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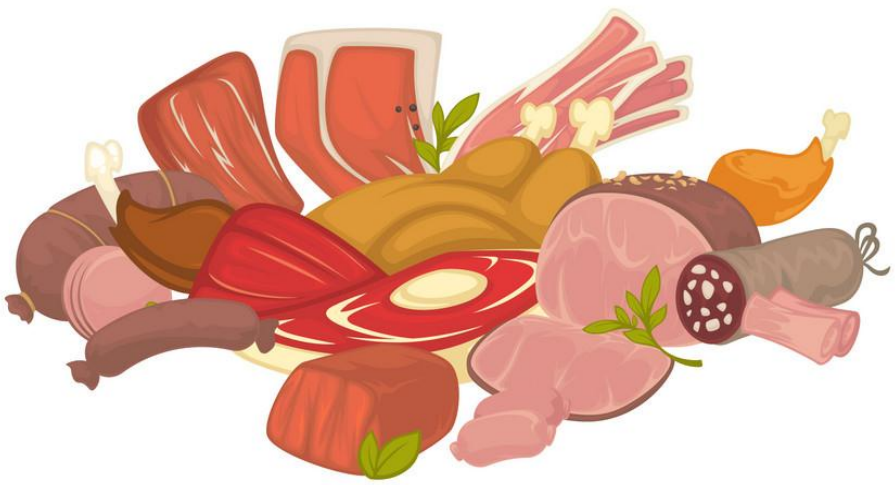
ENGLISH FOR TECHNOLOGISTS
OF PRODUCTION AND PROCESSING OF STOCK-RAISING PRODUCTS

TUTORIAL



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Introduction

The tutorial is prepared for students of specialty “Technology of production and processing of stock-raising products” and for other specialists-technologists.

The book consists of 2 chapters: Academic and General English. Academic English is devoted to scientifically and professionally oriented texts which are adapted to the Intermediate and Upper-Intermediate levels. All texts are followed by vocabulary banks and lexical tasks.

General English is supposed to improve grammatical and lexical knowledge of students. There are also writing and speaking tasks to improve writing and speaking skills of learners.

Навчально-методичний посібник складений для студентів спеціальності «Технологія виробництва і переробки продукції тваринництва», а також для студентів інших напрямків, пов’язаних з продуктами тваринництва. Посібник містить 2 розділи: академічний та загальномовний. Розділ академічної англійської мови складається з професійно-орієнтованих текстів наукового характеру, адаптованих для студентів з середнім та вище рівнем володіння іноземною мовою. Усі тексти забезпечені списками основних слів та завданнями на відпрацювання лексичного аспекту мови. Загальномовний розділ поданий для удосконалення граматичних та лексичних навичок студентів. Він також містить завдання на розвиток навичок письма та говоріння.

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Reading and Grammar practice.

Chapter I

1. MY FUTURE PROFESSION.FOOD TECHNOLOGIST

1. Read and translate the text. Use a dictionary if necessary.

Food technologists develop and improve existing food products and set standards for producing, packaging and marketing food.

Food technologists may perform the following tasks:

- ensure safe and hygienic conditions are maintained during processing, storage and packaging of food;
- check raw ingredients for nutritional value, safety and quality;
- check foods for colour, texture and taste to ensure products meet government regulations and standards;
- develop and ensure food standards;
- demonstrate products to clients;
- develop new products ;
- compare products with those of other brands and analyse market trends;
- supervise the transportation of foodstuffs such as fruit, vegetables and milk, as well as inspect for spoilage and quality deterioration;
- develop quality control procedures for the manufacture of products in plants or factories;
- analyze results and experimental data;
- supervise and coordinate the work of technicians.

Personal Requirements:

- enjoy scientific activities;
- able to take initiative;
- good problem-solving skills;
- aptitude for mathematics, science and technology;
- able to work as part of a team;
- strong reading and writing abilities;
- good observation and communication skills;
- a high level of accuracy;
- good physical health.

2. Answer the following questions.

1. Is it difficult to be a Food Technologist? Why?
2. What are the main tasks of a Food Technologist?
3. What are the main personal requirements of a Food Technologist?

4. Do you want to be a Food Technologist? Why?

3. Give the Ukrainian equivalents to the English ones.

Food products, set standards, packaging, perform, ensure, safe, hygienic, processing, storage, nutritional value, quality, texture, marketing, marketing food, government regulations, develop, market trends, supervise, foodstuffs, inspect, spoilage, quality deterioration, control procedures, manufacture, analyze, experimental data, coordinate, technician, personal requirements, good problem-solving skills, strong reading and writing abilities, good observation and communication skills, a high level of accuracy, science and technology.

4. Match the word with its Ukrainian equivalents.

1. set standards	a) зберігання
2. marketing food	b) спостерігати *за*
3. perform	c) якість
4. ensure	d) санітарний
5. safe	e) поживна цінність
6. hygienic	f) забезпечувати, гарантувати
7. maintained	g) підтримувати, зберігати
8. storage	h) установлювати норми
9. nutritional value	i) безпечний
10. quality	j) виконувати
11. texture	k) тенденції ринку
12. government regulations	l) перевіряти
13. develop	m) державні норми , державні правила
14. Market trends	n) текстура; структура
15. supervise	o) комплекс заходів з вивчення попиту оптимального збуту продукції
16. inspect	p) удосконалювати, розвиватиь, розробляти

5. Match the word with its English equivalent.

1. зіпсований товар, брак	a) good observation and communication skills
2. погіршення якості	b) personal requirements
3. процедури контролю	c) aptitudefor
4. виробництво	d) supervise
5. експериментальні дані	e) scientific
6. перевіряти спостерігати, керувати	f) manufacture
7. координувати, організовувати, узгоджувати	g) health

8. професійні якості, вміння та навички	h) quality deterioration
9. науковий	i) experimental data
10. здатність до самостійного вирішення проблем, прийняття рішень	j) good problem-solving skills
11. здібний до	k) control procedures
12. той, хто легко вивчається	l) a high level of accuracy
13. спостережливість та вміння працювати з людьми	m) spoilage
14. високий ступінь точності (скрупульозність)	n) strong reading and writir abilities
15. здоров'я	o) coordinate

6. Match the sentence parts.

1. Food technologist should enjoy	a) to take initiative.
2. Food technologist should be able	b) scientific activities.
3. Food technologist should have	c) writing abilities.
4. Food technologist should have a high level	d) good physical health.
5. Food technologist should be able to work as	e) of accuracy.
6. Food technologist should possess strong reading and	f) part of a team.

7. Make up sentences.

1. the /tasks / perform / may / food / following / technologists
2. and / existing / develop / food / technologists / products / food / improve
3. for / technologists / check / food/ raw /value / ingredients/ nutritional
4. to / food / demonstrate / clients / technologists / products
5. quality / and / raw / food / for / check / technologists / safety / ingredients / value / nutritional
6. of / packaging / food / during / ensure / food / and / processing / and / safe / hygienic / conditions / maintained / storage / technologists / are
7. quality / in / food / develop / plants / procedures / or / products / technologists / manufacture / factories / control / for / the / of
8. as / quality / deterioration / spoilage / for / as / inspect/ of/ well/ fruit/ food/ and/ as/ supervise/ transportation/ the/ foodstuffs/ technologists/ milk/ vegetables/ such/ and
9. products/ food/ regulations/ technologists/ texture/ taste/ government/ standards/ meet/ colour/ check/ foods/ and/ to/ for/ ensure/ and

8. Compose your own story "My future profession".

2. AGRICULTURE IN UKRAINE

1. Read and translate the text.

Farming plays an important role in the national economy. Ukraine has favourable conditions for the development of agricultural production: temperate climate, **fertile soils**, adequate rainfall and a well-developed industry processing agricultural raw materials. Land is the main wealth of the society. The lands of Ukraine exceed 60 million hectares. Arable land makes up 42 million hectares.

Crop growing and **livestock breeding** are the most important branches in the farming of Ukraine.

All the principle areas of plant cultivation are: grain and industrial crops, fodder plants (forage plants), fruit and vegetable rising.

Such **grain crops (cereals)** as winter **wheat**, **rye**, **oats**, **barley** and **maize**, among which wheat takes the first place, are widely grown in Ukraine. Winter wheat is sown mainly in the Steppe and Forest-Steppe zones. Maize is grown mostly in Transcarpathia and Steppe zones. Such cereals as **buckwheat**, **millet** and **rice** are also grown in our country.

Among the industrial crops such as **sugar-beet**, **sunflower**, **flax**, the leading position is occupied by sugar-beet. Today early varieties of sugar-beet are successfully cultivated and the area under sugar-beet is steadily expending.

Close to 40 types of vegetable crops are grown in Ukraine: **cabbage, tomato, cucumber, red beet, carrot, onion, garlic**, etc. Melon-growing is practiced mainly in the south. Potatoes occupy 6% of total area under cultivation.

Animal husbandry is the second largest component of agriculture. The abundance of fodder plants favours its development. Like plant cultivation, livestock production is divided into branches. The most widespread branch is cattle breeding. The most productive pedigree and **dairy cattle** are raised on the vast pastures of the **non-black soil** zone. Pig rising is another important area. Sheep farming is also practiced.

The **poultry** industry is spread through all the regions. Birds farmed include **chicken, duck, goose, turkey**. There are large mechanized poultry factories to produce eggs and meat.

Fish farming is growing in importance, with carp, being the most common fish. **Trout**, which is to be found in the Mountain Rivers, is of commercial interest.

Bee-keeping is spread through all zones. It is extensively practiced on private plots.

Fur animals' farms raise (rear) such animals as silver and blue fox, mink and nutria.

2. Give the translation of the highlighted words.

3. Answer the following questions.

1. What are two main branches of agriculture?
2. What conditions has Ukraine for the development of agriculture?

3. How many hectares of arable land are there in Ukraine?
4. What are the principle areas of plant cultivation?
5. What grain crops are grown in Ukraine? What is a chief grain crop among them?
6. What vegetable crops are cultivated in our country?
7. What is the most important industrial crop?
8. Does Ukraine go in for stock farming on a very large scale?
9. What favours the development of animal husbandry?
10. What branches is livestock production divided into?
11. Where is the poultry industry spread?
12. What types of fish are farmed in Ukraine?
13. What types of fish are farmed in Ukraine?
14. Where is bee-keeping extensively practiced?

3. Find the synonyms.

1) Abundant *adj*	a) Field *n*, area *n*
2) Cultivate *v*	b) Grain crops *n*
3) Maize *n*	c) Farming *n*
4) Branch *n*	d) To go in for
5) Cereals *n*	e) Animal husbandry *n*
6) Widely *adv*	f) Crop *n*, harvest *n*
7) Livestock breeding *n*	g) Corn *n*
8) Agriculture *n*	h) Grow *v*
9) Yield *n*	i) Rich *adj*
10) to be engaged in	j) Extensively *adv*

4. Translate into Ukrainian:
1. Farming plays an important role in the national economy.
2. Our country has abundant agricultural resources, including favourable climate, adequate rainfall and rich soils.
3. The lands of Ukraine exceed 60 million hectares.
4. Grain crops are widely grown in Ukraine.
5. The area under sugar-beet is steadily expanding.
6. These farmers cultivate early varieties of sugar-beet.
7. Ukraine goes in for stock farming on a very large scale.
8. The most productive pedigree and dairy cattle are raised in our country.
9. The abundance of fodder plants favours the development of animal husbandry.

3. WATER

1. Read and translate the text.

Water is not only the largest single constituent of all living matter, both plant and animal, but also performs very important functions. Neither humans nor animals can live without it. The chemical formula of water is H_2O. This means that its every molecule contains two of hydrogen and one of oxygen. The most active parts of plants and animals contain 70 per cent or more of water. For example, green, growing plants usually have to 80 per cent of water.

In animals the muscles and such internal organs as the liver and kidneys contain 75 per cent or more. The gray matter of the brain is even more watery, having over 80 per cent.

Water performs important functions in plants and animals. It carries the nutrients from one part of the living structure to another. Plants can absorb mineral from the soil when water dissolves them. Water reacts with many types of chemical compounds and the life processes cannot take place without it.

2. Answer the following questions.

1. What is chemical formula of water?
2. What functions does water perform?
3. What is boiling point of water?
4. Is water heavier than ice?
5. What internal organs do you know?
6. Can the life processes take place without water?
7. Do the liver and kidneys contain much water?
8. What does water carry from one part of the living structure to another?

3. Give the plural of the following nouns.

body, animal, process, fly, plant, property, kidney, quantity, life, functions.

4. Form degrees of comparison of the adjectives in the brackets.

1. July is (hot) month of the year. 2. Mil is (useful) product for all mammals. 3. There are (many) bacteria in the ground than on the mountains. 4. The heart is (important) organ in the body. 5. Hydrogen is (easy) than nitrogen. 6. This cowshed is (big) than that one. 7. The climate of Africa is (hot) than that of Europe. 8. The sheep is (small) than the cow.

5. Translate into Ukrainian.

1. Water means life both for plants and animals and is important in the control of their temperature. 2. The evaporation of water is one of the most important means by which animals keep their body temperatures constant. 3. Birds have a lower water requirement than mammals. 4. The various functions of water in

connection with the transportation of metabolic products, with secretion and excretion and with many other body processes are obvious. 5. All feeds – even corn and hay – contain a portion of water varying from 10 to 15 per cent. Roots, such as beets and turnips, contain approximately 90 per cent of water. The water in the feed serves the same purpose as ordinary water which the animals consume. 6. The weight of calves at birth is about one-twelfth that of the cow. 7. The albumin content of colostrum is considerably higher than that of normal milk.

6. Fill in the blanks with corresponding conjunctions and translate into Ukrainian.

1. … plants … animals suffer from different diseases. 2. The body requires … … nutrients, … … oxygen. 3. Any infection passes from animal to animal … by direct … indirect means. 4. … sleep … food are important for health.

7. Pay attention to the words of the same roots and their meanings.

to mean **υ** означати; *meaning* **n** значення; *means* **n** засіб; *mean* **a** середній; *by means of* завдяки; *by no means* ні в якому разі.

8. Translate into English.

1. Кожна молекула води містить два атоми водню й один атом кисню. 2. Ні рослини, ні тварини не можуть існувати без води. 3. Верблюди можуть житии без води довше за інших ссавців. 4. Усі життєві процеси не можуть відбуватися без води. 5. Грунт містить багато мінеральних поживних речовин. 6. Рослини не можуть рости без тепла й світла, які вони отримують від сонця. 7. Сіра речовина мозкумістить 80 відсотків води. 8. Підвищена температура тіла свідчить про захворювання організму.

4. PROTEINS

1. Read and translate the text.

Proteins molecules are very large and complex and due to this complexity convey to living matter a great deal of its variability and specificity. The smallest protein molecule has a molecular weight of about 5,000 and the molecular weight of some proteins is as high as 40,000,000. The protein molecule is composed of amino acids which in turn are composed primarily of carbon, hydrogen, and nitrogen. In some proteins, phosphorous and sulfur are also present.

All living material, plant and animal alike, contains protein, but the type of protein varies considerably, not only from species to species but even between individuals.

Proteins consist of amino-acid molecules bonded by the so-called peptide bond. Each amino acid molecule is composed of a carboxyl group (=COOH) and an amino group ($=NH_2$) bonded to a radical (a group of atoms that acts as a unit but that does not normally exist in a free state) of some kind that contains a carbon skeleton. Twenty-four different amino acids exist in nature. The peptide bond which links one amino acid to another is formed between the carboxyl group of one amino acid and the amino group of another. In the formation of this bond, one molecule of water is given off. When the two amino acids are linked together, they constitute a dipeptide; three, a tripeptide; and a large number, a polypeptide. Protein molecules are composed of large numbers of polypeptide chains.

The number of different proteins which exist in nature is almost unbelievable, since the 24 amino acids can combine in any number and in any sequence to form a protein molecule.

Recently developed techniques permit the determination of the number and sequence of amino acids within an entire protein molecule. Because of these techniques involve an enormous amount of work and time, however, only a few proteins have been studied extensively. Insulin, a hormone secreted by the pancreas, was the first protein to be fully analyzed in this way. It is now known that the insulin molecule consists of two amino acid chains of unequal length. One chain contains only 21 units. These two polypeptide chains are held together by bonds involving two sulphur atoms.

Another protein which has been studied extensively is hemoglobin, the red pigment responsible for the colour of blood. Despite the complexity of its chemical formula the hemoglobin molecule is small- to medium-sized when compared to other proteins. Interest in determining the amino acid sequence within this molecule originated in the study of a pathological condition known as sickle-cell anemia, a condition common in populations in Africa, around the Mediterranean, and in areas where malaria is prevalent. Investigations of this condition soon centered upon the structure of the hemoglobin molecule itself because in affected persons it appears to occupy less space, thus allowing the red blood cells to collapse into sickle-shaped structures. The number and sequence of the 19 amino acids in the hemoglobin molecule have now been determined. The difference between normal hemoglobin and hemoglobin from individuals with sickle-cell anemia involves only one amino acid. In the sickle-cell hemoglobin, valine is substituted in one place for glutamic acid in the normal hemoglobin molecule. The

position of this one amino acid thus makes the difference between a normal condition and a condition which is often fatal.

Proteins are universally present in protoplasm and are primarily responsible for the structural and functional characteristics of living material. For example, all structural membranes associated with the cell have a protein component. The antibodies that help to inactivate and render harmless foreign proteins are themselves proteins. The special characteristics of some protein found in muscle tissue enable muscle cell to contract.

2. Answer the following questions.

1. What is the molecular weight of the smallest protein molecule?
2. What is the protein molecule composed of?
3. Which elements are also present in some proteins?
4. Do all living material, plant and animal contain protein?
5. How many amino acids are there in nature?
6. The peptide bond links one amino acid to another, does not it?
7. What hormone is secreted by the pancreas?
8. How many amino acid chains does insulin consist of? Are there polypeptide?
9. What is hemoglobin responsible for?
10. What is the size of hemoglobin?

3. Give the Ukrainian equivalents to the English ones.

protein, complex, due to, to convey, living matter, molecular weight, amino acid, in turn, carbon, nitrogen, sulphur, bonded by, peptide bond, a radical, a free state, given off, polypeptide chains, to permit, determination, sequence, enormous amount.

4. Match the following words.

1.	Secrete	A	нерівна довжина
2.	Pancreas	B	середовище
3.	Unequal length	C	виділяти
4.	Extensively	D	підшлункова залоза
5.	Medium	E	широкий

5. Make up the sentences using the following words.

- living matter
- a pathological condition
- hemoglobin molecule
- red blood cells
- exist in nature
- associated with
- structural and functional

6. Match the term with its definition.

1.	Bond	A	blood vessel suddenly becomes flat because it does not have any blood in it anymore;
2.	Collapse	B	a substance produced by your body to fight disease;
3.	Hemoglobin	C	a red substance in the blood that contains iron and carries oxygen;
4.	Insulin	D	the force that holds atoms together in a molecule;
5.	Antibody	E	a substance produced naturally by your body that allows sugar to be used for energy;

7. Translate into English.

1. Хімічна структура білка складна.2. Білок надає скелету еластичності.3. Роль білка дуже велика так як він необхідний для росту організму.4. Не тільки протоплазма, а й стінки клітини складаються з білка.5. Всі білки містять азот, вуглець, водень та кисень.6. Білки м’яса, риби та яєць мають надзвичайно велику поживну цінність.7. Білки – складові протоплазми всіх тваринних та рослинних клітин.

8. Make up a plan and retell the text “Proteins” with the help of it.

5. CARBOHYDRATES

1. Read and translate the text.

Carbohydrates are composed of the elements carbon, hydrogen, and oxygen in the ratio of one carbon to two hydrogens to one oxygen. The ratio of hydrogen to oxygen, which is the same as in the water molecule, accounts for the name carbohydrate (literally, "hydrate of carbon").

Carbohydrates are present in protoplasm in a variety of forms, ranging from the simple sugars with their relatively small molecules to the starches and cellulose, which have large and complex molecules. The carbohydrates may be chemically bound to proteins or to fats, or they may be free (that is, not linked to any other kind of molecule). In some tissues, carbohydrates are present in very small quantities; in others (for example, in the liver), the amount ranges as high as 15 per cent by dry weight.

Monosaccharides, commonly referred to as simple sugars, consist of single carbon chains and are the smallest of the carbohydrate molecules. They are usually named according to the number of carbon atoms in each molecule, plus a characteristic "-ose" ending. A three carbon sugar is called a triose; a five-carbon sugar, a pentose; and a six-carbon sugar, a hexose.

The commonest of the simple sugars are glucose and fructose ($C_6H_{12}O_6$). These simple sugars all have the same number of carbon, hydrogen, and oxygen atoms within their molecules but possess different chemical properties because of the arrangement of the atoms within the molecules. Hexose serves as a primary source of energy for cells or organisms. Two other monosaccharides, ribose and deoxyribose, are important to biological system. These pentoses are constituents of the nucleic acids that will be discussed in later section of this chapter.

Disaccharide sugars (two-carbon chains) are formed by the bonding together of two monosaccharide molecules, usually hexoses. Because a water molecule is lost when two such molecules are bonded together, the disaccharide has a chemical formula of $C_{12}H_{22}O_{11}$. Sucrose, or cane sugar, is formed by the bonding of a glucose molecule to a molecule of fructose. Maltose, another disaccharide, is formed when two glucose molecules are bonded together.

A large number of monosaccharide molecules can be bonded to each other to form polysaccharides. As each monosaccharide molecule is added, one molecule of water is lost in the same way as in the formation of a disaccharide molecule.

Starches and glycogen are polysaccharides which represent stored carbohydrates in plants and animals, respectively. When energy is needed by an organism, these stored carbohydrates can be broken down into large numbers of glucose molecules. Cellulose, another polysaccharide found in plants, forms the tough cell wall that gives both support and protection to the individual cell.

In addition to serving as an energy source for an organism or as protection for the plant cell, carbohydrates can also supply the carbon skeletons (carbon atoms linked together and associated with hydrogen and oxygen) that are necessary in the synthesis of other basic components of protoplasm. For example, the hexoses can be split to form two compounds containing three carbon atoms each. The three-carbon compounds or units can then be used to synthesize other essential compounds that normally contain only three carbon atoms.

2. Answer the following questions.

1. What are carbohydrates composed of?
2. Where are carbohydrates present in a variety of forms?
3. What does monosaccharide consist of? What are they usually named?
6. What is a three-carbon sugar called?
6. The most common of the simple sugars are glucose and fructose, are not they?
7. What are disaccharide sugars formed by?
8. What is the chemical formula of the disaccharide?
9. Which polysaccharides are mentioned in the text?
10. Where is cellulose found? What does it form? What does it give?

3. Give the English equivalents to the Ukrainian ones.

вуглеводи, протоплазма, різноманітність форм, крохмаль, целюлоза, хімічно зв’язані, білки, жири, тканини, мала кількість, суха маса, моносахариди, трьох валентний цукор, тріоза, пентоза, гексоза, глюкоза, розташування атомів, первинне джерело енергії, рибоза, дезоксирибоза, нуклеїнові кислоти, дисахариди, сахароза, мальтоза, полісахаради, формування, накопичувати, розпадатися, синтез основних компонентів.

4. Match the following words.

1.	Two-carbon sugar	A	pentose
2.	Three-carbon sugar	B	hesose

3.	Four-carbon sugar	C	triose
4.	Five-carbon sugar	D	disaccharide
5.	Six-carbon sugar	E	tetrose

5. Give the definitions of the following terms.

1.	To range	
2.	To bound	
3.	To store	
4.	To break down	
5.	To supply	

6. Form the adverbs from the following adjectives by means of the suffix *–ly* and translate them.

relative, common, usual, primary, respective, slight, great, especial, abundant, high, absolute, economical.

7. Translate the following sentences into English.

1. Вуглеводи – багато численна та розповсюджена група органічних сполук. 2. Існують прості і складні вуглеводи. 3. Прості вуглеводи – кристалічні речовини, добре розчинні у воді, солодкі на смак. 4. Тварини легко засвоюють прості вуглеводи. 5. Вуглеводи здатні перетворюватися на жири, амінокислоти, білки та інші речовини як у рослинному, так і у тваринному організмах.

6. NUCLEIC ACIDS

1. Read and translate the text.

The nucleic acids (deoxyribonucleic acid, or DNA, and ribonucleic acid, or RNA) are undoubtedly the most significant of the chemical compounds found in protoplasm. On the nucleic acid molecule is coded the genetic information that controls and directs all of the activities of protoplasm. Electron microscope studies

indicate the nucleic acid molecule to be a threadlike molecule with a diameter so small that ten million molecules lying side would occupy only one inch. The molecule is extremely long, however. DNA is a compound of very high molecular weight (over one million).

Just as proteins are composed of amino acids, the nucleic acids are made up of hundreds of nucleotides, each nucleotide being composed of a fine-carbon sugar, a phosphate group (PO_4), and a nitrogen base. The nitrogen base may be either a pyrimidine (Thymine, cytosine, or uracil) or a purine (adenine and guanine). Nucleotides are classified as ribose nucleotides or deoxyribose nucleotides according to the sugar which they contain. Both ribose and deoxyribose are five-carbon sugars, but the deoxyribose molecule contains one less oxygen atom than ribose.

The designation of a nucleic acid molecule as RNA or DNA corresponds to the type nucleotide of which it is composed, each type molecule containing only one kind of nucleotide.

The accepted concept of the structure of the DNA molecule was proposed by Watson and Crick in 1953. In their model, an alternating sugar and phosphate arrangement forms the outside boundaries of the DNA molecule, while base pairs link the two sides together, the bases being attached to the sugar molecule on each side. The bases are not randomly arranged, but adenine and thymine are always paired, as are guanine and cytosine. The double chain which forms the nucleic acid molecule results when the purines and pyrimidines of one chain of nucleotides are bonded through hydrogen bonds to the purines and pyrimidines of the other chain. Each purine-pyrimidine combination is referred to as a base pair. X-ray diffraction studies of the molecular arrangement reveal that DNA is a double helix or a sort of “spiral ladder”, with the alternating sugar-phosphate groups forming the sides and the base pairs forming the rungs of the ladder. Each DNA molecule may have several thousand turns in its spiral configuration and many times this number of base pairs.

There seems to be no restriction on the number or sequence of these particular combinations of purines and pyrimidines within a nucleic acid molecule, and it is the number and sequence of the base pairs which codes the genetic information.

The component parts of the DNA molecule are, in a sense, an “alphabet”. It is the number of base pairs and the arrangement of these base pairs along the

polynucleotide chain which convey to the cell the information which is utilized, through RNA, at the ribosome for synthesizing protein molecules. The portion of the DNA molecule on which is coded a single piece of information is the gene. The size of this segment no doubt is variable in length, depending upon the information coded.

Unlike the DNA molecule, RNA is a single-stranded. Also unlike the DNA molecule, uracil is substituted for thymine in the RNA molecule, so that uracil is paired with adenine. Guanine remains paired with cytosine. Three main types of RNA have been identified: messenger (mRNA), ribosomal (rRNA), and transfer (tRNA). These three types coded information on the DNA molecule.

2. Answer the following questions.

1. What are the nucleic acids?
2. What is DNA?
3. What is RNA? Where are they found?
4. Where is the genetic information coded?
5. What is the molecular weight of DNA?
6. What is the composition of one nucleotide?
7. How are nucleotides classified?
8. Who proposed the accepted concept of the structure of DNA?
9. What do X-ray diffraction studies of molecular arrangement reveal?
10. Is the RNA molecule single-stranded?

3. Give the Ukrainian equivalents to the English ones.

nucleic acids, chemical compounds, is coded, a threadlike, inch, molecular weight, nucleotides, a five-carbon sugar, phosphate group, a nitrogen base, a pyrimidine, a purine, designation, concept, outside boundaries, base pairs, are bonded, X-ray diffraction, double helix, spiral ladder, gene, segment, single-stranded, messenger, ribosomal, to transfer.

4. Match the translations to the following adverbs.

1.	Undoubtedly	**A**	на відміну від
2.	Extremely	**B**	проте
3.	However	**C**	довільно

4.	Randomly	**D**	надто
5.	Unlike	**E**	безсумнівно

5. Match the term with its definition.

1.	Concept	**A**	a series of rings, usually made of metal, connected together in a line, used as jewelry or for fastening things, supporting weights etc.;
2.	Arrangement	**B**	a series of related events, actions etc. which have a particular order and usually lead to a particular result
3.	Chain	**C**	an idea of how smth is or how smth should be done;
4.	Sequence	**D**	a line that curves and rises around a central line;
5.	Helix	**E**	smth that has been organized or agreed on;

6. Complete the sentences using the following word combinations:

- DNA and RNA
- molecular weight
- hundreds of nucleotides
- five-carbon sugars
- Watson and Crick
- “alphabet”
- spiral ladder

7. MINERALS AND VITAMINS

1. Read and translate the text.

MINERALS

Minerals essential for animal life include ***common salt*** (sodium chloride), calcium, phosphorus, sulphur, potassium, magnesium, manganese, iron, copper, cobalt, iodine, zinc, molybdenum, and selenium. The last six of these are poisonous to animals if excessive amounts are eaten.

All farm animals generally need more common salt than is contained in their ***feeds***, so they are supplied with it regularly and should have free access to it at any time.

Of the other ***essential minerals***, phosphorus and calcium are the most important, because they are required to produce bones, milk, and egg shells. Moreover, the latter are nearly pure calcium carbonate. Good phosphorus supplements are bone meal, dicalcium phosphate, and ***defluorinated phosphates***. Calcium may readily be supplied by ***ground limestone***, ground ***shells***, or ***marl*** that is high in calcium. To provide ***livestock*** with both calcium and phosphorus a farmer may allow animals to have free access to such a mixture as 60 per cent ***dicalcium phosphate*** and 40 per cent common salt. Small amounts of iodine are needed by animals for the formation of thyroxine, a compound containing iodine. The latter is usually secreted by the ***thyroid gland*** in the organism. A ***serious deficiency*** of iodine may cause ***goitre***, a disease in which the thyroid gland enlarges greatly. In certain regions goitre has caused heavy losses of newborn pigs, lambs, kids, calves, and foals. Goitre can be prevented by supplying small amounts of ***iodised salt*** to the mother before the young are born. In some areas, soil and forage are deficient in copper and cobalt, which are needed along with iron for the formation of haemoglobin. In these areas, farm animals may suffer from anaemia if the deficiency is not corrected.

Iron, used in ***haemoglobin formation***, is abundantly supplied in most animal feeds, except milk. The only practical problem with ***iron deficiency*** occurs in young suckling pigs before they start to consume other feeds in addition to milk.

Manganese is essential for animals, but the usual rations for all farm animals, except ***poultry***, supply sufficient quantities of this element. A lack of manganese may cause the ***nutritional disease*** of chicks and young turkeys called ***slipped tendon*** and also may cause failure of eggs to hatch. Normal rations for swine are often deficient in zinc, especially in the presence of excess calcium. Adding 100 parts per million of zinc carbonate cures ***zinc-deficiency symptoms***, which include slower growth rate and severe ***scaliness and cracking*** of the skin. A trace of selenium is necessary for normal health of animals; excessive amounts found in forages in some regions poison animals and may cause death. Very small amounts of ***mineralized salt*** are used when copper or cobalt may be required by animals.

2. Give the Ukrainian equivalents to the words in italics from the text.

e.g. ***common salt – кухонна сіль***

essential minerals – суттєво важливі мінерали

3. Complete the table and use it to make an oral presentation about the role of minerals in animal nutrition.

Mineral	**The significance of the mineral**	**The source of the mineral**
Calcium	for animal bones; egg shell; milk production...	ground limestone, ground shells, marl...

4. Read and translate the text.

VITAMINS

The vitamins are classified as fat-soluble and water-soluble. The fat-soluble group includes vitamins A, D, E and K and the water-soluble group – vitamin C and the numerous members of the vitamin B complex.

Vitamin A is a colourless substance of known chemical constitution which is found in the liver oils of fish and animals. It is formed in the animal body from pigments called carotenoids associated in the plant with the green colouring material chlorophyll. Carotene is not very stable and is quickly destroyed in the presence of oxygen. Dried grass of high quality is the best source of the vitamin. Vitamin A deficiency in young cattle is not uncommon. The main signs are failure to thrive, night blindness and, later, total blindness due to damage of the optic nerves. In all animals secondary bacterial infections occur where the deficiency is prolonged, and it may lead to the death of an animal.

Vitamin D was first identified as a substance, present in cod-liver oil, which was essential to the prevention of rickets. Vitamin D, in fact, is often called the anti-rachitic factor. Rickets, the disease due to vitamin D deficiency, is characterized by a failure of the animal to lay down calcium and phosphorus in its bones. Rickets can occur as a result of a deficiency of calcium or phosphorus in the diet.

Vitamin E is a dietary ingredient essential for the reproduction of rats.

Vitamin C is required only by guinea-pigs, humans, and the higher apes, where a lack causes scurvy. Farm animals and birds manufacture the vitamin in their systems.

Vitamin B complex. The remaining water-soluble vitamins are all grouped under this one name. No member of the vitamin B complex is required by adult ruminants, the reason being that the microorganisms of rumen, besides transforming food proteins and breaking down the fibrous constituents of feeds, manufacture the vitamins of B complex in sufficient amounts to meet the needs of their host. Before the rumen of the young animal is fully established it needs a source of these B complex vitamins in its ration, but once the rumen flora is established the need comes to an end. Recent experiments have shown that horses do require some member of the vitamin B complex, but it does not appear likely that practical rations would ever be deficient. Hence pigs and poultry, and the farm dog, are the only farm animals which are ever likely to suffer from major deficiencies.

5. Answer the following questions.

1. How are the vitamins classified?
2. What vitamins does the fat-soluble group include?
3. What substances does the water-soluble group include?
4. What is vitamin A like? Where is it found?
5. What are the main signs of vitamin A deficiency?
6. How was first vitamin D identified? Where is it found?
7. What is rickets characterized by?
8. What is vitamin E?
9. Do farm animals and birds require vitamin C and vitamin B complexes?

6. Group the following words into parts of speech.

Noun	Verb	Adjective
vitamin	classify	soluble

includes, numerous, complex, colourless, chemical, liver, is destroyed, stable, uncommon, failure, thrive, lead, was identified, is called, anti-rachitic, is characterized, deficiency, lay down, dietary, scurvy, is required, fibrous, appear, sufficient, suffer, deficient.

7. Fill in the gaps using the words in brackets.

(is prolonged, manufacture, is found, is formed, are likely, is destroyed, includes, occur, is required, is established).

1. The water-soluble group … vitamin C and the numerous members of the vitamin B complex. 2. Vitamin A … in the liver oils of fish and animals. 3. Vitamin A … in the animal body from pigments called carotenoids. 4. Carotene … in the presence of oxygen. 5. Secondary bacterial infections … in all animals, where the deficiency of vitamin A … . 6. Vitamin C … only by guinea-pigs, humans, and the higher apes. 7. Farm animals and birds … the vitamin in their systems. 8. Before the rumen of a young animal … it needs a source of B complex vitamins. 9. Pigs, poultry and farm dogs … to suffer from major deficiencies.

8. Match the term with its definition.

1. vitamin	a) a chemical substance which is found in certain foods, and is important for growth and good health
2. substance	b) the quality of having none or not enough
3. constitution	c) the way in which something is put together, formation
4. deficiency	d) to experience pain, difficulty or loss
5. manufacture	e) to make or produce
6. suffer	f) a material type of matter

9. Translate into English.

1. Заражений об’єкт – це такий, що містить бактерії, здатні викликати хворобу. 2. Вітаміни розподіляють на розчинні в жиру та у воді. 3.Вітамін А – безбарвна речовина відомого хімічного складу, що знаходиться в жиру печінки риб та тварин. 4. Можнапоповнити нестачу вітаміну D, вживаючи риб’ячий жир. 5. Дорослі жуйні тварини не потребують жодного представника комплексу вітаміну В. 6. Нещодавні дослідження показали, що коні потребують деяких вітамінів комплексу В. 7.Бактерії очищують навколишнє середовище шляхом розкладу токсичних відходів, нафти, нечистот. 8. Вітамін D часто називають протирахітним фактором.

13. Use the following table to make a report about the role of vitamins in animal nutrition.

Vitamin	**The importance of vitamin for animal's health**	**The source of vitamin**
Vitamin A	growth, reproduction, milk production, resistance to respiratory infections	animals may convert carotene into vitamin A; green-growing grasses are rich in carotene
Vitamin D	enables animals to use calcium and phosphorus; a deficiency causes rachitis in young growing animals	the ultraviolet rays of sunlight produce vitamin D from the provitamin in the skin; feeding hay crops; certain fish oils
Vitamin E	for normal hatching of eggs; in preventing muscle stiffness and dystrophy in lambs, calves, and chicks	in certain plant oils and the leaves of green vegetables
Vitamins B: thiamine, riboflavin, niacin, biotin, Pantothenic acid, choline, folic acid, B_6, B_{12}	less important for ruminant animals; but very young calves, poultry, swine, and other simple-stomached animals require the B vitamins in their diets	the bacteria in the rumen synthesize these vitamins
Vitamin C	unimportant for animals, but prevents scurvyin humans and guinea pigs	can be synthesized in the bodies of other animals
Vitamin K	usually unimportant	is synthesized by bacteria in the intestinal tract

8. GENERAL FACTS ABOUT MILK

1. Read and translate the text.

Milk is known to be highly nutritious, versatile food that has been used by humans since the beginning of recorded time. People enjoy drinking milk in its natural form and also use it to make a wide range of food products, including cream, butter, yoghurt, cheese, and ice-cream.

Humans drink the milk produced from a variety of domesticated mammals including cows, goats, sheep, camels, reindeer, buffaloes1, and llama. Cow milk is the main type of milk used for commercial production and consumption throughout the world. However, the goat is believed to be an important milk producer in China, India, and other Asian countries and in Egypt. Although goat's milk is also produced in Europe and North America but, compared to cow's milk, goat's milk is relatively unimportant. Dairymen know buffalo's milk to be produced in commercial quantities in some countries, particularly India. In general, whether the milk is obtained from a cow or other species, the technology to be used for its processing will be the same.

It is interesting that the milk of all species contain the same nutrients, varying only in proportions. Although milk is a liquid composing of 80 to 90 per cent water and most often considered to be a drink, it contains between 12 and 13 per cent total solids and perhaps should be regarded as a food. The solid part of milk consists of an abundance of the major nutrients needed by the body for good health, including fats, carbohydrates, proteins, minerals, and vitamins.

Cow milk has been found to contain about 3.5 to 5 per cent fat, which is dispersed throughout the milk in globules. In addition to providing milk's characteristic taste and texture, fat supplies vitamins A, D, E, and K, as well as certain fatty acids that the body cannot produce on its own.

Scientists consider sweet taste of milk to be due to lactose, a kind of sugar found only in milk. Making up about 5 per cent of milk's content, lactose is a carbohydrate that is broken down by the body to supply energy. The most important protein in milk is casein, accounting for 80 per cent of milk protein. Casein is known to be a complete protein, which means that it contains all the essential amino acids. Casein molecules and globules of fat deflect light rays3 passing through milk, giving milk its opalescent4 appearance. Other proteins present in milk include albumin and globulin.

Milk contains many minerals, the most abundant of which are calcium and phosphorus, as well as smaller amounts of potassium, sodium, sulphur, aluminium, copper, iodine, manganese, and zinc.

Milk is likely to be the best dietary source of calcium, for the amount of this mineral in one litre of milk is quite enough to supply as much calcium as 21 eggs, 12 kg of lean beef, or 2.2 kg of whole wheat bread. Milk has been proved to be an excellent source of vitamins A and B_2. Besides, all other vitamins are present also, though in lower amounts. The milk to be sold commercially should be

fortified with vitamin D. Vitamin A found in the globules of fat is removed when fat is skimmed away to make low-fat or skim milk. Generally, vitamin A is also added during the production of commercially sold low-fat milk.

Many factors influence the composition of milk, including breed,genetic constitution of the individual cow, age of the cow, stage of lactation, interval between milkings, and certain disease conditions. In general, the type of feed only slightly affects the composition of milk. However, the feed quality may be too low or its quantity is insufficient to result in either a low yield or a low percentage of total solids. To achieve the greatest efficiency from the herd one should utilize computer programs to optimize the feeding rations to be fed to each milking cow.

9. TYPES OF MILK AND MILK PRODUCTS

1. Read and translate the text. Give the Ukrainian equivalents to the words in italics from the text.

In most countries almost half of the milk consumed is sold as fresh pasteurized whole, low-fat, or skim milk. The rest part of the milk is processed into more stable dairy products of worldwide commerce, such as cream, butter, cheese, yoghurt, dried milks, ice cream, and condensed milk.

Milk in its natural form, directly from a cow, is called ***raw milk.*** It is an extremely versatile product from which a countless number of commercial products are derived. Since the fat in raw milk is lighter in weight than the rest of the milk, it will naturally rise to form a layer of cream if allowed to stand. Spinning the milk in a centrifuge, accelerates the formation of a cream layer, or the separation of fat, from raw milk. Varying amounts of fat to be removed from the raw milk, it is possible to obtain different kinds of milk. If the fat content is lowered to 3.25 per cent, the milk is sold as ***whole milk. Low-fat milk*** typically has 1 per cent or 2 per cent fat. ***Skimmilk,*** or nonfat milk, is the liquid that remains after removing all the cream; it contains about half a per cent of milk fat.

Once the fat level has been reduced to the desired level, most fresh milk is homogenized to prevent the further separation of a cream layer. Much of the milk sold as a beverage7 has undergone homogenization, a process in which the hot milk is forced under high pressure through small openings to distribute the fat evenly8 throughout the milk.

Many countries are known to have adopted laws requiring that milk should be pasteurized as a protection against disease-causing organisms called pathogenic. Pasteurization is a partial sterilization accomplished by raising the milk to a temperature high enough to destroy pathogenic bacteria and a large proportion of those causing spoilage. The process called pasteurization is said to have been described by French microbiologist Louis Pasteur who proved that harmful organisms in raw milk are killed when it is heated either to 62 C for 30 minutes or to 71 °C for 15 seconds. Pasteurized milk to be kept refrigerated in closed

containers may remain consumable for approximately 14 days. Ultra pasteurized milk, common in Europe and Canada, is heated to an even higher temperature and can be stored at room temperature for several weeks.

Condensed**, **evaporated, and powdered milk are produced by evaporating some or all of the water in milk. Whole, low-fat, and skim milk, as well as whey and other dairy liquids, can be efficiently concentrated by the removal of water, using heat under vacuum. Sweetened condensed milk to be made by partial removing the water and adding sugar should contain about 8.5 per cent milk fat and at least 28 per cent total milk solids. Sugar is added in sufficient amount to prevent bacterial action and subsequent spoilage. Whether the milk iscondensed or powdered, the obtained products are sure to have long shelf lives.

For a product to be labelled10 as ***cream,*** it must contain 18 per cent milk fat or more. Light whipping cream must contain at least 30 per cent fat, while the minimum fat content to be contained in heavy whipping cream should be 36 per cent fat. Half-and-half, an equal mixture of milk and cream, must have at least 10.5 per cent fat. The various grades of cream are valued in cooking for their smooth, thick texture.

When chilled cream is churned gently, the fat globules gather together to form ***butter,*** leaving buttermilk as the by-product. Butter is supposed to contain at least 82.5 per cent fat. In the past, before refrigeration became widespread, people thought the salt added to butter to have been the only possible way of retarding bacterial spoilage but now salt is added mainly for flavour.

Ice cream, a popular frozen dessert, is made of milk, cream, sugar, and flavouring. The mixture is slowly beaten while chilled until it is partially frozen, then packed into containers, and chilled until firm. Variants of ice cream include ice milk, which contains less fat; sherbet, which has even less fat; and French ice cream, which is enriched with egg yolks.

Fermented milk products, including ***yoghurt and cheese,*** are formed when bacteria break down lactose to produce lactic acid, which makes the milk sour. Yoghurt is usually made from milk that has been fortified by the addition of nonfat powdered milk to improve its texture and taste. The fortified milk is pasteurized at a very high temperature and homogenized. Then, a culture containing the bacteria ***Streptococcus thermophiles*** and ***Lactobacillus bulgaricus,*** and sometimes ***Lactobacillus acidophilus,*** is added. The two most popular types of yoghurt sold in many countries are Swiss-style, with added fruit mixed throughout, and sundae-style, with fruit on the top or bottom.

Cultured buttermilk and sour cream, like yoghurt, are produced by the breakdown of lactose by bacteria. In the past, cultured buttermilk proved to have been made from buttermilk, but now dairymen more commonly make cultured buttermilk from skim milk. Sour cream is made from cream. Both buttermilk and sour cream have a sour taste due to lactic acid.

Cheese is thought to be one of the world's oldest and most versatile foods in the world. Nutritionists say cheese to be a concentrated source of almost all the

valuable nutrients found in milk, such as protein, vitamins, and minerals, as well as the less desirable fat and cholesterol, substances that may lead to health problems when consumed in excess. The fat content in cheese varies depending on whether the whole or skim milk is used. Cheese to be made with whole milk, or milk enriched with cream will have the highest amount of fat, cholesterol, and calories but cheese made from skim milk has the lowest one. Many cheeses are now made from pasteurized milk, decreasing the likelihood that harmful bacteria will contaminate cheese during the ripening process.

Because of its high protein and calcium content, cheese in reasonable quantities is sure to be an important component of a balanced diet and most people consider cheese to be a healthy component of cuisinesall over the world. Cheese-making technology developed rapidly during the last half of the 19th century and at present there exist more than 400 varieties of cheese differing in shape, size and texture, flavour, and aroma. Different types of cheese can be classified in many ways, but the most commonly used classification is based on cheese hardiness (consistency) or ripening (or ageing) method. Whether the produced cheese is hard or soft or semisoft depends to a great extent on the period of ripening, the percentage of moisture in the final product as well as on the type of the ripening bacteria to be used. Cheeses are allowed to undergo longer fermentation process than yoghurt, buttermilk, and sour cream. Generally, the longer cheeses ripen, the sharper flavours, harder textures, and deeper colours they develop. Cheese making is a complex process based on introducing bacteria into milk that consume lactose and produce lactic acid. The production of a particular variety of cheese may differ in the details of the process but the basic steps are common to all methods of cheese-making.

2. a) Translate the words into English. Use a dictionary if necessary.
Find in the above text the English equivalents for the italicized words.

1) пастеризувати, ***пастеризація, пастеризований,*** пастеризатор (апарат для пастеризації);
2) додавати, ***додавання,*** добавка,додаючи, ***доданий;***
3) сушити, сущіння, ***висушуючий, висушений;***
4) ***заморожувати, заморожений,*** морозильне обладнання;
5) ***охолоджувати, охолоджений,*** охолодження, охолоджуючий ***(реагент***);
6) поживна речовина, живлення, ***поживний;***
7) ***дієта, дієтичний;***
8) згущати/конденсувати, ***згущене (молоко), згущення/конденсація;***
9) ***гомогенізациія,*** гомогенізувати, гомогенізований;
10) ***солодкий, підсолоджений;***
11) ***частина, частковий, частково;***
12) ***здоров'я, здоровий (продукт);***

13) ***молочний (продукт), працівник молочної промисловості, молочна промисловість.***

b) Write the antonyms of the following words and find them in the above text:

liquid, fat, important, soft ***(cheese),*** sufficient, sweet, to accelerate, to chill or freeze, processed, to add, increase, improvement ***(about products),*** milder ***(flavours)***

3. Translate the following compound words into Ukrainian:

power-consuming, labour-consuming, data-processing, food-packaging, record-breaking, water-carrying, nitrogen-fixing, water-heating, air-cooling, air-cleaning, water-recycling, sour-tasting, sweet-tasting

4. Think and answer the questions.

1. Which countries are the main producers and consumers of cow's (goat's/llama's/buffalo's etc.) milk?
2. Why is this kind of animal (the cow/goat/mare etc.) considered to be the main producer of milk in a particular country/region/area?
3. Which characteristics of cow/goat/mare milk are valued most of all?
4. Do you think cow/goat/mare milk is consumed fresh or in the form of various processed dairy products?
5. What are the most important dairy products produced from this type of milk?
6. Do you know any traditional dishes made from milk or dairy products?
7. What are the main achievements and improvements in the field of dairy farming?
8. What do you know about the dairy farming in Ukraine?

5. Give the names of the dairy products described by the following definitions. All the words are from the active vocabulary to the text.

a) — is the milk that has been condensed by removing some of the water by evaporation.
b) — is the milk that is condensed by evaporating most of the water content and then sweetened.
c) — is a heavy cream containing a high proportion of butterfat, which causes it to stiffen when whipped.
d) — is the smooth thick cream that has been soured artificially, used in cooking and baking.
e) — is the milk with most or all of its fat content removed.
f) — is the cow's milk from which no fat has been removed.
g) — is the sour-tasting liquid that is formed after milk or cream has been churned to make butter.
h) — is the substance described as a soft, pale yellow, fatty food that can be derived from chilled cream by churning.

i) — is the most popular sweet frozen dessert traditionally made with cream and egg yolks and flavoured with a variety of fruits.
j) — is the watery liquid that separates from the solid part of milk when it turns sour or when enzymes are added in cheese making.
k) — is said to be solid food made from the milk of cows, sheep, goats, and some other animals. It can range from hard to semisoft, and from mildly acidic to sharp. Bacteria and acid are added to separate the coagulated milk and watery liquid whey.

10. MILK PROCESSING TECHNOLOGY

1. Find proper definitions and study them.

1.Pasteurization	A. a process used quite often in the dairy industry. Some uses include: whey separation (separation of whey cream (fat) from whey), bactofuge treatment (separation of bacteria from milk), quark separation (separation of quarg curd from whey), butter oil purification (separation of serum phase from anhydrous milk fat).
2.Clarification	B. separation of cream from skim milk.
3.Skimming	C. the streams of skim and cream after separation must be recombined to a specified fat content.
4. Standardizing	D. removal of solid impurities from milk prior to pasteurization.
5. Centrifugal separation	E. the heating of every particle of milk or milk product to a specific temperature for a specified period of time without allowing recontamination of that milk or milk product during the heat treatment process.

2. Read the whole text and make a written translation of the text A (with a dictionary).

A. Pasteurization

The process of pasteurization was named after Louis Pasteur who discovered that spoilage organisms could be inactivated in wine by applying heat at temperatures below its boiling point. The process was later applied to milk and remains the most important operation in the processing of milk. Pasteurization is the heating of every particle of milk or milk product to a specific temperature for a specified period of time without allowing recontamination of that milk or milk product during the heat treatment process. There are two distinct purposes for the process of milk pasteurization: Public Health Aspect - to make milk and milk

products safe for human consumption by destroying all bacteria that may be harmful to health (pathogens) and Keeping Quality Aspect - to improve the keeping quality of milk and milk products. Pasteurization can destroy some undesirable enzymes and many spoilage bacteria. Shelf life can be 7, 10, 14 or up to 16 days. The extent of microorganism inactivation depends on the combination of temperature and holding time. Minimum temperature and time requirements for milk pasteurization are based on thermal death time studies for the most heat resistant pathogen found in milk. Thermal lethality determinations require the applications of microbiology to appropriate processing determinations. To ensure destruction of all pathogenic microorganisms, time and temperature combinations of the pasteurization process are highly regulated: Ontario Pasteurization Regulations for milk: 63° C for not less than 30 min.,72° C for not less than 16 sec., or equivalent destruction of pathogens and the enzyme phosphatase as permitted by Ontario Provincial Government authorities. Milk is deemed pasteurized if it tests negative for alkaline phosphatase. Frozen dairy dessert mix (ice cream or ice milk, eggnog): at least 69° C for not less than 30 min; at least 80° C for not less than 25 sec; other time temperature combinations must be approved (e.g. 83° C/16 sec). Milk based products- with 10% mf or higher, or added sugar (cream, chocolate milk, etc.) 66° C/30 min, 75° C/16 sec. There are two basic methods, batch or continuous.

The batch method uses a vat pasteurizer which consists of a jacketed vat surrounded by either circulating water, steam or heating coils of water or steam. In the vat the milk is heated and held throughout the holding period while being agitated. The milk may be cooled in the vat or removed hot after the holding time is completed for every particle. As a modification, the milk may be partially heated in tubular or plate heater before entering the vat. This method has very little use for milk but some use for milk by-products (e.g. creams, chocolate) and special batches. The vat is used extensively in the ice cream industry for mix quality reasons other than microbial reasons. Continuous process method has several advantages over the vat method, the most important being time and energy saving. For most continuous processing, a high temperature short time (HTST) pasteurizer is used. The heat treatment is accomplished using a plate heat exchanger. This piece of equipment consists of a stack of corrugated stainless steel plates clamped together in a frame. There are several flow patterns that can be used. Gaskets are used to define the boundaries of the channels and to prevent leakage. The heating medium can be vacuum steam or hot water.

B. Centrifugation

Centrifugal separation is a process used quite often in the dairy industry. Some uses include: clarification (removal of solid impurities from milk prior to pasteurization), skimming (separation of cream from skim milk), standardizing, whey separation (separation of whey cream (fat) from whey), bactofuge treatment (separation of bacteria from milk), quark separation (separation of quarg curd from whey), butter oil purification (separation of serum phase from anhydrous milk fat). Centrifugation is based on Stroke's Law. The particle sedimentation velocity increases with: increasing diameter, increasing difference in density between the two phases, decreasing viscosity of the continuous phase. If raw milk were allowed to stand, the fat globules would begin to rise to the surface in a phenomena called creaming. Raw milk in a rotating container also has centrifugal forces acting on it. This allows rapid separation of milk fat from the skim milk portion and removal of solid impurities from the milk.

C. Separation

Centrifuges can be used to separate the cream from the skim milk. The centrifuge consists of up to 120 discs stacked together at a 45 to 60 degree angle and separated by a 0.4 to 2.0 mm gap or separation channel. Milk is introduced at the outer edge of the disc stack. The stack of discs has vertically aligned distribution holes into which the milk is introduced. Under the influence of centrifugal force the fat globules (cream), which are less dense than the skim milk, move inwards through the separation channels toward the axis of rotation. The skim milk will move outwards and leaves through a separate outlet.

D. Clarification

Separation and clarification can be done at the same time in one centrifuge. Particles, which are more dense than the continuous milk phase, are thrown back to the perimeter. The solids that collect in the centrifuge consist of dirt, epithelial cells, leucocytes, corpuscles, bacteria sediment and sludge. The amount of solids that collect will vary, however, it must be removed from the centrifuge. More modern centrifuges are self-cleaning allowing a continuous separation/clarification process. This type of centrifuge consists of a specially constructed bowl with peripheral discharge slots. These slots are kept closed under pressure. With a momentary release of pressure, for about 0.15 s, the contents of sediment space are evacuated. This can mean anywhere from 8 to 25 L are ejected at intervals of 60 min. For one dairy, self-cleaning translated to a loss of 50 L/hr of milk.

E. Standardization

The streams of skim and cream after separation must be recombined to a specified fat content. This can be done by adjusting the throttling valve of the cream outlet; if the valve is completely closed, all milk will be discharged through the skim milk outlet. As the valve is progressively opened, larger amounts of cream with diminishing fat contents are discharged from the cream outlet. With direct standardization the cream and skim are automatically remixed at the separator to provide the desired fat content.

3. Find in texts B and C the words that are similar in the meaning and pronunciation to the words in your language, e.g. standardization.

4. Form word using the following suffixes and prefixes:

-er/or,-ization, -ist, -ize, -ment, -tion, -al, post-

special			
produce			
treat			
graduate			
develop			
practice			
technology			
standard			
separate			
Pasteur			

5. Find proper equivalents in your native language. Learn them.

To undertake additional training	
Mammals	
To specialize in	
Treatment	
Coursework	
Animal husbandry	
Domestic species	
Graduate	
Specialization	
Master Degree course	
Tissue	
Protein	

Fat	
Cell	
Minerals	

11. YOGURT PRODUCTION

1. Read and translate the text. Give the Ukrainian equivalents to the words and word combinations in italics from the text.

Yogurt is a fermented milk product that contains the characteristic bacterial cultures *Lactobacillus bulgaricus* and *Streptococcus thermophilus*. All yogurts must contain at least 8.25% solids not fat. ***Full fat yogurt*** must contain not less than 3.25% milk fat, ***low fat yogurt*** not more than 2% milk fat, and ***non fat yogurt*** less than 0.5% milk.

The two styles of yogurt commonly found in the ***grocery store*** are ***set type yogurt*** and ***swiss style yogurt***. Set type yogurt is when the yogurt is packaged with the fruit on the bottom of the cup and the yogurt on top. Swiss style yogurt is when the fruit is blended into the yogurt ***prior to*** packaging.

The main ingredient in yogurt is milk. The type of milk used depends on the type of yogurt – ***whole milk*** for full fat yogurt, low fat milk for low fat yogurt, and skim milk for nonfat yogurt. Other dairy ingredients are allowed in yogurt to adjust the composition, such as cream to adjust the fat content, and nonfat dry milk to adjust the ***solids content***. The solids content of yogurt is often adjusted above the 8.25% minimum to provide a better body and texture to the finished yogurt.

Stabilizers may also be used in yogurt to improve the body and texture by increasing ***firmness***, preventing separation of the ***whey*** (syneresis), and helping to keep the fruit uniformly mixed in the yogurt. Stabilizers used in yogurt are alginates (carageenan), gelatins, gums (***locust bean***, guar), pectins, and ***starch***.

Sweeteners, ***flavors*** and fruit preparations are used in yogurt to provide variety to the consumer.

The main (starter) cultures in yogurt are *Lactobacillus bulgaricus* and *Streptococcus thermophilus*. The function of the starter cultures is to ferment lactose (milk sugar) to produce ***lactic acid***. The increase in lactic acid decreases pH and causes the milk ***to clot***, or form the soft gel that is characteristic of yogurt. The fermentation of lactose also produces the flavor compounds that are characteristic of yogurt. *Lactobacillus bulgaricus* and *Streptococcus thermophilus* are the only 2 cultures required by law to be present in yogurt.

Other bacterial cultures, such as *Lactobacillus acidophilus*, *Lactobacillus subsp. casei*, and *Bifidobacteria* may be added to yogurt as probiotic cultures. Probiotic cultures benefit human health by improving ***lactose digestion***, gastrointestinal function, and stimulating the immune system.

2. Answer the following questions.

1. What is yogurt?
2. How many solids must contain all yogurts?
3. How many fats must contain full fat, low fat and nonfat yogurts?
4. What are two styles of yogurt found in the grocery store?
5. What is the main ingredient in yogurt?
6. What are functions of stabilizers?
7. What are stabilizers used in yogurt?
8. What are the main cultures in yogurt?
9. What is function of the starter cultures?
10. Why we need probiotic cultures?

3. Match the words and word combinations with their Ukrainian equivalents.

1.	Lactic acid	**A**	Згущувати
2.	To adjust	**B**	Молочна кислота
3.	Grocery store	**C**	Вміст твердих речовин
4.	To clot	**D**	Бакалія, продуктовий магазин
5.	Solids content	**E**	Регулювати, корегувати, приводити до ладу

4. Match the words and word combinations with their English equivalents.

1.	Sweeteners	**A**	Стійкість
2.	Locust beans	**B**	Сироватка
3.	Firmness	**C**	Підсолоджувачі
4.	Whey	**D**	Ароматизатори
5.	Flavors	**E**	Плоди ріжкового дерева

5. Read and translate the text.

General yogurt processing steps:

- Adjust milk composition and blend ingredients
- Pasteurize milk
- Homogenize
- Cool milk
- Inoculate with starter cultures
- Hold
- Cool
- Add flavors and fruit
- Package

1. Milk composition may be adjusted to achieve the desired fat and solids content. Often dry milk is added to increase the amount of whey protein to provide a desirable texture. Ingredients such as stabilizers are added at this time.
2. The milk mixture is pasteurized at 185°F (85°C) for 30 minutes or at 203°F (95°C) for 10 minutes. A high heat treatment is used to denature the whey (serum) proteins. This allows the proteins to form a more stable gel, which prevents separation of the water during storage. The high heat treatment also further reduces the number of spoilage organisms in the milk to provide a better environment for the starter cultures to grow. Yogurt is pasteurized before the starter cultures are added to ensure that the cultures remain active in the yogurt after fermentation to act as probiotics; if the yogurt is pasteurized after fermentation the cultures will be inactivated.
3. The blend is homogenized (2000 to 2500 psi) to mix all ingredients thoroughly and improve yogurt consistency.
4. The milk is cooled to 108°F (42°C) to bring the yogurt to the ideal growth temperature for the starter culture.
5. The starter cultures are mixed into the cooled milk.
6. The milk is held at 108°F (42°C) until a pH 4.5 is reached. This allows the fermentation to progress to form a soft gel and the characteristic flavor of yogurt. This process can take several hours.
7. The yogurt is cooled to 7°C to stop the fermentation process.
8. Fruit and flavors are added at different steps depending on the type of yogurt. For set style yogurt the fruit is added in the bottom of the cup and then the inoculated yogurt is poured on top and the yogurt is fermented in the cup. For swiss style yogurt the fruit is blended with the fermented, cooled yogurt prior to packaging.
9. The yogurt is pumped from the fermentation vat and packaged as desired.

6. Match a processing step in the column A with its description in the column B.

A	**B**

1. Adjust milk composition and blend ingredients	**A.** The yogurt is cooled to 7°C to stop the fermentation process.
2. Add flavors and fruit	**B.** Yogurt is pasteurized before the starter cultures are added to ensure that the cultures remain active in the yogurt after fermentation to act as probiotics; if the yogurt is pasteurized after fermentation the cultures will be inactivated.
3. Cool	**C.** Often dry milk is added to increase the amount of whey protein to provide a desirable texture. Ingredients such as stabilizers are added at this time.
4.Hold	**D.** The yogurt is pumped from the fermentation vat and packaged as desired.
5.Pasteurize milk	**E.** The blend is homogenized (2000 to 2500 psi) to mix all ingredients thoroughly and improve yogurt consistency.
6.Package	**F.** For set style yogurt the fruit is added in the bottom of the cup and then the inoculated yogurt is poured on top and the yogurt is fermented in the cup. For swiss style yogurt the fruit is blended with the fermented, cooled yogurt prior to packaging.
7.Homogenize	**G.** The milk is held at 108°F (42°C) until a pH 4.5 is reached. This process can take several hours.

7. Choose the word from the box to complete the sentence.

the whey	the cooled milk	swiss style yogurt
the fermentation vat		is pasteurized

1. A high heat treatment is used to denature _____ (serum) proteins.
2. The starter cultures are mixed into _____ .
3. For _____ the fruit is blended with the fermented, cooled yogurt prior to packaging.
4. The yogurt is pumped from _____ and packaged as desired.
5. Yogurt _____ before the starter cultures are added.

8. Look through the texts from exercises 1 and 5. Find and read the international words used in them.

Example:yogurt, ingredient, lactose etc.

12. CHEESE PRODUCTION

1. Read and translate the text. Skim the first sentence of each paragraph to get the main ideas of the text.

History of cheese origin

Cheese is an ancient food whose origins predate recorded history. There is no conclusive evidence indicating where cheese making originated, either in Europe, Central Asia or the Middle East, but the practice has spread within Europe prior to Roman times and has become a sophisticated enterprise by the time the Roman Empire came into being.

Proposed dates for the origin of cheese making range from around 8ooo BC (when sheep were first domesticated) to around 3000 BC. The first cheese may have been made by people in the Middle East or by Nomadic Turkic tribes in Central Asia. Since animal skins and inflated internal organs have, since the ancient times, provided storage vessels for a range of foodstuffs, it is probable that the process of cheese making was discovered accidentally by storing milk in a container made from the stomach of an animal, resulting in the milk being turned to curd and whey by the rennet from the stomach. There is a widely-told legend about the discovery of cheese by an Arab trader who used this method of storing milk. The legend has many individual variations.

Cheese making may also have begun independent of this by the pressing and salting of curdled milk in order to preserve it. Observation that the effect of making milk in an animal stomach gave more solid and better-textured curds, may have led to the deliberate addition of rennet.

The earliest archaeological evidence of cheese making has been found in Egyptian tomb murals, dating to about 2000 BC. The earliest cheeses were likely to have been quite sour and salty, similar in texture to rustic cottage cheese or feta, a crumbly, flavoured Greek cheese.

Cheese produced in Europe, where climates are cooler than in the Middle East, required less salt for preservation. With less salt and acidity, the cheese became a suitable environment for beneficial microbes and moulds, giving aged cheeses their pronounced and interesting flavours. Cheese has become the most popular milk invention.

2. Read and translate the text. Give the Ukrainian equivalents to the words and word combinations in italics from the text.

Cheese comes in many varieties. The variety determines the ingredients, processing, and characteristics of the cheese.

Cheese can be made using pasteurized or raw milk. Cheese made from raw milk imparts different flavors and texture characteristics to the finished cheese. For

some cheese varieties, raw milk is given a ***mild heat treatment*** (below pasteurization) prior to cheese making to destroy some of the spoilage organisms and provide better conditions for the cheese cultures. Cheese made from raw milk must be aged for at least 60 days, to reduce the possibility of exposure to disease causing microorganisms (pathogens) that may be present in the milk. For some varieties cheese must be aged longer than 60 days.

Cheese can be broadly categorized as acid or ***rennet cheese***, and natural or process cheeses. ***Acid cheeses*** are made by adding acid to the milk to cause the proteins to coagulate. Fresh cheeses, such as ***cream cheese*** or queso fresco, are made by direct ***acidification***. Most types of cheese, such as cheddar or Swiss, use rennet (***an enzyme***) in addition to the starter cultures to coagulate the milk. The term "natural cheese" is an industry term referring to cheese that is made directly from milk. Process cheese is made using natural cheese plus other ingredients that are cooked together to change the textural and/or melting properties and increase ***shelf life***.

The main ingredient in cheese is milk. Cheese is made using cow, goat, sheep, ***water buffalo*** or a blend of these milks.

The type of coagulant used depends on the type of cheese desired. For acid cheeses, an acid source such as ***acetic acid*** (the acid in ***vinegar***) or gluconodelta-lactone (a mild food acid) is used. For rennet cheeses, calf rennet or, more commonly, a rennet produced through microbial bioprocessing is used. Calcium chloride is sometimes added to the cheese to improve the coagulation properties of the milk.

Flavorings may be added depending on the cheese. Some common ingredients include herbs, spices, hot and sweet peppers, ***horse radish***, and ***port wine***.

Cultures for cheese making are called lactic acid bacteria (LAB) because their primary source of energy is the lactose in milk and their primary metabolic product is lactic acid. There is a wide variety of bacterial cultures available that provide ***distinct flavor*** and textural characteristics to cheeses.

Starter cultures are used early in the cheese making process to assist with coagulation by lowering the pH prior to rennet addition. The metabolism of the starter cultures contribute desirable ***flavor compounds***, and help prevent the growth of spoilage organisms and pathogens. Typical starter bacteria include *Lactococcus lactis* subsp. *Lactis* or *cremoris*, *Streptococcus salivarius* subsp. *thermophilus*, *Lactobacillus delbruckii* subsp. *bulgaricus*, and *Lactobacillus helveticus*.

Adjunct cultures are used to provide or enhance the characteristic flavors and textures of cheese. Common adjunct cultures added during manufacture include *Lactobacillus casei* and *Lactobacillus plantarum* for flavor in Cheddar cheese, or the use of *Propioni bacterium freudenreichii* for eye formation in Swiss. Adjunct cultures can also be used as a ***smear*** for washing the outside of the formed cheese, such as the use of *Brevibacterium linens* of ***gruyere, brick and limburger cheeses***.

Yeasts and ***molds*** are used in some cheeses to provide the characteristic colors and flavors of some cheese varieties. Torula yeast is used in the smear for the ***ripening*** of brick and limberger cheese. Examples of molds include *Penicillium camemberti* in camembert and brie, and *Penicillium roqueforti* in blue cheeses.

3. Answer the following questions.

1. How cheese can be made?
2. What are categories of cheese presented in the text?
3. How many days cheese made from raw milk must be aged?
4. Why calcium chloride is sometimes added to the cheese?
5. How is process cheese made?
6. What are common ingredients used for cheese making?
7. What are cultures used for cheese making?
8. What are functions of the metabolism of the starter cultures?
9. Why are adjunct cultures used for cheese making?
10. What are functions of yeasts and molds?

4. Match the words and word combinations with their Ukrainian equivalents.

1.	Acid cheese	**A**	Сичужний сир
2.	Cream cheese	**B**	Фермент
3.	Acidification	**C**	Кислий сир
4.	Rennet cheese	**D**	Підкислення
5.	Enzyme	**E**	Вершковий сир

5. Match the words and word combinations with their English equivalents.

1.	М’яка термічна обробка	**A**	Ripening
2.	Строк придатності	**B**	Distinct flavor

3.	Характерний присмак	**C**	Mold
4.	Дозрівання	**D**	Mild heat treatment
5.	Пліснява	**E**	Shelf life

6. Read and translate the text.

The temperatures, times, and target pH for different steps, the sequence of processing steps, the use of salting or brining, block formation, and aging vary considerably between cheese types. The following flow chart provides a very general outline of cheese making steps.

General cheese processing steps:

- Standardize milk
- Pasteurize/heat treat milk
- Cool milk
- Inoculate with starter and non-starter bacteria and ripen
- Add rennet and form curd
- Cut curdand heat
- Drain whey
- Texture curd
- Dry saltor brine
- Form cheese into blocks
- Storeand age
- Package

The times, temperatures, and target pH values used for cheddar cheese will depend on individual formulations and the intended end use of the cheese. These conditions can be adjusted to optimize the properties of Cheddar cheese for shredding, melting, or for cheese that is meant to be aged for several years.

1. Milk is often standardized before cheese making to optimize the protein to fat ratio to make a good quality cheese with a high yield.
2. Depending on the desired cheese, the milk may be pasteurized or mildly heat-treated to reduce the number of spoilage organisms and improve the environment for the starter cultures to grow. Some varieties of milk are made from raw milk so they are not pasteurized or heat-treated. Raw milk cheeses must be aged for at least 60 days to reduce the possibility of exposure to disease causing microorganisms (pathogens) that may be present in the milk.

3. Milk is cooled after pasteurization or heat treatment to 90°F (32°C) to bring it to the temperature needed for the starter bacteria to grow. If raw milk is used the milk must be heated to 90°F (32°C).

4. The starter cultures and any non-starter adjunct bacteria are added to the milk and held at 90°F (32°C) for 30 minutes to ripen. The ripening step allows the bacteria to grow and begin fermentation, which lowers the pH and develops the flavor of the cheese.

5. The rennet is the enzyme that acts on the milk proteins to form the curd. After the rennet is added, the curd is not disturbed for approximately 30 minutes so a firm coagulum forms.

6. The curd is allowed to ferment until it reaches pH 6.4. The curd is then cut with cheese knives into small pieces and heated to 100°F (38°C). The heating step helps to separate the whey from the curd.

7. The whey is drained from the vat and the curd forms a mat.

8. The curd mats are cut into sections and piled on top of each other and flipped periodically. This step is called **cheddaring**. Cheddaring helps to expel more whey, allows the fermentation to continue until a pH of 5.1 to 5.5 is reached, and allows the mats to "knit" together and form a tighter matted structure. The curd mats are then milled (cut) into smaller pieces.

9. For cheddar cheese, the smaller, milled curd pieces are put back in the vat and salted by sprinkling dry salt on the curd and mixing in the salt. In some cheese varieties, such as mozzarella, the curd is formed into loaves and then the loaves are placed in brine (salt water solution).

10. The salted curd pieces are placed in cheese hoops and pressed into blocks to form the cheese.

11. The cheese is stored in coolers until the desired age is reached. Depending on the variety, cheese can be aged from several months to several years.

12. Cheese may be cut and packaged into blocks or it may be waxed.

7. Match a processing step in the column A with its description in the column B.

A	**B**
1. Pasteurize/heat treat milk	**A.** The whey is drained from the vat and the curd forms a mat.
2. Add rennet and form curd	**B.** The salted curd pieces are placed in cheese hoops and pressed into blocks to form the cheese.
3. Drain whey	**C.** Raw milk cheeses must be aged for at least 60 days to reduce the possibility of exposure to disease causing

	microorganisms (pathogens) that may be present in the milk.
4. Texture curd	**D.** The cheese is stored in coolers until the desired age is reached. Depending on the variety, cheese can be aged from several months to several years.
5. Form cheese into blocks	**E.** After the rennet is added, the curd is not disturbed for approximately 30 minutes so a firm coagulum forms.
6. Store and age	**F.** The curd mats are cut into sections and piled on top of each other and flipped periodically.
7. Cut curdand heat	**G.** The curd is allowed to ferment until it reaches pH 6.4. The curd is then cut with cheese knives into small pieces and heated to 100°F (38°C). The heating step helps to separate the whey from the curd.

8. Choose the word from the box to complete the sentence.

standardized	raw milk	cheese hoops	enzyme
cut and packaged			

1. Some varieties of milk are made from _____ so they are not pasteurized or heat-treated.

2. The rennet is the _____ that acts on the milk proteins to form the curd.

3. The salted curd pieces are placed in _____ and pressed into blocks to form the cheese.

4. Cheese may be _____ into blocks or it may be waxed.

5. Milk is often _____ before cheese making to optimize the protein to fat ratio to make a good quality cheese with a high yield.

9. Find more information and give a presentation about different types of cheeses.

13. ICE CREAM PRODUCTION

1. Read and translate the text. Give the Ukrainian equivalents to the words and word combinations in italics from the text.

Ice cream is a frozen blend of a sweetened cream mixture and air, with added flavorings.

Ice cream must contain at least 10% milk fat, and at least 20% total milk solids, and may contain safe and suitable sweeteners, ***emulsifiers*** and stabilizers,

and flavoring materials. The finished ice cream must weigh at least 4.5 pounds per gallon and there must be at least 1.6 pounds of total solids (fat + protein + lactose + minerals + added sugar) per gallon, thus limiting the maximum amount of air (called ***overrun***) that can be incorporated into ice cream. There are well-defined labeling requirements for the types of flavors used (natural and/or artificial) and for the presence of egg yolks in the finished product (ice cream can be called ***custard*** or "French" if the content of egg yolks is at least 1.4%). Ice cream may also be labeled as reduced fat (25% less fat than the ***reference ice cream***), light (50% less fat than the reference), lowfat (less than 3 g fat/serving), or nonfat (less than 0.5 g fat/serving).

Ice cream is sold as hard ice cream or ***soft serve***. After the freezing process only a portion of the water is actually in a frozen state. Soft ice cream is served directly from the ***freezer*** where only a small amount of the water has been frozen. Hard ice cream is packaged from the freezer and then goes through a ***hardening process*** that freezes more of the water in the mix.

There is a wide range of ingredients and formulations (recipes) that can be used in ice cream. The basic types of ingredients and their functions are briefly described below.

Milk fat provides creaminess and richness to ice cream and contributes to its melting characteristics. The minimum fat content is 10% and premium ice creams can contain as much as 16% milk fat. Sources of milk fat include milk, cream, and butter.

The total milk solids component of ice cream includes both the fat and other solids. The other milk solids consist of the protein and lactose in milk and ranges from 9 to 12% in ice cream. The nonfat solids play an important role in the body and texture of ice cream by stabilizing the air that is incorporated during the freezing process. Sources of nonfat solids include milk, cream, condensed milk, ***evaporated milk***, dry milk, and whey.

Sweeteners are used to provide the characteristic sweetness of ice cream. Sweeteners also lower the freezing point of the mix to allow some water ***to remain unfrozen*** at serving temperatures. A lower freezing point makes ice cream easier ***to scoop*** and eat, although the addition of too much sugar can make the product too soft. Sweeteners used include sugar (sucrose) and ***corn syrups***.

Stabilizers are proteins or carbohydrates used in ice cream to add ***viscosity*** and control ice crystallization. Over time during frozen storage small ice crystals naturally migrate together and form larger ice crystals. Stabilizers help to keep the small crystals isolated and prevent the growth of large crystals, which causes ice

cream to be ***coarse***, icy and unpleasant to eat. Stabilizers used include alginates (carageenan), gums (locust bean, guar), and gelatins.

Emulsifiers are used to help keep the milk fat evenly dispersed in the ice cream during freezing and storage. A good distribution of fat helps stabilize the air incorporated into the ice cream and provide a ***smooth*** product. Emulsifiers used in ice cream include egg yolks and mono- and diglycerides.

A wide range of flavorings are used in ice cream. Flavorings include natural and artificial flavors, fruit, nuts, and ***bulky inclusions*** such as chocolate chunks and candies.

2. Answer the following questions.

1. What is ice cream?
2. What must contain ice cream?
3. Milk fat provides creaminess and richness to ice cream, isn't it?
4. What is the role of the nonfat solids?
5. What are sources of nonfat solids?
6. Why are sweeteners used?
7. What are stabilizers?
8. What are functions of emulsifiers?
9. What flavorings are used in ice cream production?

3. Match the words and word combinations with their Ukrainian equivalents.

1.	Overrun	**A**	М'яка подача
2.	Custard	**B**	Еталонне (стандартне) морозиво
3.	Soft serve	**C**	Перевитрата
4.	Hardening process	**D**	Заварний крем
5.	Reference ice cream	**E**	Процес загартовування

4. Match the words and word combinations with their English equivalents.

1.	Залишатися розмороженим	**A**	Viscosity
2.	Великі включення	**B**	To scoop
3.	Зачерпувати	**C**	Smooth

4.	В’язкість	**D**	Bulky inclusions
5.	Рівний, гладкий	**E**	To remain unfrozen

5. Read and translate the text.

General ice cream processing steps

- Blend ingredients
- Pasteurize mix
- Homogenize
- Age mix
- Add liquid flavorsand colors
- Freeze
- Add fruits, nuts, and bulky flavorings
- Package
- Harden

1. The milk fat source, nonfat solids, stabilizers and emulsifiers are blended to ensure complete mixing of liquid and dry ingredients.

2. Ice cream mix is pasteurized at 155°F (68.3°C) for 30 minutes or 175°F (79.4C) for 25 sec. The conditions used to pasteurize ice cream mix are greater than those used for fluid milk because of increased viscosity from the higher fat, solids, and sweetener content, and the addition of egg yolks in custard products.

3. Ice cream mix is homogenized (2500 to 3000 psi) to decrease the milk fat globule size to form a better emulsion and contribute to a smoother, creamier ice cream. Homogenization also ensures that the emulsifiers and stabilizers are well blended and evenly distributed in the ice cream mix before it is frozen.

4. Ice cream mix is aged at 40°F (5°C) for at least 4 hours or overnight. Aging the mix cools it down before freezing, allows the milk fat to partially crystallize and the gives the proteins stabilizers time to hydrate. This improves the whipping properties of the mix.

5. Liquid flavors and colors may be added to the mix before freezing. Only ingredients that are liquid can be added before the freezing, to make sure the mix flows properly through the freezing equipment.

6. The process involves freezing the mix and incorporating air. Ice cream mix can be frozen in batch or continuous freezers and the conditions used will depend on the type of freezer. Batch freezers consist of a rotating barrel that is

usually filled one-third to one-half full with ice cream mix. As the barrel turns, the air in the barrel is incorporated into the ice cream mix. Ice cream freezers designed for home use are batch freezers. Continuous freezers consist of a fixed barrel that has a blade inside that constantly scrapes the surface of freezing barrel. The ice cream mix is pumped from a bulk tank to the freezing barrel and the air is incorporated with another pump just before it enters the freezing barrel. The continuous freezing process is much faster than the batch freezing process.

The addition of air is called overrun and contributes to the lightness or denseness of ice cream. Up to 50% of the volume of the finished ice cream (100% overrun) can be air that is incorporated during freezing. The overrun level can be set as desired to adjust the denseness of the finished product. Premium ice creams have less overrun (approximately 80%) and are more dense than regular ice cream.

At the point of discharge from the freezer (draw temperature), only about 50% of the water in ice cream is frozen. Soft serve ice cream is generated at this point in the freezing process.

7. Fruits, swirls, and any bulky type of flavorings (nuts, candy pieces, etc.) are added at this point. These ingredients can not be added before freezing or they would interfere with the smooth flow of the mix through the freezer. The ice cream at this point is soft and it is easy to mix in the bulky flavorings so they are uniformly distributed throughout the ice cream. Mixing in bulky flavorings after freezing also prevents damage to the pieces and allows them to remain whole or in large chunks.

8. Package is as desired, depending on the product.

9. The ice cream is cooled as quickly as possible down to a holding temperature of less than -13°F(-25°C). The temperatures and times of cooling will depend on the type of storage freezer. Rapid cooling will promote quick freezing of water and create small ice crystals. Storage at -13°F(-25°C) will help to stabilize the ice crystals and maintain product quality. At this temperature there is still a small portion of liquid water. If all the water present in the ice cream were frozen, the ice cream would be as hard as an ice cube.

6. Match a processing step in the column A with its description in the column B.

A	**B**
1. Age mix	**A.** Ice cream mix can be frozen in batch or continuous freezers and the conditions used will depend on the type of freezer. Batch freezers consist of a rotating barrel that is usually filled one-third to one-half full with ice cream

	mix.
2. Add liquid flavors and colors	**B.** Fruits, swirls, and any bulky type of flavorings (nuts, candy pieces, etc.) are added at the point of discharge from the freezer (draw temperature).
3. Freeze	**C.** Liquid flavors and colors may be added to the mix before freezing.
4.Add fruits, nuts, and bulky flavorings	**D.** The ice cream is cooled as quickly as possible down to a holding temperature of less than -13°F(-25°C). The temperatures and times of cooling will depend on the type of storage freezer.
5.Pasteurize mix	**E.** Ice cream mix is pasteurized at 155°F (68.3°C) for 30 minutes or 175°F (79.4C) for 25 sec.
6.Harden	**F.** Ice cream mix is aged at 40°F (5°C) for at least 4 hours or overnight. Aging the mix cools it down before freezing, allows the milk fat to partially crystallize and the gives the proteins stabilizers time to hydrate.

7. Choose the word from the box to complete the sentence.

freezing batch	freezers	the water present	are added	overrun

1. Ice cream freezers designed for home use are _____.

2. The addition of air is called _____ and contributes to the lightness or denseness of ice cream.

3. Fruits, swirls, and any bulky type of flavorings _____ at this point.

4. If all _____ in the ice cream were frozen, the ice cream would be as hard as an ice cube.

5. Liquid flavors and colors may be added to the mix before _____.

8. Find more information and give a presentation about different types of ice cream.

14. MEAT PROCESSING TECHNOLOGY

I. Read the text and choose the right answer to the questions below.

Meat processing technology comprises the steps and procedures in the manufacture of processed meat products. Processed meat products, which include various different types and local/regional variations, are food of animal origin,

which contribute valuable animal proteins to human diets. Animal tissues, in the first place muscle meat and fat, are the main ingredients, besides occasionally used other tissues such as internal organs, skins and blood or ingredients of plant origin.

All processed meat products have been in one way or another physically and/or chemically treated. These treatments go beyond the simple cutting of meat into meat cuts or meat pieces with subsequent cooking for meat dishes in order to make the meat palatable. Meat processing involves a wide range of physical and chemical treatment methods, normally combining a variety of methods. Meat processing technologies include:

Cutting/chopping/comminuting (size reduction)
Mixing/tumbling
Salting/curing
Utilization of spices/non-meat additives
Stuffing/filling into casings or other containers
Fermentation and drying
Heat treatment
Smoking

1. The main point of the passage is to

(A) explain what is food technology
(B) tell about meat processing technology
(C) present the history of technology
(D) present the data on milk technology

2. Meat processing technology comprises:

(A) the steps and procedures in the manufacture of processed meat products
(B) food processing plants
(C) milk separator and other equipment
(D) federal slaughter, food processing and import establishments

3. It can be understood from the passage that

(A) they ensure that products are safe.
(B) bacterial contamination of meat is not of great importance for people
(C) animals can pose risks for salmonellosis
(D) processed meat products are food of animal origin

4. The word “local” in line 3 means

(A) famous
(B) profitable
(C) public

(D) regional

5. It can be understood from the passage that animal tissues are

(A) the main ingredients that are used for processing

(B) the main ingredients for sanitary washing

(C) the main ingredients that are pasteurized

(D) the main ingredients that are consumed

6. According to the passage

(A) the food supply is safe

(B) samples of tissues are collected and treated

(C) all processed meat products have been physically and/or chemically treated

(D) all processed meat products have been physically treated

7. Meat processing technologies include

(A) 5 methods of meat treatment

(B) 8 methods of meat treatment

(C) 10 methods of meat treatment

(D) 7 methods of meat treatment

8. The word "palatable" in line 9 is closest in meaning to

(A) effective

(B) great

(C) delicious

(D) tasteless

9. The word "combining" in line 10 is closest in meaning to

(A) including

(B) reducing

(C) controlling

(D) owing

10. Which of the following is not mentioned in the text?

(A) These treatments go beyond the simple cutting of meat into meat cuts.

(B) Food of animal origin contributes valuable animal proteins to human diets.

(C) Meat processing technology comprises the steps and procedures in the manufacture of processed meat products.

(D) Companies can produce better foods for animals.

II. Translate the following words and word combinations into your native language:

English	Ukrainian

1. cattle	
2. milk processing technology	
3. processed meat products	
4. food of animal origin	
5. smoking technology	
6. valuable animal proteins	
7. animal tissues	
8. skin	
9. physical and chemical treatment methods	
10. sour milk	

III. Match a treatment method in A with its description in B.

A	B
1. Mixing/tumbling	A. It is a method of preparing red meat (and fish) which originates in prehistory. Its purpose is to preserve these protein-rich foods, which would otherwise spoil quickly, for long periods. There are two mechanisms for this preservation: dehydration and the antibacterial properties of phenols and other chemicals in the absorbed smoke. In modern days, the enhanced flavor of smoked foods makes them a delicacy in many cultures.
2. Salting/curing Utilization of spices/non-meat additives	B. A mixture of chopped and seasoned ingredients (bread, onion, egg and herbs) that you put inside meat before cooking it.
3. Stuffing/filling into casings or other containers	C. It refers to the processing of meat with the help of special devices. Mixers are used to blend meat and spices, or coarse and finely chopped meat. The machine generally consists of a rectangular or round bottom vessel through which two parallel shafts operate. Various paddles are mounted on those shafts to mix the meat. The mixer is discharged through tilting by 90

	degrees. Some mixers are designed as vacuum mixers, as the mixing under vacuum (exclusion of oxygen) has advantages for the development of desirable product colour and texture.
4. Fermentation and drying	D. It is used to reduce meat particle size. There are five methods of mechanical meat cutting for which specialized machinery is used: -Mincing (grinding) of lean and fatty animal tissues. Larger pieces of soft edible animal tissues can be reduced in size by passing them through meat grinders. Some specially designed grinders can also cut frozen meat, others are equipped with devices to separate hard tissues such as tendons and bone particles from the soft tissues (minced muscle meat particles). -Chopping animal tissues in bowl cutter Bowl cutters are used to chop and mix fresh or frozen lean meat, fat (and/or edible offal, if required) together with water (often used in form of ice), functional ingredients (salt, curing agents, additives) and extenders (fillers and/or binders) .
5. Heat treatment	E. NaCl adds to the taste of the final product. The content of salt in sausages, hams, corned beef and similar products is normally 1.5-3%. Solely common salt is used if the cooked products shall have a greyish or greyish-brown colour as for example steaks, meat balls or white sausages. Sodium chloride has only a very low capacity to destroy microorganisms, thus almost no bacteriological effect. Its preserving power is attributed to the capability to bind water and to deprive the meat of moisture. This means that less water will be available and the environment will be less favourable for the growth of microorganisms. Bacteria do not grow at a water activity below 0.91, which corresponds to a solution of 15g NaCl/100 ml water or about 15% salt in the product. These figures explain how salt has its preservative effect. Such salt concentrations (up to 15%) are too high for palatable food.
6. Smoking	F. This treatment of processed meat products serves two main purposes: -enhancement of desirable texture, flavour and colour, in order to make meat products more palatable and appetizing for consumption.

	-reduction of microbial content thus achieving the necessary preservation effects for an extended shelf life (storability) of the products and food safety effects by eliminating potential food poisoning agents. The heating parameters to be applied in meat processing can vary considerably in temperature and time depending on the type of product. Heat treatment methods cause various physical-chemical alterations in meat, which result in the beneficial sensory and hygienic effects on the processed products.
7. Cutting/chopping/comminuting (size reduction)	G. It refers to the breakdown of carbohydrates ("sugars") present in meat mixtures, mainly to lactic acid using microorganisms — yeasts or bacteria — under anaerobic conditions. The science of fermentation is known as zymology or zymurgy.

IV. Complete the sentences with the following words:

fermentation, cheese, cutting, term, vegetables, food safety, yeast, concentrations

1. The _____ fermentation sometimes refers specifically to the chemical conversion of sugars into ethanol, producing alcoholic drinks such as wine, beer, and cider.

2. However, similar processes take place in the leavening of bread (CO2 produced by _____ activity).

3. _____ is used in the preservation of sour foods with the production of lactic acid, such as yogurt.

4. Apart from alcohol, widely consumed fermented foods include vinegar, olives, yogurt, bread, and _____.

5. In various parts of the world, more localized foods prepared by fermentation may also be based on beans, dough, grain, _____ fruit, honey, dairy products, fish, meat, or tea.

6. Heat treatment reduces microbial content thus achieving the necessary preservation effects of the products and _____ effects by eliminating potential food poisoning agents.

7. Salt _____ (up to 15%) are too high for palatable food.

8. There are five methods of mechanical meat _____.

V. Find proper equivalents in your native language. Learn them.

Meat processing technology	
Food preservation	
Fermented foods	
To consume	
To chop meat	
To cut large pieces of meat	
To mix	
To smoke meat	
Heat treatment	
Palatable food	
Smoked meat	
Stuffed meat	
Curing of meat	
Steak	
Sausage	
To treat meat	
Food safety	
Vinegar	
Lactic acid	
Spices	
Dairy products	
Yeast	

CHAPTER II

GENERAL ENGLISH

1. Lesya Ukrainka

1. Read and translate the text.

On this poor, indigent ground

I shall sow flowers of flowing colors;

I shall sow flowers even amidst the frost,

And water them with my bitter tears.

"Contra spem spero"

Lesya Ukrainka was born on 13th February, 1871 in Novograd-Volynsky, Ukraine. Her real name was Larisa Kosach-Kvitka. She was brought up in the family of political activists and writers. She was a very smart and curious girl. Lesya learned to read at the age of 4, at 6 – she was able to sew very well, at 9 – she wrote her first poem. However her mother was a very strict and demanding person. She thought her daughter was disadvantaged that's why she taught her at home using her own program till the fifth form.

In 1881 Lesya was stricken with tuberculosis, but she continued studying, writing poems, short-stories, dramas, etc. Her early collections were influenced by the works of Taras Shevchenko. She was the most famous Ukrainian poet of the day.

She knew seven languages – Ukrainian, French, German, English, Polish, Russian and Italian. Lesya Ukrainka was a talented translator of works by Homer, W. Shakespeare, V. Hugo, I. Turgenev, etc.

She supported Ukrainian struggle against tsarism and joined Ukrainian Marxist organization. In 1903 Lesya Ukrainka translated the Communist Manifesto into Ukrainian. It led to her imprisonment in 1907. She worked in a very difficult period of Ukrainian history. Her pseudonym and works were considered as radical act against Imperial Russia regime.

Lesya Ukrainka died in Surami, Russian Empire (now Georgia) on 1st August, 1913 at the age of 42. Her works and personality inspire many generations to follow their destination and to do their best to improve the life of their country.

2. Translate and remember the words from the table.

be considered		inspire	
be stricken		join	
bring up		pseudonym	
curious		sew	
demanding		influence	
destination		strict	
disadvantaged		struggle (n)	
imprisonment		support (v)	
improve		tuberculosis	

3. Answer the questions.

1. What was the real name of Lesya Ukrainka?
2. What did her parents do?
3. What was she able to do at the age of 9?
4. Where did she study at her early age? Why?
5. What health problem did she have?
6. What foreign languages did she know?
7. What was the reason of her imprisonment?
8. When did she die?

4. Put the sentences in order.

___ She studied at home till the fifth form.

___ The works of Tasas Shevchenko influenced her early collections.

1__Lesya Ukrainka was born on 13th February, 1871.

___ She supported Ukrainian struggle against tsarism.

___ Lesya Ukrainka was stricken with tuberculosis.

___ She translated the works of V. Hugo.

___In 1913 Lesya Ukrainka died in Surami.

5. Guess the word.

a) When you show interest to something, you are c_____.

b) When a child is very poor in studying and needs additional help. She / he is a d_____ pupil.

c) To have an effect on something – i_____.

d) To help somebody in a difficult situation – to s_____.

e) A fight against something – s_____.

6. Make up and write down phrases.

To lead to	children	_____
To bring up	with tuberculosis	_____
To be stricken	against tsarism	_____
A demanding	mother	_____
To sew	beautiful clothes	_____
A struggle	imprisonment	_____

7. Choose the correct option.

1. Lesya Ukrainka's poems were_____ (considered / influenced) as radical.

2. I like your _____ (support / pseudonym). It sounds unusual. You'll become a famous poet!

3. Don't be so _____ (demanding / nice)! He does a lot of work and soon he will study better!

4. Parents should _____ (join / inspire) their children to be curious and hard-working!

5. She _____ (brought up / improved) two sons and a daughter.

Grammar Bank

The Present Simple Tense

(repeated actions)

If there isn't a main verb, we use the verb "To Be"	**If there is a main verb:**
+ I **am** never late. + He (she / it) **is** hardly ever curious. + We (you / they) **are** always demanding. - I am not late. - He (she / it) isn't curious. - We (you / they) aren't demanding. ? Am I late? ? Is he (she / it) curious? ? Are we (you / they) demanding?	+ I (we / you / they) always read books when I (we / you / they) have time. - I (we / you / they) **don't** support Peter. ? **Do** I (we / you / they) inspire him? + He (she / it) support**s** them. - He (she / it) **doesn't** support them. ? **Does** he (she / it) support them?

Key words:

Every day / week / month / year

Always

Usually

Sometimes

Hardly ever

Seldom

Never

The Present Continuous Tense

(actions that continue for some time)

+ I **am** bring**ing** up my brother. + He (she / it) **is** support**ing** the pupils. +You (we / they) **are** inspir**ing** the friends. - I am not bringing up my brother. - He (she / it) isn't supporting the pupils. -You (we / they) aren't inspiring the friends. ? Am I joining a History Club? ? Is he (she / it) supporting the pupils? ? Are you (we / they) sewing new clothes?
Key words: Now At the moment At this time From 5 to 7 For two hours

1. Complete the sentences with the verbs in Present Simple.

a) Her parents _____ (bring up) four children: two boys and two girls.

b) If you want to help him, you should _____ (support) him, because he _____ (not / believe) in himself.

c) He _____ (not / join) our team, because he _____ (not / like) volleyball.

d) When she _____ (have) free time, she _____ (sew) or _____ (draw).

e) My best friend _____ (inspire) me to study French. He always _____ (say) that it _____ (not / be) a difficult language.

2. Make up questions and then ask your partner.

You / a curious person?

Your father / strict?

You / a demanding person?

Your friend / always support you?

You / improve your English?

Your mother / sew new clothes?

3. Complete the sentences in Present Continuous.

a) We _____ our English from 10 to 11 a.m. (improve)

b) He _____ his favourite football team now. (support)

c) She _____ a new dress at this time. (sew)

d) The writer _____ about a new pseudonym at the moment. (think)

e) The teachers _____ pupils to prepare for exams. (inspire)

f) They _____ (not / bring) children. They are too young.

4. Choose Present Simple or Present Continuous.

1. What _____ (you / do) now? – I _____ (read) about tuberculosis. Why _____ (you / do) that? – Because my cousin _____ (be stricken) with this disease and I _____ (not / know) how to help him.

2. Why _____ (you / be) so strict with your sister? She _____ (be) just a very curious girl! – When my mother _____ (go) to work, I _____ (bring up) my sister.

3. Our history teacher _____ (be) very demanding. When she _____ (be) so strict as today, it _____ (not / inspire) pupils to study the subject and to join History Club.

4. Why _____ (you / not / come) to our Sports Club on Fridays? – Because every Friday I _____ (improve) my English.

2. Antoni Gaudi

1. Read and translate the text.

"Nothing is invented,

For it's written in nature first"

Antoni Gaudi was born on 25th June 1852 in a very poor family in provincial town of Catalonia, Spain. He spent most of his free time alone studying and admiring nature. Antoni suffered from rheumatism that led to his quite reserved character.

He was interested in architecture from a very early age. He managed to graduate from the Barcelona Higher School of Architecture in 1878. To finance his studies he worked as a draughtsman for different architects.

It was very difficult for him to get a reputation of a talented architect. First he did not get serious commissions which could show his talents. One of the biggest commission in which he managed to show his unique style was the construction of Sagrada Familia, Basilica and Expiatory Church of the Holy Family in Barcelona.

Antoni Gaudi was a very religious person. He said: "Those who look for the laws of Nature as a support for their new works collaborate with the Creator". The architect tried to express his faith through his works. He saw an ideal harmony in God's creation of nature and he tried to depict it in his design. For this reason he was often called God's architect. Working on Sagrada Familia he became more and more religious. Being a famous architect he neglected to take care of his appearance.

On 7th June 1926 he was struck by a tram and was unconscious. Antoni Gaudi did not have documents and people who were close at that moment thought he was a beggar. Unfortunately, he did not get immediate medical help. Taxi drivers refused to take him to hospital because they understood that he could not pay.

Antoni Gaudi died on 10th June. From now on all taxis in Barcelona must be black and yellow. Black – as a colour of mourning and yellow – as a colour of shame for human apathy.

2. Translate and remember the words from the table.

admire		draughtsman	
apathy		expiatory	
appearance		get commission	
beggar		mourning	
be struck		neglect (n)	
be unconscious		reserved	
depict		shame	

3. Answer the questions.

1. When was Antoni Gaudi born?

2. Did he have any health problems?

3. Where did he study?

4. Why did he work as a draughtsman?

5. What was his first biggest commission?

6. Was he a religious person?

7. Why was he called God's architect?

8. How did die?

9. Why did taxi drivers refuse to take him to hospital?

10. Why are taxis in Barcelona black and yellow?

4. Correct the sentences.

1. Antoni Gaudi lived in a rich family in Barcelona.

2. He suffered from tuberculosis.

3. Gaudi worked as a teacher at Barcelona Higher School of Architecture.

4. Sagrada Familia was his second commission.

5. He always took care of his appearance.

6. He was struck by a car.

7. Gaudi got medical help at once.

8. Taxis in Barcelona are black and white.

5. Guess the word.

a) It's a feeling which people have when they did something wrong. S_____

b) A very poor person who asks money for food. B_____

c) A profession in which you should draw very well. D_____

d) Something very unusual. U_____

e) Type of character when a person is very shy. R_____

6. Complete the sentences.

take care of	was unconscious	appearance	was struck	apathy

1. A person _____ by a car yesterday.

2. He didn't _____ his appearance and looked like a beggar.

3. The man _____ after the operation.

4. Look at your _____ ! These clothes are not good for a meeting!

5. Don't be always angry with him! Your __ _____ spoils your relationship.

7. Put the words in the correct order.

1. this / unique / church / expiatory / is

_____

2. an / they / commission / got / important

_____

3. his / she / doesn't / neglect / help

_____

4. I / your / appearance / today / like

_____

5. money / gave / a / beggar / to / they

_____

Grammar Bank

The Past Simple Tense

If the main verb is regular:	If the main verb is irregular.
+ I (you / we / they / he / she / it) worked hard. -I didn't work hard. ? Did I work hard?	+ I went to the hospital. -I didn't go to the hospital. ? Did I go to the hospital? The verb "To Be" - was (I / he / she / it) -were (we / you / they) + He was reserved. -He wasn't reserved. ? Was he reserved? + They were unconscious. -They weren't unconscious. ? Were they unconscious?
Key words:	

Yesterday Last week / month / year 5 minutes ago

The Past Continuous Tense

+ I **was** bring**ing** up my brother. + He (she / it) **was** support**ing** the pupils. +You (we / they) **were** inspir**ing** the friends. - I was not bringing up my brother. - He (she / it) wasn't supporting the pupils. -You (we / they) weren't inspiring the friends. ? Was I joining a History Club? ? Was he (she / it) supporting the pupils? ? Were you (we / they) sewing new clothes?
Key words: At that moment At that time From 5 to 7 yesterday For 2 hours

1. Complete the sentences in Past Simple.

a) Gaudi _____ (admire) nature.

b) A man _____ (be) struck by a car. He _____ (be) unconscious, but luckily, he _____ (get) medical help in time.

c) They _____ (get) a good commission and _____ (can) save enough money for travelling.

d) What _____ (he / depict) in this photo? – He _____ (depict) people's apathy.

e) That draughtsman _____ (have) quite reserved character.

f) The man _____ (have) a tidy appearance, so they _____ (not / think) that he _____ (be) a beggar.

2. Rewrite the sentences in Past Simple.

1. My friend has a reserved character. I think so, because when people ask her to tell about herself, she feels shame.

_____

_____

2. Yellow and black colours on taxis in Barcelona mean mourning and shame for people's apathy.

_____

3. This expiatory church is my favourite. There are many other architectural building in this city which I admire.

_____

_____

4. Do you know this draughtsman? – Yes, I do.

_____

5. This architect depicts his love to nature in his paintings.

_____

3. Complete the sentences in Past Continuous.

a) He _____ (depict) the life of poor people in this picture.

b) We _____ (admire) nature in mountains at that moment.

c) I _____ (read) a book about a very reserved person who had problems making friends.

d) When her parents heard the truth, Betty _____ (feel) shame for the whole evening.

e) From 9 to 11 they _____ (get) good commissions from different shops.

4. Choose Past Simple or Past Continuous.

1. What _____ (you / read) when I _____ (call) you? – I _____ (read) an interesting book about a person who _____ (start) his career as a draughtsman and then _____ (became) a famous architect.

2. Polly _____ (be) struck by a car. Luckily, she _____ (not / be) unconscious. The driver _____ (call) her parents and _____ (take) her to hospital. She _____ (stay) there for two days and soon _____ (can) go home.

3. When we _____ (walk), we _____ (see) a beggar. He _____ (have) a bad appearance and _____ (be) very hungry. As we _____ (have) some burgers with us, we _____ (decide) to share them with him. He _____ (be) very glad.

3. Nikola Tesla

1. Read and translate the text.

"Of all things, I like books best".

Nikola Tesla was born on 10th July, 1856 in Smiljan, Croatia in the family of a priest and an inventor. He was interested in electricity at his early age due to his physics teacher.

Being a teenager he suffered from cholera, spent 9 months in bed and could die. When he recovered he devoted his time to travelling to the mountains and reading books that helped him to overcome difficulties physically and emotionally.

He studied at Technical University of Graz and was a very hard-working and persistent student. The death of his father affected him so much that he lost interest to education and started gambling. Soon he had no money even to pay the tuition fee and dropped out of the University.

Nevertheless Nikola Tesla managed to become a great inventor who contributed much to the development of wireless power, radio, X-ray, remote control, neon lamp, etc.

He always cared about self-study, self-development and creativity. He knew eight languages. Many of his ideas were stolen by other inventors. Nikola Tesla mentioned in such cases: “I don’t care that they stole my idea. I care that they don’t have any of their own”.

Unlike many other scientists he had special attitude to money. He said “Money does not represent such a value as men have placed upon it. All my money has been invested into experiments with which I have made new discoveries enabling mankind to have a little easier life”.

Nikola Tesla died on 7th January, 1943 in America. He is acknowledged as one of the genius of his generation.

2. Translate and remember the words and word combinations from the table.

attitude		mention	
be acknowledged		nevertheless	
care		overcome difficulties	
devote		pay the tuition fee	
drop out of the University		persistent	
due to		priest	
electricity		recover	
enable		remote control	
gambling		wireless power	
genius		X-ray	

3. Answer the questions.

1. When was Nikola Tesla born?

2. What health problem did he have?

3. What helped him to recover?

4. Where did he study?

5. Why did he lose interest in studying?

6. What inventions of Nikola Tesla do you know?

7. Could he speak a foreign language?

8. What attitude to money did he have?

9. When did he die?

4. Correct the wrong sentences.

1. Nikola Tesla lived in Ukraine.

2. He suffered from cholera.

3. He dropped out of the Uni because he was a lazy student.

4. Self-development was important for him.

5. Nikola Tesla was very angry when his ideas were stolen by other inventors.

6. He believed that his discoveries were useful for people.

5. Put the letters in order.

tePris _____ bnEale _____

rcvoeRe _____ neGsiu _____

yaXr _____ ntMenio _____

reCa _____ ovDete _____

6. Choose A or B.

1. To overcome _____

A. difficulties B. X-ray

2. To pay _____

A. attitude B. tuition fee

3. To be interested in _____

A. gambling B. mention

4. To enable _____

A. to live better B. remote control

5. To devote _____

A. neon lamp B. your free time

7. Complete the sentences.

acknowledged	mentioned	nevertheless	wireless power	dropped out

1. Nikola Tesla developed _____ and X-ray.

2. You _____ something about neon lamp. Could you repeat that, please?

3. He wasn't interested in studying and soon _____ of the college.

4. It was very difficult for Tom to study. _____ he finished school with the best marks.

5. She was _____ as one of the best inventors of that time.

Grammar Bank

The Present Perfect Tense

If the main verb is **regular**:	If the main verb is **irregular**:
+ I (you / we / they) **have** car**ed** about my younger sister.	+ I (you / we / they) **have done** my homework.
+ He (she / it) **has** recover**ed** soon.	+ He (she / it) **has written** an email.
-I (you / we / they) haven't cared about my younger sister.	-I (you / we / they) haven't done my homework.
-He (she / it) hasn't recovered soon.	-He (she / it) hasn't written an email.
? Have I (you / we / they) cared about my younger sister?	? Have I (you / we / they) done the homework?
? Has he (she / it) recovered soon?	? Has he (she / it) written an email?
Key words:	
This week / month / year	

Already (in affirmative sentences) Just Yet (in negative sentences and questions)

1. Complete the sentences in Present Perfect.

1. He _____ (mention) his new book this week.

2. _____ (you / find) a remote control yet?

3. They _____ (overcome) all difficulties and _____ (already / pass) all exams very well.

4. _____ (she / turn off) electricity in the kitchen? – I hope so.

5. We _____ (just / pay) the tuition fee for studying.

6. Don't worry! You can come to her! She _____ (already / recover).

7. Bill _____ (just / see) a priest near the church.

2. Ask questions to your partner and make short notes. Then tell your teacher about him / her.

This morning	Short notes
You / have breakfast You / watch TV You / do X-ray at the hospital You / read about a genius You / devote your time to studying Math You / overcome any difficulties	

3. Choose Present Perfect or Past Simple.

1. _____ (you / prepare) a report about N. Tesla yet? – Yes, I _____ (do) it yesterday. I _____ (devote) two hours to find out about such of his inventions as wireless power and X-ray.

2. Mark _____ (be) a very persistent student last year. Nevertheless, this year he _____ (start) gambling), _____ (lose) all his money and (not / pay) the tuition fee. I _____ (just / hear) from my best friend that he _____ (drop) out of the University last month.

3. - Susan _____ (have) problems with her health last year. Luckily, she _____ (begin) to do sport. It _____ (enable) her to overcome difficulties. – Let's visit her today! I think, she _____ (already / recover) and will be glad to see us.

4. Discuss these cards with your partner. Then tell the information to your teacher.

1. _____ (you / care) about an animal? What animal was it? What did you do? Did you enjoy it?

2. _____ (you / visit) a person who _____ (just / recover)? Who did you go to? What was the health problem? Did you buy anything? Did you try to support that person?

4. Thomas Edison

1. Read and translate the text.

"I have not failed. I have just found

10000 ways that won't work".

Thomas Edison was born on 11th February, 1847 in Milan, Ohio. He was the youngest of Samuel and Nancy Eliot Edison's seven children. At school he was a very poor pupil. He had problems with hearing so many people considered him as a disadvantaged child.

One day he brought a letter from school. Thomas's mother read it loud. It was said that he was a unique and very talented boy and the local school could not give him the knowledge he deserved. So he had to be educated at home.

Many years later after his mother's death he found that letter in the box with old photos. When Thomas read it, he began to cry. It was said that he had been so poor and disadvantaged pupil that school had refused to educate him. At that moment he understood that his mother had lied him and in such way had saved him from self-reproaches. She taught him to believe in himself regardless the opinion of other people. Later he stated: "Genius is one percent inspiration and ninety nine percent perspiration".

At the age of 14 Thomas saved a three year old boy from a runaway train. The child's father was so grateful that he decided to teach Thomas how to be a telegraph operator. Later it led to many inventions which Thomas Edison made in the sphere of communications: the phonograph (the first machine which could record and playback sounds); the motion picture, carbon-button transmitter (it is still used in microphones), etc. Many of his inventions were especially motivated by his deafness. He believed that "to have a great idea, have a lot of them".

He created the first industrial research laboratory in the world and gave a chance to many scientists to work there. As American inventor he had 1093 patents in different fields such as electric light and power, telephony, telegraphy and sound recording.

Thomas Edison died on 18th October 1931 in West Orange, New Jersey. His life is a wonderful example of a person who can change the world to better using his wish and intelligence.

2. Translate and remember the words from the table.

Be educated		Motivate	
Deafness		Opinion	
Deserve		Perspiration	
Genius		Regardless	
Hearing		Refuse (v)	
Inspiration		Self-reproach	
Intelligence		State (v)	
Knowledge		Transmitter	
Lie (v)		Unique	

3. Answer the questions.

1. When was Thomas Edison born?

2. What health problem did he have?

3. Why did he bring a letter from school?

4. Why did his mother lie when she read a letter?

5. What does it mean: “Genius is one percent inspiration and ninety nine percent perspiration”?

6. How did he become a telegraph operator?

7. What inventions of Thomas Edison do you know?

8. How many patents did he have?

9. When did he die?

4. Write *True* or *False*.

1. Thomas Edison studied well at school. ____

2. He couldn’t see very well. ____

3. When he brought a letter from school, his mother lied to him. ____

4. Thomas Edison believed that to become a genius a person must work hard. ____

5. When he was a teenager, he saved a little girl from a runaway train. ____

5. Guess the word.

a) Information that you know very well - k_____

b) When you don't agree to do something – r_____

c) To say something that isn't true – l_____

d) A serious health problem with hearing – d_____

e) To support somebody to do something – m_____

6. Choose the correct option.

1. To give pupils _____

a) knowledge b) intelligence

2. To save from _____

a) opinion b) self-reproach

3. To see _____ on your face in a very hot day

a) inspiration b) perspiration

4. To be _____ at home by a good teacher

a) educated b) stated

5. To refuse means _____

a) to lie b) not to agree

7. Put the words in order.

1. invented / a / He / unique / transmitter

_____

2. was / her / She / it / opinion / stated / that

_____

3. needs / inspiration / Genius / an

_____

4. deserve / good / Children / education

_____

5. Peter / unique / is / a / boy

_____

Grammar Bank

The Past Perfect Tense

(shows the action which happened before another action in the past)

If the main verb is **regular:**	If the main verb is **irregular:**
+ He said that his best friend **had** motivat**ed** him before.	+ When we met him in the park, he **had done** his work.
-He said that he hadn't refused to do that work.	-She stated that she hadn't broken a vase.
? Had he prepared dinner when you came home?	? Had she done her homework when you called her?

1. Complete the sentences with Past Perfect.

1. He stated that he _____ (do) that work the day before.

2. Kate had a unique hearing. She _____ (play) the piano and _____ (sing) songs for her friends before she moved to Berlin.

3. When we came home, we found out that John _____ (change) his opinion and _____ (refuse) to take part in competition.

4. When they saw perspiration on his face, they understood that he _____ (do) sport before they came.

5. When I went to the laboratory, I saw a unique transmitter on the shelf. I remembered that I _____ (see) the same one in our Science Museum.

2. Choose Past Simple or Past Perfect.

1. Teachers _____ (motivate) their pupils to work hard before the competition. When they _____ (win), it _____ (be) clear that pupils _____ (get) good knowledge and _____ (deserve) their medals.

2. You _____ (do) it wrong regardless the fact that I _____ (explain) you everything before. You _____ (tell) me that you _____ (understand) the material but now I think that you _____ (lie).

3. Molly _____ (be) educated at a special school because of her deafness. Regardless the fact that she _____ (have) a serious health problem, her teachers _____ (be) sure that she _____ (be) a genius.

3. Finish the sentences in Past Perfect.

a) When I came home, I saw that…

b) When he changed his opinion, he understood that …

c) When she improved her knowledge in Literature, she stated that …

d) When I met a genius, I thought that …

e) When my friend motivated me to do sport, I felt that …

4. Make up sentences in Past Simple and Past Perfect using the verbs from the table.

lie	state	refuse	deserve	motivate

1._____

2._____

3._____

4._____

5. _____

5. Margaret Thatcher

1. Read and translate the text.

"Pennies do not come from heaven.

They have to be earned here on earth"

"Plan your work for today and every day,

then work your plan".

Margaret Thatcher was born on 13th October 1925 in Grantham, England.

She is often called "Iron Lady" because of her leadership talents and significant role in politics of the Great Britain. M. Thatcher graduated from the Oxford University in 1947 and got a degree in Chemistry. Working as a chemist she was always interested in politics.

Her first attempts to become a member of the Parliament in 1950 were unsuccessful. In 1953 she got qualification of a barrister. Her specialization was taxation. In 1959 due to her persistence and hard work she managed to become a member of Parliament. She believed that "Disciplining yourself to do what you know is right and important, although difficult is the highroad to pride, self-esteem and personal satisfaction". In 1975 she became the leader of the Opposition and was the first woman to lead a major political party in the UK. She had a lot of opponents who tried to prevent her carrier in politics. But Margaret Thatcher was sure that "If you set out to be liked, you would be prepared to compromise on anything at any time, and you would achieve nothing". Thus, she always followed her own beliefs and ideas. On 4th May 1979 she became the Prime Minister of the UK.

Margaret Thatcher reduced government intervention in the market. The biggest state companies were privatized that led to greater competition between industries and improved the quality of services. She managed to decline the inflation and to stabilize the economy.

Due to Margaret Thatcher's policy the war between the UK and Argentina in 1982 for the Falkland Islands lasted for only 74 days and ended with the UK's victory.

Margaret Thatcher played an important role in the ending of the Cold War. She took part in negotiations between American President Ronald Reagan and

USSR President Gorbachev in 1985-1987 that led to the victory of the West in the Cold War.

In 1999 Time magazine ranked Margaret Thatcher among the 100 most influential people of the 20th century.

2. Translate and remember the words and word-combinations from the table.

attempt		policy	
barrister		rank	
decline		reduce	
get a degree		self-esteem	
graduate from		significant	
influential		stabilize	
intervention		take part in	
negotiations		unsuccessful	
persistence		beliefs	

3. Answer the questions.

1. Where was Margaret Thatcher born?

2. Why is she called “Iron Lady”?

3. Were her first attempts in politics successful?

4. What did she do for the country?

5. What role did she play in the Cold War? Why?

6. Explain Margaret Thatcher’s statement: “Pennies do not come from heaven. They have to be earned here on earth”

4. Match to make a short biography of Margaret Thatcher.

1) 1925	A. Margaret Thatcher graduated from the Uni.

2) 1947	B. She made her first attempts in politics.
3) 1950	C. Date of birth.
4) 1953	D. She became a member of the parliament.
5) 1959	E. She took part in ending of the Cold War.
6) 1975	F. She managed to finish war with Argentina.
7) 1979	G. She became the leader of the Opposition.
8) 1982	H. M. Thatcher became a barrister.
9) 1985-1987	I. She became the Prime Minister.

5. Guess the word.

a) to finish university g_____

b) to make something smaller r_____

c) to be unlucky in something u_____

d) very important s_____

e) to make something better i_____

f) chance, possibility a_____

6. Match to make expressions.

1. get a degree	A. the economy
2. reduce	B. policy
3. take part in	C. the inflation
4. stabilize	D. in Chemistry
5. influential	E. negotiations

7. Complete the sentences.

attempt	persistence	barrister	to get a degree	negotiations	reduced

self-esteem

1. She studied law at the college and dreamed to become a _____ one day.

2. They hoped that due to the policy of the president, the prices will be _____.

3. _____ is important for every person.

4. _____ in science you need _____ and motivation.

5. Her first _____ to take part in _____ was very successful.

Grammar Bank

Future Tenses

Will / be going to / Present Continuous

Will **(spontaneous decisions)**	**Be (am/is/are) going to** **(planned future action)**	**Present Continuous** **(Future arrangements)**
+ I will (I'll) have a glass of mineral water, please (at the restaurant). -I will not (won't) do that work. ? Will you help me with my report?	+ I'm going to buy a new car. -He isn't going to get a degree. ? Are you going study German?	+I'm seeing a barrister today at 11 a.m. -He is meeting his friends this afternoon. ? Are you playing football after classes?

1. Choose *will* or *be (am / is / are) going to.*

1. Mary _____ take part in negotiations, but she isn't sure about it yet.

2. I think, I _____ order a sandwich and a salad.

3. What _____ if it rains tomorrow? Your attempt to plant flowers _____ be unsuccessful.

4. The president _____ stabilize the situation in the country as the situation is very difficult now.

5. You _____ have to reduce the amount of calories if your doctor recommends it to you.

2. Complete the sentences using *Present Continuous for Future arrangements.*

a) We _____ (take part) in negotiations tomorrow at 10 a.m.

b) He _____ (see) a barrister and _____ (discuss) a significant problem of their policy at 12.30.

c) My teacher and I _____ (prepare) the lecture about military intervention tomorrow afternoon.

d) She _____ (not / play) football at sports club next week.

e) This barrister is a very influential person. I _____ (meet) him in a week.

3. Complete the sentences using *will / be going to / Present Continuous.*

1. Oh, your bag is so heavy! I _____ help to with it.

2. I think I need more time and persistence to study Math. I _____ take private lessons with a Math teacher.

3. My friend _____ get a degree in June! I'm so glad for him.

4. I think you need to work on your self-esteem. I'm sure, it _____ help you in negotiations.

5. Their policy is unsuccessful so they _____ discuss a new one tomorrow evening.

4. Use these phrases to make up sentences using *will / be going to / Present Continuous.*

a) to take part in sport competition.

_____

b) to get a degree in science

_____

c) to become a barrister

_____

d) to take part in significant project

_____

e) to meet an influential politician

_____

f) to decline prices for food

_____

g) to graduate from the University

_____

6. Leonardo da Vinci

1. Read and translate the text.

"As a well-spent day brings happy sleep,

So a life well spent brings happy death".

Leonardo da Vinci was born on 15th April, 1452 in Italy. He was a curious person and studied botany, geology, zoology, hydraulics, aeronautics, physics, etc. He was always interested in the laws of nature. He believed that there was no division between science and art and they have a lot in common. He stated that studying science and laws of nature made him a better artist. He could spend long hours observing and studying nature. Once he said: "A good painter has two chief objects to paint – man and the intention of his soul. The former is easy, the latter hard, for it must be expressed by gestures and movement of the limbs". To make his paintings more accurate he spent a lot of time studying anatomy. As a result, it led to better understanding of all living beings.

Leonardo da Vinci was a famous painter, sculptor, architect and inventor. His most famous paintings included the Vitruvian Man, The Last Supper and the Mona Lisa. The Vitruvian Man shows perfect connection of art and science. A male figure is depicted in two positions with his arms and legs apart inside a square and a circle. It represents da Vinci's study of proportion in which man and nature are connected. The Last Supper was painted in the monastery of Santa Maria della Grazia in Milan. The masterpiece depicts the drama of the moment when Jesus tells the Twelve Apostles who are gathered for Passover dinner that one of them would betray him soon. The Mona Lisa is the most famous painting in the world. It

is well-known due to an enigmatic smile of the woman in the portrait. It is still unknown who was depicted on the portrait.

Leonardo da Vinci is also famous for his inventions. One of them is a "flying machine" which was constructed taking into account the physiology of a bat.

Leonardo da Vinci illustrated a book for Luca Pacioli in 1509 which was called "Divine Proportion". It is also known as Golden section or Golden ratio which equals a special number found by dividing a line into two parts so that the longer part divided by the smaller part is also equal to the whole length divided by the longer part. This number is 1.618. We can suppose that da Vinci believed in truthfulness of this proportion because he used it in many of his works (The Last Supper, The Vitruvian Man, Mona Lisa, etc.). Other famous artists such as Michelangelo, Raphael, Rembrandt, Seurat and Salvador Dali also used the Golden section in their works. It is proved that this ratio can be seen in all forms of nature and science. For example, flower petals, tree branches, shells, hurricanes, fingers, animal bodies, DNA molecules, etc. Leonardo da Vinci believed in unique relationship between living beings and nature and proved that in his famous works.

2. Translate and remember the words and word combinations from the table.

accurate		intention	
betray		limb	
depict		masterpiece	
division		observe	
enigmatic		passover dinner	
flower petal		soul	
gesture		take into account	

3. Answer the questions.

1. When was Leonardo da Vinci born?

2. What sciences did he like and why?

3. Why did he study anatomy?

4. What are his most famous paintings?

5. What does The Last Supper depict?

6. What is Divine Proportion?

7. Where can we see Divine Proportion?

4. Correct the mistakes.

1. Leonardo da Vinci believed in division between science and art?

2. It wasn't easy for him to draw a man.

3. Physics helped him to understand how to depict living beings.

4. The Mona Lisa depicts connection between art and science.

5. The Vitruvian Man is famous for his enigmatic smile.

6. Divine Proportion is equal 1.620.

5. Find a word.

pedite d_____	vsboere o_____
rtsgeue g_____	mlib l_____
losu s_____	intineton i_____

6. Match and write.

Enigmatic	dinner	_____
Take	into account	_____
Passover	petal	_____
Flower	by gestures	_____
Express	smile	_____

7. Choose a correct option.

1. The Vitruvian Man _____ (depicts / betrays) connection between science and art.

2. After the accident he has a problem with his _____ (flower petal / limb).

3. When you go to Africa, you should _____ (take into account / take part) that it's very hot there.

4. Leonardo da Vinci believed that a painter should depict intention of the _____

(gesture / soul).

5. You always make a lot of mistakes in counting! Please, be more _____ (accurate / enigmatic)!

Grammar Bank

The first and the second conditional

The first conditional **(real action or fact in Present)**	**The second conditional** **(unreal action in Past)**
+ If you take part in the competition, you will win a prize. -If he doesn't betray his friends, they will respect him. ? Will you buy a masterpiece, if it costs not so much?	+ If you took part in the competition, you would win a prize. -If he didn't betray his friends, they would respect him. ? Would you buy a masterpiece, if it cost not so much? **Remember!** If I were you, I would buy that bike. If I were you, I wouldn't tell him a secret.

1. Complete the sentences using the first conditional.

a) If you _____ (tell him) about the problem, he _____ (take) it into account and _____ (not / make) such mistakes any more.

b) _____ show me the flower petals of that unique plant?

c) This painter _____ (depict) Passover dinner, if he _____ (have) such intention.

d) _____ (make) a gesture for me if I _____ (can) run.

e) Don't tell him your secret! I _____ (be) afraid, that if he _____ (know) it, he _____ (betray) you.

2. Complete the sentences using the second conditional.

1. If he _____ (observe) a masterpiece, he _____ (write) an article about it last week.

2. If she _____ (break) a limb, she _____ (not / take) part in competition yesterday.

3. If you _____ (show) me an accurate gesture, I _____ (try) to depict it.

4. If they _____ (not / make) a division, they _____ (win) two days ago.

5. If you _____ (notice) her enigmatic smile, you _____ (not / make) that mistake yesterday.

3. Read the statements and say that you would do it differently.

I betrayed my friend. I didn't take into account the price. I didn't think about my soul. I didn't observe the last football match. I forgot to count flower petals on that unique flower.	If I were you, I would… If I were you, I wouldn't….

4. Choose the first or the second conditional.

1. If I _____ (have) enough money, I _____ (buy) a masterpiece yesterday.

2. If you _____ (want) to be accurate, I _____ (recommend) you to read a book first.

3. If you _____ (listen) to me carefully, you _____ (not / break) your limb three days ago.

4. If I _____ you, I _____ (not / betray) that boy.

5. If you _____ (depict) nature, your teacher _____ (like) your painting.

7. Benjamin Franklin

1. Read and translate the text.

"Either write something worth reading or

do something worth writing"

Benjamin Franklin was born on 17th January 1706 in a big and poor family. Being married twice his father brought up 17 children and had a business in candle production.

Benjamin liked to learn. He took every opportunity to read and find out something new. He was sure that "an investment in knowledge pays the best interest". One of his brothers had a printing shop and Benjamin often worked there.

He was also interested in writing. He wrote articles secretly under a pseudonym which were published in "New England Courant". One day Benjamin Franklin told about his articles to his father. He was very angry and beat his son for impudence. But readers liked them and soon Benjamin became famous. When he was 17 the atmosphere at home got worse and he had to move to Philadelphia.

He always worked on self-improvement. According to B. Franklin, every person has a talent and must develop it. "Hide not your talents. They for use were made. What's a sundial in the shade?" Benjamin believed that "diligence is the mother of good luck".

At first he took up science as a hobby. Later it led to some important scientific achievements. He was able to prove the origin of lightning and electricity. He gave electricity positive and negative charges. Benjamin Franklin invented flexible urinary catheter, glass harmonica and bifocal glasses. He did not patent his inventions and offered them free to society.

Benjamin Franklin played an important role in international politics of that time and took part in many public projects. He had an unusual method of solving the most difficult problems. Instead of condemnation and confrontation he asked awkward questions which as a result led to appropriate decisions. He is also

famous as one of five representatives who were invited for writing the American Declaration of Independence. Later he wrote that "The Constitution only gives people the right to pursue happiness. You have to catch it yourself".

Benjamin Franklin believed in God and was always tolerant to different religions. He did not practice one particular religion so many religious people from different countries took him as one of them. B. Franklin believed that "God helps those who help themselves".

Benjamin Franklin died on 17th April 1790 in Philadelphia. Benjamin Franklin's works are worth reading and can really teach us a lot.

2. Translate and remember the words from the table.

according to		opportunity	
appropriate		origin	
awkward		pay interest	
bifocal glasses		pursue	
condemnation		scientific achievement	
diligence		society	
flexible		sundial	
impudence		urinary catheter	

3. Answer the questions.

1. When was Benjamin Franklin born?

2. What business did his father have?

3. When did Benjamin often work?

4. Why did he write articles secretly?

5. Why did he have to move to Philadelphia?

6. What scientific achievements of Benjamin Franklin do you know?

7. Did he get money for his inventions?

8. What method did he use to solve problems in politics?

9. What was his attitude to religion?

10. When did Benjamin Franklin die?

4. Write *True* or *False*.

1. Benjamin Franklin was born in a rich family. He was the only child in the family. _____

2. He helped his brother in a printing shop. _____

3. B. Franklin wrote articles for the journal. His father was proud of him. _____

4. He believed that people should hide their talents. _____

5. He invented bifocal glasses. _____

6. Benjamin Franklin took part in writing the American Declaration of Independence. _____

7. He was a catholic. _____

8. Benjamin Franklin died on 17th August 1790. _____

5. Match the words with their definitions.

1. flexible	A. important device used in hospitals
2. urinary catheter	B. where you came from
3. origin	C. necessary to solve a problem
4. society	D. can change depending on situation
5, appropriate	E. a group of people that have common interests

6. Complete the sentences.

pays the best interest opportunity bring up according to scientific achievements

1. She liked sport and took every _____ to go to the gym.

2. This bank _____ - 20 %.

3. _____ Benjamin Franklin, we should not hide our talents.

4. Some parents think that it's difficult to _____ children nowadays.

5. This person is famous for his _____.

7. Put the sentences in order to make a dialogue.

___ Really? And what do you need for that?

_1_ How are you, my friend?

___ Why are you going there?

___ See you tomorrow!

___ Nice! And you?

___ Fine! I'm going to the bank to the city centre.

___ My parents gave me some money for my birthday and I decided to keep them in the bank and earn a little more. I heard this bank pays the best interest in our city.

___ You should have appropriate documents to prove who you are and where you are from.

___ I wish you good luck! Bye!

Grammar Bank

Degrees of comparison

Comparative degree	Superlative degree
Small – small**er** Hot – hott**er** (1-2 syllable adjectives) Significant – **more** significant Appropriate – **more** appropriate (more	Small – the small**est** Hot – the hott**est** (1-2 syllable adjectives) Significant – **the most** significant Appropriate – **the most** appropriate (more than 2 syllable adjectives)

than 2 syllable adjectives)	

Exceptions

Good – better – the best

Bad – worse – the worst

Far – further – the furthest

Little – less – the least

Many / much – more – the most

1. Complete the sentences with Comparative degree.

1. This chair is _____ (flexible) than that one.

2. The last project was _____ (good) than this one.

3. Will you think about _____ (appropriate) time to talk to him?

4. His sundial was _____ (bad) than ours.

5. According to Dr. Thomson, this urinary catheter is _____ (expensive).

2. Complete the sentences with Comparative degree.

a) For me, it's _____ (good) scientific achievement in the world.

b) Diligence and persistence were _____ (significant) traits for a scientist.

c) This bank pays _____ (high) interest, so I recommend you to go there.

d) He looked awkward in his new suit and bifocal glasses. The _____ (bad) thing was that he didn't remember _____ (big) part of his report.

e) Kate was always rude to her friends. She thought that impudence was one of _____ features in our society.

3. Choose Comparative or Superlative degree.

1. You need to go _____ (far). Your table is next.

2. I hope you use an opportunity to study at _____ (good) University in our country.

3. This medicine is _____ (appropriate) for your limb than that one.

4. Who is _____ (influential) person in your family?

5. Condemnation is _____ (bad) way to become friends with him again.

4. Make up four sentences in Comparative and four sentences in Superlative degree with these adjectives.

curious demanding little strict persistent influential successful far

1._____

2._____

3._____

4._____

5._____

6._____

7._____

8._____

8. Steven Spielberg

1. Read and translate the text.

"I don't dream at night.

I dream all day; I dream for a living".

Steven Spielberg was born on 18th December, 1946 in Ohio. His mother was a restaurateur and a concert pianist. His father worked as an electrical engineer. Steven was interested in movies from the early age. When his family went camping he liked to record their trips on the film. At the age of 13, he won a prize

for the film “Escape to nowhere”. It was a 40 minute film based on a battle in East Africa.

He was a very poor pupil at school because he suffered from dyslexia (inability to read) which at that time was undiagnosed. He was often bullied and faced mean treatment from his classmates. He once said: “I never felt like a victim. Movies helped me, saved me from shame, from guilt, from putting it on myself… when it wasn’t my burden”.

He was persistent in his decision to become a film director. He managed to get a position of intern at Universal Studios where he got acquainted with famous film directors and was able to develop and improve his skills.

Nowadays he has hundreds of film awards including three Best Movie Oscars. His first major movie was the horror film “Jaws” (1975). Since then he made many blockbusters including “Jurassic Park”, “Indiana Jones”, etc. In 1993 his famous film “Schindler’s List” came out. It said the true story of the Holocaust during the Second World War. It was the most expensive black and white movie ever made. But Spielberg refused to accept payment for this film. He believed that any payment would be “blood money”. Besides the Holocaust he shot films which revealed the horrors of slavery and terrorism. He worked with hundreds of people from all over the world. When he was asked about various difficulties of such work he mentioned: “The delicate balance of mentoring someone is not creating them in your own image, but giving them the opportunity to create themselves”.

From 1985 to 1989 he was married to Amy Irwing. His present wife is Kate Capshaw. They bring up 7 kids. Steven Spielberg is an enthusiastic and persistent person. He believes that hard work in the field that inspires you can lead to success and prosperity. He faced many difficulties in his life but had enough strength to overcome them.

2. Translate and remember the words from the table.

accept payment		improve skills	
bully		jaw	
burden		prosperity	
escape		reveal	

face (v) mean treatment		slavery	
get acquainted		suffer from	
guilt		victim	

3. Answer the questions.

1. When was Steven Spielberg born?

2. What did he like to do when his family went camping?

3. Why was he bad at school?

4. How did he become a film producer?

5. How many Oscars did he have?

6. What was the film "Schindler's list" about?

7. Why did he refuse to take money for this film?

4. Write *True* or *False*.

1. Steven Spielberg's father was a restaurateur. _____

2. When he was a teenager, he won a prize for the 40-minute film. _____

3. His classmates knew about his disease and bullied him. _____

4. Films helped Steven to escape from his problems. _____

5. He worked as an electrical engineer at Universal Studios. _____

6. "Schindler's List" is about the Holocaust in the First World War. _____

7. Steven Spielberg has 6 kids. _____

5. Find the odd one out.

a) slavery, terrorism, progress _____

b) shame, success, guilt _____

c) blockbuster, horror film, record _____

d) dyslexia, opportunity, chance _____

e) inspire, be creative, suffer _____

6. Choose the correct option.

1. To accept _____

a) payment b) slavery

2. To get _____ with new people

a) victim b) acquainted

3. To suffer from _____

a) jaw b) dyslexia

4. To face mean _____

a) treatment b) burden

5. To be bullied by _____

a) classmates b) guilt

7. Put the words in order.

a) He / read / couldn't / suffered / because / dyslexia / from / he

_____

b) got / They / because / success / they / persistent / were

_____

c) accepted / for / work / her / She / payment

_____

d) He / me / inspired / write / to / book / a

_____

e) I / your / secret / didn't / reveal

_____

Grammar Bank

Must / Have to / had to

Must **(obligation,** **only in the Present)**	**Have to / has to** **(necessity in the Present)**	**Had to** **(necessity in the Past)**
+ You must pay the tuition fee in time. -You mustn't come into this room. It's dangerous.	+ I have to wash the dishes after party. + He has to wash his car, because it's very dirty. -I don't have to talk to him, if I don't want to do it. -He doesn't reduce the prices for his products.	+ I had to wash the dishes after party yesterday. + He had to wash his car, because it was very dirty. -I didn't have to talk to him, if I didn't want to do it. -He didn't reduce the prices for his products.

1. Complete the sentences with *must or have to / has to.*

1. He _____ escape from a crocodile.

2. If he feels pain in his jaw, he _____ go to the hospital immediately!

3. If she wants to get this job, she _____ improve her skills in English.

4. If you accept this payment, you _____ inform a tax office.

5. When we tell him that we know the truth, he'll _____ reveal the secret.

2. Complete the sentences with *have to / had to.*

1. Bob faced mean treatment at school and _____ reveal that to his parents one day.

2. You _____ write a report about slavery, because all the other topics are already chosen.

3. She understood that she wasn't a victim, but _____ suffer from mean treatment from her colleagues. To solve that problem she _____ work on her self-esteem.

4. Because of his prosperity as a musician, he _____ escape from journalists every day.

5. Peter was very shy, but he _____ get acquainted with his future wife's relatives.

3. Make up sentences with must / have to / had to using these phrases.

To suffer from slavery	to face mean treatment
To reveal a secret	to accept payment
To get acquainted	to improve skills

1._____

2._____

3._____

4._____

5._____

6._____

4. Ask your partner and make short notes. Then tell your teacher about him / her.

Questions	Your notes
Do you have to improve your skills in English? Do you have to take part in any competition? Do you have to get a degree to get a good job? Do you have to pay the tuition fee?	

Do you have to be demanding to yourself?	

9. Nelson Mandela

1. Read and translate the text.

"Education is the most powerful weapon which you can use to change the world"

Nelson Mandela was born on July 18th, 1918 in a very little village Mvezo in South Africa. His father was a chief until he had a quarrel with local colonial magistrate and lost his position. Nelson's family had to move to Qunu, even smaller village than Mzevo. There were no roads, only foot paths between pastures. The family lived in a tiny hut and could get water only from springs.

He studied at a village school until 1939. He entered the University College of Fort Hare. It was the only residential center of higher education in South Africa where black people could study at that time. He was a very persistent student. Studying law at correspondence courses he lived in Johannesburg and worked as a guard and a clerk. He believed that "A good head and good heart are always a formidable combination. But when you add to that a literate tongue or pen, then you have something very special".

In 1942 he joined African National Congress (ANC) and was involved in the anti-racism movement. Together with other young Africans they created the African National Congress Youth League trying to protect the rights of black people due to boycotts, strikes, etc. Nelson Mandela and 150 other activists were arrested. He spent 27 years in prison. He had tuberculosis and as a black prisoner got the lowest level of treatment.

Only in 1990 he was released due to the help of the president Frederik Willem de Klerk. In 1991 he became a president of the African National Congress and worked hard for the first multiracial elections. He always said: "Don't judge me by my successes, judge me by how many times I fell down and got back up again". Many people from South Africa and other countries were influenced by his speeches and that led to real changes in relationships between people.

On May 10, 1994 at the age of 76, Nelson Mandela became the first black president of South Africa. He used the nation's enthusiasm for sport to reconcile white and black people. As a leader of the county he did a lot to improve the economic state in South Africa. He stated that "it always seems impossible until it's done". The government funded the creation of work places, construction of schools and hospitals, improved basic health care system, etc.

In 1996 a New Constitution was signed by Nelson Mandela, in which majority rule, rights of minorities and the freedom of expression were guaranteed.

When he retired, he still had a busy schedule. He raised money for charity and fought against AIDS. His son Makgatho died in 2005 because of this illness.

Nelson Mandela died on 5th December, 2013. His achievements continue to inspire people to fight for their rights and to make positive effect on society.

2. Translate and remember the words from the table.

achievement		hut	
charity		pasture	
correspondence course		prison	
elections		quarrel (n)	
enter (v)		reconcile (v)	
formidable		release (v)	
fund (v)		sign (v)	
guarantee		spring	
healthcare system			

3. Answer the questions.

1. When was Nelson Mandela born?

2. Why did his father lose his position as a chief?

3. Was he from a rich family?

4. Where did Nelson Mandela study?

5. Why did Nelson Mandela and other young Africans create the African National Congress Youth League?

6. What illness did he have in prison?

7. When was he released?

8. How did Nelson Mandela reconcile white and black people?

9. When was a New Constitution signed? What did it guarantee?

10. When did Nelson Mandela die?

4. Match to make up a short biography.

1918 1939 1942 1991 1994 1996 2013	-He finished school and entered the University. -Nelson Mandela took part in the anti-racism movement. -He became a president of the African National Congress. -Nelson Mandela was born in Mvezo. -Nelson Mandela died. -Nelson Mandela became a president of South Africa. -Nelson Mandela signed a New Constitution.

5. Find and write down the words.

Example: AQ*PASTURE* S*HUT* *Pasture, hut*

ENTERKNPRISON _____

ARELEASECABO _____

POSIGNFMFUND _____

QSOCHARITYM _____

QUARRELISP _____

6. Choose a correct option.

1. To study at correspondence _____

A. course B. healthcare system

2. To raise money for _____

A. quarrel B. charity.

3. To reconcile means _____

A. help people to become friends B. to fund something

4. When people need a new president, they go to _____

A. elections B. pasture

5. To release means _____

A. to be in prison B. to be free again

7. Complete the sentences.

achievement sign charity entered formidable

1. He studied very well and _____ Harvard University.

2. The sum of money was quite big, so she decided to spend it for _____.

3. According to Nelson Mandela, “A good head and good heart are always a _____ combination”.

4. Could you _____ the documents here, please?

5. Basic healthcare system was a great _____ for South Africa.

10. Albert Einstein

1. Read and translate the text.

"Science is a powerful instrument.

How it is used <…> depends on mankind

and not on the instrument"

Albert Einstein was born on 14th March 1879 in Germany. His parents belonged to the working class. They were Jews. Albert had always problems at school. He rejected to learn by rote and on teachers' opinion he was a lazy and poor pupil. Albert Einstein wrote about his school years in 1983: "School failed me and I failed school. It bored me. The teachers behaved like Feldwebel (sergeants) I wanted to learn what I wanted to know, but they wanted me to learn for the exam".

Despite the fact that he dropped out of school, he continued to learn by himself. He was very smart and had a thirst for knowledge. He applied for admission to the Federal Institute of Technology in Zurich. His first attempt was not successful because he failed exams in Botany, Zoology and Languages. However next year he passed his exams and became a student of Zurich Institute.

Einstein proved that light travels as electric currents. It caused evolution of Quantum Theory. Taking into account Einstein's research inventors were able to develop different devices, for example television and movies. He is the author of the Theory of Relativity that led to the most famous formula in the world: $E=mc^2$ (E-energy, m-mass, c- speed of light). In 1921 he was awarded the Nobel Prize in Physics for his contributions.

Being a Jew it was incredibly dangerous for him to stay in Germany. During the Second World War Nazis confiscated his property, burnt his books. Luckily he was offered a position at Princeton University in the USA. He agreed and moved to America.

Albert Einstein was always against racism. He believed in God and sought to establish a harmony between science and religion. According to Einstein, "Science without religion is lame, religion without science is blind" ("Science and Religion", 1941).

Einstein always worried about Israel and supported it. In 1948 Israel became independent. Four years later Einstein was offered a position of the second

president of this state. He refused explaining his decision in the following way: “I am deeply moved by the offer, and both saddened and ashamed that I cannot accept. But I lack both the natural aptitude and the experience to deal properly with people and to exercise official functions”.

Albert Einstein was a dedicated pacifist. He said: “My pacifism is an instinctive feeling, a feeling that possesses me because the murder of men is abhorrent. My attitude is not derived from intellectual theory but is based on my deepest antipathy to every kind of cruelty and hatred”.

He often made speeches concerning responsibilities of science and scientists. According to Einstein, “Science is a powerful instrument. How it is used, whether it is a blessing or a curse to mankind, depends on mankind and not on the instrument. A knife is useful, but it can also kill”. He believed that science was able to bring together scientists from different countries and it could lead to better understanding between nations.

Albert Einstein always supported anti-war movements, helped to raise money for war resistance, took part in controversial debates, wrote letters to presidents and gave interviews.

Albert Einstein was included to the list of one hundred people who changed the world to the better. His ideas are relevant and significant these days.

2. Translate and remember the words from the table.

abhorrent		learn by rote	
admission		murder	
aptitude		property	
blessing		prove	
controversial		relevant	
curse (n)		sergeant	
dedicated		thirst (n)	
despite the fact that		war resistance	

lame			

3. Answer the questions.

1. Why Albert Einstein's teachers thought he was a poor pupil?

2. Why didn't he enter Zurich Federal Institute at first?

3. What caused evolution of Quantum theory?

4. What is the most famous formula in the world?

5. Why did he move from Germany to America?

6. Why did he reject to become a president of Israel?

7. Why was he a dedicated pacifist?

8. How did he support anti-war movements?

4. Guess the words.

1. Ehen you want to drink, you feel it. t_____

2. Synonym of important. r_____

3. When a problem causes debates, it's a c_____ problem.

4. When a person was killed. m_____

5. When a person has problems with one leg, he/she is l_____.

6. It's very bad and often inhumane. a_____

5. Match the phrases.

1. natural aptitude	A. questions
2. to drop out	B. war resistance
3. controversial	C. to the university
4. raise money for	D. of school
5. apply for admission	E. to work with people

6. Complete the sentences.

learn by rote	property	curse	thirst	despite the fact that

1. According to Einstein, science can be a blessing and a _____ for mankind.

2. He didn't want to _____ . He tried to understand new information.

3. She was very rich and had a big _____.

4. _____ he studied bad at school, he made a lot of relevant inventions.

5. When John had a new teacher, he felt a _____ for knowledge.

7. Write *True* or *False*.

1. He liked to learn by rote. _____

2. Albert Einstein entered Federal Institute of Technology. _____

3. He was bad at Botany, Languages and Maths. _____

4. Due to his inventions, we have television nowadays. _____

5. He got the Nobel Prize in 1920. _____

6. He worked in the UK during the Second World War. _____

7. He believed in God and was a pacifist. _____

8. He was afraid to support anti-war movements. _____

Grammar Bank

Can / could / be able to

Can **(in the Present)**	**Could** **(in the Past)**	**Be able to** **(in the Present, Past or Future)**
+ I can sign this document. -He can't sign this document.	+ I could sign this document. -He couldn't sign this document.	**Present** + I am able to sign this document. -He isn't able to sign this document.

? Can you reconcile your friends?	? Could you reconcile your friends?	? Are you able to reconcile your friends? **Past** + I was able to sign this document. -He wasn't able to sign this document. ? Were you able to reconcile your friends? **Future** + I will be able to sign this document. -He won't be able to sign this document. ? Will you be able to reconcile your friends?

1. Rewrite the sentences in the Past.

1. You can enter this organization if you want to do it.

2. This achievement gives them many opportunities which they can use at their work.

3. Healthcare system can work better if it is well organized and financed.

4. You can swim in the spring if the water isn't very cold for you.

5. He can be released from a prison in a year.

2. Rewrite the sentences from ex.1 in the Future.

1._____

2._____

3._____

4._____

5._____

3. Choose *can, could* or *be able to.*

1. He _____ study at the correspondence course.

2. They _____ take part at the elections as all their documents were in order.

3. _____ you show me a good pasture with a little hut not far from it?

4. If they _____ reconcile, they would _____ win at the elections.

5. I _____ guarantee that he spends most of his money for charity.

4. Make up questions and ask your partner.

Could you / Were you able to	read well play the piano swim in the river take part in the elections draw well study at correspondence course give money for charity	at the age of four / ten / twelve / eighteen?

Grammar Bank

Should / might / would better

Should **(Polite advice)**	**Might** **(Possibility)**	**Would better** **(Recommendation)**
You should see a doctor if you feel pain in your arm.	Look at the sky! I think it might rain.	You would better hurry up or you will miss your train.

1. Complete the sentences with *should* or *might*.

1. If he feels pain in his limb, he _____ go to the hospital as soon as possible.

2. We aren't sure yet, but if he proves that the work is relevant we _____ change our opinion.

3. That sergeant was a very dedicated person. I think, he _____ take part in war resistance.

4. The problem is controversial. You _____ discuss it with your boss first.

5. If you want to remember this poem very well, you _____ learn it by rote.

2. Complete the sentences with *would better* or *might*.

1. If you feel thirst, you _____ buy a bottle of water, because the next stop will be in two hours.

2. Despite the fact that he was always a quiet person, yesterday we heard curses from him and were really shocked. The reason _____ be in his family problems.

3. You _____ not read a book about an abhorrent murder. It's really frightening.

4. He _____ improve his aptitude to count fast. Such skills _____ be relevant for a scientist.

5. The admission of documents _____ start a little bit later, because the secretary is very busy at the meeting.

3. Put the words in the correct order.

1. be / he / late / today / might

_____

2. you / better / buy / would / a / in / region / property / that

_____

3. take / she / in / should / part / that / not / controversial / subject

_____

4. they / become / might / sergeants / dedicated

_____

5. might / be / the / still / admission / closed

_____

4. Give advice or recommendation with *should* or *would better* using these phrases.

To improve your aptitudes in History

To learn the words by rote

To take part in negotiations

To reconcile your friends

To get acquainted with new people

To read about scientific achievements

1._____

2._____

3._____

4._____

5._____

6._____

References

1. Murphy R. English Grammar in Use. Cambridge University Press, 2014, 398 p.

2. DiGiacomo M. The English Grammar Workbook for Adults: A Self-Study Guide to Improve Functional Writing. Rockridge Press, 208 p.

3. Farlex I. Complete English Grammar Rules: Examples, Exceptions, Exercises, and Everything You Need to Master Proper Grammar. Rockridge Press, 2016, 518 p.

4. Redman S. English Vocabulary in Use. Pre-Intermediate. Intermediate. Cambridge University Press, 2011, 264 p.

5. Evans V., Dooley J. Career Paths. Medical. Express Publishing. 2012, 80 p.

6. Лейн Д., Гутри С. Тлумачний словник ветеринарних термінів. М.: Софион, 2007, 508 с.

6. Английский язык. Foodtechnology: Пособие / Сост. Н.Б. Нестерова, Л.А. Васильева. – СПб.: СПбГУНиПТ, 2005. – 131 с.

7. Encyclopedia of food sciences and nutrition / Ed.-in-chief Benjamin Caballero. – 2nd ed. – Amsterdam, 2003.

8. http://www.milkfacts

9. https://www.musclefood.com/meat-nutrition-facts

10. Food and nutrition / Ed. by William H. Sebrell, James Hagerty. – 2nd ed. – New York, 1998.