* – проводить

Text

TISSUES

A tissue is a group of similar cells specialized for the performance of a common function. In an animal, tissues differentiate during development to perform individual function. Cells in a multicellular animal may be divided into:

- **somatic cells**, constituting the individual animal throughout its life.
- **germ cells**, only dealing with the reproduction.

Somatic tissues are classified as one of four types:

1. Muscle (contractile)
2. Nervous tissue
3. Connective tissue (supportive), including fluid tissues
4. Epithelial tissue.

Muscle tissue allows movement. These are contractile tissues of three kinds: smooth muscle, skeletal muscle, and cardiac muscle.

Nervous tissue is composed of individual cells called neurons. They are specialized for conducting electrical impulses. Neurons receive information about changes in external and internal environment of an animal. Most neurons

contain three principal parts: a cell body, dendrites and an axon. The cell body has a large central nucleus. Dendrites are actually extensions of the cell body and conduct signals towards the cell body. The axon is a long process that conducts signals (information) away from the cell.

Connective tissue (supportive) including fluid tissues – blood and lymph. Connective tissues serve to support and bind tissues together. Connective tissues are of two general types: loose connective tissues (e.g. binding the skin to underlying muscle tissue), fibrous connective tissues (connects muscles to bones or to other muscles). (Adipose tissues, cartilage, bone cells, blood). **Fluid tissues**. The blood and lymph that serve as means for transport and distribution of material within the animal body consist of a fluid plasma containing free cells or corpuscles. Colorless white blood cells, leukocytes are found in all animals with body fluids. Some of them, phagocytes, have the function to protect the body by engulfing bacteria and other foreign materials. The blood of vertebrates also contains red blood cells or erythrocytes, colored red by hemoglobin that serves for transport of oxygen. The fluid plasma transports most materials carried in the blood stream. It is colorless in vertebrates, but in some invertebrates is colored either blue or red by dissolved respiratory pigment.

Epithelial tissue. Epithelial cells cover and line the surfaces of the body, both internal and external. All epithelial cells are collectively called the *epithelium*. Usually, epithelial tissues are separated from underlying, adjacent tissues by a basement membrane. The typical functions of epithelial tissues are absorption (e.g. lining of small intestine), transport (e.g. kidney tubules), excretion (e.g. sweat glands), protection (e.g. the skin), and sensory reception (e.g. the taste buds in the tongue). The size, shape, arrangement of epithelial cells are directly related to these specific functions.

Epithelium can be simple, consisting of only one layer of cells, or stratified, consisting of two or more layers. The shapes of the individual epithelial cells can be flat (squamous epithelium), cube shaped (cuboidal epithelium), or columnlike (columnar). The cells of pseudostratified ciliated columnar epithelium possess cilia and appear stratified or layered, but they are not. The layered effect occurs because their nuclei are located at two or more levels within cells of the tissues.



Learning Activities

1. *Guess the meaning.*

Group, specialize, classify, basement, gland, general, fibrous, cardiac, electrical, impulse, neuron, signal, principal, pigment, transport, respiratory, leukocytes, haemoglobin, plasma, signal, lymph, information, typical, dendrite, axon, effect.

2. Based on the words above choose what topic will be discussed:

a) football, b) transportation of loads, c) a new dress, d) body tissues.

3. Complete the sentences.

1. A tissue is a group of similar cells specialized...
2. Cells in a multicellular animal may be divided into...
3. Nervous cells are specialized for ...
4. Muscle tissue allows ...
5. ... serve to support and bind tissues together.
6. ... serve as means for transport and distribution of material within the body.
7. Epithelial cells cover and line the surfaces of the body both ...

4. True or false.

1. A tissue is a group of similar cells specialized for cleaning the dinner table.
2. In any animal all the tissues are the same, they do not differentiate.
3. Somatic cells constitute the individual animal throughout its life.
4. Germ cells deal only with reproduction.
5. Muscle tissues are of 20 types.
6. Blood and lymph are considered as fluid connective tissues.
7. Neurons receive information about changes in your life.
8. Epithelial cells cover and line the surfaces of the body, both internal and
9. external.

5. Put the verb in a proper form. Discuss the results with your partner.

1. Epithelial tissue... (*exists, exist, existed, will exist*) in many structural forms.
2. The size, shape, arrangement of epithelial cells ... (*is, was, are, were, will be*) directly related to these specific functions.
3. Connective tissues... (*served, serves, will serve*) to support and bind tissue together.
4. Muscle tissue... (*allowed, allows, will allow*) movement.
5. The cell body... (*have, has, had*) a large central nucleus.
6. Some of them, phagocytes, (*have, has, will have shall have*) the function to protect the body by engulfing bacteria and other foreign materials.

6. Match the term to its explanation. Discuss the results with your group.

1	Simple cuboidal epithelium	Простой кубический эпителий	a	The cells of this epithelium have a column-like appearance. They are taller than they are wide.
2	Simple columnar epithelium	Простой цилиндрический эпителий	b	A type of epithelial cells that is shaped as a square or cube.
3	Squamous epithelial cells	Клетки плоского эпителия	c	Is made up of closely packed cells of different sizes, that appear to be arranged in layers, but there is just one layer of cells.

4	Pseudostratified ciliated columnar epithelium	Многоклеточный однослойный реснитчатый столбчатый эпителий	d	These are large flattened cells filled with cytoplasm possessing a small round nucleus at the centre.
---	---	--	---	---

7. Make the sentences negative and interrogative. Complete the chart. Compare your chart with your partner's. Discuss and correct mistakes if any. Model:

+	-	?
All epithelial cells are called the epithelium.	Not all epithelial cells are called the epithelium.	Are all epithelial cells called the epithelium?

	<i>Positive</i>	<i>Negative</i>	<i>Interrogative</i>
1		Epithelium cannot be simple or stratified.	Can epithelium be simple or stratified?
2	Neurons receive information about changes in external and internal environment of an animal.		Do neurons receive information about changes in external and internal environment of an animal.
3	The axon is a long process that conducts signals away from the cell body.	The axon is not a long process that conducts signals away from the cell body.	
4		The fluid plasma does not transport materials carried in the blood stream.	
5	Most neurons have three principal parts.		
6	Connective tissue joins the other tissues of the body.	Connective tissue does not join the other tissues of the body.	
7			Does the cardiac muscle tissue make up the heart acting as a pump?

8. Sort out the sentences as active or passive. Translate the sentences into Russian.

Model:

<i>Active</i>	<i>Passive</i>
A tissue is a group of similar cells.	Somatic tissues are classified as one of four types

1. A tissue **is** a group of similar cells. 2. Tissues **differentiate** during development to perform individual function. 3. Somatic tissues **are classified** as one of four types. 4. The cells of pseudostratified ciliated columnar epithelium **possess** cilia. 5. Colourless white blood cells, leukocytes **are found** in all animals with body fluids. 6. In some invertebrates the fluid plasma **is coloured** either blue or red by dissolved respiratory pigment. 7. The fluid plasma **transports** most materials carried in the blood stream. 8. These cells **are arranged** in ways that best **suit** their function. 9. Certain epithelium cells **are specialized to produce** and **discharge** substances which **are called** glands.

9. Turn active into passive. Compare the answers with your fellow students.

Model:

#	Active	Passive
	The system conducts "current".	"Current" is conducted by the system.
1.	We separate epithelial tissues from adjacent tissues.	
2.	The fluid plasma transports most materials.	
3.	Two or more layers compose stratified epithelium.	
4.	Muscle tissues allow movement.	
5.	Individual neurons compose the nervous tissue.	
6.	The cell body possesses a large central nucleus.	
7.	We find leukocytes in all animals with body fluids.	
8.	Phagocytes engulf bacteria.	

10. Read the following and correct the wrong statements below.

The epithelial layers function in six different ways:

1. *Protection.* They protect the tissues beneath them from drying out, sustaining mechanical injury and being invaded by microorganisms.

2. *Absorption.* They provide a barrier that can help the movement of materials into the tissue beneath.

3. *Sensation.* Many sensory nerves end in epithelial cells layers. The epithelium therefore provides a sensory surface.

4. *Secretion.* Certain epithelium cells are specialized to produce and discharge substances which are called glands. Glands may be single cells (intestinal lining). Most glands however are multicellular structures (thyroid glands, sweat glands).

5. *Excretion.* Specialized epithelial cells in the kidney excrete waste products during the formation of urine. Also, the epithelium forming the air sacs of the lungs excrete the waste gas carbon dioxide.

6. *Surface transport.* Some epithelial cells have hairlike projections called cilia. The cell lining of the respiratory passageways, for example, keeps foreign particles from entering the lungs.

Statements:

1. The epithelial layers function in 10 different ways.
2. The epithelial tissues never protect the tissue beneath them from injury.
3. The epithelium does not provide a barrier for the movement of the materials into the tissues.
4. Many sensory nerves end in epithelial cells layers.
5. Certain epithelium cells are specialized for secretion or excretion.
6. Some epithelial cells have hairlike projections called cilia.

11. Match the name of tissues with their description and discuss the results with your fellow students.

	Tissue		Description
1	Epithelial tissue	a	contains microfilaments that are capable of contraction. Smooth muscle contracts involuntarily and is located in the walls of certain internal structures such as blood vessels and the stomach. Skeletal muscle is connected to bones and allows the body to move. Cardiac muscle makes up the heart acting as a pump for the circulatory system.
2	Connective tissue	b	covers and lines the internal and the external surfaces of the body and compose the glands. These cells are of three shapes and are arranged in ways that best suit their function.
3	Muscle tissue	c	is made up of two kinds of cells: 1. neurons which transmit nerve impulses, and 2. supporting cells which nourish and protect the neurons. They are specialized to conduct an electro-chemical “current”. The cell body of a neuron contains the nucleus of the cell. The dendrites serve for the reception of nerve impulses and conduct these impulses towards the cell body. An axon conducts impulses away from the cell body.

4	Nervous tissue	d	provides the body with structural building blocks and potent defenses. Connective tissue joins the other tissues of the body. Functionally they are grouped as defensive, structural and isolating connective tissues. Connective tissue and its cells provide a framework for the body, join its tissues, help defend it from foreign invaders, and act as storage sites for specific substances.
---	----------------	---	---

12. Answer the questions.

1. What is a tissue?
2. What kinds of tissues are mentioned in the text?
3. How can somatic cells be classified?
4. What do the germ cells deal with?
5. What tissues serve to support and bind tissues together?
6. What science studies tissues?
7. Name the fluid tissues of the animal body?
8. What is the colourless tissue in vertebrates that may be colored blue or red in some invertebrates?
9. Are human tissues the same as animal's ones?

13. Let's discuss.

- a) What do you think is the most important tissue in the animal body? Give your reasons why.
- b) What is the least important tissue in your body? Why?
- I think ... is the most important because...
 - It seems to me that...
 - It is evident that...
 - The fact is...
 - It looks like..., but...

14. Could you draw a neuron and name its parts? Share the result with your fellow students.

Words to remember

somatic cells, germ cells, epithelial tissue, muscle tissue, nervous tissue, connective tissue, layer, blood, leukocytes, erythrocytes, fluid tissue, adipose tissue, cartilage tissue, cardiac tissue, bone tissue, to provide, to perform.

CHECK POINT

1. Give English equivalents.

Осуществлять функции, соматические клетки, половые клетки, эпителиальные клетки, соединительная ткань, мышечная ткань, сократительная ткань, нервная ткань, покровная ткань, эпителий, типичные функции, защита, слой, жидкие ткани.

2. Describe the structure and function of any two of these tissues. Ask your partner to describe the rest ones.

1. Connective
2. Muscular
3. Nervous
4. Epithelial

3. Translate into English.

1. Ткань – это группа клеток, имеющих сходную структуру и выполняющих общую функцию.
2. Эпителиальные клетки покрывают и выстилают наружные и внутренние поверхности тела.
3. Есть четыре типа соматических тканей: эпителиальная ткань, соединительная ткань, мышечная и нервная.
4. Кровь и лимфа – это жидкие соединительные ткани организма.
5. Мышцы обеспечивают движение.
6. Нервная ткань состоит из нейронов.
7. Красные клетки крови называются эритроцитами, а белые – это лейкоциты.

UNIT 5

ORGANS AND ORGAN SYSTEMS

Topic vocabulary

- | | |
|---|---|
| 1. <i>cartilage</i> – хрящ | 13. <i>muscle fibers</i> – мышечные волокна |
| 2. <i>ligament</i> – связка | 14. <i>to attach</i> – прикреплять |
| 3. <i>tendon</i> – сухожилие | 15. <i>brain</i> – головной мозг |
| 4. <i>integumentary system</i> – покровная система | 16. <i>spinal cord</i> – спинной мозг |
| 5. <i>cardiovascular system</i> – сердечно-сосудистая система | 17. <i>chemical</i> – химическое вещество |
| 6. <i>digestive system</i> – пищеварительная система | 18. <i>nutrient</i> – питательное вещество |
| 7. <i>rigid framework</i> – жесткая рамка | 19. <i>heart</i> – сердце |
| 8. <i>to support</i> – поддерживать | 20. <i>blood</i> – кровь |
| 9. <i>to protect</i> – защищать | 21. <i>blood vessel</i> – кровеносный сосуд |
| 10. <i>injury</i> – повреждение, травма | 22. <i>bloodstream</i> – кровоток |
| 11. <i>to invade</i> – вторгаться | 23. <i>to remove</i> – удалять, выводить |
| 12. <i>contractibility</i> – способность сокращаться | 24. <i>intestinal wall</i> – стенка кишечника |
| | 25. <i>to get rid of</i> – избавляться от |

Text

ORGANS AND ORGAN SYSTEMS

An organ system is a group of organs that function together to carry out the principal activities of the body. The major systems compose the vertebrate animal body: *skeletal and integumentary, muscular, nervous, endocrine, immune, cardiovascular, lymphatic, respiratory, digestive, urinary, reproductive.*

The **skeletal system** consists of bones, cartilage, ligaments and tendons. Bones provide a rigid framework, known as the skeleton, that supports and protects the soft organs of the body. The bones of the cranium protect the brain against injury.

The **integumentary** or body covering system defends the body against mechanical injuries, invading microorganisms and diseases.

The **muscular system** is composed of specialized cells called muscle fibers. Their predominant function is contractibility. Muscles, attached to bones or internal organs and blood vessels, are responsible for movement.

The **nervous system** is the major controlling, regulatory, and communicating system in the body. The nervous system is principally composed of the brain, spinal cord, nerves. Together with the **endocrine system**, the nervous system is responsible for regulating and maintaining homeostasis. The organs of the **endocrine system** secrete chemicals called hormones that influence growth, development, and metabolic activities.

The **cardiovascular system** is sometimes called the circulatory system. It is the transportation system of the body. It brings nutrients and oxygen to all cells and removes the waste products of metabolism. It consists of the heart, the blood and the blood vessels.

The **lymphatic system** protects the body from diseases, absorbs and transports vitamins from the digestive system.

The **respiratory system** works with the circulatory system to provide the oxygen and to remove the waste products of metabolism.

The food the animal eats is broken down by the **digestive system** and is absorbed through the intestinal wall into the bloodstream. The digestive tract, also called the alimentary canal or gastrointestinal (GI) tract, consists of a long tube that extends from the mouth to the anus. Solid wastes are also eliminated from the body by this organ system.

The **urinary system** has the principal function to maintain the volume and composition of body fluids within normal limits and to rid the body of waste products that accumulate as a result of cellular metabolism. Because of this, it is sometimes referred to as the excretory system.

The **reproductive system** produces sex cells that can join in the process of fertilization to produce the first cell of the individual. The major function of the reproductive system is to ensure the survival of the species.

In the animal body the organ systems interact with one another and keep the organism alive and well.



Learning Activities

1. *Guess the meaning.*

Organ, system, group, function, skeleton, lymphatic, mechanical, microorganism, regulate, secrete, metabolism, individual, reproductive, result, process, gastrointestinal tract.

2. *Form verbs from nouns.*

Combination, coordination, work, activity, interaction, support, protection, movement, help, waste, secretion, transportation, removal, product, infection, respiration, supply, digestion, wastes, continuance, reproduction, circulation.

3. *Give Russian equivalents.*

Organ systems, body surface, organ structure, body activities, system function, waste gas, body fluid, body processes, transportation system, waste materials, sex cells, animal kind, immune system, feedback system, feedback loops, body temperature.

4. *True or false.*

1. An organ system is a group of organs that function together to carry out the principal activities of the body.
2. The bones of the cranium protect the body against injury.
3. The nervous system consists of bones, cartilage, ligaments and tendons.
4. The muscular system is composed of muscle fibers.
5. The cardiovascular system brings food from the shop.
6. The digestive system is absorbed into the bloodstream.
7. The urinary system eliminates liquid wastes.
8. The reproductive system is to ensure the survival of the species.

5. *Complete the sentences.*

1. An organ system is a group of organs that function together...
2. The skeletal system consists of bones...
3. The body covering system defends the body against...
4. The nervous system is the major controlling, regulatory and...
5. The food the animal eats is broken down by the ...
6. ... consists of a long tube that extends from the mouth to the anus.

6. *Choose which is used in the text.*

1.	The major systems compose the vertebrate animal body.	a	The vertebrate animal body is composed of the major systems.
2.	A rigid framework, known as the skeleton is provided by bones.	b	Bones provide a rigid framework, known as the skeleton

3.	Muscle fibers compose the muscular system.	c	The muscular system is composed of muscle fibers.
4.	The organs of the endocrine system secrete chemicals called hormones.	d	Chemicals called hormones are secreted by the organs of the endocrine system.
5.	Solid wastes are also eliminated from the body by the digestive system.	e	The digestive system also eliminates solid wastes.

7. Match the system with its function. Discuss the result with your partner.

1.	The skeletal system	a	pumps the blood throughout the body, transports nutrients and oxygen.
2.	The nervous system	b	works with the circulatory system to provide oxygen and to remove the waste products of metabolism.
3.	The digestive system	c	ensures <u>survival</u> of the species.
4.	The respiratory system		is the major controlling, regulatory, and communicating system in the body.
5.	The urinary system	d	processes food into molecules that can be absorbed and utilized by the cells of the body.
6.	The reproductive system	e	supports the body against the pull of gravity.
7.	Circulatory system	f	maintains the volume and composition of body fluids within normal limits, gets rid of the body waste products.

8. Make a list of major systems in the animal body. Discuss the results with your fellow students.

9. Read the following passage. Give your title to it. Express the general idea in one sentence. Share the results with your fellow students.

The state of wellness is called homeostasis. Homeostasis is the maintenance of a stable internal environment despite what may be a very different external environment. To maintain this, internal equilibrium, all the molecules, cells tissues, organs and organ systems must work together, maintaining a steady state. The body maintains a steady state by means of feedback systems, or feedback loops. Feedback loops are mechanisms by which information regarding the status of a physiological situation or system is fed back. Homeostasis is maintained by negative feedback loops, regulatory mechanisms that slow down or shut down output systems when they reach certain levels. For example, a high internal body temperature triggers mechanisms that lower the temperature.

10. Answer the questions.

1. What organ systems in the vertebrate animal body do you know?
2. Are organs and systems the same in the human and animal body?
3. What system breaks down the nutrients?
4. What functions does the skeletal system perform?
5. Which system deals with animal reproduction?
6. Which system eliminates liquid wastes from the body?
7. Do all organ systems work separately within the body?
8. Which system does the brain belong to?

Words to remember

cartilage, ligament, tendon, skeletal, integumentary, nervous, cardiovascular, immune, endocrine, digestive, urinary, reproductive, support, protect, provide, ensure, heart, blood, blood vessels, muscular system, muscles, respiratory system, wastes.

CHECK POINT

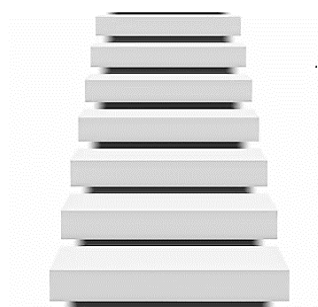
1. Give English equivalents.

Орган, система органов, организм животного, скелетно-мышечная система, деятельность, поддерживать, защищать, взаимодействие, пищеварительная система, дыхательная система, сердечно-сосудистая система, сердце, пищеварение, покровная система, иммунная система, эндокринная система, репродуктивные органы.

2. Read the following abstract. Name the component units of the body. Start from the most elementary up to the most complex unit.

The body is a single structure but it is made up of billions of smaller structures. It is not a secret that cells are composed of atoms and molecules, but cells have long been recognized as the simplest units of living matter that can maintain life and reproduce themselves. The animal body is made up of numerous cells.

Layers are somewhat more complex units than cells. A tissue is an organization of certain similar layers. Organs are more complex units than tissues. An organ is an organization of several different kinds of tissues arranged so that they can perform a special function. Organ systems are the most complex of the component units of the animal body.



The component units of the animal body:

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

3. Read the following and answer the questions.

1. Blood plasma contains nutrients, hormones, respiratory gases, wastes and a variety of ions and salts. **(What system does plasma belong to?)**
2. Erythrocytes, or red blood cells, carry oxygen. Leukocytes, or white blood cells, defend the body against invading microorganisms and other foreign substances. Platelets play an important role in blood clotting. **(What elements defend the body against infection?)**

4. Translate into English.

1. Органы состоят из тканей.
2. Органы выполняют определенную функцию.
3. Все системы взаимодействуют друг с другом.
4. Скелет защищает и поддерживает тело.
5. Нервная система координирует работу всех частей организма.
6. Сердечно-сосудистая система – это транспортная система.
7. Кожный покров тоже защищает тело.

UNIT 6

CLASSIFICATION OF ORGANISMS

Topic vocabulary

- | | |
|--|--|
| 1. <i>taxonomy</i> – систематика | 12. <i>intracellular structures</i> –
внутриклеточные структуры |
| 2. <i>taxon /pl. taxa</i> – таксон | 13. <i>algae</i> – водоросли |
| 3. <i>common ancestry</i> – общие предки | 14. <i>fungus/pl. fungi</i> – гриб, грибы
(грибки) |
| 4. <i>similarity</i> – сходство | 15. <i>obtain</i> – получать |
| 5. <i>kingdom</i> – царство | 16. <i>decomposers</i> – разлагающие
организмы, деструкторы |
| 6. <i>phylum</i> – тип (у растений –
<i>division</i> , отдел) | 17. <i>live off</i> – живут за счет |
| 7. <i>class</i> – класс | 18. <i>to rank below</i> – стоять ниже по
рангу |
| 8. <i>order</i> – отряд (у растений –
порядок) | 19. <i>to share</i> – делить |
| 9. <i>family</i> – семейство | 20. <i>mold</i> – плесень |
| 10. <i>genus/ pl. genera</i> – род | 21. <i>yeasts</i> – дрожжи |
| 11. <i>species</i> – вид | |

Text

CLASSIFICATION OF ORGANISMS

Living organisms are classified into groups depending on their structure and characteristics. This system was developed in the eighteenth century by Carl Linnaeus. Modern taxonomy, the classification of species, categorizes organisms based on their common ancestry (their evolutionary history). Organisms are placed in common groupings reflecting their similarities and closeness.

By the beginning of the 20th century, seven major taxonomic categories had been established in systematics: *kingdom*, *phylum* (plural, *phyla*), *class*,

order, family, genus (plural, *genera*), and *species*. (For plants, the term *division* is generally used instead of *phylum*.)

Most scientists today recognize six kingdoms: *Archae*; *Bacteria*; *Protista* (chiefly protozoa and algae); *Fungi* (mushrooms, molds, and yeasts); *Plantae* (plants); and *Animalia* (animals).

The organisms that are made up of cells and have organelles and a membrane bounded nucleus are called eukaryotes.

The Protist kingdom consists of primarily single-celled eukaryotes whose cells are much more complex and much larger than the bacteria. This kingdom also includes the algae, which include both unicellular and multicellular organisms that are more closely related to the protists than to the fungi, plants or animals.

Fungi are decomposers and survive by breaking down substances and absorbing the break down products. Many of these multicellular eukaryotes live off organisms that are no longer alive, such as fallen trees and leaves or dead animals. Some fungi attack living organisms.

The plants are multicellular organisms that live on land and make their own food by using carbon dioxide from the air and light energy from the sun.

The animals are multicellular organisms that cannot make their own food and that obtain food by eating and digesting other organisms.

The next subcategory is **class**. The class ranks below the phylum and above the **order** in taxonomy. Members of a class share more characteristics with each other than they do with other organisms in the same phylum. Mammals are characterized by having skin with hair and by feeding their young with milk secreted by mammary glands. Closely related families are grouped into **orders**. Below the level of families, organisms are grouped into the **species** and the **genus** level.

The development of science and technology brings about a constant development of Linnaeus's classification.



Learning Activities

1. *Guess the meaning.*

Taxonomy, to categorize, to base, evolutionary, grouping, reflect, prokaryotes, eukaryotes, attack, binominal naming, family, kingdom, species, classification, characteristics.

2. *Find in the text the sentences that correspond to the following:*

1. Современная систематика распределяет организмы по категориям на основе их общего происхождения (эволюционной истории).
2. Организмы объединяются в общие группы, отражающие их сходство и близость.
3. К началу XX века в систематике было установлено семь основных таксономических категорий: царство, тип, класс, порядок, семейство, род и вид.

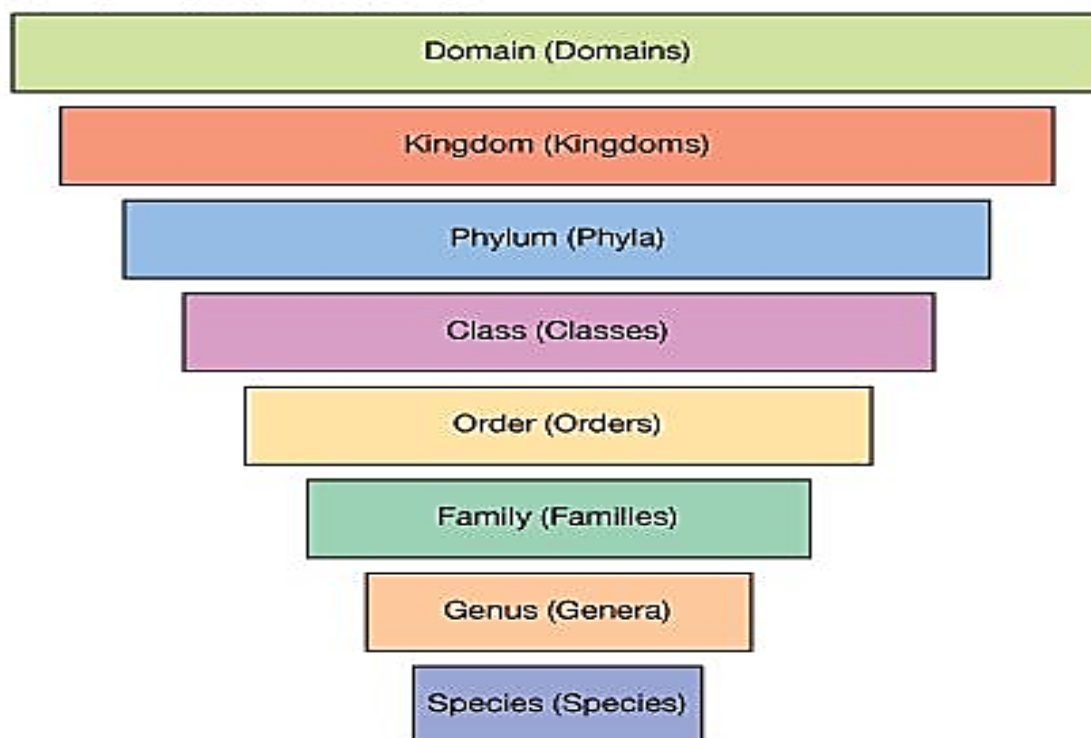
4. Большинство ученых сегодня признают 6 царств: Археи; Бактерии; Протисты; Грибы; Растения; Животные.
5. В царство Простейшие также входят водоросли, среди которых есть как одноклеточные, так и многоклеточные организмы, более близкие к протистам, чем к грибам, растениям или животным.
6. Некоторые грибы поражают живые организмы.
7. Растения живут на суше и добывают себе пищу, используя углекислый газ из воздуха и световую энергию солнца.
8. Представители класса имеют больше общих черт друг с другом, чем с другими организмами того же типа.

3. *True or false.*

1. Living organisms are classified into groups depending on their appearance.
2. This system was developed in the eighteenth century by Carl Linnaeus.
3. Organisms are placed in common groupings reflecting their similarities and closeness.
4. By the beginning of the 20th century, seventy major taxonomic categories had been established in systematics.
5. The organisms that are made up of cells and have organelles and a membrane bounded nucleus are called prokaryotes.
6. Fungi are decomposers and survive by breaking down substances.
7. The plants are multicellular organisms that live on land and make their own food.
8. The animals are multicellular organisms that can easily make their own food in the kitchen.

4. *Study the chart and develop the information card for a tiger in the zoo (in English and in Russian).*

How animals are classified



© 2015 Encyclopædia Britannica, Inc.

As an example, see the complete breakdown of the classification of a **Lion**:

- Kingdom – Animal
- Phylum – Vertebrate
- Class – Mammal
- Order – Carnivorous
- Family – Cat
- Genus – Big cat
- Species – Lion

There are many ways to remember this order, for example using the mnemonic:
Kids Prefer Candy Over Fresh Green Salad.

5. Read the text below. Discuss with your group who and where may use this binominal classification.

Genus and Species

The *genus and species* categories in the hierarchy of classification, provide the scientific name of an organism. Organisms in the same species are more closely related than organisms in the same genus. This system is known as binominal (two names) nomenclature. The first word indicates the genus, and the second part of the name indicates a species to which the organism belongs. The name of the genus is usually taken from Latin or rarely, from the Greek language. It is a noun, and it is always capitalized. The species name begins with a lowercase letter. Scientifically, humans are *Homo sapiens*, meaning “wise man”. The gray wolf’s name is *Canis lupus*. Octopus is named *Octopus vulgaris*.

Every organism has at least one name to distinguish it from other kinds of organisms. A scientific name is more or less international in meaning. Although Karl von Linnee (1707-1778) is primarily remembered for collecting and classifying plants, his work was also a milestone for zoology. His system of naming, binominal nomenclature, has been adopted for animals as well as plants. ‘*Helianthus annuus*’ is a scientific name for the sunflower.

6. Make these sentences interrogative.

1. Each kind of organism is described with a two-part name.
2. Several orders make a class.
3. Bacterial microorganisms display the characteristics of both plants and animals.
5. Most living organisms possess the characteristics of one kingdom or the other.
6. Sometimes a species is subdivided into varieties.
7. This two-part name system helps recognize each kind of organisms.

7. Fill in prepositions.

(to, into, of, in, on, by, from)

1. All living things are grouped ... broad categories called kingdoms.

2. This kingdom differs ... the other four kingdoms.
3. Ancestors ... the monerans gave rise ... organisms ... the kingdom Protista.
4. The plants are multicellular organisms that live ... land and make their food ... using carbon dioxide ... the air and light energy ... the sun.
5. ... addition, the hereditary material ... the cell is not bounded ... a membrane.
6. The Kingdoms Monera, Plantae and Fungi are each subdivided ... divisions.
7. The name ... the genus is usually taken ... the Latin or the Greek language.

8. Put questions to the given answers. Compare your results with your partner's.

1. Learning about animals is more than learning their scientific names or biological facts.
2. Yes, learning about animals is learning about how to protect them and how to take care of them.
3. The scientific name for a human is Homo sapiens.

9. Match the word with its explanation. Discuss the results with your partner.

Taxonomy	A broad category in which taxonomists group all living things.
Kingdom	A method of classification of diverse range of species based on their common ancestry.
Family	A taxonomic subcategory of divisions and phyla; as organisms appear to be increasingly related to each other.
Order	The taxa that rank below the phylum and above the order.
Class	A category into which closely related families are grouped.
Genus	The level ranks below the family.
Species	The narrowest category of taxonomic nomination.

Words to remember

kingdom, phylum, class, order, family, genus, species, binominal system, algae, fungus, mold, yeasts, ancestry, mammals, mammary glands.

CHECK POINT

1. Translate into Russian.

Kingdom, type, phylum, order, genus, algae, ancestry, mammals, species, carbon dioxide, oxygen, hydrogen, to digest, to break down food, to obtain.

2. Progress questions.

1. What does taxonomy deal with?
2. How many kingdoms of living organisms do you know?
3. What is the highest rank in this classification and what is the lowest?

4. Can organism of the same species breed?
5. What kingdom are animals referred to?
6. What kingdom are humans referred to?
7. By what features are mammals characterized?
8. What helps scientists easily understand the scientific name of an organism?

3. *Translate into English.*

1. Есть царство животных и царство растений.
2. Растения – это многоклеточные организмы.
3. Рыбы относятся к царству животных.
4. Животные не могут производить пищу, поэтому они должны ее искать.
5. Близкие семейства объединяются в отряды.
6. Организмы одного вида более тесно связаны, чем организмы одного рода.
7. Такая система называется биномиальной и применяется для обозначения растений и животных.
8. В биномиальной системе первое слово указывает на род, второе слово обозначает вид.

UNIT 7

BACTERIA

Topic vocabulary

- | | |
|--|---|
| 1. <i>abundant</i> – обильный, достаточный | 12. <i>to poison</i> – отравлять |
| 2. <i>binary fission</i> – бинарное деление (клетки) | 13. <i>poison</i> – яд |
| 3. <i>fusion</i> – слияние | 14. <i>to contaminate</i> – загрязнять, заражать |
| 4. <i>to split</i> – расщепляться | 15. <i>contamination</i> – загрязнение, заражение |
| 5. <i>to cause</i> – вызывать, быть причиной | 16. <i>to inhale</i> – вдыхать |
| 6. <i>cause</i> – причина | 17. <i>to attach</i> – прикреплять |
| 7. <i>agent</i> – агент, возбудитель (болезни), фактор | 18. <i>tetanus</i> – столбняк |
| 8. <i>pathogen</i> – болезнетворный организм, патогенный микроорганизм | 19. <i>to thrive</i> – процветать, |
| 9. <i>pickle</i> – соленье, маринад, рассол, соленые или маринованные огурцы | 20. <i>fever</i> – лихорадка |
| 10. <i>sauerkraut</i> – кислая капуста | 21. <i>pressure</i> – давление |
| 11. <i>host</i> – хозяин, организм-носитель | 22. <i>favourable</i> – благоприятный |
| | 23. <i>damage</i> – урон, повреждение |
| | 24. <i>vomiting</i> – тошнота |
| | 25. <i>diarrhea</i> – диарея |
| | 26. <i>failure</i> – неудача, провал |
| | 27. <i>ground water</i> – подземные воды |
| | 28. <i>to occur</i> – случаться, происходить |

Text

BACTERIA

Bacteria are the oldest, most abundant, and simplest organisms. Bacteria were abundant over two billion years before eukaryotes appeared in the world. They were largely responsible for creating the properties of the atmosphere and the soil during the long ages in which they were the only form of life on the Earth. Bacteria are present on and in nearly everything we eat and touch. Bacteria are also the only organisms with a prokaryotic cellular organization. For this reason, bacteria are classified as a separate kingdom of organisms, Monera, meaning “alone”.

Bacteria and viruses both have reputation of disease agents. But the role of bacteria is much broader than that of a pathogen. Bacteria make life on Earth possible because they perform functions as decomposers of organic materials and are natural recyclers of nitrogen and other organic compounds in ecosystems. They are also used to produce certain foods such as yogurt, sauerkraut, cheese, pickles etc.

Bacteria reproduce asexually by splitting in two after replication of the genetic material takes place. Bacteria within a population increase rapidly when growth conditions are favourable. A few genera of bacteria cause diseases in plants and many genera cause diseases in animals, including humans. Most disease producing bacteria use their host food, but some poison their hosts.

To cause disease, bacteria or the poisons they produce must get into the body. Usually this happens when eating contaminated food or drinking contaminated water. Bacteria present in the air may be inhaled. Sometimes bacteria enter the body through broken skin as a result of an injury or injection of a contaminated needle. After entering the body bacteria attach to body cells and cause various types of tissue damage. The chemicals bacteria produce digest the tissues so that the breakdown products can be taken into the bacteria and metabolized. In addition, certain bacteria produce toxins or poisons. These toxins can cause powerful effect, such as high fevers, muscle spasm, vomiting, diarrhea, heart damage, and respiratory failure.

Bacteria occur in wide range of habitats and play key ecological role in each of them. Some thrive in hot springs in which the water temperature can be as high as 78° C. Others live more than a quarter of a mile beneath the surface of the ice in Antarctica. Bacteria live practically everywhere, even in ground water where they were once thought to be absent.



Learning Activities

1. Guess the meaning.

Bacteria, billion, to create, atmosphere, agent, recycler, role, pathogen, yogurt, genetic material, injection, ecosystem, metabolized, staphylococcal, integral, effect, cholera, ecological, mile, practically, habitat, toxin, reputation, reasons.

2. True or false.

1. Once bacteria were the only form of life on the Earth.
2. Bacteria are prokaryotes.
3. Bacteria are classified as a separate kingdom of organisms.
4. Bacteria are only disease agents.
5. To cause disease, bacteria must get into the body.
6. Viruses are used to produce cheese.
7. Bacteria are found only on dirty hands.

3. Put the verb in the correct form.

1. Bacteria (is, was, were) the oldest, most abundant, and simplest organisms.
2. Bacteria and viruses both (have, has, had, will have) reputation as being agents of diseases.
3. Most disease producing bacteria (use, used, will use) their host food.
4. Bacteria (live, lives, lived) practically everywhere, even in ground water where they (was, were, will be) once thought to be absent.
5. Usually this (happens, happened, will happen) when eating contaminated food or drinking contaminated water.
6. Many genera (causes, cause, caused, will cause) diseases in animals, including humans.
7. Bacteria (have, has, had) a cell structure different from other organisms.

4. Translate into Russian.

1. Bacteria are widely spread in nature, being found nearly everywhere.
2. The numbers vary from one place to another, depending upon the environmental conditions.
3. Bacteria are found in the atmosphere, being carried there by air currents.
4. Their number vary considerably, depending upon the source of the water.

5. Give Russian equivalents.

nitrogen compounds, air contamination, growth conditions, tissue damage, food poisoning, muscle spasm, water temperature, ground water, garden soil, surface layers, cell wall, plant poison, ice surface.

6. Fill in the gaps with prepositions.

(on, after, of, in, as, to, for, under, into, through)

1. They were largely responsible ... creating the properties ... the atmosphere and the soil.

2. The cell is bounded ... a membrane encased ... a cell wall.
3. Bacteria and viruses both have reputation ...being agents ... diseases.
4. Sometimes bacteria enter the body ...broken skin ...a result ... an injury or injection ...a contaminated needle.
5. Others live more than a quarter ...a mile ...the surface... the ice ... Antarctica.
6. Still there are other bacteria capable ... dividing only ... high pressures.
7. ... entering the body bacteria attach ... body cells and cause various types ... tissue damage.
8. The breakdown products can be taken ... the bacteria and metabolized.

7. Complete the sentences according to your knowledge. Discuss the results with your partner.

1. Most waters contain large numbers of ...
2. The air over the ocean far removed from the shore is practically ...
3. The more dust particles are suspended in the air, the greater will be the extent of bacterial ...
4. Polluted water may contain thousands or even millions of ... per cubic centimeter.
5. Occasionally some bacterial species penetrate through the broken skin and intestinal wall, resulting in ...
6. The souring of milk is the result of ... action.

8. Read the text below and find the answers to the questions.

1. What are the major shapes of bacteria?
2. Can bacteria be seen with the naked eye?
3. Can bacteria be seen under a microscope?
4. Which is larger, a bacterium or a virus?

Shape and Size of Bacteria

Bacterial cells exhibit three fundamental shapes: the spherical, the rod and the spiral forms. All bacteria exhibit pleomorphism in more or less degree. Some of the round or coccus forms are apparently perfect spheres, others are slightly elongated or ellipsoidal in shape. Spherical forms that grow normally in pairs (diplococci), fours (tetrads), or chains (streptococci) are usually slightly flattened at the adjacent surfaces.

Bacteria are considerably smaller than yeasts, molds, algae and protozoa. They vary greatly in size according to the species. Some bacteria are so small that they cannot be easily seen with a powerful microscope. Some bacteria measure as large as 80 μ in length and others are as small as 0.1 μ . Regardless of their size, none are visible with the naked eye.

9. Read the fragment. Divide it into paragraphs. Render the fragment using speech models.

(Models: the fragment describes; the text is devoted to; the fragment outlines; it provides data on).

Bacteria are found in the soil, air, water, foods, in decaying organic matter of all kinds. The common occurrence of a species in a certain environment is spoken of as a natural flora of that particular environment. Changes in the environmental conditions produce changes in the bacterial flora. A rich garden soil contains more organisms than a poor uncultivated soil. The great majority of soil organisms are found in the surface layers. Bacteria are found in the air. Organisms do not grow and multiply in air because conditions are not favourable. There is no such a thing as a normal atmospheric flora. Most waters contain large numbers of bacterial organisms. Some bacterial species are constantly present and constitute the natural flora of the water. Usually, fewer bacterial species occur in sea water than in the soil.

10. Explain the meaning of the word “pathogen” to your partner. Ask him/her to explain a difficult word for you.

11. Put possible questions to these answers.

1. Scientists have learned ways to use disease-causing bacteria in the genetic engineering of plants.
2. Yes, they are. Many animal and plant diseases are caused by bacteria.
3. Most plant diseases are not caused by bacteria, they are caused by fungi.

12. Discuss the following statements with your group:

- a) All bacteria can be seen under the microscope.
- b) We cannot avoid bacteria in everyday life.
- c) There are no bacteria in ground water, in tap water, in sea water.

Words to remember

bacterium/bacteria, poison, pathogen, disease agent, to cause disease, contamination, fever, pressure, damage, attach, size, shape, rod, spiral, sphere, contain surface, favourable conditions.
--

CHECK POINT

1. Translate into English.

Свойства, клеточная структура, патоген, благоприятные условия, размножаться, биологический вид, индивид, форма, размер, условия, изменения, производить, вызывать болезнь, видимый, невидимый.

2. Progress questions.

1. Can bacteria produce diseases in humans or animals?
2. Is the role of bacteria to be only pathogens?
3. What functions of bacteria do you know?

4. How can bacteria enter the body?
5. Where can bacteria be found?
6. Are bacteria present in tap water that we use?
7. What about the size of bacteria?
8. What shapes can bacteria have?

3. Translate into English.

1. Бактерии обнаруживаются повсюду.
2. Бактерии бывают вредными и полезными.
3. Бактерии и вирусы считаются патогенами.
4. Большинство бактерий воспроизводятся каждые 1-3 часа.
5. Какие полезные свойства бактерий вы знаете?
6. Тебе известно, что бактерии по размерам гораздо больше, чем вирусы?
7. Мы изучаем патогенные микроорганизмы, чтобы предупреждать и лечить болезни.
8. Свежий воздух и вода – наши лучшие друзья.

4. Share with your group some interesting facts about bacteria.

UNIT 8

VIRUSES

Topic Vocabulary

- | | |
|--|---|
| 1. <i>to invade</i> – вторгаться | 11. <i>essential</i> – существенный, основной, незаменимый (аминокислота) |
| 2. <i>invasion</i> – инвазия, проникновение в организм хозяина | 12. <i>to exist</i> – существовать |
| 3. <i>invasive</i> – инвазионный, инвазивный | 13. <i>to regard</i> – рассматривать |
| 4. <i>invasiveness</i> – инвазивность, инвазионная способность | 14. <i>interact</i> – взаимодействовать |
| 5. <i>acid</i> – кислота | 15. <i>to assume</i> – предполагать, брать на себя (напр. обязательства) |
| 6. <i>to infect</i> – заражать, инфицировать | 16. <i>to rely (on, upon)</i> – полагаться |
| 7. <i>infection</i> – инфекция, заражение, инфицирование | 17. <i>pattern</i> – образец, паттерн, тип, способ |
| 8. <i>infectious</i> – инфекционный, заразный | 18. <i>to disrupt</i> – нарушать |
| 9. <i>coat</i> – оболочка | 19. <i>lytic cycle</i> – литический цикл |
| 10. <i>obligate</i> – обязательный, облигатный | 20. <i>lysogenic cycle</i> – лизогенный цикл |
| | 21. <i>to destroy</i> – разрушать |
| | 22. <i>to purify</i> – очищать |

Text

MICROORGANISMS LACKING CELL STRUCTURE – VIRUSES

Viruses are infectious agents traditionally considered as microorganisms. They enter living organisms and cause diseases. Although viruses invade living things and cause cells to make more viruses, viruses themselves are not living. They do not have a cellular structure, which is the basis of all life.

Viruses are protein coated nucleic acids that replicate within living things. They have a genetic molecule, which may be DNA or RNA, and a protein coat. Although the viral genetic molecule is capable of directing viral reproduction (one of life's characteristics), viruses do not have the cellular support structures and metabolic machinery necessary to perform life functions. They do not transform energy, carry out metabolism, or actively respond to their environment, all of which are essential characteristics of living systems. They are nonliving obligate parasites, which means that viruses cannot reproduce outside of a living system. They must exist in association with other organisms.

Viruses were discovered at the end of the nineteenth century. For many years after their discovery, viruses were regarded as primitive forms of life, perhaps the ancestors of bacteria. Today scientists know that viruses are not living organisms. Viruses infect primarily plants, animals and bacteria. A specific virus can only infect a certain species. Some viruses however can infect more than one species. Each virus has its own unique shape but all contain the same basic parts.

Viruses are made up of a nucleic acid core surrounded by a protein covering called a capsid. Some viruses have an additional covering or envelope which is rich in protein, lipids and carbohydrate molecules. On their own, viruses are inanimate objects that passively interact with their environment and are unable to replicate themselves. Within a living cell, the viral nucleic acid takes control over the metabolic activities of that cell.

Viruses must enter a cell and use the cell's enzymes and ribosomes to make more viruses. This process of viral multiplication within cell is called replication. Some viruses can seriously disrupt the normal functioning of the cell, transforming them into rapidly growing invasive cells that destroy body tissue.



Learning Activities

1. Guess the meaning.

Infectious, to infect, protein, to direct, machinery, to transform, actively, characteristics, to control, living system, cycle, to direct, metabolic, ribosomes,

energy, multiplication, genetic molecule, metabolic activities, normal functioning.

2. *Separate adjectives from adverbs. Complete the chart.*

Infectious, traditionally, nucleic, cellular, genetic, viral, capable, metabolic, actively, primitive, primarily, essential, specific, basic, additional, passively, unable, metabolic, entirely, seriously, normal, rapidly, invasive, viral, specifically.

Adjective	Adverb

3. *Give Russian equivalents.*

Protein coat, support structures, life functions, cells reproduction, carbohydrate molecules, viral nucleic acid molecule, virus replication, body tissue, metabolism machinery, cellular structure.

4. *Form nouns from the following verbs.*

Verb	Noun	Verb	Noun
to infect	infection	to interact	interaction
reproduce		to perform	
to live		to multiply	
to shape		to control	
to invade		to support	
to cause		to replicate	
to base		to direct	
discover		to enter	

5. *Turn active into passive.*

Model: Viruses invade cells. Cells are invaded by viruses.

Viruses can disrupt function of the cell. Functions of the cell can be disrupted by viruses.

	<i>Active</i>	<i>Passive</i>
1.	A coat covers the nucleus.	
2.	Viruses do not transform energy.	
3.	Damaging cells destroy body tissues.	
4.	Viruses do not carry out metabolism.	
5.	Scientists regarded viruses as primitive forms of life.	
6.	Scientists discovered viruses at the end of the 19 th century.	
7.	Viruses use cell enzymes and ribosomes.	

6. Make the sentences negative and interrogative.

1. Various patterns of viral replication exist.
2. The largest viruses are visible with a light microscope.
3. This pattern of viral replication is called a lytic cycle.
4. Viruses enter living organisms and cause diseases.

7. Translate into Russian.

1. Viruses are infectious agents traditionally considered microorganisms.
2. Viruses do not have the cellular support structures and metabolic machinery necessary to perform life functions.
3. Viruses are made up of a nucleic acid core surrounded by a protein covering called a capsid.
4. Scientists discovered that infectious agents passed through the filters they used.
5. Some viruses can disrupt the normal functioning of the cell they infect.

8. True or false.

1. Viruses do not have a cellular structure, which is the basis of life.
2. Viruses are noncellular infectious agents capable of causing certain diseases.
3. Bacteria occur in many habitats, play important ecological roles and cannot produce diseases.
4. Viruses can be seen with naked eye.
5. Because viruses are not living things they are not included into five kingdoms of life.
6. Viruses are a little different from bacteria.
7. Viruses cannot reproduce outside of a living system.
8. Viruses are not living organisms because they have no cell structure.

9. Complete the sentences.

1. Viruses are protein coated nucleic acids that replicate within ...
2. Viruses primarily infect plants, animals and ...
3. Viruses were discovered at the end of ...
4. Viruses have the same basic parts: a nucleic acid core and a protein coat called ...
5. Although viruses invade living things, the viruses themselves are not ...

10. Read the following text for comprehension. Answer the questions after the text. Give your title to the text. Discuss the results in small groups.

At the end of the nineteenth century, several groups of European scientists working independently, first realized that viruses existed. As they filtered fluids derived from plants with tobacco mosaic disease¹ and cattle with foot-and-mouth disease², the scientists discovered that the infectious agents passed through the filters they used, which were designed to hold back bacteria. These agents were not bacteria – they were too small.

The scientists also discovered that the disease-causing agents could multiply only within living cells. For a long time viruses were regarded as very primitive living things. True nature of viruses became evident in 1930s after the ground breaking work of an American Scientist Wendell Stanley.

Stanley prepared an extract of tobacco mosaic virus (TMV), purified it, and studied its chemical composition. His conclusion: TVM was a protein – and he was partially right. Scientists later discovered that TVM also contains ribonucleic acid (RNA). With the development of the electron microscope, scientists were able to see the virus that Stanley purified.

Notes:

¹ tobacco mosaic disease – мозаичная болезнь табака

² foot-and-mouth disease – ящур

Questions:

1. The nature of viruses became evident in 1930s, did not it?
2. How were viruses discovered?
3. With the development of what equipment were scientists able to see a virus?

11. Translate into English.

1. Вирусы могут вторгаться в организм и вызывать болезни.
2. У вирусов отсутствует клеточная структура.
3. Вирусы были открыты в конце девятнадцатого века.
4. Сегодня ученые знают, что вирусы не являются живыми организмами.
5. Вирусы поражают, главным образом, растения, животных, бактерии.
6. Вирусы могут серьезно нарушить функционирование клетки.
7. Вирусы могут размножаться только внутри живой клетки.
8. После создания электронного микроскопа ученые смогли увидеть вирусы.
9. Самый крупный вирус по размеру меньше самой маленькой бактерии.

12. Discuss the following statements with your group:

1. Viruses are not living microorganisms.
2. How can viruses be recognized?
3. Viruses can cause diseases in both animals and humans.

Words to remember

Invade, invasive, to cause diseases, nucleic acid, protein coat, carry out metabolism, respond to the environment, protein, lipids, carbohydrates, to discover, ancestor, to infect, to multiply, multiplication, to recognize, to exist, to purify

CHECK POINT

1. Progress questions.

1. Can viruses produce diseases in animals, and in humans?

2. Are viruses living things?
3. Do viruses have cellular structure?
4. Why do scientists call viruses 'obligate parasites'?
5. How were viruses discovered?
6. What about the size of viruses?
7. How do viruses damage the infected cell?

2. Translate into English.

1. Вирусы могут вторгаться в организм и вызывать болезни.
2. У вирусов отсутствует клеточная структура.
3. Вирусы были открыты в конце девятнадцатого века.
4. Сегодня ученые знают, что вирусы не являются живыми организмами.
5. Вирусы поражают, главным образом, растения, животных, бактерии.
6. Вирусы могут серьезно нарушить функционирование клетки.
7. Вирусы могут размножаться только внутри живой клетки.
8. После создания электронного микроскопа ученые смогли увидеть вирусы.
9. Самый крупный вирус по размеру меньше самой маленькой бактерии.

3. Share with your group three the most important things about viruses that impressed you most.

UNIT 9

FUNGI, ALGAE, PROTOZOA

Topic vocabulary

- | | |
|--|---|
| 1. <i>fungus</i> / <i>pl. fungi</i> – грибок, грибки | 12. <i>mold</i> – плесень |
| 2. <i>alga</i> / <i>pl. algae</i> – водоросль, водоросли | 13. <i>certain</i> – определенный |
| 3. <i>protozoa</i> (<i>protozoan</i>) – простейшее | 14. <i>medicine</i> – лекарство |
| 4. <i>filament</i> – нить, волокно | 15. <i>distinct</i> – отчетливый, четкий |
| 5. <i>yeasts</i> – дрожжи | 16. <i>break down</i> – расщеплять, разрушать |
| 6. <i>protists</i> – простейшие, протисты | 17. <i>decomposer</i> – разлагатель, деструктор |
| 7. <i>to contain</i> – содержать | 18. <i>obtain</i> – получать |
| 8. <i>to increase</i> – увеличиваться, расти | 19. <i>root</i> – корень |
| 9. <i>differentiate</i> – дифференцировать, различать | 20. <i>stem</i> – стебель |
| 10. <i>to belong to</i> – принадлежать, относиться (к чему-либо) | 21. <i>crude</i> – сырой |
| 11. <i>mushroom</i> – гриб | 22. <i>oil</i> – нефть |
| | 23. <i>suspend</i> – подвешивать |
| | 24. <i>exhibit</i> – проявлять, показывать |
| | 25. <i>locomotion</i> – передвижение |
| | 26. <i>flagellum</i> / <i>pl. flagella</i> – жгутик |

- | | |
|---|---|
| 27. <i>flagellate</i> – жгутиковый | 31. <i>extend</i> – выдвигать, выпячивать |
| 28. <i>whip-like</i> – похожий на жгут, нитевидный, жгутообразный | 32. <i>hyphae</i> – гифа |
| 29. <i>to propel</i> – продвигать вперед, выталкивать | 33. <i>mycelium</i> – мицелий |
| 30. <i>cilia</i> – реснички, реснитчатый | 34. <i>moist</i> – влажный |
| | 35. <i>marine</i> – морской |
| | 36. <i>seaweed</i> – морские водоросли |

Text

FUNGI, ALGAE, PROTOZOA

Protists are a varied group of eukaryotic organisms. Many are single celled, though some include multicellular or colonial forms. Within this kingdom are animal-like, plant-like and fungus-like organisms. The animal-like protists are called protozoa. The plant-like protists are the algae.

Although many protists are single celled, these organisms are incredibly different from procaryotic single celled organisms, the bacteria. The single celled protists are much larger than bacteria, having approximately 1000 times the volume, and they contain typical eukaryotic cellular organelles. This increases their organization to a level much more complex than that of bacteria.

Fungi, algae, and protozoa are microorganisms with eukaryotic cells. The cells of these organisms are structurally similar to those of plants and animals, which are multicellular organisms with eukaryotic cells and differentiated tissues.

Fungi are multicellular eukaryotic organisms that belong to their own distinct kingdom called Fungi. They are diverse organisms that include mushrooms, molds, yeasts and more. Fungi obtain nutrients by absorbing them from their environment, by breaking down organic matter. They play essential roles in ecosystems as decomposers. Fungi are a source of food and medicine for humans, they can also cause certain diseases.

Algae are widely distributed in the oceans and lakes of the world, floating on or near the surface of the water no longer than the sun's rays can reach. Algae are photosynthetic eukaryotic microorganisms that contain chlorophyll and carry out photosynthesis. Algae are defined as a group of predominantly aquatic photosynthetic and nucleus-bearing organisms of the kingdom Protista that lack the true roots, stems, leaves and specialized multicellular reproductive structures of plants.

Algae have an ecological role of oxygen producers and as the food base for all aquatic life. They are important as a source of crude oil and a number of pharmaceutical and industrial products for humans. Many algae consist of only one cell while the others have millions of cells. Some algae grow suspended in the water, some grow on the water surface, some occur in snow or ice, some live on or in soil, some grow inside other organisms.

Protozoa are unicellular, non-photosynthetic, eukaryotic microorganisms. Various groups of protozoa exhibit different strategies of locomotion. Some,

such *Amoeba*, can change their cell shape, extending the cell so that it migrates along, whereas others, such as *Paramecium*, are propelled by numerous beating structures called cilia, hair-like extensions. Flagellates are an interesting group of protozoa, they all have at least one flagellum (a long, whip-like organelle of motility) some have many flagella and some have thousands.



Learning Activities

1. Based on the vocabulary, select the appropriate topic of the text above.

a) sports, b) agriculture, c) biology, d) cosmetics.

2. Give Russian equivalents.

Cell, cellular, single celled, unicellular, multicellular, one-celled; photosynthesis, photosynthetic; ecology, ecological, ecologically; reproductive, reproduce, reproduction; pharmacy, pharmaceutical, pharmaceuticals; differ, different, difference.

3. Chose which is correct.

<i>Animal-like</i>	a) животноподобный b) животнообразный c) похожий на животное
<i>Plant-like</i>	a) растениеподобный b) растениевидный c) похожий на растение
<i>Fungus-like</i>	a) грибоподобный b) грибовидный c) грибообразный d) похожий на гриб
<i>Human-like</i>	a) человекообразный b) человековидный c) похожий на человека
<i>Whip-like</i>	a) жгутообразный b) нитевидный

4. Fill in the gaps with prepositions. (by, of, on, out, with, under, from)

1. Protists are a varied group ... eukaryotic organisms.
2. Many protists are incredibly different ... procaryotic single celled organisms.
3. Fungi, algae, and protozoa are microorganisms ... eukaryotic cells.
4. They contain chlorophyll and carry ... photosynthesis.
5. Algae can float ... or ... the surface ... the water.
6. Some protozoa are propelled ... numerous beating structures called cilia.

5. Translate the sentences in writing.

1. Within this kingdom are animal-like, plant-like and fungus-like organisms.
2. Although many protists are single celled, these organisms are incredibly different from procaryotic single celled organisms, the bacteria.
3. Algae are defined as a group of predominantly aquatic photosynthetic and nucleus-bearing organisms of the kingdom Protista that lack the true roots, stems, leaves and specialized multicellular reproductive structures of plants.

6. Make the sentences interrogative.

1. Protists are a varied group of eukaryotic organisms.
2. Fungi must obtain nutrients by absorbing them from their environment.
3. They are playing essential roles in ecosystems as decomposers.
4. Algae have an ecological role of oxygen producers.
5. Some protozoa, such as Amoeba, can change their cell shape.
6. This alga has grown suspended in the water.

7. Make up a plan of the text: “Fungi, Algae, Protozoa”. Compare your plan with your partner’s. Render the text according to your plan.

8. Read the following text. Subdivide it into paragraphs. Answer the questions below.

A Little More About Fungi

Fungi are a separate kingdom of mostly multicellular eukaryotic organisms that are saprophytic; that is, they feed on dead or decaying organic materials. Some fungi are parasites and feed off living organisms in the same way. Most fungi are multicellular. They are composed of slender filaments that may form cottony masses or that may be packed together to form complex structures, such as mushrooms. The slender filaments of fungi are hardly visible to the naked eye. The growth of fungal hyphae may be very rapid when food and water are abundant and the temperature is optimum. A mass of hyphae is called a mycelium (pl. mycelia). Many fungi are harmful because their mycelia grow into and decay, rot, and spoil foods. In addition, some fungi cause serious diseases of plants and animals, including humans. Many antibiotics (drugs that act against bacteria) are produced by fungi. Yeasts that are single celled fungi, are also useful in the production of foods, such as bread, beer, wine, cheese and soy sauce.

Questions:

1. What kingdom do fungi belong to?
2. How do fungi feed?
3. What is a mycelium?
4. Do fungi grow slowly or quickly?
5. Are fungi useful or harmful?
6. What are they used for?

9. Read the abstract. Answer the questions below.

Amebas

Amebas appear as soft shapeless masses of cytoplasm. Within the cytoplasm lie a nucleus and other eukaryotic organelles. The ameba's cytoplasm continually flows, pushing out certain parts of the cell while retracting others. These cytoplasmic extensions are called pseudopods¹ and are a means of both locomotion and food procurement².

Amebas reproduce by binary fission: the nucleus reproduced by mitosis and then the cell splits in two. Amebas are abundant throughout the world in fresh water and in salt water. Many species are parasites of animals including humans. They can cause diseases such as amebic dysentery and infection of the digestive system. Certain groups of amebas secrete shells that cover and protect their cells.

Notes:

¹pseudopod – ложноножка, псевдоподия

²food procurement – добыча пищи

Questions:

1. What organisms do amebas belong to?
2. What does the word "shapeless" mean?
3. How do amebas reproduce?
4. Can they cause diseases in animals or humans?

10. Read the following for comprehension. Write out the most interesting data about algae and share them with your groupmates.

Brown Algae

The brown algae are the dominant algae of the rocky northern shores of the world. The types of brown algae that grow attached to rocks at the shore line are known as rockweed. One type of rockweed is also called sargasso weed and gave the Sargasso Sea its name. The Sargasso Sea is an area of ocean in the mid-Atlantic, east of Bermuda, with unusual water and current patterns that cause it to be quite calm. This calmness allows floating species of the Sargasso weed to proliferate and dominate the area.

Green Algae

The green algae or Chlorophyta (green plants), are an extremely varied phylum of protists. In fact, more than 7000 species exist. Of these species, most are aquatic, but some are semiterrestrial¹. Semiterrestrial algae live in moist places on land, such as on tree trunks, on snow or in the soil. These algae are primarily unicellular microscopic forms, but some are multicellular. Green algae show many similarities to land plants: they store food as starch, they have a similar chloroplast structure, many genera have cell walls composed of cellulose

and their chloroplasts contain chlorophyll *a* and *b*. For these reasons scientists think the green algae were ancestors to the plant kingdom.

Notes: ¹semiterrestrial algae – полуназемные водоросли, могут жить как в воде, так и на суше.

Red Algae

Almost all red algae are multicellular and most of their species are marine. Their colour comes from types and amounts of photosynthetic pigments present in their chloroplasts. Many species have a predominance of red pigments in addition to chlorophyll. Some red algae have a predominance of other pigments so that they look purple, or greenish black. The red pigment, however, is especially efficient in absorbing the green, violet and blue light that penetrates into the deepest water. This enables some of the red algae to grow at greatest depth than other algae and inhabit areas in which most algae cannot exist.

The red algae produce substances that make them interesting both ecologically and economically. The corallin algae, for example, deposit calcium carbonate (limestone) in their cell walls. Along with coral animals, these red algae play a major role in the formation of coral reefs.

Also, all red algae have glue-like substances in their cell walls: agar¹ and carrageenan². Agar is used to make gelatin capsules. It is also a main ingredient in the laboratory media on which bacteria, fungi and other organisms are often grow. Carrageenan is used mainly as a stabilizer and thickener in dairy products, such as ice cream, puddings etc., as a stabilizer in paints and cosmetics. Some of the red algae are used in food in certain parts of the world, such as Japan.

Notes:

¹agar – агар. Это натуральный растительный заменитель желатина, который получают из красных и бурых морских водорослей.

²carrageenan – каррагинан. Это натуральный растительный полисахарид (загуститель и гелеобразователь), получаемый из красных морских водорослей.

11. Answer the questions.

1. Do you know another name for algae?
2. How many species of algae exist?
3. Where do algae live?
4. Do you know that red algae help in formation of coral reefs?
5. What can algae be used for?

Words to remember

Fungus/fungi, mushroom, yeasts, mold, amebae, algae, to obtain, protists, cilia, extension, single celled, unicellular, multicellular, pharmaceutical.
--

CHECK POINT

1. True or false.

1. The animal-like protists are called the protozoa, the plantlike protists are the algae.
2. The organization of protists is much more complex than that of bacteria.
3. Fungi, algae, and protozoa are microorganisms with procaryotic cells.
4. Algae are diverse organisms that include mushrooms, molds, yeasts and more.
5. All algae are green.
6. Some fungi are used as pharmaceuticals.
7. Agar is used in production of foods and cosmetics.
8. Certain algae can live both in water and on moist land.
9. You cannot find algae in the lake.
10. Fungi always reproduce very slowly.

2. Progress questions.

1. What organisms have a more complex structure protists or bacteria?
2. What species are larger, single celled protists or bacteria?
3. What colours may algae be?
4. What foods do you know to be produced with the help of fungi?
5. Where can fungi be found?
6. What type of organisms are the protozoa?
7. Can protozoa cause diseases?
8. How do protozoa move?
9. From what kind of algae is agar produced?
10. Which algae produce substances that make them interesting both ecologically and economically?
11. Do scientists think the green algae to be ancestors to the plant or animal kingdoms?

3. Translate into English.

1. Некоторые грибы вызывают серьезные болезни у животных, растений и человека.
2. Большинство грибов являются многоклеточными.
3. Многие антибиотики производятся из грибов.
4. Дрожжи – это одноклеточные грибы.
5. Дрожжи используются в производстве продуктов питания, таких как хлеб, пиво, сыр, соевый соус и других.
6. Бурые водоросли преобладают на скалистых северных берегах.
7. Зеленые водоросли имеют много сходства с наземными растениями.
8. Красные водоросли производят вещества, которые делают их интересными как экологически, так и экономически.
9. Красные водоросли играют большую роль в формировании коралловых рифов.
10. Некоторые водоросли используются в пищу.

UNIT 10

ANIMALS

Topic vocabulary

1. *backbone* – позвоночник, позвоночный столб, спинной хребет
2. *vertebral column* – позвоночный столб
3. *tetrapods* – четвероногие
4. *skull* – череп
5. *chamber* – камера
6. *gills* – жабры
7. *larva* /pl. *larvae* – личинка, гусеница
8. *larval* – личиночный
9. *plate-like* – похожие на пластинки, пластинчатые
10. *scale* – чешуя, чешуйка
11. *ectothermic* – холоднокровные животные
12. *endothermic* – эндотермические, теплокровные животные
13. *heterotrophic* – гетеротрофный (*biology*) relating to organisms that cannot synthesize their own food
14. *toad* – жаба
15. *frog* – лягушка
16. *mammal* – млекопитающее
17. *to alter* – изменять, вносить изменения
18. *to undergo changes* – претерпевать изменения
19. *wing* – крыло
20. *feather* – перо
21. *down* – пух, пушок
22. *female* – самка
23. *male* – самец
24. *adult* – взрослый
25. *insulation* – изоляция
26. *ape* – обезьяна (человекообразная, примат)
27. *maintenance* – поддержание (зд. жизни)
28. *marsupial* – сумчатое животное
29. *aquatic* – водное (животное)
30. *terrestrial* – наземное (животное)

Text

ANIMALS

Animals are a diverse group of eukaryotic multicellular, heterotrophic organisms. This diverse group is often divided into two subgroups: the invertebrates and the vertebrates. The invertebrates are animals without backbones. The vertebrates are animals with a backbone.

Three classes of vertebrates are fish; four are tetrapods. In addition to having vertebral column, vertebrates have a distinct head with the skull that houses their brains. They have a closed circulatory system and a heart to pump the blood. Vertebrates make a diverse group consisting of animals adapted to life in the sea, on land and in the air.

The vast majority of fishes are bony fishes. Along with having bony internal skeletons these fishes have thin bony plate-like scales. Fishes have a two chambered heart that pumps the blood to the gills. From the gills the blood moves to the rest of the body.

The amphibians live both in water and on land. The young of frogs and toads undergo changes from larval to adult forms during development. The

amphibians have a three chambered heart.

Reptiles are better adapted to life on land than the amphibians, because of their skin that retards water loss and their shelled eggs. Fishes, amphibians and reptiles are ectothermic animals, they regulate their body temperature by taking in heat from the environment. Ectothermic animals are often called “cold blooded”, though they often maintain body temperatures much warmer than their surroundings.

Birds are winged vertebrates that are covered with feathers and are adapted to flight. They lay eggs like the reptiles but have a four chambered heart like the mammals. Birds like mammals and unlike reptiles, amphibians and fishes are endothermic, that is they regulate body temperature internally. Several types of feathers form the body covering of birds, including contour feathers, and down feathers. Birds can alter the area and shape of their wings by altering the position of their feathers. Feathers provide birds with waterproof coats and play an important role in insulating birds against temperature changes.

There are about 4500 species of living mammals, including humans. Mammals are endothermic vertebrates. Mammals have hair and their females secrete milk from mammary glands to feed the young. Mammary glands are functional in female mammals and are present but non-functional in males. The milk that they produce contains water, carbohydrates, fat, protein, minerals and antibodies. Mammals have a four chambered heart.

Animals are unable to make their own food. Therefore, animals must eat plants, other organisms or organic matter for food. The energy produced is used to drive the activities of life, including growth, maintenance, reproduction and response to the external environment.



Learning Activities

1. Guess the meaning.

Vertebrates, invertebrates, to pump, to adapt, skeleton, contour, amphibians, reptiles to regulate, separate, reaction, circulation, chemical reaction, mineral.

2. Give Russian equivalents.

Temperature changes, body protection, female mammals, blood circulation, food digestion, animal reproduction, body cells, life maintenance, wings shape.

3. Attribute the following words to a certain part of speech. Complete the chart.

Heterotrophic, invertebrates, vertebrates, vertebral, to house, to pump, internally, functional, container, ectothermic, nucleus, to enable, capable, movement, respiration, external, environment, activity, chemical, reaction, directly, matter.

	<i>Noun</i>	<i>Verb</i>	<i>Adjective</i>	<i>Adverb</i>

4. Supply antonyms for the following words:

vertebrates, organic, diverse, closed, functional, capable, simple, majority, external, unicellular, unlike, dry, directly.

5. Complete the sentences according to the text.

1. This diverse group of animals is often divided into two subgroups: ...
2. The vertebrates are animals with ...
3. In addition to having vertebral column, vertebrates have distinct ...
4. Fishes have two chambered ...
5. Reptiles are better adapted to life on land than ...
6. Birds are endothermic, that is they regulate body ...
7. Ectothermic animals are often called ...
8. Animals must eat plants, other organisms or organic matter for...

6. True or false.

1. Reptiles are endothermic animals.
2. The invertebrates are animals without backbones.
3. Birds can not alter the area and shape of their wings.
4. Mammary glands are functional in female mammals and are present but non-functional in males.
5. Ectothermic animals are often called “warm blooded”.
6. Animals unable to make their own food.
7. Mammals have a four chambered heart.
8. There are about 45 000 species of living animals.

7. Change the Present Tense into the Past.

1. This diverse group is divided into two subgroups.
2. There are about 4500 species of living mammals, including humans.
3. Females are feeding their young with milk.
4. The energy has been used to drive the activities of life.
6. The food contains water, carbohydrates, fat, protein, minerals and vitamins.

8. Fill in prepositions.

(of, on, with, to, in, from, for, by)

1. Animals are a diverse group ... eukaryotic multicellular, heterotrophic organisms.
2. The invertebrates are animals ... backbones.
3. Vertebrates make a diverse group consisting ... animals adapted ... life ... the sea, ... land and ... the air.

4. Mammary glands are functional ... female mammals and are present but non-functional ... males.
5. Mammals have hair and their females secrete milk ... mammary glands.
6. Feathers provide birds ... waterproof coats and play an important role ... insulating birds... temperature changes.

9. Complete the sentences according to your knowledge.

1. ... are a diverse group of eukaryotic multicellular, heterotrophic organisms.
2. There are about ... species of ...
3. ... provide birds with waterproof coats and play an important role in insulating birds against temperature changes.
4. Vertebrate animals make a group adapted to live in the sea ...
5. ... have hair and their females secrete milk from mammary glands to feed the young.
6. Reptiles are better adapted to life on land than ...

10. Read the following text for comprehension. Render the text briefly.

Amphibians

The word “amphibian” means two lives and refers both to the aquatic and terrestrial existence of this class of animals. Amphibians depend on water during their early stages of development. Many amphibians live in moist places like swamps and in tropical areas even when they are mature, which lessens the loss of water through their skin. Most frogs and toads fertilize their eggs externally. Most salamanders use the internal fertilization but are still oviparous¹ (lay their eggs). Because amphibian eggs have no shells or membranes to keep them from drying out, amphibians lay their eggs directly in water or in moist places.

Some amphibians protect their eggs by incubating them in their mouths, on their backs, or even in their stomachs. A few amphibian species are ovoviviparous² and incubate their eggs within their reproductive organs until they hatch, and a few are viviparous³.

Notes:

¹oviparous – яйцекладущий

²ovoviviparous – яйцеживородящий

³viviparous – живородящий

11. Read the text. Make a list of animal species mentioned in the text. Supply translation. Learn these words.

Reptiles

The three major orders of reptiles are the crocodiles and alligators, the turtles and tortoises, and the lizards and snakes. Reptiles have dry skins covered with scales that help retard water loss. As a result, reptiles can live in a wider variety of environments on land than amphibians can, but the crocodiles, alligators and turtles are aquatic organisms.

Reptiles are ectothermic. Interestingly, fishes, certain lizards, invertebrates and plants produce their own internal antifreeze – chemical compounds that lower the freezing temperature of the body fluids of the organism. Along with such physiological adaptations, ectothermic animals protect themselves against the cold in behavioral ways. Frogs help protect themselves against freezing by spending the winter buried in the soil or in the mud at the bottom of ponds.

Ectothermic animals also protect themselves from high heat by burrowing under rocks or remaining in shady, somewhat cooler areas. Reptiles often bask in the sun, which raises their body temperature, and their metabolic rate. When cold-blooded animals are cold, the metabolic rate slows down, and they are unable to hunt for food or move about very quickly.

12. Answer the questions.

1. How do reptiles protect themselves from cold or heat?
2. Have you ever seen any reptiles in wildlife?
3. Can cold-blooded animals hunt for food when they are cold?
4. Where do frogs stay in winter?

13. Read the extract, suggest a title to it. Subdivide it into paragraphs. Make up a plan of the extract and render the information briefly.

Marsupials are mammals in which the young are born early in their development and are retained in a pouch. After birth the embryos crawl to the pouch and nurse there until they are mature. The kangaroo and koala are familiar examples of marsupials. In placental mammals, the young develop to maturity within the mother. Placental mammals are extraordinary diverse. The primates are the order that includes monkeys, apes, and humans.

Mammals are warm-blooded, and the most important distinction between mammals and other vertebrates is that all mammals and only mammals produce milk to feed their young. Only mammals possess true hair. The teeth of mammals are typically differentiated and specialized. Certainly, the most important single factor which gives mammals their superiority over other animals is the development of their brain. The ability to maintain the complex activities of the cerebral cortex in the higher mammals and to store memories is very largely dependent on the ability to maintain a constant body temperature.

Words to remember

Vertebrate, invertebrate, vertebrate column, tetrapod, mammal, marsupial, reptile, amphibian, terrestrial, aquatic, mature, backbone, gills, blood, wing, male, female, embryo, larva, frog, toad, turtle, skin, scale, fluid, reproduction, maintenance.

CHECK POINT

1. Give English equivalents.

Позвоночное животное, позвоночный столб, млекопитающее, сумчатые, рептилии, змея, лягушка, жаба, птица, самка, самец, многоклеточный, жабры, чешуя, крылья, личинка, кровь, сердце, наземное животное, водное животное, воздушное животное, холоднокровное животное, теплокровное животное.

2. Progress questions.

1. What kind of organisms are animals?
2. What subgroups are animals subdivided into?
3. Do vertebrate or invertebrate animals possess a backbone?
4. Are animals able to make their own food?
5. What specific features do mammals have?
6. Are the birds ectothermic or endothermic animals?
7. How do reptiles protect themselves against cold or heat?
8. Where do amphibians live?
9. What animals possess true hair?
10. What marsupial animals do you know?

3. Translate into English.

1. Животные – это большая группа многоклеточных организмов.
2. Животные бывают позвоночные и беспозвоночные.
3. Амфибии живут как в воде, так и на суше.
4. Рептилии лучше приспособлены для жизни на суше, чем амфибии.
5. Птицы откладывают яйца.
6. Млекопитающие – теплокровные животные.
7. Животные не могут продуцировать пищу для себя.
8. Каких сумчатых животных вы знаете?
9. Рептилии – это крокодилы, аллигаторы, черепахи, ящерицы, змеи.
10. Млекопитающие кормят детенышей молоком.

4. Put possible questions to the sentences:

1. The vertebrates are animals with a backbone.
2. Amphibians live both in water and on land.
3. Animals must eat plants or other organic matter.
4. Mammals have a four chambered heart.

5. Find out and share with your group some interesting facts about animals.

UNIT 11

INFECTION

Topic vocabulary

- | | |
|--|---|
| 1. <i>infectious disease</i> – заразное заболевание, инфекционная болезнь | 13. <i>inflammation</i> – воспаление |
| 2. <i>noninfectious disease</i> – неинфекционное заболевание, незаразная болезнь | 14. <i>artificial</i> – искусственный |
| 3. <i>incubation period</i> – инкубационный период | 15. <i>bone marrow</i> – костный мозг |
| 4. <i>appearance</i> – внешний вид, проявление, признак | 16. <i>spleen</i> – селезенка |
| 5. <i>to establish</i> – устанавливать (ся), распространяться (о болезни) | 17. <i>secondary</i> – вторичный |
| 6. <i>entrance</i> – вход, доступ (to gain entrance – попасть, получить доступ) | 18. <i>abscess</i> – абсцесс, гнойник |
| 7. <i>pathogenicity</i> – патогенность, болезнетворность | 19. <i>to localize</i> – локализовать, ограничивать распространение |
| 8. <i>to isolate</i> – выделять, изолировать | 20. <i>bacteriemia</i> – бактериемия (наличие бактерий в крови) |
| 9. <i>strain</i> – штамм, род, порода | 21. <i>septicemia</i> – септицемия |
| 10. <i>to retain</i> – сохранять, удерживать | 22. <i>focus /pl. foci</i> – очаг (болезни), фокус (оптический) |
| 11. <i>attenuated</i> – ослабленный (в вирулентности) | 23. <i>spread</i> – распространение |
| 12. <i>generation</i> – генерация, поколение | 24. <i>incidence</i> – заболеваемость, встречаемость (о болезни) |
| | 25. <i>examine</i> – осматривать, исследовать |
| | 26. <i>prevention</i> – предупреждение, профилактика |
| | 27. <i>epidemiologist</i> – эпидемиолог |
| | 28. <i>etiology</i> – причины болезней, |
| | 29. <i>transmission</i> – передача, перенос |
| | 30. <i>public health</i> – здравоохранение |
| | 31. <i>safety</i> – безопасность |

Text

INFECTION

The term “**infection**” may be defined as the entrance, growth and multiplication of organisms in the body, resulting in the development of a disease process.

Contamination. The terms infection and contamination are not synonyms, and should be distinguished from each other. A contaminated object is one that contains bacteria, especially those capable of producing diseases. The hands for instance, may be contaminated with disease bacteria without being infected.

Bacteria are found in various parts of the body. Their presence does not necessarily mean that a disease process has been established. They are normally

present on the skin, in the mouth and in the nasal passages, in the upper respiratory tract, in the intestinal tract.

The incubation period of the disease may be defined as the interval of time between the entrance of a disease organism into a host and the first appearance of symptoms. This period may be a few hours, several days, often weeks and even months,

Pathogenicity. A pathogenic organism is one capable of producing a disease. Thousands of bacterial species have been isolated but only a few of these are capable of producing diseases in humans. Some are pathogenic for humans but not for animals. Some species produce diseases in animals but not in humans. The ability of an organism to invade and produce a disease process depends upon the species concerned. It is necessary to name the host in order the term pathogenic may be used correctly.

Virulence. Virulence may be defined as the degree of invasiveness of the pathogenic organism. Different strains of the same species may show great variability in their invasive power. Also the same strain kept under different conditions may show great differences in disease producing ability. Transfer from natural to artificial culture media or other unfavourable environmental conditions also reduce the virulence of a pathogenic species. Some organisms retain their virulence even cultivated on culture media for many generations. A strain that has been greatly reduced in virulence is said to be attenuated.

Number of organisms. The number of organisms plays an important part in determining whether or not an infection will occur. A small number of virulent pathogenic organisms may be easily attacked and destroyed, whereas a large number may not be completely eliminated by the defense mechanisms of the host.

Path of infection. Bacteria gain entrance to the body in various ways. Some enter through the broken skin (occasionally through the unbroken skin), some by way of the respiratory passages, others, by way of alimentary tract. The site of the entry determines whether or not pathogenic bacteria are capable of producing an infection.

After bacteria invade the tissue, they may attack the host. The organisms may produce a local inflammation or may localize in the liver, bone marrow, spleen, lymph glands etc. giving rise to secondary abscesses or secondary foci of infection. Sometimes organisms invade the blood stream, producing bacteriemia or septicemia (blood poisoning).

Animals and humans possess several defense mechanisms for destroying invading bacteria. If these mechanisms are strong and active they will usually defend the hosts against the disease organisms. On the other hand, if they are below normal an infection may take place.



Learning Activities

1. Guess the meaning.

Term, multiplication, object, nasal passage, respiratory tract, interval, symptoms, to name, correctly, alimentary tract, to destroy, mechanism, incubation period, culture media, pathogenic process, infection, to reduce, generation.

2. Read the sentences. Attribute the words in bold type to a certain part of speech. Complete the chart.

1. The **term** **infection** may be **defined** as the **entrance**, **growth** and **multiplication** of **organisms** in the **body**.
2. A contaminated **object** is one that **contains** **bacteria**, especially those **capable** of producing **diseases**.
3. **Their** **presence** does not **necessarily** **mean** that a disease process **has been** **established**.
4. **Some** are **pathogenic** for **humans** but not for **animals**.
5. **Virulence** may be defined as the degree of **invasiveness** of the **pathogenic** organism.
6. **Transfer** from **natural** to **artificial culture media** or other **unfavourable environmental conditions** also **reduce** the **virulence** of a **pathogenic species**.

Noun	Verb	Adjective	Adverb	Pronoun	Participle

3. Supply nouns to the following adjectives.

infectious ..., bacterial ..., various ..., upper ..., pathogenic ..., different ..., unfavourable ..., small ..., respiratory ..., very important ..., local ..., secondary ...

4. Fill in prepositions.

(in, on, of, from, to)

1. The terms infection and contamination are not synonyms, and should be distinguished ... each other.
2. A contaminated object is one that contains bacteria, especially those capable ... producing diseases.
3. They are normally present ... the skin, ... the mouth and... the nasal passages, ... the upper respiratory tract, ... the intestinal tract.
4. The incubation period ... the disease may be defined ... the interval of time between the entrance ... a disease organism ... a host and the first appearance ... symptoms.
5. Some species produce diseases ... animals but not ... humans.

6. Some enter ... the broken skin (occasionally ... the unbroken skin), some ... way ... the respiratory passages, others, ... way ... alimentary tract.
7. Some bacteria invade the tissue, they may attack the host ... a variety ... ways.

5. State the forms of the verbs. Translate the sentences.

1. Bacteria are found in various parts of the body.
2. A disease process has been established.
3. Thousands of bacterial species have been isolated.
4. Some species produce diseases in animals but not in humans.
5. Bacteria invade the tissue.
6. A strain that has been greatly reduced in virulence is attenuated.

6. Translate the following sentences in writing.

1. The hands, for instance, may be contaminated with disease bacteria without being infected.
2. Their presence does not necessarily mean that a disease process has been established.
3. Thousands of bacterial species have been isolated but only a few of these are capable of producing diseases in humans.
4. It is necessary to name the host in order the term pathogenic may be used correctly.
5. Different strains of the same species may show great variability in their invasive power.
6. A strain that has been greatly reduced in virulence is said to be attenuated.
7. The number of organisms plays a very important part in determining whether or not an infection will occur.
8. The site of the entry determines whether or not pathogenic bacteria are capable of producing an infection.
9. If these mechanisms are strong and active they will usually defend the hosts against the disease organisms.
10. On the other hand, if they are below normal an infection may take place.

7. Complete the sentences according to your knowledge.

1. The terms infection and contamination are ...
2. A contaminated object is one that ...
3. The incubation period of the disease may be defined as the interval of time between ... into a host and the first appearance of ...
4. ... of organisms plays a very important part in determining whether or not an infection will occur.
5. A small number of virulent pathogenic organisms may be easily attacked and ...
6. Animals and humans possess several defense mechanisms for destroying ...
7. Sometimes organisms invade the blood stream, producing blood ...

8. True or false.

1. Disease causing microorganisms (pathogens) possess properties that enhance their pathogenicity and allow them to invade animal tissues and disrupt normal body functions.
2. Pathogenicity refers to the qualitative ability of a microorganism to cause disease.
3. Virulence quantitatively describes the extent of a microorganism's ability to cause disease.
4. The term virulence is derived from the Latin '*virulentia*', meaning poison.

9. Read the following for comprehension. Put three questions to this text in a written form. Let your speaking partner answer them.

Pathogenesis of Infectious Diseases

Pathogenic microorganisms cause diseases because the growth of the pathogen in the body or toxins produced by the pathogens, disrupt normal body functions. Pathogens have properties that contribute to their potential for causing diseases.

Virulence depends on the ability of the pathogens to invade body tissues and to produce toxins. Pathogenicity (the ability to cause disease), however is not a property of the microorganism alone; the simple presence of an organism does not equal disease. The invasion or infection of the body by a microorganism, even by a pathogen that typically causes disease, results in disease only when the infecting microorganism disrupts normal body functions.

In some cases, infections with potentially pathogenic microorganisms do not lead to disease because their ability to affect body functions adversely is not fully expressed. Many healthy individuals are carriers of potentially pathogenic microorganisms, that is, they are infected with the microorganisms but will not or have not developed a disease as the result of the infection.

10. Give your explanation for the following:

1. Infection means ...
2. Contamination means ...
3. Pathogenicity is ...
4. Virulence is ...

11. Read the passage. Express the general idea of it in a written form.

Control of Microbial Growth

There are many situations in which the presence or growth of microorganisms is undesirable or even harmful to animal or plant populations. The nature of the environment in which the organisms reside may influence the way of their control.

Exposure to high temperatures, ionizing radiation and various chemicals are routinely employed to kill microorganisms. Low temperatures, high solute concentrations and desiccation are employed to prevent microbial growth.

Killing and limiting growth of microorganisms is especially important in preserving and maintaining the safety of foods. It is also a key to modern medical practice and the use of antimicrobics to treat infectious diseases in animals and humans.

12. Read and translate the following text in a written form.

Epidemiology

Epidemiology is a field of science concerned with the circumstances under which diseases occur. This science examines factors involved in the incidence, spread, prevention and control of infectious and noninfectious diseases. Contemporary epidemiologists consider the etiology of disease, that is the cause of disease. For infectious disease, this means identifying the pathogen responsible for the disease. Epidemiologists also examine the factors involved in the transmission of infectious agents. They identify the origin and mode of transmission of a disease and assess the microbiological safety of various substances, such as food and water, involved in this transmission.

The effect of the disease on a population can be measured by the death or mortality rate it produces. The incidence of the disease or morbidity rate is usually much higher than the mortality rate. Many more individuals become ill than die of a disease.

Notes:

mortality rate – уровень смертности

morbidity rate – уровень заболеваемости

Words to remember

Entrance, contamination, incubation period, pathogenicity, virulence, path of infection, to isolate, host, to occur, inflammation, artificial, strain, generation.

CHECK POINT

1. Give English equivalents.

Загрязнение, заражение, выделить бактерии, развитие, бактериальный штамм, вызвать болезнь, патогенность, ослабленная вакцина, защитный механизм, искусственная культура, пути заражения, здравоохранение, безопасность.

2. Progress questions.

1. What initiates the disease process in the body?
2. Is there any difference between infection and contamination?
3. Can your hands be contaminated without being infected?
4. What is a pathogenic organism?

5. Is the number of pathogenic organism in the body of any importance for the infection to occur?
6. What paths of infection do you know?
7. What mechanism does the body possess to struggle the infection?
8. Does infection occur every time when pathogenic organisms get entrance into the body?
9. What does epidemiology deal with?

3. *Translate into English.*

1. Болезнь может быть результатом инфекции.
2. Контаминация – это наличие патогенных микроорганизмов, но еще не инфекция.
3. Инкубационный период может длиться долго.
4. Некоторые организмы патогенны для животных, но не для человека.
5. Различные штаммы одного вида патогенов различаются по вирулентности.
6. Защитный механизм хозяина может полностью уничтожить патогенные
7. микроорганизмы.
8. Штамм с редуцированной вирулентностью считается ослабленным.
9. Бактерии попадают в организм различными путями.
10. Если защитные механизмы ослаблены, может возникнуть инфекция.
11. Многие здоровые животные являются носителями опасных микроорганизмов.

4. *Share with your group three things about infection that were new to you.*

UNIT 12

NUTRIENTS

Topic vocabulary

- | | |
|---|--|
| 1. <i>autotrophic</i> – автотрофный, способный производить пищу | 10. <i>to compare</i> – сравнивать |
| 2. <i>ingestion</i> – прием внутрь, проглатывание, поедание | 11. <i>to refer (to)</i> – ссылаться (на) |
| 3. <i>sufficient</i> – достаточный | 12. <i>to add</i> – добавлять |
| 4. <i>nutrient</i> – питательное вещество, нутриент | 13. <i>to break down</i> – разрушать, расщеплять. |
| 5. <i>consume</i> – потреблять | 14. <i>fatty acid</i> – жирная кислота |
| 6. <i>bulk</i> – основной объем, основная масса | 15. <i>saturated fatty acids</i> – насыщенные жирные кислоты |
| 7. <i>to obtain</i> – получать, добывать | 16. <i>unsaturated fatty acids</i> – ненасыщенные жирные кислоты |
| 8. <i>diet</i> – питание, рацион | 17. <i>essential amino acids</i> – незаменимые аминокислоты |
| 9. <i>source</i> – ресурс, источник | 18. <i>chemical compound</i> – химическое соединение |

- | | |
|---|--|
| 19. <i>peptide bonds</i> – пептидные связи | 25. <i>trace element</i> – микроэлемент |
| 20. <i>chain</i> – цепочка, цепь | 26. <i>to solve</i> – растворять |
| 21. <i>to manufacture</i> – производить | 27. <i>solvent</i> – растворитель |
| 22. <i>to require</i> – требовать | 28. <i>fiber</i> – клетчатка |
| 23. <i>to join</i> – соединять,
присоединяться | 29. <i>intake</i> – прием, потребление
(воды, пищи) |
| 24. <i>diet</i> – рацион, диета | |

Text

NUTRIENTS

A **nutrient** is a substance used in an organism metabolism which must be taken in from its environment. Methods for nutrient intake vary. Animals and protists have an internal digestive system, but plants digest nutrients externally before ingesting them. Organic nutrients include carbohydrates, fats, proteins (or their building blocks, amino acids), and vitamins. Inorganic chemical compounds such as minerals, water and oxygen may also be considered nutrients. A nutrient is essential to an organism if it cannot be synthesized by the organism in sufficient quantities and must be obtained from an external source. Nutrients needed in relatively large quantities are called macronutrients and those needed in relatively small quantities are called micronutrients.

The chemical elements animals consume in the largest quantities are carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur.

- The classes of chemical compounds necessary in the largest quantities and which provide bulk energy are **carbohydrates**, **proteins**, and **fats**. Water and atmospheric oxygen also must be consumed in large quantities, but are not always considered “food” or “nutrients”.

- **Calcium**, salt (sodium chloride), **magnesium**, and **potassium** (along with **phosphorus** and **sulfur**) are sometimes added to the list of macronutrients because they are required in relatively large quantities compared to other **vitamins** and **minerals**. They are sometimes referred to as the macrominerals.

The remaining vitamins, minerals, or elements, are called micronutrients because they are required in relatively small quantities.

Substances that provide energy.

- **Carbohydrates** are compounds made up of sugars. Carbohydrates are classified by their number of sugar units: monosaccharides (such as glucose and fructose), disaccharides (such as sucrose and lactose), oligosaccharides, and polysaccharides (such as starch, glycogen, and cellulose).

- **Proteins** are organic compounds that consist of the amino acids joined by peptide bonds. The body cannot manufacture some of the amino acids (termed essential amino acids); the diet must supply these. In nutrition, proteins are broken down through digestion by proteases back into free amino acids.

- **Fats** consist of a glycerin molecule with three fatty acids attached. Fatty acids are unbranched hydrocarbon chains, connected by single bonds alone (saturated fatty acids) or by both double and single bonds (unsaturated fatty

acids). Fats are needed to keep cell membranes functioning properly, to insulate body organs against shock, to keep body temperature stable, and to maintain healthy skin and hair. The body does not manufacture certain fatty acids (termed essential fatty acids) and the diet must supply these.

Substances that support metabolism

Dietary minerals are generally trace elements, salts, or ions such as copper and iron. Some of these minerals are essential to animal metabolism.

- **Vitamins** are organic compounds essential to the body. They usually act as coenzymes or cofactors for various proteins in the body. Vitamins provide animals with ability to fight stresses, diseases, to maintain good health. They are important for the growth, production and reproduction.

- **Water** is the most abundant compound in the world. Water is an essential nutrient and is the solvent in which all the chemical reactions of life take place. Water is needed for breakdown of nutrients, for movement of feed and for milk production. Animals must have frequent intakes of water to remain alive.



Learning Activities

1. Guess the meaning.

Method, blocks, vitamin, mineral, monosaccharides, glucose, fructose, lactose, disaccharides, oligosaccharides, polysaccharides, glycogen, cellulose, glycerin, ions, salt, coenzymes, chemical, reaction, shock, hydrocarbon, categorize.

2. Give Russian equivalents.

Organic compounds, glycerin molecule, nutrient intake, sufficient quantity, external source, hydrocarbon chain, animal metabolism, peptide bond, saturated fatty acid, unsaturated fatty acid, essential amino acid, non-essential nutrients.

3. Give the antonyms for the following:

unable, harmful, internal, unsaturated, inorganic, unstable, non-essential, improperly, uncertain, unusual, dysfunction, insufficient, decrease, unimportant.

4. Supply the correct form of the verb.

1. Animals and protists ... an internal digestive system. (*have, has, had, have been*)
2. Calcium, salt (sodium chloride), magnesium, and potassium (along with phosphorus and sulfur) ... sometimes... to the list of macronutrients. (*were, to be, am, is, are; added, add, to add, adding*)
3. Fats ... of a glycerin molecule with three fatty acids attached. (*consist, consisting, consists, will consist*)
4. Fats ... needed to keep cell membranes functioning properly. (*is, was, were, are*)

5. The body does not ... certain fatty acids. (*manufacture, manufactures, manufacturing, had manufactured*)
6. The diet must ... essential nutrients. (*supply, to supply, supplied, supplying*)
7. They usually ... as coenzymes or cofactors for various proteins in the body. (*are acting, act, acts, acted*)

5. Match the words and their description.

1	A nutrient is ...	a glycerin molecule with three fatty acids attached.
2	Proteins are...	a substance used in an organism's metabolism which must be taken in from its environment.
3	Carbohydrates are...	organic compounds that consist of the amino acids joined by peptide bonds.
4	Fats consist of	an essential nutrient and is the solvent in which all the chemical reactions of life take place.
5	Water is	compounds made up of sugars.

6. Supply prepositions.

(*by, through, of, on, in, for*)

1. Carbohydrates are classified ... their number of sugar units.
2. Proteins consist ... the amino acids joined ... peptide bonds.
3. ... nutrition, proteins are broken down ... digestion.
4. Oxygen and water are also essential ... human survival, but are generally not considered "food" when consumed ... isolation.
5. Non-essential nutrients can still have a significant impact ... animal health.

7. Put the words in order to make a sentence.

1. Organic, include, carbohydrates, nutrients, fats, proteins, and vitamins.
2. Inorganic, nutrients chemical compounds, such as minerals, may also be considered, water and oxygen.
3. The body, amino acids, cannot, manufacture, all.
4. Are, essential, oxygen, and water, for, animal, survival.
5. Some, elements, trace, are, toxic, when, in a large amount, given.
6. All, vitamins, animals, require.
7. Common, salt, easily, poison, may, poultry, are given, if, they, doses, too large.

8. True or false.

1. Body processes do not require the use of energy.
2. Metabolism means all the chemical and physical processes that take place in the body.
3. Vitamins are considered macronutrients. They are essential for the development of normal body processes.
4. Nutrients are transported by the nervous system.
5. Young and lactating animals need less protein than the others.

6. Water is needed for breakdown of nutrients, for movement of feed and for milk production.
7. Sodium chloride is the most abundant compound in the world.
8. Animals must have frequent intakes of water to remain alive.
9. The chemical elements animals consume in the smallest quantities are carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur.

9. Translate the following sentences into English in a written form.

1. Animals and protists have an internal digestive system, but plants digest nutrients externally before ingesting them.
2. Fatty acids are unbranched hydrocarbon chains, connected by single bonds alone (saturated fatty acids) or by both double and single bonds (unsaturated fatty acids).
3. Water is an essential nutrient and is the solvent in which all the chemical reactions of life take place.
4. Methods for nutrient intake vary.
5. Carbohydrates are classified by their number of sugar units: monosaccharides (such as glucose and fructose), disaccharides (such as sucrose and lactose), oligosaccharides, and polysaccharides (such as starch, glycogen, and cellulose).
6. Essential nutrients are to be synthesized internally (either at all, or in sufficient quantities), and so must be consumed by an organism from its environment.
7. For example, most dietary fiber is not absorbed by the human digestive tract, but is important in digestion and absorption of otherwise harmful substances.

10. Read the following text. Write down the general idea of the text. Compare the results with your partner.

Essential and Non-essential Nutrients

Nutrients are frequently categorized as essential or non-essential. Essential nutrients are to be synthesized internally (either at all, or in sufficient quantities), and so must be consumed by an organism from its environment.

For humans, these include essential fatty acids, essential amino acids, vitamins, and certain dietary minerals. Oxygen and water are also essential for human survival, but are generally not considered "food" when consumed in isolation.

Humans can derive energy from a wide variety of fats, carbohydrates, proteins, and ethanol, and can synthesize other needed amino acids from the essential nutrients.

Non-essential nutrients can still have a significant impact on health, whether beneficial or toxic. For example, most dietary fiber is not absorbed by the human digestive tract, but is important in digestion and absorption of otherwise harmful substances. Interest has recently increased in phytochemicals, which include many non-essential nutrients which may have health benefits.

Words to remember

Ingestion, digestion, nutrition, nutrients, diet, to consume, consumer, to add, to break down, protein, carbohydrate, fat, fatty acid, amino acid, saturated, unsaturated, to manufacture, diet, ration, trace elements, fiber, solvent.

CHECK POINT

1. Give English equivalents.

Питательные вещества, пища, корма, принимать пищу, органические питательные вещества, неорганические питательные вещества, потреблять, в большом количестве, высокого качества, химические соединения, сахара, протеины, жиры, белки, углеводы, вода, микроэлементы, незаменимые аминокислоты, расщеплять, переваривать, клетчатка, жирная кислота, производство молока.

2. Translate into English.

1. У животных есть пищеварительная система.
2. Вода не имеет питательных веществ, но является растворителем.
3. Витамины очень полезны, они нужны в небольших количествах.
4. В больших дозах обычная соль может быть вредна.
5. Животные получают протеины из пищи.
6. Организм животного не может вырабатывать некоторые аминокислоты, они называются "незаменимые аминокислоты".
7. Органические питательные вещества включают углеводы, жиры, белки и витамины.
8. Вода – самое распространенное химическое соединение.
9. Животные не могут долго жить без воды.
10. Правильное питание – основа хорошего здоровья человека и животных.

3. Discuss with your group.

1. Should animals and humans consume the same nutrients in general?
2. How can bulls consume grass and produce meat?
3. Can animals make their own food? What about plants, can they?

SUPPLEMENTARY READING

Text 1

Mitochondria

Mitochondria are a double membrane organelle present in the cytoplasm of all eukaryotic cells. Mitochondria generates energy in the form of ATP because of which mitochondria is known as the “powerhouse of the cell”.

In 1857 Albert von Kolliker first discovered the organelle and Carl Benda in 1898 gave the organelle its name Mitochondria.

The word mitochondria in Geek language stands for “mitos” and “chondrion” which means “thread” and “granules-like” respectively.

Mitochondria (singular: mitochondrion) is present in the cytoplasm of most eukaryotic cells and has a double membrane covering. They have their own DNA and hence are called semi-autonomous organelles like the chloroplast. The mitochondria are called the powerhouse of the cell because their main function is to produce ATP for the cell so that the cell can perform metabolic activities.

Mitochondria play a significant role in producing energy by breaking carbohydrates. Many important biochemical reactions occur in the mitochondria that are responsible for the control of cell growth, cell cycle, cell death, cell signaling, and cell differentiation other than the production of ATP.

They appear ribbon-shaped, freely floating throughout the cytoplasm of the cell. In animals, the number of mitochondria can reach up to lakhs whereas a typical plant cell only has around hundreds of them. Mitochondria are very small organelle i.e. around 0.5 to 10 μm in diameter and require stain to observe under microscope.

Characteristics of Mitochondria:

1. They are either sausage-shaped or cylindrical-shaped.
2. They appear ribbon-like.
3. They are semi-autonomous organelle i.e. mitochondria has their own DNA, RNA and ribosomes.
4. They have two membrane covering; inner membrane, and outer membrane.
5. The space inside the membrane is called the matrix.
6. The inner membrane folds to form the cristae.
7. The cristae are responsible for increasing the surface area.
8. Most of the stages of aerobic respiration take place in the mitochondria.

Functions of Mitochondria:

The primary function of the mitochondria is to generate ATP via oxidative phosphorylation.

Other functions of mitochondria are:

1. Help in ammonia detoxification in liver cells.
2. Regulation of metabolic activity.
3. Help in cell growth and multiplication.
4. Apoptosis or programmed cell death is also performed by mitochondria.
5. Through the specialized somatic junctions status of microglia is controlled by neuronal mitochondria.
6. Membrane potential and cellular metabolism are maintained by mitochondria.
7. They also contribute to heme synthesis reactions and also in steroid synthesis.
8. They are helpful in immune signaling and also in hormonal signaling.
9. They help in the regulation of calcium ion concentration in the cell.
10. They help in various other cellular activities like cell-to-cell signaling, regulation of the cell cycle, etc.
11. In cold climatic areas, the mitochondria utilize the stored fats in the cells to generate heat.

Mitochondrial Disease

If mitochondria are not working properly, it will directly affect the human. Symptoms of mitochondrial disease vary from person to person. In some cases, ineffective mitochondria lead to organ failure in severe cases. Examples of Mitochondrial diseases are: Alzheimer's Disease, Muscular Dystrophy, Diabetes.

Learning activities

1. True or false.

1. Mitochondrion is a semi-autonomous organelle i.e. it has its own DNA, RNA, and ribosomes.
2. Mitochondrion has a single membrane.
3. Mitochondria are energy producing organelles of eukaryotic cells.
4. Most of the processes of cellular reproduction occur in mitochondria.
5. Mitochondria store many essential proteins.
6. Mitochondrion performs multiple metabolic activities.
7. Disorder in mitochondria may lead to multiple disorders.

2. Answer the following questions.

1. What is the other name of mitochondria?
2. Do mitochondria have DNA?
3. Where are the Mitochondria found?
4. What is the structure of mitochondria?
5. What are the functions of mitochondria?

3. Discuss in small groups the responsibilities of mitochondria in animal or human body.

Text 2

Origin of Life

The Ancient Greeks believed that living things could spontaneously come into being from nonliving matter, and that the goddess Gaia could make life arise spontaneously from stones. Aristotle disagreed, but he still believed that creatures could arise from dissimilar organisms or from soil. Variations of this concept of spontaneous generation still existed as late as the 17th century, but towards the end of the 17th century, a series of observations and arguments began that eventually discredited such ideas. This advance in scientific understanding was met with much opposition, with personal beliefs and individual prejudices often obscuring the facts.

William Harvey (1578–1657) was an early proponent of all life beginning from an egg. Italian physician, Francesco Redi proved as early as 1668 that higher forms of life did not originate spontaneously by demonstrating that maggots come from eggs of flies. But proponents of spontaneous generation claimed that this did not apply to microbes and continued to hold that these

could arise spontaneously. Attempts to disprove the spontaneous generation of life from non-life continued in the early 19th century with observations and experiments by Franz Schulze and Theodor Schwann. In 1745, John Needham added chicken broth to a flask and boiled it. He then let it cool and waited. Microbes grew, and he proposed it as an example of spontaneous generation. In 1768, Lazzaro Spallanzani repeated Needham's experiment but removed all the air from the flask. No growth occurred. In 1854, Heinrich G. F. Schroder (1810–1885) and Theodor von Dusch repeated the Helmholtz filtration experiment and showed that living particles can be removed from air by filtering it through cotton-wool.

In 1864, Louis Pasteur finally announced the results of his scientific experiments. In a series of experiments similar to those performed earlier by Needham and Spallanzani, Pasteur demonstrated that life does not arise in areas that have not been contaminated by existing life.

All known life forms share fundamental molecular mechanisms, reflecting their common descent; based on these observations, hypotheses on the origin of life attempt to find a mechanism explaining the formation of a universal common ancestor, from simple organic molecules via pre-cellular life to protocells and metabolism.

1. Translate into Russian.

Living things, dissimilar organisms, spontaneous generation, individual prejudices, higher forms of life, maggots, living particles, common descent, hypotheses, common ancestor, pre-cellular life.

2. True or false.

1. William Harvey was an early proponent of all life beginning from land.
2. Living particles can be removed from air by filtering it through cotton-wool.
3. The Ancient Greeks believed that living things could spontaneously come into being from nonliving matter.
4. Life arises in areas that have not been contaminated by existing life.
5. All known life forms share fundamental molecular mechanisms.

3. Work in small groups. Discuss the theory of the origin of life.

4. Prepare reports about scientists mentioned in the text.

Text 3

Abiogenesis

Life on Earth is based on carbon and water. Carbon provides stable frameworks for complex chemicals and can be easily extracted from the environment, especially from carbon dioxide. There is no other chemical element which properties are similar enough to carbon to be called an analogue. Silicon, the element directly below carbon on the periodic table, does not form

very many complex stable molecules. The elements boron and phosphorus have more complex chemistries, but suffer from other limitations relative to carbon.

Water is an excellent solvent and has two other useful properties: the fact that ice floats enables aquatic organisms to survive beneath it in winter; and its molecules have electrically negative and positive ends, which enables it to form a wider range of compounds than other solvents can.

Abiogenesis is the natural process of life arising from non-living matter, such as simple organic compounds. The prevailing scientific hypothesis is that the transition from non-living to living entities was not a single event, but a gradual process of increasing complexity. However, the occurrence of abiogenesis is uncontroversial among scientists.

There are several principles and hypotheses for how abiogenesis could have occurred. Life on Earth first appeared as early as 4.28 billion years ago, soon after ocean formation 4.41 billion years ago, and not long after the formation of the Earth 4.54 billion years ago. The earliest known life forms are bacteria.

There is no current scientific consensus as to how life originated. However, many accepted scientific models build on the Miller–Urey experiment and the work of Sidney Fox, which show that conditions on the primitive Earth favored chemical reactions that synthesize amino acids and other organic compounds from inorganic precursors, and phospholipids spontaneously form lipid bilayers, the basic structure of a cell membrane.

1. True or false.

- a) Water is a good conductor of electricity.
- b) Water is an excellent solvent.
- c) Water is always in a liquid state.
- d) Water has a high boiling point.

2. Choose the correct answer.

1) How does the fact that ice floats benefit aquatic organisms in winter?

- a) It makes it easier for them to catch prey.
- b) It provides a solid surface for them to walk on.
- c) It enables them to survive beneath it.
- d) It helps them to regulate their body temperature.

2) What enables water to form a wider range of compounds than other solvents can?

- a) Its ability to conduct electricity.
- b) Its molecules having electrically negative and positive ends.
- c) Its high density.
- d) Its low boiling point.

3) *What is abiogenesis?*

- a) The natural process of life arising from living matter.
- b) The process of life arising from non-living matter.
- c) The process of life arising from complex organic compounds.
- d) The transition of living entities to non-living matter.

Text 4

Ribosome

Ribosomes are the site of protein synthesis in the cell. Ribosomes are granular structures and were first observed by George Palade (1953) under the electron microscope. A ribosome is present inside the living cells that produce proteins from amino acids during a process of protein synthesis also called translation, and it translates genetic information stored in messenger RNA into proteins. Ribosomes are specialized cell organelles and are found in both prokaryotic and eukaryotic cells. Ribosomes are found inside the cytosol of the cell. Ribosomes are composed of two subunits – smaller and larger. The word “ribosome” is made from taking ‘*ribo*’ from ribonucleic acid and ‘*soma*’ is the Latin word for body.

Ribosomes produce proteins from amino acids during a process called translation. It translates genetic information stored in messenger RNA into proteins. The proteins synthesized in the cytoplasm are utilized in the cytoplasm itself and the proteins synthesized by bound ribosomes are transported outside the cell.

The ribosomes, present in eukaryotic cell, is 80S whereas in prokaryotic cell 70S ribosomes are found. The ‘S’ (Svedberg’s Unit) here stands for sedimentation coefficient. It is indirectly used as a measure of density and size. The 70S and 80S are both made up of two subunits. These are found both in prokaryotes and eukaryotes. They occur in eukaryotic cells. They are found freely inside the cytoplasm of prokaryotes.

In conclusion, ribosomes are cellular organelles which are responsible for protein synthesis. The 70S and 80S ribosomes exhibit distinct characteristics and functions in both prokaryotic and eukaryotic cells. They have differences in size, location, sedimentation coefficients, subunit composition, synthesis sites, and molecular composition.

1. Choose the best answer.

1) What is the function of ribosomes in the cell?

- a) to synthesize proteins
- b) to store genetic information
- c) to produce energy
- d) to divide cells

2) Who was the first to observe ribosomes?

- a) Louis Pasteur
- b) George Palade

- c) Robert Hooke
- d) Alexander Fleming

3) *In which year were ribosomes first observed?*

- a) 1950
- b) 1953
- c) 1960
- d) 1970

4) *What process do ribosomes use to produce proteins?*

- a) translation
- b) transcription
- c) replication
- d) cell division

5) *How many subunits are ribosomes composed of?*

- a) one subunit
- b) two subunits
- c) three subunits
- d) four subunits

2. Render the text “Ribosome” in English briefly.

Text 5

The Theory of Evolution

A central organizing concept in biology is that life changes and develops through evolution, and that all life-forms known have a common origin. The theory of evolution postulates that all organisms on the Earth, both living and extinct, have descended from a common ancestor or an ancestral gene pool. This universal common ancestor of all organisms is believed to have appeared about 3.5 billion years ago.

The term “evolution” was introduced into the scientific lexicon by Jean-Baptiste de Lamarck in 1809, and fifty years later Charles Darwin posited a scientific model of natural selection as evolution’s driving force.

Darwin theorized that species flourish or die when subjected to the processes of natural selection or selective breeding.

Biologists organize and analyze evolutionary relationships through various methods, including phylogenetics, phonetics.

Evolution is relevant to the understanding of the natural history of life forms and to the understanding of the organization of current life forms. But, those organizations can only be understood in light of how they came to be by way of the process of evolution. Consequently, evolution is central to all fields of biology.

The evolutionary history of life on the Earth traces the processes by which living and fossil organisms evolved, from the earliest emergence of life to the

present. Earth formed about 4.5 billion years ago. The similarities among all known present-day species indicate that they have diverged through the process of evolution from a common ancestor. Approximately 1 trillion species currently live on the Earth of which only 1.75–1.8 million have been named and 1.6 million documented in a central database. These currently living species represent less than one percent of all species that have ever lived on the Earth.

1. Answer the questions.

1. Who introduced the term “evolution” into the scientific lexicon?
2. What mechanism did Darwin propose as the driving force of evolution?
3. What phrase is used to describe the study of evolutionary relationships?

2. True or False.

1. The term “evolution” was introduced into the scientific lexicon by Charles Darwin.
2. Darwin theorized that species flourish or die when subjected to the processes of artificial selection or selective breeding.
3. A central organizing concept in biology is that life changes and develops through avocation.
4. Earth formed about 3.5 billion years ago.
5. All life-forms known have a common structure.

3. Render the text in English briefly.

Text 6

Plants

Plants are multicellular organisms, predominantly photosynthetic eukaryotes of the kingdom Plantae. Historically, plants were treated as one of two kingdoms including all living things that were not animals, and all algae and fungi were treated as plants. However, all current definitions of Plantae exclude the fungi and some algae, as well as the prokaryotes (the archaea and bacteria).

Green plants obtain most of their energy from sunlight via photosynthesis by primary chloroplasts that are derived from endosymbiosis with cyanobacteria. Their chloroplasts contain chlorophylls, which gives them their green color. Some plants are parasitic or mycotrophic and have lost the ability to produce normal amounts of chlorophyll or to photosynthesize. Plants are characterized by sexual reproduction and alternation of generations.

There are about 320,000 species of plants, of which the great majority, some 260–290 thousand, produce seeds. Green plants provide a substantial proportion of the world’s molecular oxygen, and are the basis of most of Earth’s ecosystems.

Plants that produce grain, fruit and vegetables also form basic human foods. Plants have many cultural and other uses, as ornaments, building materials, writing material and, in great variety, they have been the source of

medicines and psychoactive drugs. The scientific study of plants is known as botany, a branch of biology.

1. Answer the questions.

1. How are plants described in terms of cellular organization and energy use?
2. How do green plants obtain most of their energy?
3. Why are chloroplasts green?
4. What kind of reproductive cycle do plants have?
5. How many plant species exist?
6. How many of plant species produce seeds?

2. True or false.

1. Some plants are parasitic or mycotrophic.
2. Botany is the study of animals.
3. Plants are used for ornaments, building materials, writing material.
4. Plants are unicellular organisms.
5. There are about 330,000 species of plants.
6. 20,000 produce seeds.
7. Plants are the source of medicines and psychoactive drugs.

3. Render the text in English briefly.

Text 7

Fungi

Fungi are heterotrophic unicellular or multicellular eukaryotic organisms with external digestion. They include microorganisms such as yeasts and molds, as well as the more familiar mushrooms. These organisms are classified as a kingdom, which is separate from the other eukaryotic life kingdoms of plants and animals.

A characteristic that places fungi in a different kingdom from plants, bacteria, and some protists is chitin in their cell walls.

Similar to animals, fungi are heterotrophs. They acquire their food by absorbing dissolved molecules, typically by secreting digestive enzymes into their environment. Fungi do not photosynthesize. Growth is their means of mobility, except for spores, which may travel through the air or water.

Fungi are the principal decomposers in ecological systems. These and other differences place fungi in a single group of related organisms, named the Eumycetes.

Fungi include symbiosis of plants, animals, or other fungi and also parasites. They may become noticeable when fruiting, either as mushrooms or as molds.

Fungi perform an essential role in the decomposition of organic matter and have fundamental roles in nutrient cycling and exchange in the environment. They have long been used as a direct source of human food, in the form of mushrooms and truffles; as a leavening agent for bread; and in the fermentation of various food products, such as wine, beer, and soy sauce.

Since the 1940s, fungi have been used for the production of antibiotics, and, more recently, various enzymes produced by fungi are used industrially and in detergents. Fungi are also used as biological pesticides to control weeds, plant diseases and insect pests.

1. *Translate into Russian.*

1. Fungi are heterotrophic unicellular or multicellular eukaryotic organisms with external digestion.
2. Fungi are the principal decomposers in ecological systems.
3. Fungi include symbiosis of plants, animals, or other fungi and also parasites.
4. Fungi perform an essential role in the decomposition of organic matter and have fundamental roles in nutrient cycling and exchange in the environment.
5. Similar to animals, fungi are heterotrophs.

2. *True or false.*

1. Fungi include microorganisms such as yeasts and molds.
2. Mushrooms are not considered as fungi.
3. Chitin places fungi in a different kingdom from plants, bacteria, and some protists.
4. Fungi include symbiosis of plants, animals.
5. Fungi may become noticeable when fruiting, either as mushrooms or as molds.

3. *Render the text “Fungi” in English briefly.*

Text 8

Bacteria, Archaea and Viruses

Bacteria and Archaea constitute two domains of single-celled organisms. These microorganisms lack cell nuclei and are therefore prokaryotes. For much of the 20th century, prokaryotes were regarded as a single group of organisms and classified based on their biochemistry, morphology and metabolism. Microbiologists tried to classify microorganisms based on the structures of their cell walls, their shapes, and the substances they consume.

In 1965, Emile Zuckerkandl and Linus Pauling instead proposed using the sequences of the genes in different prokaryotes to work out how they are related to each other. This phylogenetic approach is the main method used today.

A virus is a submicroscopic infectious agent that replicates only inside the living cells of an organism. Viruses infect all types of life forms, from animals and plants to microorganisms, including bacteria and archaea.

Since Dmitri Ivanovsky's 1892 article describing a non-bacterial pathogen infecting tobacco plants, and the discovery of the tobacco mosaic virus by Martinus Beijerinck in 1898, more than 6,000 virus species have been described in detail, of the millions of types of viruses in the environment. Viruses are found in almost every ecosystem on Earth and are the most numerous type of biological entity. The study of viruses is known as virology.

Most virus species have virions too small to be seen with an optical microscope as they are one hundredth the size of most bacteria.

Viruses are considered by some biologists to be a life form, because they carry genetic material, reproduce, and evolve through natural selection, although they lack the key characteristics such as cell structure that are generally considered necessary criteria for life.

Nearly all animal life is dependent on bacteria for survival as only bacteria and some archaea possess the genes and enzymes necessary to synthesize vitamin B12, also known as cobalamin, and provide it through the food chain.

There are typically 40 million bacterial cells in a gram of soil and a million bacterial cells in a milliliter of fresh water.

The ancestors of modern bacteria were unicellular microorganisms that were the first forms of life to appear on Earth, about 4 billion years ago. Bacteria display a wide diversity of shapes and sizes, called morphologies.

1. Translate into Russian.

1. Bacteria and Archaea constitute two domains of single-celled organisms.
2. These microorganisms lack cell nuclei and are therefore prokaryotes.
3. For much of the 20th century, prokaryotes were regarded as a single group of organisms and classified based on their biochemistry, morphology and metabolism.
4. Microbiologists tried to classify microorganisms based on the structures of their cell walls, their shapes, and the substances they consume.
5. In 1965, Emile Zuckerkandl and Linus Pauling proposed using the sequences of the genes in different prokaryotes to work out how they are related to each other.
6. This phylogenetic approach is the main method used today.
7. A virus is a submicroscopic infectious agent that replicates only inside the living cells of an organism.
8. Viruses infect all types of life forms, from animals and plants to microorganisms, including bacteria and archaea.

2. True or false.

1. Bacteria and Archaea constitute two domains of single-celled organisms.
2. Prokaryotes have cell nuclei.
3. For much of the 20th century, prokaryotes were classified based on biochemistry, morphology and metabolism.
4. A virus replicates only inside living cells of an organism.
5. Viruses infect only bacteria and archaea.
6. Dmitri Ivanovsky described a non-bacterial pathogen infecting tobacco plants in 1892.
7. The tobacco mosaic virus was described by Martin Beijerinck in 1898.
8. Viruses are the most numerous type of biological entity on Earth.
9. The study of viruses is known as virology.
10. Most virus species are large enough to be seen with an optical microscope.

3. Render the text in English briefly.

VOCABULARY

A

abdomen брюшная полость; живот
abdominal cavity брюшная полость
abdominal wall стенка живота
abomasum сычуг, четвертый желудок жвачных
abscess абсцесс, гнойник
absorption всасывание, абсорбция
abundant обильный, изобилующий
access (to) доступ
accumulate накапливаться; наслаиваться
accuracy точность, правильность
acetic acid уксусная кислота
acid кислота; кислый, кислотный
acidity кислотность
acquire a disease заболеть
acute острый (болезнь)
adaptation приспособление; приспособляемость
addition прибавление, дополнение
adequate адекватный; достаточный
adhere (to) прилипать, приставать
adherent вязкий, клейкий, плотно прилегающий
adipose tissue жировая ткань
adjacent смежный, соседний
administer управлять; назначать (лекарство); вводить (лекарство)
advantage преимущество
aerobic аэробный
affect воздействовать; заболеть; поражать (о болезни)
agency возбудитель; фактор, сила
agent действующая сила; фактор
ailing больной; болезненный
ailment болезнь, недомогание, нездоровье
air current воздушное течение, поток
airtight воздухонепроницаемый
albumen белок (яйца); белковое вещество, альбумин
alcohol алкоголь, спирт (винный)
alga (pl: algae) водоросль
alimentary tract пищеварительный тракт
alkaline щелочной
alkalinity щелочность
aloe (pl. aloes) алоэ; сабур слабительное
alveolus (pl. alveoli) альвеола, ячея
amount количество
amides амиды
amino acid аминокислота
ammonia аммиак

ammonium аммиачные соли
anaemia малокровие, анемия
anaerobic анаэробный
anatomy анатомия
anaesthesia обезболивание, анестезия
anaesthetic обезболивающий; наркотическое средство
anaesthetic condition состояние обезболивания; наркотическое состояние, наркоз
ancestor предок, прародитель
ancestry происхождение, предок
animal breeding разведение сельскохозяйственных животных, животноводство
animal housing стойловое содержание
animal medicine ветеринария
animal sanitation зоогигиена, ветеринарная санитария
animal surgery ветеринарная хирургия
animal-to-animal transmissible передающийся от одного животного другому (о болезни)
anthrax сибирская язва
anus задний проход
aorta аорта
ape обезьяна (человекообразная)
apparent видимый; очевидный, явный;
appetite аппетит
application применение
apply применять; употреблять (лекарство); вводить (лекарство)
appropriate подходящий, соответствующий
aquatic life водные организмы
arrange приводить в порядок, располагать, классифицировать
artificial искусственный
artificial immunization искусственная иммунизация
artificial insemination искусственное осеменение
asepsis асептика
aseptic асептический
ash зола
ash constituents зольные вещества
assemble собирать(ся); объединяться
atmospheric атмосферный, воздушный
atrium предсердие, атриум
attack поражать (о болезни)
attenuated ослабленный (в вирулентности)

autopsy вскрытие трупа, аутопсия
autotrophic автотрофный
average среднее число; средний; в среднем равняться
avian strain (of tuberculosis) птичий

В

bacillus (pl. bacilli) бацилла, палочка
backbone позвоночник, позвоночный столб, спинной хребет
bacon type of pig свинья беконного типа
bacteriemia бактериемия, наличие бактерий в крови
bacteriology бактериология
bacterium (pl. bacteria) бактерия,
barn амбар; сарай; коровник
basement membrane базальная мембрана
beef говядина
beef extract мясной экстракт; мясной бульон
beet sugar свекловичный сахар, сахароза
belly брюхо, живот
benefit польза; выгода; **be of benefit** способствовать
bile желчь
binominal system система классификации по роду и виду
biological value биологическая ценность
bladder мочевой пузырь

С

caecum (pl. caeca) слепая кишка
calcium кальций
capillary капилляр
capture захватывать
carbohydrate углевод
carbon углерод
carbon dioxide углекислота, углекислый газ
carcass (мясная) туша; труп
carnivorous плотоядный
carrier бациллоноситель; носитель патогенных микробов
cartilage хрящ
case случай, случай в медицинской практике
catalyst катализатор
catching заразный, заразительный (о болезни)

штамм (туберкулеза)
avirulent авирулентный
axis (pl. axes) ось
axon аксон

blood кровь
blood poisoning заражение крови, септицемия
blood serum кровяная сыворотка
bloodstream кровообращение, кровоток
blood vessel кровеносный сосуд
bone кость
bone marrow костный мозг
bone tissue костная ткань
boron бор
break down разрушать; разлагать; расщеплять
breakdown разложение; распад; расщепление
breast грудь; грудинка
breastbone грудная кость
breed порода
breed (bred, bred) разводить; спаривать
breeder животновод
breeding разведение (животных); выведение
breeding-stock племенной скот
bronchi (sing. bronchus) бронхи
bronchiole бронхиола

cattle strain (of tuberculosis) бычий штамм (туберкулеза)
caudal хвостовой
cause причина; вызывать, быть причиной
causative factor возбудитель
cavity полость
cell клетка
cell membrane оболочка клетки
cereals хлебные злаки, зерновые
cervical vertebrae шейные позвонки
chain цепь
chamber камера
cheek щека
chemical composition химический состав
chemical compound химическое соединение
chest грудь; грудная клетка
chew жевать; жвачка
chlorine хлор
chronic хронический

ciliated снабженный ресничками
circuit кругооборот
circulation кровообращение
classificatory system система классификации
cloven-hoofed (animals) парнокопытные (животные)
coating слой
coccus (*pl. cocci*) кокк, шарообразный микроорганизм
colon ободочная кишка
colostrum молозиво
columnar призматический; цилиндрический
communicable disease заразная болезнь, инфекционное заболевание
compare (with) сравнивать
comparison сравнение
compartment отделение; перегородка
complex комплексный, составной, сложный
component составная часть, составной элемент
compose составлять
composition состав
concentrate концентрат, концентрированный корм
concentration концентрация
conclusion заключение; результат
concrete бетон
condition условие; состояние, положение; кондиция, упитанность; состояние здоровья
conformation телосложение; внешние стати

D

dairy breed молочная порода
dairy cow молочная корова
damage повреждение, урон, ущерб
death rate показатель, процент смертности; смертность
debris остатки
decay гнить; разлагаться
decline (in) ухудшение; упадок; спадать; уменьшаться
decompose разлагаться; гнить
decomposer деструктор, редуцент (организм, разлагающий органические вещества)
defense mechanism защитный механизм
definite определенный, точный
deficiency disease болезнь недостатка

conjunction соединение, связь; in
connective tissue соединительная ткань
consume потреблять;
consumption потребление
contagious disease контагиозная болезнь, заразное заболевание
contain содержать, вмещать
container контейнер, вместилище
contaminate загрязнять; заражать
contamination загрязнение; заражение
content содержание, доля, сущность
contract сжимать(ся); сокращать(ся); заражать(ся)
contractile сократительный; сокращающийся
copper медь
cork пробка
cough кашель
cranium (*pl. crania*) череп
criterion (*pl. criteria*) критерий
crop сельскохозяйственная культура, урожай
cross-bred гибридный, смешанный
crude сырой
crude protein сырой протеин
culling отбор; выбраковка
culture культура, выращивание бактерий
curative treatment медикаментозное лечение
cylindrical цилиндрический
cytological цитологический
cytology цитология, учение о клетке
cytoplasm цитоплазма

(какого-либо вещества в пище, в корме)

dendrite дендрит
dense connective tissue плотная соединительная ткань
designate обозначать
deviation отступление, отклонение (от нормы)
diagnosis (*pl. diagnoses*) распознавание болезни, диагноз
diagnostic диагностический
diarrhea диарея, понос
diet диета; пища; рацион
differentiate дифференцировать, различать
diffusion рассеивание, диффузия
digestive tract пищеварительный тракт
digit палец
digital bones кости пальца

dilute разводить, разбавлять
diplococcus (*pl. diplococci*) диплококк
disadvantage недостаток; отрицательная сторона
discover узнавать, обнаруживать, открывать
disease болезнь, заболевание
disinfection обеззараживание, дезинфекция
dissolve растворять(ся)
distinguish различать, распознавать
disturbance расстройство
domesticated домашний, одомашненный

E

early-maturing скороспелый
ectothermic холоднокровный
efficiency эффективность, действенность
efficient эффективный, действенный
elaborate вырабатывать; развивать
elbow локоть
eliminate устранять; уничтожать, ликвидировать; выделять
elongated продолговатый, вытянутый
embryo эмбрион, зародыш
endoplasmic reticulum
 эндоплазматическая сеть
endothelium эндотелий
endothermic эндотермный, теплокровный
engulf поглощать, пожирать
ensure обеспечивать, гарантировать
enteritis воспаление кишок, энтерит
entrance вход; доступ; gain entrance получить доступ
envelope оболочка
enzyme фермент, энзим
epidemic эпидемический; эпидемия
epidemiologist эпидемиолог
epidermis эпидерма, эпидермис
epithelial tissue эпителиальная ткань
epithelium эпителий

F

facial bone кость лица
faeces фекалии, каловые массы
family семья, семейство; (*биол.*) семейство
fat жир; жирный, тучный
fatal смертельный
fatness жирность; упитанность

domestication приручение (животных)
dormant stage состояние покоя
dosage дозировка; доза
dose доза; порция, доля; дозировать
drug лекарство
dry matter сухое вещество
dual purpose двойного направления; комбинированный
duct проток, канал
duodenum двенадцатиперстная кишка
duplicate удваивать; размножаться

epizootic эпизоотический; эпизоотия
eradication искоренение; уничтожение, ликвидация
erythrocyte эритроцит, (красное) кровяное тельце
essential существенный; необходимый;
evaluate оценивать
examine осматривать, исследовать
examination исследование; осмотр
excess излишек, избыток
excessive чрезмерный
excitability возбудимость
excitable возбудимый
excite возбуждать
excitement возбуждение, волнение
excretion выделение
excretory wastes продукты выделения
exhibit показывать, обнаруживать, проявляться
expiration выдыхание; окончание, истечение(срока)
expose (to) выставять; подвергать воздействию (солнца)
exposure подвергание воздействию (температуры, солнца и т.п.)
exterior внешняя среда
external внешний; наружный

fat-soluble жирорастворимый
fatten жиреть; откармливать
fatty acid жирная кислота
feature характерная черта, свойство, особенность
feed (*fed, fed*) питать(ся), кормить (ей);
feedback обратная связь
feeding кормление; питание

feeding stuff корма; кормовые вещества
feeding value кормовая ценность
female самка, матка; женского пола
ferment вызывать брожение, сбраживать, ферментировать
fermentation брожение, ферментация
fertilization удобрение (почвы), оплодотворение, опыление
fertility плодородие
fiber волокно, нить

G

gain прирост
weight gain суточный привес
gall bladder желчный пузырь
ganglion ганглий (нервный) узел
generation
gene ген
generation генерация, поколение, род, потомство
genesis возникновение, происхождение
genital генитальный, половой

H

heat нагревать(ся), согревать теплота, жар; температура
heifer телка, нетель
helical спиральный, спиралевидный
herbage травы, травяной покров
herbivorous травоядный
herd стадо
hereditary наследственный

I

identification определение, установление
ileum подвздошная кишка
immune иммунный
immune serum (*pl. sera*) иммунная сыворотка
immunization иммунизация
immunize иммунизировать
improve улучшать; улучшать породу, разводить
improvement улучшение; улучшение

filamentous волокнистый; нитевидный
film пленка
fission деление клетки
flagellum (*pl. flagella*) жгутик
flea блоха
fluid жидкость, жидкий, текучий
fluid tissue жидкая ткань
focus (*pl. foci*) очаг болезни, фокус

genom (e) геном
genus / *pl. genera* род
gill жабра
gilt подсвинок, молодая свинья
gland железа
glandule желёзка
gnat комар, кровососущее насекомое
grain зерно, хлебный злак, зернышко
ground water подземные воды
grasp схватывать, захватывать
grass трава, злак, злаковые травы
growth рост, развитие, произрастание

heredity наследственность
hog-raising farm свиноводческая ферма
hoof копыто
hormone гормон
horn рог
hornless безрогий, комолый
host хозяин (паразита), макроорганизм
human strain (of tuberculosis) человеческий штамм (туберкулёза)
Hydrogen водород
hygiene гигиена

породы, разведение породы
inanimate неживой
incubation инкубационный период; выращивание (бактерий)
indicate показывать; указывать; служить признаком; означать
indication признак, симптом
individual индивид, индивидуальный
induce вызывать; обуславливать
inevitable неизбежный, неминуемый
infant младенец, ребенок
infantile paralysis детский паралич
infect заражать, инфицировать
infection заражение, инфекция; зараза; заразительность

infectious disease заразное заболевание, инфекционная болезнь
infestation заражение паразитами, инвазия; загрязнение
inflammation воспаление
ingesta содержимое рубца
ingestion прием внутрь, проглатывание, поедание
ingredient составная часть, ингредиент
inhale вдыхать
inherent врожденный
inhibit препятствовать; задерживать(ся)
initial начальный; первоначальный
initiate положить начало; вызывать; побуждать
injection инъекция, впрыскивание
injure вредить; повреждать
injury повреждение
inoculation искусственное заражение; прививка
inorganic неорганический
inorganic salt неорганическая соль
insoluble нерастворимый
insufficient недостаточный; неудовлетворительный
insulate изолировать, отделять
insulation отделение, (термо)изоляция

J

jab толчок; укол
jaw челюсть
jejunum тощая кишка

K

kidney почка; почечный
kidney stones почечные камни

L

laboratory animal лабораторное животное, подопытное животное
lack недостаток, отсутствие чего-либо
lactation лактация
large intestine толстая кишка
locomotion передвижение
lower lip нижняя губа

M

macroscopic макроскопический, видимый

intake прием внутрь
integrate соединяться; объединяться
integument кожа, наружный покров
interaction взаимодействие, совместное действие
intercellular межклеточный
intestinal parasite кишечный паразит
intoxication отравление, интоксикация
invade вторгаться; поражать болезнью; инвазировать, заселять
invasiveness заразительность, инвазионность
invertebrate беспозвоночный; беспозвоночное животное
invisible невидимый
involuntary непроизвольный
involve заключать в себе; впутывать, вовлекать;
be involved поражаться (болезнью)
involvement вовлечение; поражение
iodine йод
iron железо
irradiate облучать
irritability возбудимость; раздражимость
isotonic изотонический, имеющий одинаковое осмотическое давление

jeopardize подвергать опасности, рисковать
Jersey (английская) джерсейская порода молочного скота
joint соединенный; общий; сустав

knee колено; запястье

lubricate смазывать
lumbar vertebrae поясничные позвонки
lungs лёгкие
lymph лимфа
lymphatic лимфатический
lymph node лимфатический узел
lymphocyte лимфоцит
lythic cycle литический цикл
lysogenic cycle лизогенный цикл

простым глазом
magnesium магний
magnitude величина; степень; сила
maintain поддерживать; содержать;

сохранять
maintenance поддержание (жизни);
 сохранение; содержание (животных)
mammal млекопитающее животное
mammary gland молочная железа
mammary system система молочных
 желез
mammary tissue ткань молочной железы
management управление; содержание и
 уход (за животными)
mandatory slaughter принудительный
 убой (животных)
manifest обнаруживать; обнаруживаться
manure навоз
manure disposal уборка навоза
marrow костный мозг
mating спаривание, случка
matter материя, вещество
mature зрелый, спелый; созревать
maturity зрелость
mean средний
meat extract мясной бульон
medical treatment врачебное,
 медикаментозное лечение
medicine медицина; лекарство,
 медикамент
medium (*pl. media*) среда; питательная
 среда; средний, умеренный
Merino меринос (порода овец)

N

nail ноготь, коготь; гвоздь
naked eye невооружённый глаз
nasal cavity носовая полость
natural flora обыкновенная
 (микро)флора
necessity необходимость
neck шея
necrosis (*pl. necroses*) некроз, омертвление
nematode круглый червь, нематода
nerve fibre нервное волокно
nerve tube нервная трубка
neural arch невральная дужка, дуга
 позвонка
neuron нервная клетка, нейрон

O

observance соблюдение
observe наблюдать
obtain получать, добывать, приобретать
occasion случай; вызывать; причинять

metabolism обмен веществ, метаболизм
microbiology микробиология
microdissection рассечение под
 микроскопом
micron микрон
milker доярка, дояр; молочная корова
milk flow удой молока
milk sugar молочный сахар, лактоза
milk vein молочный сосуд, молочная вена
milk-yield удой молока; удоиливость,
 молочная продуктивность
mitochondria митохондрия
mixture смесь
mobility подвижность
mold плесень; плесневой грибок
molecule молекула
molybdenum молибден
motility подвижность, способность к
 самопроизвольному движению
moult линька
movement движение
mucosa слизистая оболочка
multiply увеличиваться; размножаться
muscle мышца, мускул
muscular мышечный; мускульный,
 мускулистый
muscular tissue мышечная ткань
mutton баранина

nickel никель
nitrogen азот
nitrogenous азотный, азотосодержащий
node узел
non-communicable disease болезнь, не
 передающаяся путем контакта
non-infectious disease незаразная болезнь,
 незаразное заболевание
nonliving неживой
nourish питать
nuclear ядерный
nuclear membrane ядерная оболочка
nucleus (*pl. nuclei*) ядро
nutrient питательное вещество
nutrient solution питательный раствор
nutrition питание; кормление

occur случаться, происходить,
 встречаться
occurrence встречаемость, наличие;
 распространение
odour запах, аромат
oesophagus пищевод

offal потери при убое; субпродукты
offspring потомок
ointment мазь
omasum книжка (третий желудок у жвачных)
omnivorous всеядный
onset начало; вспышка, проявление (болезни)
oral cavity ротовая полость
orbital cavity глазная впадина
order (биол.) отряд

Р

pain боль; страдание
pancreas поджелудочная железа, панкреас
pancreatic juice сок поджелудочной железы
parasite паразит
parasitic disease паразитарная болезнь,
pasture пастбище; пасти(сь)
path of infection путь инфекции
pathogenic патогенный, болезнетворный
pathogenicity патогенность, болезнетворность
pathological патологический, болезненный
patient пациент, больной
pedigree родословная; поколение предков; происхождение
pelvic girdle тазовый пояс
реп загон
penetrate проникать внутрь, проходить сквозь
percentage процент, процентное отношение
perform исполнять, выполнять, совершать
performance исполнение, выполнение;
per head на каждого; на животное
permeable проницаемый
phagocyte фагоцит
phagocytosis фагоцитоз
pharynx глотка
phosphorus фосфор

origin происхождение
originate происходить
oscillatory movement колебательное движение
osmosis осмос
outbreak взрыв; вспышка (эпидемии)
oxidation окисление
oxide of zinc окись цинка
oxide of zinc ointment цинковая мазь
oxidize окисляться
oxygen кислород

physiochemical физико-химический
physiology физиология
piglet поросёнок
pigsty свинарня; свинарник
pneumonia воспаление лёгких
poison яд; отравлять
pollution загрязнение
pork свинина
potassium калий
poultry домашняя птица
pregnant беременная
prevention предотвращение, предохранение; профилактика
preventive предотвращающий, профилактический
processing обработка; стерилизация продукта
produce производить; продуцировать; вызывать
progeny потомок; потомство, приплод
prohibit запрещать
prone (to) склонный (к чему-либо)
propel приводить в движение
protein протеин, белок
protoplasm протоплазма
protozoa (мн.) простейшие, простозоа
pseudostratified ciliated epithelium многорядный мерцательный эпителий
pulse пульс, биение
pulverized aloes порошок алоэ
pure-bred чистопородный; чистопородное животное

Q

quarantine карантин, изоляция; держать в карантине, изолировать
quarter помещение

R

rabbit кролик
race порода; порода
raw material(s) сырьё
reagent реактив
reception приём, принятие; восприятие
receptor рецептор
recover поправляться, выздоравливать;
recovery выздоровление; восстановление
rectum (*pl. recta*) прямая кишка
recumbency лежачее положение
reduction снижение, понижение, уменьшение; вправление (кости)
reproduce размножаться
reproduction размножение
reservoir of infection источник, очаг инфекции, резервуар

S

sacral крестцовый
safety безопасность
saliva слюна
salivary gland слюнная железа
sanitary санитарный
sanitation улучшение санитарных условий, санация; санитария
sauerkraut кислая капуста
secretion секреция, выделение
secretory секреторный
semipermeable полупроницаемый
semifluid полужидкий
septicemia септицемия, гнилокровие
shed сарай; навес
shell скорлупа, шелуха; раковина
shoulder плечо; лопатка, передняя ножка; лопаточная часть
sign признак; симптом
significance важность; значение
silage силос, силосованный корм
silica кремний
simple cuboidal epithelium однослойный кубический эпителий
simple protein простой белок
simple squamous epithelium однослойный плоский эпителий
skeleton скелет

resemble походить, иметь сходство
residues остатки
resorption поглощение; всасывание
respiration дыхание
respiratory дыхательный
respiratory passages дыхательные пути
retard замедлять, задерживать
respond отвечать, реагировать
retention удерживание, сохранение; задержание
reticular tissue ретикулярная ткань
reticulum сетка, преджелудок (жвачных)
rumen рубец (первый отдел желудка жвачных)
ruminant жвачное животное
rib ребро
rickets рахит
roundworm круглый червь

skull череп
slaughter убой (скота); забивать (животных)
small intestine тонкая кишка
smallpox оспа
smear мазок
smooth muscle гладкая мышца
sneeze чиханье; чихать
sodium натрий
sodium chloride хлористый натрий, поваренная соль
solid твердый
soluble растворимый
solution раствор
somatic телесный, соматический
sow свиноматка
species биол.вид, виды; род, порода, разновидность
specimen образец; экземпляр; представитель
spherical сферический
spleen селезёнка
spoiled испорченный
spring прорасти; давать побеги; бить ключом; ключ, родник, источник
sporadic disease спорадическое заболевание, единичное заболевание
spore спора
spread распространение;

распространять(ся)
squamous чешуйчатый
stable стойло, конюшня
stain краска, цвет; красить, окрашивать
starch крахмал
sternum грудная кость
stimulus (pl. **stimuli**) раздражитель,
возбудитель, побудитель, стимул

T

teat сосок
temple висок
terrestrial земной, сухопутный
tetanus столбняк
thigh бедро; бедренная кость
thoracic cavity грудная полость
thoracic vertebra грудной позвонок
thorax грудная клетка
throat горло
tincture настойка, тинктура
tincture of iodine настойка йода
tissue ткань
toe палец на ноге; копыто (передняя часть копыта)
toxic ядовитый, токсический

U

udder вымя
ultimate первичный, основной
ultraviolet rays ультрафиолетовые лучи
undergo (underwent, undergone)

V

vaccinate вакцинировать, делать прививку
vaccination вакцинация, прививка
vasomotor вазомоторный
vegetal растительный
vegetative nervous system вегетативная нервная система
vena вена
venous венозный
ventral ventральный, брюшной
ventricle желудочек

storage хранение
strain штамм; род порода; линия
stratified squamous epithelium многослойный плоский эпителий
straw солома; соломина
streptococcus (pl. **streptococci**) стрептококк
striated полосатый

toxin токсин, ядовитый продукт бактерий
trace mineral микроэлемент
trachea трахея
transfer переносить; передавать
transmissible передающийся
transmit передавать, переносить
transparent прозрачный
traumatic pericarditis травматический перикардит
true stomach собственный желудок, железистый желудок
trunk туловище
tuberculosis of cattle туберкулёз крупного рогатого скота
tubular трубчатый
tumor опухоль
turtle черепаха
type тип, вид

испытывать, подвергаться
unicellular одноклеточный
urea мочеви́на
ureter мочеточник
urine моча
urogenital мочеполовой

vertebra (pl. **vertebrae**) позвонок
vertebral column позвоночник, позвоночный столб
vertebrate позвоночное животное
veterinarian ветеринарный работник, ветеринарный врач
veterinary medicine (science) ветеринарная медицина (наука)
veterinary surgeon ветеринарный врач
veterinary surgery ветеринарная хирургия; ветеринария

vigorous сильный, энергичный
vinegar уксус
virulence вирулентность, ядовитость
virus вирус
viscera внутренности
visceral висцеральный, внутренностный, относящийся к внутренностям

visible видимый
vital жизненный, жизнеспособный, витальный
vitamin deficiency авитаминоз
volume объём
voluntary произвольный
vomiting рвотная масса; рвота

W

waste потеря
waste products выделения, отходы
water-soluble водорастворимый
wax воск
weed сорная трава
whip-like жгутообразный; нитеобразный

wholesome полезный; здоровый
withers загривок; холка
withstand (withstood, withstood) противостоять; устоять; выдерживать
witness свидетельствовать; служить доказательством
wool шерсть
wrist запястье

X

X-ray рентгеновы лучи; просвечивать, исследовать рентгеновыми лучами
X-ray therapy рентгенотерапия

Y

yeast дрожжи; дрожжевой грибок
yellow maize жёлтая кукуруза
yield производить, давать (урожай); урожай
yolk желток

Z

zinc цинк
zoo зоопарк
zoology зоология

Список литературы

References

1. Английский язык = English : учебное пособие для студентов высших учебных заведений по специальностям «Ветеринарная медицина», «Зоотехния» / А. И. Картунова, И. Е. Калишук, Т. К. Васильева, Т. Н. Крученкова. – Минск : ИВЦ Минфина, 2018. – 368 с.
2. Англо-русский биологический словарь / О. И. Чибисова, Н. Н. Смирнов, С. Г. Васецкий [и др.] ; под общ. ред. О. И. Чибисовой. – Москва : Руссо, 2000. – 736 с.
3. Болотина, А. Ю. Англо-русский и русско-английский медицинский словарь / А. Ю. Болотина, Е. О. Якушева. – 3-е изд. – Москва : Руссо, 2001. – 544 с.
4. Дроздова, Т. Ю. English Grammar. Reference and Practice: учебное пособие / Т. Ю. Дроздова, А. И. Берестова, В. Г. Маилова. – 11-е изд., испр. – Санкт-Петербург : Антология, 2012. – 464 с.
5. Словарь ветеринарных терминов на 4-х языках. Английский, немецкий, французский, русский : около 13000 терминов / под общ. ред. Г. Ильхмана. – Москва : Аст : Астрель, 2003. – 414 с.
6. Korshuk. E. English for Environmental Science / E. Korshuk. – Uppsala : The Baltic University Press, 2003. – 165 p.
7. Maclin, A. Reference Guide to English : A Handbook of English as a Second Language / A. Maclin. – New York : Holt, Rinehart, and Winston, 1981. – 405 p.
8. Ettinger, Stephen J. Textbook of Veterinary Internal Medicine / Stephen J. Ettinger, Edward C. Feldman. – USA : W.B. Saunders Company, 2004. – 2 vol.
9. Porter, Robert S. The Merck Veterinary Manual / Robert S. Porter, Justin L. Kaplan. – 19 ed. – Rahway : Merck & Co., Inc, 2011. – 1677 p.
10. Biological Classification // Britannica : [website]. – URL: <https://kids.britannica.com/students/article/biological-classification/611149>. (date of access: 2.02. 2025).
11. Anatomy: Tissues, Membranes, Cell structure // U.S. National Institutes of Health, National Cancer Institute : [website]. – URL: https://training.seer.cancer.gov/anatomy/cells_tissues_membranes/ (date of access: 10.02.2025).
12. Fungi, A living thing that is not a plant or an animal // Brainly : [website]. – URL: <http://brainly.ph> (date of access: 25.01. 2025).

Учебное издание

Крученкова Татьяна Николаевна,
Картунова Алла Ильинична

**АНГЛИЙСКИЙ ЯЗЫК.
ANIMAL SCIENCES**

Учебно-методическое пособие

Ответственный за выпуск Т. Н. Крученкова
Технический редактор Е. А. Алисейко
Компьютерный набор А. И. Картунова
Компьютерная верстка Е. А. Алисейко
Корректор Т. А. Никитенко

Подписано в печать 01.07.2026. Формат 60×84 1/16. Бумага офсетная.
Ризография. Усл. печ. л. 6,00. Уч.-изд. л. 5,48. Тираж 170 экз. Заказ 2650.

Издатель: учреждение образования «Витебская ордена «Знак Почета»
государственная академия ветеринарной медицины».

Свидетельство о государственной регистрации издателя, изготовителя,
распространителя печатных изданий № 1/ 362 от 13.06.2014.

Ул. 1-я Доватора, 7/11, 210026, г. Витебск.

Тел.: (0212) 48-17-70.

E-mail: rio@vsavm.by

<http://www.vsavm.by>

ISBN 978-985-591-308-6

