

**МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ РОССИЙСКОЙ ФЕДЕРАЦИИ**  
**Нижегородский государственный университет им. Н.И. Лобачевского**

**БОТАНИКА И ЗООЛОГИЯ**

**Сборник текстов и заданий по английскому языку**

Практикум

Рекомендовано методической комиссией Института филологии и журналистики  
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Настоящее пособие предназначено для студентов-второкурсников биологических факультетов высших учебных заведений.

Пособие состоит из трех базовых частей: 1) ботаника; 2) зоология; 3) приложение. Части I и II включают в себя тексты обучающего плана по данным направлениям биологии. Ко всем текстам разработана система упражнений лексико-грамматического характера. Лексические упражнения составлены на основе технологии критического мышления и направлены на формирование ряда общекультурных и общепрофессиональных компетенций. Грамматика текстов, отрабатываемая в упражнениях, соответствует грамматическим явлениям, характерным для научных биологических текстов.

Часть III содержит тексты по ботанике и зоологии для самостоятельного изучения студентами и для использования на занятиях по домашнему чтению.

Ответственный за выпуск:

Зам. директора Института филологии и журналистики ННГУ по  
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# BOTANY

## SECTION 1

Grammar:

- Ing-forms;
- Absolute Participle Construction;
- Translation of “the very”.

Reading drills:

[ei]	[au]	[ou]	[ai]
stamen	flower	compose	style
male	thousand	know	like
grain	surround	ovary	rice
contain	powder	process	type

Practice the pronunciation of the words:

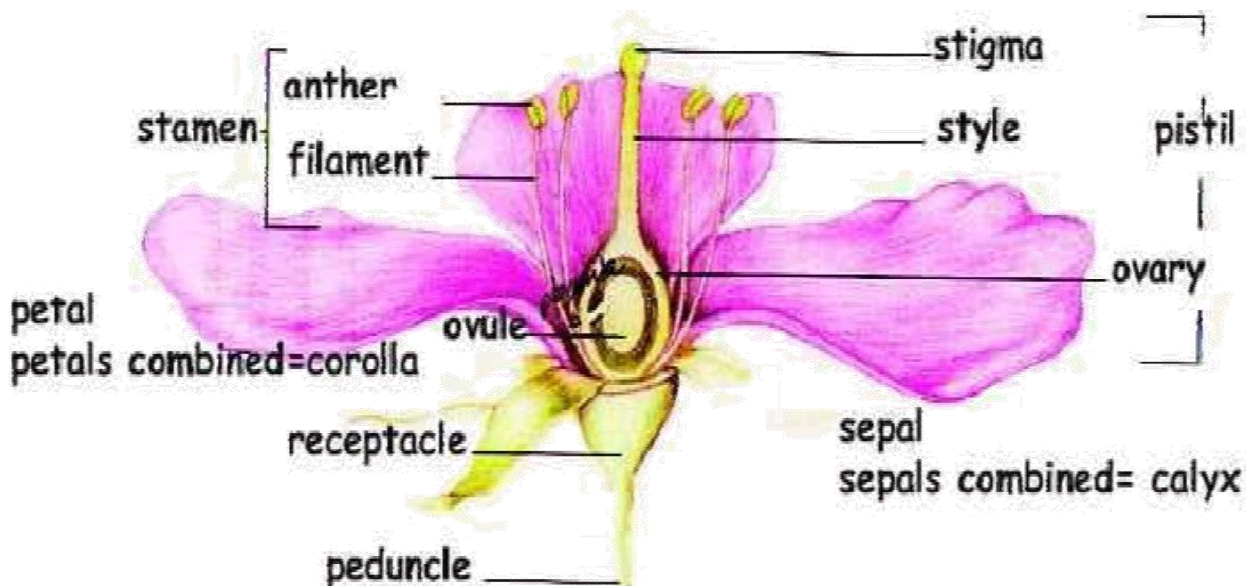
numerous ['nju:mərəs]	enlarged [in'la:dʒd]
stalk [stɔ:k]	style [stail]
anther ['ænθə]	granular ['grænjulə]
certain [sə:tn]	frequently ['fri:kwəntli]
pistil ['pistil]	segment ['segment]
surround [sə'raund]	ovule ['ɒvjul]
distinctly [di'stiŋktli]	

### TEXT

#### The Flower (p. II)

The next part of the flower is “stamens”. They are the male sex organs. The stamens may be very numerous, in some flowers they may be few. Each stamen is composed of a slender stalk or “filament” at the top of which there is a bag-like “anther” which produces pollen grains. Pollen grains are known as pollen. Thousands and even millions of pollen grains are produced in the flowers of certain plants.

The fourth organ is the pistil which usually stands in the very centre of the flower and is therefore, surrounded by the stamens, petals and sepals. The pistil is usually distinctly different from any of the other parts of the flower. Its enlarged base is called the “ovary” and the stalk leading from the ovary is called the “style”. The tip of the style is often granular and it is called the “stigma”. The stigma is frequently cut into two, three or more slender segments. In the pistil there is a well developed cavity and in this cavity one to many ovules are produced. Each ovule usually contains an egg, the female sex organ. The pistil normally develops into a fruit and each ovule develops into a seed.



complete flower = stamens + petals + sepals + carpel  
 incomplete flower: lacking 1+ more of the above

### Active Words

stamen, n. - тычинка,  
 male, a. - мужской,  
 numerous, a. - многочисленный,  
 stalk, n. - стебелек,  
 filament, n. - нить,  
 top, n. - верхушка,  
 anther, n. - пыльник,  
 pollen, n. - пыльца,  
 grain, n. - зерно,

pistil, n. - пестик,  
 ovary, n. - завязь,  
 style, n. - столбик,  
 tip, n. - кончик,  
 stigma, n. - рыльце,  
 cavity, n. - полость,  
 contain, v. - содержать,  
 female, a. - женский,  
 seed, n. - семя.

### Exercises

#### I. Specify nouns, verbs and adjectives:

Numerous, produce, sex, usual, production, sexual, frequent, development, develop, divide, division.

#### II. Translate the following word-combinations:

Slender stalk, pollen grain, certain plant, sex organ, granular tip, grain production, distinct structure, flower development, flower centre, normal development.

#### III. Translate the following sentences into Russian:

1. The daisy is a small wild and garden flower. It has a yellow centre and white petals. The name of this much-loved flower means Days Eye: the flower opens its eye to the day. A daisy is like a little sun with rays of silver, heart of gold, and when the

summer day is done its red-tipped petals droop and fold.

2. The iris has a peculiar history. The Greeks believed this flower to be the personification of the rainbow and gave it the name of the goddess of the rainbow. The iris was used for making scents and powders.

3. Orchids are exotic flowers of fantastic shapes and brilliant colours. They are remarkable for the unusual shapes of their flowers which are so varied in form that there is hardly a reptile or insect to which some of them have not been compared.

#### IV. Translate the sentences with active words:

1. Stamen is a male part of a flower, it bears pollen. 2. A stalk is non-woody part of a plant that supports a flower or flowers, a leaf or leaves, or a fruit.

3. Filament is a slender thread, e.g. the filament of wire in an electric lamp bulb.

4. Grains are seeds of food plants such as wheat or rice. 5. Pollen is fine powder (usually yellow) formed in flowers that fertilize other flowers when carried to them by the wind, insects, etc. 6. Tip is a pointed or thin end of something. 7. Cavity is a hole; it is a hollow space, e.g. a cavity in a tooth.

#### V. Translate the following into English:

а) цветоножка, чашелистик, лепесток, тычинка, пестик, оплодотворение, нить, пыльник, завязь, столбик, рыльце, полость, семязпочка, клетка, стебелек, завязь.

б) половое размножение, тонкие сегменты, основные органы, второстепенные органы, некоторые растения, каждая тычинка, важная роль, типичный пример, растворимые соединения.

в) Почти все растения продуцируют цветки. Цветок - это сочетание органов, которые делают возможным половое размножение. Анатомически цветок - это видоизмененный стебель. Главными органами являются пестик и тычинка. Лепестки и чашелистики - это второстепенные органы. Они играют важную роль при опылении и оплодотворении. Пестик находится в самом центре цветка. Он окружен тычинками, лепестками и чашелистиками. Пестик состоит из завязи, столбика и рыльца. Части тычинок - нить, пыльник. Пыльник дает тысячи и даже миллионы пыльцевых зерен.

#### VI. Translate the text without a dictionary

The roots, stems, leaves, and reproductive structure of plants are all derived originally from apical meristems.

We will focus on the primary growth of roots, stems and leaves, exploring how these organs in vascular plants develop and function together.

Vascular plants that live only one year or two years, called annuals and biennials, often have only primary growth. Those that live longer, called perennials, add new primary growth every year, lengthening shoots and roots and also replacing damaged or dead tissue. Although many perennial plants such as trees and shrubs have secondary growth, a few trees, such as palms, consist solely of primary growth.

That is, they have no lateral, or secondary, meristems.

In a sense, primary growth is about getting from one place to another. Plants cannot move through their environment as animals do, but they can grow through their surroundings to obtain what they need. Roots absorb water and mineral nutrients by growing through the soil to new regions of resources from regions that have been depleted. Meanwhile, stems and leaves acquire the solar energy needed for photosynthesis by growing toward regions of greater illumination.

The growth of roots, stems, and leaves is interrelated. For example, seedlings usually have more roots than shoots because a germinating seed contains a supply of food but needs water for elongation to allow the photosynthetic shoot to develop. As photosynthesis becomes the main source of the plant's food, the root-to-shoot ratio is reduced. Throughout a plant's life, the ratio of shoots and roots changes as necessary so that the light and CO<sub>2</sub> collected by leaves enter the plant in the correct proportion with the water and minerals collected by roots.

Evolutionary changes have resulted in modified roots, stems, and leaves that have contributed to survival in various environments. In some plants, for instance, enlarged roots and stems have evolved that store water, helping the plants to survive droughts, dry seasons, or dry climates. Roots and stems may also store food, producing reserves that can be used when decreases in photosynthesis results from shading or from leaf damage by wind, cold, disease, and predation.

Sometimes modified leaves fulfill unusual roles, as in the case of plants like the Venus's flytrap, which "eats" insects to compensate for lack of nitrogen in the soil.

In short, roots, stems, and leaves do not function in isolation but instead work together, not only in producing, transporting, and storing nutrients but also in providing structural support and protection for the plant.

*Assignment: Make up a summary of the text.*

VII. Pay attention to the translation of "the very" in the following sentences:

1. This is the very thing I wanted. I've put it in this very place. 2. We met him on that very day. 3. His very absence at the party was eloquent. 4. This was the very process he was interested in. 5. That was the very structure I was looking for.

VIII. Analyse the function of ing-forms. Translate the sentences into Russian:

1. Many people now consume commercial vitamin preparations when there is no medical reason for doing so. 2. Antivitamins are substances with molecules closely resembling those of vitamins but lacking their activity and interfering with their action. 3. There is one basic difference between growth of a crystal and growth of a living organism. 4. The crystal grows by accumulating from its surroundings units that are already identical to those of the crystal. The living organism, on the other hand, grows by transforming materials that are not unique to it into those that are. 5. One of the first estimates of the age of the earth was based on the increasing salinity of the ocean.

IX. Translate word-combinations making difference between Present and Past

Participles:

importing countries - imported materials,  
exploiting classes - exploited classes, increasing  
production — increased productivity,  
burning paper, heated air, air heated by the sun, a broken tree, a tree broken  
during the storm.

X. Translate the following sentences with Absolute Participle Construction:

1. Mendeleev having given the world the Periodic Table of elements, chemistry made great progress. 2. Bequerev having discovered radioactivity, scientists received a means of studying and explaining the structure of the atom. 3. The boiling point having been reached, the temperature of the water cannot be increased any more. 4. There being nothing else to do in the laboratory, we went home. 5. The true size of the Earth and the true distance to the Moon having been calculated, Newton solved the problem of universal gravitation. He discovered the laws of motion, these laws being the basis of practical mechanics. 6. The Antarctic has its own micro-organisms, unique insects and ticks, the edge of the continent being inhabited by birds (penguins).

XI. Read the text. Formulate the main idea of it in 5 sentences:

**Black Pepper: Savior of Rooting Meat**

It might surprise you to learn that European settlement of the Americas came about largely as a result of the search for black pepper and other spices.

Black pepper comes from the dried, ground fruits of the shrub *Piper nigrum*, native to the Malabar Coast of southwestern India. The fruits are green and have a white interior, with the black coating resulting from fungal action.

Why was pepper so important? In those pre-refrigeration days, salt preserved meat by keeping bacteria and fungi generally at bay, but this also made the meat largely inedible. Adding spices such as black pepper made salted meat palatable, which is why sailors often carried great bags of peppercorns.

During the Middle Ages, traders brought spices from Asia to Europe along trade routes through the Middle East. Caravans of camels laden with black pepper, cloves, cinnamon, nutmeg, ginger, and other spices had been making the trip for a thousand years. Beginning in 1470, however, the Turks blocked these overland routes, and Europeans looked the ocean for an alternate passage to Asia. Christopher Columbus won financial support from the Spanish Court to seek a new route to China and India. Landing to the Caribbean, he believed he had reached islands off the coast of India, referring to the inhabitants as “Indians” and the islands as the “Indies”.

Although he found no black pepper, it is not surprising that the spicy hot fruits he did find were later known as “peppers”, even though they were members of the genus *Capsicum*, an entirely different group of plants. Today we distinguish between the two plants by calling one black pepper and the other hot peppers, such as *jalaperios* and *habaneros*.



XII. Read the text. Give a short summary:

Men of science thought much over the origin, nature and classification of plants since ancient times. Agricultural and medical needs stimulated this interest in plants and led to attempts to name and classify them.

Numerous writers of ancient times described certain plant characteristics and catalogued many properties of plants. Thus Theophrastus was one of Aristotle's pupils. He described about 450 cultivated plants. Theophrastus considered trees to be the very highest expression of plant development and he placed them at the top of the plant world. Nearly twenty centuries later Linnaeus wrote of Theophrastus as the "father of botany".

Pliny wrote nine books on useful plants in which he presented many details for the cultivation of certain plants.

The good work that had been done by Theophrastus and contemporaries was lost and forgotten during the long period of the Middle Ages.

XIII. Questions for Thought and Discussion:

1. Why do you think many people take plants for granted? How would you respond to them?
2. Explain what is meant by the statement "Plants do not need us, but we need plants".
3. In what sense would you say that plants also need us?
4. Some people argue that all foods should be labeled to indicate whether they contain genetically modified ingredients. Do you agree? Explain.

## SECTION 2

Grammar:

- Ing-forms;
- Participle Constructions;
- Translation of “some”, and “same”;
- Translation of “one” in different functions;
- Verbal noun.

### TEXT

#### Pollination

By pollination we mean the transfer of pollen grains from anther to stigma in flowers. It is one of the most varied, important and interesting phases of the work of flowers. And yet the plant in itself may have little to do with this process directly, because pollination is often brought about by some external agency such as wind or water, or even by a totally separate organism such as a bee, moth or bird.

One might naturally suppose that pollen produced by a given flower would pollinate that flower and that the sperms produced by certain of those pollen grains, would fertilize the eggs in the ovules of the same flower. This would be self-fertilization. This actually happens in certain species but it is not by any means the rule among flowering plants. The vast majority of flowering plants develop so that self-fertilization is prevented. The fact is that cross-pollination and therefore usually also cross-fertilization is the rule among flowering plants.

#### Active Words

mean, v. - означать, подразумевать,	separate, a. - отдельный,
meaning, n. - значение,	the same, a. - тот же самый,
transfer, n. - перенос,	by no means, - ни в коем случае,
bring about - осуществлять,	by any means, - в любом случае,
external, a. - внешний, наружный,	prevent, v. - предотвращать,
internal, a. - внутренний,	in itself- сам по себе,
separate, v. - отделять,	rule, n. - правило.

#### Exercises

##### I. Translate, paying attention to the prepositions:

- a) by an organism, by wind, by pollination, by pollen grains, by natural decay;
- b) into the cavity, into the cell, into the structure, into the seed;
- c) for the production, for the development, for the transfer, for the pollination;
- d) to the root, to the top, to the leaves, to the stamens and petals, to the pistil.

##### II. Note the difference between “some” and “same”:

1. Some flower, some process, some organism; the same flowers, the same rule, the same means.

2. Here are some texts with some exercises, some of them are difficult. All the students must read the same texts, learn the same words, do the same exercises. Some students make the same mistakes.

III. Translate the following word-groups into Russian:

flower parts	important phase	wind pollination
seed development	external agency	water pollination
plant structure	separate organism	particular difference
certain grains		
This phenomenon in itself...	by the same organs...	
The meaning of the word...	his point of view...	
To the very tip of...		

IV. Translate into English:

1. Пыльцевые зерна переносят ветер, вода и насекомые. 2. Перенос пыльцы с пыльника на рыльце называется опылением. 3. Растение само по себе имеет мало отношения непосредственно к опылению. 4. Как правило, опыление производится внешним агентом. 5. В некоторых случаях пыльца, производимая данным цветком, опыляет этот же цветок. 6. В этом случае мы имеем самоопыление и самооплодотворение. 7. Самооплодотворение ни в коем случае не является правилом среди цветковых растений. 8. В большинстве случаев самооплодотворение предотвращается. 9. Правилom среди цветковых растений является перекрестное опыление и перекрестное оплодотворение.

V. Note different functions and translation of "one":

- a) One phase, one phenomenon, one pollen grain, one cell.
- b) Before the reaction starts one must provide for low pressure. One may think... One may (might) suppose... This leads one to regard two problems... One had to find out... One must take into consideration...
- c) This substance reacts 10 times as fast as the other one. The method was much better than the previous one. This flower is the most complicated one. This stem is the shortest one.

VI. Analyse the ing-forms:

1. The analysing of the facts helped the scientist in his work. 2. Analysing the facts is the first stage in the work of a scientist. 3. We realize the importance of the correct pronouncing of the terms. 4. We realize the importance of pronouncing the terms correctly. 5. Introducing the new method into practice requires much time. 6. The introducing of the new method into practice took much time. 7. I am tired of walking. 8. His comings are always quite unexpected.

VII. Translate the sentences into Russian (with Gerund):

1. Oxidation led to the reaction having taken another course. 2. This is due to

the reaction running at a low temperature. 3. There are unmistakable proofs of Pauling's having been wrong. 4. We have already referred to the reaction having resulted in alkanes. 5. This was due to the central atom being screened.

VIII. Translate the following sentences with Absolute Participle Constructions:

1. The weather being fine, we went for a walk. 2. The lecture was put off, the professor being ill. 3. The goods having been unloaded, the workers left the port. 4. My task being finished, I went home, 5. Peter being ill, Alexander had to do his work. 6. It being very cold, they made a fire. 7. Every thing was clearly visible, the moon being bright. 8. The preparations being over, they began to climb up the mountain.

IX. Read and translate the text without any dictionary:

The flowers of most species of flowering plants possess both stamens and pistils and also petals and sepals. Such flowers may be termed "complete" since they have all four of the regular organs that are characteristics of flowers.

Many different species of flowering plants produce flowers that lack one or more of the four regular parts. For instance certain flowering plants are known which do not have petals or sepals. In a number of groups there are species in which sepals and petals are lacking but the stamens and pistils are present. These flowers may be called "incomplete" but "perfect", since they still possess the essential organs, the stamens and pistils. There are still other flowering plants in which the staminate and pistillate flowers are formed on totally separate individuals of the species. The individuals are strictly differentiated on a sexual basis, i.e. they are males and females. This condition is more common among flowering plants than is popular known, and it explains why every individual plant does not produce fruits and seeds.

X. Translate the text with the help of a dictionary:

**Nature of Wind-pollinated Flowers**

Wind-pollinated flowering plants are commonly characterized by flowers that are inconspicuous because of their size or lack of nectar or odor and brilliant colours, and by the production of a great number of dry or oily powdery pollen. The stigmas of such flowers are often much branched, feathery or hairy. These details assist in the catchment of greater numbers of pollen grains than would otherwise be possible. The minute size and lightness of pollen grains contribute to the ease with which they are carried by the wind. Uncountable numbers of wind-carried pollen grains never reach the flowers and so are lost without performing their function. Many anomophyllous species could greatly reduce the amount of pollen produced and still they are not weakened, or threatened by extinction.

XI. Translate the text with the dictionary. Retell it using the key words printed in thick letters:

Before fertilization can occur in a seed plant, pollination must take place. In seed plants, the male gametophytes are **pollen grains**, collectively known as **pollen**.

The process of transferring pollen from the "male" part of a plant to the "female" part of the plant is known as **pollination**. Keep in mind, though, that pollination does not guarantee fertilization. In order for fertilization to take place, a sperm produced by a pollen grain must unite with an egg in the female part of a seed plant. Each egg is contained in a structure called an **ovule** (Latin ovulum, "little egg"). Fertilization does not immediately follow pollination and might not take place until months later, if at all. If fertilization does occur, the ovule will develop into a seed.

Some species of seed plants are capable of **self-pollination** because the male and female gametophytes are on the same plant. In most gymnosperm species, for instance, the male and female gametophytes are on different cones on the same plant. In most angiosperm species male and female gametophytes are not only on the same plant but also on the same flower. In some angiosperm species, the male and female gametophytes are on different flowers of the same plant. Such species are said to be **monoecious** (from the Greek words for "one house") because each plant has both male and female flowers. Pumpkins and corn are examples. By contrast, in some angiosperm species the male and female flowers are on different plants. Such a species is called **dioecious** (from the Greek words for "two houses"). In a dioecious species, pollination can only occur through **cross-pollination** between separate plants. Marijuana (*Cannabis sativa*) and willows (species of the genus *Salix*) are examples of dioecious species.

XII. Read the following text. Give a short summary:

### **Poisonous Plants**

Some plants, if eaten, affect a certain organ or organs of the body only, though they do not cause serious harm. As an example may be mentioned some varieties of the sunflower family which cause cirrhosis in man and animals, and prevent the liver from carrying on its normal functions.

Certain plants (some of the yams) are poisonous to man and animals in the fresh state, but lose their toxicity when dried or cooked, and are used as articles of food.

Several plants, for example potatoes, which provide valuable food for animals, at the time of sprouting produce poisonous substances which may be deadly. Many plants such as chickling vetch give rise to pathological conditions when fed in large doses over long periods. Belladonna is nightly poisonous to several animals but rabbits can withstand it in large quantities.

## SECTION 3

### Grammar:

- Ing- forms;
- Absolute Participle Construction.

*Practice the pronunciation of the following words:*

consequence ['kɒnsɪkwəns]

fertilization [ˌfɜːtɪlaɪ'zeɪʃən]

transformation [ˌtrænsfə'meɪʃn]

wither ['wɪðə]

broad [brɔːd]

feature ['fi:tʃə]

mature [mə'tjuə]

enormous [ɪ'nɔːməs]

coconut ['kəʊkənət]

watermelon ['wɔːtəmelən]

exhibit [ɪg'zɪbɪt]

texture ['tekstʃə]

scarcely ['skeəslɪ]

embryo ['embriə]

agent ['eɪdʒənt]

### TEXT

#### Fruits and seeds

One of the most important consequences of fertilization is the transformation of ovaries into fruits and ovules into seeds, each seed containing a partially developed new plant or embryo. The ovary withers and dies as a rule if fertilization does not occur.

The word “fruit” has a broader meaning in plants than is reflected in the popular use of the term. The development and structure of fruits may be understood best from a study of the flower parts from which they develop. The features of the ovary may be recognized in many mature fruits, even in such enormous ones as the coconut and watermelon.

Fruits exhibit a great variety of size, colour, shape, texture, number, etc. Some fruits are so small as are scarcely visible to the unaided eye. But others are enormous.

A seed is produced as a result of the fertilization of an egg within the embryo sac of the ovule. There may be as many seeds matured as there are ovules, but that seldom happens. The difficulties surrounding pollination and fertilization prevent the development of many ovules into seeds. The seeds are so characteristic of the plant that they are very useful agents in the classification of plants.

#### Active Words

transform, v. - преобразовывать,

transformation, n - преобразование,

wither, v. — увядать,

occur, v. - происходить, случаться,

feature, n. - черта, характер,

mature, a. - зрелый,

enormous, a. — огромный,

coconut, n. - кокосовый орех,

watermelon, n- арбуз,

size, n - размер,

shape, n - форма,

texture, n- ткань,

etc. - и т.д.

visible, a- видимый,

useful, a- полезный,

useless, a- бесполезный.

## Exercises

### I. Translate the following word-groups into Russian:

1. One consequence, one pistil, one ovary. 2. One may think, one may suppose, one must consider. 3. Partially developed plant, fundamentally transformed ovary, fully ripened ovary, mostly stored food. 4. May be recognized, may be considered, may be supposed, may be prevented, may be protected.

### II. Find Russian equivalents to the following sentences:

1. "To transform" means to change the shape, size, quality, appearance, etc. 2. "Transformer" is an apparatus that transforms electric current from, one voltage to another. 3. "To wither" is to become dry, faded or dead. So, flowers wither, the hot summer withers the grass. Sometimes our hopes may wither. 4. Which letter of the alphabet occurs most commonly? When did the idea occur to you? 5. As a rule one knows the geographical features of the district he lives in. 6. "Mature" means ripe, fully grown or developed, carefully thought of; ready for use.

### III. Find English equivalents to the following word-groups:

1. Внешний вид, внутреннее строение, многочисленные тычинки, дополнительные части, огромный размер. 2. Требовать, означать, осуществлять, отделять, вянуть. 3. Полезный - бесполезный, видимый - невидимый, важный - неважный, внутренний - внешний, зрелый - незрелый.

### IV. Translate the following sentences into English:

1. Внешний вид растения представляет большой интерес. 2. Без воды растение увядает и погибает. 3. Его интересуется ткань плода. 4. Некоторые растения могут мигрировать с помощью воды. 5. Эти изменения приводят к превращению завязи в плод и семян в семена. 6. Некоторые плоды имеют огромные размеры. 7. Растения требуют очень многое для своего роста и развития. 8. Многочисленные тычинки окружают пестик. 9. Пестик имеет сложное строение.

### V. Answer the following questions:

1. Is the flower of a complex structure? 2. What are its male and female organs? 3. What are the main and what are the accessory organs of the flower? 4. What is pollen? Where is it produced? 5. What do we mean by pollination? 6. How is pollination brought about? 7. What are the two kinds of pollination? 8. What are the consequences of pollination? 9. What do we mean by "fruit"?

### VI. Translate the texts during the limited period of time:

#### **Seed structure**

Seeds get plants through the hard times – through the seasons when extreme temperatures or lack of moisture can make growth, and even life, impossible. Seeds might never have evolved if the climate were conducive to plant growth year-round.

In fact, ferns and other seedless plants ruled the botanical world when the continents, as a result of the constantly moving plates of the Earth's crust, were clustered near the equator. In response to the present seasonable environments, however, animals hibernate, store food in burrows, migrate to warmer climates, or build houses to weather unpleasant seasons. Gymnosperms and angiosperms produce seeds-tiny dormant copies of themselves that germinate when favorable conditions return. Overproduction of seeds is largely responsible for feeding the animal world.

### **Fruit structure**

Before the evolution of flowers, plants either did not produce seeds or produced them exposed on the bracts of cones. In flowering plants, seeds are enclosed in an ovary, produced as part of the flower. After fertilization and seed development, the ovary and sometimes other parts of the flower will expand to produce a fruit. Fruits can serve various purposes, depending on the species. They protect the developing embryo (seeds) from drying out and to some extent protect from disease and herbivores. They promote seed distribution by animals that eat the fruit. In addition, they provide ready-made fertilizer for the germinating seed.

In the United States most people are familiar with fruits grown in temperate climates, such as apples and oranges, as well as some tropical fruits that are transported without spoiling quickly, such as pineapples. Many delicious tropical fruits, however, do not ship well and are usually unavailable in American stores.

#### VII. Translate the sentences with Absolute Participle Constructions:

1. A new technique having been worked out, they started the work. 2. The temperature being only 100, water boiled quickly. 3. We found new routes of synthesis, the older ones being unsatisfactory. 4. All the values found experimentally are considerably higher, their mean being 6.45. 5. Electrophilic reagents are those which seek electrons, the most common being positive ions. 6. Treating ephedrine with cold sulfuric acid forms the ester of pseudoephedrine, inversion occurring.

#### VIII. Analyse the “-ings” and “-eds”. Translate the sentences into Russian:

1. Let us begin with the Bratsk Timber Industry Complex which combines the procuring of raw materials, all stages of their processing and the output of finished goods. 2. You get the feeling that nature itself intended this area to supply timber and paper to woodless parts of the country. 3. The very town of Bratsk stands in a clearing wrested from the taiga. 4. The sparse population of the area makes it possible to arrange plants freely, in a way best fitting the production cycle. 5. Frankly speaking, the dam of the Bratsk Hydroelectric Station may look disappointing at the first glance. 6. Northern oil is now receiving an outlet to the starting point of the future pipeline. 7. In cities having scanty greenery people suffered from lack of oxygen. 8. The prospecting and mining of minerals, earthquake forecasts and in particular the drying up of the Caspian Sea were the problems discussed by researchers at the conference.



IX. Translate the sentences making difference between Gerund and Present

Participle:

1. Water may be changed into ice by freezing. One can't swim in a freezing river. 2. Experimenting is a scientific method. Every experimenting scientist works in a laboratory. 3. Look at the swimming children. Swimming is a good physical exercise. 4. Melting begins with warm weather. The melting snow flows down from the roofs through a pipe. 5. The doctor recommended sleeping on the open air. The woman carried the child in her arms. 6. One of the chemical processes is burning. Every burning thing produces smoke. 7. Boiling takes place at different temperatures. Boiling milk may run over. 8. Growing is a natural process of a living organism. Growing children need good food and physical exercise.

X. Note the translation of the Verbal Noun in the following sentences:

1. The first classification appeared at the beginning of the development of natural sciences. 2. Chernyshevsky approved of the materialistic side of Lamarck teaching but criticized him for his idealism. 3. He could not bear the sight of blood and the sufferings of patients during operations (there were still no anesthetics). 4. Darwin wrote "I have always felt that I owe to my voyage the first real training and education of my mind".

XI. Translate the sentences or parts of sentences with "fact":

1. It explains the fact that... 2. The fact is that... 3. It is a well known fact that... 4. For the explanation he gives the fact that...

XII. Translate the following texts. Use no dictionary:

**About Eggs.** The egg gives the chicken inside it all the nourishment it needs. The egg is good food too. There are proteins, vitamins, minerals and fats in it just in the right proportions. The amount of vitamins A and D in the egg depends on the food the hen gets, that of D vitamin depending also on the hen's exposure to sun. The egg is rich in amino-acids (proteins). It is very good in combination with cereal foods because cereal foods lack many amino-acids. Combined with the protein of the egg the cereal protein is made better use of by our body.

**Boiling.** When any liquid boils, parts of it are changed into a hot gas. This is much lighter than the liquid in which it is formed. It rises to the top as a bubble, and the bubble bursts giving off the gas into the air. When a bubble formed at the bottom rises through the liquid unbroken until it reaches the top and bursts there, we say that the liquid is boiling.

XIII. Translate the text using a dictionary:

**Origin of Life**

About 100 years ago F. Engels defined life as the "mode of motion of albuminous substances". Modern sciences succeeded in tracing-the stages of the evolution of life from a barren, entirely inorganic earth through the formation of

organic compounds, their polymerization to giant-chained molecules of proteins and nucleic acids, the formation of living cells and the whole process of Darwinian evolution to man. Polymeric compounds are chemical substances composed of the same elements in the same proportion but with different molecular weights. They are liquid or gaseous substances with small molecules (  $C_2H_2$  -acetylene,  $C_6H_6$ -benzene). Scientists have found ways of joining the small molecules together into long chains thus forming a solid with various properties of polythene or other plastic. A similar process of the formation of long - chain molecules from small ones goes on in living cells. Proteins and amino-acids are the building bricks of living matter. Living organisms produce proteins from the food they absorb. In this way we are getting some insight into the structure of natural polymers.

XIV. Speak on:

1. The main parts of the flower.
2. The process of pollination and fertilization.
3. The structure of a fruit.

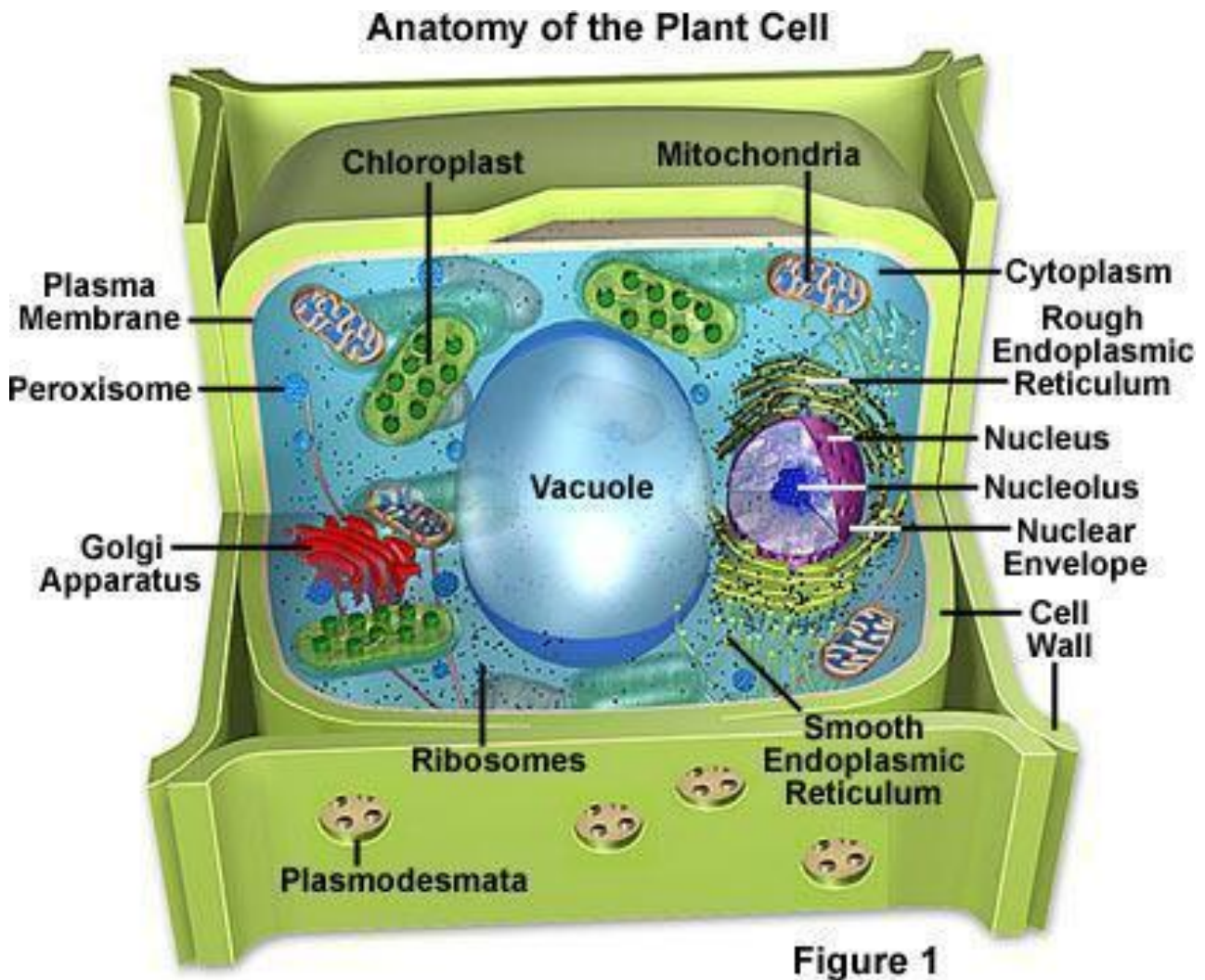
## ZOOLOGY SECTION 1

Grammar:

➤ Forms and Functions of the Infinitive.

Phonetical drills:

[ɜ:]	[ɔ:]	[a:]	[ʌ]	[ai]
firm	call	are	result	type
firm	portion	large	structure	apply
occur	small		function	realize



*Practise the pronunciation of the following words:*

protoplasm ['prəʊtəplæzm]	multiplication [ˌmʌltɪpli'keɪʃn]
occur [ə'kɜ:]	through [θru:]
mass [mæs] - masses ['mæsɪz]	health [helθ]
portion ['pɔ:ʃn]	individual [ɪndɪ'vɪdʒuəl]
pliable ['plaiəbl]	existing [ɪg'zɪstɪŋ]
vary ['veəri]	mitosis [mi'təʊsɪs]
human ['hju:mən]	apparent [ə'pærənt]
tissue ['tɪʃu]	realize ['riəlaɪz]
nucleus ['nju:kliəs]	repair [rə'peə]
	injure ['ɪndʒə]

TEXT

**Cells and Protoplasm**

The substance of which living cells are composed is called protoplasm. Protoplasm does not usually occur as large masses, but is divided up into small portions, each of which is named a cell. This structural unit of living bodies is defined as a small mass of protoplasm containing a nucleus. Cells are the building blocks of living organisms.

The living protoplasm of a cell is bounded externally by a layer which is termed the cell-membrane in the animal cell, and the cell-wall in the plant cell. The cell-membrane of an animal cell is usually very thin and pliable. The term "cell-wall" is applied to the thick and firm outer structure of the plant cell.

Organisms vary in complexity from the simple plants and animals consisting of a single cell to the human body composed of trillions of cells. To study the cell is essential to understand both structure and function of living things.

Man starts life as a single cell, his growth results from the multiplication of cells, he inherits through the cell, and even his health depends on the proper functioning of individual cells.

New cells arise only by division of existing cells, and mitosis is the usual type of cell division. Its importance becomes apparent when we realize that it is important in reproduction, growth and repair of injured tissues. It is responsible for the multiplication of cells in both plants and animals.

**Active Words**

protoplasm, n. - протоплазма,	single, a. - один, единственный,
occur, v. - встречаться, происходить,	growth, n. - рост, multiplication,
nucleus, n. - ядро,	n. - размножение, mitosis, n. —
membrane, n. - оболочка, мембрана,	МИТОЗ,
layer, n. - слой,	health, n. - здоровье, depend
pliable, a. - гибкий, податливый, apply,	on, v. - зависеть от, repair,
v. - применять, обращаться, application,	v. - восстанавливать,
n. - применение, заявление, injure, v. -	ремонттировать
повреждать	

## Exercises

### I. Give nouns from:

To develop, to grow, to multiply, to apply, to improve, to organize, to reproduce.

### II. Give adjectives from:

Importance, structure, chemistry, botany, biology, zoology, nerve.

### III. Define as parts of speech:

Usually, structural, growth, pliable, structure, relatively, essential, function, individual, multiplication, application.

### IV. Give verbs from the following nouns:

Division, multiplication, growth, existence, reproduction, application, inheritance, understanding.

### V. Translate the word-groups:

a) cells and tissues, nucleus and protoplasm, origin and development, scientists and investigators, discoveries and successes, leaves and roots;

b) plant cell, egg-cell, animal cell, cell division, substance constituents;

c) certain properties, evident phenomenon, watery sap, constant movement, scientific observation;

d) as for the origin, thanks to this exploration, concerning the origin, under this influence, by inheritance;

e) клетка состоит, она является, она представляет из себя, они встречаются, они восстанавливаются, они повреждаются, они применяются, они наследуются, они называются.

### VI. Listen and translate:

A) 1. They saw that the protoplasm of the cell contained nitrogenous matter. 2. They investigated certain constituents of the cell. 3. They believed that during cell-division the nucleus disappeared and reappeared again in the daughter cell. 4. Soon a method of staining microscopic preparations was introduced. 5. It was due to some transformations in the substance of the nucleus.

B) 1. About 500 million books are published in Moscow annually. 2. Business letters are usually written on special forms. 3. The matter will be discussed at the next meeting. 4. The letter has just been typed. 5. I was shown a new dictionary. 6. This question is being discussed now.

### VII. Answer the questions:

1. What is the cell? 2. What does it consist of? 3. How is the cell defined? 4. How do organisms vary? 5. How do new cells arise? 6. What is the usual type of cell division? 7. What is mitosis responsible for? 8. Why is the study of the cell so essential?

VIII. Translate the following into Russian:

1. We apply electricity in industry, agriculture and everyday life. If you want to become a student of the institute you must send a written application to the rector. Hundreds of people from Africa and Latin America applied for admission to the Patrice Lumumba University in Moscow. The money was applied for the benefit of the poor.

2. Which letter of the alphabet occurs most commonly? When did this idea occur to you?

3. The old woman still depends on her earnings. Good health depends on good food, sleep and exercise.

4. They repaired the instruments and used them again. “Repairs done while you wait”. “Closed during repairs”.

IX. Translate the following, text into English:

**Клетка как организм**

1) Клетка является не только основной структурной единицей организма, но и органом. 2) Простейшие организмы состоят из одной клетки. 3) Это организм со всеми жизненными функциями: питания, роста, развития, размножения и активного движения. 4) Жизнь одноклеточных организмов протекает в различных условиях существования: в воздухе, воде и почве.

5) Они известны как паразиты растений и животных. 6) Некоторые из них, как бактерии имеют очень простое строение. 7) Но есть одноклеточные, имеющие очень сложную структуру своего тела. 8) Эти сложные формы одноклеточных растений являются результатом исторического развития в различных условиях существования.

X. Define the forms of the Infinitive:

To be made, to have been made, to make, to be making, to have made.

XI. Give other forms from: to produce, to divide, to become.

XII. Define the functions and forms of the Infinitive. Translate the sentences:

1. We have come to the station to see our friends off. 2. We want to buy a newspaper at the bookstall. 3. Don't forget to drop the letter. 4. He has bought some magazines to read in the train. 5. To skate is pleasant. 6. He asked me to help him. To know English is quite necessary in our work. 7. His task was to develop a new frost-resistant variety. 8. To know all the details he made many experiments. 9. He is known to study well. 10. The question to be studied is of great practical importance.

XIII. Analyse the ing-forms and translate the sentences:

1. Asparagine and glutamine both occur in germinating seeds. 2. Having considered the method many workers used it willingly. 3. Such minerals are likely to occur in some other places as well, the probability of discovery them being however limited to certain areas. 4. This reaction involves the following temperature changes. 5. The rates and molecular weights are affected by lowering the temperature, the former being decreased and the latter increased. 6. This substance is best suited as starting compound. 7. In the first case, two samples were used, one of them having low catalytic activity, the other one high activity.

XIV. Translate the sentences with the Absolute Participle Construction:

1. The steamer could not enter the dock, its length exceeding 120 metres. 2. The last experiment having been carried out, we started a new investigation. 3. In their nature all these radiations are similar, gamma rays having properties nearest to those of x-rays. 4. An atom in its normal state being electrically neutral, it was necessary in some way to explain the positive electricity which must exist in the atom to balance the negative electrons. If the temperature is increased the molecules are given additional speed, more of them breaking through the surface of the liquid. 6. When heat is applied at one spot, copper being a very good conductor, it is rapidly transferred throughout the whole mass.

XV. Read the text and answer the question "What is the principle of the organization of organisms?"

Many researchers devoted their work to study of the cell. Especially important were the observations of the German botanist Schleiden who established that all plant cells originated in the same way. Proceeding from these data, and from numerous observations on the development of cells in animal organisms, the German physiologist Theodor Schwann in 1839 formulated the cell theory that has played such a great role in biology. The discovery made by Schwann and his predecessors is probably unique in the history of science. They found that all cells develop from nuclei contained in the parent cells. Though their findings were completely erroneous, they nevertheless provided the basis for a correct idea of the genetic unity and similarity of plant and animal cells. In other words, cellular structure is the general principle of the organization of all living organisms.

XVI. Translate the text without dictionary:

**The Cell as the Unit of Living Things Structure**

We know that living things are made of one or more cells. Amoeba, bacteria and the tiny flagellate Chlamydomonas are all single-celled organisms. Within their single cell, they contain all the equipment needed to carry out the various functions of life. At some time these cells divide and form two individuals where before there was one. Each daughter cell receives a complete set of the nuclear controls present in the parent cell.

Prior to actual division of the cell, each chromosome in the nucleus is duplicated. Then, during the process of cell division itself, these duplicated chromosomes become separated. With remarkable precision, a complete set migrates to each of the two daughter cells. Mitosis is the term used to describe this important process.

Mitosis provides a mechanism for the reproduction of single celled organisms. It also provides a mechanism for growth in multicellular organisms. In both cases, it provides an escape from excessive growth or enlargement of single cells.

prior to - до, перед

complete – полный

escape – выход

excessive - чрезмерный

flagellate - жгутиковый

*XVII. Read the text. Formulate a definition of a cell.*

In modern biology, the term “cell” refers to the fundamental microscopic unit that makes up all living matter. This is quite different from its everyday meaning. Its adoption as a biological term originated in 1665 in a book written by Robert Hooke and entitled Micrographia. In the book Hooke described the microscopic units that make up a slice of cork as cells because they resemble the six-sided structures that form the honeycomb of bees. These structures were called cellulae in Latin. In Hooke’s time, Latin was the language most commonly used in scientific communications. There is also a suggestion that Hooke thought each individual cork unit resembled a monk’s cella (the Latin word for a “small room”). Although Hooke used the word differently to later cell biologists, so influential was his book that the word “cell” is still used as a biological term today.

Hooke’s publication of Micrographia caused much excitement and stimulated many other scientists to use microscopes to examine living matter. But it was not until 1839 that a “cell theory”, the idea that all living things are composed of cells or their products, was proposed. The idea gained the status of a theory after the botanist Schleiden and the zoologist Schwann found that many types of plant and animal tissues were made of cells.

Today, with the advent of electron microscopes, evolutionary theory, and the development of genetics, the original cell theory has been modified. But it still maintains the core concept that cells are the basic units of all life. It also states that:

- cells arise only by the division of existing cells
- cells are able to divide to form new cells; this is the basic for reproduction in all organisms, and for growth and repair of multicellular organisms
- cells contain inherited information which controls their activities
- the cell is the functioning unit of life
- metabolism takes place in cells
- given suitable conditions, cells are capable of independent existence

These propositions underlie so many different aspects of biology that the cell theory is regarded as a major unifying concept. As with most theories, however, it is likely



that the cell theory will continue to be modified as new discoveries are made.

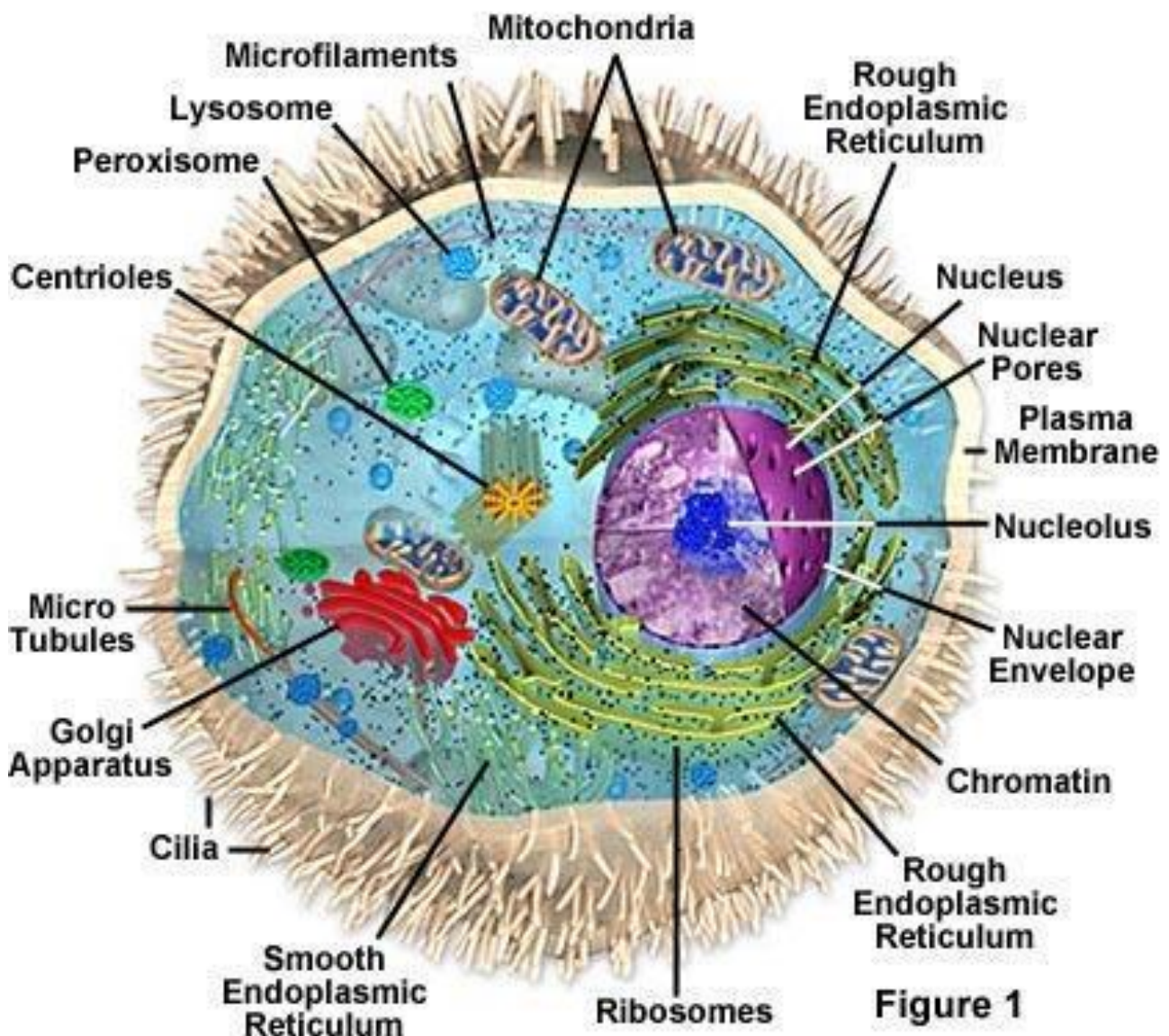
Currently, scientists are discovering how cells within a multicellular organism are interconnected and how they communicate with each other. These discoveries are modifying our view about the ability of cells to have an independent existence.

The cells of a multicellular organism do not function as self-contained units but as part of an integrated tissue, organ, and organism. It is possible to isolate a single cell and keep it alive in an artificial environment, but this does not mean that this cell will function in exactly the same way as a single cell in a multicellular organism.

XVIII. Speak on:

1. The research work on the structure and function of the cell.
2. Who came to the conclusion about the cell structure of organisms.

### Anatomy of the Animal Cell



## SECTION 2

Grammar:

- Complex Object,
- Words “like”, “no”, “mean”.

*Practise the pronunciation of the following words:*

protozoa [prəʊtə'zəʊə]	material [mə'tɪəriəl]
amoeba [ə'mi:bə]	thrust [θrʌst]
include [in'klud]	projection [prə'dʒekʃən]
exist [ig'zɪst]	reception [rɪ'sepʃən]
parasite ['pærəsɪt]	transmission [trænz'mɪʃən]
representative [reprɪ'zentətɪv]	stimuli ['stɪmjulaɪ]
evolutionary [i:və'lju:ʃənəri]	cytoplasm[saitəʊ'plæzəm]
excellent ['eksələnt]	opportunity [ɒpə'tju:nɪti]

### TEXT

#### Protozoa. Amoeba

We know amoebas to be jelly-like, microscopic, single-celled animals which are found in many different habitats such as fresh water, the sea, the soil and even within more complex animals, including man, where they exist as parasites.

We consider the amoeba to be a representative of the simplest animals, which are near the bottom of the evolutionary ladder. In the study of this animal there is an excellent opportunity to study the complex colloidal material called protoplasm. This is the living substance of which all cells are composed, even those of the human body.

The amoeba has a small, irregular, greyish body, which is very slowly but constantly changing shape. It moves by thrusting out projections which are called pseudopodia. The amoeba possesses no special structure for the reception and transmission of stimuli. The protoplasm of the body functions in this capacity.

The amoeba reproduces by fission, a simplest process of dividing into two amoebas.

The nucleus divides, the cytoplasm constricts until the parent animal is divided into two “daughter” amoebas.

#### Active Words

protozoon, protozoa, n. - простейшее,	representative, n. - представитель,
простейшие,	opportunity, n. - возможность, случай,
амеба, n. - амеба,	shape, n. - форма,
habitat, n. - место обитания,	projection, n. - выступ,
include, v. - включать,	possess, v. - обладать,
fresh water - пресная вода,	reception, n. - восприятие, прием,
exist, v. - существовать,	transmission, n. - передача,

represent, v. – представлять,  
constrict, v. - стягивать, сокращать,

stimulus, stimuli, n. - стимул, стимулы,  
fission, n. - деление, расщепление,

## Exercises

### I. Give nouns from:

Exist, apply, grow, transmit, represent, multiply, divide.

### II. Define the words as part of speech:

Microscopic, different, evolutionary, colloidal, slowly, reception, constantly, transmission, structure.

### III. Translate:

1) jelly-like amoeba, excellent opportunity, pliable material, single-celled organism, different habitats, simplest animals, constant shape, irregular shape;  
получать раздражение, представлять простейших, передавать информацию, изучать процессы, наблюдать явления, изменять форму;  
они делятся на, они двигаются с помощью, они состоят из, они зависят от, они существуют в, они включают;  
их изучают, их делят, их находят, их создают, их строят, их воспринимают.

2) Амёба - простейшее одноклеточное животное. Она живет в пресной воде и в море. Иногда она является паразитом другого животного. Амёба имеет неправильное тело. Она постоянно меняет свою форму. Передвигается она при помощи псевдоподий. Специального органа для восприятия раздражений она не имеет. Эту функцию выполняет протоплазма. Размножается амёба делением. Один родительский организм делится на две дочерние амёбы.

Протоплазма. 1. Протоплазма растительной клетки представляет собой живое вещество, связанное с жизнью растения. 2. Протоплазма, или плазма растительной клетки, или цитоплазма, представляет собой бесцветную жидкость. 3. Она имеет большое значение в жизни клетки. 4. Протоплазма содержит 80-95% воды. 5. Вода является основой организации протоплазмы. 6. Иногда протоплазма становится твердой. 7. Но она никогда не теряет способности возобновить все свои жизненные свойства.

### IV. Translate the sentences into Russian:

1. What I had said does not apply to you. 2. The rule does not apply to all cases. 3. They measured the thickness of the layer of clay. 4. Pliable is that which is easily bent or twisted. 5. There was no single ticket left for the journey to the place. 6. Stop! This road is under repair. 7. Habitat is the natural place of growth or life of plants and animals. 8. Is a radio reception good in your district? 9. The wedding reception lasted till midnight. 10. This disease is easily transmitted. 11. The message was transmitted by radio. 12. He has got a reward. 13. He was a member of the House

of Representatives. 14. We can shape clay, into any form, it may form a square piece or have a round shape.

V. Translate the sentences with:

**like** 1) I like this girl, she is like her mother, but quite unlike her sister. Unlike other girls she does not like to dance, but she plays the piano like an artist. 2) “Do you like to read? I shall give you an interesting book if you like. I know that you will like it. “Thank you. I should like to read it”.

**no** 1) No animals can speak. 2) We find no trees in the tundra. 3) No ocean divides Europe from Asia. 4) The moon gives no warmth. 5) Water has no colour. 6) We see no stars by day. 7) No man can live without food.

**Means** 1) To work means to live. 2) What would be the most effective means of growing these plants? 3) What does the word “undergraduate” mean? It means a university student without any degree. 4) The result was achieved by means of hard work.

VI. Translate the sentences with Complex Object:

A) 1. We know the amoeba to reproduce by fission. 2. We believe this animal to be a good representative of single-celled animals. 3. We suppose him to have graduated from our institute. 4. We know him to have studied the properties of all chemical elements. 5. I suppose her to be working at this question now. 6. We know our students to be listening to the lecture now. 7. We know these experiments to have been made quite successfully. 8. I suppose these results to have been obtained in the experimental work.

B) 1. I saw her enter the house. 2. We noticed file captain appear on the bridge. 3. Have you heard him play the piano? 4. They saw the fascist plane fly over the houses.

VII. Translate the sentences containing Gerund with prepositions:

1. By burning coal we may heat water in a boiler. 2. There are many ways of solving this problem. 3. We spoke about the difficulty of reading such books without consulting the English - Russian dictionary. 4. Nowadays scientists are working out methods for utilizing atomic energy for general use in peaceful purposes. 5. Upon finishing the experiments we wrote down the results. 6. After cooling the substance to 15° the pressure dropped to 20 atm. 7. On reading the book he took it to the library. 8. After doing this with two separate groups of cells they put the nuclei from one group into the cell bodies of the other.

VIII. Translate the sentences into Russian:

1. He was told to finish the experiment in time. 2. She was given a piece of good advice. 3. We were shown some new books on bionics. 4. Their discovery is much spoken of. 5. The old law was followed by a new one. 6. She was told to study much. 7. I was allowed to leave. 8. She will be given your article.

IX. Change the following sentences from Active into Passive:

- A). 1. People often look at this picture. 2. Everybody speaks about this novel.  
3. They were looking for this book everywhere. 4. They will listen to this lecture.  
B). 1. The teacher asked me many questions. 2. I often see him at the lectures.  
3. He has given me a new book on microbiology.

X. Translate the text with the help of a dictionary:

**The Protozoa**

All the organisms known as protozoa are separated into the four phyla on the basis of the manner in which they move about.

The member of the *Phylum Sarcodina* move by the flowing of their cell content into temporary projections called pseudopodia. Amoeba is the classic example of the group. It lives in fresh water. It is only a scientific interest to man, but a relative, *Endamoeba histolitica*, caused the serious disease, amoebic dysentery. There are two large groups of marine protozoa. The first, the *foraminifera*, are protected by a many-chambered external skeleton made of calcium carbonate. The chalk cliffs of Dover, England, were formed from deep sediments of foraminifera shells. The second, the *radiolaria*, are especially abundant in the Indian and Pacific Oceans. These organisms possess an internal skeleton made of silica which is often of remarkable intricacy and beauty.

All sporozoans are parasitic in the bodies of other animals and have complex life histories. *Sporozoans* lack the power of locomotion during most of their life cycle.

The *Mastigophora* move by means of one more whip like appendage called flagella. One member of this group causes the dread disease, African sleeping sickness. *Trichonymph* is a flagellate which lives within the gut of termites and digests the wood particles that they eat.

XI. Read the text and make up a summary:

**General structure of bacteria**

Bacteria are prokaryotes, a large grouping of relatively simple organisms which lack nuclei (the term “prokaryote” means “before nucleus”). Animals, plants, fungi, seaweeds, and some single-celled organisms are eukaryotes: all have a well defined nucleus bound by a nuclear membrane (“eukaryote” means “true nucleus”).

Like an animal or plant cell, a bacterial cell has a cell surface membrane enclosing cytoplasm that contains enzymes, ribosomes, and food granules. In some bacteria, the membrane is surrounded by a cell wall, and this may in turn be enclosed in a capsule. However, in addition to lacking a true nucleus, a bacterial cell lacks the high level of organisation of an animal or plant cell. Its ribosomes are smaller than those in animal and plant cells. The cell wall (if present) is not made of cellulose. It has a Golgi apparatus or endoplasmic reticulum. The flagella (if they occur) are simple; they have no complex assembly of microtubules.

## SECTION 3

Grammar:

➤ Complex Subject

*Practise the pronunciation of the following words:*

organize ['ɔ:gənaɪz]

extremely [ɪkst'reɪmli]

nevertheless ['nevəðəles]

epithelial [epi'thi:liəl]

vascular ['væskjulə]

muscular ['mʌskjulə]

nervous ['nɜ:vəs]

specialize ['speʃəlaɪz]

major ['meɪdʒə]

adjoin [ə'dʒɔɪn]

determine [di'tɜ:mɪn]

fluid ['flu:ɪd]

blood [blʌd]

plasma ['plæzmə]

bind [baɪnd]

fibrous ['faɪbrəs]

impulse ['ɪmpʌls]

indistinct [ɪndɪ'stɪŋkt]

### TEXT

#### Tissues

The cells which comprise the body of many-celled animals are organized into groups called tissues. The man, like many other animals, is known to be an extremely complex organism. Nevertheless his whole body consists of only 5 fundamentally different tissues: epithelial, vascular, connective, muscular and nervous. These 5 different tissues represent groups of specialized cells, that is, they are modified in structure for the performance of particular function. In some cases, as for example, in bone, a material is secreted by cells. This material is intercellular substance, it constitutes the major part of the tissue.

Epithelial tissues have one surface bordering a space, and the other adjoining an underlying membrane. This kind of tissue is found to have a very small amount of intercellular substance. Its cell membrane is usually indistinct, which often makes it difficult to determine the shape of the cell.

Vascular tissues are circulatory fluid tissues which are known to include blood and lymph. Both consist of the plasma and cells of different types.

Connective tissues are widely distributed throughout the body, they are used to bind and support parts. There are many types of connective tissues.

Muscle tissues are characterized by their ability to contract when stimulated. They form no intercellular substance and are held together by fibrous connective tissues.

Nervous tissue is composed of nerve cells and structures which support them. A nerve cell consists of a central portion, the cell body, from which numerous processes of two kinds extend: those which carry impulses into the cell body, and those which carry impulses away.

## Active Words

tissue, n. – ткань,	secrete, v. - выделять, секретировать,
comprise, v. - включать, составлять,	surface, n. - поверхность,
nevertheless, adv. - однако, тем не менее,	amount n. — количество,
epithelial, a. — эпителиальный,	distinct, a. - ясный, определенный,
vascular, a. — сосудистый,	fluid, n. - жидкость,
muscular, a. – мышечный,	blood, n. - кровь,
nervous, a. - нервный,	distribute, v. - распределять,
performance, n. - выполнение, работа,	ability, n. - способность,
perform, v. - выполнять (функцию),	fibrous, a. - волокнистый,
particular, a. - особый, определенный,	impulse, n. - возбуждение, толчок.
bone, n. – кость,	

## Exercises

### I. Give Russian equivalents to the groups of words:

- 1) to apply methods, to secrete materials, to repair smth, to injure the skin, to constrict the protoplasm, to increase the amount, to comprise the body;
- 2) injured surface, increased amount, distributed material, covered surface, applied methods, secreted material;
- 3) nervous cells, fibrous tissues, distinct interval, definite method, certain amount, vascular tissue, single opportunity, small projection, pliable membrane.

### II. Listen and translate the following sentences:

1. Different tissues comprise the body of an animal. 2. This organ has some particular features of its structure. 3. The bone tissue has a very firm intercellular substance. 4. Here a large amount of intercellular substance is secreted. 5. The shape of the cell is indistinct. 6. Blood and lymph are fluid tissues. 7. These cells are scattered. They are not numerous. 8. Connective tissues are widely distributed throughout the body. 9. They bind different parts of the body. 10. They have an ability to constrict. 11. They carry impulses.

### III. Translate the text into English:

## Ткани

Органы состоят из различных тканей. Ткань образована клетками, одинаковыми по строению и выполняющими в организме определенные функции. Между клетками тканей находится межклеточное вещество. Ткани нашего организма разнообразны. Их можно найти в любом органе.

В эпителиальных тканях клетки находятся плотно друг к другу. Межклеточное вещество плохо развито и его трудно обнаружить. Часто эпителиальная ткань образуется многими слоями клеток. Такая ткань хорошо защищает расположенные под нею органы. Эпителиальные клетки погибают в больших количествах. Поэтому они обладают способностью к быстрому размножению. Мертвые клетки заменяются новыми.

IV. Answer the following questions:

1. What do we call tissues? 2. What are the five types of tissues? 3. What is matrix? 4. In what kind of tissues there is a large amount of intercellular substance? 5. In what kind of tissue it is difficult to determine the shape of the cell? 6. What tissue is widely distributed throughout the body? Where can we find it? 7. What are the characteristic features of the muscular tissue? 8. What is the structure of the nervous tissue? What does a nerve cell consist of?

V. Translate the following sentences into Russian:

A) 1. He is supposed to work in that laboratory. 2. She is thought to study at the University. 3. They are considered to have gone from Gorky. 4. This animal is considered to be a representative of Protozoa. 5. He is known to have graduated from our faculty last year.

B) 1. He wishes the work to be done at once. 2. I should like him to be invited to the conference. 3. I consider him to be a clever man. 4. I know them to have been quite right. 5. We know the opening of the conference to be fixed for the 15<sup>th</sup> of December. 6. We suppose him to be working now in the field of organic chemistry.

C) 1. We consider all these elements to be quite essential. 2. We proved this theory to have been wrong. 3. They believe this scientist to have discovered a new compound. 4. Evald found this to be true to all reactions. 5. Connective tissue is known to be distributed over the whole organism.

VI. Translate the following sentences with Verbal Nouns:

1. He took part in the sittings of the committee. 2. I was awoken by their loud talking. 3. They started the loading of the ship. 4. A mastering of a foreign language will assist you in many branches of work. 5. The increasing of the amount of the substance was quite evident.

VII. Translate the following sentences with Present Participles:

1. "Komsomolskaya Pravda" is the leading organ of the Russian press. 2. While we were crossing the bridge we saw Mr. D. 3. The boys stood on the bank throwing stones into the water. 4. We were able to speak to all students with the exception of those working in the library. 5 Reading English books you enlarge your vocabulary-. 6. Not knowing his address I cannot write to him. 7. Studying a foreign language students should learn the words.

VIII. Translate the following texts into Russian. Use no dictionary:

**The Cell**

The carbohydrate, lipid, protein, nucleic acid, and other molecules that make up living things are not themselves alive. It is only when these molecules become organized in precise ways that the phenomenon of life appears. We owe the term "cell" to the research of the Englishman Robert Hooke (1665).

Cells occur in a variety of sizes and shapes. Eggs are single cells and most of



them can be seen easily with the unaided eye. Tissue cells are generally microscopic. The smallest size of a cell is probably represented by the mycoplasmas. Cells vary markedly in shape as well as size. The shape of a cell is usually a clear reflection of the function it carries out in the organism. Nerve cells, which must transmit electrical impulses over long distance, have long extensions in some cases several feet in length. Muscle cells are elongated so that the force of contraction can be exerted efficiently in one direction. Epithelial cells are flattened in the plane of the surface they are covering. The supporting cells of a plant have thick walls. Animal cells do not possess walls. They secrete a thin surface layer that serves to cement cells together. The exact chemical nature of this layer is not yet known. This cell membrane provides an important barrier between the interior of the cell and the exterior.

### **Higher Levels of Organization**

The various tissues of a body are not arranged haphazardly. Different tissues are organized and integrated into organs. The various organs of the body are, in turn, organized into systems. Each system accomplished a major function for the body. The system as a whole works only if its various constituent organs carry out their functions in a well-coordinated way. Proper anatomical arrangement and harmonious functioning produce the organism. When many different organisms function in a coordinated way, a society exists. The honey-bee produces a good example of this.

One of the principal features of living things is the complex organization of the matter out of which they are made. We examine various levels of this organization. Our understanding of the structure and function of any level depends upon understanding of the structure and properties of earlier levels.

The organization of life is not a static, unchanging thing. To be alive is to constantly build and rebuild the structural materials out of which the organism is composed. The building up and tearing down depends upon the exchange of materials between the organism and its environment. The exchange of materials and the chemical transformations carried out on these materials within the organism constitute its metabolism.

### *IX. Read and translate the text without a dictionary:*

#### **Tissues**

In the human body, there are more than 200 different types of cell. Those specialized to carry out a particular function come together to form one of four of primary tissue:

- Connective tissue adds support and structure to the body. It includes bone, cartilage, fat tissue, and blood.
  - Epithelial tissue lines the body surface and the surfaces of organs, cavities, and tubes.
  - Muscle tissue moves the body or body parts.
  - Nerve tissue enables quick communication between different body parts.
- To work effectively, cells making up a tissue must be able to bind together and

interact specifically with one another. Extracellular material and various membrane proteins called cell adhesion molecules enable specific cells to stick together and communicate with each other so that their activities can be integrated.

*X. Read the text. Answer the question: What are embryonic stem cells?*

Cells found during the earlier mitotic cell cycles are unspecialized but have the potential to divide and make a wide range of specialized cells such as those of the skin, muscles, or nerves. Such cells are called embryonic stem cells and exist in the human embryo for a few weeks after conception.

Adults have various kinds of stem cells that have descended from embryonic stem cells. They generally remain inactive until needed to replace particular types of non-reproducing specialized cells.

When triggered to divide, a stem cell produces one daughter cell that will give rise to differentiated cells, and one daughter cell that remains a stem cell. Normally, in a living animal, adult stem cells give rise to a small range of cell types, unlike embryonic stem cells that can give rise to cells of any type. However, given the right culture conditions some stem cells isolated from certain adult tissues can be made to differentiate into a wide range of cell types. Bone marrow, for example, contains adult stem cells that normally give rise to all kinds of blood cells. But the addition of specific growth factors to cultures of bone marrow stem cells make them differentiate into a wider range of cell types than they normally do.

Consider the different ethical implications of using embryonic stem cells and adult stem cells. Which are easier to use? Which do you think would be most acceptable by the public?

## SECTION 4

Grammar:

- Infinitive as an Attribute;
- Because of, due to.

Read aloud the following words:

elementary [eli'mentəri]	through [θru:]
embryology [embri'ɒlədʒi]	constitute ['kɒnstɪtju:t]
cytoplasm ['saɪtɒp,læzəm]	process ['prəʊses]
cleavage ['kli:vɪdʒ]	sequence ['si:kwəns]
preliminary [pri'liminəri]	variation [,veəri'eɪʃn]
differentiation [,dɪfərenʃi'eɪʃn]	due [dju:]
increase [ɪn'kri:s]	specialize ['speʃəlaɪz]
various ['veəriəs]	yolk [jɒk]

### TEXT

#### Elementary Embryology

All animals, including man which develop from fertilized eggs, go through the same general stages of development. The union of an egg and sperm constitutes fertilization, and this initiates changes that are collectively termed the embryology, or formation of an organism. Embryology is the science of the study of the development of a fertilized egg into a fully formed new individual.

An egg is a single cell, and because of the large amount of food stored in the cytoplasm, in the form of yolk, it is usually larger than most cells. After the egg is fertilized by the sperm, it begins to develop. First it divides into two; then the resultant cells divide again; this process of division, termed cleavage, continues for some time, preliminary to the differentiation of tissues and organs. Eggs of all animals show quite a definite sequence of cleavage events during early development; variations which occur are in large part due to the amount and distribution of the yolk in the cytoplasm.

In general, development consists of three important processes: 1. cell division which results in an increase in the number of cells; 2. cell growth, or formation of an increased amount of protoplasm; 3. cell differentiation, in which the cells become specialized by structural and chemical modifications into different cell types. These compose the various tissues.

A general knowledge of elementary embryology is essential for the understanding of important biological principles.

#### Active Words

embryology, n. - эмбриология,	constitute, v. - составлять,
because of- из-за,	sperm, n. - сперма,
sequence, n. - последовательность,	event, n. - здесь этап,

due to - происходить благодаря, из-за, amount, n. - количество,  
distribution, n. - распределение, yolk, n. - желток,  
cytoplasm. - цитоплазма, in general — в целом,  
compose, v. - составлять, increase, v. — увеличивать.

## Exercises

### I. Give nouns from:

Develop, fertilize, form, store, differentiate, know, compose, modify.

### II. Define the words as parts of speech:

Collectively, fertilization, individual, fully, division, usually, important, elementary, various.

### III. Translate the following into Russian:

- |  |  |  |
|--|--|--|
| a) fertilized egg,<br>formed individual,<br>stored food,<br>dissolved oxygen,<br>specialized cells,<br>increased amount, | b) are defined,<br>are termed,<br>are divided,<br>are produced,<br>is fertilized,<br>is performed,<br>is modified, | c) the understanding of the<br>principle,<br>the sittings of the<br>committee, |
|--|--|--|
- d) chemical changes occurring in the cell, one surface bordering the cavity, the processes carrying the impulses,  
e) because of the large amount, because of all these transformations, because of their poor knowledge, because of misunderstanding,  
f) due to the large amount of food, due to the distribution of yolk in the cytoplasm, due to the increased amount of protoplasm, due to the cell division and differentiation.

### IV. Translate into English:

a) Одни и те же стадии, оплодотворенная яйцеклетка, большое количество, химические изменения, определенная последовательность, глубокие знания, единственная клетка, вся поверхность, волокнистая ткань, определенные изменения.

b) В этом случае, несмотря на, из-за, в целом, благодаря, и т.д.

c) Все животные развиваются из оплодотворенной яйцеклетки. Все они проходят одни и те же стадии развития. Весь процесс образования организма из оплодотворенной яйцеклетки называется эмбриологией. Это — одна из

отраслей биологии. Знание эмбриологии очень важно для понимания основных принципов развития животного мира.

V. Translate the sentences with 'to mean', 'means', 'by means of', 'by no means', 'by all means':

1. To work means to live. 2. Democracy means a happy life to all people, progress of science and culture and friendship among nations. 3. What does the word "undergraduate" mean? - It means a university student without any degree. 4. What does the word "graduate" mean? - It means a student who has a degree. 5. Radio, telegraph, telephone and television are means of communication. 6. We express our thoughts by means of words. 7. The dress is by no means cheap. 8. The Dean tried to influence his students by all means.

VI. Translate the sentences with the Infinitive as an Attribute:

1. The question to be discussed is of great significance for our practical work. 2. This is the book to be read next. 3. The text to be translated was rather difficult. 4. This is the point to be taken into consideration. 5. The next part to be analysed was the stamen. 6. The anther bursts and gives pollen to be later carried by wind.

VII. Translate into Russian paying attention to the function of the Infinitive:

1. To use gas more profitably as cheap fuel was our main task. 2. The mixture to be separated is introduced at the beginning of the column. 3. The electrons have come to be known as valence electrons, due to the fact that the valence of any given element depends on the number of these electrons. 4. The organic compounds to be discussed are of great importance in the study of plastics. 5. Carbon has a tendency to combine with oxygen from the air to form gaseous carbon dioxide. 6. Chlorine requires only one electron to form the stable electron layer of the following inert gas.

VIII. Translate the following text into English:

Процесс размножения клеток в организме связан с очень сложными изменениями, происходящими в клеточном ядре. В результате непрямого деления каждая новая клетка получает полный набор хромосом. Каждому виду растений, животных, а также человеку свойственны строгая определенная форма и количество хромосом в клетках.

Когда сперматозоиды встречаются с неподвижной и более крупной яйцевой клеткой, они ее окружают. Затем один из сперматозоидов внедряется в яйцевую клетку. Ядра обоих половых клеток сливаются в одно, и образуется оплодотворенное яйцо.

IX. Translate the text. Use no dictionary:

### **Common Amoeba**

The Amoeba is a tiny blob of mucus, irregular in form, with an oval corpuscle inside. The mucus is protoplasm and the corpuscle is a nucleus. The Amoeba is a

single-celled animal, it has no chlorophyll.

As the Amoeba moves parts of its body flow out in the direction of the movement forming pseudopodia. As the pseudopodia are thrust out they become longer and broader, the protoplasm flowing into them. The shape of the Amoeba's body constantly changes. In Greek, the word "amoeba" means "change".

The Amoeba respire by absorbing oxygen and excreting carbon dioxide. Respiration is performed by the entire body surface. As the animal is very small, oxygen, dissolved in water, easily passes into all sections of the protoplasm. The process of carbon dioxide excretion is simple.

XI. Read the text, find the Infinitive Constructions. Translate the text.

**Pigeons "see" light through their skin**

The eyes seem to be not the only organs that can sense light. Electrical responses to light have been recorded in the skin of frogs, rats, axolotls and other animals. Scientists from North Carolina (America) report young pigeons to sense light through their skin. They were investigating the onset of vision in pigeon embryo when they noticed the squabs to respond to light before there was any evidence of visual function.

The researchers report a five-second light flash to cause young pigeons to raise their heads and shake them from side to side. The investigators covered the eyes of the still blind squabs to be tested. The animals were reported to respond to the light in the same manner.

XII. Read the text. Retell it using following key words:

- inbreeding
- desirable characteristics
- artificial selection
- uniform quality
- homozygous
- gene locus
- Phytophthora infestans

**Inbreeding**

Inbreeding involves breeding between closely related individuals which, by chance, possess some desirable characteristics. What is desirable will depend on what animal or plant is going to be used for. For example, desirable characteristics in plants used for food might include high yield and pest resistance, while desirable characteristics in a race horse might be speed and stamina. Dogs have undergone artificial selection for at least 12 000 years to produce specific breeds suited to particular types of work or for show.

Inbreeding aims to retain desirable characters in future generations. It also enables a farmer to produce food of a uniform quality for the market. However, their uniformity of characters is at the expense of genetic diversity. Taken to its extreme, inbreeding can reduce genetic diversity to such an extent that every individual is

completely homozygous: at each gene locus, the two alleles are identical. Crops with complete homozygosity cannot be used to produce new strains in the future because they are genetically identical.

Another concern is that if genetically identical organisms are exposed to new diseases to which they have no resistance, all of them may be killed. This is perfectly what happened in Ireland in 1845 when potato blight caused by *Phytophthora infestans* destroyed the whole potato crop and led to famine.

Even if inbreeding does not lead to complete homozygosity, it increases the risk of harmful recessive alleles occurring in the homozygous condition and being expressed. Because of these disadvantages, inbreeding is not carried out indefinitely. New alleles are introduced by outbreeding with other stock.

## SECTION 5

Grammar:

- Infinitive;
- One.

*Practise the pronunciation of the following words:*

earthworm ['ə:θwə:m]	distinguish [di'stɪŋwiʃ]
Darwin ['da:win]	bear [beə]
doubt [daʊt]	mouth [maʊθ]
creature ['kri:tʃə]	exception [ɪk'sepʃən]
distribute [di'strɪbjʊ:t]	receptacle [ri'septəkl]
entire [ɪn'taɪə]	groove [ɡru:v]
illustrate ['ɪləstreɪt]	female ['fi:meɪl]
anus ['eɪnəs]	vesicle ['vesɪkl]
radially ['rædiəli]	bilaterally [baɪ'lætərəli]
	terminal ['tə:mɪnəl]

### TEXT

#### Common Earthworm

Darwin, after much study of the earthworm, said, "It may be doubted if there are any other animals which have played such an important part in the history of the world as these lowly organized creatures". They are distributed over the entire earth.

The so-called night crawler is one of the large species. It feeds at night on leaves and vegetable substances, as well as organic matter which is contained in the soil. The earthworm is an important form of study because it illustrates so well many features of structure and function. Among these features are segmentation, tube-within - a - tube structure, a more complex nervous system, nephridia, and a blood-vascular system.

The form of the body is bilaterally (or radially) symmetrical. The segments can easily be distinguished. The peristomium is the first segment. It bears the prostomium and the mouth.

Nephridispores are the small external openings of the nephridia. There is a pair on each of the segments with the exception of the first and the last. The openings from the seminal receptacles are found in the grooves between segments 9 and 10, and 10 and 11. The seminal receptacles are the female organs. The male reproductive organs are the seminal vesicles, which are light-coloured bodies in the ninth, tenth, eleventh and twelfth segments. The openings of the sperm ducts can easily be found on segment 15. The anus is located on the terminal segment.

#### Active Words

common, a. - обычный,	receptacle, n. - влагалище, вместилище,
earthworm, n. - земляной червь,	seminal, a. - семенной,
creature, n. - существо,	groove, n. - канавка, желоб,



feature, n. - черга, характ. особенность,	vesicle, n. - пузырек,
nephridia, n. pl. - нефридии,	duct, n. - проток, канал,
peristomium, n. - перистом,	anus, n. - задний проход,
bear. v. - нести,	terminal, a. - конечный,
prostomium, n. - простомииум,	male, a. - мужской,
with the exception of- за исключением,	female, a. - женский.

## **Exercises**

### I. Translate the following derivatives into Russian:

1. Stable, stability, stabilization, stabilizator. 2. Phenomena, phenomenon, phenomenal. 3. Act, active, activity, action. 4. Apply, application. 5. Divide, division, subdivision. 6. Fiber, fibrous. 7. Possible, impossible, possibility. 8. Solve, soluble, solution.

### II. Translate the following word-groups into Russian:

1. Vegetable substance, entire earth, main feature, common representative, external opening, terminal segment, internal structure, seminal receptacle, sperm duct.

2. To doubt, as well as, in this case, with the exception, for example, due to, in order to, by means of, in spite of, because of.

3. They may occur, they may be found, they may depend on, they may be located, they may represent, they can be distributed, they can bear, they can be distinguished, they can constitute, they may be represented.

### III. Listen and translate:

The earthworm is a lowly organized creature. It is a representative of the simplest animals, invertebrate animal. It is distributed all over the earth. Its habitat is the soil. Its food is leaves and other vegetable substances. Its structure has some interesting features (peculiarities). Its body is symmetrical the symmetry is bilateral or radial. The main peculiarities of its structure are: segmentation, tube-within-a-tube structure, etc.

### IV. Translate the following into English:

Земляной червь сыграл большую роль в изучении истории мира. 2. Они распространены по всей земле. 3. Они питаются листьями и органическими веществами, которые содержатся в почве. 4. Земляного червя легко можно отличить благодаря строению его тела. 5. Основная черта его строения - сегментация. 6. Форма его тела - радиально симметричная.

Дождевые черви всю жизнь проводят в земле, редко появляясь на поверхности, в ночное время или после дождя. В сухой почве дождевые черви не встречаются. Пищей ему являются различные гниющие растения встречающиеся в почве. Дождевой червь имеет вытянутое округлое тело, способное сокращаться и удлиняться. Они - гермафродиты. Семенники и

яичники расположены в передней части тела. Дождевой червь способен восстанавливать утраченные части тела. Даже разрезанный на две части, червь не погибает. Обе половинки восстанавливают недостающие органы. Способность к регенерации имеет большое значение.

V. Answer the following question:

1. Where are the earthworms distributed? 2. What do they feed on? 3. Do they have any specific features of its species? 4. What are the main features of their structure? 5. Is the body symmetrical? 6. Are the segments easily distinguished? 7. What is its peristomium? 8. Does it bear any prostomium? 9. What are its nephridia? 10. Where are they situated? 11. What are its male and female organs?

VI. Define the function of the Infinitive and translate the sentences:

A) 1. To do this work we must know the composition of plants. 2. To understand the significance of this event we must know all the facts. 3. To solve the problem they used a new method of investigation. 4. To answer this question we must know the structure of matter. 5. We studied the results of four years selection to increase the production of plants. 6. The next question to be considered is the place of the conference.

B) 1. This work is known to be quite necessary. 2. The flower is known to be a differentiated branch of the stem. 3. We know those leaves to be called sepals. 4. The orthotropic ovule is considered to be the most primitive type. 5. They burst and give pollen to be then carried by wind. 6. This is the point to be taken into consideration. We know them to be brightly coloured. 7. Flowers of this sort are said to be "dichogamous". 8. We know the flower to be a combination of different organs.

VII. Translate into Russian paying attention to the pronoun "one":

1. It is pleasant if one devotes himself to learning about what is going on in biological systems. 2. An analytical chemist should know enough about existing methodologies to choose the best one for application. 3. To be a good chemist one must be first of all a good analytical chemist. 4. His car is new, mine is a very old one. 5. Which pen do you like better - this one or that one?

VIII. Fill in the blanks with "few", "a few", "little", "a little":

1. Very \_\_\_ students know English well. 2. There are \_\_\_ students in our group who speak German. 3. She has \_\_\_ friends. 4. Give me \_\_\_ milk. 5. The little boy asked \_\_\_ bread. 6. There is \_\_\_ water in this river in summer. 7. They've got very \_\_\_ information from the article. 8. This fact was known to only \_\_\_ people.

IX. Translate the text. Use no dictionary.

**Earthworms**

Earthworms live in the soil. They need oxygen. After heavy rain, when the air has been forced out of the soil by the water, masses of earthworms burrow out to the

surface. This is why they are also called rain-worms. Oxygen enters their body through the skin. The act of respiration continues as long as the skin is wet. When it gets dry the worm dies. Since the earthworm spends a major part of its life creeping on the ground, its ventral side is somewhat flattened, while the dorsal surface is more rounded. The dorsal surface is also darker.

The body of the earthworm is composed of segments. It is pointed at the anterior and posterior ends, which makes it convenient for the animal to move in both directions. However the anterior end is muscular and thicker. Animals having different anterior and posterior ends and dorsal and ventral sides are said to have developed bilateral symmetry.

Eyesight and hearing are not important for an animal that lives in the soil. They are not developed in the earthworm. But the senses of touch, taste and smell are quite acute, helping them to find food easily.

The Earthworm is a multicellular animal. The cells, of which its tissues are formed -the epithelium and the muscular and the nervous tissues. The epithelium covers the body protecting it from injury. The cells are very closely bound together, they have no contractile fibers. The muscular tissue consists of tall-column shaped cells whose basic feature is the ability to contract. The contractions of the muscular cells give rise to movements.

The two characteristic features of the nervous tissue are excitability and the ability to pass on stimulations.

The worm's skin is thin and conceals two layers of muscular cells. The one nearer the surface is the circular muscle layer, which can be seen through the skin. Under it is the longitudinal layer, which also consists of cells.

X. Read the texts and say what they are about:

1. When the days become more spring like, insects begin to appear. Where they hide themselves in winter varies with the insect. Some butterflies often hibernate in houses. Others go through a resting stage in an immature form, such as the larvae. They hide in the soil or live in wood through which they bore holes. Many insects are pests, some of them are often ineffective to insecticides. An instance is the *Colorado beetle*. It caused a havoc among potato crops in America and later spread to Europe. The most successful way of controlling this is by picking off the beetles and their larvae by hand. The larvae are red with black dots, and the beetles have yellow bodies with five black stripes down each wing cover.

2. The viral disease "myxomatosis", which almost wiped out rabbits in Great Britain, has been used intentionally to control rabbits in Australia. It has been transmitted to rabbits via infected mosquitoes, but with only limited success. Mosquitoes depend on rainfall and warm weather for breeding, thus are only partly available to infect young rabbits in spring.

## SECTION 6

Grammar:

➤ Infinitive Constructions.

*Practice in the pronunciation of the following words:*

crayfish ['kreɪfɪʃ]

class [kla:s]

Crustacea [krə'steɪʃə]

flea [fli:]

fuse [fju:z]

representative

[reprɪ'zentətɪv] region

['ri:dʒən] antennae [æn'teni:]

skeleton ['skelɪtən]

chitin ['kæɪtɪn]

calcium ['kælsɪəm]

carbonate ['kɑ:bəneɪt]

rigidity [rɪ'dʒɪdɪtɪ]

cephalic [kə'fæɪlɪk]

abdominal [əb'dɔ:mɪnəl]

barnacle ['bɑ:nkl]

sow bug ['sau 'bʌg]

rather ['rɑ:ðə]

appendage [ə'pendɪdʒ]

serial ['sɪərɪəl]

thorax ['θɔ:ræks]

abdomen ['æbdəmən]

uropod ['juərəpəd]

### TEXT

#### **Crayfish**

The crayfish and lobster are representatives of the class Crustacea, which includes aquatic forms such as the crab, water flea, and barnacle, as well as terrestrial forms such as the sow bug. As it is rather characteristic of the arthropods, the crayfish and lobster are distinguished by highly specialized appendages. The study of the appendages offers one of the best illustrations of the principle of serial homology.

The body of the crayfish is divided into head, thorax and abdomen, but the head and thorax are fused into one region. There are 18 segments which are numbered consecutively from 1 to 18 beginning with the antennae of the head. Each segment bears a pair of jointed appendages.

The entire body of the crayfish is covered with a hard, shell-like skeleton, composed of a substance called chitin, which is secreted by underlying cells and made hard by the deposition of calcium carbonate in it. The rigidity of the body is maintained by the exoskeleton.

On the ventral surface of the thorax there are paired appendages. The cephalic region is provided with several sense organs. There is a pair of eyes located on movable stalks. Located in front of the eyes is a pair of short, forked filament-like structures called antennules. The openings to the balancing organs are situated in the bases of the antennules. The mouth and mouth appendages are located on the ventral surface of the head region.

The abdominal region is divided into 6 distinct segments, 5 of which bear appendages known as swimmerets, while the sixth segment displays a pair of broad, fan-shaped uropods.

## Active Words

crayfish, n. – рак,  
lobster, n. - омар,  
flea, n, - блоха,  
barnacle, n. - морская уточка,  
terrestrial, a. - земной, сухопутный,  
sow bug, n. - мокрица,  
distinguish, v. — различать,  
appendage, n. - придаток,  
thorax, n. - грудь, грудная клетка,  
abdomen, n. - живот, брюшко,  
fuse, v. – сливаться,

region, n. - область, часть,  
jointed - членистые,  
entire, a. - весь, целый,  
cover, v. - покрывать,  
underlying - низлежащие,  
maintain, v. - поддерживать,  
abdominal, a. - брюшной,  
swimmeret, n. - брюшная ножка,  
uropod, n. - уropод,  
movable, a. - подвижной,  
in front of- перед.

## Exercises

### I. Translate the following derivatives:

1) mix, mixed, mixer, mixing, mixture; 2) concentrate, concentrated, concentration; 3) decompose, decomposer, decomposing, decomposition; 4) use, useful, useless; 5) solve, solvent, solution, solubility.

### II. Group the words into pairs of synonyms:

Investigation, if, process, procedure, provided, entirely, search, totally.

### III. Group the words into pairs of antonyms:

Original, rapidly, start, insoluble, as high as, final, slowly, complete, in particular, above, as low as, soluble, below, in general.

### IV. Translate the following into Russian:

1) crayfish and lobster; thorax and abdomen; swimmeret and uropod; body and appendage; receptacle and vesicle; tissues and bones; blood and lymph;

2) abdominal and ventral; movable and quick; terrestrial and aquatic; common and unusual; fibrous and nervous; entire and pliable;

3) to distinguish certain features; to represent some terrestrial creatures; to cover the body with chitin; to maintain the constant shape of the body; to bear jointed appendages; to secrete particular substance; to compose different tissues; to possess some common features;

4) in front of the eyes; with the exception of the first segment; in general; because of the underlying cells; it is due to the distribution of yolk in the egg.

### V. Listen and translate the following sentences:

The class of Crustacea included many forms, aquatic and terrestrial. The crayfish is a representative of aquatic forms. It is distinguished by its highly specialized jointed appendages. The parts of its body are head, thorax and abdomen. The entire body is covered with chitin which is hard and forms a shell-like skeleton.

It maintains the shape of the body. The sense organs are located on the head region. The abdomen consists of segments which bear swimmerets and uropods.

VI. What are the English equivalents of:

1. Надземные и водные формы, членистые придатки, все тело, низлежащие клетки, брюшная часть, головная область.

2. Этот класс представлен, они различаются по, они известны как, их называют, его можно разделить на, они составлены из.

3. Этот класс представлен раком и омаром. Они отличаются высоко специализированными придатками. Тело делится на несколько частей. Первые две части сливаются в одну. Устойчивость тела поддерживается скелетом. Это вещество выделяется клетками, лежащими под хитиновой оболочкой. Это явление иллюстрируется несколькими примерами.

VII. Answer the questions:

1. What forms represent the class of Crustacea? 2. What class do the crayfish and lobster belong to? 3. What is the crayfish distinguished by? 4. What parts is its body divided into? 5. How many segments are there? 6. In what way are they numbered? 7. What does each segment bear? 8. What is the body of the crayfish covered with? 9. Where are the sense organs situated? 10. Where is the mouth found?

VIII. Define the function of the Infinitive in the following sentences and translate them into Russian:

1. To do this work we must know the structure of a typical plant. 2. To analyse a plant is not an easy task. 3. To skate is pleasant. 4. The work to be done was a very essential one. 5. Such was the conclusion to be made. 6. The question will be discussed at the conference shortly to open in Moscow. 7. He wishes the work to be done at once. 8. I should like her to be invited to the concert. 9. The train is expected to leave in the evening. 10. Our scientists are known to have made many discoveries in this field of biology. 11. To be a good chemist one must be first of all a good analytical chemist. 12. Scientists considered absorption from solutions to be physical or chemical. 13. The purpose of the article is to show the necessity of this experiment. 14. To carry out measurement water was passed through a glass siphon. 15. The results to be presented in the article will provide no evidence for these changes. 16. A number of questions remain to be answered. 17. We know carbon to occur in two crystalline forms that differ in their properties. 18. The organic compounds to be discussed are of great importance in the study of plastics.

IX. Translate the following text. Use no dictionary.

The fresh-water Crayfish is found through the Soviet Union. It lives on the beds of rivers, lakes and ponds where it crawls (to crawl - ползать) on its long, jointed legs. Its body is divided into two sections: the cephalothorax and the abdomen. The cephalothorax carries two pairs of antennae, compound eyes, mouth-

parts and ten segmented legs. The abdomen consists of segments. Each segment carries a pair of short appendages. The abdomen ends with flattened solid appendages, the uropods. The last uropod carries the anus. The body of the crayfish is protected by a chitinous exoskeleton, which is thick and hard. The chitinous cover is rigid. The muscles under the exoskeleton are covered by a thin epithelium, the hypodermis, which secretes a new layer of chitin each time the animal moults (to moult - линять). The eyes are compound and located on movable stalks. The long antennae serve as feelers, the short ones act as organs of smell.

X. Read the text, say what it is about. Give a short summary.

Microorganisms constitute the majority of the living being inhabiting our planet. Among the most widely spread microorganisms there are so-called *actinomycetes*, the ray fungi capable of synthesizing such vital substances as amino-acids, enzymes, vitamins, antibiotics and a number of other compounds. Nikolai Krasilnikov, Correspondent Member of the USSR Academy of Sciences, is the founder of the Soviet School of actinomycetes research. He directs the research work being done in this field at the Institute of Microbiology. "My research group", the scientists said, "studies problems which are not of theoretical, but of great practical importance for medicine and agriculture. Some of our achievements are connected with the unique qualities of microorganisms, such as the high rates of their multiplication, and their extraordinary ability to synthesize biologically. For example, we have isolated a group of organisms capable of synthesizing a number of new antibiotics used in medicine. These include antitumour preparation known as chrysomallin. Chrysomallin has passed chemical tests at the Institute of Oncology and proved especially effective in treating cancer of the sexual organs. We are now busy improving the new antitumour preparations."

XI. Translate the following texts with the help of a dictionary:

**In Place of Penicillin**

A new antibiotic, *cefazolin sodium*, is proving highly successful against pneumonia bacteria that have developed a resistance to penicillin and other common agents. Doctors of Louisville School of Medicine who have been working with the antibiotic say that it is effective when penicillin fails. They have not observed any dangerous side effects from its use.

Reporting on tests with 30 patients ranging in age from 19 to 89 years, the Kentucky doctors report success and no bad side effects in 29 cases.

Drugs from the same family as cefazolin sodium - the *cephalosporins* - are also effective against penicillin-resistant infections of heart and blood vessels, according to medical scientists at the Henry Ford Hospital in Detroit.

Such Infections, causing endocarditis, are becoming more common and more lethal as open-heart surgery comes into greater use and as bacteria become more resistant to older antibiotics.

### **Coffee and Heart Trouble**

A team of doctors at the National Naval Medical Center in Maryland has just concluded a study on coffee drinking. Since Americans drink half of the coffee consumed in the whole world, some of the team's findings drew wide interest.

Two or three cups of coffee a day - one at a sitting - helps perk up the drinker, relieves fatigue, adds to alertness.

But five or more cups a day can damage the central nervous system, elevate fatty acids and blood-sugar levels, and thereby burden the blood vessels and heart.

Advice from the team: Don't start children drinking coffee at an early age; wait for a while before having a second cup; never take more than two cups at a sitting



## SECTION 7

### Grammar:

#### ➤ Infinitive Constructions.

#### Practice in the pronunciation of the words:

phylum ['faɪləm] - phyla ['faɪlə]  
chorda ['kɔ:də] - chordae ['kɔ:di]  
Chordata ['kɔ:dətə]  
chordate ['kɔ:deɪt]  
notochord ['nɒtəkɔ:d]  
comprise [kəm'praɪz]  
diverse [daɪ've:s]

vertebra ['və:tibrə] - vertebrae ['və:tibrɪ]  
vertebrate ['və:tibrɪt]  
dorsal ['dɔ:səl]  
length [leŋθ]  
pharyngeal ['færɪŋgəl]  
abundant [ə'bʌndənt]  
China ['tʃaɪnə]  
ton [tʌn]

### TEXT

#### Phylum Chordata

The great Phylum Chordata comprises animals which are very diverse in form and structure; within this group primitive chordates without backbones (vertebrae) such as the worms, as well as complex vertebrates such as man are found. All are alike, however, in possessing the following chordate characteristics at some time in their life: 1. a notochord, which is a supporting rod of connective tissue lying near the dorsal surface and extending nearly the entire length of the body; 2. pharyngeal clefts (gill slits) in the wall of the pharynx; and 3. a central nervous system in the form of a dorsal hollow nerve tube. The representative is amphioxus (branchiostoma). It is a small somewhat fishlike animal which is so abundant on the seacoast of China that at certain times it is collected by the tons of human consumption. It is of special interest because it shows the fundamental characteristics of this phylum. The amphioxus is thought by some zoologists to have descended from the same primitive stock which gave rise to the vertebrates, thus serving as something of a connective link between the animals with and without backbones.

#### Active Words

phylum (pl. phyla), n. - тип,  
chorda (pl. chordae), n. - хорда,  
pharynx, n. - глотка,  
vertebra (pl. vertebrae), n. - позвонок,  
vertebral, a. - позвоночный,  
vertebrate, n. - позвоночное животное,  
backbone, n. — позвоночник  
tube, n. - трубка,  
extend, v. - тянуться, простираться,  
consumption, n. - потребление,  
cleft, n. — щель,

alike, a. - одинаковый, похожий,  
pharyngeal, a. - глоточный,  
abundant, a. - обильный,  
многочисленный,  
be of interest - представлять интерес,  
same - тот же самый,  
give rise - давать начало,  
link, n. - связь, соединение,  
hollow, a. - полый,  
comprise, v. - включать,  
such as - такой как.

## Exercises

### I. Give antonyms to:

Low, to take, complex, similar, insoluble, cover, male, unable, short, thick, disconnect, fluid.

### II. Choose suitable attributes to the words of column A from the words of column B. Make up sentences with these words:

	A		B
experiment	parts	accurate	stable
method	duct	acid	thermal
solution	feature	evaporated	movable
proportion	amount	fatty	terminal
system	task	hard	seminal
temperature	representative	natural	common

### III. Translate the words. Pay attention to the prefixes:

Degradation, invertebrate, intermolecular, immobile, discover, unusual, disconnect, undesirable.

### IV. State to what parts of speech the following words belong:

a) ambient, conventional, elastic, flexible, suitable, transparent; b) abrasion, dissolution, elongation, flexibility, resistance, resilience, entanglement; c) constitute, formulate, modify, vulcanize; d) loosely, unduly, unusably.

### V. State the key words in the following word-groups. Translate them into

#### Russian:

Body covering; head region; pharynx clefts; backbone structure; connective tissue surface; human consumption amount; hollow tube structure; fresh water crayfish habitat.

### VI. What are the equivalents of:

1. Включать, составлять, состоять из, простираться, различать, сливаться, покрывать, нести, увеличивать.

2. Подвижный, позвоночный, наземный, одинаковый, водный, полый, обильный, такой как, мужской, семенной, женский, конечный, обычный.

3. Глотка, трубка, позвоночник, позвонок, тип, рак, область, омар, мокрица, придаток, червь, черта, желток, количество, жидкость, способность, кость, ткань.

### VII. Translate the following text into English:

К хордовым относятся многоклеточные двустороннесимметричные животные. Вдоль их тела проходит кишечник, начинающийся ртом и заканчивающийся заднепроходным отверстием. Над кишечником лежит

опорный тяж - хорда. Центральная нервная система имеет вид трубки. В течение всей жизни хордовых или только во время зародышевого развития стенки их глотки пронизаны жаберными щелями. Всего известно свыше 40000 видов хордовых.

VIII. Translate the following, change into the Plural, and the Past Indefinite Tense. Give some examples with these constructions:

Is distinguished, is called, is divided, is secreted, is fused, is maintained, is numbered, is situated, is covered, is provided.

IX. Pay attention to the translation of "the same":

1. Scientists hope to learn about differentiation, the process by which cells, all having the same genetic material, differentiate to form tissues of the eye, heart, etc.

2. The second group wrote exercises № 1,3,5; the first group wrote the same ones.

3. The article deals with the same problems discussed at the conference.

X. Translate the sentences with the verb "to call":

1. The road across the Ladoga was called "the Road of Life". 2. The new journal will be called "Cosmos". 3. What is the University for foreign students called?

2. Как назывался Ленинград до революции? 2. Почему город Козлов был назван Мичуринск? 3. Как называется эта часть растения?

XI. Translate the following expressions and use them in sentences of your own:

To be of some interest, to be of great importance, to be of practical significance, to be of some colour, to be of low (high) value, to be of complex structure.

XII. Define the function of the Infinitive in the sentences. Translate them into Russian:

1. Plastics is a material to be widely used in industry. 2. We know the crayfish to be a common representative of the Class Crustacea. 3. The plan to be discussed is of great interest. 4. This substance, called chitin is supposed to be secreted by the underlying cells. 5. The difficulties to be overcome seemed irresistible. 6. To get new additional information he made thousands and thousands of experiments. 7. This is a book to be obtained only in the public library. 8. Those are the days not to be forgotten.

XIII. Translate the following sentences with Gerund:

1. His having studied mathematics systematically helped him to develop logical thinking. 2. This article describes the expedition having traveled to the East.

3. Having finished experimenting he continued his research. 4. A great joy for the

children was their having presented flowers to the space pilot. 5. He had to leave without having finished his report. 6. Our being taught English literature gives us much pleasure. 7. They heard of your being wounded in a road accident a week ago. 8. We know of many new cities having been built in the remotest comers of our great country. 9. Scientists have discovered a way of taking living cells apart and putting them together again. The cell body - the cytoplasm - contains the machinery for carrying out the instructions of the genes and chromosomes.

IX. Translate the text. Use no dictionary:

### **Phylum Chordata**

This phylum contains some 40000 species of fishes, amphibia, reptiles, birds and mammals. All of its members have bilateral symmetry, some degree of segmentation, and an internal skeleton. But they have three unique features.

1. All chordates possess a flexible, rod like structure, the notochord, at some stage of their development. It is located dorsal to the digestive tract and provides internal support for the body. In most chordates, it is replaced by a vertebral column or backbone long before maturity is reached.

2. At some stage in development, all chordates possess pairs of gill pouches. In aquatic chordates the gill pouches break through forming gill slits. This provides an exit for water that is taken in through the mouth and passed over the gills. In the land chordates, the gill pouches do not break through but become greatly modified during the later course of development.

All chordates possess a hollow nerve cord that develops on the dorsal side of the body above the notochord. At its anterior end it becomes enlarged to form the brain.

## SECTION 8

Grammar:

➤ Revision

Practice the pronunciation of the following words:

genus ['dʒi:nəs]  
species ['spi:ʃi:z]  
exhibit [ig'zɪbɪt]  
roughly ['rʌfli]  
triangular [traɪ'æŋɡjʊlə]  
forward ['fɔ:wəd]  
edge ['edʒ]  
moveable ['mu:vəbl]  
colour ['kʌlə]  
ridge [rɪdʒ]  
thigh [θaɪ]

posterior [pəʊ'stɪəriə]  
limb [lɪm]  
forelimb ['fɔ:lɪm]  
hind limb ['haɪndlɪm]  
forearm ['fɔ:ra:m]  
wrist [rɪst]  
palm [pɑ:m]  
thumb [θʌm]  
plicae ['plɪsi:]  
cause [kɔ:z]  
underneath ['ʌndəni:θ]  
cloacal [klou'eɪkəl]

### TEXT

#### The Frog

The frog exhibits well the characteristics of the most specialized and complex group of animals, the vertebrates.

The head is roughly triangular in shape, with a slit extending around its forward edge, forming the mouth. Two openings, the external nostrils are used as organs of respiration. The eyes are protected by an upper lid and lower lid. The upper lid is capable of little movement, the lower lid is moveable.

There are usually two light-coloured ridges of skin called dermal plicae, A hump may be seen in the middle of the back which is caused by the shape of the skeleton underneath. The cloacal opening is at the most posterior part of the trunk. The under side of the trunk and limbs are lighter in colour than the upper.

The appendages of the frog are forelimbs and hind limbs. The forelimbs are divided into three main parts: the upper arm, forearm and hand. The hand is divided into a wrist, palm and fingers. The thumb is absent in the frog. The three divisions of the hind limb are thigh, lower leg and foot which has 5 webbed toes.

#### Active Words

frog, n. - лягушка,  
triangular, a. - трехгранный,  
slit, n. - щель,  
forward, a. — передний,  
edge, n. - край,  
external, a. - наружный, внешний,

hand, n. - кисть,  
wrist, n. - запястье,  
palm, n. - ладонь,  
thumb, n. - большой палец,  
thigh, - бедро,  
upper, a. - верхний,

internal, a. - внутренний, trunk, n. - туловище, limb, n. - конечность, forelimb, n. - передняя конечность, hind limb, n. - задняя конечность, upper arm - плечо, forearm, n. - предплечье, webbed - перепончатый,	lower leg - голень, lower, a. - нижний, nostril, n. - ноздря, lid, n. - веко, toe, n. - палец на ноге, respire, v. - дышать, respiration, n. - дыхание, protect, v. - охранять, защищать, cause, v. — вызывать, причинять.
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### Exercises

I. Translate the following international words:

Protoplasm, nucleus, membrane, mitosis, amoeba, transmission, stimuli, epithelial, nervous, muscular, secrete, fibrous, embryology, cytoplasm, anus.

II. Translate the words. Pay attention to the negative prefixes:

- 1) unknown, unusual, unlimited, unlocated, unequal, unnecessary;
- 2) discover, disconnect, disappear;
- 3) insignificant, independent, inactive, immovable.

III. Find Russian equivalents to the following word-groups and sentences:

- 1) external structure, internal organs, entire body, upper surface, the same limbs, underlying tissues, movable parts;
- 2) to respire oxygen, to protect from injury, to cause injury, to extend along the body, to be of great interest, to give rise to life;
- 3) Muscle is elastic substance in an animal body that can be tightened or loosened to produce movement. Hollow is something with a hole or empty space inside. Abundant means more than enough. Frog is a small cold-blooded tailless jumping animal living in water and on land. Triangle is a plane figure with three straight sides; and three points are not in a straight line. Edge means the outer limit or boundary of a flat surface, e.g. to sit on the edge of a table; the edge of a lake.

IV. Translate the following text into English:

Среда обитания зеленой лягушки - берега прудов и рек. У лягушки выпуклые глаза и ноздри. Широкое, короткое тело лягушки состоит из туловища и головы, лишено хвоста. Она имеет две пары хорошо развитых конечностей - передние и задние ноги. Ноги лягушки соответствуют парным плавникам рыб но имеют более сложное строение. Передняя нога состоит из плеча, предплечья и кисти с четырьмя пальцами. Между длинными пальцами плавательная перепонка. Голова её заострена, шеи нет. Зубы очень мелкие, только на верхней челюсти. Верхнее веко - мало подвижно, нижнее - подвижнее. Над ртом расположена пара ноздрей.

V. Listen and translate:

The frog is found on the banks of rivers or ponds. It has two natural environments. It can live in the water and on land. The body is thick and short, without a tail. The head continues rear wards into a trunk, and there are two pairs of limbs. The limbs correspond to the paired fins of the fish, but each has three separate bones. When on land, the frog moves by leaping. Its powerful hind legs are ideally adapted for this purpose. The hind limbs are of great importance for swimming: the feet are webbed.

VI. Finish the sentences:

1) The Frog represents... 2) The shape of its head is... 3) The nostrils are used as organs of... 4) The eyes are protected by... 5) The lower lid is... 6) The appendages are... 7) The forelimb consists of... 8) The hind limb consists of... 9) The thumb is...

VII. Answer the questions:

1) What characteristics does the frog exhibit? 2) What group of animals does it represent? 3) What are the main parts of the body? 4) What are its appendages? 5) What is the form of the head? 6) What are the eyes protected by? 7) Are the lids movable? 8) What are the dermal plicae? 9) What is the colouration of the frog? 10) What does the forelimb consist of? 11) What are the divisions of the hind limb?

VIII. Make up simple sentences using infinitive constructions:

1) It is known that this problem is rather complicated. 2) We think that this theory is of great importance for our subsequent investigations. 3) It is supposed he studied the habits and the mode of life of Protozoa. 4) It is known that the head of the frog is of triangular form. 5) It is known that the limbs consist of 4 parts. 6) It is known that the external nostrils are used as organs of respiration.

IX. Translate the sentences. Pay attention to the Gerund with preposition:

1) It was impossible to do anything without consulting him. 2) You should aim at pronouncing English words better. 3) I insist on your working in our lab. 4) I am surprised at your doing nothing. 5) I am pleased to meet you after hearing so much about you. 6) After having written the exercise, I began to doubt whether it was correct.

## SUPPLEMENT

### Texts for home-reading

#### Text 1

#### Bonsai Trees



Bonsai is the art of growing trees in a confined space to simulate the environmental conditions that give trees some of their most stunning and beautiful effects. Bonsai is not stunting a tree's growth but causing the plant to grow slowly and in specific directions. The goal is to use a small plant to "suggest" a larger natural scene. The word bonsai is translated roughly as "tree in a tray or pot". Bonsai trees are miniature reproductions of trees in their natural state.

When properly cared for, these trees can live for many years. Examples exist today of bonsai almost 500 years old.

The art of growing bonsai trees, which originated in China as far back as 200 B.C. and spread to Japan in the tenth century, included a variety of trunk and planting styles. Some criteria of beauty include the shape and size of roots and the shape and branching of the trunk. Also important is the arrangement of the branches and foliage. Some bonsai even have reproductive structures such as cones, flowers, or fruit. Bonsai trees can be shaped in a wide variety of styles designed to simulate nature, including formal upright, informal upright, slanting, cascade, and windswept.

Although the art of bonsai can be painstaking and complex, here is a quick and easy way to create these miniature art forms with few resources and minimal time and effort.

- Select a species. You can use trees, shrubs, or even vines. You will want



a relatively small plant, such as one that you can purchase in a small container at a nursery.

- Select a shallow, decorative container. A bonsai in a glazed container requires less frequent watering.

- Select a small specimen and prune the roots and shoots considerably so that they fit easily in your container.

Decide which direction the resulting bonsai will face, and shape accordingly.

- Add small rocks to the bottom of the container for good drainage. Use potting soil for a growth medium. Plant your bonsai. Cover the soil surface with pebbles or gravel according to your tastes.

- Supply water frequently, especially if the container is small, and small amounts of slow-release fertilizer occasionally.

- Place the bonsai in the level of light it prefers in nature. If the plant is in high light, water frequently.

- Wrap tape or wire around individual branches to encourage growth in a particular orientation. Once you have oriented the branch correctly, remove the tape or wire.

- Be prepared to experiment and learn by doing.

Exercise 1. Answer the following questions:

1. What is bonsai?
2. What is the goal of bonsai?
3. How is the word “bonsai” translated?
4. Bonsai trees are miniature reproductions of trees in their natural state, aren't they?
5. What is the age of bonsai trees?
6. Where did the art of growing bonsai trees originate in?
7. What century did the art spread to Japan?
8. What do some criteria of beauty include?
9. Is the arrangement of the branches and foliage important or not?
10. Do bonsai have some reproductive structures?
11. Can bonsai trees be shaped in a wide variety of styles?
12. How can the art of bonsai be characterized?
13. Is there a quick and easy way to create bonsai trees?
14. What are the procedures necessary to grow a bonsai tree?

Exercise 2. Retell the text using key phrases:

- Bonsai trees
- most stunning effects
- grow slowly
- tree in a tray
- miniature reproductions

- 500 years old
- originated in China
- planting styles
- branching of the trunk
- reproductive structures
- to simulate nature
- minimal time and effort



## Text 2 (part I)

### Food fight

*Some call them Frankenstein foods. Genetically modified fruit and vegetables are on store shelves, and Canada is leading the cheering for them. But are they safe?*  
 (by Thomas Walkom, National Affairs Writer) The fight over genetically engineered food has all the drama of a sophisticated thriller.

At one level, it is story of high-level politics and international intrigue, as countries where the technology is firmly entrenched - particularly the United States, Australia and Canada - alternately woo and bully the rest of the world to accept genetically engineered crops.

At another, it is a story of action leavened by farce.

Last month, for instance, a gaggle of British Greenpeace - dressed in white decontamination suits and led by their executive director, Lord Peter Melchett - charged into a farmer's field to destroy genetically engineered crops.

As bemused reporters looked on, angry farmers retaliated by smashing Greenpeace vehicles with their tractors and chasing protesters through the waving fields of corn.

The British press quickly dubbed genetically engineered food "Frankenstein food".

There are health scares and allegations of cover-ups: Arpad Pusztai, a respected British scientist, warns that a certain type of genetically engineered potato damages the immune system of rats; he is immediately fired from his job with a government-

funded research institute, while his findings are dismissed by fellow researchers from Britain's Royal Society as flawed and inconclusive.

Was Pusztai engaging in fishy science? Or, as is claimed by his supporters (including, oddly monarch, Prince Charles), was he sandbagged by a pro-biotech scientific/government establishment wedded to the technology?

Studies from Cornell University, Iowa State University and Switzerland report that genetically altered corn appears fatal to the monarch and other butterflies. A problem? Or, as supporters of genetic engineering such as the University of Guelph's Dong Powell insist, a tempest in a teacup?

And throughout North America, super-weeds-the result of herbicide-resistant, genetically engineered crops — are on the rise.

At the base of it all, as in any good drama, is money. Lots of money.

Those behind the technology include some of the most powerful firms in the word, companies such as St. Louis-based Monsanto Co. and Switzerland's Novartis Ag, which have gambled billions on their bet that biotechnology will be the ware of the future.

Certainly, the science is futuristic. Since 1982, when Monsanto scientists made one of the first commercial breakthroughs, genetic splicing has taken off in directions that, to the layman, would seem bizarre.

Fish genes have been inserted into strawberries, viruses into squash, bacterial genes into corn.

Monsanto has even purchased rights to what is called "the Terminator", a genetic technology designed to create plants that won't reproduce (meaning that anyone who relies on them would have to rely on Monsanto or other biotech firms for future crops).

(from The Toronto Star, August 22,1999)

Exercise 1. Match words and their definitions:

- |                               |  |
|-------------------------------|--|
| - immune system               | - a genetic technology designed to create plants that won't reproduce  |
| - genetically engineered food | - the use in science and industry of living things such as cells and bacteria, to make drugs or chemicals, destroy waste matter etc.   |
| - biotechnology               | - a vegetable, virus etc. that is genetically engineered has been produced by method that involves changing the structure of its genes |
| - breakthrough                | - the system by which your body protects itself against disease  |
| - "the terminator"            | - an important new discovery in something you are studying, especially one made after trying for a long time                           |

Exercise 2. Agree or disagree with the following statements. Use the following expressions:

- |                       |                        |
|-----------------------|------------------------|
| - I fully agree.      | - By no means!         |
| - I quite agree here. | - Far from it!         |
| - That's it!          | - Not in the least.    |
| - Exactly so.         | - Nothing of the kind! |
| - Precisely.          | - On the contrary!     |

1. Arpad Pusztai, a respected British scientist warns that a certain type of genetically engineered potato damages the immune system of rats.

2. Genetically altered corn appears very useful to the monarch and other butterflies.

3. Argument about genetically engineered food is a tempest in a teacup.

4. Superweeds throughout North America are the result of herbicide-resistant, genetically engineered crops mating with their more common cousins.

5. At the base of genetically engineered food is money.

6. The most powerful firms are behind the technology?

7. Biotechnology will be the wave of the future.

8. Fish genes have been inserted into strawberries, viruses into squash, bacterial genes into corn.

### **Text 3 (part II)**

In both Canada and the U. S. genetically engineered crops took off. In Canada, an estimated 55% of canola, 45% of corn and 25% of soybeans grown are genetically engineered. In the U. S., the percentages are higher.

Now, genetically modified soy, canola, corn, potatoes, cotton and other crops are mixed randomly with their normal counterparts in grain cars, mills and processing plants.

The food processors that receive the raw ingredients have no idea which are genetically altered. And except for those who buy organic products (which, in Canada, may contain no more than 5% genetically modified material), neither do the final consumers.

As a result, Canadians consume tonnes of genetically engineered foods each day - from corn and potato chips to breakfast cereal; from whiskey to jam.

For not only did Canada and the U. S. not require labeling, both also insisted that no one could engage in any form of labeling that suggested genetically engineered forms were somehow bad for human health.

In fact, to even advertise a product as free from genetic modification might be deemed illegal in Canada.

Bart Bilmer, a biotechnology regulatory officer with the Canadian Food Inspection Agency, says the problem with the term "genetically modified" is that it has bad connotations for consumers.

(from The Toronto Star, 1999)

Exercise 1. Answer the questions:

- How many percents of genetically engineered crops are there in Canada and the U. S.?
- Do the food processors have any idea about the raw ingredients they receive?
- How many genetically modified foods do Canadians consume every day?
- What did Canada and the U. S. insist on?
- What might be deemed illegal in Canada?
- What is the problem with the term “genetically modified” according to some officials?

**Text 4**

**Plants have lasting appeal**

Heirloom plants are special garden treasures. Sometimes precious seeds are handed down from one generation to another. And often gardeners who do not have such family traditions, but who value the history that old-time varieties of flowers and vegetables bring to a garden, will delight in growing them for that.

While plant hybridizers are working to constantly come up with new varieties of old favourites, at some companies the goal is to keep the old strains strong and true to their own heritage.

For example, the “Sensation” series of tomatoes and the “Royal” family of sweet peas have been kept as pure as possible.

While new varieties of tomatoes are popular for their disease resistance and near-perfect appearance, a few of the old ones keep their place in gardeners’ hearts.

“The tomato called Brondywine is close to 100 years old”, notes Yates.

“The fruit is not perfect looking and it has zero disease resistance, but it taste absolutely wonderful.”

Exercise 1. Find the words definitions given:

1. A small plant that is grown for the beauty of this part.
2. A valuable object that has been owned by a family for many years and that is passed from the older members to the younger members (heirloom [ealu:m]).
3. Especially BrE a piece of land around or next to your house where you grow flowers, plants, or vegetables.
4. A plant such as a cabbage, carrot, or potato which is eaten raw or cooked and is usually not sweet.
5. Something that consists of or comes from a mixture of two or more other things.
6. Important qualities, customs, and traditions that have been in a society for a long time.

(Key: flower, heirloom, garden, vegetable, hybrid, heritage)

## Text 5

### **These wonderful orchids - most beautiful blossoms in the whole world**

As usual, there were many visitors on traditional home growing flower exhibition being arranged in every autumn by Moscow Nature Protection Society.

There was some crowd of people before an extraordinary unusual plant and they looked at it with silent admiration. Every one of short thick bulb-like stems was terminated by pair of dark green tongue-like leaves. And thin but firm stalks were arising from lower part of the plant bearing huge bright beautiful flowers of fantastic shape. They slightly resembled a hand with fingers spread wide; their varnished petals were of bright “tiger” color-yellow with red-brown spots and bars. There was such abundance of these flowers, that they almost covered the plant. This was *odontoglossum* - the orchid from Guatemala. But most amazing was that the owner of this wonder being already not quite young and an extremely busy person managed to grow it in usual flat conditions.

#### Exercise 1. Give English equivalents:

Похожий на луковицу; темно-зеленые, похожие на язык листья; фантастические по форме; ладонь с растопыренными пальцами; огромное количество цветов; обычная городская квартира; энтузиаст-любитель выращивания орхидей.

#### Exercise 2. Translate the text into English with the help of the dictionary:

Что цветки орхидей красивы и не просто красивы, а красивее других цветков - известно почти всем. А о том, что цветки орхидей бесконечно разнообразны, знает далеко не каждый. Велик диапазон размеров цветков орхидей: от нескольких миллиметров в диаметре до почти метрового размаха лепестков. Некоторые курьезные и даже не похожи на цветок, напоминающие то изящную дамскую туфельку, то какое-то загадочное животное. Другие роскошные, пышные, объединяющие в себе все самое лучшее, что только мы понимаем под словом цветок.

## **Zoology**

### **Text 1**

#### **The Bee**

The bee has been man's companion since time out of mind. He has seen it behind him for millennia, and for this reason he believes that he knows everything about it. More has been written about it, it seems that about any other living creature.

According to the beliefs of Ancient Egyptians, the soul, after parting with the body, often assumed the form of the bee. It is considered obligatory always to address the bees nicely and courteously, lest they take offence and abandon the hive.

Indeed, if we were to collect everything that has been written about bees, we would have an enormous library. And if we were, in addition, to write down all the legends, tales, beliefs and rites connected with bees, the library would be increased many times over.

But long before man began making up legends and studying bees, he began to use them, or rather to use the fruit of their labours - honey.

Exercise 1. Translate the text without a dictionary.

Exercise 2. Tell the class about everything you know about bees.

### **Text 2**

#### **Domestication of bees**

Of course it is not known who came up with the idea of "taming" bees, but we do know that "tame bees" were already known to Ancient Egyptians nearly 6 thousand years ago. This is borne out by the picture archeologists have dated as belonging to the 25- century BC. The picture shows an apiary belonging to a temple, and two bee-keepers standing by man-made hives.

For a long time it was believed that it was the Ancient Egyptians who domesticated the bee.

However, in 1961 a town whose age was estimated to be 7,000 years was excavated in Turkey. And the frescoes in the houses and the temple there portrayed not only bees but even a honeycomb frame!

So it wasn't the Egyptians but the Turks who first domesticated bees? Then again, perhaps Armenians, and not Turks?

There is a district in Armenia which is called Megri. Its name is derived from the Armenian word "megr", which means "honey". It is held by some that this was the main and first centre of the domestication of bees. Moreover Armenians, it appears, released swarms of bees against their enemies, and thus put them to flight. Apparently the Armenians had a good knowledge of the ways of bees and could make them do what they wanted.

There is no doubt that bees were well known and respected in Ancient Greece and Rome.

The late domestication of the honey-bee in Europe, and, in particular, in Russia, where the most abundant honey harvests were gathered, is explained by the simple fact that for a long time the local people simply had no need to domesticate bees. The vast forests and steppes yielded large enough quantities of first-rate honey.

Exercise 1. Retell the story using the following key words and word combinations:

Taming bees, archeologists, bee-keepers, man-made hives, ancient Egyptians, Turkey, honeycomb frame, Armenians, Megri, against enemies, late domestication, had no need, first-rate honey.

### **Text 3**

#### **Mulberry silk moth**

In the first place it is a relatively small moth (6-7 cm wingspan). In the second, it is so ill-adapted to wild life that it cannot even fly, and its larva, should it drop from the tree-branch, will never crawl back, and will just starve to death. The silk moth has not always been like that: after living under man's care for countless centuries it has lost all the abilities of a normal wild animal: it is unable to find food independently or even to reach it when it is quite near. For that matter, man doesn't want the silk moth to be independent: he is quite prepared to take care of it, supply it with food and create the most favourable conditions for it. All he wants from the silk moth is its larva, the silkworm, which will spin itself a cocoon in reaching the pupa stage. And it is this cocoon which yields the wonderful silk filament.

Sericulture involves more than the rearing of the moths. The art of sericulture begins with the care of the grain, silkworm eggs, each the size of a pinhead. At a certain season, before mulberry trees break into leaf, silkworm-breeders begin to hatch the grain by taking the eggs into the sun or placing them into a room heated to the necessary temperature. Several days later worms are hatched, tiny things which don't look like worms at all but are dark-brown in colour, have shiny heads and are covered with long hair. They come into this world very hungry, and their keeper, aware of this, immediately transfers them to a special tray and gives them mulberry leaves to eat. The worms have a voracious appetite and eat practically without interruption all their life (which lasts from 40 to 80 days). They only stop eating before molting and during molting. The larvae molt four times and gradually change their colour from dark brown to milk-white. At the same time they shed their hairs and become quite smooth. And, certainly they grow some 25 times over, while their weight increases 9,000 times. And no wonder, since - it has been reckoned-10 thousand larvae eat no less than 200 kilogrammes of leaves within a month.

Once the larvae have matured, it stops eating and starts wandering over the feeding shelf. It no longer seeks food but a place where it can transform into a pupa. And it is the task of the keeper to provide such a place. Special frames are made for the larvae, or sometimes simply bunches of twigs are put up-the larvae are, not too particular as long as the necessary conditions are provided in time. Then the main



process starts - for the sake of which the worms have been fed and pampered - the spinning of the cocoon.

Exercise 1. Answer the questions:

- The size of a silk moth is relatively small, isn't it?
- Is it well-adapted to wild life?
- What does sericulture involve?
- How do the hatched worms look like?
- Do the worms have a good appetite?
- When do they stop eating?
- How does their size and weight change?
- When does the main process start?

## Text 4

### Spiders and science development

It appears that astronomers have long been using cobwebs. To keep the star in focus the photographic camera must be perpetually adjusted. After much thought the astronomers decided to use cobweb filaments. This device is used in the photographing of stars to this day.

English physicists also found a use for cobwebs. In order to catch the small radioactive particles suspended in the atmosphere, a frame with a very fine netting is necessary, among other things. The physicists decided that a cobweb would serve very well. So they made spiders stretch their netting across the frame and obtained a splendid high-frequency sensor.

Engineers, meantime, have been studying the spiders legs, which are devoid of muscle, and yet very strong.

These legs are, in fact, hollow tubes into which the spider sends its blood under high pressure. This makes the leg straighten out, and the spider makes a step, or a jump. Then it lowers the pressure, the blood flows away and the leg bends.

This ability of the spider to raise or lower the blood pressure, also interests physicians. There are so many people in the world suffering from high or low blood pressure, hyper-or hypotension! If only we could find how the spider increases and lowers this tension, thousands of people might obtain quick relief.

Exercise 1. Find a wrong word in the sentence. Change it into a correct one.

1. To keep the star in focus the photographic camera must be temporarily adjusted.
2. After little thought the astronomers decided to use cobweb filaments.
3. In order to catch the small radioactive particles a frame with a very thick netting is necessary.
4. The physicists made spiders stretch their netting across the frame and obtained a splendid low-frequency sensor.

5. The spiders' legs are hollow tubes into which the spider sends its blood under low pressure.

6. There are so few people in the world suffering from high and low blood pressure.

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## **БОТАНИКА И ЗООЛОГИЯ**

### **Сборник текстов и заданий по английскому языку**

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