**Міністерство освіти та науки України**

**Львівський національний університет ветеринарної**

**медицини та біотехнологій імені С.З.Гжицького**

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**ENGLISH FOR BIOTECHNOLOGISTS**

**Львів 2023**

**УДК 631.862.1:378.147**

**Б 623**

Затверджено на засіданні кафедри української

та іноземних мов імені Якима Яреми:

протокол №\_1\_від\_\_\_07 вересня 2023р.\_

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**О.М. Бінкевич.** English for biotechnologist: навчальний посібник. Львів. 2023. 70 с

Посібник призначений для здобувачів вищої освіти першого курсу університету, які обрали своїм фахом біотехнологію, та вивчають англійську мову за професійним спрямуванням. Метою посібника є допомога майбутнім фахівцям оволодіти професійною лексикою та опрацювання англійської оригінальної літератури за обраною спеціальністю.

Посібник розрахованих на аудиторні практичні та самостійні заняття, містить текти для читання та переказу із завданнями для самоконтролю у вигляді лексико-граматичних вправ.

**УДК 631.862.1:378.147**

**О.М.Бінкевич,2023**

**A T O M S**

**You can’t do without them:**

|  |  |
| --- | --- |
| Atom  Electron  Proton  Neutron  Ancient  Existence  Theory  Phenomenon (pl.-a)  Nucleus (pl.-i)  Algebraic  isotope | Атом  Електрон  протон  нейтрон  стародавній  існування  теорія  феномен, явище  ядро  алгебраїчний  ізотоп |

**Directions: *Read the text carefully and be ready to discuss it.***

Any matter is composed of tiny particles called atoms. In Greek *atoms* mean “uncut”. The atom is a complex unit of various particles, the most important of which are electrons, protons and neutrons.

The ancient Greeks and Romans had ideas about the existence of atoms, but in more modern times Sir Isaac Newton was one of the first scientists to put forward the theory that all matter was composed of them. At the beginning nineteenth century John Dalton (1766-1844) showed experimentally how this theory could be tested, so he is known to be the founder of modern atomic theory. It was largely due to him that chemistry changed from an art studied by a few learned people to an exact science. Dalton was the person to show how many chemical phenomena could be understood through the existence of atoms.

The difference between atoms of different elements is due to differences in the number of protons and neutrons in the nucleus and to differences in the arrangement of the electrons surrounding the nucleus. The mass ot the atom is concentrated almost in nucleus.

The chemical properties of different elements can be explained by the structure of atom. Chemical changes involve a shifting of outer valence electrons so that to achieve a shell. The activity of metals and non-metals is related to the size of the atom and to the number of electrons in the external orbit.

The valence or combining capacity of an atom is determined by the number of electrons it gains, loses or shares in chemical combinations with atoms of other elements. Atoms also may be joined to the other atoms by sharing pairs of electrons. This process produces covalent compounds. These are generally gases or liquids with low boiling points. Oxidation involves the loss of electrons by the elements. The process is accompanied by an algebraic increase in valence. Reduction, on the other hand, involves a gain of electrons by the substance reduced. This process is accompanied by an algebraic decrease in valence.

The number of protons in any atom equals the number of electrons in that atom. This number is used to identify an element and is called the atomic number of the element. The weights of atom are very small and to avoid using minute quantities we use numbers expressing the comparative weights of atoms. Atoms of the same element often have different atomic weights due to differences in the number of neutrons in their nuclei and are called isotopes. This difference in atomic weight does not change the chemical properties but it does have an effect upon the nuclear properties of the atom or its radioactivity.

**Learn to use:**

|  |  |
| --- | --- |
| Complex unit | Складна одиниця |
| Arrangement | Розташування |
| To surround | Оточувати |
| Entirely | Повністю,цілком |
| Property | Властивість |
| To explain | Пояснювати |
| To involve | Включати, містити в собі |
| Outer valence electrons | Зовнішня валентність електронів |
| External orbit | Зовнішня орбіта |
| Capacity | Здатність |
| To gain | Одержувати |
| To share | Ділити,розділяти |
| To lose | Втрачати |
| Covalent compound | Ковалентна сполука |
| Low boiling point | Низька точка кипіння |
| Oxidation | Окислення |
| Decrease | Зменшення, спад |
| To equal | Зрівнювати, рівняти |
| Minute quantity | Крихітна величина,кількість |
| Radioactivity | Радіоактивність |
| Particle | Частинка |
| To be composed of | Складатись з |
| Due to | Відповідно до |

**Task 1. Answer the questions:**

1. What is matter composed of?
2. What is the atom?
3. Who was the first scientist to put forward the atomic theory?
4. Who is known to be the founder of modern atomic theory?
5. What does atom mean in Greek?
6. What is the difference between atoms of different elements due to?
7. Where is the mass of the atom concentrated?
8. How can the chemical properties of different elements be explained?
9. What do chemical changes involve?
10. What is the valence of an atom determinate by?
11. What process produces covalent compounds?
12. What is oxidation accompanied by?
13. What does reduction involve?
14. Does the difference in atomic weight change the chemical properties?
15. What does the difference in atomic weight of atoms of the same element effect upon?

**Task 2. Give English equivalents to the following words and phrases:**

Точна наука; хімічне явище; хімічна властивість; розташування; хімічні зміни; втрачати електрони; ділити; рідини з низькою точкою кипіння; атомна вага; крихітна часточка; мати уяву; запропонувати теорію; показати експерементально; освічені люди; оточувати ядро; зміна валентності; супроводжувати; уникати; впливати на.

**Task 3. Paraphrase the following sentences. Remember that**

***Instead of We can say***

|  |  |
| --- | --- |
| To be composed of | To comprise |
| To test | To analyze, to examine |
| Due to | According to |
| Entirely | Completely |
| To explain | To clarify, to define |
| To be related to | To be connected with |
| To involve | To include, to comprise, to contain |
| To accompany | To follow |
| To have an effect on | To impact, to influence |

1. Matter is composed of tiny called atoms.
2. At the beginning of the nineteenth century John Dalton (1766-1844) showed experimentally how this theory could be tested.
3. It was largely It was largely due to him that chemistry changed from an art studied by a few learned people to an exact science.
4. The mass of the atom is concentrated almost entirely in the nucleus.
5. The chemical properties of different elements can be explained by the structure of atom.
6. The activity of metals and non-metals is related to the size of the size of the atom and to the number of electrons in the external orbit.
7. Oxidation involves the loss of electrons by the elements.
8. This process is accompanied by an algebraic decrease in valence.
9. This difference in atomic weight has an effect upon the nuclear properties of the atom or its radioactivity.

**Task 4. Ask questions to which the following could be answers.**

1. The ancient Greeks and Romans had ideas about the existence of atoms. (Who?)
2. The mass of the atom is concentrated almost entirely in the nucleus. (Where?)
3. Oxidation involves the loss of electrons by the elements. (What?)
4. The chemical properties of different elements can be explained by the structure of atom. (How?)

**M O L E C U L E**

**You can’t do without them:**

|  |  |
| --- | --- |
| Molecule | молекула |
| Hydrogen | водень |
| Oxygen | кисень |
| Nitrogen | азот |
| Chlorine | хлор |
| Argon | аргон |
| Helium | гелій |
| Neon | неон |
| Monoatomic | одноатомний |
| diatomic | двоатомний |

**Directions: *Read the text carefully and be ready to discuss it.***

As an atom is the smallest part of an element, and as the compound mast contain at least two elements, it follows that the smallest part of a compound that can exist must contain at least two different atoms. This is called a molecule. Molecule is the smallest unit, consisting of a group of atoms, into witch a substance can be divided without a change in its chemical nature. A molecule of water consists of two atoms of hydrogen and one atom of oxygen. Molecular structure is the way in which molecule is organized, built or put together. Although the atoms of elements take part in chemical reactions, they very often do not normally exist as single atoms when they are free. The atoms of such gases as oxygen, hydrogen, nitrogen and chlorine may be considered as very friendly ones, as that almost always occur in pairs, each pair forming a molecule, the smallest particle able to exist alone. On the other hand, the atoms of such gases as argon, helium and neon seem to prefer to remain alone. As molecules of these gases contain only one atom, they are said to be monoatomic in contrast to the former, which are diatomic.

Some compounds are so complex that a single molecule may contain several hundreds of atoms, and be quite large in comparison with a molecule of hydrogen, the smallest of all. It is possible to take photographs showing the way in which such large molecules are made up by means of a special type microscope called an electron microscope, but these molecules are still too small to be seen through the most powerful of optical microscopes.

**Learn to use:**

|  |  |
| --- | --- |
| Smallest unit | Найменша одиниця |
| Substance | Речовина |
| Cell | Клітина |
| Genetic information | Генетична інформація |
| Compound | Сполука |
| To take part in | Брати участь |
| Particle | Частинка |
| To exist | Існувати |
| One the one hand | З одного боку |
| On the other hand | З іншого боку |
| To prefer | Надавати перевагу |
| In comparison with | В порівнянні |
| Powerful | Могутній |
| To occur | Траплятися |
| microscope | Мікроскоп |

**Task 1. Answer the questions:**

1. What is a molecule?
2. What does molecule of water consist of?
3. What is a molecule structure?
4. What is an atom?
5. What is a compound?
6. Molecules of what gases are diatomic?
7. Molecules of what gases are monoatomic?
8. Is it possible to investigate the structure of some large molecules? How?

**Task 2. Give English equivalents to the following words and phrases:**

По крайній мірі; розділяти; хімічна природа; молекулярна структура; містити генетичну інформацію; хімічна реакція; на противагу; оптичний мікроскоп; вважатися; залишатись одним (наодинці); робити фото; бачити в мікроскоп.

**Task 3. Paraphrase the following sentences. Remember that**

***Instead of We can say***

|  |  |
| --- | --- |
| To contain | To have, to comprise |
| To be free | To be in free state |
| To occur | To exist |
| To be able to | Can |
| To remain | To stay |
| In contrast to | Unlike |
| By means of | With the help of |

1. A compound must contain at least two elements.
2. The atoms very often do not normally exist as single atoms when they are free.
3. The atoms almost always occur in pairs.
4. A molecule is the smallest particle able to exist alone.
5. On the other hand, the atoms of such gases as argon, helium and neon seem to prefer to remain alone.
6. As molecules of these gases contain only one atom, they are said to be monoatomic in contrast to the former, which are diatomic.
7. It is possible to take photographs by means of a special type of microscope called an electron microscope.

**Task 4. Use the words and phrases supplied below to make up extensive answers to questions:**

*1*.*Characterise the atom.*

- complex unit of various particles;

- smallest part of element;

- matter

*2. Describe the molecule.*

- group of atoms;

- smallest unit;

- to change chemical nature.

*3. What is monoatomic molecule?*

- to remain alone;

- to contain only one atom;

- argon, helium, neon.

*4. What is diatomic molecule?*

- to occur in pairs;

- to contain several atoms;

- oxygen, hydrogen, nitrogen, chlorine.

**E L E M E N T S, C O M P A U N D S, M I X T E R E S**

**You can’t do without them:**

|  |  |
| --- | --- |
| Iron | Залізо |
| Lead | свинець |
| Aluminium | алюміній |
| Silicon | кремній |
| Gold | золото |
| Copper | мідь |
| Mercury | ртуть |
| Compound | сполука |
| mixture | суміш |

**Directions: *Read the text carefully and be ready to discuss it.***

Man has always wanted to discover the composition of common substances. The ancient Greeks thought there were only four elements in nature: fire, air, earth and water. In the course of centuries people’s ideas of the basic elements have radically changed.

An element is a substance which contains only one kind of atom. There are more that 100 known elements. Some of the commoner elements are oxygen, hydrogen, nitrogen, iron, lead, aluminium, gold, copper, carbon, mercury.

Elements have properties distinguishing them from other substances. Some of these properties are their colour, hardness, smell, taste, density, solubility in water or other liquids, and others. In nature, elements may occur in a free state of they may occur combined with other elements.

When elements combine to form new substance, they always do so in definite proportions. Such substances are called compounds. The same compound always consists of same elements in the same proportion. Compounds are produced as a result of chemical reactions.

Elements can be combined in mixtures. But there is a difference between a compound and a mixture. A compound is a new substance consisting of several parts and formed after chemical process. A mixture is a mechanical combinations of substances involving no change in their character. For example, two elements, oxygen and hydrogen, may be mixed together and the mixture is still a gas. But if two atoms of hydrogen combine with one atom of oxygen (written H2O), the substance is water.

The most wide-spread element on our planets is oxygen. In nature, it may occur in a free state or it may occur combined with other elements. Because of its chemical properties, it is called the most important of all elements to man. It is a colourless, odourless, tasteless gas, slightly heavier than air and is slightly soluble in water. Oxygen, silicon, aliminium and hydrogen together constitute about 80% of the Earth’s crust, sea and atmosphere.

Some elements may be found in a free state around us. Others are so active that they are never found free at all. Some elements have been produced artificially. Among the elements are solids, liquids and gases.

Astronomers have found that the same elements which are common on the Earth, e.g. nitrogen, carbon, and hydrogen, are also the most common in the Sun and other stars. Thus, elements are the primary building materials of the Universe.

**Learn to use:**

|  |  |
| --- | --- |
| In the course of centuries | Впродовж століть |
| To change radically | Радикально змінювати (ся) |
| Properties | Властивості |
| To distinguish | Відрізняти, розрізняти |
| Hardness | Твердість |
| Density | Щільність |
| Solubility | Розчинність |
| In a free state | У вільному стані |
| In definite proportions | У певних пропорціях |
| Chemical reactions | Хімічна реакція |
| To combine with | Сполучатись з |
| To constitute | Становити, складати |
| To produce artificially | Виробляти штучно |
| Primary building material | Первинний будівельний матеріал |

**Task 1. Answer the questions:**

1. What did the ancient Greeks think about elements?
2. What kind of substance is an element?
3. How many elements are known in the world?
4. What are the most common elements?
5. What are the properties of elements?
6. How do elements occur in nature?
7. What is the difference between a compound and a mixture?
8. What is the most wide-spread element on our planet?
9. Why are some element never found free in nature?
10. What elements are the primary building materials of the Universe?

**Task 2. Give English equivalents to the following words and phrases:**

Склад речовини; містити один вид атома; запах; смак; рідина; зустрічатись у природі; механічна сполука (сполучення) ; змішані разом; широкорозповсюджений; без кольору; без запаху ; без смаку; земна кора; тверді речовини; активний елемент.

**Task 3. Paraphrase the following sentences. Remember that**

***Instead of We can say***

|  |  |
| --- | --- |
| Common | Usual |
| To contain | To consist of |
| Distinguishing properties | Distinctive characteristics |
| In definite proportions | According to certain regularities |
| Because of | Due to |
| To constitute | To make up |
| Primary building materials | Fundamental constituents |

1. Nitrogen, carbon, and hydrogen are the most common elements.
2. An elements contains only one kind of atom.
3. Elements have properties distinguishing them from other substances.
4. Elements combine to form compound in definite proportions.
5. Oxygen is very important to man because of its chemical properties.
6. Oxygen, hydrogen, silicon and aluminium together constitute about 80% of the Earth’s crust.
7. Elements are the primary building materials of the Universe.

**Task 4. Make up extensive answers to the questions:**

1. What characteristics of elements do you know?
2. What is a compound?
3. What is a mixture?
4. How can you characterize oxygen?
5. How do elements occur in nature?

**S T A T E M AT T E R:**

**L I Q U I D S, S O L I D S, G A S E S**

**You can’t do without them:**

|  |  |
| --- | --- |
| Current | струм |
| Compression | стискання |
| Compressible | той,що піддається компресії |
| A melting point | точка плавлення |
| A freezing point | точка замерзання |
| A boiling point | точка кипіння |
| Kinetic equilibrium | кінетичний баланс |
| Atmospheric pressure | атмосферний тиск |
| Vapour | пар |
| Evaporation | випаровування |
| Ammonia | аміак |
| Sulphur dioxide | діоксин сірки |
| attraction | тяжіння, притягування |

**Directions: *Read the text carefully and be ready to discuss it.***

There are three known states of matter: liquids, solids, gases. The comparison of various state of matter reveals their connection to each other as well as their differences. A liquid is a substance without definite shape. It can flow and conduct current. Liquids can easily take the form of any vessel they are placed in. A gas is a substance without bounding surface. Gases are compressible. They can spread easily in any vessel or capacity. A solid has a definite shape resisting any attempt to change it.

All these three states of matter are different and at the same time very much alike. Most substances can readily be placed in one of these three categories or change one for the other. A solid may become a liquid when it is heated to a certain temperature (to a melting points). A liquid becomes a solid at a freezing point or the same liquid may become a gas at boiling point.

Many substances are in a kinetic equilibrium: a bit more or less heat may change them from one state to another. A common example is water. It freezes and ice melt at 00C. Another border-line between such states of water as liquid and gas is 1000C (a boiling point) when one state easily changes into another under standard atmospheric pressure: thus water returns into vapour. Evaporation of water can take place at any temperature. At higher pressures water boils at lower temperatures.

Some gases are liquefied at room temperature by increasing the pressure. Such substances as chlorine, ammonia and sulphur dioxide are often transported as liquids under pressure. Due to their compression gases become hot when subjected to an increase in pressure. And vice versa, a gas becomes cooler when it is allowed to expand.

Physical and chemical properties of liquids, solids and gases are different because of the attraction between the molecules. The molecules of a solid, for instance, have a great attraction for each other and are placed very close together. In a liquid the attraction between molecules is much less. And the ties between the molecules of a gas are rather loose.

**Learn to use:**

|  |  |
| --- | --- |
| Connection to each other | Зв'язок одного з іншим |
| Definite shape | Певна форма |
| To conduct current | Проводити струм |
| Bounding surface | Окреслена поверхня |
| To resist an attempt | Протистояти спробі |
| To heat to a temperature | Нагрівати до температури |
| Border-line | Межа |
| Under the pressure | Під тиском |
| To be liquefied | Розріджуватись |
| To be subjected to | Бути під впливом |

**Task 1. Answer the questions:**

1. How many states of matter are known?
2. What does the comparison of states reveal?
3. What is common between liquids and gases?
4. What are the differences between them?
5. How can we change one state to another?
6. How are some gases liquefied?
7. How does pressure influence the compression of gases?
8. Why are the properties of state matters different?
9. Where is the greatest attraction between molecules?

**Task 2. Give English equivalent to the following words and phrases:**

Агрегатний стан,виявити зв'язок, виявити різницю, помістити в посудину, розповсюджуватися в ємкості, замерзати при 00 С, завдяки компресії, поширюватися, зв’язки між молекулами, закипати при 1000 С, при будь-якій температурі, перетворюватись.

**Task 3. Paraphrase the following sentences using the table:**

|  |  |
| --- | --- |
| Liquid | Fluid |
| Alike | Similar |
| May become | May be transformed to |
| Equilibrium | Balance |
| To take place | To occur |
| To be liquefied | To become liquids |
| To be subjected to | To be under the influence of |
| S of matter | To be arranged |

1. A liquid is a substance without definite shape.
2. All three states of matter are very much alike.
3. A solid may become a liquid when it is heated.
4. Many substances are in kinetic equilibrium.
5. Evaporation of water can take place at any temperature.
6. Some gases are liquefied at room temperature.
7. Being subjected to an increase in pressure gasses become hot.
8. The molecules of a solid are placed very closely together.

**Task 4. Ask questions to which the following could be answers:**

1. A liquid is a substance without definite shape. (What kind …?)
2. A liquid can flow and conduct current. (Can …?)
3. Gases can spread easily in any vessel. (How …?)
4. A liquid becomes a solid at a freezing point. (When …?)
5. Heat changes substance from one state to another. (What …?)
6. The molecules of a gas have a loose attraction. (What kind …?)
7. Some gases are transported as liquids under pressure. (How …?)

**T R A C E E L E M E N T S**

**You can/t do without them:**

|  |  |
| --- | --- |
| Fluorine | фтор |
| Manganese | марганець |
| Zinc | цинк |
| Iodine | йод |
| Cobalt | кобальт |
| Selenium | селен |
| Molybdenum | молібден |
| Chromium | хром |
| Myelin | мієлін |
| Nucleic acid | нуклеїнова кислота |
| Thyroid gland | щитовидна залоза |
| Goitre | зоб |
| Cardiomyopathy | кардіоміопатія |
| Oesophagus | стравохід |
| cornea | рогівка |

**Dircections*: Read the text carefully and be ready to discuss it.***

Trace elements ate those require in minute concentrations for normal growth and development. Trace elements include fluorine, manganese, zinc, copper, iodine, cobalt, selenium, molybdenum, chromium, silicon. They may serve as cofactors or as constituents f complex molecules. The exact role of these trace elements is not definitely known. Some of them have recently been found to be essential, but dietary deficiencies of some are still unknown.

Here comes a short characteristic of the trace elements. Cobalt may be used by people only in the form of vitamin B12 (cyanocobalamin) which is necessary for the synthesis of nucleic acids, the maintenance of myelin in the nervous system. A deficiency of this trace elements results in anemia and degradation of the nervous system. Good sources of it are in the liver, fish and eggs.

Copper is associated with a number of enzymes. Its deficiency has been observed in malnourished infants. The main source of copper in the average diet are meat, bread, other cereals and vegetables.

Chromium is involved in the utilization of glucose and widely distributed in foods. Fluorine in creases resistance of bones and teeth to decay. Water is an important source, but natural content is often, very low. Sufficient amounts of fluorine are contained in tea and sea-food.

Iodine is essential constituent of hormones produced by the thyroid gland. The biggest source of iodine is sea-food. Its amount is in vegetables and cereals depends on its level in the soil. A deficiency of iodine leads to goiter.

Manganese is associated with a number of enzymes. It is contained in plants products mainly, especially in tea. But the oxide of manganese, when inhaled by people may cause brain damage and symptoms are very similar to those of parkinsonism.

Selenium is needed for an enzyme in the red blood cells. It has important antioxidant properties. Dietary deficiency of selenium results in cardiomyopathy.

Zinc is a cofactor of many enzymes. It is present in a wide range of foods. Deficiency is rare but may occur in alcoholics and those with kidney disease. Symptoms include lesions of the skin, oesophagus, cornea.

**Learn to use:**

|  |  |
| --- | --- |
| Trace elements | Мікроелементи |
| In minute concentrations | У крихітних концентраціях |
| Constituent | Складова частина |
| Dietary deficiency | Недостатність харчування |
| To result in | Призводити до |
| Malnourished infants | Діти, що не доїдають |
| To increase the resistance | Збільшувати опір |
| Decay | Руйнування |
| To inhale | Вдихати |
| To cause brain damage | Пошкоджувати головний мозок |
| To be involved | Бути задіяним в |
| To distribute | Розподіляти |
| To occur | траплятись |

**Task 1. Answer the questions:**

1. What are trace elements required for?
2. What is the exact role of these trace elements?
3. How can cobalt be used by people?
4. What is cobalt necessary for?
5. Where is copper deficiency observed?
6. Which of the trace elements is involved in the utilization of glucose?
7. How can we increase the resistance of bones and teeth?
8. What is the main cause of goiter?
9. How are antioxidant properties of selenium seen?
10. Which factors does zinc deficiency provoke?

**Task 2. Give English equivalents to the following words and phrases:**

Нормальний ріст і розвиток, точна (достеменна) роль, коротка характеристика,синтез нуклеїнових кислот, деградація нервової системи, спостерігати, важливе джерело,природний вміст, достатня кількість, морепродукти, продукти рослинного походження, схожі симптоми, червоні кров’яні клітини, широкий вибір (діапазон), пошкодження шкіри, захворювання нирок.

**Task 3. Ask questions to which the following could be answers:**

1. Trace elements serve as cofactors or as constituents of complex molecules. (What …as?)
2. We do not definitely know the exact role of trace elements? (Do …?)
3. Another name of vitamin B12 is cyanocobalamin.(What …?)
4. A deficiency of cobalt results in anemia. (What …in?)
5. Copper is associated with a number of enzymes. (What …with?)
6. The biggest source of iodine is contained in the sea food. (Where…?)
7. Water is an important source of fluoride. (What…?)

**M I N E R A L S**

**You can’t do without them:**

|  |  |
| --- | --- |
| Phosphorus | фосфор |
| Magnesium | магній |
| Soluble salt | розчинна сіль |
| Enzyme | фермент |
| Haemoglobin | гемоглобін |
| Sulphur | сірка |
| Fatty acid | жирна кислота |

**Directions:**

Minerals are inorganic elements. Most of them can be found in nature. Only fifteen of them are known to be essential and must be taken from food. Minerals are necessary for normal functioning of the body systems. Minerals perform a number of functions.

First of all minerals are constituents of the bones and teeth. These include calcium, phosphorus and magnesium. Many minerals are soluble salts. They help to control the composition of body fluids and cells. These include sodium and chlorine in the fluid outside the cells. Potassium, magnesium and phosphorus are situated inside the cells.

Minerals are essential adjuncts to many enzymes and other proteins such as haemoglobin. Iron and phosphorus are necessary for the release and utilization of energy.

There are seven principal elements in our body: calcium, phosphorus, magnesium, sodium, chlorine, potassium and iron. They are needed in the greatest quantities in the diet and are present in the largest amounts in the body tissues. Together with sulphur they may be considered as the major minerals.

Minerals are obligatory components of our food. The combinations phosphorus with proteins, fatty and other acids produces substances of a high biological activity. Different minerals come to organism from different food. The main sources of magnesium are cereals, beans and dairy products. Meat, eggs, bread should be included into diet as well.

Minerals are necessary to children and adult s. They maintain physiological growth and development of the human organism at any age.

**Learn to use:**

|  |  |
| --- | --- |
| To be found in nature | Знаходитися в природі |
| To perform functions | Виконувати функції |
| Constituent | Складова частина |
| Outside the cell | Поза клітиною |
| Inside the cell | Всередині клітини |
| Composition of food | Склад рідини |
| Essential adjuncts | Необхідні доповнення |
| To release energy | Вивільнювати енергію |
| To utilize energy | Використовувати енергію |
| Obligatory components | Обов’язкові компоненти |
| A high biological activity | Висока біологічна активність |
| To maintain growth | Підтримувати ріст |

**Task 1. Give English equivalents to the following words and phrases:**

Неорганічні елементи, поступати через їжу, контролювати, основні елементи, у найбільших кількостях (2 варіанти), тканини організму, можуть вважатися, молочні продукти, бобові, риба, у будь-якому віці.

**Task2. Answer the questions:**

1. What are minerals in their nature?
2. How many minerals are essential?
3. What are minerals necessary for?
4. What do minerals help ton control?
5. Where are sodium and chlorine situated?
6. What are the principal elements in our body?
7. What are iron and phosphorus necessary for?
8. How can phosphorus be combined with proteins?
9. What food is the main source of magnesium?
10. How do minerals maintain growth and development?

**Task 3. Make up extensive answers to the questions using the below words and phrases:**

1. How can you characterize minerals?

- inorganic elements;

- to be found in nature;

- to be essential;

- necessary for normal function

2. What part of the body are minerals necessary for?

- the bones and teeth;

- to be constituents;

- to include calcium, phosphorus and magnesium.

3.What functions do minerals perform?

- to control the composition of body fluid;

- to be essential adjuncts to many enzymes;

- to release and utilize energy;

- to maintain physiological growth and development.

1. How is the composition of body fluid controlled?

* to be soluble salt;
* sodium and chlorine;
* outside the cells;
* inside the cells.

**Task 4. Ask questions to wich the following could be answers.**

1. Most minerals can be found in nature. (Where…?)
2. Essential minerals must be taken from food. (Where…from?)
3. Minerals perform a number of functions? (What…?)
4. There are seven principal elements in our body. (How many…?)
5. Minerals are necessary for children and adults. (Whom…to?)
6. Minerals are present in the large amounts in the body tissues. (Where…?)

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

1. Різні мінерали надходять в наш організм з різною їжею.

2. Наші кістки та зуби містять кальцій, фосфор та магній.

3. Мінерали необхідні для регулювання рідини в організмі та клітинах.

4. Мінерали є необхідним доповненням для багатьох ферментів.

5. Мінерали, як неорганічні елементи, потрібні нам для нормального функціонування систем організму.

**C A R B O H Y D R A T E S**

**You can’t do whithout them:**

|  |  |
| --- | --- |
| Cellulose | Целюлоза |
| Starch | Крохмаль |
| Glucose | Глюкоза |
| Galactose | Галактоза |
| Amylopectin | Амілопектин |
| Amylose | Амілоза |
| Lactose | Лактоза |
| Maltose | Мальтоза |
| Glycogen | Глікоген |
| Nutritionist | Дієтолог |
| Ketosis | Кетоз |
| Fatigue | Слабкість |
| lethargy | Летаргія, сонливість |

**Directions: Read the text carefully and be ready to discuss it.**

Carbohydrates present a large class of organic compounds so called because they contain carbon, hydrogen and oxygen. Hydrogen and oxygen are in the same ratio as they are in water, that’s why the general formula of carbohydrates is: Cx(H2O)y.

Carbohydrates are manufactured by plants and obtained by people and animals from their diet. In addition to fats and proteins, carbohydrates are one of the three main constituents of food. In plants carbohydrates are important structural materials (e.g. cellulose) and storage products ( commonly in the form of starch ).

Carbohydrates which are sugars, are an essential part of a healthy diet. They provide the main source of energy for the body, and they also function to flavour and sweeten foods. For such activities as breathing, heartbeating, maintenanceof body temperature and others any person needs energy. We can get energy from fats and proteins. But from carbohydrates we get most of the energy that we need.

There are three major groups of carbohydrates in food: sugars, starches, cellulose, and related materials. Carbohydrates range from simple sugars like glucose, fructose and galactose to complex sugars such as amylose, lactose, maltose and amylopectin.

Glucose occurs in fruit and plant juices and in blood of living animals. Glucose is the principal circulating sugar in the organism. It is taken from the blood by the liver cells and converted into glycogen. The major supplies of glycogen are in the liver and skeletal muscles.

Nutritionists estimate that carbohydrates should make up about one-fourth of a person’s diet. This translates to about 75-100 grams of carbohydrates per day. A diet that is deficient in carbohydrates can have an adverse effect on a person’s health. A lack of carbohydrates can also lead to ketosis, a build-up of ketons in the body that causes fatigue, lethargy and bad breath.

**Learn to use:**

|  |  |
| --- | --- |
| In the ratio | В пропорції |
| Storage products | Продукти накопичення (збереження) |
| To flavour | Надавати аромату |
| To sweeten | Підсолоджувати |
| To estimate | Оцінювати |
| To translate to | Відповідати чомусь |
| To have adverse effect | Мати побічну дію |
| Build-up | Відкладення, накопичення |
|  |  |

**Task I. Answer the questions:**

1. What kind of substances are carbohydrates?
2. Why are carbohydrates organic?
3. How are carbohydrates manufactured?
4. Why are carbohydrates an essential part of a healthy diet?
5. What are the sources of energy for human organism?
6. What activities in the human body are impossible without carbohydrates?
7. What are simple sugars?
8. What are complex sugars?
9. What is the recommended portion of carbohydrates in a person’s diet?
10. What are possible complications of carbohydrates deficiency?

**Task 2. Give English equivalents to the following words and phrases:**

Органічні сполуки; загальна формула; у тій самій пропорції; складові їжі; структурні матеріали; дихання; серцебиття: основний циркулюючий цукор; клітини печінки; основні запаси; скелетні м’язи; недостача вуглеводів; неприємний подих.

**Task 3. Use the words and phrases supplied below to make up extensive answers to the questions:**

**1.What is the main characteristic of carbohydrates?**

- organic compounds;

- to contain hydrogen, oxygen and carbon;

- the general formula;

- in the same ratio.

**2. Where do carbohydrates occur?**

- to be manufactured by;

- constituents of food;

- structural materials;

- storage products;

**3. What do carbohydrates serve for?**

- to supply energy;

- to flavour foods;

- to sweeten foods;

- to maintain activities in the human body.

**Task 4. Ask questions to which the following could be answers. Start your questions with the words in brackets.**

1. Carbohydrates present a large class of organic compounds. (What class?)
2. Carbohydrates, fats and proteins are the main constituents of food. (What?)
3. Carbohydrates provide the main source of energy for body. (What?)
4. Any person needs energy for the maintenance of vital activities. (Why?)
5. We can get energy from fats, proteins and carbohydrates. (Where …from?)

**F A T S**

**You can’t without them:**

|  |  |
| --- | --- |
| Margarine | Маргарин |
| Soya-bean | Соя |
| Triglyceride | Тригліцерид |
| Cholesterole | Холестерол |
| Carotene | Каротин |
| Adipose tissue | Жирова клітина |
| Peritoneum | Очеревина |
| Depot | Депо (запас) |
| Obesity | Ожиріння |

**Directions: *Read the text carefully and be ready to discuss it.***

Fats present the second largest source of energy in most diets. Fats include not only “visible fats” such as butter and margarine, cooking fats and oils, but also “invisible fats” which are found in milk, nuts, seeds and other foods.

The main sources of fats are vegetable and animal once. Vegetable sources include plants such as sunflower, soya-beans, which contain 20-40 per cent of oil. Animal sources include different kinds of fish and meat. In more developed countries fat provides about 40 per cent of the energy value of the diet. But in the world’s poorest countries only 10 per cent of energy value is taken from fat.

Like carbohydrates, fats consist of carbon, hydrogen and oxygen, but the proportion of oxygen is lower. Chemically, fats consist mainly of mixtures of triglycerides. Each triglyceride is a combination of three fatty acids. The differences between one and another are largely the result of the different fatty acids in each of them.

Fats do not dissolve in water. Animal fats contain Vitamins A and D and varying amounts of cholesterol. Vegetable fats contain carotene, which is converted into vitamin A in the body, and Vitamin E, but they have no cholesterol. High concentrations of cholesterol in the blood are associated with a greater risk of heart disease.

Vegetable fats (oils) are liquids at room temperature. But on freezing they may come solids. Animal fats are solids at low temperatures and become liquids when they are heated.

Fats are better source of energy than carbohydrates. They are carried by the blood to all parts of the body. Fats are stored in the adipose tissue, in the various parts of the body, for example, under the skin, peritoneum etc. Carbohydrates are usually stored in the form of glycogen in the liver and muscles. When they are in excess of the amount they are converted into depot or stored fat. Excessive deposition of fat in the body leads to obesity.

**Learn to use:**

|  |  |
| --- | --- |
| Visible fats | Видимі жири |
| Cooking fats | Кулінарні жири |
| Energy value | Енергетична цінність |
| To dissolve in water | Розчинятись у воді |
| On freezing | При заморожуванні |
| To heat | Нагрівати |
| In excess of the amount | В надлишковій кількості |

**Task 1. Answer the questions:**

* + - 1. What is the second largest source of energy?
      2. What are visible and invisible fats?
      3. Where do we get vegetable fats or oils?
      4. What are animals source of energy?
      5. What do fats consist of?
      6. Why is the difference between fats caused?
      7. What vitamins do fats contain?
      8. How do vegetable oils become solids?
      9. When do animals fats become liquids?

10.Where are fats stored?

11. Where are carbohydrates stored?

12. When are carbohydrates converted into fats?

**Task 2. Give English equivalents to the following words and phrases:**

Знаходитися в молоці (горіхах, насінні), рослинні джерела, тваринні джерела, соняшник, розвинуті країни, суміш тригліцеридів, олія, при кімнатній температурі, при низьких температурах, розноситься кров’ю, накопичуватись (зберігатись), під шкірою.

**Task 3. Use the words and phrases supplied below to make up extensive answers to the questions**

* + - 1. What is the difference between visible and invisible fats?
* to include;
* butter, margarine, cooking fats;
* to be found;
* milk, nuts, seeds.
  + - 1. What is the difference between the consumption of fats in different countries?
* more developed countries;
* the poorest countries;
* to provide;
* the energy value.
  + - 1. What is the chemical compositions of fats?
* to consist of;
* mixtures of trigcerides;
* a combination of fatty acids.
  + - 1. Why are fats a better source of energy?
* to carried by the blood;
* to be stored;
* the adipose tissue;
* under the skin, peritoneum.

**Task 4. Translate into Ukrainian:**

1. Соняшник та соя містять приблизно від 20-40 % жирів.

2. Жири містяться в більшості раціонів.

3. Жири не розчиняються в воді, але деякі розчиняються в алкоголі.

4. Вуглеводи накопичуються у вигляді глікогенів.

5. І люди ,і тварини споживають більш жирну їжу в холодну пору року.

**P R O T E I N S**

**You can’t dowithout them:**

|  |  |
| --- | --- |
| Phosphorus | Фосфор |
| Anaemia | Анемія |
| Rickets | Рахіт |
| Physiological | фізіологічний |

**Direction: Read the text carefully and be ready to discuss it.**

In 1838 a Dutch physician and chemist, Gerri Mulder, announced that all living plants and animals contained a certain substance without which life was impossible. He named it protein, from the Greek word “proteios” meaning “first. primary”.

All proteins are organic in their nature consisting of carbon, hydrogen and oxygen. But, unlike carbohydrates and fats, they also contain nitrogen. Most of proteins contain phosphorus and sulfur. Proteins are necessarily present in all cells. They help to regulate the process of living. Proteins are provided in the diet for the growth and repair of the body, but any excess of them is used to provide energy.

Proteins consist of chains of hundreds of amino acid units. Only about 20 amino acids are used, but the number of ways in which they can be arranged is almost endless. The sequence of these unites is specific and unique. It gives each proteins its characteristic properties.

Some of proteins can dissolve in water, others - only in salt water. Certain proteins cannot dissolve at all .Proteins are divided into animal and vegetable proteins. Vegetable proteins have low biological value because they are not able to supply all the essential amino acids in necessary amount. Mixtures of such food complement each other and raise the nutritional value.

Most animal proteins have a high biological value. The reason for this is that man belongs to mammals, the animal world. The proteins of animals are like those of man and can be utilized with the minimum of waste. The nutritional advantages of animal foods over vegetable foods in practice is more substantial because animal proteins contain vitamin B12, iron and vitamin D. A lack of them leads to the diseases of the nervous system, blood disorders (anaemia), rickets and others.

So mixtures of animals and vegetable protein foods have a sound physiological basis.

**Learn to use:**

|  |  |
| --- | --- |
| To regulate the process of living | Регулювати процес життя |
| For the growth and repair | Для росту і відновлення |
| Chain of amino acids | Ланцюжки амінокислот |
| To be arranged | Розподілятись |
| Law (high) biological value | Низька (висока)біологічна цінність |
| To complement | Доповнювати |
| To raise nutritional value | Піднімати харчову (поживну) цінність |
| The minimum of waste | Мінімальна втрата |
| Advantages | Переваги |
| A sound physiological basis | Відчутна фізіологічна основа |

**Task 1. Answer the questions:**

Who and when introduced the name “proteins”?

What is the nature of proteins? Why?

What do proteins help to regulate?

When do proteins supply energy?

What is the structure of proteins?

How do proteins dissolve?

What are the two groups of proteins?

What substances do animal proteins contain?

What does a lack of animal proteins lead to?

Why are the mixtures of proteins recommended?

**Task 2. Give English equivalents to the following words and phrases:**

Проголошувати, називати, живі рослини і тварини, будь-який надлишок, безкінечний, число способів (шляхів), послідовність, характерні властивості, розчинятись у солоній воді, ессенціальні (незамінимі) амінокислоти, у необхідних кількостях, тваринний світ, на практиці,вагомий (суттєвий), нестача вітамінів.

**Task 3. Ask questions to which the following could be answers. Start your questions with the words in brackets.**

* + - 1. All living plants and animals contain properties. (What?)
      2. Proteins are necessarily present in all cells. (Where?)
      3. Man belongs to mammals, the animal world. (Where …to?)
      4. Animal proteins contain vitamin B12, vitamin D and iron. (What?)
      5. Mixtures of vegetable proteins complement each other. (What?)

**W A T E R**

***Water is the driving force of all nature.***

***Leonardo da Vinci***

1. **Answer the questions:**

1). Is water important for all living things? Why?

2). Do you remember the chemical formula of water?

3). What do you know about water like substance?

4). Is water important for plants?

5). Is it possible to survive without water?

6). Where do we use water?

**You can’t do without them:**

|  |  |
| --- | --- |
| Liquid | Рідина |
| Percent | Відсоток |
| Hydrogen oxide | Оксид водню |
| Temperature | Температура |
| Crystallization | Кристалізація |
| Copper sulphate | Сульфат міді |
| atmosphere | атмосфера |

**Direction: Read the text carefully and be ready to discuss it.**

Water is the most common of all liquids and probably the most useful. It is the simple compound, but one of the most biologically important and chemically interesting. It was in water that life originated on our planet; water covers three-fourth of present-day earth, and from 45 to more than 95 percent of the weight of any active organism consists of water. Some organism live out their lives in water, and no organism can remain biologically active without it.

Water is hydrogen oxide, a compound of hydrogen and oxygen. Water can exist in three different physical states – solid, liquid and gas – at temperatures commonly found on our planet. 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 tons of water vapor. Clouds consist of minute droplets of water or crystals of ice. Water is the most effective solvent known, that is, more kinds of substances will dissolve in it than any other liquid. It does not dissolve greasy, fatty substances or most plastics. For chemical work distilled water is used purified by distillation.

Water has a high boiling point – 100 0C Celsius and a low freezing point – 00C. Water’s resistance to heating is important to living things, because it helps to maintain the relatively constant external and internal environments they need. The fact that living things are 50 to 90 percent water means that body temperature especially of large organisms also change slowly. This property provides a natural cooling system and explains why many mammals – including our species – have sweat glands.

The microflora of natural water depends on the pollution and quality of purification of sewage waters. Micro-organism are widespread in the waters of seas and oceans. Water is subdivided into three zones: strongly polluted water, zone of moderate pollution and zone of pure water. Depending on the degree of pollution

pathogenic bacteria can survive in water and for certain time can remain viable. Capillary microscopy is used for a complete and profound study of the microflora of water. If people want to be healthy they should first of all take a good care of the quality of water they use. Nearly 50 percent of all diseases appeared as a result of the polluted water. 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.

**Learn to use:**

|  |  |
| --- | --- |
| Compound | Сполука |
| Microflora | Мікрофлора |
| Pollution | Забруднення |
| Quality | Якість |
| Sewage water | Стічні води |
| Moderate | Помірний, середній |
| Pure water | Чиста вода |
| Pathogenic bacteria | Патогенні бактерії |
| To survive | Виживати |
| Viable | Життєдайний |
| Capillary microscope | Капілярна мікроскопія |
| Profound | Глибокий |
| Fraction | Частинка фракції |
| Vapour | Пара, випаровування |
| Solvent | Розчинник |
| To dissolve | Розчиняти |
| Greasy | Жирний, маслянистий |
| Poisonous | Отруйний |
| Distilled water | Дистильована вода |
| To purify | Очищати |
| distillation | Очищення |
| Constituent | Складова частина |
| Sewage water | Стічні води |
| Sweat glands | Потові залози |

***Thousands have lived without love, but not one without water.***

***(W.H. Auden)***

***When the well is dry, we know the worth of water.***

***(Benjamin Franklin)***

***The mind is like an iceberg, it floods with one-seventh of its bulk about water .***

***(Sigmund Freud)***

**Task 2. Answer the questions:**

* + - 1. When did life originate on our planet?
      2. How many percent of Water does living organism consist of?
      3. What is water?
      4. What states can water exist in?
      5. What properties of water do you know?
      6. Why is water the most effective solvent?
      7. What substance can’t be dissolved in water?
      8. What are the freezing and boiling point s of water?
      9. What kinds of water do we use for chemical reactions?
      10. What microscope do we use to study the microflora of water?

**Task 3. Give English equivalents to the following words and phrases:**

Найпростіша сполука,виникати, вага, залишатися біологічно активним, іскра, твердий, рідкий, газоподібний, важлива частинка, мінеральна речовина, містити в собі, ефективний розчинник, жирні речовини, очищати, дистиляція.

**4. Make up word combinations and translate them:**

|  |  |
| --- | --- |
| simple | solvent |
| hydrogen | temperature |
| physical | pollution |
| effective | oxide |
| body | a good care |
| degree of | state |
| to take | compound |
| polluted | water |

**5. Complete the sentences and translate them:**

1) Water can exist in … different physical states - …, …, … .

2) Water has a high … … - 100\*C.

3) … … are wide spread in the waters of seas and oceans.

4) Water is a … …, but one of the most biologically important.

5) The micro flora of natural water depends on the degree of … .

6) … … is used for a complete and profound study of the micro flora of water.

7) If you want to be healthy, you should take care of the … of water.

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

1) Ні люди, ні тварини не можуть виживати без води.

2) Багато ссавців мають потові залози.

3) Хмари складаються з крихітних краплин води чи кристаликів льоду.

4) Хімічна формула води – Н2О.

5) Вода реагує з багатьма речовинами.

6) Вода може бути хорошим розчинником для багатьох речовин.

**7.Translate into Ukrainian:**

* + - 1. It was in water that life appeared on our planet.
      2. No organism can remain biologically active without water.
      3. Rain contains dissolved gases and dust.
      4. For chemical work distilled water is used refined by distillation.
      5. Water’s resistance to heating is important to living things.
      6. Clouds are made up of minute droplets of water or crystals of ice.

**A C I D S (F A T T Y A N D A M I N O A C I D S)**

**You can’t do without them:**

|  |  |
| --- | --- |
| Alkali | Луг |
| Isoleucine | Ізолейкін |
| Leucine | Лейкін |
| Lysine | Лізин |
| Methionine | Метіонін |
| Phenylalanine | Фенілаланін |
| Threonine | Треонін |
| Tryptophan | Триптофан |
| Valine | Валін |
| Histadine | Гістидин |
| Double bond | Подвійна сполука |
| Saturated | Насичений |
| Palmitic acids | пальмітинова кислота |
| Stearic | Стеаринова |
| Butyric | Масляна |
| Oleic | Олеїнова |
| Linoleic | Лінолеїнова |
| Linolenic | Ліноленова |
| arachidonic | арахідонова |

**Directions: Read the text carefully and be ready to discuss it.**

Acid is a chemical compound, usually a liquid, that contains hydrogen and has pH of less than seven. PH is a measurement of the level of acids or alkali in a solution or substance. In the pH range of 0 to 14 a reading of bellow 7 shows an acid and of above 7 shows an alkali. Alkali has a pH of more than seven. Hydrogen in acids can be replaced by a metal to form a salt. Acids are usually sour and can often burn holes in or damage things they touch. Acids may contain different levels of oxygen or may not contain it at all.

The body can not exist without amino and fatty acids. Hundreds and thousands of amino acids build proteins. But only 20 amino acids are used. Amino acids are divided into two types: essential and non-essential. Essential amino acids cannot be made in the body in the amounts necessary for health, and must therefore be presented in the food. There are eight essential amino acids for adults: isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, valine. One more essential amino acids, histidine, is essential for the rapidly growing infants only.

The remaining amino acids are non-essential. They are equally necessary as components of all proteins and can be made in the body.

There are many different fatty acids in nature. They differ in the number of carbon atoms and “double bonds” which they contain. Fatty acids are divided into unsaturated, polyunsaturated, saturated and supersaturated.

Saturated and unsaturated fatty acids are the most important for the human organism. Saturated fatty acids have no double bonds and this makes them stable. The most important saturated fatty acids in food are: palmitic, stearic and butyric. Palmatic and stearic acids are major constituents of hard fats such as lard and cocoa butter. Butyric acid is present only in small amounts of milk fat and butter.

Unsaturated fatty acids can be changed into saturated by controlled treatment with hydrogen. This happens when liquid oils are hardened in the manufacture of margarine. The most important of unsaturated fatty acids are: oleic, linoleic, linolenic, arachidonic. They are found in vegetable seed oils and in very small amounts in some animal fats. Linoleic, linolenic, and arachidonic acids are called “essential fatty acids” because they are required in small amounts for normal health, but cannot be made in the body.

**Learn to use:**

|  |  |
| --- | --- |
| Reading | Показник |
| To be replaced by | Бути заміщеним |
| To burn holes in | Пропалювати дірки в |
| Rapidly growing infant | Немовлята, що швидко ростуть |
| Controlled treatment | Контрольоване збагачення |
| To harden | Надавати твердості, тверднути |
| Hard fats | Тверді жири |
| Measurement of the level | Показник рівня |

**Task l. Focus Questions:**

1. What is acid?
2. What kind of index is pH? What does it mean?
3. What elements do acids contain?
4. What acids are necessary for the existence of the organism?
5. How are amino acids divided?
6. Where are fatty acids found?
7. How do fatty acids differ?
8. What is the difference between saturated and unsaturated fatty acids?
9. Where are unsaturated acids found?
10. How can unsaturated fatty acids be changer into saturated ones?

**Task 2. Give English equivalents to the following words and phrases:**

Хімічна сполука; розчин; утворювати сіль; кислий; пошкоджувати речі; необхідна кількість; вироблятись в організмі; число атомів вуглецю; стійкий (стабільний); жир (смалець); масло какао; виробництво маргарину; масло насіння рослин; нормальне здоров’я.

**Task 3 . Paraphrase the following sentences and translate them. Remember that**

|  |  |
| --- | --- |
| ***Instead of*** | ***We can say*** |
| To replay | To substitute |
| To build | To form |
| To make | To produce |
| To be present in the food | To be included in the diet |
| Rapidly growing | Developed quickly |
| Infants | Little children |
| To differ in the number | To vary in the quantity |
| Major constituents | Principal parts |
| Manufacture | Production |

1. Hydrogen in acids can be replaced by a metal to form a salt.
2. Hundreds and thousands of amino acids build proteins.
3. Essential amino acids cannot be made in the body.
4. Essential amino acids must be presented in the food.
5. Histidine is essential for the rapidly growing infant.
6. Fatty acids differ in the number of carbon atoms.
7. Palmitic and stearic acids are major constituents of hard fats.
8. Liquid oils are hardened in the manufacture of margarine.

**Task 4. Use the words and phrases supplied below to make up extensive answers to the questions:**

1. **What are the main characteristics of acids?**

* a chemical compound;
* to contain hydrogen, oxygen;
* to be sour;
* to burn holes in;
* to damage things.

1. **How are amino acids characterized?**

* essential and non-essential;
* to build proteins;
* to be made in the body;
* to be present in the food.

1. **What are the properties of fatty acids?**

* to differ in the number of carbon atoms;
* “double bonds”;
* saturated and unsaturated;
* to be changed into;

1. **Where are fatty acids found?**

* to be major constituents;
* in hard fats;
* in vegetable seed oils;
* to be small amounts;
* in animal fats.

1. **What is the difference between acid and alkali?**

* liquids;
* pH measurement;
* a reading below 7;
* a reading above 7.

**Task 5. Ask questions to which the following could be answer. Start your questions with the words in brackets.**

1. pH level of acids is below 7. (What?)
2. Proteins are built by hundreds and thousands of amino acids. (How?)
3. Essential amino acids must be present in the food because they are not made in the body. (Why?)
4. There are eight essential amino acids for adults. (How many?)
5. Histidine is essential for rapidly growing infants. (Whom … for?)
6. There are many fatty acids in nature. (How many?)
7. The most important saturated fatty acids are palmatic, stearic and butyric. (What?)
8. Palmatic and stearic acids are found in hard fats. (Where?)
9. Liquid oils are hardened in the manufacture of margarine. (When?)
10. Unsaturated fatty acids are found in vegetable seed oils mainly. (Where?)

**H O R M O N E S**

**You can’t without them:**

|  |  |
| --- | --- |
| Endocrine gland | Ендокринна залоза |
| Ductless gland | Безпроточна залоза |
| Pituitary | Гіпофіз |
| Ovary | Яєчник |
| Testis | Яєчко |
| Anti-inflammatory effect | Протизапальна дія |
| Deficiency | Нестача |
| Stomach ulcer | Виразка шлунка |
| Adolescent | Підлітковий період |
| Prostate gland | Передміхурова залоза |
| Gigantism | Гігантизм |
| Acromegaly | Акромегалія (збільшення кінцівок) |
| Dwarfism | Карликовість; недорозвиненість якогось органа |
| Adrenal cartex | Наднирник |

Hormone is a substance that is produced in one part of the body by an endocrine glad. Endocrine gland (ductless gland) is a gland that manufactures one or more hormones and secretes them directly into the bloodstream. Endocrine glands include the pituitary, thyroid, parathyroid, and adrenal glands, the ovary and testis, the placenta, and part of the pancreas.

Hormones may by divided into:

* corticosteroids (from the adrenal cortex);
* growth hormone (from the pituitary gland);
* androgens (from the testes).

Corticosteroid is an any steroid hormone synthesized by the adrenal cortex. There are two main groups of corticosteroids; the glucocorticoids and the mineralocorticoids. The glucocorticoids are essential for the utilization of carbohydrate, fat and protein by the body and for a normal response to stress.

They are used to treat conditions that involve inflammation. The mineralocorticoids are necessary for the regulation of salt and water balance.

Cortisone is a naturally occurring corticosteroid that is used mainly to treat deficiency of corticosteroid hormones in Addison’s disease. Addison’s disease is a syndrome due to inadequate secretion of corticosteroid hormones by the adrenal glands, sometimes as a result of tuberculous infection. Symptoms include weakness, loss of energy, low blood pressure, and dark pigmentation of the skin. Formerly fatal, the disease is now treatable by replacement hormone therapy. Cortisone is administered by mouth or injection and may cause serious side-effects such as stomach ulcers and bleeding, nervous and hormone disturbances, muscle and bone damage, and eye changes.

Androgen is a group of steroid hormones that stimulate the development of male sex organs and male secondary sexual characteristics (beard growth, deepening of the voice, and muscle development). The principal source of these hormones is the testis but they are also secreted by the adrenal cortex and ovaries in small amounts. In women excessive production of androgens gives rise to masculinization. Naturally occurring and synthetic androgens are used in replacement therapy and us anabolic agents. Side effects include salt and water retention, increased bone growth, and masculinization in women. Androgens should not be used in patients with cancer of the prostate gland or in pregnant women.

Growth hormone is a hormone that promotes growth of the long bones in the limbs and increases protein synthesis. Excessive production of growth hormone results in gigantism before puberty and acromegaly in adults. Lack of growth hormone in children causes dwarfism.

**Learn to use:**

|  |  |
| --- | --- |
| To secrete | Виробляти, виділяти, секретувати |
| Placenta | Плацента, дитяче місце |
| To modify | Видозмінювати |
| Growth hormone | Гормон росту |
| Utilization | Використання |
| Tuberculous infection | Туберкульозна інфекція |
| Side-effect | Побічна дія |
| Bleeding | Кровотеча |
| Disturbance | Розлади, відхилення |
| Retention | Затримка |

**Task 1. Focus questions:**

1. What does the endocrine gland produce?
2. What glands are endocrine?
3. How are hormones divided?
4. What is the importance of glucocorticoids?
5. What are mineralocorticoids necessary for?
6. What is the use of cortisone?
7. What are the side-effects of cortisone replacement therapy?
8. What is the principal source of androgens?
9. What do androgens treat? What are they used for?
10. What are the side-effects of such treatment?
11. Describe the growth hormone.

**Task 2. Give English equivalents to the following words and phrases:**

Залоза внутрішньої секреції; підшлункова залоза; затримка статевого дозрівання (росту); надлишкове вироблення; вуглевод; кортикостероїд; необхідний для; запалення; вторинні статеві ознаки; вагітна жінка; мала кількість.

**Task 3. Paraphrase the following sentences. Remember that**

|  |  |
| --- | --- |
| **Instead of** | **We can say** |
| Substance | Matter |
| To produce | To yield, to manufacture |
| To include | To consist |
| Main | Basic |
| To be essential | To be necessary |
| To treat | To heal, to cure |
| To occur | To exist |
| Stomach ulcer | Gastric ulcer |
| Principal source | Main, fundamental source |
| To increase | To extend |

1. Hormone is substance that is produced in one part of the body by an endocrine gland.
2. Endocrine glands include the pituitary, thyroid, parathyroid, and adrenal glands, the ovary and testis, the placenta, and part of the pancreas.
3. There are two main groups of corticosteroids: the glucocorticoids and the mineralocorticoids.
4. The glucocorticoids are essential for the utilization of carbohydrate, fat and protein by the body and for a normal response to stress.
5. Naturally occurring and synthetic glucocorticoids are used to treat conditions that involve inflammation.
6. Cortisone is a naturally occurring corticosteroid.
7. Cortisone is administered by mouth or injection and may cause serious side-effects such as stomach ulcers and bleeding, etc.
8. The principal source of these hormones is the testis.
9. Growth hormones is a hormone that promotes growth of the long bones in the limbs and increases protein synthesis.

**Task 4. Use the words and phrases supplied below to make up extensive answers to the questions:**

1. ***How does endocrine gland act?***

* to secrete hormones into the bloodstream;
* to modify the structure or function of organs or tissues;
* ductless.

1. ***What is the division of hormones?***

* corticosteroid;
* androgens;
* growth hormone.

1. ***What do endocrine glands include?***

* pituitary;
* thyroid, parathyroid;
* adrenal glands, ovary, testis;
* placenta;
* part of the pancreas.

1. ***When do we use cortisone?***

* naturally occurring corticosteroid;
* Addison’s disease;
* Replacement hormone therapy;

1. ***What are the results of the excessive production of growth hormone?***

* acromegaly;
* gigantism;
* dwarfism.

**Task 5. Ask questions to which the following could be answer. Start your questions with the words in brackets.**

1. Endocrine glands include the pituitary, thyroid, parathyroid, and adrenal glands, the ovary and testis, the placenta, and part of the pancreas. (What?)
2. Hormones may by divided into: corticosteroids (from the adrenal cortex); growth hormone (from the pituitary gland); androgens (from the testes). (How?)
3. Corticosteroid is an any steroid hormone synthesized by the adrenal cortex. (What?)
4. There are two main groups of corticosteroids: the glucocorticoids and the mineralocorticoids. (How many?)
5. Naturally occurring and synthetic glucocorticoids have very powerful anti-inflammatory effects and are used to treat conditions that involve inflammation. (What effect?)
6. The mineralocorticoids are necessary for the regulation of salt and water balance. (What…for?)
7. Cortisone is used mainly to treat deficiency of corticosteroid hormones in Addison’s disease and following surgical removal of the adrenal glands. (What deficiency?)
8. Cortisone is administered by mouth or injection. (How?)
9. Side effects include salt and water retention, increased bone growth, and masculinization in women. (What?)
10. Excessive production of growth hormone results in gigantism before puberty and acromegaly in adults. (What results?)

**A N T I B I O T I C S**

**You can’t do without them:**

|  |  |
| --- | --- |
| Antibiotic | Антибіотик |
| Penicillin | Пеніцилін |
| Streptomycin | Стрептоміцин |
| Erythromycin | Еритроміцин |
| Neomycin | Неоміцин |
| Staphylococcus (pl. – cci) | Стафілокок |
| Streptococcus | Стрептокок |
| Pneumococcus | Пневмокок |
| Meningococcus | Менінгокок |
| Bacillus (pl. – i ) | Бацила |
| Bacterium (pl. – a) | Бактерія |
| Fungus (pl. – i) | Гриб, грибок |

**Directions: *Read the text carefully and be ready to discuss it.***

The term ‘antibiotic’ means (anti – against, bios – life) ‘ against life’. It shows that antibiotics kill some of the simple organisms. This effect of antibiotics was discovered by Fleming in 1929. Penicillin was the first of the antibiotics.

We may define antibiotics as substances produced by or derived from microorganisms, that destroy or inhibit the growth of other microorganisms. Antibiotics are used to treat infections caused by organisms that are sensitive to them, usually bacteria or fungi. They may alter the normal microbial content of the body (e.g. in the intestine, lungs, bladder) by destroying one or more groups of harmless or beneficial organisms. This may result in infections due to overgrowth of resistant organisms.

These side-effects are most likely to occur with broad spectrum antibiotics. They are active against a wide variety of organisms. Resistance may also develop in the microorganisms being treated. For example, through incorrect dosage or overprescription side reaction may occur. Antibiotics may cause allergy. Many people are allergic to them. Patients must always be asked beforehand in they are hypersensitive to these drugs.

Antibiotics are effective against many infections. They be administered orally, intramuscularly and topically. Penicillin, which was discovered first, is isolated from certain molds. It is comparatively non- toxic. It is an effective agent against staphylococci, streptococci, pneumococci, meningococci and other organisms. But it doesn’t have a great effect on gram-negative bacilli.

Another antibiotic Streptomycin is effective in many cases when Penicillin can’t help. It is much more active against gram-negative and acid-fast bacilli. Erythromycin is used in water solutions for ear and nose infections. It is also made in tablets and ointments. Neomycin is effective against a wide variety of microbes. It gives little or no allergic reactions. Neomycin is used to treat infections caused by a wide range of bacteria mainly those affecting the skin, ears and eyes. It is usually applied in creams or drops with other antibiotics.

**Learn to use:**

|  |  |
| --- | --- |
| To inhibit the growth | Пригнічувати ріст |
| To alter | Змінювати |
| Harmless organisms | Нешкідливі організми |
| Beneficial organisms | Корисні організми |
| Side-effects | Побічна дія |
| Broad-spectrum antibiotics | Антибіотики широкого спектра дії |
| Minor infection | Незначна інфекція |
| Unaided | Без сторонньої допомоги |
| Molds | Пліснява |
| (To) Effect | Вплив, дія; здійснювати, впливати |
| Effective | Ефективний |
| To affect | Уражати, впливати |
| A wide variety | Широка різноманітність |

**Task 1. Focus questions:**

1. What does the term ‘antibiotic’ mean?
2. Who discovered the first antibiotics?
3. What is the aim of giving antibiotics?
4. How can we define antibiotics?
5. What is the negative effect of antibiotics?
6. What kind of antibiotics produces side-effects?
7. Why may side reaction occur?
8. How can people prevent negative influence of antibiotics?
9. How are antibiotics administered?
10. What is the difference between Penicillin and Streptomycin?
11. When is Erythromycin used?
12. What infections are treated with Neomycin?

**Task 2. Give English equivalents to the following words and phrases:**

зверх чутливий; нормальний вміст; мікробів; призводити до інфекції; резистентні організми; неправильна доза; надмірне прописування; спричиняти алергію; призначати орально (внутрішньо-м’язево; місцево); грам-негативні бацили; кислотно-стійкі бацили; додати у креми (краплі).

**Task 3. Paraphrase the following sentences. Remember that**

|  |  |
| --- | --- |
| ***Instead of*** | ***We can say*** |
| Effect | Influence |
| To destroy | To ruin |
| To inhibit | To reduce |
| To alter | To change |
| To result in | To lead to |
| To clear up unaided | To stop without adding help |
| To isolate from | To separate from |
| To give allergic reaction | To produce side-effect |

1. The effect of antibiotics was discovored by Fleming.
2. Antibiotics destroy or inhibit the growth of other microorganisms.
3. Antibiotics may alter the normal microbal content of the body.
4. Minor infections can clear up unaided.
5. Penicillin is isolated from certain molds.
6. Neomycin give little or no allergic reactions.

**Task 4. Use the words and phrases supplied below to make up extensive answers to the questions:**

1. ***What kind of substances are antibiotics?***

* to be derived from;
* to destroy;
* to inhibit;
* the growth of microorganisms.

1. ***What are advantages of using antibiotics?***

* to treat infections;
* to be effective against;
* comparatively non-toxic;
* to have great effect;
* gram-negative bacilli.

1. ***What are disadvantages of using antibiotics?***

* to alter normal microbal content;
* to destroy harmless organisms;
* to produce side-effects;
* to result in infections.

1. ***How can antibiotics be administered?***

* orally, intramuscularly, topically;
* in water solutions;
* to be made in tablets;
* to be applied in creams of drops.

1. ***Why is special care needed in using antibiotics?***

* incorrect dosage;
* overprescription;
* side reaction;
* to be hypersensitive;
* to be allergic to antibiotics.

**Task 5. Ask questions to which the following could be answer. Start your questions with the words in brackets.**

1. Antibiotics kill some of the simple organisms. (What?)
2. Antibiotics are used to treat infections caused by organisms. (When?)
3. They may destroy harmless or beneficial organisms. (What?)
4. Antibiotics are active against a wide variety of organisms. (What…against?)
5. Resistance may develop in the microorganisms being treated. (Where?)
6. Through incorrect dosage or overprescription side-effects may occur. (Why?)
7. Antibiotics should not be used to treat minor infections because they can clear up unaided. (Why?)
8. Many people are allergic to antibiotics. (Who?)
9. Penicillin is isolated from certain molds. (Where…from?)
10. Erythromycin is used for ear and nose infections. (What…for?)
11. Neomycin gives little allergic reactions. (What?)
12. Neomycin is usually applied in creams and drops. (Where?)

**P O I S O N I N I G**

**You can’t do without them:**

|  |  |
| --- | --- |
| Nausea | Нудота, морська хвороба |
| Vomiting | Блювання |
| Diarrhoea | Пронос |
| Caustic alkali | Каустичний луг |
| Oxalic acid | Щавлева кислота |
| Ammonia | Аміак, нашатирний спирт |
| Bichloride of mercury | Сулема |
| Cyanosis | Ціаноз, синюха |
| Consciousness | Свідомість |
| Acetylide | Карбід |
| Nitrobenzene | Нітробензол |
| Cyanide | Ціанід, сіль ціанистоводневої кислоти |
| Sequela (pl.-ae) | Ускладнення, наслідок |
| Seizure | Судома |

**Poisoning –** *an action or instance of giving or taking poison.*

***The common symptoms of acute poisoning are as follows:***

|  |  |
| --- | --- |
| **COMMON SYMPTOMS:** | **SOURCE:** |
| 1. Nausea, vomiting, abdominal pain, diarrhea, gastric disorder. | 1.Many chemicals and drugs, food poisoning. |
| 1. Corrosive burns on the lips, mouth, and throat. | 2.Mineral acids, austic alkali, oxalic acid, ammonia, bichloride of mercury, phenol, and fluorides. |
| 1. Respiratory and circulatory symptoms such as cyanosis, shock collapse, sudden loss of consciousness and convulsions. | 3.Lack of oxygen (replacement by other gases, including odourless carbon dioxide, from decaying vegetables and fruit), many chemicals and drugs. |
| 1. Pupillary Changes: a) dilated pupil; b) constricted pupil. | 4.a)Belladonna group, cocaine, nicotine;  b)Opium group. |
| 1. Respiratory paralysis. | 5.Carbon monoxide, cyanides. |
| 1. Skin discolouration. | 6.Acetanilid, nitrobenzene, aniline, sulfa drugs. |
| 1. Delirium. | 7.Barbiturates, cocaine, opium, derivatives of atropine, lead, mercury. |
| 1. Characteristic odour on the breath. | 8.Chloroform, ether, phenol, and cyanides. |