# МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ

# ЧЕРКАСЬКИЙ ДЕРЖАВНИЙ ТЕХНОЛОГІЧНИЙ УНІВЕРСИТЕТ

**PROFESSIONAL ENGLISH**

|  |  |
| --- | --- |
|  | * Civil Engineering * Chemical Industry * Wine Production * Ecology Study |

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Пропонований посібник містить фахово спрямовані завдання для студентів, які вивчають англійську мову за професійним спрямуванням. За структурою видання складається з чотирьох частин, що містять тексти за спеціальностями, лексичних пояснень до них та вправ, що базуються на матеріалі текстів. У кінці кожної тематичної частини подається словник найуживаніших термінів, які зустрічаються у текстах.

The manual includes specialized tasks for the students studying professional English. Structurally, the book is divided into four parts, each dealing with the specific brunch of knowledge. The content of the parts are professional texts, explanations and tasks based on the material of the texts. The parts end up with the professional vocabulary actively used in the units.

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**CIVIL ENGINEERING**

### Text 1

## THE DEVELOPMENT OF THE HOUSE

The first houses in different countries of the world were made of wood. At that time the greater part of our planet was covered with thick forests. Even in those days men found ways of using wood as a building material. In some places they tied together the tops of several trees and covered them with the hides (skins) of animals. In other places they covered them with leaves or grass.

The primitive people’s first houses were tents or huts. Primitive building required no tools. The invention of tools permitted the cutting of stones and timber. Stone was the most convenient building material in the countries where there was not much wood but plenty of stone.

People began to use stone widely to build their houses many centuries ago. With the development of stone cutting finer tools appeared.

The column played an important part in the history of building. Most of the buildings of old times were based upon the column and beam method of construction.

About 4.000 years B.C. the Egyptians possessed great constructional know-how (ability). They built simple houses by present standards. They used bricks that in their primitive form were not burned, but were hardened by being dried in the sun. Since the Middle Ages, brickwork has been in constant use everywhere, in every sort of construction and in every architectural style. They made flat roofs because there was very little rain in Egypt. Their buildings were simple in construction but very beautiful. We still admire their monuments, sphinxes and palaces.

Greek builders learned much from Egyptian builders. They built their houses with slanting roofs because the climate of these two countries differs greatly. Soon Greek builders became second to none in column making. But they added the arch, thus adding much strength and beauty to their buildings.

The use of precast concrete, a very advanced construction technique has many advantages over building materials. Precast building units can be assembled at the site all the year round in any weather. The precast concrete technique plays a great role in our extensive building program.

***Vocabulary Notes:***

thick forest – густий ліс

primitive – 1) первісний; 2) примітивний, простий

convenient building material – придатний будматеріал

the column and beam method – колонно-балочнийметод

know-how (ability) – вміння

to burn – обпалювати

to harden – надавати міцності, твердості

slanting roof – пологий дах

since the Middle Ages – починаючи з середніх віків

to be second to none – не мати собі рівних

precast – збірний

## Exercises

* 1. **Make up as many questions to the text as possible.**
  2. **Translate the following sentences:**

1. Cutting stones and timbers became possible with the invention of tools. 2. The building of skyscrapers was started in the 19th century. 3. By using industrial methods of construction the speed of construction may be considerably increased. 4. The technology of construction provides for transporting precast reinforced concrete elements by rail or by lorry. 5. Erecting tall buildings without using building mechanisms is now unthinkable. 6. Precast concrete is widely used in building modern structures. 7. The use of fine tools resulted in developing building methods. 8. Methods of designing structures are changing. 9. Up-to-date building is based upon using industrial methods of work. 10. Due to our introducing mechanical aids labor productivity increased greatly. 11. Timber, stone and brick being the oldest building materials is common knowledge.

**ІІІ. Retell the dialogue and copy the most informative sentences**:

A: What did the early houses in Great Britain look like?

B: Most of them were round and built of wood.

A: Do you know whether those houses were plastered?

B: Sure, they were. A plastered house is warmer and looks nicer.

A: How did the light come into those early houses?

B: Well, as you know, there were no windows in such houses.

A: No windows? What do you mean “no windows”?

B: That’s exactly what I mean: those early houses had no windows.

A: Then how did the light come in? Through the roof?

B: Yes, through the roof. There was a special hole in the roof for that purpose.

A: What did they do when it rained? Cover up the hole?

B: Right! They covered that hole and opened the door.

A: The Romans built their houses of brick, didn’t they?

B: They did. They built their houses of brick because that was their only available building material.

A: Do you mean to say there was a lack of timber?

B: Yes, there was a lack of timber in ancient Rome.

### Text 2

**THE CONSTRUCTION OF A BUILDING**

A building is a construction that is raised on a foundation and is generally made of stone, concrete blocks, bricks and mortar or cement. Bricks or concrete blocks are held together by mortar. Walls made of bricks and those built of concrete blocks are suitable both for small buildings and multistoried structures.

Nowadays houses are often built of complete concrete structural units that are factory-made and assembled on the spot.

Every detail of a house must be carefully planned. The working plan itself is called a blueprint. Without a blueprint the workmen would make all sorts of mistakes and waste a lot of time.

Plans for building a house are drawn by an architect. The architect draws a separate plan for each individual floor. He shows all the parts of the house exactly as if the house was already built. It is from the blueprint of the architect that the workman sees where to place the walls, the windows, the doors, the staircases etc. The size of the room, the width of the doors and windows, the height of the ceiling are also marked on the plan by the architect.

Different workmen are employed in building a house. The stonemason builds the foundation. The bricklayer builds the walls and other parts made of bricks. He lays the bricks one on the top of another and puts mortar between them with a trowel. The slater or tiler is employed for putting slates or tiles on the roof. The plumber fixes all the baths, water pipes, and the sanitary fittings of drains and lavatories in the places marked for them in the plan drawn by the architect. The electrician runs electric wires and makes connection all through the house from the cellars under the ground to the attics under the roof. All the doors and window-frames are made by the carpenter and put into their places by the joiner who also lays down the floor. Then the plasterer puts plaster or cement over all the walls and ceilings and makes them smooth. The walls are then painted, papered or whitewashed as the case may be.

***Vocabulary Notes:***

concrete block – бетонний блок

on the spot – зразу, намісці

carefully planned – обережно, дбайливо спланований

to waste a lot of time – втрачати багато часу

separate plan – окремий план

Exercises

# **Put the questions to the text and ask them.**

**ІІ. Learn the following professions. Say in two words what these specialists do:**

|  |  |
| --- | --- |
| a miner – шахтар | a baker – пекар |
| a doctor – лікар | a plasterer – штукатур |
| a teacher – вчитель | a blacksmith – коваль |
| a builder – будівельник | a watchmaker - годинникар |
| a tailor – кравець | a fisherman – рибалка |
| a farmer – фермер, селянин | a musician – музика |
| a pilot – льотчик, пілот | a dentist – стоматолог |
| a shoemaker – швець, чоботар | a printer – друкар |
| an architect – архітектор | a composer – композитор |
| a turner – токар | a cook – кухар |
| a driver – водій, шофер | a seaman – моряк |
| a painter – художник | a fireman – пожежний |
| a carpenter – тесляр | a molder – ливарник |
| a photographer – фотограф | a designer – конструктор |
| a locksmith – слюсар | a janitor – двірник, прибиральник |
| a mechanic – механік | a secretary – секретар |
| a weaver – ткач | a shop-assistant – продавець |
| a barber – перукар | a draftsman – кресляр |
| a writer – письменник | a shepherd – пастух |
| an actor – актор | an officer – офіцер |
| a singer – співак | a guide – провідник, гід |
| a welder – зварювальник | a professor – професор |
|  | a dress-maker – кравець |

**ІІІ. Find in the text and copy the sentences where the building occupations are described.**

**IV. Read and dramatize the dialogues:**

A: What are the three materials most widely used in construction?

B: I’m quite sure they are lime, gypsum and cement. Right?

A: Right! Now tell me for what purpose these materials are used.

B: They are used for the purpose of binding together masonry units.

A: What kind of masonry units do you mean?

B: I mean stone and brick. Don’t you agree with me?

A: Are those three materials used as constituents of wall plaster?

B: They are, yes. All of them are used as constituents of wall plaster.

\* \* \*

A: What building materials are at present considered to be the most important ones?

# B: It goes without saying that structural steel and concrete are!

A: May we consider concrete to be an artificial conglomerate?

B: Yes, we may. But remember that it’s an artificial conglomerate of crushed stone, gravel or similar inert material with a mortar.

\* \* \*

A: Can you tell me what the most accurate method of measuring proportions is?

B: I can, yes! It is to weigh the required quantities of each material.

A: And how do you think this may be done?

B: Well, you see, this may be done if the proportions are based on volumes or weights.

A: I’m sure this method is being extensively used. But where?

B: In a lot of central mixing and central proportioning plants.

A: Where else is this method being used?

B: It is also very widely used in large building constructions.

\* \* \*

A: The chief control tests made of concrete are workability and strength, aren’t they?

B: Quite true! That is what a building engineer should always bear in mind.

### Text 3

**AN HONOURABLE PROFESSION**

In this country housing construction is being carried out on a large scale. Hundreds of factories producing prefab panels are being constantly built. The successful fulfilment of housing plans in this country is a practicable realization of the industrialized building methods and the development of a large quantity of prefab ferro-concrete panels and parts. The work of a builder is no longer backbreaking and complicated.

Builders, as we know, assemble a house from prefabricated units that are delivered to the construction site. A welder then welds the units to hold them in place. Builders nowadays use a great variety of materials. Students of building departments study the existing materials. When they become qualified specialists they develop new building materials and building methods.

A building worker must now be able to read technical drawings, he must know the scale and the specifications. If you want to contribute to the beauty of a town or city, if you want to leave a memory of yourself in the history of a town or city, come to the construction site and learn the trade of a builder.

The building profession attracts a lot of young people nowadays. It is an honourable profession.

Builders construct and reconstruct residential and industrial buildings, bridges, schools, palaces of culture, museums, theatres, kindergartens and hospitals. They build tunnels, canals, power stations, dams and reservoirs. They also construct aqueducts to store and transport water for populated areas and to irrigate desert lands. The distribution of water in irrigated areas is based on annual plans. Very many irrigation systems have been built and are being built and modernized. Hundreds of dams, reservoirs, locks, pumping stations have been erected on the rivers of our country by our hydro-technicians.

The person entering this honourable profession must have a scientific attitude, imagination, initiative and sound judgement, obtained by experience and serious work.

Civil engineers and architects have a common aim – to provide people with all modern conveniences, such as running water, gas, electricity, central heating. While a sanitary engineer protects the quality of water by treating and purifying this water when it is used for domestic purposes, an architect is a person who designs buildings. An architect must receive a great deal of scientific training connected with his profession. He must know mathematics, as well as many facts concerning materials – for example what loads different materials may safely carry – so that there will be no danger of his building falling down. Architects must need some knowledge of sculpture, painting, design, mechanical engineering, geography, city planning, etc. The structure an architect creates should give us pleasure, a sense of beauty.

# ***Vocabulary Notes:***

ferroconcrete panels – залізобетонні панелі

a construction site – будівельний майданчик

a great variety / a great deal – багато; велика кількість

honourable – почесний, благородний

populated areas – населені райони

to irrigate – зрошувати

annual plans – щорічні плани

canal – канал (штучний); channel – протока, русло

attitude – відношення, позиція

topurify – очищувати

domestic – домашній, внутрішній

centralheating – центральне опалення

aqueduct – акведук, водопровід, канал

### Exercises

**I.Find in the text the English equivalents for the following sentences:**

1. Будинки зводяться із збірних елементів.
2. Праця будівельника вже не є виснажливою.
3. У будівництві використовується велика кількість різноманітних будівельних матеріалів.
4. Професія будівельника приваблює багатьох молодих людей.

**ІІ. Point out the predicate in each sentence of the text**.

**III. Define the tense of the verbs and translate the following sentences into Ukrainian:**

1. In this country housing construction is being carried out on a large scale.
2. Hundreds of factories producing prefab panels are being constantly built.
3. Builders nowadays use a great variety of materials.
4. I have been in construction for many years.
5. A qualified building worker must know the scale and the specifications.

**IV. Insert prepositions:**

1. The building profession attracts a lot … young people.
2. Builders construct residential and industrial buildings, palaces … culture etc.
3. Hundreds … dams, reservoirs, pump stations have been erected … our hydro-technicians.
4. A great deal … an architect’s scientific training is connected with his profession.

**V. Open the brackets and use the proper tense:**

1. The building profession (to attract) a lot of young people nowadays.
2. It (to be) an honourable profession.
3. The person (to enter) this profession must (to have) a scientific attitude, imagination, initiative and sound judgement.
4. A sanitary engineer (to protect) the quality of water by treating and purifying this water when it (to be) used for domestic purposes.
5. An architect (to be) a person who (to design) buildings.

**VI. Translate into English:**

Професія будівельника – почесна професія. Вони будують та відбудовують житлові та громадські будівлі, мости, школи, палаци культури, музеї, театри, дитячі садки та лікарні. У будівельників і архітекторів – одна спільна мета: забезпечити людей найсучаснішими зручностями. Інженер-сантехнік слідкує за якістю води, тоді як архітектор проектує будинки. Архітектору необхідно знати скульптуру, живопис, проектування, географію та ін.

### Text 4

#### **THE ENGINEERING AND CONSTRUCTION ECONOMY**

The efforts of an engineer who designs a project, and constructor, who builds the project, are directed towards the same goal, namely, the creation of something which will serve the purpose for which it is built. Construction is the ultimate objective of a design. The application of engineering fundamentals and analyses to construction activities may reveal methods of improving the quality, and at the same time reduce the cost of construction.

The cost of project is influenced by the requirements of the design and the specifications. Prior to completing the final design the engineer should give careful consideration to the methods and equipment that may be used to construct the project. Requirements, which increase the cost without producing commensurate benefits, should be eliminated. The ultimate decisions of the engineer should be based on a reasonable knowledge of construction methods and costs.

An engineer may use the following methods to reduce the costs of construction:

1. Design concrete structures with as many duplicate members as possible in order to permit the reuse of forms without rebuilding.
2. Simplify the design of the structure where possible.
3. Design for the use of cost-saving equipment and methods.
4. Eliminate unnecessary special construction requirements.
5. Design to reduce the required labour to a minimum.
6. Specify quality of workmanship that is consistent with the quality of the project.
7. Furnish adequate foundation information where possible.
8. Refrain from requiring the contractor to assume the responsibility for information that should be furnished by the engineer or for adequacy of design.
9. Use local materials when they are satisfactory.
10. Use standardized specifications the contractors are familiar with where possible.

***Vocabulary Notes:***

ultimate objective – кінцева мета

careful consideration – уважний, детальний розгляд

to be directed toward(s) smth. – бути направленим на...

duplicate members – *тут*: однакові деталі

to simplify – спрощувати

workmanship – майстерність, мистецтво

to specify – точно визначити

consistent – той, що узгоджується, послідовний

to assume the responsibility – брати на себе відповідальність

adequacy – відповідність, достатність

**Exercises**

1. **Answer the questions:**
   1. Are the efforts of an engineer and the constructor directed towards the same goal?
   2. Construction is not the ultimate objective of a design, is it?
   3. What is the cost of project influenced by?
   4. What do the ultimate decisions of an engineer should be based on?
   5. Name the methods of reducing the costs of construction.
2. **Find in the text and copy the words which were made with the help of word-building prefixes.**

### Text 5

## TYPES OF BUILDINGS

Buildings are divided into classes based upon the manner of their construction, use, or occupancy. According to the manner of construction they are divided into:

1. Frame construction.
2. Non-fireproof constructions:
   1. Ordinary construction;
   2. Slow-burning constructions.
3. Fireproof construction.

Frame construction embraces all buildings with exterior walls of wooden framework sheathed with wood shingles or siding veneered with brick, stone, or terra cotta; or covered with stucco or sheet metal. Such buildings naturally have floors and partitions of wood and are considered as comprising the most inflammable type of construction.

Non-fireproof construction includes all buildings with exterior walls of masonry but with wood floor construction and partitions. Slow burning construction designates heavy timber framing designed as far as possible to be fire resistant, the heavy beams and girders of large dimension proving far less inflammable than the slender joists of ordinary construction.

Fireproof construction includes all buildings constructed of incombustible material throughout, with floors of iron, steel, or reinforced concrete beams, filled in between with terra cotta or other masonry arches or with concrete slabs. Wood may be used only for under and upper floors, window and door frames, sash, doors, and interior finish. In the buildings of great height the flooring must be of incombustible material and the sash, door, frames, and interior finish of metal. Wire glass is used in the windows, and all structural and reinforced steel must be surrounded with fireproof material, such as hollow terra cotta and gypsum tile to protect the steel from the weakening effect of great heat.

*Vocabulary Notes:*

to be based (upon) – базуватись

manner – спосіб

occupancy – зайнятість, заселеність

framework– структура

frame construction – каркасна конструкція

fireproof– вогнестійкий

to sheathe– обшивати

to veneer– облицьовувати

incombustible – той, що не горить, вогнестійкий

as far as possible – наскільки це можливо

girder – балка, брус,перекладина

## Exercises

* + 1. **Answer the following questions:**

1. What kind of buildings does frame construction embrace?
2. Does non-fireproof construction include buildings with exterior walls of wooden framework sheathed with wood shingles?
3. Is heavy timber framing connected in any way with slow-burning construction?
4. Can you say what is meant by ordinary construction?
5. Why is fireproof construction so important for a man?
6. Must the flooring be of incombustible material in the buildings of great height?
7. Where is wire glass used?

**ІІ. Translate the following using a dictionary:**

Project supervision. The extent and type of supervision required during construction varies considerably with the project. For a small, compact project the supervision may be relatively simple, while a large project, which is spread out over considerable area, such as a dam or a major pipe line, may introduce many supervisory problems.

### Text 6

**BEARING WALL AND SKELETON FRAME**

From the point of view of method of construction buildings may be divided into the following groups:

1. Bearing wall construction;
2. Skeleton frame construction.

Bearing wall construction has been the method of structural design employed from the earliest days. By this method the loaded floor and roof beams rest upon the exterior and interior walls, which in turn transmit the loads to the foundation. It is evident that the walls must be of sufficient thickness to carry the loads as well as their own weight; consequently, as the height of buildings increases, the required thickness of the walls and the weights brought upon the foundations become excessive and uneconomical.

Skeleton frame construction has been made possible by the development of structural steel and later of reinforced concrete. According to this method the loaded floor and roof beams rest upon girders running between the columns. The columns placed along the building line are known as exterior or wall columns; they also occur at required intervals within the body of the building, in which case they are called interior columns. A framework is thereby formed, the walls being carried upon the wall girders at each storey level. The walls are consequently mere enclosures bearing no weight and are of the same thickness on all storeys. The columns transmit the loads to the foundations.

***Vocabulary Notes:***

bearing wall – несуча стіна

skeleton – каркас

to rest upon – cпиратися (на)

from the point of view – з точки зору

inturn – в свою чергу

sufficient – достатній

excessive – надмірний

girder – прогін

it is evident – очевидно

as well as – так само (як)

consequently – отже, отож

to be made possible – ставати можливим

### Exercises

#### **Answer the questions:**

1. Into what groups may buildings be divided from the point of view of methods of construction?
2. Is bearing wall construction an old method of structural design?
3. Do the loaded floor and roof beams rest upon the exterior and interior walls by this method?
4. Are those loads in turn transmitted to the foundation?
5. Why must the walls be of sufficient thickness?
6. What happens if the height of buildings increases?
7. Are structural steel and reinforced concrete used in skeleton frame construction?
8. What do the loaded floor and roof beams rest upon according to this method?
9. Can you explain the difference between exterior and interior columns?
10. How can you explain the fact that the walls are of the same thickness on all storeys in skeleton frame construction?
11. **Write out from the text sentences in passive.**
12. **Translate the sentences into Ukrainian paying attention to the passive constructions:**
13. The design of the wall in modern steel-framed buildings is not seriously affected by structural considerations.
14. It is known that the wind load of a structure is influenced by its shape.
15. When any concrete work is to be carried out, the cheapest coarse aggregate, which will give good results, is chosen.
16. During recent years the value of aluminium as an architectural metal has been increasingly recognized.
17. The effect of additional insulation on the inside temperature was calculated.
18. Asphalt tiles are not affected by water.

### Text 7

### ROOF LOADS

On flat roofs and those of slight pitch the snow load will be at the maximum and the wind pressure at the minimum. As the pitch of the roof increases, the snow load will decrease and the wind load increases. Boston building law includes the following regulations. Roofs will be designed to support safely minimum live loads as follows:

1) roofs with a pitch of 4 in. or less per foot, a vertical load of 40 psf of horizontal projection.

2) roofs with a pitch of more than 4 and not more than 8 in. per foot, a vertical load of 15 psf of horizontal projection, and a wind load 10 of psf of surface acting at right angles to one slope, these two loads being assumed to act either together or separately.

3) roofs with a pitch of more than 8 and not more than 12 in. per foot, a vertical load of 10 psf of horizontal projection, and a wind load of 15 psf of surface acting at right angles to one slope, these two loads being assumed to act either together or separately.

4) roofs with a pitch of more that 12 in. per foot, vertical load of 5 psf of horizontal projection, and a wind load of 20 psf surface acting at right angles to one slope; these two loads are assumed to act together or separately.

The expected snow load naturally varies in different parts of the country as exhibited by the requirements of the local building codes.

##### Exercises

1. **In the following sentences explain the meaning of the underlined words:**
2. We can easily lift great loads by means of helicopters.
3. Using helicopters means making the job easier on inaccessible construction sites.
4. The use of helicopters is an excellent means of placing in position building units on inaccessible construction sites.
5. By no means can long-wheel-base lorries be used on a building site where access conditions are difficult.
6. The mean speed of manipulating building cranes can easily be calculated.
7. Large-scale mechanization should be introduced into building practice by all possible means.

###### Underline the suffixes, state what part of speech they indicate and translate the following words into Ukrainian:

###### pressure, building, regulation, safely, vertical, projection, horizontal, separately, acting, requirement, structure, equipment, partition, structural, employment, specially, different, storage, reinforcement, central, directly, exception, nearly, construction, economic insulation.

### Text 8

##### The Properties of Building Materials

Materials that are used for structural purposes should meet several requirements. In most cases it is important that they should be hard, durable, fire-resistant and easily fastened together.

The most commonly used materials are steel, concrete, stone, wood and brick. They differ in hardness, durability and fire-resistance.

Wood is the most ancient structural material. It is light, cheap and easy to work. But wood has certain disadvantages: it burns and decays.

Stone belongs to one of the oldest building materials used by man. It is characteristic of many properties. They are mechanical strength, compactness, porosity, sound and heat insulation and fire-resistance.

Bricks were known many thousands years ago. They are the examples of artificial building materials.

Concrete is referred to as one of the most important building materials. Concrete is a mixture of cement, sand, crushed stone and water.

Steel has come into general use with the development of industry. Its manufacture requires special equipment and skilled labour.

Plastics combine all the fine characteristics of a building material with good insulating properties. It is no wonder that the architects and engineers have turned to them to add beauty to modern homes and offices.

All building materials are divided into three main groups: 1) Main building materials such as rocks and artificial stones, timber and metals. 2) Building materials such as lime, gypsum and cement. 3) Secondary or auxiliary materials which are used for the interior parts of the buildings.

Natural building materials are: stone, sand, lime and timber. Cement, clay products and concrete are examples of artificial building materials.

***Vocabulary Notes:***

in most cases – в більшості випадків

insulation – ізоляція

to come into general use – увійти до широкого вжитку

it is no wonder – не дивно

to turn to somebody – звертатися до когось

to be used for… –використовуватися для…

Exercises

1. **Answer the following questions:**
2. What are the properties of building materials?
3. What are the most commonly used building materials?
4. Do building materials differ from each other?
5. What can you say about the most ancient building materials?
6. What can you say about bricks?
7. Is concrete an artificial or natural building material?
8. Into what groups do we divide building materials?
9. What artificial building materials do you know?
10. What natural building materials do you know?
11. **Translate into English:**

***Пластмаса як матеріал для будівельних конструкцій***

Пластмаса – це матеріал, який складається із полімерів або їх сполук. Легкість, значна міцність, водостійкість є основними перевагами більшості пластмас. Ці якості пластмас дозволяють створювати легкі, міцні, красиві, економічно вигідні конструкції.

Основними компонентами пластмас є синтетичні смоли. Ці смоли являють собою високомолекулярні сполучки, отримані шляхом синтезу їх низькомолекулярних сполук. Вугілля, торф, нафта є основною сировиною для смол. Смоли – це полімери малих молекул-мономерів.

### Text 9

**TIMBER**

Timber is the most ancient structural material. In comparison with steel timber is lighter, cheaper, easier to work and its mechanical properties are good. On the other hand, timber has certain disadvantages. First, it burns and is therefore unsuitable for fireproof buildings. Second, it decays.

At present an enormous amount of timber is employed for a vast number of purposes. In building timber is used too.

Timber is a name applied to the cut material derived from trees. Timber used for building purposes is divided into two groups: softwoods and hardwoods. Hardwoods are chiefly used for decorative purposes, as for panelling, veneering in furniture and some of them are selected for structural use because of their high strength and durability. In modern construction timber is often used for window and door frames, flooring, fences and gates, wall plates, for temporary buildings and unpainted internal woodwork.

Timber cannot be used for either carpenter’s or joiner’s work immediately it has been felled because of the large amount of sap which it contains. Most of this moisture must be removed; otherwise the timber will shrink excessively, causing defects in the work and a tendency to decay. Elimination of moisture increases the strength, durability and resilience of timber.

***Vocabulary Notes:***

in comparison (with) –порівняно

on the other hand – з другого боку

at present – зараз, тепер

an enormous amount /a vast number (of) – велика кількість

chiefly – головним чином, в основному

temporary – тимчасовий

resilience – пружність, еластичність

**Exercises**

1. **Answer the following questions:**
2. Is timber a very ancient structural material?
3. What are the advantages of timber in comparison with steel?
4. What are the disadvantages of timber in comparison with steel?
5. Into what two groups is timber, used for building purposes, divided?
6. For what purposes are hardwoods chiefly used?
7. For what purposes is timber often used in modern construction?
8. Why cannot timber be used for either carpenter’s or joiner’s work immediately it has been felled?
9. What increases the strength, durability and resilience of timber?
10. **Retell the dialogues, perform them in pairs:**
11. -What do you know about cement?

-It’s a powder, which becomes hard like stone when mixed with water.

-Suppose we mix cement with sand and stones?

-If we mix cement with sand and stones, we get concrete.

1. -Do you know what a brick is?

-Yes, I do. It is a block of baked clay.

-What are bricks chiefly used for?

-They are chiefly used for building houses.

1. -What kind of a building is called a “skyscraper”?

-A skyscraper is a very, very tall building.

-How tall are some skyscrapers?

-Some of them are so tall that their tops are hidden by clouds when it rains.

1. -Suppose you wanted to make some concrete, what would you take?

-I’d take some cement, gravel and sand. Then I’d mix them with water.

-Quite right! Now, what is concrete used for?

-It’s used for building, making roads etc.

1. -What is a lift?

-It’s an apparatus for taking people up or down to another floor.

-Do the Americans call this apparatus a lift?

-No, they don’t. They call it an elevator.

1. -How long does it take to build such a house?

-It takes about ten or eleven months.

-How long did it take to build the house you live in?

-I suppose it took about a year and a half.

1. -What do we call a number of rooms on one floor of a building?

-If the rooms are used as a home, then we call the rooms a flat.

- And what is an apartment?

-In England they use the word “flat”, while in America they use the word “apartment”.

### Text 10

**STONE**

Stone has been used as a structural material since the earliest days. Almost all famous buildings of classic times, of the medieval and Renaissance periods and of the eighteenth and early nineteenth centuries were erected of stone. The art of making any structure in stone is called stone masonry. In some places stone was used because of the scarcity of timber, but in other places stone was preferred because of its durability.

The stones that are usually used for masonry work are as follows:

1. Granite. Granite is very hard, strong and durable. It is used particularly for basements, base courses, columns and steps and for the entire facades. Its colour may be grey, yellow, pink or deep red.
2. Sandstone. Sandstone is composed of grains of sand or quarts cemented together. Sandstones form one of the most valuable materials. The durability of sandstones depends very largely upon the cementing material. Thus there are different kinds of sandstones. Many types of sandstone are exceptionally hard and are selected for steps, sills etc. It is an excellent material for concrete aggregate.
3. Marble. Marble is a crystalline stone chiefly used for ornamental decorative purposes. White and black marbles are used for ornamental decoration where the beauty of the marble is shown to its best advantage.

***Vocabulary Notes:***

medieval – середньовічний

Renaissance – епоха Відродження

scarcity – нестача

particularly – частково

to be composed – складатися

**Exercises**

1. **Answer the questions:**
2. Do you know that stone has been used as a structural material since the earliest days?
3. What is called stone masonry?
4. Why did people begin to use stone?
5. Can you name the stones used for masonry work?
6. Granite is usually used in construction, isn’t it?
7. Does granite possess any special properties?
8. Can you say what these properties are?
9. What does the durability of sandstone depend upon?
10. Why are many sandstones selected for steps, sills etc.?
11. Marble is chiefly used for decorative purposes, isn’t it?
12. White and black marbles are widely used for ornamental decoration, aren’t they?
13. **Complete the following sentences using English equivalents instead of Ukrainian words and word combinations:**
14. Stone has been as a structural material since (стародавніх часів).
15. The art of making any structure in stone is called (кам’яна кладка).
16. Granite is used particularly for (фундаментів, колон, сходів і т. ін.).
17. Sandstone is composed of (зерен, піску та кварцу).
18. Sandstone is an excellent material for (заповнювача бетону).
19. Sandstones form one of the most (цінних матеріалів).
20. Limestones are used extensively for (будівельних цілей).
21. Marbles are chiefly used for (декоративних цілей).

### Text 11

**METALS AND CONCRETE**

All metals are divided into ferrous and non-ferrous metals. Ferrous metals include iron, steel and its alloys. Non-ferrous metals are metals and alloys the main component of which is not iron but some other element. Metals, in general, and especially ferrous metals are of great importance in modern life.

Metals possess the following properties:

* 1. All metals have specific metallic luster.
  2. They can be forged.
  3. Metals can be pulled.
  4. All metals, except mercury, are hard substances.
  5. They can be melted.
  6. In general, metals are good conductors of electricity.

These characteristics are possessed by all metals but the metals themselves differ from one another. Steel and cast iron are referred to the group of ferrous metals. Cast iron is the cheapest of the ferrous metals. It is chiefly used in building for compressed members of construction, as the supporting members.

When an engineer designs a steel work he must carefully consider that the steel frame and every part of it should safely carry all the loads imposed upon it.

The steel framework must be carefully hidden in walls, floors and partitions. It is steel and metal that is employed as reinforcement in modern ferroconcrete structures. In the curriculum of the Institute there is a special course on metal structures.

***Vocabulary Notes:***

ferrous metals – чорні метали

non-ferrous metals – кольорові метали

in general – в основному, в цілому

metallic luster – металічний блиск

they can be forged – їх (метали) можна кувати

castiron – чавун

chiefly – головним чином

compressed – стиснутий, спресований

supporting – той, що підтримує

steelwork – сталеварний завод

reinforcement – посилення, укріплення

partitions – перестінки, внутрішні стіни

curriculum – учбовий план, програма

**Exercises**

* 1. **Answer the following questions:**

1.What do ferrous metals include?

2. Is iron the main component of non-ferrous metals?

1. What properties do metals possess?
2. Do the metals themselves differ from one another?
3. Is cast iron the cheapest of the ferrous metals?
4. What must an engineer carefully consider when he designs a steelwork?
5. Where must the steel framework be carefully hidden?
6. What is used as reinforcement in modern ferroconcrete structures?
   1. **Give appropriate suffixes to each verb from nouns:**

to build, to decorate, to imitate, to separate, to develop, to introduce, to distribute, to construct, to present, to recognize.

* 1. **Give Ukrainian equivalents of the following international words:**

activity, architecture, process, product, master, concentrate, period, method, special, history, culture, limit, amateur, technology, formal, proportion, legal, category, registration, structure, designer, resource, dynamic, crisis, ornament, practical.

### Text 12

**ALUMINIUM IN STRUCTURES**

Aluminium is not a new material. Probably the first example of large-scale structural use of aluminum was in 1933 when the floor steelwork of a large road bridge in Pittsburgh, Pennsylvania, was replaced with aluminium and the resulting saving in dead weight – about 1 ton/ft run – enabled the bridge to carry with greater safety the increased loads of modern traffic. Apart from the construction of aircraft, aluminium has thus a structural history of about only half a century. Extensive use of aluminium in buildings such as aircraft hangers did not occur until about 30 years ago. In many ways aluminium has been slow in making progress, mainly because of its cost; it is produced by electrolytic means that requires cheap hydro-electric power. About 10 units of electricity are required to make 1 lb. New reduction plants of large capacity have been coming into service in many parts of the world and these provide increased production with improved efficiency. The use of aluminium in structures may well expand in corresponding manner as simultaneous advances are being made with the development of improved aluminium materials and products.

The principal virtues of aluminum are lightness combined with strength and freedom from corrosion. The extent to which the latter two properties are developed depends on the alloy concerned.

The advantage of lightness – one-third the density of mild steel with nearly the same strength – is particularly of value, where weight saving is of importance: in lift bridges, long span roofs, dome roofs, crane jibs and in a wide range of moving and portable structures.

***Vocabulary Notes:***

probably – очевидно, мабуть

large-scale – великий, значний

to replace – замінити

loads (of) – велика (надмірна) кількість

aircraft hangar – ангар (для повітряного транспорту)

to occur – траплятися

by means(of) – за допомогою, шляхом

large capacity – велика потужність

in corresponding manner – відповідним чином

principal virtues – основні достоїнства

extent – ступінь, протяжність

crane jib – стріла крана

**Exercises**

1. **Translate into Ukrainian:**
   1. Aluminium alloys can possess the strength of steel, though it is only a third of the weight.
   2. Cows give more milk when there are cool, heat reflecting aluminium roofs on their dairy barns.
   3. Aluminium offers a bright hope for energy conservation.
   4. In direct contact with a heat source, aluminium is an excellent conductor.
   5. World’s lightweight champion in the long-distance transport of electricity, aluminium has virtually replaced heavier copper in high-voltage power lines.
   6. Nearly indestructible aluminium can be remelted over and over.
   7. Aluminium is alloyed with small amounts of other metals.
   8. Copper adds strength; magnesium imparts additional marine-corrosion resistance.
   9. Unlike copper or iron, aluminium does not occur naturally in metallic form.
   10. Aluminium exists only in combination with other elements, primarily oxygen, with which it forms an extremely hard oxide known as alumina. When tinted by traces of other elements, alumina can take the form of gems such as rubies and sapphires.
   11. Constituting 8 per cent of the earth’s crust, aluminium is the most abundant of metals, as well as one of the hardest to produce.
   12. Even fly ash from coalburning furnaces could become a source of aluminium.
   13. Subduing the waves, aluminium alloys not only combine lightness with strength but stoutly resist salt water’s corroding effect.
   14. Once you make aluminium it becomes an energy bank that you can tap over and over again.
   15. The uses of aluminium are almost unlimited.
2. **Answer the following questions:**
   1. Can aluminium alloys possess the strength of steel?
   2. Is aluminium an excellent conductor when it is in direct contact with a heat source?
   3. Has aluminium replaced copper in high-voltage power lines?
   4. Do you think aluminium can be remelted over and over?
   5. Does copper add strength when it is alloyed with aluminium?
   6. Is it true that aluminium exists only in combination with other elements?
   7. When combined with oxygen, what does aluminium form?
   8. Do aluminium alloys resist salt water’s corroding effect?
   9. Are the uses of aluminium almost unlimited?

**III. Dramatize the dialogues:**

A: What can you say about aluminium as a structural material?

B: You see, aluminium has many attractions as a structural material.

A: Can it be readily obtained in various alloys?

B: Yes, it can be readily obtained in various alloys.

A: And can it be obtained in various conditions and shapes?

B: It can – to suit specific uses.

A: You haven’t said anything about aluminium’s reliability.

B: Oh, there is sufficient experience now to have confidence in its reliability.

\* \* \*

A: Aluminium alloys of very high strength are obtainable, aren’t they?

B: They are, but such alloys are not generally used in structural engineering.

A: Is corrosion from sea air or industrial pollution a problem?

B: No, corrosion from sea air or industrial pollution is no longer a problem.

A: So that means that painting is not necessary?

B: You are right. Painting is not necessary.

\* \* \*

A: I’ve heard that aluminium lends itself particularly well to roofing. Is that so?

B: Yes, that’s so. Aluminium is a wonderful roofing material!

A: But it must be very expensive. Don’t you think so?

B: It is rather expensive, but there are many instances where aluminium structures justify themselves.

\* \* \*

A: Do you agree that an aluminium-domed roof makes it simple to provide lighting in the walls beneath?

B: I do. Besides, the domes can be assembled at ground level and lifted into position.

A: That’s remarkable! Don’t you think dome roofs pack economically for sea transport?

B: It’s exactly what I was going to tell you.

### Text 13

**CONCRETE**

It is difficult to imagine modern structure without concrete. Concrete is the very building material, which led to great structural innovations. The most important quality of concrete is its property to be formed into large and strong monolithic units. The basic materials for making concrete are cement, aggregate and water. Cement is the most essential material and the most important one for making concrete of high quality. Cement is made of limestone clay. It is burnt (calcined) at high temperature and ground up into powder. Depending on the kind and composition of the raw materials different types of cement are obtained.

Concrete is made by mixing cement, water, sand and gravel in the right amount. As soon as it is thoroughly mixed it is poured into forms that hold it in place until it hardens. The crystals formed in the process of making concrete stick together in a very hard artificial stone. Cement starts hardening one hour after the water has been added and the process of hardening lasts for about twenty-eight days. The process is called concrete curing.

The characteristics of concrete depend upon the quality of the materials used, grading of the aggregates, proportioning and amount of water. The most important requirements for concrete are: it should be hard, strong, durable, fire-resistant and economical.

Concrete can be divided into two classes: mass or plain concrete and reinforced concrete (ferro-concrete) where it is necessary to introduce steel. Plain or mass concrete can be used for almost all building purposes. Ferro-concrete is used in building bridges and arches, dams and dock-walls, for structures under water, for foundations, columns, girders, beams. The use of concrete is almost universal.

Builders now produce two types of new building materials: alkali-slag concrete and silica concrete. In alkali-slag concrete cement is replaced by a mixture of granulated blast-furnace slags and sodium and potassium compounds. The fillers can be sand or sandy loams containing various amounts of clay, which usually cannot be used with conventional cement. The new material has been tested successfully and is now being used for irrigation systems, roads, pavements and other structures. Silica concrete is light, fire-resistant and acid-proof. It contains no cement whatever. Silica concrete is widely used in aviation and in under-water constructions.

The term “concrete” is used to describe a dense material composed of cement and aggregate mixed with water. The density of such a material, and therefore many of its properties, depends upon the density of the aggregate. There is a broad division of concrete types into:

1. dense concretes – composed of heavy aggregates;
2. light-weight concretes – composed of light aggregates.

The aggregates are graded in size from fine to coarse in order to reduce the amount of void space to be filled by cement.

There are “cellular” concretes made by using materials, which foam or form gas during the mixing of the concrete. These give a product of very light weight, because after setting it contains a large number of small voids.

The reduction in weight is accompanied by a considerable decrease in strength. Another type of lightweight concrete is made by “entraining” air bubbles in the mix to which a substance has been added to keep the bubbles stable during setting.

***Vocabulary Notes:***

the very building material – саме той будівельний матеріал

to depend on smth. – залежати від чогось

in the right amount – у правильній кількості (пропорції)

as soon as – як тільки

to last for – продовжуватися (деякий час), тривати

mass concrete – збірний цемент

alkali-slag concrete – лужний цемент

silica concrete – кварцовий цемент

cellular – клітковий, чарунковий

**Exercises**

**I. Answer the following questions:**

1. Is it possible to put up modern structures without using concrete?
2. Do you know what the most important quality of concrete is?
3. The basic materials for making concrete are cement, aggregate and water, aren’t they?
4. What is the most essential material for making concrete?
5. Can we make concrete if we take limestone and clay?
6. How is cement made?
7. What are Portland and blast furnace cement suitable for?
8. When does cement start hardening?
9. How long does the process of hardening last?
10. Can you tell us what process is called concrete hardening?
11. Can you say what the characteristics of concrete depend on?
12. Should concrete be hard, strong, durable, fire-resistant and economical?
13. Into what two classes can concrete be divided?
14. Is the use of concrete and ferro-concrete most universal?
15. Do builders now produce two or three types of new building materials?
16. Where is silica concrete widely used?

**II. Translate into English:**

1. Міцність хорошої цегли, сталі, природного каменю з часом не змінюється.
2. Бетон протягом довгого часу може міцнішати.
3. Якщо прийняти міцність бетону за сто відсотків, то через 1,5 року вона буде 150%, через 2 роки – 200%, а через 5 років – 225% .
4. Міцний бетон є морозостійким.
5. Міцність, водостійкість, щільність, морозостійкість роблять бетон дуже хорошим будівельним матеріалом, придатним для зведення гідротехнічних споруд. Бетон добре захищає від ударної хвилі та світлового випромінювання.
6. Офіційною датою виникнення залізобетону вважають 1867 рік, коли французький садівник Ж. Монтьє отримав перший патент на залізобетон як будівельний матеріал.
7. Ж. Монтьє робив із бетону квіткові горщики і діжки, невеликі басейни для води та інші вироби.
8. Перший залізобетонний міст був побудований в 1875 році.
9. Російські інженери зробили великий вклад у розвиток залізобетонного будівництва. Вони використовували залізобетон як чудовий будівельний матеріал в Петербурзі, Москві та інших містах. Деякі промислові та громадянські будівлі збереглися і до сьогодні.
10. В 1904 році недалеко від Миколаєва був побудований перший залізобетонний маяк.
11. З кінця ХІХ століття отримали широке поширення бетонні конструкції, що було тісно пов’язано з промисловим виготовленням портландцементу.
12. Залізобетонні вироби та споруди з’явились після успішного використання сталевої арматури.
13. Залізобетон як будівельний матеріал є дуже молодим.

**ІІІ. Read the text carefully and translate it:**

Concrete is made by binding together particles of sand and gravel, stone or broken brick. The building agent used is a paste of Portland cement and water in suitable proportions. When water is added to the cement, hydration takes place. This causes the whole mixture to set and harden, forming a solid mass. The sand, gravel (or broken stone) are termed “aggregate”; sand is known as “fine aggregate”; and gravel as “coarse aggregate”. Concrete can be made on a building site and poured into position as a wet mix, or it may be used as the material for making prefabricated units in a factory. That is why there is another classification into “in-situ” (or cast-in-place) concrete and “precast” concrete.

**IV. Complete sentences using the English equivalents for the Ukrainian words in brackets:**

1. All metals are divided into (чорні та кольорові).
2. Ferrous metals include (залізо, сталь та їх сплави).
3. Copper, aluminum and some other metals are referred to as (кольорові метали).
4. Metals in general, and especially ferrous metals are of (велике значення в будівництві).
5. All metals have specific metallic (блиск).
6. All metals, except mercury, are (тверді речовини).
7. All metals are good conductors of (електрики).
8. (Сталь та чавун) are referred to the group of ferrous metals.
9. (Чавун) is the cheapest of the ferrous metals.

**V. Translate into English orally:**

1. Мідь та алюміній відносяться до кольорових металів.
2. Всі метали, крім ртуті, є твердими речовинами.
3. Сталь широко використовується в будівництві.
4. Сталь використовується як арматура в залізобетонних конструкціях.

**VI. Render the following into English and give it a title:**

За запасами деревини Росія є найбільшою країною в світі. Особливо великими є запаси хвойного лісу, що використовується в будівництві. Деревина є міцною, має невелику вагу і малий коефіцієнт теплопровідності. Як будівельний матеріал деревина має кілька важливих вад: легко займається (спалахує), гниє та ін.

Полімери – синтетичні штучні та природні смоли. Сировиною для отримання скла служать кварцові піски, сульфат натрію, вапняк та інші речовини.

Бетон добре стискається та погано розтягується. Тому бетонні конструкції при невеликих розтягувальних зусиллях руйнуються. Введення в бетон сталевої арматури дозволило отримати будівельний матеріал – залізобетон, в якому вигідно поєднується спільна робота бетону та сталі.

Основними показниками механічних властивостей сталі є міцність, пружність та пластичність.

**VII. Give the comparative and superlative degrees of the following:**

Big, long, late, heavy, strong, dry, short, interesting, beautiful, pleasant, important, little, large, good, bad, well.

### Text 14

GAS CONCRETE

Lime and silica are ground together to very fine limits. The silicious material can vary considerably in its composition. Much use is made of such waste materials as fly ash from power stations, blast furnace slag, as well as natural pozzolanas, pumice etc. The degree of foaming in the gas concrete, and thus its specific gravity, is determined by the amount of aluminum powder or other agent added. The practical limits of the final density are between 13 and 90 1b per. cu. ft. If the gas concrete is allowed to harden on its own, it usually takes about three weeks before the final strength is achieved. It is more customary to accelerate the setting of the gas concrete by steam hardening it in autoclaves with superheated steam at about 140 1b per sq. in. The steam hardening process takes about 15-20 hr. Air-cured gas concrete can be used for the manufacture of special components for the refrigeration industry. Such blocks are cast to special dimensions.

Gas concrete can be cast horizontally to form room sized outer wall units.

It is possible to incorporate electric conduit pipes, piping for the cold and hot water systems and also drainage pipes. The units usually include windows and doors, and are reinforced by embedding steel mesh in the mix.

Gas concrete can be used as thermally insulating floor screens or as an additional thermally insulating layer on the top of a concrete roof.

Cast gas concrete is often used as the thermally insulating layer in “sandwich wall” units.

Gas concrete is often used as a thermally insulating layer when casting buildings by a continuous casting technique.

# ***Vocabulary Notes:***

fine limits – точні (маленькі) розміри

waste materials – відходи

as well as – так само, як

final density – остаточна (кінцева) густина, щільність

on its own – самостійнo, саме по собі

it takes… – потрібно

electric conduit pipes – електричні водопровідні труби

drainage pipes – дренажні труби

to embed steel mesh – вмурувати сталеву решітку (грати)

pumice – пемза

# **Exercises**

**I. Answer the following questions:**

1. Which materials are used for the production of gas concrete?
2. How can the setting of gas concrete be accelerated?
3. Can you name the main purposes for which air hardening gas concrete is used?
4. Where can gas concrete be successfully used?
5. What can you say about cast gas concrete?

**II. Which are the nouns, derived from the following verbs?**

|  |  |  |
| --- | --- | --- |
| to change | to mix | to practice |
| to damage | to crack | to set |
| to work | to cast | to consider |
| to affect | to pipe | to hydrate |
| to cause | to insulate | to prefabricate |
| to contain | to achieve | to divide |
| to require | to compress | to bind |
| to stress | to cure | to distribute |
| to produce | to heat | to reinforce |
| to protect | to place | to force |
| to develop | to transport | to weigh |
|  |  | to concrete |

**Translate these verbs and nouns into Ukrainian.**

**III. Explain the use of gerund in the following sentences:**

1. Placing concrete in winter is not very complicated.
2. Even in winter you can achieve a proper strength gain in concrete, if you succeed in keeping the material warm and moist.
3. Before cooling, the concrete must be kept warm for several days.

**IV. Fill in the blanks with English equivalents:**

1. (Найважливішою властивістю) of concrete is its property to be formed into large and strong monolithic units.
2. Concrete is made by missing cement, sand, gravel and water (в потрібній кількості).
3. The characteristics of concrete depend (від якості матеріалів, що використовуються).
4. (Бетонвикористовувавсяєгиптянами, римлянами) in the construction of aqueducts and bridges.
5. (Оскільки цемент не був відомий в той час) concrete was made of clay and later of gypsum and lime.

**V. Read and translate the following word-combinations:**

to put in position, to pour concrete, to lose strength, to come into practical application, to cause tensile strength, to undergo shrinkage, at the turn of the century.

### Text 15

### NEW TYPES OF CONCRETE

a) Not long ago a new building material was born. Called alkali-slag concrete, most of its components come literally from under foot. Cement is replaced by a mixture of granulated blast furnace slags and sodium and potassium compounds. The filler can be sand or sandy loams containing various amounts of clay, which usually cannot be used with conventional cement.

The new material has been tested successfully and is now being used for roads, pavements, irrigation systems and other structures. Specialists estimate that the use of alkali-slag concrete will help to save much money on the country’s construction projects.

b) Chemically resistant concrete may be sometimes used in the construction of structures attacked by chemically active media, i.e. industrial, hydraulic and underground structures. It has been suggested to prepare chemically resistant concrete using a binder, a vitreous sodium silicate. When such a vitreous silicate is dissolved in water, liquid glass is obtained. In order to assist in the solidification of the liquid glass and increase its water resistance certain elements are added to the concrete composition. They serve to neutralize the alkali in the liquid glass and convert it into a water-insoluble compound. Thus, during the course of the neutralization of the alkali, free silica is evolved (виділяється кварц) from the liquid glass in the form of a gel, which serves as binder.

***Vocabulary Notes:***

various amounts – різноманітні кількості

chemically resistant concrete – кислотостійкий бетон

media– середовище

binder – зв’язка

vitreous sodium silicate – скловидний силікат натрію

liquid glass – рідке скло

in order to…– щоб, з метою

solidification– затвердіння

alkali– луг

water-insoluble – нерозчинний

**Exercises**

* + 1. **Translate into English:**

Проблема постачання будівельних матеріалів в пустелі є надзвичайно гострою. Навіть щебінь доводиться везти сюди за сотні кілометрів.

Чарунковий бетон є різновидом легкого бетону з рівномірно розподіленими по всій масі матеріалу замкнутими повітряними порами (85%).

Пориста структура бетонів досягається застосуванням піно- і газоутворювачів.

За способом утворення пористої структури чарункові бетони підрозділяють на пінобетони і газобетони. Газобетон майже удвічі легший за залізобетон, з нього зручно монтувати будинки. Технологія виготовлення різноманітних деталей є простою і добре освоєною. Уже діють заводи, що випускають газобетон.

**ІІ. Retell and give titles to the separate paragraphs given below:**

1. The manufacture and use of ready mixed concrete requires skills and good organization. Some care and organization is also required from the user of ready mixed concrete. He must know what concrete he requires and when he needs it. He must also have available enough men and equipment to handle and place it when it arrives on the site.

2. To a large extent the strength is dependent upon the type of clay used and method of making, but with most types of brick there is also a considerable variation according to the temperature at which the bricks are burnt.

Where considerable loads have to be carried a strong brick is needed, but it should be remembered that the strength of a wall is derived from a combination of brick and mortar. Building regulations define the type of mortar to be used with bricks of varying strength to carry varying loads. Nowadays the majority of bricks are used in non-bearing walls.

**III. Make up some sentences using the following words and word combinations:**

Сoncrete durability, deep water, offshore, concrete structures, reinforced concrete, underwater structures.

**IV. Read the text and render it in English:**

The first reinforced concrete skyscraper in the world was built in 1902-1903 in Cincinnati, Ohio. The 16-storey structure demonstrated for the first time the safety and economy of reinforced concrete frames for high-rise construction and was a vital stimulus for using reinforced concrete in fireproof construction.

Concrete was chosen as a structural material chiefly for economics; it offered the equivalent of steel frames in load bearing capacity and other physical properties yet was somewhat lower in cost. Engineers all over the world watched with great interest as construction proceeded smoothly along its 16-storey route. Today this building is recognized by engineers as having revolutionized the building industry.

### Text 16

# **REINFORCED CONCRETE**

Reinforced concrete is a combination of two of the strongest structural materials, concrete and steel.

This term is applied to a construction in which steel bars or heavy steel mesh are properly embedded in concrete. The steel is put in position and concrete is poured around and over it, then tamped in place so that the steel is completely embedded. When the concrete hardens and sets, the resulting material gains great strength. This new structural concrete came into practical application at the turn of the 19th century. The first results of the tests of the reinforced concrete beams were published in 1887. Since that time the development of reinforced concrete work has made great progress. And the reasons of this progress are quite evident. Concrete has poor elastic and tensional properties, but it is rigid, strong in compression, durable under and above ground and in the presence or absence of air and water, it increases its strength with age, it is fireproof.

Steel has great tensional compressive and elastic properties, but it is not durable being exposed to moisture, it loses its strength with age, or being subjected to high temperature. So, what is the effect of the addition of steel reinforcement to concrete?

Steel does not undergo shrinkage or drying but concrete does and therefore the steel acts as a restraining medium in a reinforced concrete member. Shrinkage causes tensile stresses in the concrete that are balanced by compressive stresses in the steel. For getting the best from reinforced concrete the following consideration should be kept in mind:

1. For general use the most suitable proportions of cement and aggregate are: 1 part of cement, 2 parts of sand and 4 parts of gravel.
2. Only fresh water free from organic matter should be used for reinforced work. Seawater is not allowed.
3. Homogeneity of the concrete is a very important requirement.

Steel constructions with reinforced concrete have become the most important building materials invented in centuries and they have given modern architecture its peculiar features.

# ***Vocabulary Notes:***

to apply – застосовувати

to come into practical application – починати застосовуватися на практиці

quite evident – досить очевидний

to keep in mind – пам’ятати

peculiar features – особливі риси

# **Exercises**

* 1. **Answer the following questions:**

1. Is reinforced concrete a combination of two of the strongest structural materials?
2. What is the process of making reinforced concrete?
3. When did this new structural concrete come into practical application?
4. Since when has the development of reinforced concrete work made great progress?
5. Can you name the properties of concrete?
6. Will you say a few words about the properties of steel?
7. Does concrete increase its strength with age?
8. Does steel increase its strength with age?
9. Is it true that steel does not undergo shrinkage or drying but concrete does?
10. Shrinkage causes tensile stresses in the concrete, doesn’t it?
    1. **Make up sentences using the following words:**

To combine – combination; strong – strength – to strengthen; hard – to harden – hardness; tension – tensional; compression – compressive; durable – durability; to apply – application; to shrink – shrinkage.

* 1. **Complete the sentences using the English equivalents for the Ukrainian words in brackets:**

1. The resulting material gains great strength when (він затвердіває).
2. At the turn of the 19th century new structural concrete (почав застосовуватися).
3. Steel has great tensional, compressive and elastic properties but (з часом вона втрачає міцність).
4. Steel does not undergo shrinkage and therefore it acts (як стримуюче середовище).
5. Shrinkage causes tensile stresses in concrete that are balanced (стискаючими зусиллями всталі).
   1. **Write a summary of the text in English.**

Бетон – це штучний матеріал. Його отримують в результаті формування і затвердіння правильно підібраної суміші (зв’язки, заповнювачів, води і в необхідних випадках спеціальних добавок). Зв’язку в бетоні використовують разом з дрібними та великими заповнювачами.

Як заповнювачі застосовують різноманітні сипкі матеріали (пісок, шлак, щебінь, гравій, керамзит). Найчастіше для отримання бетону використовують різний за розміром наповнювач: від великих шматків щебеню до піщинок. В такому разі пустоти між великими шматками щебеню наповнюються частинками менших розмірів. Крім того, дрібні частинки забезпечують відносну рухливість великих частинок, що необхідно для кращої якості бетонної суміші.

В особливо важких бетонах (що використовуються для біологічного захисту від радіоактивних випромінювань на підприємствах атомної промисловості) застосовують спеціальні види наповнювачів з підвищеною об’ємною масою.

Особливо важкі метали застосовуються як конструктивні матеріали, наприклад, при будівництві доріг і аеродромів. Конструктивні бетони призначені для сприйняття навантажень, що виникають в конструкціях під час експлуатації споруди.

* 1. **Change the following into the past tense:**

Ready mixed concrete has added significantly to the resources of the concrete industry in Britain. It has helped architects, engineers, contractors and ordinary citizens.

Close cooperation among the architect, engineer and contractor during the design is essential to achieve greatest economy. Materials, methods and budgets can be worked out for acceptable treatment of the facade.

### Text 17

**CRANES**

In factories, works, plants and mines, in **civil** engineering', etc. a surprising amount of time is spent in simply moving things from one place to another. Today the high price of unskilled **labor** and the need to make the manufacturing processes as **efficient** as possible have made engineers study the possibility of **material handling** and develop many special **pieces of equipment** for moving things about.

To lift and transport loads from one position to another in all the industries cranes are used. **Loads** of 300 tons and upwards are handled by **power-driven** cranes controlled by operators manipulating various **handles.**

The size and structure of the crane, the speed of operation, the area of its operation, as well as its lifting capacity affect its design. Apart from small **hoists** used in engineering shops, all modern cranes are power-operated. Where the crane is a permanent unit of the plant, it is almost always electrically driven, since electric motors are smaller and more convenient than other sources of **motive** power. Mobile cranes, on the other hand, like those used on the railway lines and in civil engineering are often diesel-driven. Small mobile cranes are sometimes driven by petrol engines.

Overhead traveling cranes (span type) **jib** cranes (radius type) and mobile cranes are the main types of this piece of material-handling equipment.

Modern cranes are fitted with automatic safe-loading **devices.** The design and operation of the cranes are steadily improving to meet the demands of industries.

# ***Vocabulary Notes:***

amount of time – кількість часу

unskilled – некваліфікований, недосвідчений

to make smb do smth – примусити (когось) щось робити

upwards – більше

lifting capacity – підйомна здатність

to affect – впливати

permanent unit – постійна, незмінна одиниця (складова)

to be fitted (with) – бути оснащеним

to meet the demands (of) – відповідати вимогам

* + 1. **Translate the words in bold type with the vocabulary, learn them and use in your own sentences.**
    2. **Answer the following questions:**

1. What kind of activity takes a surprising amount of time in civil engineering?
2. What factors have made engineers develop many special pieces of equipment for moving things about?
3. Are cranes used to lift and transport loads from one position to another?
4. Who controls a power-driven crane? How does he do it?
5. What affects the design of a crane?
6. Are the most cranes electrically-operated or diesel-driven when used as a permanent unit of the plant?
7. Name the main types of the cranes.
8. What are modern cranes fitted with?
9. Why are the design and operation of the cranes are steadily improving?

**III.** **Complete the sentences using the English equivalents for the Ukrainian words in brackets:**

1. The need to make the manufacturing processes as efficient as possible (змусила інженерів вивчати можливість) of material handling and develop many special pieces of equipment for moving things about.

2. (Щоб підіймати й транспортувати вантажі) from one position to another in all the industries (використовуються крани).

3. (Розмір та будова крана, його швидкість, сфера застосування), as well as its lifting capacity affect its design.

4. Loads of 300 tons and upwards are handled by power-driven cranes (що контролюються операторами) manipulating various handles.

5. Where the crane is a permanent unit of the plant, it is almost always electrically driven, (тому що електромотори менші за розміром і зручніші) than other sources of **motive** power.

6. The design and operation of the cranes are (постійно покращуються, щоб відповідати запитам промисловості).

### Vocabulary

**A**

to accelerate [Ək′selƏreıt] – прискорювати

to accompany [ƏkΛmpənı] – супроводжувати

accurate [′ækjurıt] – точний, правильний, вірний

to achieve [Ə′tʃı:v] – досягати, доводити до кінця

acid [′æsıd] – кислота

according (to) [Ə′kɔ:dıŋ] – відповідно (до)

activity [æk′tıvıtı] – діяльність, енергія

to add [æd] – додавати, докладати, добавляти

to admire [Əd′mαıƏ] – милуватись, захоплюватись

advanced [Əd′vα:nst] – передовий, просунутий вперед

advantage [Əd′vα:ntıʤ] – перевага, користь

agent [′eıʤƏnt] – діяч, агент, представник

aggregate [′ægrıgeıt] – сукупність

aircraft [′ƐƏkrα:ft] – літак, авіація

allow [Ə′lαu] – дозволяти, припускати

alloy [′ælɔı] – сплав

amount [ə′mαunt] – кількість, сума, підсумок

ancient [′eınʃənt] – давній, стародавній

to appear [ə′pıə] – з’являтись, виявлятись

to apply [ə′plαı] – звертатись, докладати, впливати, застосовувати

arch [α:ʧ] – арка, дуга

architect [′α:kıtekt] – архітектор, засновник

artificial [α:tı′fıʃəl] – штучний

ash [æʃ] – попіл, зола

to assemble [ə′sembl] – скликати, збирати(сь), монтувати

attic [′ætık] – горище, мансарда

attitude [′ætıtju:d] – позиція, відношення

to attract [ə′trækt] – приваблювати, притягати

auxiliary [ɔ:g′zıljərı] – допоміжний, додатковий, запасний

available [ə′veıləbl] – доступний, дійсний, корисний

# **B**

backbreaking [′bæk′brekıŋ] – виснажений, знесилений

basement [′beısmənt] – фундамент, основа, підвал

beam [bı:m] – перекладина, балка, брус

beauty [′bju:tı] – краса, чарівність, привабливість

to belong to [bı′lɔŋ] – належати,відноситись (до)

benefit [′benıfıt] – користь, прибуток

bind (bound, bound) [bαınd] – в’язати, переплітати, затримувати, обмежувати

blast-furnace [′blα:st ′fə:nıs] – домна, доменнапіч

to blueprint [′blu:prınt] – планувати, намічати, робитисвітлокопію

board [bɔ:d] – дошка

brick [brık] – цегла

bricklayer [′brık ′leıə] – каменяр, муляр

bridge [brıʤ] – міст

broad [brɔ:d] – широкий, основний, головний

bubble [′bʌbl] – пузир, бульбашка

to burn (burnt, burnt) [bə:n] – палити, спалювати, пекти, смажити

## С

carpenter [′kα:pıntə] – тесля

to carry [′kærı] – везти, перевозити

to cast [′kα:st] – кидати, метати

to cause [kɔ:z] – бути причиною, причиняти

ceiling [′sı:lıŋ] – стеля

cellar [′selə] – погріб, підвал

cellular [′seljulə] – клітковий

cement [sı′ment] – цемент

certain [′sə:tn] – визначений, певний

cheap [tʃ**l**:p] – дешевий, низький

civil [′sıvl] – громадський, цивільний, штатський

clay [kleı] – глина, мул

coarse [kɔ:s] – грубий, великий, шорсткий, шершавий

column [′kɔləm]– колона, опора, підтримка

commensurate[kə′menʃərət] – відповідний

complicated [′kɔmplıkeıtıd] – складний, ускладнений, заплутаний

compress [′kɔmpres] – компрес, пов’язка

compound [′kɔmpαund] – склад, сполучення, суміш

concern [kən′sə:n] – турбота, клопіт, клопотання, занепокоєння, хвилювання

concrete [′kɔnkrı:t] – бетон

concrete reinforced [′kɔnkrı:t ′rı:ın′fɔ:st] – залізобетон

conduit [′kɔndjuıt] – трубопровід, водопровідна труба

to consider [kən′sıdə] – розглядати, обговорювати

constituent [kən′stıtjuənt] – складова частина

constant [′kɔnstənt] – постійна (величина), константа

to contain [kən′teın] – включати, вміщувати

contractor [kən′træktə] – постачальник, контрагент

convenient [kən′vı:njənt] – зручний, придатний

to cost (cost, cost) [kɔst] – назначатиціну, коштувати

to cover [′kʌvə] – покривати, захищати

to create [krı′eıt] – творити, створювати

crystalline [′krıstəlαın] – кристал, прозорий предмет

custom [′kʌstəm] – звичай, звичка

cure [kjuə] – ліки, засіб

to cut (cut, cut) [kʌt] – різати, розрізати

##### D

dam [dæm]– дамба, гребля

danger [′deınʤə] – небезпека, загроза

decay [dı′keı] – гниття, розпад, руйнування

decision [dı′sıʒən] – рішення

to decorate [′dekəreıt] – прикрашати, оздоблювати (будинок, приміщення)

to decrease [′dı:krı:s] – зменшення, зниження, спад

deep [dı:p] – глибокий, сильний

degree [dı′grı:] – ступінь, кількість, достоїнство

deliver [dı′lıvə] – розносити, доставляти

density [′densıtı] – густота, щільність

department [dı′pα:tmənt] – відділ, область, галузь

to depend [dı′pend] – залежати, розраховувати

to derive [dı′rαıv] – отримувати, діставати, здобувати

design [dı′zαın] – план, ціль, намір, проект, задум

to designate [′dezıgnıt] – призначати на посаду, визначати, характеризувати

to determine [dı′tə:mın] – визначати, встановлювати, вирішувати, сприяти

to develop [dı′veləp] – розвивати, вдосконалювати, розробляти, виявляти

dimension [dı′menʃən]– вимірювання, розмір, величина

disadvantage [dısəd′vα:ntıʤ] – недолік, шкода, незручність, перешкода, завада

distribution [dıstrı′bju:ʃən] – розподілення, поширення

to divide [dı′vαıd] – ділити, розподіляти

dock [dɔk] – док

dome [doum] – купол, ковпак

to draw (drew, drawn) [drɔ:] – тягти, волокти, витягати

duct [dʌkt] – трубопровід, труба

due (to) [dju:] – точно, рівно, прямо

durable [′djuərəbl] – міцний, тривкий, надійний, тривалий, довгочасний, довгий

## E

efficiency [ı′fıʃnsı] – дієвість, ефективність, продуктивність, вміння

to eliminate [ı′lımıneıt] – усувати, відстороняти, вилучати

elimination [ılımı′neıʃən] – виключення, виводження, вилучення

to embrace [ım′breıs] – вибирати, охоплювати, включати, вміщувати

to employ [ım′plɔı] – наймати, займати, вживати, використовувати

to enable [ı′neıbl] – надавати можливість, полегшувати

enclosure [ın′klouʒə] – огорожа, вклад, додаток

enormous [ı′nɔ:məs] – величезний

entire [ın′tαıə] – повний, цілий, досконалий, суцільний, безперервний

equipment [ı′kwıpmənt] – обладнання

essential [ı′senʃəl] – суттєвий, невід’ємний, необхідний

to erect [ı′rekt] – споруджувати, встановлювати, піднімати, створювати

excellent [′eksələnt] – відмінний, чудовий

exception [ık′sepʃən] – виключення, заперечення

excessive [ık′sesıv] – надмірний

to expand [ıks′pænd] – розширяти, збільшувати, розвивати(сь)

experience [ıks′pıərıəns] – (життєвий) досвід, випадок, кваліфікація, майстерність

to exist [ıg′zıst] – існувати, знаходитись

### F

to fall (down) (fell, fallen) [fɔ:l] – падати, терпіти невдачу

to fasten [′fα:sn] – прикріплювати, прив’язувати, закріплювати

to fell [fel] – рубати, валяти (дерево)

fence [fens] – огорожа, паркан

ferroconcrete [′ferou′kɔŋkrı:t] – залізобетон

to fill [fıl] – наповнювати, заповнювати, закладати

fine [fαın] – тонкий, витончений, гарний, прекрасний, вишуканий

floor [flɔ:] – підлога, поверх, мінімальний рівень

to fly [flαı] – літати, поспішати, зникати

foam [foum] – піна

to forge [fɔ:ʤ] – кувати, винаходити, підробляти

fundamental [fʌndə′mentl] – основний, суттєвий

foundation [fαun′deıʃən] – основа, фундамент

to frame [freım] – створювати, виробляти, складати, споруджувати

framework [′freımwə:k] – корпус, рама, структура

to furnish [′fə:nıʃ] – постачати, надавати, доставляти

### G

#### gate [geıt] – ворота, брама, вхід, вихід

#### glue [glu:]– клей

#### glass [glα:s] – скло

goal [goul]– ціль, мета, завдання

grade [greıd] – градус, ступінь

grain [greın] – зерно, будова, структура

granite [′grænıt] – граніт

gravel [′grævəl] – гравій, золотоносний пісок

gravity [′grævıtı]– серйозність, вага, тяжіння

grind [grαınd] – тяжка (нудна) робота

gypsum [′ʤıpsəm] – гіпс

# **H**

hard [hα:d] – твердий, жорсткий, міцний, сильний

to harden [hα:dn] – твердіти, застигати, цементувати

heat [hı:t] – жара, жар, тепло, теплота

height [hαıt] – висота, височина, височінь

to hide (hid, hidden) [hαıd] – ховати(сь), переховувати(сь)

hole [houl] – дірка, отвір

hollow [′hɔlou] – порожнина, пустота, заглиблення, дупло

hut [hʌt] – хатина, халупа

# **I**

imagination [ımæʤı′neıʃən] – уявлення, фантазія

immediately [ı′mı:djətlı] – безпосередньо, негайно

to impose [ım′pouz] – накладати, обманювати, нав’яз

to improve [ım′pru:v] – поліпшувати, покращувати, вдосконалювати

increase [′ınkrı:s] – збільшення, зростання

inert [ı′nə:t] – неактивний, нейтральний

inflammable [ın′flæməbl] – легко запалюваний, вогненебезпечний

influence [′ınfluəns] – вплив, дія, фактор, діяння

innovation [ınou′veıʃn] – нововведення

insulation [ınsju′leıʃən] – ізоляція, ізоляційний матеріал

interior [ın′tıərıə] – внутрішній

internal [ın′tə:nl] – внутрішній, душевний, щиросердний

to introduce [ıntrə′dju:s] – впроваджувати, представляти, застосовувати, знайомити

invention [ın′venʃən] – винахід, вигадка

iron [′αıən] – залізо, праска, чорний метал

irrigation [ırı′geıʃən]– зрошення, зрошування

### j

judgement [′ʤʌʤmənt] – вирок, кара, думка, погляд, вміння, розсуд

joiner [′ʤɔınə] – столяр

joist [ʤɔıst] – балка

# **L**

#### labour [′leıbə] – праця, робота, зусилля

lack [læk] – недостача, нестаток, відсутність

large [lα :ʤ] – великий, широкий

latter [′lætə] – недавній, останній

layer [′leıə] – шар, пласт

leaf (pl. leaves) [lı:f] – листя, лист металу

light [lαıt] – світло, освітлення

lime [lαım] – вапно

burnt (slaked) lime [′bə:nt ′sleıkdlαım] – негашене вапно

limestone [′lαımstəun] – вапно

linoleum [lı′noulıəm] – лінолеум

load [loud] – вантаж, тягар, вага

to lock [lɔk] – замикати, з’єднувати, стискати

log [lɔg] – колода, деревина

# **M**

manner [′mænə] – метод, спосіб

manufacture [mænju′fæktʃə] – виробництво, виготовлення, обробка

marble [′mα:bl] – мармур

mark [mα:k] – знак, межа, кордон, норма

masonry [′meısənrı] – кам’яна кладка

mass [mæs] – маса, безліч, численність

medieval [medı′ı:vəl] – середньовічний

mere [mıə] – простий, явний, очевидний

method [′meθəd] – метод, спосіб, система, порядок

mild [mαıld] – м’який, помірний, слабкий, тихий

to mix [mıks] – змішувати

mixture [′mıkstʃə] – змішування, суміш

moisture [′mɔıstʃə] – вологість, вогкість, сирість

monolithic [mɔnou′lıθık] – монолітний

mortar [′mɔ:tə] – ступа

**N**

nail [neıl] – цвях, гвіздок

namely [′neımlı] – саме, тобто

necessary [′nesəsərı] – необхідний, потрібний, неминучий, змушений, вимушений

# **O**

#### to obtain [əb′teın] – отримувати, набувати, досягати, домагатися, застосовуватись

occupancy [′ɔkjupənsı] – заняття, аренда, володіння

to occur [ə′kə:] – траплятись, відбуватись, зустрічатись

ordinarily [′ɔ:dınərılı] – звичайно

otherwise [′ʌðəwαız] – інакше

outer [′αutə] – зовнішній, віддалений, фізичний

# **P**

paneling [′pænəlıŋ] – вагонка

paper [′peıpə] – паперовий, тонкий як папір, газетний

parquet floor [′pα:keı ′flɔ:] – паркет

partition [pα:′tıʃən] – розподіл, розподілення, частина, відділення, перетинка

particular [pə′tıkjulə] – специфічний, особливий, окремий, індивідуальний

pavement [′peıvmənt] – тротуар, панель

to permit [pə′mıt] – дозволяти, надаватиможливість

pipe [pαıp] – труба, трубопровід

place [pleıs] – місце, служба, положення, посада

plain [pleın] – ясно, відверто, розбірливо, чітко, виразно

planet [′plænıt] – планета

plaster [′plα:stə] – розчин

plate [pleıt] – балка

plinth [′plınθ] – плінтус

plywood [′plαıwud] – фанера клеєна

portable [′pɔ:təbl] – складний, пересувний

possible [′pɔsıbl] – можливий, певний, ймовірний

potassium [pə′tæsjəm] – калій

to pour [pɔ:] – вливати, лити, наливати

powder [′pαudə] – порошок, пил

to prefabricate [′prı:′fæbrıkeıt] – виготовляти заводським способом

to project [prə′ʤekt] – проектувати, складати проект (план), відображати, кидати

property [′prɔpətı] – майно, власність, господарство, властивість, якість

to protect [prə′tekt] – захищати, охороняти, огороджувати, оберігати, запобігати

to provide [prə′vαıd] – забезпечувати, постачати, давати, надавати

to pull [pul] – тягти, тягнути, натягувати

purity [′pjuərıtı] – чистота, проба

to purify [′pjuərıfαı] – очищати (сь)

purpose [′pə:pəs] – намір, ціль, мета, результат, призначення

putty [′pʌtı] – замазка

# **Q**

quality [′kwɔlıtı] – якість, властивість, особливість, характерна риса

quart [kwɔ:t] – кварта

# **R**

reasonable [′rı:znbl] – розсудливий, розважливий, помірний, стерпний, терпимий

to reduce [rı′dju:s] – знижувати, зменшувати, скорочувати

reduction [rı′dʌkʃən] – зниження, зменшення, скорочення

to refer [rı′fə:] – посилати, відправляти, розглядати, звертатись, пояснювати, мати відношення

to refrain [rı′freın] – утримуватися, стримувати

refrigeration [rıfrıʤə′reıʃən] – охолодження,замороження

reinforcedconcrete [′rı:ınfɔ:st ′kɔŋkrı:t] – залізобетон

to remove [rı′mu:v] – відсувати, переміщати, прибирати

Renaissance [rə′neısəns] – епоха Відродження

to replace [rı′pleıs] – ставити на місце, повертати, відновлювати, замінювати

to require [rı′kwαıə] – вимагати, показувати

reservoir [′rezəvwa:] – резервуар, басейн, водосховище, запас, джерело

resistance [rı′zıstəns] – опір, опірність, протидія, протидіяння

to reveal [rı′vı:l] – відкривати, викривати, виявляти, показувати

roof [ru:f] – дах, покрівля

**S**

# safely [′seıflı] – безпечно, благополучно

#### sand [sænd] – пісок

sandstone [′sændstoun] – піщаник

sap [sæp] – сік (рослин), живиця

sash [sæʃ] – віконний перепліт, ковзаючa рама в під’ємному вікні

scale [skeıl] – окалина, накип

to select [sı′lekt] – вибирати, відбирати

to sell [sel] – продавати(сь), торгувати, рекламувати

setting [′setıŋ] – кладка (кам’яна)

several [′sevrəl] – декілька, окремий, особливий

shingle [′ʃıŋgl] – крівельна дранка, галька

to shrink (shrank, shrunk) [ʃrıŋk] – скорочувати, всихати, відступати

silica [′sılıkə] – кварц, кремнезем

silicate [′sılıkıt] – силікат, силікатний

silicon [′sılıkən] – кремній

since [sıns] – з того часу як, оскільки

skill [skıl] – мистецтво, майстерність, вміння

skin [skın] – шкіра, кірка

skyscraper [′skαı ′skreıpə] – хмарочос

slab [slæb] – плита бетонна(плитка, пластина, шматок)

slag [slæg] – шлак, окалина

slate [sleıt] – сланець, шифер

smooth [smu:θ] – рівний, гладенький, спокійний

sodium [′səudjəm] – натрій

sort [sɔ:t] – сорт, вид, спосіб, манера

span [spæn] – проміжок часу, коротка відстань

specification [spesıfı′keıʃən] – специфікація, деталь, докладність, подробиця

staircase [′stɛəkeıs] – сходи, східці

steam [stı:m] – пара, випаровування

steel [stı:l] – сталь

step [step] – крок, слід, східець, сходинка

stick [stık] – ломака, палиця, гілка

stone [stoun] – камінь

stone-mason [′stoun′meısn] – каменяр, муляр

store [stɔ:] – запас, резерв, склад, майно

storey [′stɔ:rı] – поверх, ярус

substance [′sʌbstəns] – речовина, матерія, суть, зміст, стан, щільність

sufficient [sə′fıʃənt] – достатній, достатня кількість

suitable [′sju:təbl] – відповідний, придатний

to support [sə′pɔ:t] – підтримувати, сприяти

to surround [sə′rαund] – оточувати

# **T**

technique [tek′nı:k] – техніка, метод, спосіб

tent [tent] – палатка, намет

thereby [′ðɛə′bαı] – таким чином, в зв’язку з тим

therefore [′ðɛəfɔ:] – тому, отже, отож

thermal [′θə:məl] – термічний, тепловий, гарячий

thickness [′θıknıs] – щільність, шар, товщина

thoroughly [′θʌrəlı] – цілком, сповна, ретельно

thus [ðʌs] – так, таким чином

tie [tαı] – зв’язок, з’єднання, зав’язка

tile [tαıl] – черепиця, кахель

timber [′tımber] – лісоматеріали, деревина, балка

tool [tu:l] – інструмент, верстат

to top [tɔp] – покривати (зверху)

trade [treıd] – заняття, ремесло, торгівля

to transmit [trænz′mıt] – передавати, відправляти

to treat [trı:t] – відноситись, обробляти

trowel [′trαuəl] – кельма, лопатка

# **U**

ultimate [′ʌltımıt]– кінцевий, останній

universal [′ju:nı′və:sl] – загальний, всесвітній, універсальний

up-to-date [′ʌptə′deıt] – сучасний, найновіший

upper [′ʌpə] – верхній, вищий

to use [ju:z] – вживати, використовувати, застосовувати

# **V**

valuable [′væljuəbl] – цінний, корисний

value [′vælju:] – цінність, вартість

to vary [′vɛərı] – змінювати

vast [vα :st] – великий, просторий

virtue [′və:tju:] – властивість, достоїнство

veneer [vı′nıə] – фанера одношарова

void [vɔıd] – вільний, пустий

# **W**

wallpaper [′wɔ:lpeıpə] – шпалери

weak [wı:k] – слабкий

weight [weıt] – вага, маса

welder [weldə]– зварювальник

whatever [wɔt′evə] – будь-який, будь-що

whitewash [′wαıtwɔʃ] – вапняний розчин

width [wıdθ] – ширина, відстань

wire [′wαıə] – дріт, провід

wood [wud] – дерево (матеріал), деревина

**CHEMICAL INDUSTRY**

**TEXT 1**

**OVERVIEW OF CHEMISTRY**

**Learn the new vocabulary:**

|  |  |
| --- | --- |
| definition | визначення |
| the study of matter | вивчення речовини; наука про матерію |
| space | простір |
| in addition | на додачу |
| a set of properties | низка / набір властивостей |
| substance | речовина |
| personality traits | особисті риси |
| ancient times | стародавні часи |
| to be based (on / upon) | базуватися (на) |
| practical goal | практична мета |
| to be related (to) | бути пов’язаним (з) |
| complex substance | складна речовина |
| basic / fundamental concepts | основні поняття / ідеї |

**1. Read and translate the text:**

What is chemistry? All definitions of chemistry include the study of matter. Matter is defined as anything that has mass and occupies space*.* All matter is arranged and organized. The way it is arranged is called its structure*.* The parts of the structure and the ratio in which they are organized are called its composition*.* In addition, all matter has characteristics or properties*.* That is, each substance has a set of properties that are characteristic of that substance and give it a unique or special identity. These physical or chemical properties are the personality traits of that substance. In brief, chemists study the properties, the composition, and the structure of matter. They also study changes in the composition and the structure as well as the reactions of matter, especially of atomic and molecular systems. Basically, chemistry is a science that deals with the composition and properties of substances and with the reactions by which substances are produced from, or converted into, other substances.

People have practiced chemistry since ancient times. The Egyptian, Arabic, Greek, and Roman cultures each contributed significant developments to chemistry. These early developments were empirical*.* That is, they were achieved by trial and error and were not based on any valid theory of matter. The alchemists (500-1600 A.D.) whose practical goal was to change base metals into gold and to prolong life, also contributed to the development of chemistry. However, it was not until the 17th and 18th centuries that modern chemistry began to develop through systematic experimentation rather than trial and error. In fact, this systematic experimentation, called the scientific method, is usually credited with being the most important single factor in the development of chemistry and its application to technology.

Chemistry is related to physics, another basic branch of science. It is also related to biology, the science of life, because life itself is basically a complicated system of interrelated chemical processes.

The range, or scope, of chemistry is very wide. In fact, it includes the whole universe and every animate (living) and inanimate (nonliving) thing in it. Chemistry may be broadly classified into two main branches: organic chemistry (the chemistry of living things) and inorganic chemistry (the chemistry of nonliving things). Through the study of chemistry we try to learn and understand the principles and laws that control the activity of all matter.

Chemists may try to observe and to explain natural situations, or phenomena, or they may invent experiments that will show the composition and structure of complex substances. They may look at methods to improve natural processes or, sometimes, create or combine substances that are unknown in nature.

Even though the total of chemical knowledge is so enormous that no one could learn all of it in one's lifetime, the basic concepts are not difficult. In fact, these fundamental concepts in chemistry have become part of the education required for many professionals in a wide variety of fields and they have contributed to the rapid growth of technology.

**2. Look through the text again and decide which of the following ideas are *not* expressed in the passage:**

1. Chemistry plays the central role in the life of modern world.

2. Chemistry studies the composition, the properties and the structure of matter.

1. Reactions of matter in atomic and molecular systems are also studied by chemists.
2. It's necessary to demonstrate the influence of chemistry on science in general and its position in society.
3. The history of chemistry can be traced back to ancient times.
4. Experimentation in chemistry began only in the 17th and 18th centuries.
5. In chemical reactions one or more substances change their chemical composition and form one or more new substances.
6. Scientific method is the most important factor in the development of chemistry.

9. Every chemical element is characterized by a definite atomic number.

10. Chemistry is related to other sciences, e.g. physics and biology.

**3. Answer the following questions:**

1. Why are the contributions of ancient cultures to chemistry called empirical?
2. What were the principle goals of alchemists?
3. When did chemistry begin to develop through systematic experimentation?
4. What is the most important single factor in the development of chemistry?
5. What other sciences is chemistry related to?
6. How are subfields of chemistry classified?

**4. Match the words in column A with their definitions in column B*:***

|  |  |
| --- | --- |
| ***A*** | ***B*** |
| 1. matter 2. structure 3. composition 4. property 5. chemistry 6. scientific method 7. animate 8. inanimate 9. space 10. ratio 11. substance 12. trial 13. error 14. branch 15. universe | * 1. a material, type of matter   2. a division of science   3. a way or manner of doing scientific work   4. a quality or power, or effect that belongs naturally to smth   5. smth done wrongly, a mistake   6. all space and the matter around us   7. the material that makes up the world and everything in space and can be seen or touched   8. the arrangement of various parts of which smth is made up   9. the science studying the substances which make up the Earth, the universe and living things   10. nonliving objects   11. a figure showing the number of times one quantity contains another   12. living animals and plants   13. m) the way in which parts are formed into a whole   14. the way in which parts are formed into a whole   15. an act of testing smth   16. smth that surrounds all objects and continues in all directions |

**5. Using a dictionary give the plural form of the following Latin words and translate them into Ukrainian:**

phenomenon, basis, thesis, index, focus, criterion, datum, equity, librium, medium, synthesis, analysis, curriculum, symposium, spectrum, maximum, vacuum, stratum, hypothesis, phasis, nucleus.

**6. Using chemical terms given below complete the following sentences in the text:**

*scientific method, law, composition, experiments, chemistry, changes, properties, branch, matter, science*

(1) ... , which is the study of the (2) ... and (3) ... of (4) ... , and of the (5) ... that it undergoes, is a (6) ... of (7) ... , which itself provides us with the way of knowing and understanding the universe we live in. In the operation of the (8) ... we ask questions of the universe through tests and (9) ... . By observing the results we can formulate additional questions, perform additional experiments, and finally develop a tentative explanation of what we have learned. If this tentative explanation is confirmed by others and becomes widely accepted, it becomes a (10)... and helps us understand better the world around us.

**7. Translate the following text into English:**

Хімія – це наука, яка займається питаннями, пов’язаними з речовинами, їх складом, якостями та перетвореннями (transformations). Із стародавніх часів людина почала використовувати багато хімічних процесів. Хімія розвивалася в тісному зв’язку з усіма практичними потребами (needs) людського суспільства (society). Стародавні цивілізації зробили значний внесок у розвиток хімії.

До XVII—XVIIIстоліть хімія розвивалася шляхом накопичення (accumulation) практичних знань і експериментальних навичок (skills). Лише в XVIII столітті почали з’являтися науково обґрунтовані основи хімії.

Сучасна хімія складається з декількох галузей: органічної хімії, що вивчає властивості хімічних елементів та їх перетворень – неживу матерію; органічної хімії, об’єктом вивчення якої є сполучення вуглецю (carbon) – живої матерії; фізичної хімії, що активно застосовує методи фізики для вивчення хімічних процесів тощо (etc).

Хімія тісно пов’язана з біохімією, що вивчає хімічні процеси живих організмів; геохімією, що досліджує хімічні процеси в земній корі (theEarth'scrust) тощо (andsoon).

**TEXT 2**

**THE NATURE OF CHEMISTRY**

**Learn the new vocabulary:**

|  |  |
| --- | --- |
| neither (of) | жоден (з) |
| along (with) | разом (з) |
| branch of knowledge | галузь знань |
| closely related (to) | тісно пов’язаний (з) |
| universe | Всесвіт |
| animate / inanimate | живий / неживий |
| to be concerned (with) | мати відношення (до) |
| to govern the behavior (behaviour) | керувати поведінкою |
| to observe nature | спостерігати за природою |
| to rust | ржавіти |
| poisonous | отруйний |
| natural phenomena | природні явища |
| relatively | відносно |

**1. Read and translate the text:**

What is chemistry? A popular dictionary gives this definition: Chemistry is a science of the composition, structure, properties, and reactions of matter, especially of atomic and molecular systems. Another, somewhat simpler dictionary definition is: Chemistry is a science dealing with the composition of matter and the changes in composition that matter undergoes. Neither of these definitions is entirely adequate. Chemistry, along with the closely related science of physics, is a fundamental branch of knowledge. Chemistry is also closely related to biology, not only because living organisms are made of material substances but also because life itself is an essentially complicated system of interrelated chemical processes.

The scope of chemistry is extremely broad. It includes the whole universe and everything, animate and inanimate, in it. Chemistry is concerned not only with the composition of matter, but also with the energy and energy changes associated with matter. Through chemistry we seek to learn and to understand the general principles that govern the behavior of all matter.

The chemist, like other scientists, observes nature and attempts to understand its secrets: What makes a rose red? Why is sugar sweet? What is occurring when iron rusts? Why is carbon monoxide poisonous? Why do people wither with age? Problems such as these — some of which have been solved, some of which are still to be solved — are part of what we call chemistry.

A chemist may interpret natural phenomena, devise experiments that will reveal the composition and structure of complex substances, study methods for improving natural processes, or, sometimes, synthesize substances unknown in nature. Ultimately, the efforts of successful chemists advance the frontiers of knowledge and at the same time contribute to the well-being of humanity. Chemistry can help us to understand nature, but it is not necessary to be a professional chemist or scientist to enjoy natural phenomena. Nature and its beauty, its simplicity within complexity, are for all to appreciate.

The body of chemical knowledge is so vast that no one can hope to master it all, even in a lifetime of study. However, many of basic concepts can be learned in a relatively short period of time. These basic concepts have become part of the education required for many professionals including agriculturists, biologists, dental hygienists, dentists, medical technologists, microbiologists, nurses, nutritionists, pharmacists, physicians, and veterinarians, to name just a few.

**2.** **Choose the most suitable title to the text out of the given ones:**

1. The Scope of Chemistry.

2. The Nature of Chemistry.

3. The Body of Chemical Knowledge.

4. The Work of a Chemist.

5. Chemical Education.

**3. Say if the following statements are true (T) or false (F):**

1. We can infer that physics is a fundamental branch of knowledge.
2. In paragraph 2, the study of energy is said to be a part of chemistry.
3. The author writes that every animate and inanimate thing in the universe is governed by general principles.
4. According to the author, even though there are unsolved secrets in nature, principles govern these secrets.
5. The author believes that if chemists “advance the frontiers of knowledge”, they will “contribute to the well-being of humanity”.
6. To truly enjoy nature, the author thinks, we must have some knowledge of chemistry.
7. If you are studying to become a veterinarian (a doctor for animals), you will have to take courses in chemistry.

**4. Read the text once again and entitle its paragraphs.**

**5. Write out:**

**a) key-words out of each paragraph;**

**b) sentences expressing main ideas of each paragraph.**

**6. Retell the text briefly in your own words using the key words and the sentences you’ve written out.**

**7. Read the following text about this scientist and make notes on his personal information: first name, family name, date and place of birth, occupation qualification, nationality, etc.**

Dmitry Ivanovych Mendeleyev was born in Tobolsk in 1834. In1850 he entered the Pedagogical Institute in St. Petersburg to study chemistry. Five years later he graduated from it with a gold medal and was invited to lecture on theoretical and organic chemistry at Petersburg University.

Then, in 1859, he was sent to Germany to continue his education. When he was living abroad, he made a number of important investigations.

The year 1868 was the beginning of his highly important work *Fundamentals of Chemistry.* When Mendeleyev was working on the subject, he analyzed an enormous amount of literature, and made thousands of experiments and calculations. This tremendous work resulted in the Periodic Table of the Elements consisting of vertical groups and horizontal periods.

Thanks to his investigations Mendeleyev was able to predict not only the existence of a few unknown elements but their properties as well.

D. I. Mendeleyev was engaged not only in the study of chemistry. He combined theory with practical activity and carried out enormous research in coal, petroleum, iron and steel industries in Russia.

Mendeleyev died in 1907 at the age of 73.

**8. Fill in the form with the information about D. I. Mendeleyev:**

First name

Middle name

Family name

Date of birth

Place of birth

Nationality

Occupation

Qualification

**9. Match the points on the left with the questions on the right:**

|  |  |
| --- | --- |
| 1.First name  2.Middle name  3.Family name   1. Nationality 2. Date of birth 3. Age 4. Place of birth 5. Permanent address 6. Marital status 7. Occupation 8. Qualification 9. Hobbies/Interests | a) Are you married or single?  b) What do you do in your free time?  c) What’s your first name?   1. What do you do? 2. When were you born? 3. Where were you born?   g) What degrees, diplomas do you have? h) What’s your family name?  i) What nationality are you?  j) What’s your middle name?  k) Where do you live?  1) How old are you? |

**10. Be ready to give personal information about a well-known scientist in the field of chemistry**

**TEXT 3**

**HISTORY OF CHEMISTRY**

**Learn the new vocabulary:**

|  |  |
| --- | --- |
| unique ability | особлива / унікальна здатність |
| to resist decay | протистояти руйнуванню |
| acid | кислота |
| to fight ageing | боротися зі старінням |
| the Middle Ages | Середньовіччя |
| benefit | вигода / користь |
| internal / external | внутрішній / зовнішній |
| to apply | використовувати, докладати |
| remedy | ліки |
| empirical evidence | емпіричне свідчення / доказ |
| to contain | містити в собі |
| to prolong | продовжувати |
| spirit | спирт / алкоголь |
| raw materials | сировина |
| herb | трава |

**1. Read and translate the text about the early days of chemistry and find out what alchemists’ contribution to the development of the science was:**

Thousands of years ago people valued gold as a rare and beautiful substance. They also understood that gold had a unique ability to resist decay and corrosion. Since there was no known acid or other substance that could damage gold they thought that gold had a quality of performance that could be transmitted to humans. Therefore, every medicine that fought ageing contained gold as an essential ingredient and doctors urged people to drink from gold cups to prolong life.

This universal desire for gold made alchemy a formal discipline in the first century A.D. It first appeared among Greek scholars, then spread to eastern Mediterranean countries, and finally to Spain and Italy in the 12th century. Though the attempts to produce gold from other substances was the original and central purpose of alchemy, a number of physician-alchemists in Europe in the Middle Ages tried to produce medicines that were not dependent on gold or related to it.

They worked to produce medicines and spirits from raw materials, such as herbs, and in this way improved methods of separating elements by distillation. For example, as early as the 13th century, Thad-deus of Florence identified the medical benefits of alcohol distillates taken internally and applied locally. Paracelsus (1493-1541), the German-Swiss physician and alchemist, was the first person to unite medicine with chemistry through his use of remedies that contained mercury, sulphur, iron, and copper sulphate. This led to steam distillation and improved equipment.

The development of apparatus and the extensive efforts to break down or distil substances laid the foundation for modern chemistry, but as true science began to evolve during the Renaissance, the study of alchemy blocked the birth of modern chemistry. Some scientists tried to lead people toward reliance on empirical evidence (that is, what can actually be observed and/or measured), but the idea of four essential elements (earth, air, fire, and water) lived on and there was no recognition that these four substances are made up of a combination of basic elements.

**2. Find in the text sentences describing**

**a) gold;**

**b) production of medicines;**

**c) contributions of scholars.**

**Translate these sentences into Ukrainian.**

**3. Answer the following questions:**

1. Why did every medicine fighting ageing contain gold?
2. What made alchemy a formal discipline?
3. When and where did alchemy appear?
4. What did some physicians use to produce medicines in the Middle Ages?
5. Who was the first to unite alchemy with chemistry?
6. What laid the foundation for modern chemistry?
7. What was the idea of ancient scholars about the four essential elements?

**4. Match the English words, word combinations and chemical terms in *A* with their Ukrainian equivalents in *B:***

*A.* 1. to value; 2. rare; 3. unique; 4. ability; 5. to resist; 6. decay; 7. acid; 8. to damage; 9. quality; 10. performance; 11. ageing; 12. to urge; 13. desire; 14. to spread; 15. purpose; 16. dependent; 17. to be related to; 18. spirit; 19. herb; 20. as early as; 21. benefit; 22. remedy; 23. mercury; 24. sulphur; 25. iron; 26. copper sulphate; 27. steam; 28. to lay the foundation; 29. to evolve; 30. reliance; 31. evidence; 32. recognition; 33. therefore; 34. since

*B.* 1. пapа; 2. протистояти; З. старіння; 4. тому; 5. поширюватися; 6. спирт; 7. залежний; 8. перевага; 9. залізо; 10. кислота; 11. пристрасть (бажання); 12. розвивати; 13. ліки; 14. цінувати; 15. якість; 16. свідчення (доказ); 17. ще; 18. ртуть; 19. рідкий (рідкісний); 20. довіра; 21. ціль (мета); 22. руйнувати; 23. визнання; 24. закласти основи; 25. єдиний у своєму роді; 26. дія; 27. сірка; 28. бути пов’язаним (з); 29. мідний купорос; 30. переконувати (змушувати); 31. трава; 32. здатність;33. розкладання (гниття); 34. так як

**5. Match the synonyms in columns *A* and *B:***

***А В***

|  |  |  |
| --- | --- | --- |
| 1. to value | a) | admission |
| 2. ability | b) | testimony |
| 3. decay | c) | lust |
| 4. to damage | d) | advantage |
| 5. to urge | e) | medication |
| 6. desire | f) | hence |
| 7. purpose | era | to ruin |
| 8. to be related to | h) | to develop |
| 9. benefit | i) | to appreciate |
| 10. remedy | J) | to force |
| 11. to evolve | k) | decomposition |
| 12. reliance | 1) | trust |
| 13. evidence | m) | to be connected with |
| 14. recognition | n) | power |
| 15. therefore | o) | aim |
| 16. rare | p) | to oppose |
| 17. to resist | q) | constancy |
| 18. permanence | r) | to scatter |
| 19. to spread | s) | subordinate |
| 20. dependent | t) | unique |

**6. Write out of the text all irregular verbs and give their infinitives.**

1. **Ask all kinds of questions to the following sentences:**
2. Alchemy began to decline in the 16th century.
3. People have long had a lust for gold.
4. Ancient civilizations were practicing the art of chemistry as early as 3000 B.C.

**8. Read the text of another author on alchemy, compare it with the first one and say what information they have in common and what is different. Share your ideas with your fellow students.**

One of the most interesting periods in the history of chemistry was that of the alchemists (500-1600 A. D.). People have long had a lust for gold, and in those days gold was considered the ultimate, most perfect metal formed in nature. The principle goals of alchemists were to find a method of prolonging human life indefinitely and to change the base metals, such as iron, zinc, and copper, into gold. They searched for a universal solvent to transmute base metals into gold and for the "philosopher's stone" to rid the body of all diseases and to renew life. In the course of their labors they learned a great deal of chemistry. Unfortunately, much of their work was done secretly because of the mysticism that shrouded their activity, and very few records remained.

Although the alchemists were not guided by sound theoretical reasoning and were clearly not in the intellectual class of the Greek philosophers, they did something that philosophers had not considered worthwhile. They subjected various materials to prescribed treatment under what might be loosely described as laboratory methods. These manipulations, carried out in alchemical laboratories, not only uncovered many facts of nature but paved the way for the systematic experimentation that is characteristic of modern science.

Alchemy began to decline in the 16th century when Paracelsus (1493-1541), a Swiss physician and outspoken revolutionary leader in chemistry, strongly advocated that the objectives of chemistry be directed toward the needs of medicine and the curing of human ailments. He openly condemned the mercenary efforts of alchemists to convert cheaper metals to gold.

**TEXT 4**

**MODERN CHEMISTRY**

**Learn the new vocabulary:**

|  |  |
| --- | --- |
| to discover | відкривати, виявляти |
| founder | засновник |
| to distinguish | відокремлювати, виділяти |
| compound | суміш, сполука |
| quantitative measurements | кількісні вимірювання |
| weight | маса, вага |
| to involve | залучати, умішувати |
| to contribute (to) | сприяти, робити внесок |
| chemical data | хімічні дані |
| concept of matter | поняття / концепція матерії |
| to advance in great strides | розвиватися великими темпами |
| rapid advancement | швидкий розвиток |
| to occur | ставатися |
| outstanding achievements | визначні досягнення |

**1. Read and translate the text:**

Modern chemistry was slower to develop than astronomy and physics. It began in the 17th and 18th centuries when Joseph Priestley (1733-1804), who discovered oxygen in 1774, and Robert Boyle (1627-1691) began to record and publish the results of their experiments and to discuss their theories openly. Boyle, who has been called the founder of modern chemistry, was one of the first to practice chemistry as a true science. He believed in the experimental method. In his most important book, *The Sceptical Chemist,* he clearly distinguished between an element and a compound or mixture. Boyle is best known today for the gas law that bears his name.

A French chemist, Antoine Lavoisier (1743-1794), placed the science on a firm foundation with experiments in which he used a chemical balance to make quantitative measurements of the weights of substances involved in chemical reactions. The use of the chemical balance by Lavoisier and others later in the 18th century was almost as revolutionary in chemistry as the use of the telescope had been in astronomy. Thereafter, chemistry became a quantitative experimental science. Lavoisier also contributed greatly to the organization of chemical data, to chemical nomenclature, and to the establishment of the law of conservation of mass in chemical changes.

During the period from 1803 to 1810, John Dalton (1766-1844), an English schoolteacher, advanced his atomic theory. This theory placed the atomistic concept of matter on a valid rational basis. It remains today as a tremendously important general concept of modern science.

Since the time of Dalton, knowledge of chemistry has advanced in great strides, with the most rapid advancement occurring at the end of the 19th century and during the 20th century. Especially outstanding achievements have been made in determining the structure of atom, understanding the biochemical fundamentals of life, developing chemical technology, and mass production of chemicals and related products.

**2. Read the text again and complete the chart. The first line is completed as an example:**

|  |  |  |
| --- | --- | --- |
| Date | The name of the scientist | Contribution |
| 1733-1804 | Joseph Priestley | Discovery of oxygen |
|  |  |  |

**3. Read the text once again, divide it into logical parts and entitle them. Write out of the text the sentences expressing the main ideas of each logical part.**

**4. Reduce the text in any possible way omitting unnecessary details.**

*Example:* The use of the chemical balance by Lavoisier and others later in the 18th century was almost as revolutionary in chemistry as the use of the telescope had been in astronomy. —*The use of the chemical balance was revolutionary in chemistry.*

**5. Using your plan, the key words, the sentences you've written out and condensed, and the completed chart give an oral summary of the text.**

**6. Render the following in English. Entitle the text:**

Першу сучасну атомістичну теорію створив Джон Дальтон. Він припустив, що кожний хімічний елемент складається з атомів, однакових за розміром та з однаковою масою. Ці частки вважалися неподільними та незмінними в процесі хімічної реакції. Дальтон приписав (assigned) атомам таких елементів, як водень, кисень, азот і сірка, певну відносну вагу, точніше масу, а також надав кожному елементові певний символ.

Але ще в кінці ХІХ століття було зроблено низку відкриттів, які показали, що атом зовсім не є неподільною часткою. Перше з цих відкриттів базувалося на вивченні променів (rays), які випускає (emitted) негативно заряджений (charged) електрод (electrode). Існування таких катодних променів було продемонстроване в 70-х роках ХІХ століття в багатьох експериментах, виконаних Круксом і Гольдштейном (CrookesandGoldstain). 1895 року Вільгельм Рентген (WilhelmRoentgen) відкрив Х-проміння, що в майбутньому назвали рентгенівським. У наступному році Антуан Анрі Беккерель (AntoineHenriBecquerel) продемонстрував, що сіль урану довільно (spontaneously) випускає невидиме випромінювання (radiation), подібне до рентгенівського, і це явище назвали радіоактивністю. За свої дослідження Рентген і Беккерель були нагороджені Нобелівською премією.

**7. There are more than thirty branches of chemistry. Below you are given the names of a few chemical sciences. See if you know what these branches deal with. Match the numbers and the letters. Write out the complete definitions using the verbs in the middle column:**

|  |  |  |
| --- | --- | --- |
| *Field of Chemistry* |  | *The Subject Matter* |
| 1. Organic chemistry |  | a) radioactive elements. |
| 2. Inorganic chemistry |  | b) chemical properties and reactions involving ions in solutions. |
| 3. Analytical chemistry | *is concerned with* | c) compounds of carbon. |
| 4. Physical chemistry | *concerns itself with* | d) methods of separating pure substances from mixtures. |
| 5. Biochemistry | *deals with* | e) elements other than carbon. |
| 6. Radiochemistry | *covers* | f) effects of chemical structure on physical properties of matter. |
| 7. Electrochemistry | *considers* | g) substances contained in living organisms. |
| 8. Magnetochemistry | *treats of* | h) spatial arrangement of atoms in molecules. |
| 9. Stereochemistry |  | i) complex substances produced by living cells. |
| 10. Enzimochemistry |  | j) the magnetic properties of compounds. |

1. **Choose the most suitable word in each of the pairs enclosed in brackets. Explain the difference in their usage:**
2. Chemistry (*includes / implies*) the study of elements and their compounds.
3. We can (*distinguish / define*) “universe” as all space and the matter around us.
4. The mechanical (*properties / qualities*) of polymeric materials are very complex.
5. M. V. Lomonosov discovered the (*law / rule*) of the conservation of matter.
6. Organic chemistry is a (*department / branch*) of chemistry dealing with carbon and its compounds.
7. The vibration resonance can (*create / invent*) new protons.
8. Chemists are trying to (*help / improve*) the properties of plastics.
9. The experiments of ancient scholars contributed to the (*development / growth*) of chemistry.

**TEXT 5**

**PERIODIC TABLE AND PERIODIC LAW**

**Learn the new vocabulary**

|  |  |
| --- | --- |
| researcher / research worker | дослідник |
| well-ordered | упорядкований |
| to establish | створювати, засновувати |
| to be firmly convinced | бути глибоко переконаним |
| quite independent | досить незалежний |
| general system of laws | загальна система законів |
| to exercise no influence (on) | не впливати (на) |
| however | проте, однак |
| to be appointed (to) | бути призначеним |
| according (to) | відповідно, у залежності (від) |
| to increase | збільшувати(ся) |
| insight | прозорливість, усвідомлення |
| open spaces | вільні місця |
| lucidly | ясно, зрозуміло |

**1. Read and translate the text:**

The story of how D. I. Mendeleyev established the Periodic System of Elements has long been a matter of great interest to research workers.

When Mendeleyev began to teach at St. Petersburg University, chemistry was still far from being the well-ordered and harmonious branch of science that we know today.

The great majority of scientists were firmly convinced that atoms of different elements were in no way connected with each other, and that they were quite independent particles of nature. Only a few advanced scientists realized that there must be a general system of laws which regulates the behavior of atoms of each and every element. However, the few attempts made by Beguyer de Chancourtois, Newlands, Lother Meyer and others to find a system of laws controlling the behavior of atoms were unsuccessful and exercised no influence on Mendeleyev, the future founder of the Periodic System of Elements.

"Mendeleyev was a man who could not bear any kind of disorder and chaos," writes Academician A. A. Boikov. "This is why at the beginning of his course in chemistry at St. Petersburg University, where he had been appointed to the department of chemistry, Dmitry Ivanovich had to establish order in the chemical elements."

By comparison of chemical properties of different elements researchers had long ago discovered that elements could be placed in several groups according to similarity in their properties.

Mendeleyev applied in his system the principles that he developed and included in his table the listing of the elements according to increasing weights.

Because he had the insight to see that many elements had not yet been discovered, he left open spaces in the Periodic Table. For example, he predicted that an unknown element with atomic weight of 44 would be found for the space following calcium. And in 1879 the Swedish chemist Lars Fredric Nilson discovered scandium.

Mendeleyev's table developed into the modern Periodic Table, one of the most important tools in chemistry. The vertical columns of the modern Periodic Table are called groups and the horizontal rows are called periods. The atomic number of an element is the number of protons in the nucleus of the atom of that element. The modern Periodic Table not only clearly organizes all the elements, it lucidly illustrates that they form "families" in rational groups, based on their characteristics.

**2. Look through the text again and find the sentences where the author describes the following facts:**

1. Mendeleyev could foresee the existence of new elements because he was very gifted.

1. Scientists of Mendeleyev's time didn't believe that elements are connected with each other.
2. Mendeleyev's character made him order the elements.
3. Mendeleyev's work on the Periodic Table and the Periodic Law has long interested scientists.
4. There were some scientists' attempts to find a system to order the elements but they failed.
5. Thanks to Mendeleyev modern chemistry uses the clearly developed Periodic System as the main instrument.

**3. Answer the following questions choosing the correct answer out of the given ones:**

1. Where did Mendeleyev start ordering the elements?

1. at school;
2. at St. Petersburg University;
3. abroad.

2. Why did Mendeleyev turn to ordering the elements? Because:

1. other scientists' attempts failed;
2. he had talent;
3. he didn't like disorder.

3. What did the researchers try to do to find some order of the elements?

1. they compared different properties;
2. they read scientific literature;
3. they denied the earlier attempts of the scientists.

4. How did Mendeleyev list the elements?

1. according to their names;
2. according to their atomic weights;
3. according to their chemical symbols.

5. What did scientists of Mendeleyev's time think about atoms of different elements?

1. they were independent particles of nature;
2. they were closely connected;
3. they belonged to a well-ordered system.

**4. Give Ukrainian equivalents to the following words, word combinations and chemical terms from the text:**

|  |  |  |
| --- | --- | --- |
| 1. research worker | 10. to exercise | 19. increasing |
| 2. well-ordered | 11. to influence | 20. insight |
| 3. majority | 12. could not bear | 21. for example |
| 4. firmly | 13. had been appointed | 22. weight |
| 5. were convinced | 14. disorder | 23. tools |
| 6. particles | 15. comparison | 24. nucleus |
| 7. advanced | 16. according to | 25. lucidity |
| 8. realized | 17. similarity | 26. density |
| 9. unsuccessful | 18. applied |  |

**5. Match the synonyms in ex. 4 and ex. 5:**

|  |  |  |
| --- | --- | --- |
| a) to affect | j) center | s) in agreement with |
| b) investigator | k) very small bits | t) thickness |
| c) were sure | l) understood | u) used |
| d) unlucky | m) to exert | v) disliked very much |
| e) resolutely | n) chaos | w) intuitive cognition |
| f) progressive | o) likeness | x) heaviness |
| g) to be given a position | p) making greater | y) clearly |
| h) instrument | q) collation | z) a greater number |
| i) for instance | r) properly organized |  |

**6. Translate the following sentences into Ukrainian:**

1. The scientist said that our age was the age of chemistry.
2. The ancient Greek philosophers thought that matter consisted of infinitely small particles.
3. Aristotle believed that his theory would agree with the general views on nature.
4. After Copernicus and Galileo everybody could know that the Earth turns round the Sun.
5. Cavendish discovered that water consists of a definite proportion of hydrogen and oxygen.
6. Few scientists of that time knew that Mendeleyev had discovered the Periodic System of Elements.
7. It was reported that those interesting experiments would initiate a series of similar investigations.
8. The professor said that they had found some unknown properties of that substance.
9. It was reported that the new element would occupy the definite place in the Periodic Table.
10. They assumed that their method of investigation could be applied in many experiments.

**TEXT 6**

**MENDELEYEV’S CONTRIBUTION TO CHEMISTRY**

**Learn the new lexical material:**

|  |  |
| --- | --- |
| in spite (of) | не зважаючи(на) |
| undoubtedly | без сумніву |
| to suffer changes | зазнавати змін |
| subsequent years | наступні роки |
| to fully realise | усвідомлювати повністю |
| to point out | указувати, підкреслювати |
| to predict | передбачати |
| comprehensive work | вичерпна, глибока робота |
| remarkable agreement of properties | визначне узгодження властивостей |
| justification | підтвердження |
| faith | віра |
| to be proud (of) | гордитися |
| series | серія, низка, ряд, цикл |

**1. Read and translate the text:**

In spite of the importance of the contributions that had been made earlier, the greatest portion of credit for the development of the Periodic System must undoubtedly go to the Russian scientist, D. I. Mendeleyev. The understanding that the properties of the elements can be represented as periodic functions of their atomic weights made possible classification that has suffered few significant changes in the subsequent years.

In March of 1869 D. I. Mendeleyev published his first description of the Periodic System in which he gave the arrangement of the elements in terms of their increasing atomic weights. He fully realized the importance of this periodicity. In his first article D. I. Mendeleyev pointed out the similarities of a number of properties of certain elements and changed the order of atomic weights where necessary in order to have the group similarity. D. I. Mendeleyev left vacant positions in his table for yet undiscovered elements and expressed the opinion that the chemical and physical properties of the elements would be discovered, as he predicted, from their positions in the table.

In the summer of 1871 D. I. Mendeleyev published a more comprehensive work and called it the Periodic Law. At this time he presented the more familiar form of the Periodic Table and although it differs somewhat from the one we use today, it is in general the same. In his publication of 1871 D. I. Mendeleyev used the periodic character to predict the properties of the elements which would be later described as those of scandium, gallium, and germanium. The remarkable agreement of the properties of these elements as they had been described by Mendeleyev and those that were observed later is without doubt a complete justification of D. I. Mendeleyev's faith in his Periodic Law.

In December 1945 Glenn Seaberg made his first publication of a Periodic Table which described a new actinide series beginning with actinium. He said that American scientists were proud and happy to honor the name of D. I. Mendeleyev by calling element 101 "mendelevium".

**2. Choose the most suitable title to the text out of the given ones:**

1. History of Scientific Discoveries.

2. Mendeleyev’s Contribution to Chemistry.

3. Elements of the Periodic Table.

4. The Periodic System of Elements.

**3. List the points of the given plan in the order of events they occur in the text:**

1. Advent of the Periodic Law.
2. Discovery of "Mendelevium".
3. Similarities of Elements' Properties.
4. The Inventor of the Periodic System of Elements.

**4. Write out the main sentence(s) of each logical part and translate them into Ukrainian.**

**5. Combine the sentences you've written out into a summary. Then rewrite them in your own words, omitting unnecessary details.**

**6. Translate the following sentences into English:**

1. Професор сказав, що експеримент проводиться для демонстрації його доповіді.

2. Студенти сказали, що дізналися про нове відкриття на семінарі.

3. Викладач знав, що декілька студентів стануть дослідниками.

4. Учені були впевнені, що деякі відкриття вплинули на наукові погляди Менделєєва.

5. Декілька прогресивних учених розуміли, що існує певна система елементів.

6. У своїй книзі Б. Н. Конарєв доводить, що у стародавні часи люди знали тільки ті речовини, які були їх необхідні для життя.

7. Арабські алхіміки уже в ІХ – Х ст. вважали, що всі речовини можна поділити на органічні та неорганічні.

8. Лавуазьє відповів на ті питання, на які не могли знайти відповідь учені кількох поколінь.

9. Викладач розповів на лекції, який внесок зробив Берцеліус у неорганічну хімію.

10. Ми знаємо, що Берцеліус був автором декількох підручників з хімії.

**TEXT 7**

**MATTER OF THE UNIVERSE**

**Learn the new vocabulary:**

|  |  |
| --- | --- |
| solid | твердий; тверде тіло |
| to be common knowledge | бути загальновідомим |
| for instance | наприклад |
| to melt | танути |
| to evaporate / vapor | випаровуватися / пара |
| to be liquefied | перетворюватися на рідину |
| volume | об’єм, обсяг |
| shape | форма |
| neither … nor … | ні … ні … |
| thorough knowledge | глибокі знання |
| various | різноманітні |
| to be composed (of) | складатися (з) |
| essential | важливий, необхідний |

**1. Read and translate the text:**

The fact that matter may exist in three physical states (solid, liquid and gas) is common knowledge. It is usually possible to change matter from one state to the other by changing its temperature. For instance, a piece of ice is called a solid; it may melt and form a liquid; as it evaporates, liquid water changes into a vapor, i. e. into the gaseous state.

Many kinds of matter, like water, can be obtained in each of the three states; for some, however, extraordinary means have to be used in order to produce one, or even two of the states; and for others, only two states are known or can be produced.

Common salt, for example, exists normally as a solid; at a temperature of several hundred degrees, it can be liquefied; and at still higher temperature it is converted into vapor. Carbon, a solid under normal conditions, can be vaporized, but it has never been liquefied.

Solids have both a definite volume and a definite shape. Liquids, too, have a definite volume, but they take the shape of their containers.

Gases have neither a definite shape nor a definite volume. A chemist must have a thorough knowledge of the states of matter and of physical laws that govern the behavior of matter in various states.

That all matter is composed of molecules is known to everybody. The question which must be answered, then, is: if all matter is composed of molecules, what is the essential difference between the states of matter? The answer to this question is that the essential difference between these states is the relative quantities of energy molecules possess in different states.

**2. Find in the text sentences where the author describes:**

1. the facts that are well-known;
2. examples of matter changes;
3. the necessity for a specialist to know matter transformations;
4. a question on the matter composition and the answer to it.

**3. Answer the following questions:**

1. How is it usually possible to change matter from one state to theother?
2. Can all kinds of matter be obtained in each of the three states?
3. What do solids have?
4. What characterizes gases?
5. Why should a chemist know the states of matter?

6. What other substances besides water can be obtained in the three states?

**4. Look through the text and say what information is *not* necessary to understand the topic.**

**5. Find the text English equivalents to the given Ukrainian words, word combinations and chemical terms:**

|  |  |
| --- | --- |
| 1. загальновідомо | 12. виробляти |
| 2. звичайно | 13. форма |
| 3. існувати | 14. тверде тіло |
| 4. надзвичайні засоби | 15. випаровуватися |
| 5. танути / плавитися | 16. об’єм |
| 6. градуси | 17. глибокий / ретельний |
| 7. певний | 18. як, аналогічно |
| 8. складатися (з) | 19. випарюватися |
| 9. відносна кількість | 20. вуглевод |
| 10. перетворюватися | 21. ще, все ще |
| 11. отримувати |  |

**6. Match the Ukrainian words, word combinations and chemical terms from ex. 5 with the English equivalents:**

|  |  |
| --- | --- |
| a) to obtain | l) like |
| b) common knowledge | m) usually |
| c) definite | n) carbon |
| d) relative quantity | o) to be composed of |
| e) still | p) extraordinary means |
| f) to melt | q) to vaporize |
| g) to exist | r) degree |
| h) volume | s) to convert |
| i) to evaporate | t) solid |
| j) to produce | u) shape |
| k) thorough |  |

**7. Complete the following sentences using modal verbs:**

1. Chemicals ... be used carefully in the laboratory.
2. You ... stay out of the laboratory if your teacher is not there.
3. You ... obey the laboratory rules when working there.
4. If you ... to smell any chemical, fill your lungs with air first, then sniff carefully.
5. As you ... see, many of the chemicals ... be dangerous.
6. All chemicals ... to be treated with care.
7. Ethanol and water... look alike.
8. What we ... to remember is that a substance ... be recognized by its properties.
9. How ... you tell that a substance is pure?
10. Dalton's ideas about atom ... explain many experimental observations and scientific laws.
11. Elements ... be decomposed because the atoms they are made of are indestructible.
12. The question that we ... answer at the start is: how do the atoms get electrical charges?

**TEXT 8**

**STATES OF MATTER**

**Learn the new vocabulary:**

|  |  |
| --- | --- |
| motion | рух |
| to slow down | уповільнюватися |
| to add | додавати |
| to speed up | прискорюватися |
| randomly | у довільному порядку |
| clamp together | з’єднуватися / об’єднуватися разом |
| in many ways | у багато способів |
| to decrease | зменшувати(ся) |
| to store | зберігати |
| in pattern | за моделлю, за зразком |
| dimension | напрямок |
| to be realized | реалізовуватися, утворюватися |
| to probe deeper | глибше досліджувати |

**1. Read and translate the text:**

Matter can occupy three different states — gas, liquid and solid. Changes of state depend on the motion of sub-microscopic particles. The motion of these particles depends on energy. Cooling particles takes away energy and slows them down. Heating particles adds energy and speeds them up. In a gas these particles move quickly and randomly, they have neither set volume nor shape. In a liquid the particles slow down and clamp together. We use gases, such as a natural gas, in many important ways. Cooling a gas into a liquid decreases its volume dramatically. This makes it possible to store and transport it more effectively. In a solid particles of matter have a definite volume and shape. They are held in a pattern that repeats itself in three dimensions. Crystals are highly ordered form of solid matter. They were one of the first clues to the arrangement of particles in the solid state.

The states of matter are few. But the ways in which they are realized, the number of different substances around us, are many. Let’s see an example. On breathing oxygen — the life-giver — is obviously a gas. But here is another element, sulphur that chemically very closely related to oxygen. And yet, it is obviously different: it is a solid at room temperature. Now, there are obviously different forces that work between the atoms of molecules of sulphur and oxygen within these two substances. We want to know why this is so. We have to probe deeper, we have to, then, ask: What is the nature of the atom? What is it that makes oxygen and sulphur similar or different?

**2. Work in pairs and make up a dialogue out of the text below. Act your dialogue in front of your fellow students. There are some possible situations where your dialogue could take place:**

1. Two students are discussing the lecture they've just heard.
2. A student discusses his/her paper with the supervisor.
3. At the examination the professor asks the student a few questions on the states of matter, and the student answers.

**3. You're given descriptions of ten elements of the Periodic Table. Give the names and symbols of the elements. If in the given definitions some important details are lacking, add whatever you consider necessary. Choose the elements from the list below:**

*chlorine, tin, hydrogen, zinc, copper, bromine, carbon, helium, silver, oxygen*

1. Chemically it is a reactive metal, combining with oxygen and other nonmetals and reacting with dilute acids to release hydrogen.
2. Chemically it is reactive. It combines directly with chlorine and oxygen and displaces hydrogen from dilute acids. It also dissolves in alkalis to form stannates.
3. It is a white lustrous soft metallic transition element. It is used in jewellery, tableware, etc., and its compounds are used in photography.
4. A colorless, odorless gaseous element. It is the most abundant in the Earth's crust (49.2 percent by weight) and is present in the atmosphere (28 percent).
5. A colorless, odorless gaseous chemical element. It is the lightest and the most abundant element in the universe. It is used in the Haber process.
6. This nonmetallic element is totally inert and has no known compounds. It was discovered in the solar spectrum in 1868.
7. It is a red volatile liquid at room temperature. Chemically, it is intermediate in reactivity between chlorine and iodine. The liquid is harmful to human tissues and the vapor irritates the eyes and throat.
8. It is manufactured by the electrolysis of brine and also obtained in the Downs process for making sodium. It has many applications, one of which is purification of drinking water.
9. The name of this element comes from the island of Cyprus. It is used for making electric cables and wires. Its alloys are used extensively. Water does not attack it, but in moist atmospheres it slowly forms a characteristic green surface layer (patina).
10. A nonmetallic element belonging to group IV of the Periodic Table. It has two main allotropic forms (diamond and graphite).

**4. Give your answer to the following question; add other characteristics of the element.**

*Which metal is the best conductor of heat and electricity?* Its conductivity is a standard, which means that all other metals are compared to it when it comes to measuring their conductivity of heat and. electricity. Another thing about it is that it reflects 95% of all the light reaching it, which makes it the whitest and brightest of all metals. It was the rarest and most precious metal for ancient Egyptians. It is five hundred times more expensive than iron, fifty times more expensive than copper, but is only worth one-fiftieth as much as platinum and one-twentieth as much as gold.

**5. Translate the following sentences into English:**

1. У своїй статті Менделєєв писав, що він відкрив періодичний закон.
2. Стародавні греки вважали (вірили), що речовина складається з нескінченно (infinitely) малих часток.
3. Аристотель (Aristotle) думав, що його теорія узгоджуватиметься з його загальними поглядами (general views) на природу.
4. Уже в 1789 році Лавуазьє доповів Французькій академії наук, що вода – це сполука кисню та водню.
5. У той час Прістлі не розумів, що його відкриття дуже важливе.
6. Кавендіш (Cavendish) відкрив, що вода складається з певного відсотка (proportion) кисню та водню.
7. Автори твердо переконані, що їхня робота може вплинути на розвиток хімії.
8. Ми повинні провести новий дослід, тому що необхідно (it is necessary) отримати ці речовини.
9. Ми не знали, що повинні були обрати хід реакції.
10. Доповідач (speaker) повідомив, що повинен закінчити нову серію (new series) експериментів.
11. Якоб Берцеліус (JacobBerzelius) почав свої дослідження після того, як дізнався про атомістичну теорію Дальтона (Dalton).
12. Авогадро (Avogadro) розробив нову гіпотезу до того, як були класифіковані елементи.
13. Крукс (Crookes) зміг описати декілька характеристик променів (rays).
14. Бор (Bohr) був упевнений, що теорію світла, розроблену Планком (Planc) і Ейнштейном (Einstein), можна застосувати до атома.

**TEXT 9**

**WATER**

**Learn the new vocabulary:**

|  |  |
| --- | --- |
| compound | сполука, сполучення |
| fraction | частка |
| minute droplets | дрібні краплини |
| solvent | розчинник |
| composition of water | склад води |
| to be stated | бути доведеним / установленим |
| pure / impure | чистий / нечистий |
| to purify | очищувати |
| odourless | без запаху |
| to freeze | замерзати |
| to boil | кипіти |
| pressure | тиск |
| major constituent | основна складова частина |

**1. Read and translate the text:**

Water is hydrogen oxide, a compound of hydrogen and oxygen. It can be made if hydrogen or a hydrogen-containing substance is burnt in air or oxygen.

Most of the world's water is liquid, but an important fraction is solid as ice and snow.

Many mineral substances contain water of crystallization (e. g., copper sulphate) and in the atmosphere there are millions of tons of water vapor. Clouds consist of minute droplets of water or crystals of ice.

Water dissolves a very large number of substances and is the most important solvent. It does not dissolve greasy, fatty substances or most plastics.

After they had found the composition of water, the scientists could investigate its properties. It was stated that ordinary water is impure it usually contains dissolved salts and dissolved gases, and sometimes organic matter.

For chemical work water is to be purified by distillation. Pure water is colorless, tasteless, and odorless. Rain water formed by condensation of water in the air is nearly pure water, which contains only small proportions of the dust and of dissolved gases.

After the examination of the water properties the chemists found that physical properties of water can be used to define many physical constants.

The freezing point of water (saturated with air at 1-atm pressure) is taken at 0 Сand the boiling point of water at 1 atm is taken as 100°С

The unit of volume in the metric system is chosen so that 1 ml of water at 3.98°С(the temperature of its maximum density) weighs 1,000 g/cm.

So water is one of the most important of all chemical substances. It is a major constituent of living matter and of the environment in which we live.

**2. Read and translate the following words both as nouns and verbs:**

change, state, water, mark, influence, increase, decrease, experiment, experience, comment, matter.

**3. Give Ukrainian equivalents to the following words, word combinations and chemical terms:**

*Nouns*: 1.condition, 2.current, 3.hydrogen oxide, 4.importance, 5.point of view, 6.quarter, 7.surface, 8.vapour.

*Verbs*: 9.burn, 10.cool, 11.cover, 12.heat.

*Adjectives*: 13.artificial, 14.dangerous, 15.marked, 16.strict.

*Adverbs*: 17.commonly, 18.exactly, 19.in this way.

*Conjunctions*: 20.either … or …

**4. Match the words of ex. 3 with their synonyms given below:**

1. to warm up k) water
2. usually l)   viewpoint
3. stream m) synthetic
4. steam n) to fire
5. to chill o) rigorous

f) hazardous p) to hide

g)  the 4th part of a whole q) significance

h) noted r) the outer part

i) state s) precisely

j) thus

**5. Match antonyms in *A* and *B:***

*А В*

1. the commonest a) impossible
2. like b) the most unusual
3. simple c) old
4. usually d) common
5. new e) few
6. single f) exceptionally
7. many g) to lose
8. decomposition h) natural
9. to obtain i) unlike
10. possible j) integration
11. easy k) complicated
12. dangerous 1) secure
13. artificial m) lenient
14. strict n) difficult

**6. Change the given sentences into indirect speech:**

1. The author writes: "Three-quarters of the Earth is covered in water."
2. The writer asks: "Is it possible to make water from its elements?"
3. The scientists stated: "The radiation from thorium nitrate is unsteady."
4. Rutherford remarked: "It's really very fine to see the things one has seen in imagination visibly demonstrated."
5. He said: "I have already drawn your attention to the social implications of the release of atomic energy."
6. Pauling often repeated: "I keep on the outlook for aspects that I don't understand."
7. The scholars usually asked: "What causes electrons to change orbits?"
8. They also asked: "Is the electron a wave or a particle?"

**TEXT 10**

**ATMOSPHERE**

**Learn the new vocabulary:**

|  |  |
| --- | --- |
| layer | шар |
| to cover | покривати, укривати |
| blanket | ковдра |
| thin stuff | тонка матерія, тонкий |
| to hardly know | погано знати |
| at the bottom | на дні |
| to climb / climber | підніматися, залазити / альпініст |
| sea level | рівень моря |
| exactly | точно, правильно |
| deep | глибокий |
| to mix together | змішуватися |
| spontaneously | спонтанно, довільно, стихійно |
| to escape the Earth | полишати Землю, відриватися від Землі |
| single substance | однорідна речовина |
| gradually | поступово |
| plenty of ways | багато способів |
| to put it another way | іншими словами |
| apart from | окрім |
| amount | кількість, об’єм |
| density | густина |
| to contaminate | забруднювати, псувати |
| light bulb | електрична лампочка |

**1. Read and translate the text:**

The layer covering the Earth like a blanket is called the atmosphere. It is made of very thin stuff called air. Air is so thin you hardly know it's there. But it's all around us. Really, we live at the bottom of a very deep "ocean of air".

Air gets thinner and thinner as you go up. There's enough air to breathe at the top of Mt. Everest (five miles above sea level), but getting there is hard work! Most climbers have used breathing apparatus on their way up. By the time you get to 50 miles above sea level, there's practically no air left. The air doesn't stop suddenly, however, so it's impossible to say exactly how deep the atmosphere is.

Air is not a single substance. It's made of a number of gases all mixed together. It's impossible to stop gases mixing together. They mix together spontaneously. So a gas that escapes from the Earth becomes a part of the atmosphere. Scientists believe that the atmosphere has changed a very great deal since the Earth was first formed. At first, the atmosphere may have been made up of gases like ammonia, methane, carbon dioxide and water vapor. Later, the first early forms of life developed and gradually more and more oxygen was added to the atmosphere. Nowadays the main gases in the air are oxygen and nitrogen.

You can easily perform experiments in the laboratory to find out about the air, for example, to prove that it's a mixture rather than a single substance, or find out how much oxygen there is in it. These experiments usually involve getting the oxygen to combine with another substance. In other words, to get rid of the oxygen altogether a chemical reaction is used.

There are plenty of ways to do this because oxygen is a very reactive gas. For instance, burning and rusting are two kinds of chemical change that use up oxygen.

The main gas left after removing oxygen is nitrogen. In fact, nearly all of the remainder (about four-fifths) is nitrogen. To put it another way, 78 percent of the air is nitrogen.

Apart from oxygen and nitrogen, there are only small amounts of other gases in the air. One of them is carbon dioxide. Another of the minor constituents of the air is water vapor. Ordinary air always contains some of it. The best way to show that there is water vapor in the air in the laboratory is to condense the water. This can be done by cooling the air. Altogether there's not much of either water vapor or carbon dioxide in the air, both of them are very important.

So far we've mentioned oxygen, nitrogen, carbon dioxide and water vapor. Are these the only gases in the air? The answer is "no", but it's hard to prove.

Evidence for other gases in the air came towards the end of the 19th century (a long time after oxygen and nitrogen had been sorted out). The work leading to their discovery was an investigation into the density of nitrogen.

Unlike oxygen, nitrogen is very unreactive. So it's difficult to do experiments to remove nitrogen from the air. But it's quite easy to take the oxygen, carbon dioxide and water vapor out of the air practically leaving nitrogen alone. This nitrogen might be called "atmospheric nitrogen".

The main gas that "contaminates" the atmospheric nitrogen is argon. Being a very inert gas, it's used for filling electric light bulbs.

**2. Give the answers to these questions using the text and your knowledge of chemistry:**

1. Air is not a chemical compound, is it?
2. Is air the same as atmosphere?
3. Can any chemical formula *exactly* show the proportions of oxygen and nitrogen?
4. What is the nearest simple formula of air?
5. Why can’t you know that the air is around us?
6. Why isn’t it possible to stop gases mixing together?
7. What was the atmosphere made up at first?
8. What are the main gases in the atmosphere nowadays?
9. What can you say about carbon dioxide and its importance?
10. How can you show that there is water vapour in the air?
11. Why is it difficult to make experiments for removing nitrogen from the air?
12. What do you know about argon?

**3. Change the given questions to the order of events in the text:**

1. What is air?

1. What other gases are there in the air?
2. What is atmosphere?
3. What experiments with air can one make?
4. How deep is the "ocean of air"?

**4. Look through the text and find all the definitions connected with air. Discuss these definitions with your fellow-students.**

**5. Complete the sentences using chemical terms from the list below. Some of them can't be used in the given sentences, while the others can be used several times:**

*Combustion, rusting, hydrogen, oxygen, nitrogen, ardon, inert, reactive, atmosphere, carbon dioxide, cooling, heating, remove, mixture, substance, isolate.*

1. ... is a corrosion of iron or steel to form a hydrate iron (III) oxide.
2. ... occurs in the air (78%) and is an essential constituent of proteins and nucleic acids in living organisms.
3. ... is a chemical reaction in which a ... reacts rapidly with ... producing heat and light.
4. ... is a colorless, odorless gas, soluble in water, ethanol and acetone.
5. ... occurs only in the presence of both water and ....
6. Reactions of... are often free-radical chain reactions, which can usually be summarized as the oxidation of carbon to form its oxides and the oxidation of... to form water.
7. ... is really prepared in the laboratory by the action of dilute acids on metal carbonates.
8. Though ... is essential to all forms of life, the huge amount present in the ... is not directly available to most organisms.
9. ... is the lightest element and most abundant at the universe.
10. ... is an electrochemical process in which different parts of iron surface act as electrodes in a cell reaction.
11. Flame is a luminous... of gases undergoing ....
12. ... is a by-product (супутнійпродукт) from the manufacture of lime (вапно) and from fermentation process.

**6. Match the words, word combinations and chemical terms in *A* with their synonyms in** B:

|  |  |
| --- | --- |
| **A** | **B** |
| 1. stuff | a) inert |
| 2. evidence | b) usual |
| 3. to contaminate | c) precisely |
| 4. to sort out | d) to delete |
| 5. ordinary | e) testimony |
| 6. suddenly | f) to isolate |
| 7. exactly | g) much |
| 8. spontaneously | h) matter |
| 9. plenty | i) combustion |
| 10. gradually | j) impulsively |
| 11. burning | k) to pollute |
| 12. rusting | l) corrosion |
| 13. unreactive | m) unexpectedly |
| 14. to remove | n) amalgam |
| 15. mixture | o) little by little |

**7. Translate the following text into English paying attention to the italicized parts of the sentences:**

За нормальних умов кисень є газом *без кольору та запаху*, який *складається* з двохатомних молекул. *Для отримання* кисню в лабораторних умовах застосовують декілька методів. Кисень – сильний окислювач і, *з’єднуючись* з багатьма елементами, утворює оксиди. Реакції утворення оксидів екзотермічні (exothermic), що часто призводить до загоряння елемента, який *сполучується* з киснем або того, який *утворює* це сполучення.

Кисень та його сполуки необхідні *для підтримання* життя. Вони відіграють важливу роль у процесах *обміну* речовин та *дихання*.

Озон – один із алотропів (allotrope) кисню. Це блакитний газ, що *володіє* невеликою розчинністю в воді. За низьких концентрацій він нетоксичний, але в концентраціях, які *перевищують* 100 мільйонних долів, стає токсичним.

Озон реагує з алкенами (alkene), *розщеплюючи* (to split) їхні подвійні зв’язки (bond) у процесі, *відомому* як озоноліз (ozonolysis), та *утворюючи* органічні сполуки, що називаються озонідами (ozonide).

**TEXT 11**

**REACTIONS OF OXYGEN**

**Learn the new vocabulary:**

|  |  |
| --- | --- |
| the most widely distributed | найпоширеніший |
| globe | глобус, планета Земля |
| maintenance of life | підтримання життя |
| within a few minutes | протягом декількох хвилин |
| supply of oxygen | подача / запаси кисню |
| oxidation | окислення |
| to be unaffected (by) | не зазнавати впливу |
| to liberate heat | виділяти тепло |
| combustion | горіння |
| to catch fire | загорітися |
| to ignite | запалювати, загорятися |
| kindling point | точка горіння |
| to be radiated (to) | випромінюватися / попадати (в) |
| rate of reaction | швидкість / темп реакції |

**1. Read and translate the text:**

No other element is more important to life than oxygen. It is not only the most widely distributed element on the surface of the globe, but it is absolutely necessary to the maintenance of life. To be sure, air breathing animals would die within a few minutes if the supply of oxygen in the atmosphere stopped suddenly. After we have learned the methods of oxygen's preparation, let us study its main reactions.

Combining with an element, oxygen forms a product called an oxide. The process is called oxidation. There are only a few elements which are attacked by oxygen. Among the substances which are unaffected by it we should mention inert gases.

Combinations with oxygen often liberate heat and light and this process is known as combustion. There are some elements which do not catch fire unless they are heated. Some substances will ignite even if slightly heated; others have to be heated before taking fire. The temperature at which a substance ignites is called its kindling point. Once these reactions are started, they liberate heat and light. The heat which is liberated maintains the substance at or above the kindling temperature.

The amount of heat which is liberated by very slow oxidation such as rusting of metals and the decay of wood is the same as that which is liberated by rapid combustion, but there is no rise in temperature because the heat is radiated to the surrounding air. The difference between combustion, on the one hand, and corrosion and decay, on the other, is one of the rates of reaction and temperature at which these reactions take place.

**2. State which of the following statements are true (T), false (F) or not mentioned (NM) in the text:**

1. There are many elements that are more important than oxygen.

2. Oxygen is very reactive.

3. Oxygen is a blue-colored gas.

4. The amount of heat liberated on oxidation doesn't depend on the rate of oxidation.

5. Combinations with oxygen seldom liberate heat.

6. Liquid oxygen boils at -185.5°C.

**3. Divide the text into logical parts and entitle them thus making a plan. Write out the sentences expressing the main ideas of the text.**

**4. Complete the following sentences using the words from the list below. Some of the words can be used more than once.**

*Level, layer, blanket, top, evidence, to mention, to lead, to contaminate, to isolate, nitrogen, oxygen, argon, spontaneously, gradually, to escape, atmosphere, density, bottom.*

1. … for other gases in the … came towards the end of the 19th century.

2. The work … to the discovery was an investigation into the … of … .

3. The … lying all over the Earth like a … is called the … .

4. So far we’ve … … , … , carbon dioxide and water vapour.

5. By the time you get to 50 miles above the sea … , there’s practically no air left.

6. The main gas that … the atmospheric … is … .

7. Gases mix together … .

8. So a gas that … from the Earth becomes a part of the … .

9. … more and more … is added to the … .

10. … and … were … long before the end of the 19th century.

11. We live at the … of a very deep “ocean of air”.

12. There’s enough air to breathe at the … of Mt. Everest.

**5. Translate the following sentences into English:**

1. Хімія – це наука, яка вивчає властивості, якості та будову матерії.

2. Хімія вивчає різноманітні форми матерії, а фізика має справу головним чином з природними перетвореннями й дією різних форм енергії.

3. З хімічної точки зору дощова та грунтова вода насправді не є чистими.

4. Гази не мають ні власної форми, ні об’єму.

5. Вода – це складна речовина.

6. Більшість речовин є складними за будовою та можуть ділитися, утворюючи простіші речовини.

7. Якщо речовину не можна розкласти або отримати сполученням простіших речовин, її називають елементом.

8. я знав, що ми проводитимемо дослід.

9. Він вважав, що рідина випарується швидше.

10. Будь-який елемент у поєднанні з киснем утворює оксид.

11.  Кисень може перетворюватися на рідину, яка кипить при температурі – 183° С.

12. Оскільки водень – найменший із елементів, його щільність є найменшою з усіх речовин.

13. Після закінчення досліду отримали водень.

14. Ми почали розрахунки після того, як дослідження були завершені.

15. Молекули – це найдрібніші частки, що утворюють усі види речовини.

**TEXT 12**

**ORGANIC CHEMISTRY**

**Learn the new vocabulary:**

|  |  |
| --- | --- |
| can’t help (doing smth) | не могти (не робити щось) |
| to obtain | добувати, набувати |
| living thing | живий організм |
| ordinary | звичний, звичайний |
| to convert | перетворювати |
| exception | виняток |
| man-made | штучний |
| manufacturing | виробництво |
| petroleum | нафта |
| marine | морський |
| separate | окремий |
| since | *тут*: оскільки |

**1. Read and translate the text:**

Non-chemist can't help being surprised to learn that many chemical compounds are obtained from living things. For example, sugars, ethanol, methane, urea, etc.

What all these compounds have in common are the elements carbon and hydrogen. Thus, it can be said that nearly all compounds obtained from living things are carbon compounds.

In the early days of chemistry no one ever thought of obtaining compounds from living things in the laboratory. The idea was that there were special processes going on inside the organism (living thing). The special processes were believed to be essential for the formation of the compounds. So, chemists considered the compounds from organisms to be somehow special and different from "ordinary" chemicals that could be made in the laboratory. They called chemicals from living things organic chemicals and the others inorganic chemicals.

However, in 1828 a chemist called Wohler showed organic chemicals to be just ordinary chemical substances. He did this by converting an inorganic chemical into an organic one simply by heating it in the laboratory. Gradually, more and more organic chemicals were shown to be just like ordinary chemicals. But we still use the terms "organic" and "inorganic" to divide chemicals into two classes. Nowadays, however, we use the term "organic compounds" to mean carbon compounds, there being some exceptions to the rule.

Most of the organic chemicals we have nowadays are man-made and are obtained directly from organisms. However, the main raw material for manufacturing organic chemicals is petroleum, it having been formed in the past from marine organisms.

Why do we have to separate a branch of chemistry just for carbon compounds? Couldn't its compounds be included with those of other elements?

There's a simple reason for keeping carbon compounds separate: there are just too many of them. There are more compounds of carbon than compounds of all the other elements put together. Organic chemistry is therefore to be a very large branch of chemistry. It includes millions of compounds. Most of these are compounds of carbon involving just a few other nonmetallic elements, for example, hydrogen, nitrogen, oxygen and the halogens.

Why does carbon have so many more compounds than other elements? What is special about it? The answer to these questions is: carbon atoms have the special property of being able to join together to form chains of atoms. The chains may be short, or they may be hundreds or even thousands of atoms long.

Since the carbon chain can be practically of any length, the number of possible hydrocarbons is enormous.

**2. Find in the text sentences stating that:**

1. The material for producing organic chemicals used to be found inthe sea.

2. In the past chemists didn't even think of preparing organic chemicals in the laboratory.

3. The reason for a great variety of carbon compounds is its ability of forming atom chains of different length.

4. The method of obtaining an organic chemical from an inorganic one turned out to be very simple.

5. There were some experiments proving that man-made organic compounds didn't differ much from ordinary chemicals.

**3. Answer the following questions to the text using your knowledge of chemistry or an encyclopedia as well.**

1. What is organic chemistry?
2. Why are there more organic compounds than in organic ones?

3. What is the most important source of organic compounds at the present time?

4. What sugars does the author mean?

5. Why are carbon compounds so important?

6. What was the source of organic chemicals in the past?

7. What chemical did Wohler prepare in the laboratory?

8. What else can Wohler be credited with?

9. What do you know about petroleum?

10. It's written in the text: "Nowadays, however, we use the term "organic compounds" to mean *carbon compounds,* there being some exceptions to the rule." What are the exceptions?

11. Why does carbon have so many more compounds than other elements?

12. Why is number of possible hydrocarbons enormous?

**4. Choose a word in the columns (a) or (b) that has nearly the same meaning as the italicized word:**

|  |  |  |
| --- | --- | --- |
|  | **A** | **B** |
| 1. to learn | to know | to find out |
| 2. essential | significant | fundamental |
| 3. man-made | important | artificial |
| 4. to consider | to think | to weigh |
| 5. to convert | to study | to transform |
| 6. to manufacture | to do | to produce |
| 7. to join | to combine | to associate |
| 8. separated | divisible | separated |
| 9. directly | spontaneously | immediately |
| 10. nowadays | at present | at some time |
| 11. exception | elimination | deviation |
| 12. reason | cause | intuition |
| 13. rule | law | instruction |
| 14. marine | naval | oceanic |

**5. Translate the following text into English:**

Ще на початку ХІХ століття хіміки не могли не дивуватися тому, що органічні речовини при нагріванні легко перетворюються в неорганічні. Учені того часу, які мали справу зі звичайними сполуками та користувалися звичайними методами, не могли синтезувати органічні сполуки.

1828 року німецький хімік, учень Берцеліуса, Фрідріх Веллер, шляхом нагрівання ціанату амонію (ammonium cyanate) отримав сечовину. Повторивши дослід декілька разів, Веллер зрозумів, що може перетворювати неорганічні сполуки в органічні. Він повідомив Берцеліуса про своє відкриття, і його вчитель не міг не погодитися з тим, що Веллер має рацію.

**TEXT 13**

**CARBON**

**Learn the new vocabulary:**

|  |  |
| --- | --- |
| to constitute | складати |
| relatively small amount | відносно мала кількість |
| Earth’s crust | земна кора / поверхня |
| approximately | приблизно, майже |
| aid | допомога |
| to differ | відрізнятися |
| strikingly | разюче, дуже |
| conductor | провідник |
| on the contrary | навпаки |
| transparent | прозорий |
| X-rays | рентгенівські промені |
| to enable | давати можливість |
| to share electrons | ділитися електронами / віддавати електрони |
| to be arranged | розміщуватися |
| hence | звідси, відповідно |
| giant | гігантський |
| to account (for) | пояснювати |
| to furnish bonds | забезпечувати зв’язки |

**1. Read and translate the text:**

Carbon is to be ranked along with hydrogen and oxygen as one of the most important of all the elements to man. Carbon occurs in nature as a free element and in many compounds. It constitutes only about 0.03 percent of the Earth's crust, but this relatively small amount of the element is of great importance. Its importance is indicated by the 300,000 or more compounds of the element which exist naturally or which have been prepared. It is proved that this number is approximately ten times the number of compounds of all the other elements put together.

For a long time it was believed that these compounds might have never been produced except with the aid of organic life, in other words, by living plants and animals. For this reason they were called organic compounds.

It is known that carbon occurs in two crystalline forms which differ strikingly by their properties. Graphite is black, soft, a good conductor of electricity. Diamond, on the contrary, is colorless and transparent, the hardest of known substances, a non-conductor of electricity. It is the crystal structure, as determined by X-rays, which gives an explanation of this contrast of properties. The four valence electrons of each carbon atom enable it, by sharing electrons with four of its neighbors, to be linked with them in a covalent union.

It may be shown by X-rays examination that in the diamond the four nearest neighbors of each carbon atom are symmetrically arranged about it in space. All atoms in a diamond are thus firmly linked together hence the whole crystal acts as a giant molecule. Thus we account for the extreme hardness of the diamond, its high melting point, and its failure to dissolve in any solvent.

On the other hand, it is found that graphite possesses parallel planes of atoms, and each is at a considerable distance from its neighbors. Each carbon atom in graphite has three nearest neighbors and they all are present in its own plane. Only three of the four valence electrons of each atom are needed for furnishing bonds with these nearest neighbors and the fourth is available for producing a bond with a neighboring plane. A certain portion of the electrons in graphite are relatively free to move as it is true of metals. Hence, graphite is a conductor of electricity.

**2. Read the text again, divide it into logical parts and entitle them**.

**3. Write out of the text all the sentences expressing the main idea(s) of each logical part.**

**4. Write a summary of the text in your own words using Ex. 2 and Ex. 3.**

**5. Translate the following sentences into Ukrainian:**

1. The carbon is known to cycle from the Earth into the atmosphere and back again like water.

2. The plants are eaten by animals including people who exhale carbon dioxide.

3. It was discovered that carbon dioxide is also formed by decomposition of dead animals and animal wastes by microorganisms.

4. It was estimated that much carbon is stored in the Earth’s crust in the form of fossil fuels – coal, petroleum, and natural gas – and in the form of limestone and coral.

5. Since the middle of the nineteenth century the production of carbon dioxide by combustion and decomposition of limestone has increased rapidly.

6. Destruction of tropical forests is reducing the quantity of carbon dioxide used up by photosynthesis.

7. Human activities have reached the scale where interference with the natural carbon cycle may well be significant.

8. Green plants use the sun’s energy to convert carbon dioxide into carbohydrates.

9. The carbon dioxide passes into the atmosphere and is again used for photosynthesis.

**6. Give the answers to the given questions. Use the sentences of Ex. 5 and your knowledge of chemistry.**

1. Who eats the plants?

2. What is the form of carbon in the Earth’s crust?

3. What energy is used by green plants and what do they do with it?

4. What are the ways of forming carbon dioxide?

5. How are human activities estimated now?

6. What is reducing the quantity of carbon dioxide used up by photosynthesis?

**TEXT 14**

**THE ORIGIN OF COAL**

**Learn the new vocabulary:**

|  |  |
| --- | --- |
| abundant | поширений, у великій кількості |
| to be exposed to the air | попасти під дію повітря |
| owing (to) | завдяки |
| gaseous product | газоподібний продукт |
| to be trapped | бути спійманим, заблокованим |
| failure | невдача, гандж |
| swamp / bog | болото |
| to submerge | погружатися |
| beds of dead plants | пласти перегною |
| tissue | тканина, переплетення |
| marsh gas | болотний газ |
| average value | *тут*: середня величина |
| to be expelled | бути видаленим |
| starch | крохмаль |

**1. Read and translate the text:**

Carbon compounds are very abundant in nature. All organic substances are carbon compounds, and dead animals or plant matter, once exposed to the air, decay very rapidly owing to the oxidation brought about by the agency of bacteria. The gaseous products of this process of decay escape in bacterial decomposition, and become trapped or fixed in rock. Coal and petroleum are supposed to be the result of this failure of nature's cleaning system.

When plant matter from the great prehistoric forests came submerged in swamps and bogs, the supply of air was limited, and complete oxidation was, therefore, impossible.

These beds of dead plant matter gradually became covered with deposits of sand and mud, so that the pressure above them became very great, the beds of plant tissue being pushed deeper into the hotter zones of the Earth's crust. As a result of this terrific compression, water is believed to have been pressed out of the plant remains and the chemical changes taking place resulted in the loss of hydrogen and hydrogen compounds such as methane (marsh gas).

The final result, after thousands of years, was coal: a material containing a high percentage of carbon. Different varieties of coal, dependent on the pressure involved, may be formed. The process of coal formation is generally believed as follows:

*plant matter — peat (29% C) — lignite (43% C) — bituminous coal (64% C) —anthracite (87% C).*

The percentages of carbon given above are average values from the analysis of a large number of coals, but the gradual increase in carbon content is clearly shown. If the pressure of the rock has been so great that all the hydrogen has been expelled, graphite is formed. Coal is not found, therefore, in the oldest rocks since the pressures involved would have expelled all hydrogen from the original plant tissue. The theory of the biological origin of coal may be represented by the following diagram:

*atmospheric carbon dioxide — photosynthesis — sugar — starch —cellulose — (plant tissue) — wood — coal.*

Thus, the solar energy stored by plants during the process of photosynthesis millions of years ago is liberated as heat energy in the combustion of coal today.

**2. Divide the text into logical parts, entitle them**.

**3. Write out of the text the sentences expressing the main idea(s) of each logical part.**

**4. Write a summary of the text in your own words omitting all unnecessary details.**

**5.  Translate the following sentences into English:**

1. Нагріваючись, ця сполука перетворюється в органічну речовину.

2. Після дослідження сировини вчені назвали нові елементи.

3. Дізнавшись, що пристрій працює погано, вони зупинили дослід.

4. Перед вивченням цієї теорії давайте згадаємо деякі питання із загальної хімії.

5. Ви можете допомогти мені сформулювати це правило.

6. Їм вдалося провести експеримент.

7. Замість доведення нової теорії вони з’ясували, хто має рацію.

8. Вони не могли не розуміти важливості цього доказу.

9. Цей пристрій використовують для вимірювання тиску.

10. Варто обговорити результати нашої роботи.

11. У нас є заперечення проти використання етилового спирту.

12. Реакція проходить дуже повільно й вимагає декількох годин кип’ятіння розчину.

13. Був вивчений виділений метан.

14. Використавши цю реакцію, ми отримали чотири різних речовини.

15. Після перетворення речовини, виходи (the yields) збільшилися.

16. Після завершення досліду ми почали новий експеримент.

17. З’ясовано, що застосування цієї реакції є непотрібним (unnecessary).

18. Вони, напевне, були першими, хто запропонував цей механізм реакції (reaction mechanism).

19. Вважають, що поглинання (the uptake) кисню є останньою стадією, що визначає швидкість реакції (the rate-determining step).

20. Де Бор (De Boer) визначив (reported), що густина цієї речовини дорівнює 2.5.

21. Учені вважають, що відкрили нову сполуку.

22. Фарр (Farr) вважає, що довів своє положення.

23. Було зроблено припущення (to postulate), що поверхня цього каталізатора складається з атомів кобальту (cobalt).

24. Він, звичайно, з’ясує це припущення.

**TEXT 15**

**MERCURY IN THE ENVIRONMENT**

**Learn the new vocabulary:**

|  |  |
| --- | --- |
| rare | рідкісний, рідкий |
| trace amounts | незначна кількість |
| soil | грунт, земля |
| under natural conditions | у природних умовах |
| extremely sensitive | дуже обережний, ніжний |
| to tend (to) | мати тенденцію |
| algae | водорості |
| corrosive sublimate | сулема |
| seed | зерно |
| due (to) | завдяки, через |
| wastes | відходи |
| to present a threat (to) | загрожувати |
| injurious | шкідливий |
| soluble inorganic salts | розчинні неорганічні солі |

**1. Read and translate the text:**

Mercury is known to be a rare metal. The element is found in trace amounts throughout the lithosphere (rocks and soil), the hydrosphere, the atmosphere and the biosphere (in tissues of plants and animals). In the rocks and soil mercury is found to be measured in fractions of one part per million. In the hydrosphere (the seas and fresh water) it occurs only in parts per million. In the atmosphere mercury is present both as vapor and in the form of particles.

Under natural conditions the amount of mercury in the atmosphere is so small that extremely sensitive methods are required for detecting and measuring it.

The situation is somewhat different in the biosphere. Plants and animals tend to concentrate mercury. For example, it has been found that some marine algae contain a concentration of mercury more than 100 times higher than that in the seawater in which they live.

Mercury is used on a substantial scale in chemical industries, it being used in the manufacture of paints and paper as well as in agriculture. The world production of mercury has been found to amount to about 10,000 tons per year. In agriculture mercury in the form of corrosive sublimates (HgCl2) can be used for disinfecting seeds. The chlorides of mercury are employed in protecting vegetable crops.

Due to such large-scale uses a considerable amount of mercury wastes is likely to flow into the air, the soil, the streams, rivers, lakes. One might ask whether all these may present a threat to health. In order to answer this question it is necessary to examine the forms in which mercury occurs. Liquid mercury itself is not toxic to man, but mercury vapor, however, can be injurious. It has long been known that the soluble inorganic salts are toxic. So, knowing properties and forms of mercury, it is possible to use it. Mercury being very important, it is useful to continue investigating its properties very closely.

**2. Divide the text into logical parts, entitle them**.

**3. Write a summary of the text in your own words omitting all unnecessary details.**

**4.  Translate the following sentences into English:**

1. Як мені відомо, азот і фосфор є найважливішими елементами в групі VI.

2. У лекції зазначалося, що за нормальних умов азот є газом, що складається з двоатомних молекул.

3. Відомо, що азот складає приблизно 60 відсотків усього об’єму атмосфери.

4. Ніхто не знає, що процес перетворення атмосферного азоту в формулу, яку утворюють рослини й тварини, називається фіксацією азоту.

5. Хочу додати, що цей процес є складовою частиною кругообігу азоту в природі.

6. Я десь читав, що щорічно у світі виробляють більше 100 млн. тон азоту.

7. Чи правда, що фосфор є найнеобхіднішим для життя елементом та входить до складу майже всіх організмів?

8. На мою думку, фосфор необхідний для побудови кісткової тканини та забезпечення організму енергією в процесі дихання.

9. Червоний фосфор використовують для виготовлення сірників, чи не так?

10. Варто зазначити, що фосфор входить до складу всіх мінералів, найважливішим із яких є апатит.

**5. Translate the following text into English:**

Ртуть відома зі стародавніх часів. Ртуть згадується у працях Аристотеля, Теофраста, Плінія Старшого, Вітрувія та інших давніх учених. Латинська назва цього металу “гідраргірум” означає в перекладі “срібна вода”. У величезному палаці знаменитого (famous for) своєю жорстокістю (cruelty) китайського імператора Цінь-Шіхуанді були створені цілі ріки й озера, наповнені (filledwith) чистою ртуттю. За легендою, по цих небезпечних для дихання (breathing) річках імператор пропливав із наложницями на прикрашених човнах.

Ртуть широко застосовується при виготовленні різних приладів (барометри, термометри, манометри тошо). Крім того, сполуки ртуті застосовуються в медицині.

Пари ртуті та її сполуки дуже отруйні (poisonous). З попаданням до організму людини через органи дихання, ртуть акумулюється та залишається там на все життя. Симптоми гострого отруєння проявляються через 8-24 години: починається загальна слабкість, головний біль та підвищується температура; згодом – болі в животі, розлад шлунку. Хронічне отруєння є наслідком вдихання малих концентрацій парів ртуті протягом тривалого часу. Ознаками такого отруєння є: зниження працездатності, швидка стомлюваність, послаблення пам'яті й головний біль.

**TEXT 16**

**THE AGE OF POLYMER**

**Learn the new vocabulary:**

|  |  |
| --- | --- |
| shelter | прихисток, житло |
| to supply | постачати |
| fur | хутро |
| leather | шкіра |
| resin | смола, каніфоль |
| rubber | резина, каучук |
| fragility | крихкість, слабкість |
| to defy | відмовлятися, не піддаватися |
| fibre (fiber) | волокно |
| coating | покриття, обшивка, шпаклівка |
| adhesive | клей. замазка |
| to repair | ремонтувати, лагодити |
| to be resistant to corrosion | протистояти іржі, окисленню |
| moisture | волога |
| durability | міцність, тривалість |
| to compete (with) | конкурувати, змагатися (з) |
| precipitate | осад |
| feeble efforts | незначні / слабкі спроби |
| intricacy | складність |

**1. Read and translate the text:**

Life depends fundamentally on organic polymers. If it were not so, we wouldn't have food, clothing, shelter and transportation.

Indeed, nearly all of the material needs of man could be supplied by natural organic products. The list of these materials and things made of them might be very long: wood, fur, leather, wool, cotton, silk, rubber, oils, paper, paint and so on. The organic polymers which these things are made from include: proteins, cellulose, starch, resins, and a few other classes of compounds.

But for the complexity and fragility of the molecules of the natural organic polymers they wouldn't have defied the attempts to analyze their molecular structure until very recently.

There would be no industry of man-made organic polymers, were it not for modern methods of physical and chemical analyses which uncovered the principles that govern the properties of the natural polymers. One could list the principal products such as fibers, synthetic rubbers, coatings, adhesives and a lot of materials called "plastics". Plastics and synthetic coating are already in common use. It is desirable that they should be used on a large scale, and get further developed.

Synthetic polymers now available already possess several of the properties required in a structural material. They are light in weight, easily transported, easily repaired, highly resistant to corrosion and solvents, and satisfactorily resistant to moisture. It would be necessary to add that they have long-lived durability and resistance to high temperatures. A very important question could arise over whether synthetic polymers could be made inexpensive enough to compete with the structural materials such as metals and ceramics. The answer could be —"yes".

It might seem odd that man came rather late to the investigation of organic polymers as the principal means of supporting life. The natural polymers such as proteins, cellulose and others dominated his existence and even in ancient times people used these materials.

Yet as late as the end of the 19th century polymer chemistry got little attention.

Chemists attacked sugar, glycerol, fatty acids and other ordinary organic compounds — dissolving, precipitating, crystallizing and distilling them to learn what these substances were composed of.

But only feeble efforts were made to investigate such common materials as wood, starch, wool, and silk. The substances composing these materials couldn't be crystallized from solutions, nor could they be isolated by distillation.

It was only in the 20th century that the scientists began thorough investigation of these materials. Having used some powerful physical instruments, an electron microscope, viscosimeter, X-ray diffraction apparatus, they could have revealed the polymers in all their intricacy. Their molecules were incredibly large, the molecular weights running as high as millions of units, whereas simple organic substances such as, for instance, sugar and gasoline have molecular weights in the range of only about 50-500.

Giant molecules can be composed of a large number of repeating units, they being given the name "polymer" from the Greek word *poly* (many) and *meros* (a part). Many polymers have the form of long, flexible chains. If the chemists had not found that out, they wouldn't have been able to synthesize artificial polymers. This has led to the establishment of industries producing synthetic fibers and numerous polymeric materials, many of which were less expensive and superior in various ways to the natural materials.

**2. Put the numbers of the given plan in the order of events they occur in the text:**

1. The history of polymers.

2. Natural organic products.

3. The molecules of polymers.

4. Discoveries made by modern methods.

5. The importance of organic polymers.

6. New industries of man-made organic polymers.

7. Properties of synthetic polymers.

**3. Answer the following questions:**

1. What does the life depend on?
2. Why does life depend upon organic compounds?
3. What is the list of materials needed for life?
4. What do organic polymers include?

5.  What have modern methods of physical and chemical analyses uncovered?

1. What products appeared on the basis of the discovery of polymers?
2. What properties do synthetic polymers possess?
3. Did people use natural polymers in ancient times?
4. What were those polymers?
5. What is the origin of the word “polymer”?
6. Give examples of the polymers we eat.

**4. Give chemical terms to the following definitions:**

1. Any of large group of organic compounds found in all living organisms.
2. A synthetic or naturally occurring polymer used in making plastics.
3. A polysaccharide that consists of a long unbranched chain of glucose units.
4. A liquid that dissolves another substance or substances to form a solution.
5. A process of boiling a liquid and condensing and collecting a vapor.
6. A suspension of small particles produced in a liquid by chemical reaction.
7. A homogeneous mixture of a liquid with a gas or solid.

**5. Translate the following sentences into Ukrainian:**

1. It is necessary that this substance should be analyzed under suitable conditions.

2. If they used these materials, the cost of production would not be expensive.

3. Everybody should know that our scientists developed methods of obtaining strong and cheap glass fiber.

4. If you use such fibers, the material will be durable.

5. Had they known about this new discovery earlier, they would have applied the method in their investigation.

6. Were I in your place, I should investigate the properties of these synthetic materials before using them.

7. The professor insisted that I (should) take part in the conference.

8. It is desirable that a chemist (should) know the structure of a polymer.

9. Unless synthetic polymers possessed such valuable properties, they would not be so important for industry.

**TEXT 17**

**PLASTICS**

**Learn the new vocabulary:**

|  |  |
| --- | --- |
| but for … | якби не … |
| thread | нитка |
| moulded objects | формові / ливарні предмети |
| ancestor | предок |
| disadvantage | недолік |
| flammability | загоряння |
| desired shape | бажана / необхідна форма |
| rigidity | твердість, жорсткість |
| binder | зв’язувальна речовина |
| abrasion | стирання, зношування |
| flour | борошно, клейстер |
| to cast | кидати |

**1. Read and translate the text:**

But for plastics man wouldn't have had an endless variety of products such as threads, sheets, tubes, moulded objects, etc. It is known that plastics are organic substances which are made synthetically by polymerization.

The ancestor of synthetic plastics is celluloid. If the properties of celluloid had been perfect, it could have been the basis for a new industry. But celluloid has certain disadvantage — its flammability. More than that, it is necessary that the material of this kind be readily moulded, which was not the case with celluloid. Thus it was not until the discovery of bakelite in 1907 that the real foundation of the synthetic plastics industry was laid.

Plastics consisting of long-chain molecules, they can be softened by heat and moulded into a desired shape. It is known that these plastics are thermoplastic. Plastics having cross-linked polymeric chains are of much greater rigidity and cannot be softened. They are called thermosetting. It is essential that the terms thermoplastic and thermosetting be also applied to the resins from which plastics are made, the resin being the principal agent incorporated in plastics. It may be natural, like cellulose, but it is most generally synthetic. It is also known that the resin is a binder.

There are some other substances added to the plastics without which it would not be possible to synthesize these wonderful materials. Because it is necessary that plastics should enhance such properties as hardness, resistance to shock, or resistance to abrasion, filters are added; examples of filters are: asbestos, glass fibres, and wood flour. It is required that plasticizers be also included in the formulation. Hadn't antioxidants been added, chemical stability and long life of plastics wouldn't have been possible. It was suggested that catalysts should be added to assist the final cure (final formation of the product). Furthermore, if it were not for stabilizers, plastics would not be protected against sunlight, heat and other destructive factors.

The procedure which is used to shape plastics into a final form depends on their properties. Some plastics may be injection moulded. Other plastics must be compression moulded. It means that after they are filled into the mould they must be subjected to pressure. Certain plastics are simply cast into their final shape.

**2. Divide the text into logical parts, entitle them**.

**3. Write out of the text the sentences expressing the main idea(s) of each logical part.**

**4. Give an oral summary of the text in your own words omitting all unnecessary details.**

**5. Give your own conclusion to the text.**

**6. Translate the following text into English.**

Каучук (caotchouc) існує так довго, як і сама природа. Знайдені закам’янілі залишки каучуконосних дерев мають вік близько трьох мільйонів років.

Перше знайомство європейців із натуральним каучуком відбулося п’ять століть тому, а в США речі з каучуку набули популярності в 1830-х роках, гумові (rubber) пляшки й взуття, виготовлені південноамериканськими індіанцями, продавалися у великих кількостях.

1839 року американський винахідник Чарльз Гудьєр (Charles Goodyear) дослідив, що нагрівання каучуку з сіркою усуває його неприємні властивості. Він поклав на піч шматок накритої каучуком тканини, на яку було нанесено шар сірки. За деякий час він побачив шкірястий матеріал – гуму. Цей процес було названо вулканізацією.

Відкриття гуми привело до широкого її застосування: до 1919 року випустили на ринок більше 40 000 різноманітних виробів із гуми.

**TEXT 18**

**STRATOSPHERIC OZONE**

**Learn the new vocabulary:**

|  |  |
| --- | --- |
| chlorine | хлор |
| to be spilled | виливатися, розливатися |
| to emit | випускати, випромінювати |
| to prevent | попереджати, запобігати |
| to contrive | вигадувати, винаходити |
| eventually | зрештою |
| to absorb ultraviolet sunlight | поглинати ультрафіолетове проміння |
| disturbing change | хвилюючі зміни |
| to occur | ставатися |
| emission | виділення, поширення |
| to penetrate | проникати |
| decade | десятиліття |

**1. Read and translate the text:**

Ordinarily there is very little chlorine in the stratosphere. Chlorine gas is sometimes spilled in industrial or shipping accidents, but this gas reacts strongly with almost any water-drop or particle it touches and, as a result, is used up long before it can diffuse upward. Ocean waves throw up small droplets of salty water, some of which evaporate, leaving salt particles in the air. Although these particles contain chlorine, the chance that one of them will get as high in the atmosphere as the ozone layer is small, since salt is very soluble and these particles are readily washed out of the air by the rain. Some biological systems emit methyl chloride, a gas that contains chlorine. But this gas reacts fairly rapidly with other substances, and most of it disappears before it can diffuse to the stratosphere. Thus, strong barriers prevent chlorine from reaching high in the atmosphere, unless people contrive to put it there.

Damage to the layer of ozone in the high atmosphere by human activity is complex, esoteric, and completely invisible to anyone but the scientists who are studying the issue. Yet, around the world, people who twenty years ago had never heard the word *ozone* are now worried about its disappearance.

Two of these substances, CFC-11 and CFC-12, have proved so valuable in a number of applications that more than 20 million tons have been manufactured worldwide. Most of these 20 million tons still exist and either escaped to the atmosphere or eventually will. Once in the air, these substances mix and diffuse, finally reaching all parts of the atmosphere. Those CFC molecules that find themselves in the stratosphere are subjected to intense ultraviolet radiation from the Sun; they split apart into smaller fragments, releasing chlorine. The chlorine then starts a new career as a catalyst in the reactions that destroy ozone.

Ozone plays an important role in the high atmosphere in addition to screening out UV-B. By absorbing ultraviolet sunlight, ozone deposits the heat associated with this light into that level of the atmosphere, thus creating a layer much warmer than those immediately below. The stable region so created is the stratosphere. It is in this stable layer that disturbing changes are occurring. As scientists' understanding of the chemical reactions that create and destroy ozone increased, it became clear that relatively small quantities of some substances could change these reactions and hence the amount of ozone in the stratosphere, provided those substances were placed in the high atmosphere. And chlorine, an effective chemical catalyst that can change ozone into normal oxygen, is appearing in rapidly increasing concentrations in the atmosphere.

If we did wish, for some reason, for chlorine at the Earth's surface to move into the atmosphere, we would have to arrange for the emission at the surface of the Earth of a chlorine-containing gas. We would, in addition, have to find a chlorine-containing gas that did not react readily with anything, one that was not very soluble, and one that, upon reaching the stratosphere, could be broken down to release free chlorine only by the action of strong ultraviolet light. (If it were broken down too soon, by sunlight that penetrates low into the atmosphere, the free chlorine would react with something and be removed). The described properties would also make the gas extremely useful here at the surface of the Earth, and people have worked hard to create such a substance.

Laboratory scientists created such substances decades ago. They are called chlorofluorocarbons, indicating that they contain carbon, fluorine, chlorine, and sometimes hydrogen. The name is frequently abbreviated to CFC, and a numbering scheme is used to tell how much of each element is in the molecule of the particular CFC under discussion. CFC-12, for example, has one atom of carbon, no atoms of hydrogen, two atoms of fluorine (and, by implication, two atoms of chlorine) in each molecule.

**2. Entitle each paragraph so as to make a plan and write down the sentence(s) that express the main idea(s) of each paragraph.**

**3. Write a summary of the text in your own words using the plan and the sentences you've written out. Omit all unnecessary details.**

**4. Make up 10 special questions to the text.**

1. **Translate the following text into English:**

Хлор – досить поширений елемент. Він становить 0,04% маси земної кори. У вільному стані в природі він не зустрічається, оскільки в хімічному відношенні хлор дуже активний. Найбільш поширеною природною сполукою хлору є хлорид натрію NaCl, величезні кількості якого розчинені у воді морів, океанів і деяких озер. У багатьох місцях хлорид натрію у вигляді мінералу галіту або кам'яної солі (rocksalt) утворює потужні поклади (deposits).

Вперше хлор був отриманий у 1772 шведським хіміком К. Шеєле. Учений описав виділення хлору при взаємодії з соляною кислотою у своєму трактаті (treatise). Шеєле відзначив запах хлору, схожий із запахом царської води, його здатність взаємодіяти з золотом, а також його відбілюючі властивості. Однак Шеєле, відповідно до пануючої тоді в хімії теорії, припустив (tosuppose), що хлор є оксидом соляної кислоти (hydrochloric acid).

Бертолле та Лавуазьє припустили, що хлор є оксидом елемента *мурія*, однак спроби його виділення залишалися марними аж до часу робіт Деві, якому електролізом вдалося розкласти кухонну сіль на натрій і хлор.

**ТЕХТ 19**

**PETROLEUM**

**Learn the new vocabulary:**

|  |  |
| --- | --- |
| residual | залишковий |
| lubricating | змащувальний |
| crude | сирий, необроблений |
| to secure | одержувати, добувати |
| to pump | качати, викачувати |
| well | свердловина, шахта |
| opaque | непрозорий |
| impurities | домішки, бруд |
| minute quantity | незначна кількість |
| joining | з’єднання |
| to upgrade | покращувати, вдосконалювати |
| rating | норма, частка |

**1. Read and translate the text:**

Petroleum products, such as gasoline, kerosene, home heating oil, residual fuel oil, and lubricating oils, come from one source — crude oil found below the Earth's surface, as well as under large bodies of water, from a few hundred feet below the surface to as deep as 25,000 feet into the Earth's interior. Sometimes crude oil is secured by drilling a hole through the Earth, but more dry holes are drilled than those producing oil. Pressure at the source or pumping forces crude oil to the surface.

Crude oil wells flow at varying rates, from ten to thousands of barrels per hour. Petroleum products are always measured in 42-gallon barrels.

Petroleum products vary in physical appearance: thin, thick, transparent or opaque, but regardless, their chemical composition is made up of only two elements: carbon and hydrogen, which form compounds called hydrocarbons. Other chemical elements found in union with hydrocarbons are few and are classified as impurities. Trace elements are also found, but these are such minute quantities that they are disregarded. The combination of carbon and hydrogen forms many thousands of compounds which are possible because of the various positions and joining of these two atoms in the hydrocarbon molecule.

The various petroleum products are refined from the crude oil by heating and condensing the vapors. These products are the so-called light oils, such as gasoline, kerosene, and distillate oil. The residue remaining after the light oils are distilled is known as heavy or residual fuel oil and is used mostly for burning under boilers. Additional complicated refining processes rearrange the chemical structure of the hydrocarbons to produce other products, some of which are used to upgrade and increase the octane rating of various types of gasoline.

**2. Which of the following is not true?**

1. Crude oil is found below land and water;
2. Crude oil is always found a few hundred feet below the surface;
3. Pumping and pressure force crude oil to the surface;
4. A variety of petroleum products is obtained from crude oil.

**3. Many thousands of hydrocarbons compounds are possible because...**

1. The petroleum products vary greatly in physical appearance;
2. Complicated refining processes rearrange the chemical structure;
3. The two atoms in the molecule assume many positions;

d) The pressure needed to force oil to the surface causes molecular transformation.

**4. Which of the following is true?**

1. The various petroleum products are produced by filtration;
2. Heating and condensation produce the various products;
3. Chemical separation is used to produce the various products;

d) Mechanical means such as the centrifuge are used to produce the various products.

**5. Crude oil is brought to the surface by…**

1. Expansion of hydrocarbons;
2. Pressure and pumping;
3. Vacuum created in the drilling pipe;
4. Expansion and contraction of the Earth's surface.

**6. Which of the following is not listed as a light oil?**

a) distillate oil c) lubricating oil

b) gasoline d) kerosene

**7. Translate the text into English:**

Бензи́н — природна або штучно одержана суміш вуглеводнів (hydrocarbon) різної будови, які киплять (to boil) найчастіше між 40°C і 205°C. Бензин — рухлива (active), горюча (combustible) здебільшого безколірна рідина з характерним (typical) запахом, легко випаровується, утворює з повітрям у певних концентраціях вибухові (explosive) суміші. Більшість бензинів замерзає при температурі нижче -60°C. Близько 90 % бензинів добувають з нафти.

Бензин використовують як моторне паливо, розчинник для жирів, каучуку, смол (resin), у медицині тощо. Пара (vapour) його отруйна, тому під час роботи в приміщеннях, де є пара бензинів, треба вживати запобіжних (protective) заходів.

**8. Translate the following sentences into Ukrainian:**

1. Petroleum products are useful materials derived from crude oil

2. Gasoline (US) or petrol (UK) is a petroleum-derived liquid mixture which is used as a fuel in engines.

3. Gasoline is also used as a solvent, mainly known for its ability to dilute paints.

4. According to crude oil composition and demand, refineries can produce different shares of petroleum products.

5. Refineries also produce other chemicals, some of which are used in chemical processes to produce plastics and other useful materials.

**TEXT 20**

**BIOSPHERE**

**Learn the new vocabulary:**

|  |  |
| --- | --- |
| to include | охоплювати, включати |
| to capture | захоплювати, привертати |
| core concept | основна ідея (поняття) |
| cycling | цикл, кругообіг |
| totality of biodiversity | повне біологічне різноманіття |
| decomposition | розпад, гниття |
| new approach | новий підхід |
| to exceed | перевищувати, перевершувати |
| to precede | передувати, бути попереду |
| envelope / to envelope | оболонка / огортати |
| to undergo | зазнавати, переносити |

**1. Read and translate the following text:**

The **biosphere** is the biological component of earth systems, which also include the lithosphere, hydrosphere, atmosphere and other "spheres" (e.g. cryosphere, anthrosphere, etc.). The biosphere includes all living organisms on earth, together with the dead organic matter produced by them.

The biosphere is dynamic, undergoing strong seasonal cycles in primary productivity and the many biological processes driven by the energy captured by photosynthesis.

The biosphere concept is common to many scientific disciplines including astronomy, geophysics, geology, hydrology, biogeography and evolution, and is a core concept in ecology, earth science and physical geography. A key component of earth systems, the biosphere interacts with and exchanges matter and energy with the other spheres, helping to drive the global biogeochemical cycling of carbon, nitrogen, phosphorus, sulfur and other elements. From an ecological point of view, the biosphere is the "global ecosystem", comprising the totality of biodiversity on earth and performing all manner of biological functions, including photosynthesis, respiration, decomposition, nitrogen fixation and denitrification.

The idea of the biosphere was introduced into science almost century ago by the Austrian geologist Eduard Suess, who was the first to use the term in a discussion of the various envelopes of the Earth in his book published in 1875. The concept played little part in scientific thought until the publication in 1926 of two lectures by the Russia mineralogist Vladimir Ivanovich Vernadsky. It is essentially Vernadsky's concept that we use today.

The necessity to quite a new approach to the biosphere was realized by Vernadsky as early as the mid-forties. According to him man has become a geological and biological factor by far exceeding everything that preceded him throughout evolution, the rate of his intervention in nature steadily increasing.

Yet it was with optimism that he looked ahead when he wrote: "I think we undergo not only a historical but also a planetary change as well. We live in a transition to the noosphere." By "noosphere" Vernadsky meant the envelope of mind that was to supersede the biosphere, the envelope of life.

**2. Divide the text into logical parts, entitle them**.

**3. Write out of the text the sentences expressing the main idea(s) of each logical part.**

**4. Give an oral summary of the text in your own words omitting all unnecessary details.**

**5. Give your own conclusion to the text.**

**6. Translate the following sentences and text extracts into English:**

1. The biosphere has evolved since the first single-celled organisms originated 3.5 billion years ago under atmospheric conditions resembling those of our neighboring planets Mars and Venus, which have atmospheres composed primarily of carbon dioxide.

2. Free oxygen, both for breathing (O2) and in the stratospheric ozone (O3) that protects us from harmful UV radiation, has made possible life as we know it while transforming the chemistry of earth systems forever. As a result of long-term interactions between the biosphere and the other earth systems, there is almost no part of the earth's surface that has not been profoundly altered by living organisms.

3. The biosphere is the relatively thin life-supporting stratum of the earth's surface, extending from a few miles into the atmosphere to the deep-sea vents of the oceans.

4. Water is not the only substance that circulates through the various earth systems. So, too, do six other substances or, rather, chemical elements. These elements are composed of a single type of atom, meaning that they cannot be broken down chemically to make a simpler substance, as is the case with such compounds as water. The six elements that cycle throughout Earth's systems are hydrogen, oxygen, carbon, nitrogen, phosphorus, and sulfur.

**THE LIST OF CHEMICAL ELEMENTS**

|  |  |  |
| --- | --- | --- |
| Ag | argentum = silver | срібло |
| Al | aluminium | алюміній |
| Ar | argon | аргон |
| As | arsenic | арсен, миш’як |
| Au | aurum | золото |
| В | boron | бор |
| Ba | barium | барій |
| Be | beryllium | берилій |
| Bi | bismuth | вісмут |
| Br | bromine | бром |
| С | carbon | вуглець |
| Ca | calcium | кальцій |
| Се | cerium | церій |
| Cd | cadmium | кадмій |
| CI | chlorine | хлор |
| Cr | chromium | хром |
| Cs | caesium | цезій |
| Cu | copper | мідь |
| F | fluorine | фтор |
| Fe | ferrum | залізо |
| Ga | gallium | галій |
| Ge | germanium | германій |
| H | hydrogen | водень |
| He | helium | гелій |
| Hg | hydrargyrum / mercury | ртуть |
| I | iodine | йод |
| Ir | iridium | іридій |
| К | kalium / potassium | калій |
| Li | lithium | літій |
| Mg | magnesium | магній |
| Mn | manganese | марганець |
| Mo | molybdenum | молібден |
| N | nitrogen | азот |
| Na | natrium / sodium | натрій |
| Ne | neon | неон |
| Ni | nickel | нікель |
| О | oxygen | кисень |
| P | phosphorus | фосфор |
| Pb | plumbum /lead | свинець |
| Pt | platinum | платина |
| Pu | plutonium | плутоній |
| Ra | radium | радій |
| Rb | rubidium | рубідій |
| S | sulphur | сірка |
| Sb | antimony | сурма |
| Sc | scandium | скандій |
| Se | selenium | селен |
| Si | silicone | кремній |
| Sn | stannum /tin | олово |
| Sr | strontium | стронцій |
| Те | tellurium | телур |
| Th | thorium | торій |
| Ti | titanium | титан |
| U | uranium | уран |
| W | wolfram /tungsten | вольфрам |
| Zn | zinc | цинк |
| Zr | zirconium | цирконій |

**WINE PRODUCTION**

**TEXT 1**

**1. Read the text, translate it with the help of the notes given after the text.**

**WINE**

Wine is an [**alcoholic beverage**](http://en.wikipedia.org/wiki/Alcoholic_beverage) made from the [**fermentation**](http://en.wikipedia.org/wiki/Fermentation_%28wine%29) of [grape](http://en.wikipedia.org/wiki/Grape) juice. The natural chemical balance of grapes is such that they can ferment without the addition of sugars, acids, enzymes or other nutrients. Although other fruits such as apples and berries can also be fermented, the resultant "wines" are normally named after the fruit from which they are produced (for example, [apple wine](http://en.wikipedia.org/wiki/Apfelwein) or [elderberry wine](http://en.wikipedia.org/wiki/Elderberry_wine)) and are generically known as *fruit* or [*country wine*](http://en.wikipedia.org/wiki/Country_wine). Others, such as [barley wine](http://en.wikipedia.org/wiki/Barley_wine) and [rice wine](http://en.wikipedia.org/wiki/Rice_wine) (e.g. [sake](http://en.wikipedia.org/wiki/Sake)), are made from **starch**-based materials and resemble [beer](http://en.wikipedia.org/wiki/Beer) more than wine, while [ginger wine](http://en.wikipedia.org/wiki/Ginger_wine) is [**fortified**](http://en.wikipedia.org/wiki/Fortified_wine) with brandy. In these cases, the use of the term "wine" is a reference to the higher alcohol content, rather than production process. The commercial use of the [English](http://en.wikipedia.org/wiki/England) word "wine" (and its equivalent in other languages) is protected by law in many jurisdictions. Wine is produced by fermenting **crushed** grapes using various types of [**yeast**](http://en.wikipedia.org/wiki/Yeast) which consume the sugars found in the grapes and **convert** them into [alcohol](http://en.wikipedia.org/wiki/Ethanol). Various varieties of grapes and strains of yeasts are used depending on the types of wine produced.

Wine stems from an extended and rich history dating back about 8,000 years and is thought to have originated in present day [Georgia](http://en.wikipedia.org/wiki/Georgia_%28country%29) or [Iran](http://en.wikipedia.org/wiki/Iran). Wine is thought to have appeared in [Europe](http://en.wikipedia.org/wiki/Europe) about 6,500 years ago in present-day [Bulgaria](http://en.wikipedia.org/wiki/Bulgaria) and [Greece](http://en.wikipedia.org/wiki/Greece) and was very common in classical Greece, [Thrace](http://en.wikipedia.org/wiki/Thrace) and [Rome](http://en.wikipedia.org/wiki/Ancient_Rome_and_wine). Wine has also played an important role in religion since ancient times. The [Greek](http://en.wikipedia.org/wiki/Ancient_Greek_Religion) God [Dionysos](http://en.wikipedia.org/wiki/Dionysos) and the [Roman](http://en.wikipedia.org/wiki/Roman_Religion) God [Bacchus](http://en.wikipedia.org/wiki/Dionysus) represented wine. Wine has also played an important role in religious ceremonies of [Christianity](http://en.wikipedia.org/wiki/Christianity) and [Judaism](http://en.wikipedia.org/wiki/Judaism).

**Notes**

alcoholic beverage – *алкогольний напій*

fermentation – *бродіння*

starch – *крохмаль*

to fortify – *зміцнювати, посилювати, підкріплювати*

to crush – *розчавити, роздушувати; тут розчавлений*

yeast – *дріжджі; закваска*

to convert – *перетворювати*

**2. Find equivalents.**

|  |  |
| --- | --- |
| 1. алкогольний напій 2. додавання цукру, кислоти 3. яблучне вино 4. чавлений виноград 5. природній хімічний баланс 6. бродіння виноградного соку 7. різні види дріжджів | * 1. fermentation of grape juice   2. addition of sugar, acids   3. crushed grapes   4. alcoholic beverage   5. natural chemical balance   6. various types of yeast   7. apple wine |

**3. Translate the expressions given in brackets.**

1. Wine is produced by (давлений виноград, що бродить) using (різні види дріжджів) which consume the sugar found on the grapes and (перетворюють) them into alcohol.
2. Wine stems from (багата історія, що датується) back about 8,000 years and is thought to have originated in (сучасна Грузія або Іран).
3. (Грецький бог Діоніс та римський бог Бахус) represented wine.
4. Wine has also played an important role in (релігійні церемонії).

**4. Give written answers to the questions.**

1. How is wine produced?
2. What year does wine date back?
3. Where is wine used?
4. How is the commercial use of wine protected?
5. What is wine?
6. When did wine appear in Europe?

**5. Retell the text.**

**TEXT 2**

**1. Read the text, translate it with the help of the notes given after the text.**

**HISTORY OF WINE**

Archaeological evidence suggests that the earliest wine production came from **sites** in Georgia and Iran, dating from 6000 to 5000 BC.

The very oldest known evidence suggesting wine production in Europe and second oldest in the world comes from archaeological sites in Greece and is dated to 6,500 years ago. The same archaeological sites in Greece also contain remnants of the world’s earliest evidence of crushed grapes. In Egypt, wine became a part of recorded history, playing an important role in ancient ceremonial life. Traces of wine were also found in China, dating from the second and first millennium BC.

In medieval Europe, the Roman Catholic Church was a staunch supporter of wine which was necessary for the celebration of Mass. In places such as Germany, beer was banned and considered pagan and barbaric while wine consumption was viewed as civilized and a sign of conversion.

Wine was also forbidden in the Islamic civilization, but after Geber and other Muslim chemists pioneered the distillation of wine, it was used for other purposes, including cosmetic and medical uses. In fact the 10th century Persian philosopher and scientist Al Biruni described recipes where herbs, minerals and even gemstones are mixed with wine for medical purposes. Wine was so revered and its effect so feared that elaborate theories were developed about which gemstone-cups would best counteract its negative side effects.

**Notes**

|  |  |
| --- | --- |
| site –*тут*: *місцевість*  remnant – *залишок, рештка (їжі)*  trace – *слід*  astaunchsupporter – *відданийприхильник*  [pagan](http://en.wikipedia.org/wiki/Paganism) – *язичницький* |  |

barbaric – *варварський, дикий, грубий*

herb – *трава, рослина (лікарська)*

gemstone – *коштовний камінь*

torevere – *поважати, шанувати*

counteract – *протидіяти, нейтралізувати*

**2. Дайте письмові відповіді на запитання:**

1. When does the earliest production of wine come from?
2. Who has a staunch supporter of wine in medieval Europe?
3. What drink was banned in Germany?
4. Where was wine forbidden?
5. Who pioneered the distillation of wine?
6. What other purpose was wine used for?

**3. Find equivalents in the text.**

Археологічний доказ, найдавніше виробництво вина, датуватись, давлений виноград, прадавнє церемоніальне життя, середньовічна Європа, відданий прихильник, забороняти, споживання вина, косметичне та медичне використання, негативні побічні ефекти.

**4. Translate the following sentences into English.**

1. Він запросив її в ресторан і вони розпили пляшку грузинського вина.
2. Неповнолітнім забороняється купувати і розпивати алкогольні напої в громадських місцях.
3. Виноградні кісточки широко використовуються в косметології для омолодження шкіри.
4. Споживання вина значно збільшилось за останні роки завдяки його значному зниженню цін.

**5. Retell the text.**

**TEXT 3**

**1. Read the text, translate it with the help of the notes given after the text.**

**CLASSIFICATION OF WINE**

Regulations govern the classification and sale of wine in various regions of the world. France has an appellation system which ranges from Vin de Table ("table wine"), through [Vin de Pays](http://en.wikipedia.org/wiki/Vin_de_Pays) and [Vin Délimité de Qualité Supérieure](http://en.wikipedia.org/wiki/Vin_D%C3%A9limit%C3%A9_de_Qualit%C3%A9_Sup%C3%A9rieure) (VDQS) up to [Appellation d'Origine Contrôlée](http://en.wikipedia.org/wiki/Appellation_d%27Origine_Contr%C3%B4l%C3%A9e) (AOC) and which is based on the concept of terroir (or region of origin) and wine quality. Like France, Portugal also has a governmental classification based on the region of the grapes and the quality of the wine. Portugal is pioneer in the creation of the DOC ("Denominação de Origem Controlada" or AOC in Portuguese) by creating the Demarcated Douro Region and a system regulating its wine production and trade, by a royal charter in 1756.Germany developed a similar system in 2002though this has not yet developed the authority of the French system. Spain and Italy also have a classification which is based on a dual system of region of origin and quality of product. [New World wine](http://en.wikipedia.org/wiki/New_World_wine), that is wines from outside of the traditional wine growing regions of Europe, tend to be classified by grape rather than by quality or region of origin, though there have been attempts to classify by quality, most successfully by Langton's.

Wines are usually named either by their grape variety or by their place of production. Generally speaking, European wines are named both after the place of production (e.g. Bordeaux, [Rioja](http://en.wikipedia.org/wiki/Rioja_%28wine%29), [Chianti](http://en.wikipedia.org/wiki/Chianti), [Cotnari](http://en.wikipedia.org/wiki/Cotnari)) and the grapes used (e.g. [Pinot](http://en.wikipedia.org/wiki/Pinot_noir), [Riesling](http://en.wikipedia.org/wiki/Riesling), Chardonnay, Merlot). Wines from everywhere except Europe are generally named for the grape variety. More and more, however, market recognition of particular regions and wineries is leading to their increased prominence on non-European wine labels. Examples of recognized locales include: Margaret River, [Napa Valley](http://en.wikipedia.org/wiki/Napa_Valley_AVA), [Barossa Valley](http://en.wikipedia.org/wiki/Barossa_Valley), [Willamette Valley](http://en.wikipedia.org/wiki/Willamette_Valley), [Cafayate](http://en.wikipedia.org/wiki/Cafayate), [Marlborough](http://en.wikipedia.org/wiki/Marlborough%2C_New_Zealand), [Walla Walla](http://en.wikipedia.org/wiki/Walla_Walla_County%2C_Washington), [Douro](http://en.wikipedia.org/wiki/Porto), [Rioja](http://en.wikipedia.org/wiki/Rioja) etc.

Some blended wine names are marketing terms, and the use of these names is governed by [trademark](http://en.wikipedia.org/wiki/Trademark) or [copyright law](http://en.wikipedia.org/wiki/Copyright_law), rather than a specific wine law or a patent on the actual varietal blend or process used to achieve it.

**Notes**

regulation – *правило, статут, інструкція*

appellation – *ім'я, назва*

dual – *подвійний*

governmental – *урядовий*

a royal charter – *королівська хартія*

winery – *винний завод*

**2. Match the phrases in two columns.**

|  |  |
| --- | --- |
| 1. 1. класифікація та продаж вина 2. 2. світові райони 3. 3. варіюватись 4. 4. першовідкривач 5. 5. королівська хартія 6. 6. називати за 7. 7. торгівельна марка 8. 8. якість вина | 1. *a*. regions of the world 2. *b*. wine quality 3. *c.* pioneer in creation 4. *d*. to name by 5. *e*. to range 6. *f*. classification and sale of wine 7. *g*. royal charter 8. *h*. trademark |

**3. Choose the right variant among the words given in brackets.**

1. Regulations govern the (classification and sale, development and distribution, marketing a consumption) of wine in various regions of the world.

2. Portugal also has a governmental classification based on (production of wine, the region of the grapes, selling of grapes) and the quality of the wine.

3. Wines are usually named either by their (tomato, cherry, grape) variety and by their place of (distribution, production, stealing).

4. The use of the names of some blended wine is governed by (public, trademark, Parliament).

**4. Answer the questions. Do it in pen.**

1. What governs the classification and sale of wine?

2. What is Portugal pioneer in?

3. How are wines usually named?

4. How is the use of wine marketing terms governed?

**5. Retell the text.**

**TEXT 4**

**1. Read the text, translate it with the help of the notes given after the text.**

**FRENCH WINE**

France is the greatest wine-producing area in the world, both in quantity and quality, and has developed superfine natural still wines and the finest sparkling wine – champagne. The department of Bordeaux **furnishes** red wine known as **claret** and white wine, both dry except for sauterne. The best-known Bordeaux wines are Medoc (red), classified and known by the vineyard names, as Chateau Lafite, Chateau Margaux, Chateau Latour; graves (red or white); sauterne (white), sweet, made from overripe grapes and including the noted Chateau d'Yquem; and St. Emilion-Pomerol. Burgundy wines, red and white, have more body than the Bordeaux. Connoisseurs prize the Burgundies of the Cote d'Or, especially the white Montrachet, and red Clos Vougeot and Romance. The Chablis area produces fine, white Burgundy. Good wines are made in the Loire valley (Vouvray), the Rhone valley (Hermitage), Alsace, and the Jura mountains. A great quantity of ordinary wine is produced in South France, much of it made into vermouth, **distilled** into brandy, or used for **blending.**

**Notes**

|  |  |
| --- | --- |
| to furnish – *постачати*  to distil – *дистилювати, очищати*  connoisseur – *знавець*  blending – *змішування*  claret – *червоне вино бордо*  vineyard – *виноградник*  sauterne – *сотерн*  body – *міцність*  superfine – *вищого ґатунку*  except – *крім* |  |

still – *неігрісте, негазоване*

**2. Find equivalents in the text.**

Найбільший виробник вина, кількість / якість, негазоване натуральне вино вищого ґатунку, ігристе вино, постачати червоне вино, сухе вино, відомі за назвами виноградників, перестиглий виноград, міцність вина, знавці вина, велика кількість ординарного вина, дистилювати у бренді, використовувати для змішування.

**3. Finish the following sentences.**

1. France is the greatest … .
2. France has developed superfine natural still wines and … .
3. Burgundy wines, red and white, have more … .
4. Connoisseurs prize … .
5. Good wines are made in … .
6. A great quantity of ordinary wine is produced in South France, much of it made into … .

**4. Answer the following questions. Do it in pen.**

1. Where is the greatest wine-producing area in the world?
2. What wine does the department of Bordeaux furnish?
3. What are the best-known Bordeaux wines?
4. Where else is wine produced?

**5. Retell the text.**

**TEXT 5**

**1. Read the text, translate it with the help of the notes given after the text.**

[**VINTAGE**](http://en.wikipedia.org/wiki/Vintage) **WINE**

A **vintage** wine is one made from grapes that were all, or primarily, grown in a single specified year, and are accordingly dated as such. Variations in a wine's character from year to year can include **subtle** differences in color, **palate**, **nose**, **body** and development. Good quality red table wines in particular can improve in flavor with age if properly stored. Consequently, it is not uncommon for wine enthusiasts and traders to save bottles of an especially good vintage wine for future **consumption**. Most countries allow a vintage wine to include a portion of wine that is not from the **labeled** vintage.

In the United States for a wine to be vintage dated (and labeled with a country of origin or [American Viticultural Area](http://en.wikipedia.org/wiki/American_Viticultural_Area) (AVA), such as "[New Zealand](http://en.wikipedia.org/wiki/New_Zealand)" or "[Napa Valley](http://en.wikipedia.org/wiki/Napa_Valley)") it must contain at least 95% of its volume from wines harvested in that year. If a wine is not labeled with a country of origin such as "[Napa County](http://en.wikipedia.org/wiki/Napa_County)", it must contain at least 85% of its volume from wines harvested in that year.

Vintage wines are generally bottled in a single **batch** so that each bottle will have a similar taste. Climatic factors can have a dramatic impact on the character of a wine to the extent that different vintages from the same vineyard can vary dramatically in flavor and quality. Thus, vintage wines are produced to be individually characteristic of the vintage and to serve as the **flagship** wines of the producer. Superior vintages, from **reputable producers** and regions, will often cost more than their average vintages. Some vintage wines are only made in better-than-average years.

**Notes**

|  |  |
| --- | --- |
| vintage – *вино вищої якості з певного району і врожаю певного року*  subtle – *тонкий, ніжний (про запах ); витончений; ледь відчутний*  palate – *смак*  batch – *партія, комплект, серія*  nose – *запах, аромат*  body – *міцність вина*  flagship – *найкращій за якістю*  reputable producers – *тут: провідні виробники*  consumption – *споживання*  labeled – *марочний* |  |

**2. Find equivalents in the text.**

Марочне вино, тонкий смак, букет вина, міцність вина, якісне червоне столове вино, майбутнє споживання, етикетка марочного вина, містити, зібрати урожай, розлити в пляшки, єдина партія, провідні марки вин.

**3. Translate the expressions given in brackets.**

1. Superior vintages, from (провідні виробники та області) will often cost more than their average vintages.
2. Vintage wines serve as (найкращі вина за якістю від виробника).
3. Vintage wines are generally (розливають в пляшки однієї партії) so that each bottle will have a similar taste.
4. Good quality red table wines can improve with flavor in the age if (зберігаються належним чином).

**4. Answer the following questions. Do it in pen.**

1.What is a vintage?

2. How are vintage wines generally bottled?

3. How can good quality red table wines be improved with age?

4. How much will superior vintages made by reputable producer and regions cost?

5. What effects can climatic factors have on vintages?

**5. Retell the text.**

**TEXT 6**

**1. Read the text, translate it with the help of the notes given after the text.**

## GRAPE VARIETIES

Wine grape **varieties** represent only a small portion of the more than 600 kinds of grapes. Each grape variety has its own unique combination of characteristics including color, size, skin thickness, acidity, yield per vine and flavors. Only a few grape varieties are suited to produce fine quality wine.

While many grape varieties are used to produce wines, only a few grapes have distinguished themselves as being particularly suited for the production of fine wine. These 'noble grape varieties' must still be matched with the right micro-climate and winemaking techniques in order to live up to their potential.

Wine is usually made from one or more varieties of the European species, *Vitis vinifera*. When one of these varieties, such as Pinot Noir, Chardonnay, or Merlot, for example, is used as the **predominant** grape (usually defined by law as a minimum of 75 or 85%) the result is a varietal, as opposed to a blended wine. Blended wines are in no way inferior to varietal wines; some of the world's most valued and expensive wines from the Bordeaux, Rioja or Tuscany regions are a blend of grape varieties of the same **vintage.**

Wine can also be made from other species or from hybrids, created by the genetic **crossing** of two **species**. *Vitis labrusca*, *Vitis aestivalis*, *Vitis rupestris*, *Vitis rotundifolia* and *Vitis riparia* are native North American grapes, usually grown for eating in fruit form or made into grape juice, jam, or jelly, but sometimes made into wine, eg. Concord wine (*Vitis labrusca* species).

Hybrids are not to be **confused** with the practice of **grafting.** Most of the world's vineyards are planted with European vinifera vines that have been grafted onto North American species rootstock. This is common practice because North American grape species are resistant to phylloxera, a **root louse** that eventually kills the **vine.** In the late 19th century, Europe's vineyards were **devastated** by the bug, leading to massive vine deaths and eventual replanting. Grafting is done in every wine-producing country of the world except for the Canary Islands, Chile and Argentina, which have not been **exposed** to the insect.

However, flavor differences are not desirable for producers of mass-market table wine or other cheaper wines, where consistency is more important. Producers will try to minimize differences in sources of grapes by using wine making technology such as micro-oxygenation, tanning filtration, cross-flow filtration, evaporation.

**Notes**

|  |  |
| --- | --- |
| variety – *різновид, різноманіття*  predominant – *той, щопереважає, домінуючий (над чимось – over)*  vintage – *збір (врожай) винограду*  graft – *1) живець 2) розводити (рослини)*  root louse – *коренева воша (комаха)*  vine – *виноградна лоза*  to devastate – *спустошувати, розоряти*  to expose – *піддавати (чомусь – to)*  to confuse – *плутати*  species – *вид*  crossing – *змішування* |  |

**2. Find equivalents in the text.**

Європейський вид, змішані вина, цінні та дорогі вина, урожай вина, генетичне поєднання двох сортів вина, спустошувати, столове вино.

**3. Finish the following sentences.**

1. Hybrids are not to be confused with … .

2. A root louse that eventually … .

3. Grafting is done in every wine-producing country of the world except … .

4. Flavor differences are not desirable for … .

5. Producers will try to minimize differences in sources of grapes by … .

**4. Answer the questions. Do it in pen.**

1. What is wine usually made from?

2. What happened to Europe’s vineyards in the late 19th century?

3. What will wine producers do to minimize differences in sources of grapes?

**5. Retell the text.**

**TEXT 7**

**1. Read the text, translate it with the help of the notes given after the text.**

**CHAMPAGNE**

**Champagne** is **sparkling** white wine made from grapes grown in the old French province of Champagne. The best champagne is from that part of the Marne valley whose **apex** is Rheims, the center of the industry. Champagne was reputedly developed by a monk, Dom Perignon, in the 17th century. It is a mixture of black Pinot Noir and white Chardonnay grapes and is named for the vintners and shippers responsible for each **blend**.

The small, slightly acid grapes are **laboriously** cultivated. After the first **fermentation** the wine is blended; it undergoes a secondary fermentation, then is drawn off into bottles **reinforced** to withstand high internal pressure, and is sweetened **to induce** further fermentation. The carbonic acid retained in the bottle after the final fermentation renders champagne sparkling.

The wine is matured in the **labyrinthine** tunnels of the old chalk **quarries** of Rheims. The **sediment** formed is collected on the cork by **tilting** the bottle neck downward and frequently rotating it by hand. After fermentation comes the degorgement process, whereby the neck of the bottle is frozen and the cork is removed; the lump of frozen sediment shoots out, propelled by the pressure in the bottle. The space left is filled with the proper dosage of cane sugar dissolved in wine and usually fortified with **cognac**.

Brut champagne is theoretically not sweetened. It is extra dry, very light champagne.

An American sparkling wine called champagne is made in New York and California.

**Notes**

champagne – *шампанське*

sparkling – *шипучий, іскристий*

apex – *верхівка*

reputedly – *на загальну думку*

blend – *cyміш*

laboriously – *важко; старанно*

fermentation– *бродіння*

to reinforce – *підсилювати, закріпляти*

to induce – *спонукати*

labyrinth – *лабіринт*

quarry – *кар'ер*

sediment – *осад, гуща*

to tilt – *нахиляти*

cognac – *коньяк*

**2. Answer the questions according to the text. Do it in pen.**

1. What is champagne? What is it made from?

2. Where is the best champagne made?

3. Who developed this drink first and when?

4. How did champagne obtain its name?

5. What sorts of grape are used for producing the true champagne?

6. Does champagne need sweet or acid grapes?

7. How many processes of fermentation does the drink need?

8. Where is the wine matured?

9. What is the degorgement process?

10. How is brut champagne peculiar?

**3.Match the expressions in two columns.**

|  |  |
| --- | --- |
| 1. chalk quarries | a. ігристе вино |
| 2. slightly acid grapes | b. шматок замерзлого осаду |
| 3. sparkling wine | c. центр промисловості |
| 4. to dissolve sugar | d. крейдяні кар’єри |
| 5. lump of frozen sediment | e. кислуваті сорти винограду |
| 6. vintners and shippers | f. правильна кількість |
| 7. center of the industry | g. розчиняти цукор |
| 8. proper dosage | h. виноторговці й відправники вантажу |

**4. Translate the text into English.**

Шампанське **–** ігристе вино, виготовлене з винограду, який росте в певному районі в провінції Шампань, що знаходиться в ста милях на схід від Парижу. Усе шампанське в цьому районі виготовляється з використанням особливого процесу, який полягає в ферментації всередині пляшки, після чого вино стає ігристим. Це єдиний спосіб досягнення високої якості. Шампанському притаманний тонкий смак, світло-золотистий колір та гармонійний букет.

У зв'язку з тим, що назва «Шампанське» є захищеною законом зареєстрованою торговою маркою, інші виробники не мають права називати ігристі вина власного виготовлення шампанським.

**5. Do the back translation of the text.**

**TEXT 8**

**1. Read the text, translate it with the help of the notes given after the text.**

**BRANDY**

Brandy is a strong alcoholic **spirit distilled** from wine or from marc, the **residue** of the wine press. The most noted brandy is cognac, made from white grapes in the Charente district of France. The label *Cognac, fine champagne* denotes the finest type of cognac, which comes from a small area around Cognac.

Brandy is manufactured commercially in other districts of France, notably Armagnac and in Spain, Portugal, Australia, Italy, South Africa, and the United States. Most fine brandies are distilled in pot **stills** constructed to retain the **volatile** ingredients. The product is blended and flavored, then stored in casks (preferably oak), where it **mellows** and takes on a yellow color; it acquires a deeper tint from long storage or the addition of **caramel syrup**.

Brandy **marketed** in the United States must be matured in cask for at least four years.

Brandy made from marc is very **potent** and is **inferior** to wine brandy.

Liquor distilled from fermented **beets**, grains, or sugar-cane is sometimes called brandy.

The term, qualified by the name of a fruit, is applied to spirits distilled from the fermented juice of fruits other than the grape, e.g., peach brandy, cherry brandy, and plum brandy (slivovitz), which is extensively manufactured in the Balkans.

**Notes**

spirit – *спирт, (алкогольний) напій*

to distil – *очищувати*

residue – *залишок, осад*

still – *винокурний завод*

volatile – *непостійний, мінливий*

to mellow – *достигати*

caramel syrup – *карамельний cupon*

to market – *купувати або продавати*

potent – *сильный, сильнодіючий*

inferior – *гipшa якість*

beet – *буряк*

**2. Answer the questions according to the text. Do it in pen.**

1. What is brandy?

2. Name the most noted brandy. Where is it produced?

3. In what districts and countries is brandy manufactured commercially?

4. How is the product made?

5. What is the reason of adding caramel syrup to brandy?

6. What are the peculiarities of producing brandy in the USA?

7. Why do some brandies contain fruit in its name? Where are such spirits extensively made?

**3. Match the expressions in two columns.**

|  |  |
| --- | --- |
| 1. to take on a yellow color | a. міцний алкогольний напій |
| 2.to be extensively manufactured | b. дубова бочка |
| 3. strong alcoholic spirit | c. цукрова тростина |
| 4. to acquire a deeper tint | d. тривале зберігання |
| 5. sugar-cane | e. набувати жовтого кольору |
| 6. to retain the volatile ingredients | f. набувати глибшого відтінку |
| 7. oak cask | g. широко вироблятися |
| 8. long storage | h. зберігати нестійкі складники |

**4. Finish the sentences.**

1. Most fine brandies are distilled in …

2. Brandy made from marc is …

3. The label Cognac, fine champagne denotes …

4. The term, qualified by the name of a fruit, is applied to …

5. The most noted brandy is …

6. It acquires a deeper tint from long storage or the addition of …

7. Brandy is a strong alcoholic spirit distilled from …

**5. Write the plan to the text, retell the text according to the plan.**

**TEXT 9**

**1. Read the text, translate it with the help of the notes given after the text.**

**WHISKEY**

Whiskey is a **spirituous liquor** distilled from a fermented mash of grains, usually **rye**, barley, **oats**, wheat, or corn. **Inferior** whiskeys are made from potatoes, beets, and other roots. The standard whiskeys of the world are Scotch (commonly spelled *whisky),* Irish, American, and Canadian.

The Scotch Highland whiskey (made in pot stills) and that of the Lowlands (patent stills) differ in the percentage of barley used, quality of the water, quantity of **peat** employed in curing the **malt**, manner of distilling, and kind of casks in which they are matured. Practically all Scotch whiskeys are blends.

Irish whiskey resembles Scotch, but no peat is used in the curing, and instead of the dry, somewhat smoky flavor of Scotch, it has a full, sweet taste.

American whiskeys are divided into two main varieties, rye and bourbon, a corn whiskey that derives its name from *Bourbon со., Ky*. They have a higher flavor and a much deeper color than Scotch or Irish and require from two to three years longer to mature. Newly made whiskey is colorless, the rich brown of the matured liquor being acquired from the cask in which it is stored.

Canadian whiskey has a characteristic lightness of body and must, according to law, be produced from **cereal** grain only.

Whiskey was made in England in the 11th century chiefly in monasteries, but in the 16th century distilling was carried on commercially. No whiskey can be released from **bond** in Great Britain until it has matured in wood at least three years, and in practice most whiskey is stored seven or eight years before marketing.

In the United States bonded whiskey must stay a minimum of four years in bond before it can be labeled as bonded rye or bourbon. The **illicit** manufacture of whiskey to avoid payment of excise taxes has been common. In the United States this is known as **moon shining**.

**Notes**

spirituous liquor – *спиртний нaniй*

rye – *жито*

oats – *овес*

inferior – *гірший*

peat – *торф*

malt – *солод*

cereals – *хлібні злаки*

bond– *договір*

illicit – *незаконний*

moon shining – *нісенітниця; фантазія*

**2. Answer the questions according to the text. Do it in pen.**

1. What is whiskey? What is it produced from?

2. Where are standard whiskeys produced?

3. How do the Scotch Highland and Lowland whiskeys differ?

4. Is peat used in the curing of Irish whiskey?

5. What kind of whiskey has a smoky flavor?

6. Name two types of American whiskey.

7. What is a peculiarity of bourbon?

8. What is used for producing Canadian whiskey?

9. When and where did they start to produce whiskey in England?

10. What are the general terms of storing whiskey before marketing in Great Britain?

11. How did the Americans call the illicit manufacture of whiskey to avoid payment of excise taxes?

**3. Find the equivalents in the text.**

Дозрівати, зберігати в бочці, якість води, кукурудза, відповідно до закону, акцизний податок, пшениця, вироблятися виключно із зернових, кількість торфу, солодкий смак, без кольору, уникати, глибокий колір, незаконне виробництво, монастир, легкість.

**4. Finish the sentences.**

1. Whiskey was made in England in the 11th century in …

2. Canadian whiskey must be produced from …

3. Irish whiskey has a …

4. The illicit manufacture of whiskey to avoid payment of excise taxes has …

5. No whiskey can be released from bond in Great Britain until …

6. American whiskeys are divided into …

7. Newly made whiskey is …

8. Whiskey is a spirituous liquor distilled from …

9. The standard whiskeys of the world are …

10. The Scotch Highland whiskey and that of the Lowlands differ in …

**5. Retell the text using the questions you’ve answered.**

**TEXT 10**

**1. Read the text, translate it with the help of the notes given after the text.**

**WINE QUALITY CRITERIA**

European **Economic Chamber** of Trade, Commerce and Industry developed European Wine **Quality Standards** (EuWQS) to avoid **unfair competition**, to protect **consumer interests** and **to contribute** to an improvement of the quality in this **specific field**.

Accordingly, producers of wine, the quality of which **complies with** the quality criteria as **stipulated** by the EuWQS can be certified as certified quality wine producers, and they can be entitled to use the ‘Seal of Quality’ of the European Economic Chamber of Trade, Commerce and Industry on the products, folders, price lists, letterheads, etc.

The quality has **to meet** the analytic **requirements**. The **visual** (color, clearness) **and sensory** (smell, taste) **assessment** has to show excellent results.

Declaration and **labeling** should present demonstration, name and address of producer, alcohol contents in % vol., remaining sugar, contents of the bottle in metric system (1 000 ml = 1 liter), region of origin, kind of grape, total content of natural acid, optimal temperature for consumption, serving proposals, and indication of vintage (year) only if at least 85 per cent of the grapes originate from the vintage of this year.

*Special definitions*: “Wine, almost alcohol free” = 0,5 % vol. or less. “Alcohol reduced wine” = more than 0,5 % vol., but less than 5,0 % vol.

*Enrichment with sugar and alcohol*: “Special high quality wines” and “High quality wines” are not allowed **to be enriched** with sugar. To other categories not more than 15 grams / liter sugar can be added. “Special high quality wines” and “High quality wines” are not allowed to be enriched with alcohol. To other categories alcohol can be added: white and rose wines – up to maximal 12,8 % vol., red wines – up to maximal 13,6 % vol.

**Notes**

economic chamber – *економічна палата*

quality standards – *стандарти якості*

unfair competition – *недобросовісна конкуренція*

consumer interests – *інтереси споживачів*

to contribute (to) – *сприяти*

specific field – *особлива галузь*

to comply with – *дотримуватися*

to stipulate – *обумовити*

to meet the requirements – *відповідати вимогам*

visual and sensory assessments – *візуальні і сенсорні показники*

labeling – *маркування*

to be enriched (with) – *збагачуватися, додавати*

**2. Find equivalents in the text.**

Вино високої якості, Європейська економічна палата торгівлі, комерції та промисловості, вино із зменшеним вмістом алкоголю, додавати, дозволяти, дотримуватися критеріїв якості, щоб уникнути недобросовісної конкуренції, мати право, загальний вміст природних кислот, оптимальна температура споживання, показувати відмінні результати.

**3. Give written answers to the questions.**

1. What organization developed European Wine Quality Standards?

2. Why are European Wine Quality Standards necessary?

3. Who can be entitled to use the ‘Seal of Quality’ of the European Economic Chamber of Trade, Commerce and Industry?

4. What information should the labeling present?

5. Is there any alcohol free wine?

6. Are “Special high quality wines” and “High quality wines” allowed to be enriched with sugar or alcohol?

**4. Translate the words and expressions given in brackets into English. Make up 6 questions to the text.**

***What makes a wine "better quality" than another.***

The way grapes are grown (viticulture) and how they are subsequently made into wine (vinification) are the two main factors that effect quality in wine.

**Viticulture** – common sense practices like keeping the vine disease free makes a difference to the quality of the fruit and ultimately the wine. Harvesting only the ripest grapes and then delivering them quickly to the winery to limit oxidisation also helps.

Yield is very important, this is how many grapes are grown per hectare of land; it is quoted in hectolitres per hectare e.g. 50 hl/ha. The fewer grape bunches per vine the more intense their flavor will be. At the very best vineyards yields can be as low as 30hl/ha, e.g. top quality Burgundy, as opposed to around 100hl/ha for non-quality wines, e.g. Liebfraumilch.

**Vinification** – grapes must be made into wine as soon after they have been picked as possible because contact with air causes oxidisation, which spoils their flavor. Understanding the effects of air, as well as temperature control during fermentation have been breakthroughs in modern winemaking techniques. This knowledge has raised the overall quality of wine today.

There are many treatments used to make wine and some are very harsh and can spoil or taint the flavor. Mostly these are used for convenience when processing enormous quantities of lesser quality wines.

**5. Retell the text.**

**TEXT 11**

**1. Read the text, translate it with the help of the notes given after the text.**

**FAULTS AND DEFECTS OF GRAPE WINES**

A **wine fault** or defect is an unpleasant characteristic of a wine often resulting from **poor winemaking practices** or storage conditions, and leading to **wine spoilage**. Many of the compounds that **cause** wine **faults** are already naturally present in wine but at **insufficient** concentrations to adversely **affect** it. In fact, depending on perception, these concentrations may impart positive characters to the wine. However when the concentration of these compounds greatly **exceeds the sensory threshold**, they replace or obscure the flavors and aromas that the wine should be expressing. Ultimately the quality of the wine is reduced, making it less **appealing** and sometimes undrinkable.

There are many causes for the perception in wine faults ranging from poor hygiene at the winery, excessive and/or insufficient exposure of the wine to oxygen, excessive or insufficient exposure of the wine to **sulphur**, **overextended maceration** of the wine either pre or post fermentation, faulty fining, filtering and stabilization of the wine, the use of dirty oak barrels, overextended barrel aging and the use of poor quality corks. Outside of the winery, other factors within the control of the retailer or end user of the wine can contribute to the **perception of flaws** in the wine. These include poor storage of the wine that exposes it to excessive heat and **temperature fluctuations** as well as the use of dirty **stemware** during wine tasting that can introduce materials or aromas to what was previously a clean and **fault-free wine**.

**Notes**

wine fault – *вада, дефект вина*

fault-freewine – *бездоганне вино*

poorwinemakingpractices – *недотримання процесу виноробства*

winespoilage – *псування вина*

tocausefaults – *спричиняти вади*

insufficient – *недостатній*

to affect (smth) – *впливати*

to exceed the sensory threshold – *перевищувати припустиму норму (поріг)*

appealing – *привабливий*

sulphur – *сірка*

overextended maceration – *перебільшене (дуже тривале) вимочування*

perception of flaws – *сприйняття недоліків*

temperature fluctuations – *перепади температури*

stemware – *фужери*

**2. Answer the questions. Do it in pen.**

1. What is a wine fault or defect?

2. What can cause wine faults?

3. Can insufficient concentration of compounds that cause wine faults be naturally present in wine? May it impart positive characters to the wine?

4. What result do fault compounds make to the wine?

5. Name causes for the perception in wine faults.

6. Are there any factors of damaging wine outside of the winery? List them.

**3. Translate words and expressions given in brackets into English.**

1. Many of the compounds (що спричиняють дефекти вина) are already naturally present in wine.

2. A wine fault or defect is an unpleasant characteristic of a wine often resulting from (недотримання процесу виноробства або умов зберігання), and leading to (псування вина).

3. (Якість вина) is reduced, making it (менш привабливий) and sometimes (неможливо пити).

4. (Поза межами виноробного заводу), other factors within the control of (торговець або кінцевий споживач) of the wine can contribute to the perception of flaws in the wine.

5. Theseinclude (неправильне зберігання вина) thatexposesitto (надмірна жара та перепади температури).

**4. Find equivalents in the text.**

Якість вина, бездоганний, дубова бочка, бродіння, взаємодія вина з киснем, заміщувати або зменшувати смаки та аромати, недотримання гігієни на виноробному заводі, брудний, перезрівання в бочці, корок поганої якості, сприяти, дегустація вин, надмірно висока температура.

**5. Retell the text.**

**TEXT 12**

**1. Read the text, translate it with the help of the notes given after the text.**

**COLOR OF WINE**

The color of wine comes from the skin of the grapes. The juice that comes from nearly every **variety of grape** when pressed is white or clear. This is true of red grapes **as well as** white wines. The color or pigments of red grapes are found in **the skins of the grapes**. In order to make a red wine from red grapes, it is necessary to leave the skins in contact with the juice during fermentation. When the skins are placed in the fermenting '**must**', the pigments **leach out** of the skins and color the wine. When red grapes are pressed and the skins are kept out, the color of the wine **remains** white and is considered a “blanc de noirs” (a white wine from red grapes).

White wines do not usually have the skins left in the must while fermentation takes place. If the wine is being made from white grapes, there is no **benefit** to the color and if the wine is being made from red grapes, the skin contact would give an **undesirable** red color to the wine. Rose or blush wines can be made with 'limited' skin contact (leaving the skins in the fermenting juice for only a short period of time) but this method is **unreliable** in **obtaining consistent tinting** from **vat** to vat.

Rose wines are more often produced by adding a specific amount of red wine to an already finished white wine.

**Notes**

variety of grape – *сорти винограду*

must – *сусло*

as well as – *а також, так само*

the skins of the grapes – *виноградні шкірки*

to leach out – *вилуговувати*

to remain – *залишатися*

benefit – *перевага, користь*

undesirable – *небажаний*

unreliable – *ненадійний*

to obtain consistent tinting – *для отримання стійкого забарвлення (тонування)*

vat – *чан, бочка, ванна (промислова)*

**2. Answer the following questions in written form.**

1. What does the color of wine come from?

2. What is generally the color of grape juice?

3. Where is the red pigment of grape found?

4. What is necessary to do in order to make a red wine from red grapes?

5. How can rose or blush wines be made?

**3. Match the expressions in two columns.**

|  |  |
| --- | --- |
| 1. undesirable color | a. із одного чану в інший |
| 2. to add a specific amount of wine | b. під час бродіння |
| 3. while fermentation takes place | c. сусло, що бродить |
| 4. from vat to vat | e. небажаний колір |
| 5. in order to | f. ненадійний метод |
| 6. fermenting 'must' | g. щоб |
| 7. unreliable method | h. додати певну кількість вина |

**4. Read the text. Put the verbs given in brackets into the right tense form.**

|  |
| --- |
| It may seem a bit unnecessary to discuss *how to hold a wine glass*, but there is a right way and a wrong way and it does make a difference.  Wine … (*to serve*) in stemware because the temperature at which wine is served … … (*can; to have*) a profound impact on the tastes and the enjoyment it … (*to yield*). Wine glasses should always be held by the stem of the glass rather than the bowl since the heat of your hand will quickly … (*to warm*) the liquid.  Warming a wine above its desired serving temperature will … (*to yield*) unwanted and unpleasant characteristics. The alcohol in wine will … (*to give*) sharpness or 'bite' to the taste if the wine … (*to serve*) above 74 F. degrees.  Enough said. Just … (*to hold*) the glass by the stem unless the wine is served at too cool a temperature and you … (*to need*) to warm it for a minute or two. |

**5. Retell the text.**

**TEXT 13**

**1. Read the text, translate it with the help of the notes given after the text.**

**TASTE PROGRESSION**

There is a normal progression in **taste preferences** when it comes to wine.

**Sweet and served chilled.** This category of wines is light, sweet and served cold. Wines in this group sometimes have a little spritz or carbonation. Pop wines, some **blush wines**, and fruit wines **fall into this** first wine **category**. Think of these wines like **soft drinks** with a kick (cold, sweet and sometimes with **bubbles**).

**Semi-dry and served chilled.** These are very agreeable wines and can be food friendly as well. Some of the **cloying sweetness** and any trace of carbonation that existed in the first group of wines is gone. Higher acid levels in these wines balance the remaining sweetness. Vouvray, most German wines and many blush wines fall into this category. At some point, you'll prefer wines with little or no sweetness. When that happens, move to the dry whites.

**Dry, white and served chilled.** Wines in this category have no sweetness, and are served **chilled**. Chardonnay is the most popular grape variety in this category. Sauvignon Blanc and Pinot Gris are also favorites in this taste range. It is common for a person to enjoy wines in this category for many years before moving on to the fuller flavored, light red wines. These wines go especially well with **fowl** and seafood.

**Dry, more flavorful and served slightly chilled.** Light red wines such as Beaujolais and inexpensive Pinot Noir are found in this group of wines. They are dry wines and have stronger flavors than the white wines in the previous category. They are served **slightly chilled** but not cold. These wines do not have the tannins that are to be found in the next group. They **match up well** with grilled fish and **poultry** because they often have higher acid levels than most red wines.

**Dry, rich flavored and served at cellar temperature.** Cabernet Sauvignon and Merlot are the dominant grape varieties from which these wines are made. They are richly flavored, **medium bodied**, dry red wines and they often have very high levels of tannin in their youth. They should be served at very cool room temperature and allowed to warm in the glass. These wines often require aging to show their best.

**Notes**

taste preferences – *смакові уподобання*

blush wines – *рожеві вина*

to fall into this category – *потрапити в цю категорію*

soft drinks – *безалкогольні напої*

bubbles – *бульбашки*

cloying sweetness – *приторність, надмірна солодкість*

slightly chilled – *злегка охолоджений*

fowl – *дичина*

to match up well (with) – *гарно поєднуватися (з), підходити (до чогось)*

poultry – *птиця*

medium bodied – *середньої (помірної) міцності*

**2. Find equivalents in the text.**

Послідовність (зміна) смаків, попередня категорія, потребувати дозрівання, напівсухе біле вино, насолоджуватися, рівень таніну, подавати, смак, вищий рівень кислотності, потребувати, домінуючі сорти винограду, нагріватись у склянці.

**3. Answer the following questions according to the text.**

1. Do people change their wine tastes during their life?

2. What wines fall into sweet wine category?

3. What does mean the term ‘food friendly’ concerning wine?

4. What is the difference between sweet and semi-dry wines?

5. Do dry wines have bubbles?

6. Which group of wine is richly flavored, medium bodied, often with high levels of tannin in its youth?

7. What kind of wine do you prefer? Why?

**4. Read and translate the text. Give it a title. Write out the main ideas of the text.**

The best way to chill a bottle of wine is in an ice bucket or something that can act as an ice bucket. Fill a bucket 2/3 full with a mixture of half ice and half water. Be sure to add the water since ice alone will not chill the wine as quickly. Put a bottle in the solution and leave it for 20 to 30 minutes. Add rock salt to the ice and water to chill the wine a bit more rapidly. Using ice without water will take more than an hour to chill properly. Use the water.

Another way to chill your wine is to put it in a refrigerator. Expect to leave the wine in the refrigerator for at least two hours in order to completely chill it.

Never put wine in a freezer. You expect that you will check the bottle often to keep it from freezing. You will probably check for the first bottle or two or even three but eventually you will have a mostly frozen, broken bottle mess in your freezer. And even if you do keep the focus and manage to chill a bottle with the freezer method, it will still take longer than using ice and water.

Wines that are too cold will exhibit less pronounced bouquet and flavors. These will become more evident as the wine warms.

**5. Retell the text.**

**TEXT 14**

**1. Read the text, translate it with the help of the notes given after the text.**

## TASTING

Wines may be classified by their primary impression on the drinker's **palate**. They are made up of chemical compounds which are similar or identical to those in fruits, vegetables, and spices. The sweetness of wine is determined by the amount of **residual** sugar in the wine after fermentation, relative to the acidity present in the wine. Dry wine, for example, has only a small amount of residual sugar.

Specific flavors may also be sensed, due to the highly complex mix of organic molecules such as **esters** that grape juice and wine can contain. **Tasters** will also distinguish between flavors characteristic of a specific grape (e.g., Cabernet Sauvignon and **blackcurrant**) and flavors that are **imparted** by other factors in wine making, either **intentional** or not. The most typical intentional flavor elements in wine are those that are imparted by aging in oak casks, and virtually every element of chocolate, vanilla, or coffee is actually a factor of oak and not the native grape.

Banana flavors are the product of **yeast** metabolism. Some varietals can also have mineral flavor, due to the fact that some salts are **soluble** in water (as limestone), and thus absorbed by the wine.

Wine aroma is the result of the interaction between components of the grapes and those produced during winemaking process, fermentation and aging. Being served at room temperature increases the vaporization of aroma compounds, making the wine more aromatic. For red wines that are already highly aromatic, for example Chinon and Beaujolais, the **volatility** of the wine makes it better served chilled.

**Notes**

|  |  |
| --- | --- |
| palate – *смак*  residual – *залишковий*  esters – *складний ефір*  intentional – *навмисний*  soluble – *розчинний*  volatility – *хім. летючість, непостійний, мінливий*  yeast – *дріжджі*  taster – *дегустатор*  black currant – *чорна смородина*  to impart – *наділяти; надавати* |  |

**2. Find equivalents in the text.**

Класифікувати, прихильність людини, яка п’є вино, хімічні елементи, схожі на, солодкість вина, залишковий цукор, сухе вино, відчути присмак, складне поєднання органічних молекул, складний ефір, витримувати в дубових бочках, банановий присмак.

**3. Answer the following questions. Do it in pen.**

1. How are wines usually classified?
2. How is sweetness of wine determined?
3. What flavors in wine may be sensed?
4. How are flavors imparted to wine?
5. What is wine aroma?

**4. Translate the sentences into English.**

1. Сухі вина мають більшу популярність серед споживачів, ніж десертні завдяки меншій місткості залишкового цукру та алкоголю.

2. Вино було надзвичайно смачне, тому що довго зріло у дубовій бочці на фермі.

3. Червоне вино настільки ароматне, що його присмак відчувається довго.

4. Виробники вин рекомендують подавати їх охолодженими.

**5. Retell the text.**

**TEXT 15**

**1. Read the text, translate it with the help of the notes given after the text.**

## COLLECTING

At the highest end, rare, super-premium wines are the most expensive of all food, and outstanding **vintages** from the best vineyards may sell for thousands of dollars per bottle. The most common wines purchased for investment include Bordeaux, **cult** wines and Port. The reasons for these choices over thousands of other products and regions are:

1. They have a proven track record of holding well over time.
2. Their **plateau** drinking window (the period for **maturity** is of many, many years, when the taster will be able to enjoy the wine at its best.
3. There is a record of quality and consensus amongst experts as to the uniqueness of the wines.

Investment in fine wine has attracted **fraudsters** who play on fine wine's exclusive image and their clients' ignorance of this sector of the wine market. Wine **fraud** often works by **charging** excessively high **prices** for the wine, while representing that it is a sound investment unaffected by economic cycles. Like any investment, proper research is essential before investing. **False labeling** is another dishonest practice commonly used.

**Notes**

|  |  |
| --- | --- |
| сult – *культ*  plateau – *стадія, стабілізація, відсутність розвитку*  fraudster – *шахрай*  fraud – *підробка*  false labeling – *підробка етикетки*  vintage – *вино вищого ґатунку*  maturity – *достигання, дозрівання вина*  to charge price – *стягувати ціну* |  |

**2. Find equivalents in the text.**

Дорогий, найкращі виноградники, ціна за пляшку, розповсюджена купівля вина, унікальність вина, приваблювати шахраїв, економічні цикли, ринок вина, достатнє вивчення ринку, підробна етикетка, нечесна практика.

**3. Finish the following sentences.**

1. Outstanding vintages from the best vineyards may sell for … .
2. Investment of wine has attracted … .
3. Wine fraud often works by charging … .
4. Proper research is essential before … .
5. False labeling is another … .

**4. Give the written answers to the following questions.**

1. What may be the price of a wine bottle from the best vineyard?
2. What are the reasons of purchasing Bordeaux, cult wine and Port for investment?
3. Whom does investment in fine wine attract?
4. How does wine fraud work?
5. What is another dishonest practice in wine - making commonly used?

**5. Retell the text.**

**TEXT 16**

**1. Read the text, translate it with the help of the notes given after the text.**

## USES OF WINE

Wine is a popular and important beverage that accompanies and **enhances** a wide range of European and Mediterranean-style cuisines, from the simple and traditional to the most sophisticated and complex. Wine is important in cuisine not just for its value as a beverage, but as a flavor agent (primarily in **stocks** and **braising**) in which its acidity lends balance to rich **savory** or sweet dishes. Red, white and **sparkling** wines are the most popular, and are also known as light wines, because they only contain approximately 10–14% alcohol. (Alcohol percentages are usually by volume.) The apéritif and dessert wines contain 14–20% alcohol, and are fortified to make them richer and sweeter than the light wines.

The labels on certain bottles of wine suggest that they need to be set aside for an hour before drinking to *breathe*, while other wines are recommended to be drunk as soon as they are opened. **Decanting** is a **controversial subject** in wine. In addition **to aeration**, decanting removes some of the **bitter sediments** from the bottle. **Sediment** is more common in older bottles but younger wines benefit more from the aeration.

During aeration, the **exposure** of younger wines to air often "relaxes" the flavors and makes them taste smoother and better integrated in aroma, texture, and flavor. Wines that are older generally fade (lose their character and flavor intensity) with extended aeration. Breathing, however, does not benefit all wines, and should not therefore **be taken to the extreme**. In general, wine should be tasted as soon as it is opened to determine how long it may be aerated, if at all.

**Notes**

|  |  |
| --- | --- |
| stocks – *сировина, асортимент, запас*  braising – *тушковане м'ясо*  decanting – *переливати з пляшки у графин*  to enhance – *збільшувати, підсилювати*  savory – *пікантний, гострий*  sparkling – *ігристе*  bitter – *гіркий*  controversial subject – *суперечливе питання*  toaeration – *провітрювання, насичення киснем, карбонування*  sediment – *осад, гуща*  to take to the extreme – *зловживати*  exposure – *випаровання* |  |

**2. Match the expressions in two columns.**

|  |  |
| --- | --- |
| 1. важливий напій 2. підсилювати розмаїття 3. цінність напою 4. легкі вина 5. випити щойно відкритим 6. десертне вино 7. осад | * 1. to enhances a wide range   2. dessert wine   3. value of beverage   4. important beverage   5. light wines   6. to drink as soon as opened   7. sediment |

**3. Finish the following sentences.**

1. Wine is a popular and important beverage that … .

2. Wine is important in cuisine not just for its … .

3. Dessert wines contain 14–20% alcohol, and are fortified … .

4. The labels on certain bottles of wine suggest to… .

5. Decanting is … .

6. Sediment is more common in … .

**4. Answer the questions. Do it in pen.**

1. Why is wine popular in world cuisines?
2. Why are light wines most popular?
3. What is the peculiarity of dessert wines?
4. What is decanting?
5. What is aeration?

**5. Retell the text.**

**TEXT 17**

**1. Read the text, translate it with the help of the notes given after the text.**

### RELIGIOUS USES

The use of wine in religious ceremonies is common to many cultures and regions.

Wine plays an integral part of Jewish laws and traditions.

In Christianity, wine or grape juice is used in a **sacred rite** called the Eucharist, Lord's Supper, or Communion, which originates in Gospel accounts of the Last Supper when Jesus shared bread and wine with his **disciples** and commanded his followers to "do this in remembrance of me". Beliefs about the nature of the Eucharist vary between denominations, with [Roman Catholics](http://en.wikipedia.org/wiki/Roman_Catholicism) believing that the bread and wine are changed into the real body and blood of Christ.

Wine was used in the rite by all Protestant groups until an alternative arose in 1869. Methodist [minister](http://en.wikipedia.org/wiki/Minister_of_religion)-turned-[dentist](http://en.wikipedia.org/wiki/Dentist) Thomas Bramwell Welch applied new pasteurization techniques to stop the natural fermentation process of grape juice. The substitution of grape juice for wine spread quickly over much of the United States in Protestant rites, although the beverage is usually called wine in accordance with **scriptural** references.

The use of wine is forbidden under Islam. Iran used to have a **thriving** wine industry that disappeared after the Islamic revolution in 1979.

**Notes**

|  |  |
| --- | --- |
| disciples – *учень, апостол*  sacred – *святий, священний*  rite – *обряд, церемонія; ритуал*  scriptural – *біблійний*  thriving – *той, що процвітає* |  |

**2. Find the equivalents in the text.**

Невід’ємна частина, благословення, святкова їжа, випити чотири келихи вина, розповсюджене невірне трактування, виноградний сік, природний процес бродіння, символ крові.

**3. Choose the right variant of words given in brackets.**

1. Wine plays an integral part of Jewish (laws and traditions, religion, culture).

2. In Christianity (whisky, lemonade, wine) is used in a sacred rite called the Eucharist.

3. [Roman Catholics](http://en.wikipedia.org/wiki/Roman_Catholicism) believed that (bread and butter, sausages with mustard, bread and wine) are changed into the real body and blood of Christ.

4. The use of wine is forbidden under (Christianity, Islam, Buddhism).

**4. Give the written answers to the following questions.**

1. In what ceremonies is wine used?

2. How is wine used in Christianity?

3. Why were the new pasteurization techniques applied?

4. Where was the use of wine forbidden under Islam?

**5. Retell the text.**

**TEXT 18**

**1. Read the text, translate it with the help of the notes given after the text.**

## HEALTH EFFECTS

The health effects of wine (and alcohol in general) are the subject of considerable on going study. In the USA, a boom in red wine **consumption** was initiated in the 1990s by '60 Minutes', and other news reports on the French paradox. The French paradox refers to the lower **incidence** of coronary heart disease in France than in the USA despite high levels of **saturated** fat in the traditional French diet. Epidemiologists suspect that this difference is attributed to the high consumption of wines by the French, however this suspicion is based on limited scientific evidence.

Population studies have observed a **J curve association** between wine consumption and the risk of heart disease. This means that **abstainers** and heavy drinkers have an elevated risk, while moderate drinkers have a lower risk. Population studies have also found that moderate consumption of other alcoholic beverages may be cardio protective, though the association is considerably stronger for wine. These studies have found a protective effect from both red wine as well as white wine, though evidence from laboratory studies suggests that red wine may possess superior health benefits including **prevention** of cancer due to the fact red wine contains more polyphenols than white wine due to the production process.

Red wines from South of France and Sardinia Italy have been found to have the highest levels of procyanidins – the compounds in grape seeds responsible for making red wine good for the heart. Wines from France and Sardinia have between two and four times as much procyanidins as other red wines.

A 2007 study found that both red and white wines are effective anti-bacterial agents against strains of Streptococcus. Interestingly, wine has traditionally been used to treat **wounds** in some parts of the world.

**Notes**

|  |  |
| --- | --- |
| consumption – *споживання*  incidence – *охоплення*  abstainer – *прихильник тверезості, непитущий*  prevention – *запобігання;*  wound – *рана*  J curve association – *графік у формі літери J, що показує співвідношення*  saturated – *насичений* |  |

**2. Find equivalents in the text.**

Корисний ефект вина, бум у споживанні червоного вина, коронарне захворювання серця, насичений жиром, традиційна французька дієта, споживання алкоголю, обмежені наукові докази, хвороба серця.

**3. Finish the following sentences.**

1. Both red and white wines are effective anti-bacterial agents against … .
2. The French paradox refers to the lower incidence of coronary heart disease in France than … .
3. Abstainers and heavy drinkers have an elevated risk, while moderate drinkers have …
4. Red wine may possess superior health benefits including … .
5. Red wine contains more … .
6. Wine has traditionally been used to … .

**4. Answer the following questions. Do it in pen.**

1. When was a boom of red wine consumption initiated?
2. What diseases prevention does red wine have?
3. Who has a lower risk of red wine consumption?
4. What compounds in grape seeds are responsible for making red wine good for health?
5. What has wine been traditionally used for in medicine?

**5. Retell the text.**

**TEXT 19**

**1. Read the text, translate it with the help of the notes given after the text.**

**FOOD AND WINE BASICS**

The Food and Wine combinations that most of us grew up with were the 'red wine with beef' and 'white wine with fish or poultry' rules. In fact, you should drink the wine you like but understand that the traditional rules are based on centuries of experience. Once you understand the simple logic you will be able to **confidently** match foods and wines.

If the match is good, each **bite of food** replaces the taste of the wine and each **sip of wine** replaces the taste of the food. In a poor match, one is so dominant that it is all that is tasted through the meal.

Most of what we take for taste, is actually a result of our sense of smell. A typical person can **differentiate** (on average) about 9,000 different aromas. Even those of us with **a poor sense of smell** can identify more than 3,000 aromas.

Our sense of taste is much more focused than our sense of smell. You can actually taste (on the tongue) only four things: **Sweetness, Acidity, Bitterness and Saltiness**. By working with these tastes and their presence in the foods and wines we are matching, we can create very good pairings.

The surest and easiest way to match foods with wines is to look for sweetness, acidity or bitterness in the food and serve wines that have the same characteristics. For instance, if your food item has an element of sweetness, your wine should also be sweet. Otherwise, the wine will seem **sour**. If your dish has bitterness (like **the char on a steak**) then the best match will be a wine that has bitterness (from tannins in red wines). When it comes to acidity, it is easier to think of foods that benefit from the addition of acidity when selecting wines. If you would consider **squeezing lemon** on a dish (like seafood) then you would want to match that dish with a wine that has higher acid content.

**White wines with high acid include**: Sauvignon Blanc, Riesling, White Bordeaux and almost all sparkling wines. These wines usually pair well with most seafood.

**Red Wines with high acid levels include:** Pinot Noir (including Red Burgundys), Sangiovese (including Chiantis) and Gamay (including Beaujolais). These wines are usually very good pairings with grilled seafood and with most red sauces (tomato based).

**White wines that have an amount of sweetness include:** most German wines, Vouvray, Chenin Blanc, Asti Spumante and many Rieslings. White Zinfandel is a pink wine that has sweetness and high acidity.

**Red wines with sweetness include:** Lambrusco and Port (very sweet).

**Red wines with bitterness include:** Cabernet Sauvignon, Merlot, Red Bordeaux and red Zinfandel.

**Notes**

confidently – *упевнено*

bite of food – *шматочок їжі*

sip of wine – *ковток вина*

differentiate – *розрізняти, відрізняти*

poor sense of smell / taste – *поганий нюх / смакове відчуття*

sour – *кислий*

char on a steak – *пересмажений стейк*

to squeeze lemon – *вичавити лимон*

**2. Find in the text the following words and expressions.**

Поєднання їжі та вина, досвід, у середньому, язик, солодкість, кислота, гіркота, солоність, найвірніший спосіб, однакові якості, виграє від додавання кислоти, вибирати вино, ігристе вино, соус на основі томату, птиця.

**3. Answer the questions. Do it in pen.**

1. What food and wine combinations did most of us grow up with?

2. Can the taste of food or wine be dominant while eating?

3. How many aromas can a typical person differentiate?

4. What four things can you actually taste (on the tongue)?

5. What is the surest and easiest way to match foods with wines?

**4. Finish the following sentences.**

1. You should drink the wine you like but understand that … .

2. Once you understand the simple logic you will be able to … .

3. In a poor match, one is so dominant that … .

4. Our sense of taste is much more focused than our … .

5. If your food item has an element of sweetness, … .

6. If your dish has bitterness then the best match will be … .

7. When it comes to acidity, it is easier to think of foods that benefit from … .

**5. Retell the text.**

**TEXT 20**

**1. Read the text, translate it with the help of the notes given after the text.**

## PACKAGING AND STORAGE

Most wines are sold in glass bottles and are **sealed** using a cork. Recently a growing number of wine producers have begun sealing their product with alternative **closures** such as **screw-caps** or synthetic plastic "corks." Some wines are packaged in heavy plastic bags, which are typically packaged further within **cardboard boxes**, similar to the packaging of breakfast cereal. One advantage of boxed-wine is that it can stay fresh for up to a month after opening, while bottled wine will start **to oxidize** immediately after opening. The **contents** of boxed wine are typically accessed via a tap on the side of the box. In addition to being less expensive, alternative closures prevent **cork taint**, although alternative closures can also cause other types of wine **spoilage**.

Wine cellars offer the opportunity to protect alcoholic beverages from potentially harmful **external** influences, providing darkness and a constant temperature. Wine is a natural, **perishable** food product. Left **exposed** to heat, light, vibration or **fluctuations** in temperature and humidity, all types of wine, including red, white, sparkling, and fortified, can spoil. When properly stored, wines not only maintain their quality but can actually improve in aroma, flavor, and complexity as they mature.

**Notes**

|  |  |
| --- | --- |
| toseal – *закорковувати, герметично закривати*  screw-cap– *пробка-викрутка*  cardboardbox – *картонна коробка*  tooxidize – *окисляти(ся)*  perishable – *що швидко псується*  fluctuations – *коливання*  spoilage – *псування*  external – *зовнішній*  corktaint – *псування пробки*  closure – *закупорювальний матеріал*  content – *вміст, склад*  exposed – *що підається* |  |

**2. Match the expressions n two columns.**

|  |  |
| --- | --- |
| 1. скляна пляшка 2. закрити пробкою 3. виробники вина 4. пластикова пробка 5. каша на сніданок 6. вино з пакету 7. захистити алкогольні напої | * 1. to seal using a cork   2. plastic cork   3. breakfast cereal   4. to protect alcoholic beverage   5. boxed bottle   6. wine producers   7. glass bottle |

**3. Give written answers to the questions.**

1. In what way are most wines sold?
2. What are alternative closures of wine?
3. What is advantage of boxed-wine?
4. What is happening to bottled-wine after opening?
5. What can closures cause to wine?
6. What is happening to wine when it is properly stored?

**4. Translate the sentences into English.**

1. Щоб зберегти вино, потрібно закрити його пробкою.
2. Зараз задля економії багато виробників вина використовують пластикові пробки як альтернативну закупорку пляшок.
3. Вино було зіпсованим і його довелося вилити.
4. Вино потрібно зберігати в належних умовах, щоб воно не втрачало свій аромат, смак і колір.

**5. Retell the text.**

**TEXT 21**

**1. Read the text, translate it with the help of the notes given after the text.**

## PROFESSIONS

* [**Cooper**](http://en.wikipedia.org/wiki/Cooper_%28profession%29): Someone who makes wooden **barrels**, **casks,** and other similar wooden objects.
* [**Négociant**](http://en.wikipedia.org/wiki/N%C3%A9gociant): A wine merchant who **assembles** the produce of smaller growers and winemakers, and sells them under his own name. Sometimes, this term is simply a synonym for wine merchant.
* [Vintner](http://en.wikipedia.org/wiki/Vintner): A wine merchant or producer.
* [Sommelier](http://en.wikipedia.org/wiki/Sommelier): A person in a restaurant who specializes in wine, and **is** usually **in charge of** assembling the wine list, staff education and making wine suggestions to customers
* [Winemaker](http://en.wikipedia.org/wiki/Winemaker): A person who makes wine. May or may not be formally trained.
* [Garagiste](http://en.wikipedia.org/wiki/Garagistes): One who makes wine in a garage (or basement, or home, etc.) An amateur wine maker. Also used **in a derogatory way**, when speaking of small scale operations of recent inception, or without **pedigree** (ie. small scale winemakers of Bordeaux).
* [**Oenologist**](http://en.wikipedia.org/wiki/Oenologist): Wine scientist or wine chemist, student of [oenology](http://en.wikipedia.org/wiki/Oenology). A winemaker may be trained as oenologist, but often instead uses a consultant oenologist
* [**Viticulturist**](http://en.wikipedia.org/wiki/Viticulturist): A person who specializes in the science of the **grapevines** themselves. Can also be someone who manages a vineyard (decides how **to prune**, how much to irrigate, how **to deal with pests**, etc.)

**Notes**

cooper – *бочар*

barrel, cask – *бочка, бочонок*

to assemble – *збирати*

negociant – *оптовий торговець*

to be in charge of – *нести відповідальність за*

in a derogatory way – *принизливо*

pedigree – *походження, родовід*

oenologist – *енолог, ферментолог*

viticulturist – *виноградар*

grapevine – *виноградна лоза*

toprune – *підрізати*

to deal with pests – *боротись з шкідниками*

**2. Find in the text the following words and expressions.**

Торговець вином, дерев’яний бочонок, нести відповідальність за що-небудь, виноградна лоза, боротись зі шкідниками, складати перелік вин, ферментолог, обрізати виноградну лозу, зрошувати землю, бочар.

**3. Give written answers to the questions.**

1. Who makes wooden barrels, casks, and other wooden objects?
2. Does viticulturist specialize in the science of the grapevines?
3. Who is vintner?
4. Who is in charge of assembling the wine list, staff education and making wine suggestions to customers ?
5. Negociant is an amateur wine maker, isn’t he?

**4. Guess who is who.**

|  |  |
| --- | --- |
| 1. … specializes in wine, and is usually in charge of assembling the wine list. 2. … makes wooden barrels. 3. … specializes in the science of the grapevines. 4. … is wine scientist or wine chemist. 5. … assembles the produce of smaller growers and winemakers, and sells them under his own name. 6. … makes wine in a garage (or basement, or home, etc.). | viticulturist  oenologist  sommelier  cooper  garagiste  negiciant |

**5. Retell the text.**

**ECOLOGY STUDY**

**TEXT 1**

**1. Read and translate the text:**

# **Disciplines of ecology**

Ecology is a broad discipline comprising many sub-disciplines. A common, broad classification, moving from lowest to highest complexity, where complexity is defined as the number of entities and processes in the system under study is:

**Ecophysiology** examines how the physiological functions of organisms influence the way they interact with the environment, both biotic and abiotic.

**Behavioral ecology** examines the roles of behavior in enabling an animal to adapt to its environment.

**Population ecology** studies the dynamics of populations of a single species.

**Community ecology** (or synecology) focuses on the interactions between species within an ecological community.

**Ecosystem ecology** studies the flows of energy and matter through the biotic and abiotic components of ecosystems.

**Systems ecology** is an interdisciplinary field focusing on the study, development, and organization of ecological systems from a holistic perspective.

**Landscape ecology** examines processes and relationship across multiple ecosystems or very large geographic areas.

**Evolutionary ecology** studies ecology in a way that explicitly considers the evolutionary histories of species and their interactions.

**Political ecology** connects politics and economy to problems of environmental control and ecological change.

Ecology can also be sub-divided according to the species of interest into fields such as animal ecology, plant ecology, insect ecology, Marine Ecology, and so on. Another frequent method of subdivision is by biome studied, e.g., Arctic ecology (or polar ecology), tropical ecology, desert ecology, etc. The primary technique used for investigation is often used to subdivide the discipline into groups such as chemical ecology, genetic ecology, field ecology, statistical ecology, theoretical ecology, and so forth. These fields are not mutually exclusive.

**Vocabulary**

|  |  |
| --- | --- |
| broad – adj. загальний;  tocomprise – містити в собі, вміщувати, охоплювати  complexity – складність  ecophysiology – екофізілогія  synecology – синекологія  сommunityecology – екологія спільнот  biome – біом  marine – морський | interdisciplinaryfield – комплексна дисципліна  tointeract – взаємодіяти  toenable – 1) давати змогу (право) (щось зробити) 2) робити можливим, полегшувати  species – різновид, вид  biotic and abiotic components – живі та неживі компоненти |

1. **Answer the following questions:**

1. What sub-disciplines of Ecology do you know?

2. What does Ecophysiology examine?

3. Which sub-discipline of Ecology does examine the roles of behaviour in enabling animals to adapt to their environment?

4. What does Systems ecology focus on?

5. What is another name of Community ecology?

6. What does Evolutionary ecology study?

**3. Fill in the blanks with the appropriate words.**

|  |  |
| --- | --- |
| 1. Population ecology studies the dynamics of ……. of a single species. | 1. interdisciplinary field |
| 1. Ecology is a broad discipline comprising many …. . | 1. populations |
| 3. Systems ecology is an ….. focusing on the study, development, and organization of ecological systems from a holistic perspective. | 1. political ecology |
| 4………connects politics and economy to problems of environmental control and ecological change. | 1. sub-disciplines |
| 5. Ecosystem ecology studies the flows of energy and matter through the …… components of ecosystems. | 1. biotic and abiotic |

**4. Give the English equivalent of the following words and word combinations:**

Загальна дисципліна; досліджуваний; взаємодіяти с навколишнім середовищем; пристосовуватись до чогось; популяція окремого виду; екологія спільнот; живі та неживі компоненти екосистеми; підрозділятися; основна технологія; сфера, (галузь); і так далі (тощо); взаємовиключний.

**5. Confirm or contradict the following statements:**

1. **Population ecology** connects politics and economy to problems of environmental control and ecological change.

2. **Behavioral** ecology concerns with the ecological function of animal’s [behaviour](http://www.biology-online.org/dictionary/Behavior) in its [evolution](http://www.biology-online.org/dictionary/Evolution), [survival](http://www.biology-online.org/dictionary/Survival) and [adaptation](http://www.biology-online.org/dictionary/Adaptation).

3. **Community ecology** concerns with the [interactions](http://www.biology-online.org/dictionary/Interaction) between [species](http://www.biology-online.org/dictionary/Species) within an ecological [community](http://www.biology-online.org/dictionary/Community).

4. **Political ecology** is an [ecological science](http://www.biology-online.org/dictionary/Ecology) that focuses on the evolutionary histories of [species](http://www.biology-online.org/dictionary/Species) and their [interactions](http://www.biology-online.org/dictionary/Interaction).

5. **The biotic component** pertains to a non-living thing, which is a nonliving physical and chemical attribute of a system, for example [light](http://www.biology-online.org/dictionary/Light), [temperature](http://www.biology-online.org/dictionary/Temperature), [wind](http://www.biology-online.org/dictionary/Wind) patterns, [rocks](http://www.biology-online.org/dictionary/Rocks), [soil](http://www.biology-online.org/dictionary/Soil), [pH](http://www.biology-online.org/dictionary/PH), [pressure](http://www.biology-online.org/dictionary/Pressure), etc. in an [environment](http://www.biology-online.org/dictionary/Environment).

6. **The abiotic component** pertains to a living thing (such as [plant](http://www.biology-online.org/dictionary/Plant), [animal](http://www.biology-online.org/dictionary/Animal), [fungus](http://www.biology-online.org/dictionary/Fungus), etc.) as well as its products (e.g. [secretions](http://www.biology-online.org/dictionary/Secretion), [wastes](http://www.biology-online.org/dictionary/Waste), and remains)

**TEXT 2**

1. **Read and translate the text:**

**Ecology**

*Ecology* certainly isn't a new word. In Greek ("oikos"), it means the home, the place where we live. And *ecology* means the science of how all living creatures interact within the same environment on the Earth. Yet, "environment" and "ecology" are extended to encompass the inseparable universe. Environmental unity exists everywhere, and the survival of all species on Earth depends on its continuance. It isn't surprising that today, more and more people pay attention to a company's environmental reputation before they buy its products and services, to the problems of recycling the waste from our homes, schools, or offices; and are willing to pay higher taxes to make our air and water cleaner.

The ecosystem is the complex web linking animals, plants, air, water and every other life form in the biosphere. It all hangs together. The system is in a "steady state" of dynamic balance, which means that by altering any one part you affect all the others. The definition suggests that the individual parts of the ecosystem depend on each other. Humans are only one factor in the ecosystem. But we set our selves apart and call all the other factors simply *nature.* Humans' attitude to nature can be called chauvinistic, as it is characterized by the highest level of consumerism.

"The frog does not drink up the pond in which he lives", says an Indian proverb, but people pollute, deteriorate and destroy their home: the air they breathe, the water they drink or bathe in, they contaminate the soil, mismanage resources, test weapons, kill and exterminate wildlife, destroy the natural beauty that surrounds them by the unaesthetic and random erection of buildings, produce aggressive noises that impose an enormous stress on the nervous system, etc. Pollution knows no boundaries, whether it is airborne or waterborne, it is the cause of health hazards for entire population of the world, for all inhabitants of our planet.

**Vocabulary**

|  |  |
| --- | --- |
| encompass – оточувати, містити в собі  web – павутина, сітка, сплетіння  by altering any part – змінюючи будь-яку частину  affect – впливати; діяти на  definition – визначення  consumerism – споживання  deteriorate – погіршувати(ся); псувати(ся);  contaminate – забруднювати; псувати | mismanage – погано керувати чимось  exterminate – винищувати; знищувати  unaesthetic and random – небажане та безладне спорудження  boundary – границя, межа; кордон  airborne (waterborne) – що транспортується повітряними шляхами (водними)  health hazards – небезпека для здоров’я  entire population – все населення |

2. **Answer the following questions:**

1. What is the origin of the word "ecology" and what does it mean?

1. What does the notion of "ecosystem" include?
2. What does the definition of the ecosystem suggest?

4. Can you think of any examples that demonstrate the highest level of consumerism in humans' attitude to Nature ?

1. **Find English equivalents for:**

Жива істота, звертати увагу, утилізація сміття, складна система, стан рівноваги, залежати, люди забруднюють та знищують свій дім; проводити випробування зброї; індійське прислів'я; забруднення не знає меж; це спричиняє небезпеку для здоров’я; мешканці нашої планети.

4. **Write out:**

**a) key-words out of each paragraph;**

**b) sentences expressing main ideas of each paragraph.**

**5. Retell the text briefly in your own words making use of the key words and the sentences you’ve written out.**

**6. It is interesting to know. Add some facts.**

1. Eight million of oil are spilled into the Earth’s oceans every day.
2. Madagascar is home to at least 150, 000 living species found nowhere else in the world.
3. In Germany, several water utilities now pay farmers to switch to organic operations because such conversion costs less than removing farm chemicals used in conventional agriculture from water supplies.
4. One ton of recycled paper can save 17 trees and three cubic yards of landfill space.

**TEXT 3**

**1. Read and translate the text:**

**Our Environment**

Many nations of the world have set up special government department to protect the nature resources that are found within their lands. These resources include streams and forests.

Some of these departments, or agencies, have effected a change in the ingredients of detergents, products used for cleansing. These new compounds break down naturally into simple forms. This decreases the amount of suds and harmful chemicals in lakes and streams.

Many paper and aluminum products are now being recycled so that they can be used again. Instead of accumulating trash to harm the environment, these materials can be processed and manufactured into other products. Some communities in the USA have drives to collect old newspapers. The paper can then be specially prepared for reuse.

Almost everything can be used again instead of being thrown away. The people, as well as the government, can help clean up the environment.

**Vocabulary**

|  |  |
| --- | --- |
| set up – засновувати, створювати; відкривати (справу тощо); забезпечувати; призначати  detergent – 1) пральний порошок 2) дезінфекційний засіб  suds – мильна піна (вода) | to recycle – 1) повторно використовувати (відходи виробництва)  reuse – 1) знову використовувати;  2) повторне використання |

**2. Find the meaning.**

*accumulating:*

1. piling up
2. ending;

*processed:*

1. treated or prepared
2. stored.

**3. Choose the correct variant.**

1. What is the right statement to introduce the main idea of the article?

a) People develop new ways to protect the environment.

b) It is very important to recycle aluminum and paper products.

c) Instead of throwing things we can process them, thus protecting the environment.

d) In many countries there exist special departments to protect the environment.

2. Detergents are used … .

a) to increase the amount of suds and chemicals;

b) to make things usable again;

c) to help in cleaning up;

d) to break down different things into simple forms.

3. What is the right order?

a) People use improved detergents to clean and wash up.

b) New ingredients to be added into detergents were invented.

c) Lakes, rivers and streams become cleaner.

d) new compounds break down naturally into simple forms.

4. Because almost everything can be used again people should … .

a) throw things away;

b) find ways to recycle wastes;

c) accumulate things as trash;

d) use detergents everywhere.

5. Recycling isn’t connected with … .

a) processing wastes;

b) manufacturing wastes into new products;

c) collecting old newspapers;

d) throwing things away.

6. Ingredients are … .

a) small pieces of information;

b) elements of which compounds consists;

c) lakes and rivers;

d) aluminum and papers.

**4. Answer the questions.**

1. Are there any National Parks in Ukraine?

2. What is global warming?

3. Why is it so dangerous to be in direct sunlight?

4. Can you name any society fighting for environmental protection?

**5. Write what people must do to protect nature and what they mustn’t do not to do harm to it.**

**For example:** Don’t cut, but plant trees.

Don’t leave a fire in the forest.

**6. Read and learn. Cover the right side of the exercise, read the words on left side and give their definition.**

|  |  |
| --- | --- |
| **ecology** | a) the study of the relation of plants and animals to their environment; |
| **environment** | b) the air, water, land on the Earth which can be harmed by man’s activities; |
| **organism** | c) any living things; |
| **atmosphere** | d) the layer of gases surroundings the Earth; |
| **endangered species** | e) animals and plants in danger of becoming extinct; |
| **extinct** | f) when animals and plants die out and are gone from the Earth forever (like dinosaurs); |
| **oxygen** | g) a gas that makes up about 21% of the Earth’s atmosphere; all living things need it to survive; |
| **acid rain** | h) when harmful gases from cars and power plants are released into the air and fall back to the Earth with rain or snow; |
| **greenhouse effect** | i) when gases from factories, electric power plants and cars trap the sun’s heat and warm up the Earth. |

**TEXT 4**

1. **Read and translate the text:**

**Ecological problems**

Since ancient times nature has served man, being the source of his life. For thousands of years people lived in harmony with environment and it seemed to them that natural riches were unlimited. But with the development of civilization man's interference in nature began to increase. Large cities with thousands of smoky industrial enterprises have appeared all over the world today. The byproduct of their activity pollutes the air we breathe, the water we drink, the land we grow grain and vegetables. Every year world industry pollutes the atmosphere with about 1000 million tons of dust and harmful substances. Many cities suffer from smog. Vast forests are cut and burn in fire. Their disappearance upsets the oxygen balance. As a result some rare species of animals, birds, fish and plants disappear forever, a number of lakes and rivers dry up.

The pollution of air and the world's ocean destruction of the ozone layer is the result of man's careless interaction with nature, a sign of ecological crises. As a result of the Chernobyl tragedy the Belarussian people faced the most horrible ecological disaster. About 18 per cent of the territory of Belarus was contaminated with radioactive substances. A great damage has been done to the republic's agriculture, forests and people's health. The consequences of the atomic power station explosion are tragic for the Belarussian nation. Only a small percent of Belarussian land remains contamination are being discovered every year. Not only Chernobyl but many of our "peaceful" factories and towns cause a great damage to the environment. Dangerous dust and blow-outs of the enterprises are being carried out by winds for long distances destroying the life around. People all over the world are worried about what is happening to the environment. They understand that the earth is their home, a big green home. The environment protection should be our universal concern. Some progress has been already made in this direction. As many as 159 countries -members of the UNO have set up environmental protection agencies. Numerous conferences have been held to discuss questions of ecologically poor regions including the Aral Sea, the South Urals, Kuzbass, Donbass, Semipalatsinsk and Chernobyl. An international environmental research centers have been set up on Lake Baikal. The international organization Greenpeace is also doing much to preserve the environment. But these are only the initial steps that must be carried forward to protect not only for the sake of the present but for the future generations.

**Vocabulary**

|  |  |
| --- | --- |
| harmful substances – шкідливі речовини  to suffer – страждати, зазнавати  disappearance – зникнення  upset – розстроювати, порушувати  carelessinteraction – недбале поводження  destruction – знищення, руйнування  damage – збиток, шкода, пошкодження | consequence – наслідок, результат  tocause – спричиняти, заподіяти, призводити, викликати  dust – пил, сміття, курява, порох  disaster – лихо, катастрофа  blowouts – викиди  universalconcern – загальний інтерес, турбота  setup – заснувати  preserve – зберігати, оберігати, охороняти  for the sake – заради  by-product – побічний продукт |

1. **Answer the following questions:**
   1. Why did people seem, that natural riches were unlimited?
   2. What increased environmental pollution?
   3. What causes disappearance of forests and what is the result of it?
   4. How do industrial enterprises affect the environment?
   5. What are the results of man’s careless interaction with nature?
   6. Why are people worried about what is happening to the environment?
   7. What do people do to preserve the environment?
2. **Give the English equivalents of the following words and word combinations:**

Втручання людини в природу, промислові підприємства, шкідливі речовини, рідкісні види тварин, птахів, риб, рослин; зникати, руйнування озонового шару, велика шкода, жахлива екологічна катастрофа, вибух на атомній електростанції, спільна турбота, природоохоронні органи (агентства), зберегти довкілля, недбале поводження, заради майбутніх поколінь.

1. **Complete the sentences:**
2. The development of civilization increased… .
3. The by-products of industrial enterprises pollute … .
4. The disappearance of forests … .
5. The result of man’s careless interaction with nature is … .
6. Chernobyl tragedy has caused great damage to … .
7. People all over the world … .
8. The environmental protection should be … .
9. 159 countries-members of UNO … .
10. The International organization Greenpeace … .
11. We should do all our best to preserve … .
12. **Write out: a) key-words of each paragraph; b) sentences expressing main ideas of each paragraph.**
13. **Retell the text, using key words and sentences you’ve written out.**

**TEXT 5**

* 1. **Read and translate the text:**

**Environmental pollution**

Pollution is the contamination of the environmental situation, including air, water, and land. Such contaminationoriginates from human activities. Pollution became evident in Ukraine with industrial development in the 19th century. Ukraine contains some of the most polluted landscapes in Eastern Europe.

Airpollution is especially severe in the heavily industrialized cities of Kharkiv, Luhansk, Donetsk, Dnipropetrovs'k and Zaporizhzhia. Coal-using industries are major sources of high levels of uncontrolled emissions of harmful substances. Other Ukrainian cities with major chronic air pollution problems include Kyiv, Komunarsk, Makiivka and Odesa.

Over one-third of the emissions into the atmosphere originate from automobiletransport. It is aggravated by the use of leaded gasoline and inefficient enginesas well as a lack of catalytic converters.

Almost all surface waters of Ukraine belong to the Black Sea and the Sea of Azov basins. The high population density and low protection have given rise to chronic and serious levels of water pollutionin Ukraine.

The Dniester and the Danube are the most polluted bodies of water. Hundreds of small rivers supply water for villages and cities of Ukraine. Those water arteries are so polluted as to pose fatal health risk to the people who depend on them. About half of the chemical fertilizers applied in the fields are washed off into the river.

One of the areas suffering most from chronic coastal water pollution is the Sea of Azov.The sea's salinityhas increased by 40 percent since the 1950's. It has resulted in a dramatic dropin fish catches by 60-90 percent

On April 26, 1986 a horrible accident occurred at the Chornobyl'nuclear station. There was a nuclear reactor explosion, which had far reaching consequences. Contamination by various radioactive isotopeshas affected the air, land and water of Ukraine. About 100,000 people were exposed to deadly levels of radiation before being evacuated. Recorded but unreported radiation levels in Kyiv the maximum levels by ahundredfold. Numbers of death and children leukemia have occurred in the affected areas.

Significant areas of lands will remain unsafe for food production for 8000 years. Workers enclosed the destroyed reactorin asteel and containment building, but radiation continues to leak from this structure.

After the Chernobyl disaster the environmental situation has become much worse. Ukraine appealed to the UNOrequesting help to overcome the disaster aftermath. The ecological organization Green Worldis active in Ukraine.

Since 1991 the Environmental Protection Law has been in force. Environmental safeguards of conservation bodieshave become more stringent Ecological monitoringhas covered Ukraine's whole area. The Governmental Commissionon the Problems of the Dnieper and Drinking Water has been set up.

Ukraine has joined internationalcooperation in the field of environmental protection. Agreementshave been signed with conservation bodies of the USA. Poland, Czechia, Slovakia, Germany and Latvia. The Ukrainian delegation took part in the UNO Conference on the Problems ofEnvirinment.

**Vocabulary**

|  |  |
| --- | --- |
| contamination – забруднення, зараження  originate – походити, породжувати, виникати через щось  severe – тяжкий  emissions – викиди  harmful substances – шкідливі речовини  chronic – поспішний, жахливий  aggravate – поширювати, посилювати  leaded gasoline – етиловий бензин  inefficient engine – неефективний двигун  water pollution – забруднення води  catalytic conventer – каталітичний нейтралізатор  high population density – висока щільність (густота населення)  bodies of water – водойм | chemical fertilizers – хімічні добрива  coastal water pollution – забруднення прибережних вод  salinity – солоність  to pose – представляти  dramatic drop – різке падіння  occur – відбуватися, траплятися  far-reaching consequences – далекосяжні наслідки  to be exposed – піддавати дії чогось (радіації, сонця, вітру)  hundred fold – у сто крат  unsafe – небезпечний  to leak – текти  disaster – катастрофа, лихо  stringent – суворий, переконливий  conservation bodies – природоохоронні органи |

* 1. **Answer the questions:**

1. What is environmental pollution originated by?
2. Are Ukraine’s landscapes polluted?
3. Where is air pollution especially severe?
4. What are major sources of air pollution?
5. What are the most polluted bodies of water?
6. What is the ecological problem of the Sea of Azov?
7. What is theecological problem of the Chernobyl destroyed reactor?
8. What are the ecological problems of your region?
9. What causes chronic and serious levels of water pollution in Ukraine?
10. How does Ukraine solve the problems of environmental pollution?
11. What is Green World?
    1. **Match the following English words and word-combinations with their Ukrainians equivalents:**

|  |  |
| --- | --- |
| emission  chemical fertilizers  occur  originate  bodies of water  chronic  harmful substances  hundredfold  to pose  inefficient engine  aggravate  high pollution density  disaster  contamination  far reaching consequences | катастрофа  висока густота населення  погіршувати  зараження  неефективний двигун  представляти  далекосяжні наслідки  траплятися  водойм  викиди  виникати через щось  постійний, жахливий  хімічні добрива  шкідливі речовини  у сто крат |

* 1. **Translate into English:**

1. Забруднення довкілля виникає через діяльність людини.
2. Вугільна галузь є основним джерелом неконтрольованих викидів шкідливих речовин.
3. Сотні малих річок забезпечують водою села та міста України.
4. Близько половини хімічних добрив, що застосовуються на полях, вимиваються у річки.
5. 26 квітня 1986 року на Чорнобильській АЕС сталася аварія, яка мала далекосяжні наслідки.
6. Після чорнобильської катастрофи екологічна ситуація в Україні погіршилась.
7. Одна з територій, які найбільше потерпають від забруднення прибережних вод – це Азовське море.
8. З 1991 року Закон про захист довкілля – у дії.
9. Більше 1/3 викидів в атмосферу – від автомобільного транспорту.
10. Українська делегація брала участь в конференції ООН з проблем довкілля.
    1. **Write out sentences, expressing main ideas of each paragraph.**
    2. **Retell the text briefly, using the sentences you’ve written out.**

**TEXT 6**

**1.Read and translate the text:**

**Sea Pollution: Poisoning the Food Chain**

Crave concern is expressed about the pollution of the sea with untreated domestic and industrial sewage. Every year, the sea is getting more polluted. It contains more and more chemicals and more rubbish. The continental coastal regions are most polluted. The toxic effects of chemical substances are very harmful. Fish choke with refuse, ashes, chemical salts, tars, phenol and bacteria. A layer of grease on the water surface prevents oxygen from penetrating into water. Many fish become deformed from the pollution.

Contaminated marine fishery products are poisonous to eat. Many animals are suffering: birds, whales, dolphins become poisoned and die. Their dead bodies have such a high level of pollution that it is classified as toxic waste. It goes without saying, that all that is the direct threat to human health. Human poisoning and illness associated with eating contaminated fish and shell-fish multiply.

So, the people poison themselves: sea is the final cesspool into which most of the discharge of man’s polluting activities flows.

**Vocabulary**

|  |  |
| --- | --- |
| poison – отрута  untreated – неочищений  sewage – стічні води  rubbish – сміття  coastal – прибережні  choke – задихатися  refuse – сміття, відходи  ashes – попіл  tars – смола  phenol – фенол,карболова кислота | grease – жир  oxygen – кисень  penetrate – проникати  marinefishery – морське рибальство  suffer – страждати  whale – кит  dolphin – дельфін  shellfish – молюск  cesspool – стічна яма  discharge – стік,злив |

**2. Answer the questions:**

* 1. What is expressed about the pollution of the sea with untreated domestic and industrial sewage?
  2. What are the effects of chemicals in sea water on sea flora and fauna?
  3. What contains more and more chemicals and more rubbish?
  4. What is meant by “poisoning the food chain”?
  5. What are the areas for environmentalists’ control over water polluting activities of manufacturers?

**3. Match the words on the right with their correct definitions on the left.**

|  |  |
| --- | --- |
| 1) pollution  2) sewage  3) harmful  4) ashes  5) to penetrate | a) the presence in or introduction into the environment of a substance which has harmful or poisonous effects  b) waste water and excrement conveyed in sewers  c) causing or likely to cause harm  d) go into or through (something), especially with force or effort  e) the powdery residue left after the burning of a substance |

**4. Fill in the blanks with the necessary words given below according to the text**

*Domestic, rubbish, toxic effects, phenol, whales, contaminated fish, cesspool*

* 1. Crave concern is expressed about the pollution of the sea with untreated \_\_\_\_\_\_\_ and industrial sewage.
  2. It contains more and more chemicals and more \_\_\_\_\_\_.
  3. The \_\_\_\_\_\_\_\_ of chemical substances are very harmful.
  4. Fish choke with refuse, ashes, chemical salts, tars, \_\_\_\_\_\_ and bacteria.
  5. Many animals are suffering: birds, \_\_\_\_\_\_, dolphins become poisoned and die.

6. Human poisoning and illness associated with eating \_\_\_\_\_\_\_ and shell-fish multiply.

7. So, the people poison themselves: sea is the final \_\_\_\_\_\_\_ into which most of the discharge of man’s polluting activities flows.

**5. Confirm or contradict the following statements:**

1. Crave concern is expressed about the pollution of the air with untreated domestic and industrial sewage.
2. The toxic effects of chemical substances are very harmful.
3. A layer of grease on the land surface prevents oxygen from penetrating into

water.

1. Many people become deformed from the pollution.
2. Contaminated marine fishery products are useful to eat.
3. Many animals are suffering: birds, whales, dolphins become poisoned and die.
4. Water poisoning and illness associated with eating contaminated fish and shell-

fish multiply.

1. So, the people poison themselves: sea is the final cesspool into which most of the

discharge of man’s polluting activities flows.

* 1. **Give Ukrainian equivalents to the following words:**

Crave concern, untreated domestic, chemical substances, grease, deform, contaminated marine fishery, to suffer, shell- fish, to poison, discharge, to associate

**TEXT 7**

* + 1. **Read and translate the text:**

**Pollution of Baikal**

Every day it’s becoming clearer that people are upset by the deterioration of nature in one place or another. Nature is being victimized by the triumphant march of Industry. Such a vast territory as our world would seem to offer enough space for both. However, over the past decades, this same evil presence seems to be at work trying to influence its actions against this silent, no-man’s land.

The Paper-and-Pulp Mill at Baikalsk has polluted the surrounding region and threatens the pristine conditions that have existed for centuries. The paper mill produces bleached cellulose that is used in clothing manufacture. The process, however, produces chemicals and effluent that threaten more than 1,500 species unique to the lake. The success of Lake Baikal has been viewed as critical to other environmental efforts throughout the world. Plans for the paper mill at Baikalsk began in 1954. The public was informed in 1957; protests were held, and ignored. This pollution affects the bottom-dwellers of the lake as well, for Lake Baikal's waters are thoroughly mixed, with oxygen found even at the lowest depths. In addition, the Angara carries some of this pollution westward. Baikalsk releases chlorinated organics from the waste chemicals involved in pulp bleaching. These are of particular concern since they take centuries to biodegrade.

**Vocabulary**

|  |  |
| --- | --- |
| deterioration – погіршення, псування  victim – жертва  to be victimised – потерпати  triumphant – тріумфальний, переможний  vast – безкраїй, величезний  decade – десятиріччя  the paper-and-pulp mill – целюлозно-паперова фабрика | pristine – давній, первісний  cellulose – целюлоза, клітковина  effluent – стічні води  bottom-dwellers – жителі дна  pulpbleaching – відбілена целюлоза  biodegrade – розкладатися під дією бактерій  species – вид, різновид |

1. **Answer the following questions:**

1) What is becoming clearer every day?

2) What is being victimized by the triumphant march of industry?

3)How does the paper-and-pulp mill influence the surrounding regions?

4) What is used in clothing manufacture?

5) Does the process produce chemicals and effluent that threaten more than 1,500 species unique to the lake?

6) When did plans for the paper mill at Baikalsk begin?

7) What was held and ignored?

8) What affects the bottom-dwellers of the lake?

9) What happens with the Lake Baikal’s waters?

10) Does Baikalsk release chlorinated organics from the waste chemicals involved in pulp bleaching?

1. **By referring to the text complete the following sentences:**
2. Every day it’s becoming clearer that …….**.**
3. Such a vast territory as our world ………..
4. …………..this same evil presence seems to be at work trying to influence it’s actions against this silent, no-man’s land.
5. The Paper-and-Pulp Mill at Baikalsk has polluted the surrounding ………… .
6. The process, however, produces chemicals ……… .
7. **Find Ukrainian equivalents for:**

*Deterioration of nature; is being victimized by the triumphant march; no-man’s land; threatens the pristine conditions; bleached cellulose; environmental efforts;chlorinated organics.*

1. **Confirm or contradict the following statements:**
2. Every day it’s becoming clearer that people are upset by the deterioration of nature.
3. Society is being victimized by the triumphant march of industry.
4. The Paper-and-Pulp Mill at Baikalsk has polluted the surrounding countries and continents.
5. The success of Lake Baikal has been viewed as critical to other environmental efforts throughout the world
6. Plans for the paper mill at Baikalsk began in 1958.
7. **Give a brief summary of the text.**

**TEXT 8**

* 1. **Read and translate the text:**

**Air pollution of Baikalsk**

Air pollution surrounding Baikalsk is the worst in Baikal region. The larch and pine forests in the area also exhibit degradation effects from the pollution. Furthermore, disabilities in the population are rising, ostensibly a result of the pollution. DDT levels are higher here. Many other chemical levels show similarities to the U.S. Great Lakes. This is particularly worrisome, as the food web for Lake Baikal closely mirrors that of the Great Lakes. While Baikal supports 1,500+endemic species, however, Lake Superior, by contrast, has only four. This may be a result of age, however; while Lake Baikal is roughly 30 million years old, Lake Superior is only 10,000 years old.

Pollution also occurs from the Selenga River. This tributary is the main inlet to Baikal, contributing almost one-half of Baikal's water inflow. Sediment and waste from three large Mongolian cities, as well as human and industrial wastes are carried by the Selenga. Thus far, the most noticeable effect has been decreased spawning rates for the omul, an endemic fish considered a delicacy. The coal-burning plants in Slyudyanka, furthermore, contribute to acid rain, which in turn further pollution in the lake. In April 1987, the Soviet government issued a decree to protect Lake Baikal. Mikhail Grachev, a molecular biologist, was appointed the director of the Institute for Limnology at Irkutsk in 1986, (the Siberian branch of the Soviet Academy of Sciences) and was directed to study Lake Baikal. In 1988 the Centre for the Great Lakes Studies entered into a joint project with the Institute of Limnology. An international ecological center was instituted at Baikal in 1990. UNESCO (United Nations Educational, Scientific and Cultural Organization) is considering classifying Lake Baikal as a natural treasure of the world, which would then give it international protection.

Lake Baikal is currently a test area to determine the extent of the spread of manmade pollutants. Considering the levels of pollution, Lake Baikal remains in fairly pristine condition. This is largely the result of its tremendous size. Its size, however, is what led to the pollution in the first place. For years, many Soviet officials believed that factories would not harm the lake; its size would disperse the chemicals harmlessly. Now, however, it has been shown that pollution at any level is detrimental. Baikal has become a symbol of environmental dangers. The similarities of Lake Baikal to other bodies of water indicate these dangers and the urgency of conservation. The Great Lakes, although now on a rebound, were in terrible condition. Lake Baikal has also been compared to Lake Tanganyika, which houses no life. International participation and funding, however, appear crucial to salvaging the Siberian Pearl. If the pollution continues unabated, which is not foreseen, it may become more crucial. At particular risk are the Baikal seal and several species of endemic fish found no where else in the world, including the omul and the golomyanka.

**Vocabulary**

|  |  |
| --- | --- |
| larch – *бот.* модрина  to exhibit – показувати, виявляти  disability – непрацездатність, безсилля  ostensibly – нібито, немовби  DDT – ДДТ (інсектицид)  worrisome – неспокійний, що завдає турбот (клопоту)  endemic **–** місцевий, властивий даній місцевості  tributary – притока  inlet – вузька затока, бухта, фіорд  inflow – впадання, вливання  sediment – осад, гуща (на дні)  spawning – нерест | omul – *зоол.* омуль  delicacy – делікатес  acidrain – кислотний дощ  extent – простягатися, поширюватися  manmade – штучний, створений людиною  disperse – розповсюджувати, розсіювати  detrimental – збитковий, шкідливий  conservation – зберігання  to be on a rebound – вплинути на когось (щось)  salvaging – рятування  unabated – неослаблений, не зменшений  crucial – вирішальний, критичний |

* 1. **Answer the following questions on the text:**

1. Is air pollution surrounding Baikalsk the worst in Baikal region?
2. Why do many other chemical levels show similarities to the U.S. Great Lakes?
3. How many endemic species does Baikal support?
4. What does pollution of Baikal also occur from?
5. What is carried by the Selenga?
6. When was the decree to protect Lake Baikal issued?
7. Is Lake Baikal currently a test area to determine the extend of the spread of manmade pollutants?
8. What is detrimental?
9. A symbol of what has Baikal become?
10. What appears crucial to salvaging the Siberian Pearl?

**3. Read, translate the text and make up your own plan. Retell the text according to the plan.**

**4. Translate the following phrazes from Ukrainian into English:**

*Забруднення повітря; зростає непрацездатність людства; промислові відходи; кислотний дощ; молекулярна біологія; штучні забруднювачі; рівень забруднення.*

**5. Open the brackets and translate the sentences:**

1. Air pollution surrounding Baikalsk (to be) the worst in Baikal region.
2. Furthermore, disabilities in the population (to be) rising, ostensibly a result of the pollution.
3. This is particularly worrisome, as the food web for Lake Baikal closely (to mirror) that of the Great Lakes.
4. Pollution also (to occur) from the Selenga River.
5. Sediment and waste from three large Mongolian cities, as well as human and industrial wastes (to be) carried by the Selenga.
6. Lake Baikal (to be) currently a test area to determine the extent of the spread of manmade pollutants.
7. This (to be) largely the result of its tremendous size.

**6. Make up your own sentences with the following words and word combinations:**

*Аir pollution, degradation effects, chemicallevels, endemicspecies, coal-burning plants, internationalecologicalcenter, manmadepollutants, pristinecondition, environmental dangers.*

**TEXT 9**

* + 1. **Read and translate the text:**

**Switiaz**

The nature of Volyn’ region is very rich and various. Here we can see mysterious forests and green meadows. There are a lot of lakes with clean water. They are 200. Lake Svitiaz’ is the largest among them. It’s often called “Ukrainian Baikal”. It covers the territory of 24,2 square kilometers and is 58,4 metres deep. You can look down through the water and count the stones on the bottom of the lake. Various species of plants and fish live in this crystal-clear water, many of them can’t be found anywhere else in the world.

There have been many discussion about Lake Svitiaz’. Some scientists have demanded that Sviatiaz’ should be preserved completely as it is a wonder of nature.

Others want to use this great reservoir of water for economic purposes. The discussion still goes on, and many points are disputable. The timber processing plant that has been constructed on the bank of the lake has proved that a factory can return its waste water to the lake quite pure if it uses modern filtering techniques.

Lake Svitiaz’ attracts a lot of tourists. Camping sites and tourist centres are situated on its bank. Its a beloved place of recreation for many people.

We need to change our attitude to the ecological problems that the lake faces; otherwise the future generations will not see the beauty of Lake Sviatiaz’.

* + 1. **Write down new words from the text and learn them.**

**3. Answer the questions.**

1. Where is Volyn’ region situated?

2. How many lakes are there on its territory?

3. What is the largest one?

4. What do you know about Lake Svitiaz?

5. What is it famous for?

6. Why is Lake Svitiaz called a wonder of nature?

7. Do you think it makes sense to build factories near Svitiaz’? Why?

8. Do you think it’s good idea to build tourists centers on the bank of Svitiaz’? Why?

**4. Say if the following statements are true or false.**

1. There is a hundred of lakes with clean water in Volyn’ region.

2. Different species of plants and fish live in the lake.

3. The lake is a popular tourist attraction.

4. Lake Svitiaz’ is the smallest lake of Volyn’ region.

* 1. **Read the words from the box and explain their meaning.**

|  |
| --- |
| *to pollute, environment, mutual, ecology, habitat, poison,*  *urgent, generation, benefit, waste* |

* 1. **Match the words with their definitions.**

|  |  |
| --- | --- |
| 1. to make dirty 2. a natural place of growth 3. advantage, profit 4. held (shared) in common 5. no longer in use 6. surroundings, circumstances | * 1. waste   2. benefit   3. habitat   4. to pollute   5. mutual   6. environment |

* 1. **Fill in the blanks with the proper word from the box.**

|  |
| --- |
| *ecology, benefit, mutual, habitat, demand, polluted,*  *concerned, waste, generation, urgent* |

1. The science that studies the conditions of the … of people, animals and plants for the … of the present and future … is called … .
2. Our country is rich in water resources but the problem of pure water is … nowadays. The water of rivers, lakes must not be … by slicks or released factory … .
3. There is growing … for water in cities and villages.
4. People should be … about how to make our planet a healthful place for all living beings.
5. The Earth is our … home.

**TEXT 10**

**1. Read and translate the text:**

Global warming threatens Arctic

The Arctic ice is melting at a dangerous speed and may completely disappear by the end of this century. This is according to scientists at America's National Snow and Ice Data Centre (NSIDC). Experts said recent satellite images showed the volume of sea ice was the lowest it has ever been. An area five times larger than the UK has disappeared since 1978 and the melting is getting faster. This year was the warmest Arctic summer in 400 years. Dr. Mark Serreze from the NSIDC said the worrying trend of melting ice caps is because of global warming.

The NSIDC's leader Dr. Ted Scambos said the Arctic Circle is melting so quickly that it may never recover. He said the Arctic is caught in a dangerous process that man cannot reverse. Less sea ice means the Earth cannot reflect the suns rays and cool itself. Warmer seas then melt more ice. The loss of sea ice in one year increases the loss the next year. Current ice loss is estimated at eight percent per decade. This means there may be no ice at all during the Arctic summer of 2060. Dr. Scambos warned: "It is pretty certain a long-term decline is underway."

**Vocabulary**

|  |  |
| --- | --- |
| to melt – танути  satellite – штучний супутник  trend – напрям,тенденція  cap – верхівка | the Arctic Circle – північне полярне коло  to reverse – змінювати  to estimate – оцінювати |

**2. Look at the text’s headline and guess wheather these sentences are true (T) or false (F).**

|  |  |  |
| --- | --- | --- |
| a)  b)  c)  d)  e)  f)  g)  h) | The Arctic Circle ice may disappear completely within a decade.  The volume of sea ice is at the lowest levels on record.  An area fifty times larger than the UK has already been lost.  The loss of ice has nothing to do with global warming.  The ice caps may never recover.  Less sea ice means the Earth cannot reflect the suns rays.  Current ice loss is happening at a rate of eight percent a year.  There may be no ice in the Arctic summer of 2060. | T/F  T/F  T/F  T/F  T/F  T/F  T/F  T/F |

* 1. **Match the following synonyms from the article.**

|  |  |
| --- | --- |
| a) speed  b) completely  c) images  d) disappeared  e) worrying  f) recover  g) reverse  h) current  i) decline  j) underway | 1. vanished 2. beginning 3. turn around 4. pictures 5. present 6. rate 7. disturbing 8. drop 9. bounce back 10. totally |

* 1. **Match the following phrases from the article (sometimes more than one combination is possible).**

|  |  |
| --- | --- |
| a) The Arctic ice is melting  b) by the end  c) the volume of sea ice was the  d) An area five times  e) melting ice caps is because  f) is melting so quickly that  g) in a dangerous process that man  h) Earth cannot reflect  i) Current ice loss is estimated at  j) pretty | 1. lowest it has ever been 2. the suns rays 3. of global warming 4. it may never recover 5. certain 6. at a dangerous speed 7. eight percent per decade 8. of this century 9. larger than the UK 10. cannot reverse |

* 1. **In pairs / groups, agree on the endings to the following “If” sentences. Talk about what you wrote. Change partners and share your sentences and ideas.**

1. If sea levels rise, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. If governments don’t act, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .
3. If polar bears disappear, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .
4. If temperatures continue to rise, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
5. If summer get hotter, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
6. If we keep creating greenhouse gases, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .
7. If the Arctic disappears, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
8. If the world’s weather changes, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
   1. **Put the words in the box into the gaps in the text.**

|  |
| --- |
| *ever, time, Arctic, estimated, pretty, cool, recover, during, leader, loss, process* |

The Arctic ice is \_\_\_\_\_\_\_ at a dangerous speed and may completely \_\_\_\_ by the end of this century. This is \_\_\_\_\_ to scientists at America's National Snow and Ice Data Centre (NSIDC). Experts said recent satellite images showed \_\_\_\_\_\_ of sea ice was the lowest it has \_\_\_\_\_\_ been. An area five times \_\_\_\_\_\_ than the UK has disappeared since 1978 and the melting is getting faster. This year was the warmest \_\_\_\_\_\_\_\_ summer in 400 years. Dr. Mark Serreze from the NSIDC said the worrying \_\_\_\_\_\_\_of melting ice caps is because of global warming.

The NSIDC's \_\_\_\_\_\_ Dr. Ted Scambos said the Arctic Circle is melting so quickly that it may never \_\_\_\_\_\_\_\_. He said the Arctic is caught in a dangerous \_\_\_\_\_\_\_\_ that man cannot reverse. Less sea ice means the Earth cannot reflect the suns rays and \_\_\_\_\_\_\_ itself. Warmer seas then melt more ice. The loss of sea ice in one year increases the loss in the next year. Current ice loss is \_\_\_\_\_ at eight percent per decade. This means there may be no ice at all \_\_\_\_\_\_ the Arctic summer of 2060. Dr. Scambos warned: "It is \_\_\_\_\_\_\_ certain a long-term decline is underway."

**TEXT 11**

**1. Read and translate the text:**

**THE TRAGEDY IN CHORNOBYL**

Mankind will remember the 26lh of April 1986 forever. The tragedy in Chornobyl showed how great and how dangerous the power of atom could be. And it is especially dangerous when it is not under control.

On the 26th of April 1986 there was the blast at the Chornobyl Nuclear Power Station. And a lot of radioactive substances got into the atmosphere.

During the liquidation of the consequences of the accident, people all over the world could see the courage and bravery of the people who tried to save the situation.

During the first weeks of the tragedy a large number of men of letters and journalists from Ukraine and other countries of the world visited Chornobyl Zone. In their articles they told us about our compatriots such as Volodymyr Pravyk, Mykola Antoykin and many others. They got into struggle with the threatening and invisible enemy.

The rescuers did impossible. A lot of them perished, but they managed to stop the fiery element that had been storming over the damaged station for some days. The courageous heroes saved people who had got dan­gerous doses of radiation, they cleaned fields, gardens and houses. We can say that it was a national fear.

People did impossible: in history there hadn't been such an example before. The damaged reactor was covered with steel and concrete and buried under them. Nowadays the Chornobyl Nuclear Power Station is under control.

It certainly effects the ecological situation in Ukraine. On the 13th of December 2000 it was closed.

**Vocabulary**

|  |  |
| --- | --- |
| mankind – людство  blast – вибух  consequences – наслідки  rescuer – рятівник, визволитель | to be damaged– завдавати шкоди (збитків); бути пошкодженим  steel – сталь  concrete – бетон |

**2.Agree or disagree with the sentences**

1. The tragedy in Chornobyl showed how weak the power of atom was.
2. The accident happened on the 26th of April 1986.
3. During the liquidation of the consequences people all over the world could see the courage of the Ukrainian people.
4. A few journalists visited Chornobyl Zone.
5. A lot of rescuers did common things.
6. The rescuers couldn't stop the fiery element.
7. The courageous heroes saved people who had got a dangerous dose of radiation.
8. It was a national fear.
9. The damaged reactor was covered with leaves and wood.
10. Nowadays the level of radiation is higher at thestation than it should be.
    * 1. **Fill in the blanks with the words:**

*radiation, can, under, dangerous, save, of the world, ecological, atmosphere, enemy, damaged.*

1. The tragedy in Chornobyl showed how \_\_\_\_\_\_\_\_ the power of atom could be.
2. And a lot of radioactive substances got into the \_\_\_\_\_\_\_.
3. During the liquidation of the consequences of the accident, people all over the world could see the courage and bravery of the people who tried to \_\_\_\_\_\_ the situation.
4. During the first weeks of the tragedy a large number of men of letters and journalists from Ukraine and other countries \_\_\_\_\_\_\_\_\_ visited Chornobyl Zone.

5. They got into struggle with the threatening and invisible \_\_\_\_\_\_\_\_\_\_.

6. A lot of them perished, but they managed to stop the fiery element that had been storming over the \_\_\_\_\_\_\_station for some days.

7. The courageous heroes saved people who had got dangerous doses of\_\_\_\_\_\_\_, they cleaned fields, gardens and houses.

8. We can say that it was a national fear.

9. Nowadays the Chornobyl Nuclear Power Station is \_\_\_\_\_\_\_\_control.

10. It certainly effects the \_\_\_\_\_\_\_\_\_\_situation in Ukraine.

**4.** **Questionnaire. Check your knowledge about the problem.**

1. People can call it ecological problem. Some countries suffer from it. It can cause serious health problems. It can poison food. It can also damage statues and architecture badly.

2. Dirty water, poisoned food, industrial waste, heat, acid rains… What is the common name of this fact?

3. What is the most polluted place in Ukraine? Why?

4. It can cause the holes in the ozone layer. It also pollutes the air we breathe and wastes our time in the morning and evening.

5. It is a big spark of electricity that travels from the sky down to the Earth. It produces a great number of oxygen.

6. It helps us to breathe. It helps plants to live. The lack of it in the air can cause death. It helps doctors to save people’s lives in the hospital. If it is not enough inr thr water, fish and other sea creatures can die too.

7. This thing pollutes the atmosphere very much, but we cannot live without it. It takes people to and from work.

8. This is a part of science that studies the relationship between all forms of life.

9. These three words starting with “R” help us to create a cleaner world.

10. These useful organisms breathe in carbon dioxide and produce oxygen.

11.This is the most common greenhouse gas. People breathe it out and the trees breathe it in.

**5. Put the words in the right order to build up sentences.**

1. 1986, can, nuclear, energy, disaster, showed, in, that, extremely, Chernobyl, dangerous, be.

2. world, we, in, a, live, changeable.

3. people, all, of, millions, over, fight, the world, pollution, against.

4. problem, cities, another, wastes, big, of, is.

5. from, water, contaminate, wastes, the, plants, and, soil, factories, and.

6. many, there, of, problems, are, environment, the.

7. humsanity, today, problem, the greatest, for, pollution, is.

**6. Write your own propositions of building power stations.**

**Key:** acid rains, pollution, Prypyat’s – because of Chernobyl disaster in 1986, traffic jam, lightning, oxygen, transport, ecology, “reduce”, “recycle”, “reuse”, trees and plants, carbon dioxide.

**TEXT 12**

**1. Read and translate the text:**

# **Radioactive Waste**

Storage of radioactive waste (RAW) and the use of radioactive materials is a pressing problem in Ukraine. The country is still dealing with the consequences of the Chernobyl Nuclear Accident. In 1992, a detailed survey of the radiation levels in the Ukraine was undertaken. Contaminated territories cover an area of 41,000 square km (equal to the area of a country like the Netherlands) containing a population of 2.5 million people. Today the radiological situation of the area is determined by such long-living radionuclides as cesium 137, strontium 90, isotopes of plutonium and americium. Such a mixture is extremely hazardous due to various individual impacts and the transfer to the human organism.

In 1986, an entombment was built over the destroyed Chernobyl power unit, isolating the remains of the radioactive material (calculated at 20 million Ci of radioactivity) from the outside environment. This shelter was always intended as a temporary measure, and in 1992 Cabinet adopted a resolution for a competition to ensure the ecological safety of the construction. The problem is so complicated and severe that no particular project could provide an overall solution. In 1993, a joint French, German and Ukrainian project "Resolution" emerged with some solutions. The next stage is to determine who will carry out the work.

In addition to Chernobyl, there are more than one thousand sources of radiation applied for industrial, agricultural, medical and scientific purposes. Radioactive materials are also used by the military. More than 70,000 cubic metres of RAW are dumped or stored by the uranium and mining processing industries.

As an independent state, Ukraine now faces the problem of treating used nuclear fuel (among the former Soviet republics only Russia has the proper facilities for recycling). At present the used fuel is stored in temporary reservoirs at nuclear power plants, but many of these reservoirs are almost completely full. This is an extremely serious problem which must be dealt with soon.

**Vocabulary**

|  |  |
| --- | --- |
| storage – зберігання, акумулювання  radioactive waste – радіоактивні відходи  pressing problem – актуальна проблема  to deal with the consequences – мати справу з наслідками  Chernobyl Nuclear Accident – аварія на Чорнобильської АЕС  detailed survey – детальний (докладний ) огляд  contaminated (polluted) – забруднений  to determine – визначати  radionuclide – радіонуклід  cesium – цезій  hazardous – небезпечний  impact – вплив  transfer – перенесення, передача  entombment – саркофаг | remains – рештки, залишки  shelter – укриття, сховище  temporary measure – тимчасовий захід  to be intended – бути призначеним  to ensure – забезпечувати, страхувати  ecological safety – екологічна безпека  overall solution – спільне рішення  emerge – з’являтися, виникати  purpose – ціль, мета  treating used nuclear fuel – обробка відпрацьованого ядерного палива  proper facilities for recycling – належні умови для переробки  to store – зберігати  reservoir – резервуар  must be dealt – повинна бути розглянута  dump – скидати |

**1. Answer the questions on the text:**

1. Why is storage of RAW a pressing problem in Ukraine?
2. When did Chernobyl Nuclear Accident happen?
3. What was a detailed survey of the radiation levels undertaken for?
4. What determines the radiological situation of the contaminated territories?
5. Why was an entombment built?
6. what has been done to ensure the ecological safety of the construction?
7. Was the problem solved?
8. Are there any other sources of radiation in Ukraine?
9. What problems does Ukraine face nowadays?

**2. Give English equivalents to:**

Екологічна безпека, небезпечний, наслідки Чорнобильської аварії, визначати, забруднений, саркофаг, забезпечувати, рештки радіоактивних матеріалів, рівень радіації, тимчасовий захід, детальний огляд, переробка, зберігати, відпрацьоване ядерне паливо, радіоактивні відходи.

**3. Fill in the gaps:**

1. Ukraine is still dealing ……consequences of the Chernobyl Nuclear Accident.

2. ……territories cover an area of 41,000 square km.

3. Cesium 137, strontium 90 – are…… …… .

4. Entombment was built as a …… …… .

5. No project could provide an …… …… .

6. More than 70,000 cubic metres of RAW are …… .. ……by the uranium and mining processing industries.

7. Ukraine doesn’t have proper facilities for …… .

8. This serious problem must be …… .

**4. Translate into English:**

1. Забруднені території площею 41.000 кв. км. – це наслідки Чорнобильської аварії.
2. Суміш таких довго живучих радіонуклідів як цезій 137 та стронцій 90 є небезпечними для організму людини.
3. Щоб ізолювати залишки радіоактивних матеріалів від довкілля, був збудований саркофаг.
4. Питання було настільки складним, що жоден проект не забезпечив спільного рішення.
5. Зберігання радіоактивних відходів та використання радіоактивних матеріалів – актуальне питання для України.
6. Радіоактивні матеріали використовують військові.
7. Крім Чорнобиля, існує понад тисяча джерел радіації, які застосовуються в промисловості, сільському господарстві, науці, медицині.
8. В 1992 році в Україні було проведено детальний огляд рівня радіації.
9. Наразі відпрацьоване паливо зберігається в тимчасових резервуарах на атомних станціях.
10. В результаті спільного французько-німецько-українського проекту виникли деякі рішення.

**TEXT 13**

* 1. **Read and translate the text:**

**Chemicals kill off song thrush**

The mysterious silencing of the song thrush has been unravelled by experts. They believe the dramatic decline of one of Britain's most tuneful birds is due to a food shortage caused by modem farming methods.

In the past 30 years, song thrush numbers have fallen by at least 65 per cent — about four million birds. And a report by the British Trust for Ornithology revealed that they may be literally starving to death in the bird equivalent of their teenage years because pesticides are killing off their staple diet of worms and snails.

Experts who studied 90,000 song thrushes ringed since the 1960s found that far fewer young birds are getting through their first winter to join the breeding population.

The drop in numbers has been less marked in Scotland where comparatively little farmland is subjected to intensive agriculture. The ornithologists found that before 1975 about half the young birds survived to breed. But from then until 1993 the survival rate dropped to only two in five.

Many farmers claim the decline in song thrushes and skylarks, tree sparrows and grey partridges is due to an increase in predators such as sparrow-hawks and magpies.

Dr David Thomson, admits that this cannot be riled out. But he adds, “We are focusing our attention on the changes in agricultural practices which may be reducing the birds’ food supplies. These include pesticides, the removal of hedgerows and the reduction in ploughing in spring because so many crops are now sown in the autumn”.

But while the song thrush has declined, the report also revealed that Britain’s population of rooks has increased by 39 per cent since 1975.

**Vocabulary**

|  |  |
| --- | --- |
| 1. thrush – дрізд 2. unravel – розгадувати, пояснювати; 3. worm – черв'як, хробак; | 1. skylark – жайворонок; 2. partridge – куріпка; 3. sparrow-hawk– ястреб-перепелятник 4. magpie – сорока |

**2. Answer the following questions.**

1. What are the undesirable consequence of progress?

2. How do you take care of nature?

3. What can people learn from observing animals?

4. Are human beings an organic part of this world? Prove it.

5. The harmony between nature and human beings is desirable / Do you agree with it?

**3. Choose the words from the box to complete the sentences.**

|  |  |  |
| --- | --- | --- |
| the survival rate | tuneful birds | unraveled |
| has increased | reduce | predators |

1. The mysterious silencing of the song thrush has been ……. by experts.
2. From 1975 till 1993 …… dropped to only two in five.
3. They believe the dramatic decline of one of Britain’s most …… is due to a food shortage caused by modern farming methods.
4. Many farmers claim the increase in …… such as sparrow-hawks and magpies.
5. The changes in agricultural practices ……the bird’s food supplies.
6. British population of rooks …… by 39 per cent since 1975.

**4. Find the best answer to complete the sentences.**

1. The experts believe that the dramatic decline of thrushes is due to… .

a) pesticides which are killing off their staple diet of worms and snails;

b) a food shortage caused by modern farming methods;

c) significant levels of radiations which were found in the birds.

2. the decline of song thrushes has been less marked in… .

a) Scotland;

b) Wales;

c) England.

3. The farmers claim the increase of predators such as … .

a) skylarks and tree sparrows;

b) grey partridges and pigeons;

c) sparrow-hawks and magpies.

4. From 1975 until 1993 the survival rate of thrushes dropped to … .

a) only three in five;

b) only two in five;

c) only four in five.

5. The changes in agricultural practice include … .

a) pesticides, the removal of hedgerows and the sowing in spring;

b) pesticides, deforestation and the removal of hedgerows;

c) pesticides, the reduction in ploughing in spring, the removal of hedgerows.

6. Thrushes’s staple diet consists of ... .

1. cereals and ants;
2. worms and snails;
3. butterflies and grass.

**5. Find out how you worry about the environment with the help of his test.**

TEST

***DO YOU WORRY ABOUT THE ENVIRONMENT?***

1. Imagine you are on holiday abroad. You eat loads of chocolate-covered sweets but there aren’t any rubbish bins to put their wrappers in. What do you do?

a) Keep the wrappers in your pockets until you see a bin.

b) Throw them on the ground. It’s not your fault there aren’t enough rubbish bins.

c) It depends. If there’s a lot of rubbish on the floor, you might “drop them accidentally”.

2. On the way home you are very thirsty. What do you buy?

a) Something in a non-recyclable plastic bottle.

b) Something in a glass bottle or aluminum can.

c) Something in a carton.

3. Your personal stereo always needs new batteries. What do you do?

a) Buy rechargeable batteries.

b) Put the old batteries in the bin and buy new ones.

c) Buy new ones and take the old ones to a recycling centre.

4. If you lived near a beach, how would you react if a fast food restaurant opened near the beach?

a) Be pleased but also worried about more rubbish on the beach.

b) Be pleased about the possibility to eat burgers on the beach.

c) You never eat at fast food places there is too much packing.

5. You buy a couple of things in a shop. When you pay, the cashier is about to put the things in a plastic bag. What do you say?

1. "No, thank you". (You have brought your own bag from home.)
2. Nothing. You let him/her put the things in the bag.
3. It depends if you can carry the things easily without a bag.

6. There are a couple of flies in your bedroom. They are annoying you. What do you do?

1. Try to kill them with a newspaper.
2. Try to kill them with a horrible-smelling aerosol.
3. Hit the air with a newspaper so they leave you alone.
4. You are writing a letter to a good friend. You have made several mistakes and need to cross things out. What do you do?
5. Start the letter again on another piece of paper.
6. Continue writing; your friend will excuse your mistakes.
7. Continue to write but if you make any more mistakes, start again.

|  |  |  |
| --- | --- | --- |
|  |  | **score** |
| l. a = 3; | b=l; | c = 2. |
| 2.a = l; | b =3; | c = 2. |
| 3.a = 3; | b=l; | c = 2. |
| 4.a = 2; | b=l; | c = 3. |
| 5.a = 3; | b=l; | c = 2. |
| 6.a = 2; | b=l; | c = 3. |
| 7.a = 2 | b = 3 | c = 1 |

**Answers:**

7-10. You do not worry about the environment at all! You think pollution is someone else's problem, not yours. You think recycling and saving resources are too time-con­suming.

11-17. You care about the environment and you have good habits, which help save it. However, there are probably a few other things you could do.

18-21. You definitely care about the environment. You think about it when you make every day decisions. If more people in the world were as good as you, the planet would have fewer problems.

**6. Write an essay about the protection of nature in our native town and what your contribution may be.**

**TEXT 14**

1. **Read and translate the text:**

**Preserving wildlife**

Some species are on the verge of extinction, preserving and guarding them is the motto and aim of numerous campaigns waged by "green-minded" people.

Thus, the centre for cellular and molecular biology (India), in collaboration with the Central Zoo Authority, decided to set up a research centre for the conservation of endangered species. The Centre, the Third of its kind in the world after the US and China, aims at establishing gene banks and improving reproduction performance of endangered animals.

The Delhi High Court upheld the Centre's ban on trading of ivory and snake skin through amendments to the Wildlife Protection Act. Apart from ivory, elephants were also hunted for its meat, considered a delicacy by some native tribes. It was also smuggled out to neighbouring countries. Rhinos are being killed as rhino horns are in demand in east Asian oriental medicine markets. They also should be protected: as many as 1500 of the world's 1900 rhinos live in seven protected areas of the country.

A Mumbai court ordered the release of five blind lions performing for a circus.

The year witnessed the successful translocation of about 600 monkeys from Vrindavan to six nearby forests with financial assistance from the world wide fund for nature.Protecting endangered sea turtles the Orissa government banned the movement of merchandised trawlers within the 20 km radius of sea coast from November to April, the breeding season for the turtles. The Act put an end to the economic exploitation of the 1435 Sq km of sea coast in Bay of Bengal.

Following a Delhi High Court directive, the centre ordered closing down of as many as 66 mini zoos and seven small zoos in the country for not meeting the prescribed requirements.

Environmentalists were incensed when about 100 rare endangered migratory birds were allegedly shot down by state guests of Jammu and Kashmir during a two-day hunt. The area is visited by birds from central Asia, Europe and Siberia every year.

Unregulated flow of tourists and proliferation of facilities put biotic pressure on some parks and was responsible for the ecological imbalances in some regions where butterflies became a hot selling commercial proposition for tourists. Scientists of the Wildlife Institute of India expressed concern that although 50 per cent of insects were in the protected list, about 50,000 of them were being smuggled out every month. The trade included some rare species like Kohinoor, Kaiser-e-Hind, Bhutan Glory and Castor.

**Vocabulary**

|  |  |
| --- | --- |
| on the verge – на грані  guard – охороняти  motto – девіз  wage a compaign – проводити компанію  cellular – клітинний  in collaboration – в співпраці  endangered – той, що знаходиться в небезпеці  ivory – слонова кістка  smuggle out – вивозити контрабандою  neighbouring – сусідній  rhino (rhinoceros) – носоріг  horn – ріг | release – відпускати на волю  blind – сліпий  witness – бути свідком  the year witnessed – в цьому році відбулося  breeding – розмноження  meet requirements – виконувати вимоги  proliferation – миттєве захоплення |

**2. Answer the following questions:**

1. What is the aim of numerous campaigns waged by “green-minded”people?

2. Why did the center for cellular and molecular biology decide to set up a researched centre?

3. Does the Center aim at establishing gene banks and improving reproduction performance of endangered animals?

4. What is a delicacy for some tribes?

5. What was also smuggled out to neighbouring countries?

6. How many rhinos do live in seven protected areas of the country?

7. What were the actions of the Orissa government to protect endangered sea turtles?

1. Who ordered closing down of as many as 66 mini zoos and seven zoos in the country ?
2. Why were environmentalists incensed?
3. What put biotic pressure on some parks and was responsible for the ecological imbalances in some regions where butterflies became a hot selling commercial proposition for tourists?
4. **Write out of the text all the sentences expressing the main idea(s) of each logical part taking into account all the changes that you've made.**
5. **Match the words on the right with their correct definitions on the left:**

|  |  |
| --- | --- |
| 1) release  2) ivory  3) endangered  4) smuggle out  5)blind | 1) unable to see because of injury, disease, or a congenital condition  2) seriously at risk of extinction  3) move (goods) illegally out of a country  4) a hard creamy-white substance composing  the main part of the tusks of an elephant  5) allow or enable to escape from confinement;  set free |

**5.Discuss the following:**

1. The motto and aim of “green-minded” people.
2. Research center for the conservation of endangered species.
3. Protection of endangered sea turtles.
4. The influence of unregulated flow of tourists.

**6. Fill in the blanks with the necessary words given below according to the text:**

*endangered; molecular biology; delicacy; extinction; successful translocation*

1. Some species are on the verge of … , preserving and guarding them is the motto and aim of numerous campaigns waged by "green-minded" people.

2. Thus, the centre for cellular and … (India), in collaboration with the Central Zoo Authority, decided to set up a research centre for the conservation of endangered species.

3. Apart from ivory, elephants were also hunted for its meat, considered a … by some native tribes.

4. The year witnessed the ….. ….. of about 600 monkeys from Vrindavan to six nearby forests with financial assistance from the world wide fund for nature.

5.Environmentalists were incensed when about 100 rare….. migratory birds were allegedly shot down by state guests of Jammu and Kashmir during a two-day hunt.

**TEXT 15**

1. **Read and translate the text:**

**Аlternatives to cutting down trees**

While trees are a vital component in the creation of paper, many manufacturers today are beginning to use recycled waste combined with tree pulp to decrease the number of trees that need to be cut down and keep up with the growing demand for paper. Nearly half of all paper produced in the US is kept out of landfills by recycling it. Here waste paper has been sorted and prepared for recycling.

Recycling is by far the most common way to help save a tree. Some paper mills rely on recycled waste as their primary source of raw material. Others point to agricultural waste as a stand in for wood. Agri-pulp, as it's called, is wheat, oat, barley and other crop stalks left over after harvesting. Combined with recycled paper and other fillers, some paper makers are finding that agri-pulp paper makes fine stationery.

Many environmentalists who believe that the world's forests are being cut down faster than they can grow are pointing to the continued success of wood-free paper made with other plants such as hemp and a similarly fibrous plant called kenaf.

Hemp is a wood substitute that has a rich history in the paper making industry from paper's origins in China in the first century AD to the Declaration of Independence, which was written in the 18th century on hemp paper. Hemp is now used to make rope and clothes as well as paper. Unfortunately, it is illegal to grow hemp in the U.S. because it is a non-intoxicating variety of *cannabis saliva,* the same plant marijuana comes from. For that reason, hemp must be imported for use in the U.S.

The kenaf plant can quickly grow to between 12-18 feet in a few months. These plants provide about three-five times more fiber per harvest than southern pine trees, which can take 7-40 years before they can be harvested. This makes kenaf an attractive tree-substitute for making paper. This 4,000-year-old hibiscus plant – an annual, non-wood fiber plant related to okra and cotton – is native to central Africa

and can grow up to 18 feet tall in a four-to-five month season. Like hemp, kenaf is naturally whiter than wood and can be bleached with hydrogen peroxide instead of chlorine.

One of the major reasons paper mills are hesitant to convert to using kenaf or hemp to make paper is because they are not set up to process anything except trees. Converting a paper mill to process these wood pulp alternatives would cost tens of millions of dollars and major coordination with their suppliers and customers.

**Vocabulary**

|  |  |
| --- | --- |
| pulp – целюлоза, деревина маса  decrease – деревна маса  keep up with – відповідати (дійсності)  landfill – закопування сміття,  відходів, сміттєва звалка  waste paper – використаний папір  recycling – вторинна переробка  paper mill – паперова фабрика  agricultural waste – сільськогосподарські  відходи  stand in – замінник, дублер  wheat – пшениця | oat – овес  barley – ячмінь  crop – врожай  stalk – стебло  filler – наповнювач  stationery – канцелярські товари  pine tree – сосна  substitute – замінник  hibiscus – *бот.* роза гібіскус  okra – *бот*. окра,батия, гомбо  bleach – відбілювач  hydrogen peroxide – *хім*. перекис водню  chlorine – *хім*. хлор |

1. **Answer the following questions:**
   1. What is a vital component in the creation of paper?
   2. Is nearly all paper produced in the US kept out of landfills by recycling it?
   3. What is by far the most common way to help save a tree?
   4. Why is hemp illegal to grow in the US?
   5. What provides about three-five times more fiber per harvest than southern pine trees?
   6. What makes kenaf an attractive tree-substitude for making paper?
   7. Are many environmentalists pointing to the continued success of wood-free paper made with other plants?
   8. What can be bleached with hydrogen peroxide instead of chlorine?
   9. What is the main reason paper mill are hesitant to convert to using kenaf or hemp to make paper?
2. **Confirm or contradict the following statements:**

1) While trees are a vital component in the creation of paper, many manufacturers today are beginning to use recycled waste combined with tree pulp to decrease the number of trees that need to be cut down and keep up with the growing demand for paper.

2) Nearly all paper produced in India is kept out of landfills by recycling it.

3) Many environmentalists who believe that the world's forests are being cut down faster than they can grow are against the continued success of wood-free paper made with other plants such as hemp and a similarly fibrous plant called kenaf.

4) These plants provide about three-five times more fiber per harvest than western pine trees, which can take 10 years before they can be harvested.

5) Converting a paper mill to process these wood pulp alternatives would cost tens of millions of dollars and major coordination with their suppliers and customers.

**4. Give synonyms to the following words and word combinations:**

*demand for paper, vital component; waste, to recycle, raw materials,*

*to bleach, to supply, alternative, customer.*

**5.Translate the following phrases from Ukrainian into English:**

*Bідповідати дійсності, важливий компонент, використовувати вторинну переробку сміття та відходів, підготовлений до вторинної переробки, паперова фабрика, канцелярні товари, перекис водню, основні причини, щорічний.*

**TEXT 16**

**1.Read and translate the text:**

Environmental problems are the world’s ones.

Nowadays environmental problems are too big to be managed by individual persons or individual countries. In other words, it is an international problem. To what extent do you agree or disagree?

An essential problem of the 21st century is world pollution. Currently the environment is so much contaminated that urgent measures should be taken. The single individual cannot be blamed for the world pollution, however every person should take care of his or her habitat. In addition, it is vital that environmental issues should be treated internationally.

Lately, many presentations, conferences and international summits are held regarding waste treatment, recycling, soil and water contamination. For sure joint efforts and consolidation can only help in the mutual war towards the environmental disaster, which is going on. For instance, governments should offer support to companies and organizations, involved in manufacturing, industry or agriculture in order to find environment friendly approaches. These could be special law regulations, recycling programs, helping courses in order to implement ISO certificates and many more.

However, the influence of individuals over environment should not be ignored. If we do not confess that our planet is our home, we will never be able to take adequately care of it. We have to contribute every day to the preservation of nature and environment. For example, always remember to save energy by switching off lamps, computers and everything that we do not use. Our next obligation is to separate waste and throw bulk only in the designated areas. Driving vehicles can also be environment friendly. For example, we have to avoid accelerating the engines too rapidly or using the air condition in the country, where it will be better to save energy and simply open the windows.

To stop air pollution we basically need to reduce how much we travel (especially in cars and aeroplanes) and reinvent other non-pollutioning forms of energy to use (such as solar and hydro).

To stop water pollution we need to reuseand refinethe waste coming out of factories and reinvent a new sewage system, preferably with the sewage going into the ground rather than into a river so that it can decompose.

To stop land pollution we should reducethe number of items we simply buy, use and throw away, reuseobjects again and again, and recycleold things into new objects to be used again.

To sum up, environmental problems should be handled by local and international authorities also. Every single person should take care of environment and moreover we have to bring up our children to be conscious citizens of a clean and preserved planet.

**Vocabulary**

|  |  |
| --- | --- |
| individual person (country) – окрема особа (кратна)  world pollution – забруднення навколишнього середовища  urgent measures – термінові заходи  it is vital – життєво важливо  environmental issues – економічні проблеми  should be treated – повинні розглядатися  waste treatment – переробка відходів  environmental disaster – економічна катастрофа  to implement - здійснювати  to confess – сповідувати, визнавати, признаватися | to contribute – сприяти, робити вклад  designated areas – відведені місця  environment friendly – екологічно чисті  to accelerate – прискорювати, розганяти  to sum up – підводячи підсумки  sewage – стічні води  sewage system – каналізація  decompose – розкладатися, розщеплюватися, гнити  to be blamed – бути звинуваченим  approach – підхід |

**2. Answer the questions:**

1. What is the essential problem of the 21st century?

2. Why are environmental problems the world’s ones?

3. What problems have been discussed at recent international conferences and summits?

4. And what should governments do in this direction?

5. What is the influence of individuals over environment?

6. What should people do to stop environment pollution (air pollution, water pollution, land pollution)?

**3. Agree or disagree with these statements:**

|  |  |
| --- | --- |
| 1. The single individual can be blamed for the world pollution. | T/F |
| 2. We may ignore the influence of individuals over environment. | T/F |
| 3. It’s impossible to stop pollution. | T/F |
| 4. Environmental problems should be handled by local and international authorities. | T/F |
| 5. We make a great contribution to the preservation of nature and environment, switching off lamps, computers and everything that we do not use. | T/F |
| 6. To stop air pollution we need to refuce travelling at all. | T/F |
| 7. To stop land pollution we should reduce the number of items we buy, use and throw away. | T/F |

**4. Match the following phrases to make up sentences:**

|  |  |
| --- | --- |
| 1. An essential problem of the 21st sentury 2. Every person should 3. Governmental should 4. The influence of individuals over environment should 5. Driving vehicles can 6. We have 7. Every single person 8. Reducing the number of items we buy, use and throw away, | 1. not be ignored 2. offer support to companies and organizations 3. be environmental friendly 4. to avoid accelerating 5. the engines too rapidly 6. we can stop land pollution 7. take care of environment 8. is world pollution 9. take care of his or her habitat |

**5.Write out key words from the text. Retell the text, using these words.**

**6. Give your own ideas of solving the problem of air, water and land pollution.**

**TEXT 17**

**1.Read and translate the text:**

**Understanding consumerism and pollution**

The term "ecological footprint" describes the impact that a person or community makes on the planet as a result of the way they live. The more a person or a society consumes, the larger their ecological footprint. We live in a consumer society. That means that our culture is based on the production and consumption of goods. The products that we are able to buy make our lives more comfortable, but we do not need most of what we use. This is most apparent in the large gap between wealthy countries and poor countries. Half of the world's population does not have access to clean water, let alone the latest fashion of sneaker. Furthermore, many manufacturing processes of the goods sold in wealthier countries has been moved to the poorer countries, so that the goods can be made at lower cost and profit for the manufacturer increased. These factories are often very unsafe and unpleasant places to work, but the local people take jobs there in order to be able to survive. More often than not, they cannot afford the goods they are making. Unfortunately, these factories also often have unsound environmental practices, and contribute very little to the economic growth of the country.

Not only is our culture a consumer culture, it is also a disposable culture. We make stuff that exists to get thrown out, like garbage bags, paper cups, disposable mops, junk mail, packaging and overstock. This produces so much waste that developed countries sometimes pay to export their garbage to poorer places. This does not solve the pollution problem: it is simply displaced. China is well-known for recycling technological waste, such as computers and cell phones. Recycling is better than just throwing things out, but the recycling process can also produce toxic by-products that pollute the land and make people and animals sick. For many years, the city of Toronto, Canada has shipped its garbage to Michigan in the United States. The people of Michigan finally refused to continue with this method in 2006, and Toronto had to find new ways to deal with its waste. One of the methods it found was a city-wide composting program, where each household puts its organic waste into a green bin. On garbage day, that organic waste is taken to a plant where it is composted. Composting reduces the waste that goes into landfill, but it does not reduce packaging waste. In Europe, many countries have passed strict packaging laws, where it is illegal to put too much packaging on goods. These are good steps to reducing waste, but it will take a major change in attitude to reduce our excessive production and consumption.

**Vocabulary**

|  |  |
| --- | --- |
| consumerism and pollution –  "ecological footprint" – екологічний слід  impact – вплив  consumer society – споживче суспільство  consumption – споживання  apparent – очевидний  gap – розрив  access – доступ, підхід  let alone – не кажучи вже про  sneakers – черевики на гумовій підошві, кросівки, тенісні тапочки  furthermore – крім того  profit – прибуток, вигода користь  in order to – для того, щоб  to survive – вижити  afford – дозволити собі  unsound – необґрунтований  contribute – сприяти, робити вклад, співробітничати  disposable culture – одноразова культура | stuff – матеріал, предмет  garbage bags – мішки для сміття  disposable mops – одноразові швабри  packaging and overstock – упаковка і затоварення  displace – витісняти  recycling technological waste – переробка технологічних відходів  by-product – побічний продукт  city-wide composting program – загальноміська програма  organic waste – органічні відходи  green bin – зелений бак  landfill – звалище  illegal – незаконний  excessive production and consumption – надмірне виробництво та споживання  to reduce – скоротити, зменшити |

**2. Answer the questionson the text:**

1. What does the term “ecological footprint” mean?

2. Do people produce much more products, they need?

3. How do wealthy countries solve the problem of environmental pollution?

4. Why is there large gap between wealthy and poor countries?

5. What is disposal culture?

6. Does recycling technological waste solve the problem?

7. How is effective a city-wide composing program?

8. What should people do to reduce waste?

9.Will strict packaging laws help to solve the problem of waste?

**3. Give English equivalents for:**

Прибуток, дозволити собі, матеріал, побічний продукт, доступ, екологічний слід, споживацтво, розрив, переробка технологічних відходів, необґрунтований, упакована і затоварення, для того щоб, споживання, звалище, загальноміська програма компостування, вплив.

**4. Match the parts of the sentences:**

|  |  |
| --- | --- |
| 1. The more a society consumes,  2. The products, that we are able to buy  3. half of the world’s population  4. These factories are often  5. We make stuff  6. Recycling is better than just throwing things out,  7. One of the methods, Canada found  8. Strict packing laws are  9. Developed countries sometimes pay  10. Our culture is based on | 1. to export their garbage to poorer places. 2. was a city-wide composting program. 3. good steps to reducing waste. 4. make our lives more comfortable. 5. the production and consumption of goods 6. the larger its ecological footprint. 7. that exists to get thrown out. 8. but it can also produce toxic by-products. 9. doesn’t have access to clean water. 10. very unsafe and unpleasant places to work. |

**5.Fill the gaps with suitable words:**

|  |
| --- |
| *organic waste, by-products, packaging, solve, afford, recycling technological waste, unsafe and unpleasant, contribute, refused, consumer society* |

* 1. These factories are often very … … … places to work.
  2. They cannot … the goods they are making.
  3. These factories … very little to the economic growth of the country.
  4. This does not … the pollution problem.
  5. The people of Michigan finally … to continue with this method.
  6. It is illegal to put too much … on goods.
  7. We live in a … …
  8. Recycling process can also produce toxic …
  9. China is well-known for … … … .
  10. On garbage day, that … … is taken to a plant, where it is composted.

**6. Review the Vocabulary Notes and translate the following into English:**

1. «Екологічний слід» - це результат того, як ми живемо.

2. Будь-яке суспільство засноване на виробництві та споживанні товарів.

3. Половина населення світу не має доступу до чистої води.

4. Виробництво товарів, що продаються в багатих країнах, перемістилося в бідні країни, щоб товари вироблялись за нижчою вартістю, а прибуток для виробника – зростав.

5. Нажаль, ці підприємства дуже мало сприяють економічному зростанню даної країни.

6. Китай відомий переробкою технологічних відходів.

7. Переробляти речі – краще ніж викидати їх, але в процесі переробки також виробляються токсичні побічні продукти, які забруднюють землю та спричиняють хвороби людей та тварин.

8. Один із методів впоратися з відходами – це загальноміська програма компостування.

9. Багато країн прийняли суворі закони про упаковку.

10. Люди повинні змінити своє ставлення до надмірного виробництва та споживання.

1. **Write out main sentences from the text and retell it in your own words.**

**TEXT 18**

1. **Read and translate the text:**

**Green Peace**

I am a representative of one of the most known international ecological organizations, which is called "Green Peace". Our organization was founded in 1970 for protecting the ecology of our planet. The aim of its creation is in the organization's name. And really, the people, who join the "Green Peace", seek to keep the world clean, the environment green, to keep life on the Earth. Already after a year of its establishment the organization was recognized by the world and after 25 years its branches were opened in more than 50 countries.

The first action of the "Green Peace" was the organization of protest against the nuclear tests on the French island Moruroa in the Pacific Ocean.

During many years the organization "Green Peace" is fighting for protection of all the geographical spheres of the Earth. The protection of the tropical rainforest – the lungs of the planet from death is also the sphere of activity of the "Green Peace". Before rainforests covered 14 % of the world's surface Today they over only 7 % . The reason is simple. They have been cut to provide (a) land, (b) paper, (c) wood, (d) medicines, (e) minerals, (f) fuel. But it's not only trees which are disappearing. Millions of animals, insects and flowers are destroyed, too.

Our organization doesn't want our planet to be turned into desert. The pollution of the atmosphere is a global problem now. The members of the "Green Pease" call the world's monopolies to stop polluting the air and ruining the ozone layer. The mountaineers of the "Green Peace" hang the slogan: "STOP ACID RAIN" on factories' chimneys. We fight against the oil pollution of the seas because it kills underwater life. Now "Green Peace" is fighting for giving up nuclear tests in the world. Slogans: "SWEET RAIN", "PURE RIVERS", "CLEAN SEAS" which call to this hang on Big Ben in London and on the Statute of Liberty in New York.

One of the main spheres of activity of the "Green Peace" is the protection of animal world. It is known that more than one hundred kinds of animals had disappeared from the Earth's face. Today we fight against whale killing and against the destructionof the seals on the Newfoundland.

Today, the name "Green Peace" is connected with the following

words –PEACE and LIFE on the HEALTHY PLANET. We call on you DON'T LET THE WORLD DIE

**Vocabulary**

|  |  |
| --- | --- |
| representative – представник  tropical rainforest – тропічні ліси  lungs – легені  aim – ціль  establishment – організація, заклад  nuclear – ядерний  surface – поверхня | fuel – паливо  insects – комахи  mountaineer – альпініст  chimney – димар  pure – чистий  whale killing – винищення китів  seal – тюлень |

1. **Answer the following questions:**
   1. When was the international ecological organization "Green Peace" founded?
   2. What is the aim of creation of this organization?
   3. Was the “Green Peace” recognized by the world?
   4. What was the first action of the organization?
   5. What is the “Green Peace” fighting for?
   6. Is the protection of the rainforest the sphere of the “Green Peace” activity?
   7. What is the “Green Peace” slogan?
   8. Is the protection of animal world one of the main spheres of the "Green Peace" activity?
   9. Is the organization fighting against whale killing or destruction of the seals?

**3. Confirm or contradict the following statements.**

1) Our organization was founded in 1971for protecting the ecology of our planet.

2) And really, the people, who join the "Green Party", seek to keep the world safe, the environment green, to keep life on the Earth.

3) Already after a year of its establishment the organization was recognized by the world and after 25 years its branches were opened in more than 50 countries.

4) The protection of the oceans – the lungs of the planet from death is also the sphere of activity of the "Green Peace".

5) Our organization doesn't want our planet to be turned into desert. The pollution of the atmosphere is a global problem now.

6) The members of the "Green Pease" call the world's monopolies to pollute the air and ruining the ozone layer.

7) One of the main spheres of activity of the "Green Peace" is the protection of animal world.

8) It is known that more than one hundred kinds of animals had appeared on the Earth's face in recent ages.

1. Today we fight for whale killing and the destructionof the seals on the Newfoundland.
2. Today, the name "Green Peace" is connected with the following words – PEACE and LIFE on the HEALTHY PLANET.

4. **Match the synonyms in columns *A* and *B:***

|  |  |
| --- | --- |
| representative | defence |
| to join | delegate |
| branch | devastation |
| protection | creation |
| establishment | to unite |
| to pollute | undertow |
| destruction | to dirty |
| global | section |
| underwater | universal |

**5. Translate the following sentences:**

1. I am a representative of one of the most known international ecological organizations, which is called "Green Peace"

2. The aim of its creation is in the organization's name.

3. Already after a year of its establishment the organization was recognized by the world and after 25 years its branches were opened in more than 50 countries.

4. The first action of the "Green Peace" was the organization of protest against the nuclear tests on the French island Moruroa in the Pacific Ocean.

5. During many years the organization "Green Peace" is fighting for protection of all the geographical spheres of the Earth.

6. The protection of the tropical rainforest – the lungs of the planet from death is also the sphere of activity of the "Green Peace".

7. The members of the "Green Pease" call the world's monopolies to stop polluting the air and ruining the ozone layer.

8. The mountaineers of the "Green Peace" hang the slogan: "STOP ACID RAIN" on factories' chimneys.

9. We fight against the oil pollution of the seas because it kills underwater life.

10. It is known that more than one hundred kinds of animals had disappeared from the Earth's face.