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PROFESSIONAL ENGLISH FOR BIOLOGISTS

Part II

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Навчально-методичний посібник «Professional English for Biologists. Part II» укладений відповідно до вимог робочих навчальних програм курсу «Іноземна мова за професійним спрямуванням» для студентів III – IV курсів факультету біології та лісового господарства. Книга складається з чотирьох змістових модулів. Кожний модуль включає тексти фахового орієнтування та комплекс вправ лексико-граматичного характеру на закріплення фахової лексики.

Призначений для студентів спеціальностей «Біологія», «Лабораторна діагностика», «Середня освіта. Біологія», «Середня освіта. Біологія, природознавство, здоров'я людини», «Середня освіта. Природничі науки» різних форм навчання, а також для науковців-біологів, які прагнуть поліпшити знання англійської мови за фахом.

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ПЕРЕДМОВА

Навчально-методичний посібник «Professional English for Biologists. Part 2» призначений для студентів III-IV курсів спеціальностей «Біологія», «Лабораторна діагностика», «Середня освіта. Біологія», «Середня освіта. Біологія, природознавство, здоров'я людини», «Середня освіта. Природничі науки» та укладений згідно з силабусами освітнього компоненту «Англійська мова за професійним спрямуванням» на факультеті біології та лісового господарства.

Мета навчально-методичного посібника: виробити у студентів вміння і навички, необхідні для практичного використання англійської мови в професійній діяльності.

Навчально-методичний посібник складається з чотирьох змістових модулів, кожен з яких містить тексти на професійну тематику та комплекс вправ лексичного та комунікативного характеру.

Вправи спрямовані на формування лінгвістичної та професійної компетенції майбутніх фахівців-біологів: прочитати та проаналізувати тематичний текст; відповісти на запитання до тексту; дібрати англійські еквіваленти до поданих слів і виразів; знайти синоніми слів; виконати вправи на підстановку пропущених слів у реченнях; визначити правильність чи хибність тверджень тощо.

Кожний модуль включає низку граматичних вправ (change the forms of the verbs, select the correct word from the choices in brackets, correct the mistakes in the sentences, fill in the proper form of the suggested verbs, etc.) спрямованих на вироблення вмінь правильного вживання часових форм, модальних дієслів, неособових форм дієслова, фразових дієслів.

UNIT I

SYSTEMS OF THE HUMAN BODY

A system of a human body means a collective functional unit made by several organs in which the organs work in complete coordination with one another. Organs cannot work alone because there are certain needs of every organ that need to be fulfilled and the organ itself cannot fulfill those needs. So, all organs of human body need the support of other organs to perform their functions and in this way an organ system is formed.

Human body is made of several different systems. All the systems require support and coordination of other systems to form a living and healthy human body. If any one of these systems is damaged, human body will become unstable and this lack of stability will ultimately lead to death. The instability caused by damage of one system cannot be stabilized by other systems because functions of one system cannot be performed by other systems.

I. SKELETAL MUSCULAR SYSTEM

The skeletal muscular system includes the bones, muscles, and joints. All have important functions in the body.

Bones provide the framework on which the body is constructed and protect and support internal organs. Bones also assist the body in movement, because they serve as a point of attachment for muscles. The inner core of bones is composed of hematopoietic tissue (red bone marrow, which manufactures blood cells), whereas outer parts of bone are storage areas for minerals necessary for growth, such as calcium and phosphorus.

Joints are the places at which bones come together. Several different types of joints are found within the body. The type of joint found in any specific location is determined by the need for greater or lesser flexibility of movement.

Muscles, whether attached to bones or to internal organs and blood vessels, are responsible for movement. Internal movement involves the contraction and relaxation of muscles found in viscera, and external movement is accomplished by the contraction and relaxation of muscles that are attached to the bones. **Tendons** are connective tissue that bind muscles to bones, while **ligaments** bind bones to other bones.

Bones are complete organs composed chiefly of a specialized connective tissue called osseous (bony) tissue, plus a rich supply of blood vessels and nerves.

Osseous tissue consists of a combination of osteocytes (bone cells), dense connective tissue strands known as *collagen*, and intercellular *calcium salts*.

During fetal development, the bones of the fetus are composed of **cartilage**, which resembles osseous tissue but is more flexible and less dense because of a lack of calcium salts in its intercellular spaces. As the embryo develops, the process of depositing calcium salts in the soft, cartilaginous tissue occurs and continues throughout the life of the individual after birth. The gradual replacement of cartilage and its intercellular substance by immature bone cells and calcium deposits is called **ossification** (bone formation).

Osteoblasts (**-blast** is from the Greek word meaning to bud or sprout) are the immature osteocytes that produce the bony tissue replacing cartilage during ossification. **Osteoclasts** (**-clast** is from the Greek word meaning to break) are large cells that function to reabsorb, or digest, bony tissue. Osteoclasts (also called **bone phagocytes**) digest bone tissue from the inner sides of bones thus enlarging the inner bone cavity so that the bone does not become overly thick and heavy. When a bone breaks, osteoblasts lay down the mineral bone matter (calcium salts) and osteoclasts remove excess bone debris (smooth out the bone).

Osteoblasts and osteoclasts work together in all bones throughout life, tearing down (osteoclasts) and rebuilding (osteoblasts) bony tissue. This allows bone to respond to mechanical stresses placed on it and thus enables it to be a living tissue, constantly rebuilding and renewing itself. This process is known as bone remodeling.

There are 206 bones of various types in the body. **Long bones** are found in the thigh, lower leg, and upper and lower arm. These bones are very strong, are broad at the ends where they join with other bones, and have large surface areas for muscle attachment. **Short bones** are found in the wrist and ankle and are small with irregular shapes. **Flat bones** are found covering soft body parts. These bones are the skull, shoulder blades, ribs, and pelvic bones. **Sesamoid bones** are small, rounded bones (resembling a sesame seed in shape). They are found near joints, and they increase the efficiency of the tendons at a particular joint. The kneecap is the largest example of a sesamoid bone.

The **vertebral (spinal) column** is composed of 26 bone segments, called **vertebrae**, that are arranged in five divisions from the base of the skull to the tailbone. The bones are separated by pads of cartilage called **intervertebral discs**.

Ex. 1.1. Learn and translate the following words and word combinations:

to fulfill; to mean; to perform; to require; to be damaged; lack; collective functional unit; complete; certain; needs; ultimately; throughout ; to realize; to allow; motion; to send; to receive; to process; to respond; to see; to hear; to smell; to taste; to feel; to include; tube; air sac; waste; to eliminate; to distribute; fluid; to drain; excess; disease; to prevent; to release; to break down; carbohydrate; to repair; to chew; to swallow; to be discharged.

Ex. 1.2. Translate into Ukrainian and learn glossary of essential terms:

№	English term	Ukrainian equivalent	№	English term	Ukrainian equivalent
1.	human body		11.	ligaments	
2.	healthy <i>adj</i>		12.	collagen	
3.	unstable <i>adj</i>		13.	calcium salts	
4.	stability <i>n</i>		14.	ossification	
5.	joint <i>n</i>		15.	osteoblasts	
6.	bone <i>n</i>		16.	osteoclasts	
7.	tendons		17.	sesamoid bones	
8.	skeletal muscular system		18.	vertebral (spinal) column	
9.	associated cartilage		19.	intervertebral discs	
10.	skeletal system				

Ex. 1.3. Complete the following sentences.

1. Bones are composed of a type of connective tissue called _____ tissue.
2. Bone cells are called _____.
3. The bones of a fetus are composed mainly of _____.
4. Immature bone cells called _____ produce bony tissue.
5. Large bone cells called _____ digest bone tissue to shape the bone and smooth it out.
6. Mineral substances needed for bone development are _____ and _____.
7. The patella, covering the knee joint, is an example of a/an _____ bone.
8. Connective tissue that binds muscles to bones is a/an _____.

Ex. 1.4. Read the text “Bones of the thorax” and translate into Ukrainian the essential terms:

BONES OF THE THORAX

Clavicle – collar bone; a slender bone, positioned anteriorly (ventrally), one on each side, connecting the breastbone (sternum) to each shoulder blade (scapula).

Scapula (*pl. scapulae*) – shoulder blade; one of two flat, triangular bones on each dorsal side of the thorax. The extension of the scapula that joins with the clavicle to form a joint above the shoulder is called the **acromion** (**acr/o** means extremity, **om/o** means shoulder). The joint formed by these two bones is known as the **acromioclavicular (AC) joint**.

Sternum – breastbone; a flat bone extending ventrally down the midline of the chest. The upper part of the sternum articulates on the sides with the clavicle and ribs, and the lower, narrower portion is attached to the ribs, diaphragm, and abdominal muscles. The lowest portion of the sternum is the **xiphoid process** (*xiph/o* means sword). The uppermost portion is the **manubrium** (from a Latin term meaning handle).

Ribs – There are 12 pairs of ribs. The first 7 pairs join the sternum anteriorly through cartilaginous attachments called **costal cartilages**. Ribs 1 to 7 are called **true ribs**. They join with the sternum anteriorly and with the vertebral column posteriorly. Ribs 8 to 10 are called **false ribs**. They join with the vertebral column posteriorly but join the 7th rib anteriorly instead of attaching to the sternum. Ribs 11 and 12 are the **floating ribs** because they are completely free at their anterior ends.

№	English term	Ukrainian equivalent	№	English term	Ukrainian equivalent
1.	clavicle		7.	xiphoid process	
2.	scapulae		8.	manubrium	
3.	sternum		9.	costal cartilages	
4.	acromion		10.	ribs	
5.	acromioclavicular joint		11.	true/false/floating ribs	
6.	abdominal muscles				

Ex. 1.5. Read the text and fill in the missing words.

Ulna	Carpals	Metacarpals	Humerus	Radius	Phalanges
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BONES OF THE ARM AND HAND

The bones of the arm and hand are described with the subject in the anatomic position – standing, with the arms held at the sides and the palms facing forward.

_____ – upper arm bone; the large head of the humerus is rounded and joins with the glenoid fossa of the scapula to form the shoulder or glenohumeral joint. A rim of fibrocartilage, called a **labrum**, guides the humerus as it moves in the glenoid fossa. The **rotator cuff** is a group of muscles with tendons that surround the shoulder joint.

_____ – medial lower arm (forearm) bone; the proximal bony process of the ulna at the elbow is called the **olecranon** (elbow bone). The olecranon is the bony point formed when the elbow is bent.

_____ – lateral lower arm (forearm) bone (in line with the thumb).

_____ – wrist bones; there are two rows of four bones in the wrist.

_____ – the five bones of the palm of the hand.

_____ (*sing.* **phalanx**) – finger bones. Each finger (except the thumb) has three phalanges: a proximal, a middle, and a distal phalanx. The thumb has only two phalanges: a proximal and a distal phalanx.

Ex. 1.6. Learn the information given in the table and translate into Ukrainian the essential terms:

CRANIAL AND FACIAL BONES

Cranial bones		
	Translation	Location
ethmoid bone		supports nasal cavity and eye sockets
frontal bone		forehead; part of eye sockets
occipital bone		back and base of skull
parietal bones		top and sides of skull
sphenoid bone		base of skull and behind eyes (bat-shaped bone)
temporal bones		lower sides and back of skull
Facial bones		
lacrimal bones		corners of each eye
mandible		lower jawbone
maxillae		upper jawbones
nasal bones		bridge and septum of nose
vomer		nasal septum (tin, flat bone)
zygomatic bones		cheek bones

Ex. 1.7. Match the cranial and facial bones with their meanings that follow.

<i>ethmoid bone</i>	<i>frontal bone</i>	<i>lacrimal bones</i>	<i>mandible</i>	<i>maxilla;</i>
<i>nasal bone</i>	<i>occipital bone</i>	<i>parietal bone</i>	<i>sphenoid bone;</i>	
<i>temporal bone</i>	<i>vomer</i>	<i>zygomatic bone</i>		

1. forms the roof and upper side parts of the skull _____;
2. delicate bone, composed of spongy, cancellous tissue; supports the nasal cavity and orbits of the eye _____;
3. forms the back and base of the skull _____;
4. forms the forehead _____;
5. bat-shaped bone extending behind the eyes to form the base of the skull _____;
6. bone near the ear and connecting to the lower jaw _____;
7. cheekbone _____;
8. bone that supports the bridge of the nose _____;
9. thin, flat bone forming the lower portion of the nasal septum _____;
10. lower jawbone _____;
11. upper jawbone _____;
12. two paired bones, one located at the corner of each eye _____

Ex. 1.8. Read the text “Bones of the pelvis” and translate into Ukrainian the essential terms:

BONES OF THE PELVIS

Pelvic girdle – pelvis. This collection of bones supports the trunk of the body and articulates with the femur to form the hip joint. The adult pelvis is composed of three pairs of fused bones: the ilium, ischium, and pubis. The pelvis joins with the single, posteriorly (dorsally) located sacrum.

Ilium—uppermost and largest portion of the pelvis. Dorsally, the two parts of the ilium do not meet. Rather, they join the sacrum on either side to form the sacroiliac joints. The connection between the iliac bones and the sacrum is very firm, and very little motion occurs at these joints.

The superior part of the ilium is the **iliac crest**. It is filled with red bone marrow and serves as an attachment for abdominal wall muscles as well as strong muscles of the hip and buttocks.

Ischium—inferior or lower part of the pelvis. The ischium and ligaments, tendons, and muscles attached to it are what you sit on.

Pubis—anterior part of the pelvis. The two pubic bones join by way of a cartilaginous disc. This is the **pubic symphysis**. Like sacroiliac joints, this area is quite rigid.

Pelvic cavity—region within the ring of bone formed by the pelvic girdle. The rectum, sigmoid colon, bladder, and female reproductive organs lie within the pelvic cavity and are protected by the rigid architecture of the pelvic girdle.

№	English term	Ukrainian equivalent	№	English term	Ukrainian equivalent
1.	pelvic girdle		8.	sacroiliac joints	
2.	trunk		9.	iliac crest	
3.	femur		10.	buttocks	
4.	ilium		11.	cartilaginous disc	
5.	ischium		12.	pubic symphysis	
6.	pubis		13.	pelvic cavity	
7.	sacrum				

Ex. 1.9. Read the text “Bones of the leg and foot” and translate into English the essential terms:

BONES OF THE LEG AND FOOT

Femur (thigh bone) is the longest bone in the body. At its proximal end it has a rounded head that fits into a depression, or socket, in the pelvis. This socket is called the **acetabulum**. The head of the femur and the acetabulum form a ball-and-socket joint otherwise known as the **hip joint**.

Patella (kneecap) is a small, flat bone that lies in front of the articulation between the femur and one of the lower leg bones called the **tibia**. It is a sesamoid bone surrounded by protective tendons and held in place by muscle attachments. Together with the femur and the tibia, it forms the knee joint.

Tibia (the larger of the two bones of the lower leg) runs under the skin in the front part of the leg. It joins with the femur and patella proximally, and at its distal end (ankle) forms a flare that is the bony prominence (medial **malleolus**) at the inside of the ankle. The tibia commonly is called the **shin bone**.

Fibula – smaller of the two lower leg bones; this thin bone, well hidden under the leg muscles, runs parallel to the tibia. At its distal part, it forms a flare, which is the bony prominence (lateral **malleolus**) on the outside of the ankle. The tibia, fibula, and **talus** (the first of the tarsal bones) come together to form the **ankle joint**.

Tarsals are bones of the hind and mid parts of the foot. These seven short bones resemble the carpal bones of the wrist but are larger. The **calcaneus** is the largest of these bones and also is called the **heel bone**. As noted, the **talus** is one of three bones that form the ankle joint.

Metatarsals are bones between the tarsals and phalanges. There are five metatarsal bones, which are similar to the metacarpals of the hand. Each articulates with the phalanges of the toes.

Phalanges of the toes - bones of the forefoot; as in the digits of the hand, there are two phalanges in the big toe and three in each of the other toes.

№	Ukrainian equivalent	English term	№	Ukrainian equivalent	English term
1.	колінна чашечка		7.	кульшова западина	
2.	щиколоток		8.	таранна кістка	
3.	тазостегновий суглоб		9.	велика гомілкорова кістка	
4.	малогомілково кістка		10.	стегно; стегнова кістка	
5.	передплесно		11.	пальці ноги	
6.	гомілка				

Ex. 1.10. Read and translate the short texts without any dictionary.

1. JOINTS

A **joint (articulation)** is a coming together of two or more bones. Some joints are immovable, such as the **suture joints** between the skull bones. Other joints, such as those between the vertebrae, are partially movable. Most joints, however, allow considerable movement. These freely movable joints are called **synovial joints**. Examples of synovial joints are the ball-and-socket type (the hip and shoulder joints) and the hinge type (elbow, knee, and ankle joints).

The bones work with the muscles to help the body move. *Marrow*, which is soft, fatty tissue that produces red blood cells, many white blood cells, and other immune system cells, is found inside bones.

2. ACTIONS OF SKELETAL MUSCLES

Skeletal (striated) muscles (more than 600 in the human body) are the muscles that move bones and joints.

When a muscle contracts, one of the bones to which it is joined remains virtually stationary as a result of other muscles that hold it in place. The point of attachment of the muscle to the stationary bone is called the **origin (beginning)**

of that muscle. When the muscle contracts, however, another bone to which it is attached does move. The point of junction of the muscle to the bone that moves is called the **insertion** of the muscle. Most often, the origin of a muscle lies proximal in the skeleton, whereas its insertion lies distal.

II. NERVOUS SYSTEM

The nervous system is one of the most complex of all human body systems. More than 100 billion nerve cells operate constantly all over the body to coordinate the activities we do consciously and voluntarily, as well as those that occur unconsciously or involuntarily. We speak, move muscles, hear, taste, see, and think. Our glands secrete hormones, and we respond to danger, pain, temperature, and touch. All of these functions comprise only a small number of the many activities controlled by the nervous system.

Fibers exiting from microscopic **nerve cells (neurons)** are collected into macroscopic bundles called **nerves**, which carry electrical messages all over the body. External stimuli, as well as internal chemicals such as **acetylcholine**, activate the cell membranes of nerve cells, which results in electrical discharges of these cells. These electrical discharges, **nervous impulses**, may then traverse the length of the associated nerves. External **receptors** (sense organs) as well as internal receptors in muscles and blood vessels receive these impulses and may in turn transmit impulses to the complex network of nerve cells in the brain and spinal cord. Within this central part of the nervous system, impulses are recognized, interpreted, and finally relayed to other nerve cells that extend out to all parts of the body, such as muscles, glands, and internal organs, peripheral nervous system, and the autonomic nervous system.

GENERAL STRUCTURE OF THE NERVOUS SYSTEM

The nervous system is classified into two major divisions: the **central nervous system (CNS)** and the **peripheral nervous system (PNS)**. The central nervous system consists of the **brain** and **spinal cord**. The peripheral nervous system consists of **cranial nerves** and **spinal nerves, plexuses, and peripheral nerves** throughout the body. Cranial nerves carry impulses between the brain and the head and neck. The one exception is the tenth cranial nerve, called the **vagus**

nerve. It carries messages to and from the neck, chest, and abdomen. **Figure 1** shows cranial nerves, their functions, and the parts of the body that they carry messages to and from. Spinal nerves carry messages between the spinal cord and the chest, abdomen, and extremities.

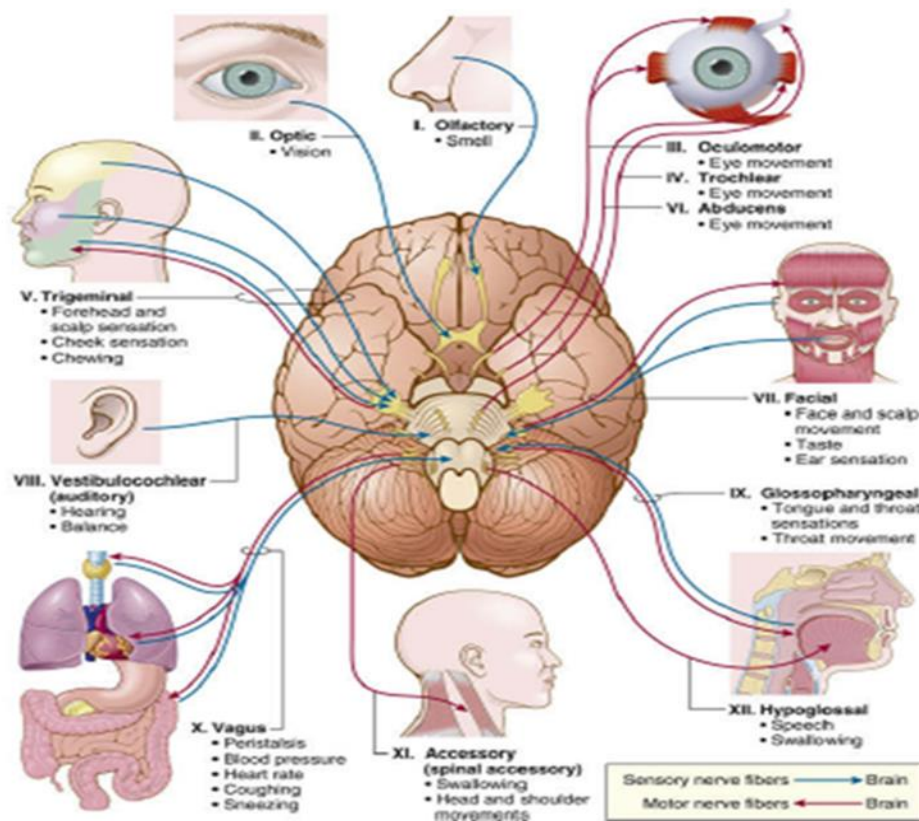


Figure 1.

A **plexus** is a large network of nerves in the peripheral nervous system. The cervical, brachial (brachi/o means arm), and lumbosacral plexuses are examples that include cervical, lumbar, and sacral nerves.

The spinal and cranial nerves are composed of nerves that help the body respond to changes in the outside world. They include sense **receptors** for sight (eye), hearing and balance (ear), smell (olfactory), and touch (skin sensation) and **sensory (afferent) nerves** that carry messages related to changes in the environment *toward* the spinal cord and brain. In addition, **motor (efferent) nerves** travel from the spinal cord and brain to muscles of the body, telling them how to respond. For example, when you touch a hot stove, temperature and pain receptors in the skin stimulate afferent nerves, which carry messages toward the spinal cord and brain. Instantaneously, the message is conveyed to efferent nerve

cells in the spinal cord, which then activate voluntary muscles to pull your hand away from the stove.

In addition to the spinal and cranial nerves (whose functions are mainly voluntary and involved with sensations of smell, taste, sight, hearing, and muscle movements), the peripheral nervous system also contains a large group of nerves that function involuntarily or automatically, without conscious control. These peripheral nerves belong to the **autonomic nervous system**. This system of nerve fibers carries impulses to glands, heart, blood vessels, involuntary muscles found in the walls of tubes like the intestines, and hollow organs like the stomach and urinary bladder.

Some autonomic nerves are **sympathetic** nerves and others are **parasympathetic** nerves. The sympathetic nerves stimulate the body in times of stress and crisis. They increase heart rate and forcefulness, dilate (relax) airways so more oxygen can enter, and increase blood pressure. In addition, sympathetic neurons stimulate the adrenal glands to secrete epinephrine (adrenaline), while also inhibiting intestinal contractions to slow digestion. The parasympathetic nerves normally act as a balance for the sympathetic nerves. Parasympathetic nerves slow down heart rate, lower blood pressure, and stimulate intestinal contractions to clear the rectum.

Ex. 2.1. Translate into Ukrainian and learn glossary of essential terms:

№	English term	Ukrainian equivalent	№	English term	Ukrainian equivalent
1.	cranial nerves		11.	plexuses	
2.	acetylcholine		12.	vagus nerve	
3.	nervous impulses		13.	extremities	
4.	receptors		14.	cervical	
5.	brain		15.	brachial	
6.	spinal cord		16.	lumbosacral	
7.	peripheral nervous system		17.	sensory (afferent) nerves	
8.	autonomic nervous system		18.	motor (efferent) nerves	
9.	central nervous system		19.	sympathetic nerves	
10.	nerve cells (neurons)		20.	parasympathetic nerves	

Ex. 2.2. Read the text and translate into Ukrainian the words in bold.

NEURONS, NERVES, AND GLIAL CELLS

A **neuron** is an individual nerve cell, a microscopic structure. Impulses pass along the parts of a nerve cell in a definite manner and direction.

A **stimulus** begins an impulse in the branching fibers of the neuron, which are called **dendrites**. A change in the electrical charge of the dendrite membranes is thus begun, and the nervous impulse moves along the dendrites like the movement of falling dominoes. The impulse, traveling in only one direction, next reaches the **cell body**, which contains the **cell nucleus**. Small collections of nerve cell bodies outside the brain and spinal cord are called **ganglia** (*sing. ganglion*). Extending from the cell body is the **axon**, which carries the impulse away from the cell body. Axons can be covered with a fatty tissue called myelin. The purpose of this **myelin sheath** is to insulate the axon and speed transmission of the electrical impulse.

Demyelination is loss of the myelin insulating the nerve fiber and is characteristic of multiple sclerosis, an acquired illness affecting the CNS.

The myelin sheath gives a white appearance to the nerve fiber – hence the term white matter, as in parts of the spinal cord and the white matter of the brain and most peripheral nerves. The gray matter of the brain and spinal cord is composed of the cell bodies of neurons that appear gray because they are not covered by a myelin sheath.

The nervous impulse passes through the axon to leave the cell via the **terminal end fibers** of the neuron. The space where the nervous impulse jumps from one neuron to another is called the **synapse**. The transfer of the impulse across the synapse depends on the release of a chemical substance, called a **neurotransmitter**, by the neuron that brings the impulse to the synapse. Tiny sacs (vesicles) containing the neurotransmitter are located at the ends of neurons, and they release the neurotransmitter into the synapse. **Acetylcholine, norepinephrine, epinephrine (adrenaline), dopamine, serotonin, and endorphins** are examples of neurotransmitters.

Whereas a neuron is a microscopic structure within the nervous system, a **nerve** is macroscopic, able to be seen with the naked eye. A nerve consists of many axons that travel together like strands of rope. Peripheral nerves that carry impulses to the brain and spinal cord from stimulus receptors like the skin, eye, ear, and nose are **afferent** or **sensory nerves**; those that carry impulses from the

CNS to organs that produce responses, such as muscles and glands, are **efferent** or **motor nerves**.

Neurons and nerves are the **parenchyma** of the nervous system. Parenchyma is the essential distinguishing tissue of an organ. In the brain and spinal cord, neurons, which conduct electrical impulses, are the parenchymal tissue. **Stroma** of an organ is the connective and supportive tissue of an organ. The stromal tissue of the central nervous system consists of the **glial (neuroglial) cells**, which make up its supportive framework and help it ward off infection. Glial cells do not transmit impulses. They are far more numerous than neurons and can reproduce.

Astrocytes (astroglial cells) are star-like in appearance (*astr/o* means star) and transport water and salts between capillaries and neurons. **Microglial cells** are small cells with many branching processes (dendrites). As phagocytes, they protect neurons in response to inflammation.

Oligodendroglial cells (oligodendrocytes) have few (*olig/o* means few or scanty) dendrites. These cells form the myelin sheath in the CNS. By contrast, **ependymal cells** (Greek *ependyma* means upper garment) line membranes within the brain and spinal cord where CSF is produced and circulates.

Glial cells, particularly the astrocytes, are associated with blood vessels and regulate the passage of potentially harmful substances from the blood into the nerve cells of the brain. This protective barrier between the blood and brain cells is called the **blood-brain barrier (BBB)**. This barrier consists of special lining (endothelial) cells, which along with astrocytes separate capillaries from nerve cells. Delivery of chemotherapeutic drugs to treat brain tumors is thus difficult, because the BBB blocks drug access to brain tissues.

Ex. 2.3. Match the listed terms with the definitions that follow.

<i>Astrocyte</i>	<i>oligodendroglial cell</i>	<i>motor nerves</i>	<i>neurotransmitter</i>	<i>dendrite</i>
<i>glial cell</i>	<i>sensory nerves</i>	<i>myelin sheath</i>	<i>neuron</i>	<i>plexus axon</i>

1. Microscopic fiber leading from the cell body that carries the nervous impulse along a nerve cell _____
2. Large, interlacing network of nerves _____
3. Chemical that is released at the end of a nerve cell and stimulates or inhibits another cell (example: acetylcholine) _____
4. Microscopic branching fiber of a nerve cell that is the first part to receive the nervous impulse _____
5. Carry messages toward (afferent) the brain and spinal cord from receptors _____

6. Glial cell that transports water and salts between capillaries and nerve cells _____
7. Glial cell that produces myelin _____
8. A nerve cell that transmits a nerve impulse _____
9. Carry messages away from (efferent) the brain and spinal cord to muscles and glands _____
10. Fatty tissue that surrounds the axon of a nerve cell _____
11. Connective and supportive (stromal) tissue _____

Ex. 2.4. Read the text “The Brain” and translate into English the essential terms:

THE BRAIN

The brain controls body activities. In the human adult, it weighs about 1.3 kg and has many different parts, all of which control different aspects of body functions.

The largest part of the brain is the “thinking” area, or **cerebrum**. On the surface of the cerebrum, nerve cells lie in sheets, which make up the **cerebral cortex**. These sheets, arranged in folds called **gyri**, are separated from each other by grooves known as **sulci**. The brain is divided in half, a right side and a left side, which are called **cerebral hemispheres**. Each hemisphere is subdivided into four major lobes named for the cranial (skull) bones that overlie them. *Figure 2* shows these lobes – frontal, parietal, occipital, and temporal – as well as gyri and sulci.

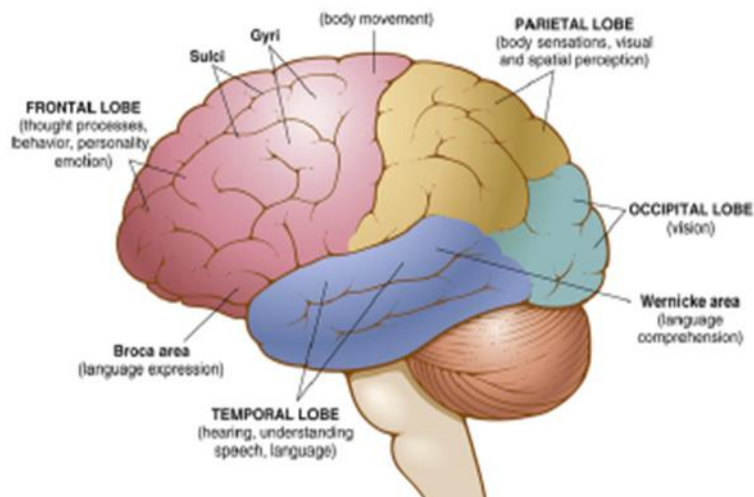


Figure 2.
Left cerebral hemisphere (lateral view). **Gyri** (convolutions) and **sulci** (fissures) are indicated. Neurologists believe that the two hemispheres have different abilities. The **left brain** is more concerned with language, mathematical functioning, reasoning, and analytical thinking. The **right brain** is more active in spatial relationships, art, music, emotions, and intuition.

The cerebrum has many functions. It is responsible for thought, judgement, memory, association, and discrimination. In addition, sensory impulses are received through afferent cranial nerves, and when registered in the cortex, they are the basis for perception. Nerve impulses from the cerebrum extend to muscles and glands producing movement as well as internal changes in the body.

In the middle of the cerebrum are spaces, or canals, called **ventricles**. They contain a watery fluid that flows throughout the brain and around the spinal cord. This fluid is **cerebrospinal fluid (CSF)**, and it protects the brain and spinal cord from shock by acting like a cushion. CSF usually is clear and colorless and contains lymphocytes, sugar, and proteins. Spinal fluid can be withdrawn for diagnosis or relief of pressure on the brain; this is called a **lumbar puncture (LP)**. For this procedure, a hollow needle is inserted into the lumbar region of the spinal column below the region where the nervous tissue of the spinal cord ends, and CSF is withdrawn.

Two other important parts of the brain are the **thalamus** and the **hypothalamus** (*Figure 3*).

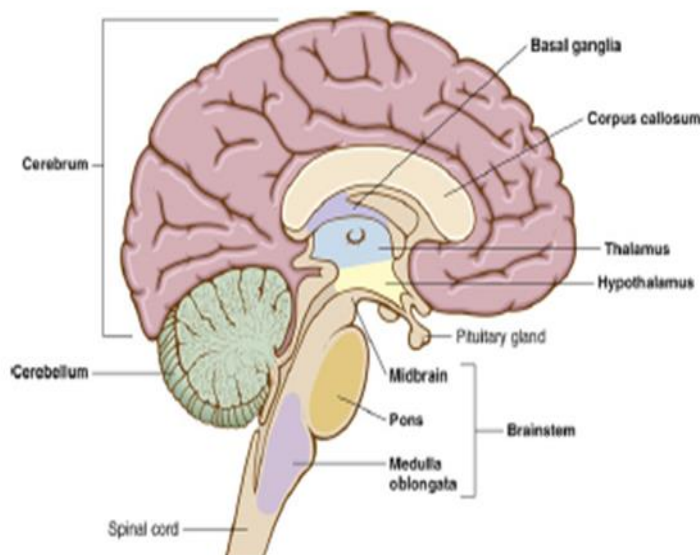


Figure 3.

*Parts of the brain: cerebrum, thalamus, hypothalamus, cerebellum, midbrain, pons, and medulla oblongata. Note the location of the pituitary gland below the hypothalamus. The **basal ganglia** (a group of cells) regulate intentional movements of the body. The **corpus callosum** lies in the center of the brain and connects the two hemispheres (halves).*

The thalamus acts like a triage center. It decides what is important and what is not, selectively processing and relaying sensory information to the cerebral cortex. The thalamus also plays a major role in maintaining levels of awareness and consciousness. The hypothalamus (below the thalamus) contains neurons that control body temperature, sleep, appetite, sexual desire, and emotions such as fear and pleasure. The hypothalamus also regulates the release of hormones from the pituitary gland at the base of the brain and integrates the activities of the sympathetic and parasympathetic nervous systems.

№	English term	Ukrainian equivalent	№	English term	Ukrainian equivalent
1.	cerebrum		6.	ventricles	
2.	cerebral cortex		7.	lumbar puncture	
3.	gyri		8.	pituitary gland	
4.	sulci		9.	triage center	

5.	cerebral hemisphere		10.	cerebrospinal fluid	
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Ex. 2.5. Learn the information given in the table and translate into Ukrainian the essential terms:

Functions of the Parts of the Brain		
Structure	Translation	Function(s)
Cerebrum		thinking, personality, sensations, movements, memory
Thalamus		relay station, (“trriage center”) for sensory impulses; control of awareness and consciousness
Hypothalamus		body temperature, sleep, appetite, emotions; control of the pituitary gland
Cerebellum		coordination of voluntary movements and balance
Pons and Midbrain		connection of nerve and nerve fiber pathways, including those to the eyes and face
Medulla oblongata		nerve fibers cross over, left to right and right to left; contains centers to regulate heart, blood vessels, and respiratory system

Ex. 2.6. Read and translate the short texts without any dictionary.

1. SPINAL CORD

The **spinal cord** is a column of nervous tissue extending from the **medulla oblongata** to the second **lumbar vertebra** within the **vertebral column**. Below the end of the spinal cord is the **cauda equina** (Latin for “horse's tail”), a fan of nerve fibers. The spinal cord carries all the nerves to and from the limbs and lower part of the body, and it is the pathway for impulses going to and from the brain.

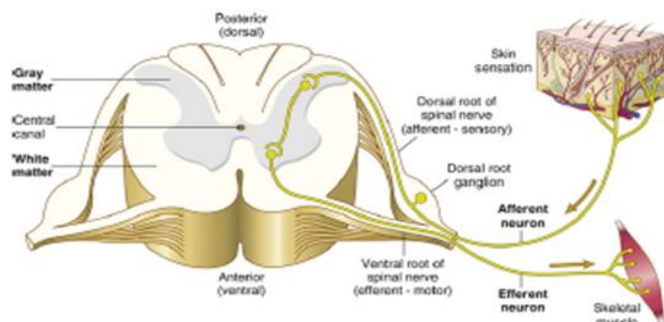


Figure 4.

The spinal cord, showing gray and white matter (transverse view). Afferent neurons bring impulses from a sensory receptor (such as the skin) into the spinal cord. Efferent neurons carry impulses from the spinal cord to effector organs (such as skeletal muscle). The central canal is the space through which CSF travels.

A cross-sectional view of the spinal cord (*Figure 4*) reveals an inner region of **gray matter** (containing cell bodies and dendrites) and an outer region of **white matter** (containing the nerve fiber tracts with myelin sheaths) conducting impulses to and from the brain.

2. MENINGES

The **meninges** are three layers of connective tissue membranes that surround the brain and spinal cord. Label *Figure 5* as you study the following description of the meninges.

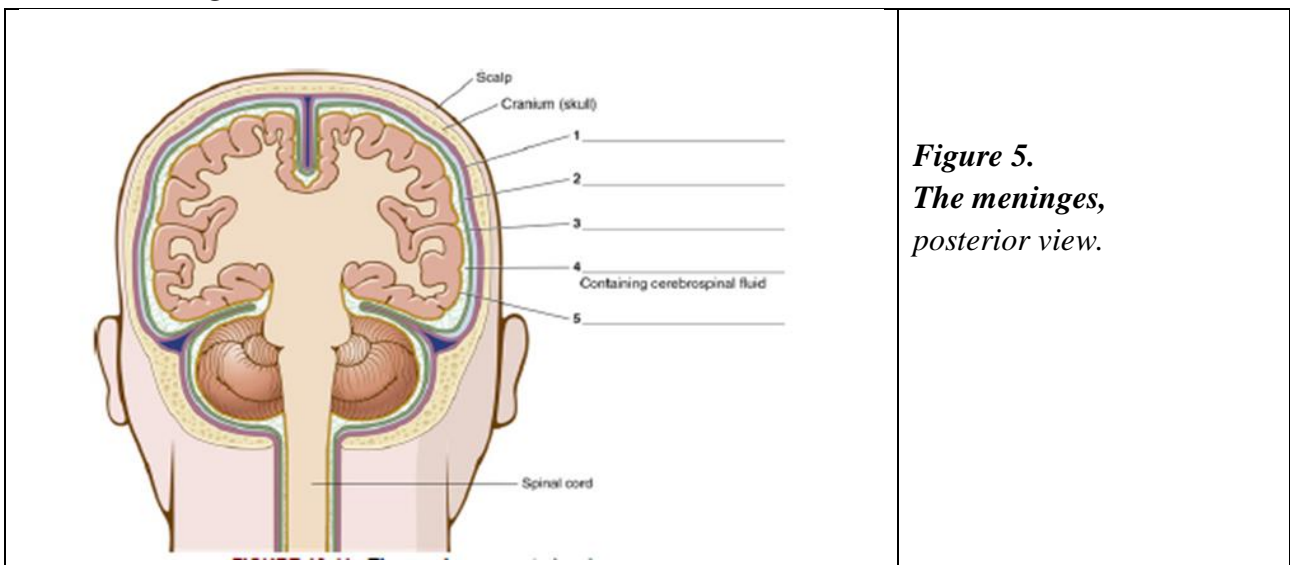


Figure 5.
The meninges,
posterior view.

The outermost membrane of the meninges is the **dura mater**. This thick, tough membrane contains channels (dural sinuses) that contain blood. The **subdural space** is below the dural membrane. The second layer surrounding the brain and spinal cord is the **arachnoid membrane**. The arachnoid (spider-like) membrane is loosely attached to the other meninges by web-like fibers, so there is a space for fluid between the fibers and the third membrane. This is the **subarachnoid space**, containing CSF. The third layer of the meninges, closest to the brain and spinal cord, is the **pia mater**. It contains delicate (Latin *pia*) connective tissue with a rich supply of blood vessels.

Ex. 2.7. Give the definitions of the following terms.

1. dura mater _____
2. central nervous system _____
3. peripheral nervous system _____
4. arachnoid membrane _____
5. hypothalamus _____

6. synapse _____
7. sympathetic nerves _____
8. medulla oblongata _____
9. pons _____
10. cerebellum _____
11. thalamus _____
12. ventricles of the brain _____
13. brainstem _____
14. cerebrum _____
15. ganglion _____

Ex. 2.8. Match the listed terms with the descriptions/definitions that follow.

<i>cauda equina</i>	<i>cerebral cortex</i>	<i>meninges</i>	<i>subarachnoid space</i>	<i>sulci</i>
<i>pia mater</i>	<i>parenchymal cell</i>	<i>gyri</i>		

1. Innermost meningeal membrane _____
2. Three protective membranes surrounding the brain and spinal cord _____
3. Grooves in the cerebral cortex _____
4. Contains cerebrospinal fluid _____
5. Outer region of the largest part of the brain; composed of gray matter _____
6. Elevations in the cerebral cortex _____
7. Essential cell of the nervous system; a neuron _____
8. Collection of spinal nerves below the end of the spinal cord at the level of the second lumbar vertebra _____

III. RESPIRATORY SYSTEM

We usually think of **respiration** as the mechanical process of breathing, the exchange of air between the lungs and the external environment. This exchange of air in the lungs is called **external respiration**. During **inhalation**, oxygen passes from the environment (inhaled air contains about 21%) into the lung air sacs and blood capillaries of lungs. Simultaneously, during **exhalation** carbon dioxide, a gas waste product produced when oxygen and food combine in cells, passes from the capillary blood vessels into the air sacs of the lungs to be exhaled.

Whereas external respiration occurs between the outside environment and the capillary blood of the lungs, another form of respiration occurs between the individual body cells and the tiny capillary blood vessels that surround them. This is **internal (cellular) respiration**, which involves an exchange of gases at the level of the cells within all organs of the body. Here, oxygen passes out of the

tissue capillaries into body cells. At the same time, carbon dioxide passes from body cells into the tissue capillaries to travel to the lungs for exhalation.

ANATOMY AND PHYSIOLOGY OF RESPIRATION

Air enters the body via the nose through two openings called nostrils or nares. Air then passes through the nasal cavity, lined with a mucous membrane and fine hairs (cilia) to help filter out foreign bodies, as well as to warm and moisten the air. Paranasal sinuses are hollow, air-containing spaces within the skull that communicate with the nasal cavity. They, too, have a mucous membrane lining. Besides producing mucus, a lubricating fluid, the sinuses lighten the bones of the skull and help produce sound.

After passing through the nasal cavity, the air next reaches the **pharynx (throat)**. There are three divisions of the pharynx. The first is the **nasopharynx**. It contains the **pharyngeal tonsils**, or **adenoids**, which are collections of lymphatic tissue. They are more prominent in children and, if enlarged, can obstruct air passageways. Below the nasopharynx and closer to the mouth is the second division of the pharynx, the **oropharynx**. The **palatine tonsils**, two rounded masses of lymphatic tissue, are in the oropharynx. The third division of the pharynx, the **laryngopharynx**, serves as a common passageway for food from the mouth and air from the nose. It divides into the **larynx (voice box)** and the **esophagus**.

The esophagus leads into the stomach and carries food to be digested. The larynx contains the vocal cords and is surrounded by pieces of cartilage for support and to keep the airway open. The thyroid cartilage is the largest and in men is commonly referred to as the Adam's apple. As expelled air passes the vocal cords, they vibrate to produce sounds. The tension of the vocal cords determines the high or low pitch of the voice.

Because food entering from the mouth and air entering from the nose mix in the pharynx, what prevents food or drink from entering the larynx and respiratory system during swallowing? Even if a small quantity of solid or liquid matter finds its way into the air passages, aspirated food can cause irritation in the lungs and breathing can stop. The **epiglottis**, a flap of cartilage attached to the root of the tongue, prevents choking or aspiration of food. It acts as a lid over the opening of the larynx. During swallowing, when food and liquid move through the throat, the epiglottis closes over the larynx, preventing material from entering the lungs.

On its way to the lungs, air passes through the larynx to the **trachea (windpipe)**, a vertical tube about inches long and 1 inch in diameter. The trachea is kept open by 16 to 20 C-shaped rings of cartilage separated by fibrous connective tissue that stiffen the front and sides of the tube.

The **mediastinum** is a space in the center of the chest. In the region of the mediastinum, the trachea divides into two branches, the right and left **bronchial tubes**, or **bronchi** (*sing. bronchus*). The bronchi are tubes composed of delicate epithelium surrounded by cartilage rings and a muscular wall. Each bronchus leads to a separate **lung**, where it divides and subdivides into smaller and finer tubes, somewhat like the branches of a tree.

The small bronchial branches are the **bronchioles**. Each **terminal bronchiole** narrows into alveolar ducts, which end in collections of air sacs called **alveoli** (*sing. alveolus*). About 300 million alveoli are estimated to be present in both lungs. The total area of the alveoli is approximately the size of a tennis court. Each alveolus is lined with a one-cell-thick layer of epithelium. This very thin wall permits an exchange of gases between the alveolus and the **capillary** surrounding it. Blood flowing through the capillary accepts oxygen from the alveolus while depositing carbon dioxide into the alveolus. **Erythrocytes** in the blood carry oxygen away from the lungs to all parts of the body and carbon dioxide back to the lungs for exhalation.

Each lung is covered by a double-layered membrane called the **pleura**. The outer layer of this membrane, nearer the ribs, is the **parietal pleura**, and the inner layer, closer to the lung, is the **visceral pleura**. A serous (thin, watery fluid) secretion moistens the pleura and facilitates movements of the lungs within the chest (thorax).

The two lungs are not quite mirror images of each other. The slightly larger right lung is divided into three **lobes**, whereas the smaller left lung has two lobes. One lobe of the lung can be removed without significantly compromising lung function. The uppermost part of the lung is the **apex**, and the lower area is the **base**. The **hilum** of the lung is the midline region in which blood vessels, nerves, lymphatic tissue, and bronchial tubes enter and exit.

The lungs extend from the collarbone to the **diaphragm** in the thoracic cavity. The diaphragm is a muscular partition separating the thoracic from the abdominal cavity and aiding in the process of breathing. It contracts and descends with each **inhalation (inspiration)** and relaxes and ascends with each **exhalation (expiration)**. The downward movement of the diaphragm enlarges the area in the

thoracic cavity, decreasing internal air pressure, so that air flows into the lungs to equalize the pressure. When the lungs are full, the diaphragm relaxes and elevates, making the area in the thoracic cavity smaller, thus increasing air pressure in the chest. Air then is expelled out of the lungs to equalize the pressure; this is **exhalation (expiration)**.

Ex. 3.1. Translate into Ukrainian and learn glossary of essential terms:

№	English term	Ukrainian equivalent	№	English term	Ukrainian equivalent
1.	respiration		14.	epiglottis	
2.	external/internal (cellular) respiration		15.	pharyngeal tonsils (adenoids)	
3.	inhalation (inspiration)		16.	trachea (windpipe)	
4.	exhalation (expiration)		17.	(terminal) bronchioles	
5.	larynx (voice box)		18.	parietal/visceral pleura	
6.	pharynx (throat)		19.	bronchial tubes	
7.	nasopharynx		20.	bronchus	
8.	oropharynx		21.	lung	
9.	palatine tonsils		22.	pleura	
10.	laryngopharynx		23.	lobes	
11.	esophagus		24.	apex	
12.	mediastinum		25.	hilum	
13.	alveolus (pl. <i>alveoli</i>)		26.	diaphragm	

Ex. 3.2. Match the listed anatomic structures with the descriptions that follow.

<i>adenoids</i>	<i>alveol</i>	<i>mediastinum</i>	<i>bronchioles</i>	<i>cilia</i>	<i>epiglottis</i>	<i>hilum</i>
<i>larynx</i>	<i>palatine tonsils</i>		<i>parietal</i>	<i>pleura</i>	<i>bronchi</i>	
<i>pharynx</i>	<i>trachea</i>		<i>visceral pleura</i>	<i>paranasal sinuses</i>		

1. Outer fold of pleura lying closer to the ribs _____ . 2. Collections of lymph tissue in the nasopharynx _____. 3. Windpipe _____ . 4. Lid-like piece of cartilage that covers the voice box _____. 5. Branches of the windpipe that lead into the lungs _____. 6. Region between the lungs in the chest cavity _____. 7. Air-containing cavities in the bones around the nose _____. 8. Thin hairs attached to the mucous membrane lining the respiratory tract _____. 9. Inner fold of pleura closer to lung tissue _____ .

_____. 10. Throat _____. 11. Air sacs of the lung _____. 12. Voice box _____. 13. Smallest branches of bronchi _____. 14. Collections of lymph tissue in the oropharynx _____. 15. Midline region of the lungs where bronchi, blood vessels, and nerves enter and exit the lungs _____.

Ex. 3.3. Complete the following sentences.

1. The apical part of the lung is the _____. 2. The gas that passes into the bloodstream at the lungs is _____. 3. Breathing in air is called _____. 4. Divisions of the lungs are known as _____. 5. The gas produced by cells and exhaled through the lungs is _____. 6. The space between the visceral and the parietal pleura is the _____. 7. Breathing out air is called _____. 8. The term that describes the essential parts of the lung (bronchiole and alveoli), responsible for respiration is pulmonary _____. 9. The exchange of gases in the lung is _____ respiration. 10. The exchange of gases at the tissue cells is _____ respiration.

IV. CARDIOVASCULAR SYSTEM

Body cells are dependent on a constant supply of nutrients and oxygen. When the supplies are delivered and then chemically combined, they release the energy necessary to do the work of each cell. How does the body ensure that oxygen and food will be delivered to all of its cells? The cardiovascular system, consisting of the heart (a powerful muscular pump) and blood vessels (fuel line and transportation network), performs this important work. This chapter explores terminology related to the heart and blood vessels.

BLOOD VESSELS

There are three types of blood vessels in the body: **arteries, veins, and capillaries.**

Arteries are large blood vessels that carry blood away from the heart. Their walls are lined with connective tissue, muscle tissue, and elastic fibers, with an innermost layer of epithelial cells called **endothelium**. Endothelial cells, found in all blood vessels, secrete factors that affect the size of blood vessels, reduce blood clotting, and promote the growth of blood vessels. Because arteries carry blood away from the heart, they must be strong enough to withstand the high

pressure of the pumping action of the heart. Their elastic walls allow them to expand as the heartbeat forces blood into the arterial system throughout the body.

Smaller branches of arteries are **arterioles**. Arterioles are thinner than arteries and carry the blood to the tiniest of blood vessels, the capillaries.

Capillaries have walls that are only one endothelial cell in thickness. These delicate, microscopic vessels carry nutrient-rich, oxygenated blood from the arteries and arterioles to the body cells. Their thin walls allow passage of oxygen and nutrients out of the bloodstream and into cells. There, the nutrients are burned in the presence of oxygen (catabolism) to release energy. At the same time, waste products such as carbon dioxide and water pass out of cells and into the thin-walled capillaries. Waste-filled blood then flows back to the heart in small **venules**, which combine to form larger vessels called veins.

Veins have thinner walls compared with arteries. They conduct blood (that has given up most of its oxygen) toward the heart from the tissues. Veins have little elastic tissue and less connective tissue than that typical of arteries, and blood pressure in veins is extremely low compared with pressure in arteries. In order to keep blood moving back toward the heart, veins have **valves** that prevent the backflow of blood and keep the blood moving in one direction. Muscular action also helps the movement of blood in veins.

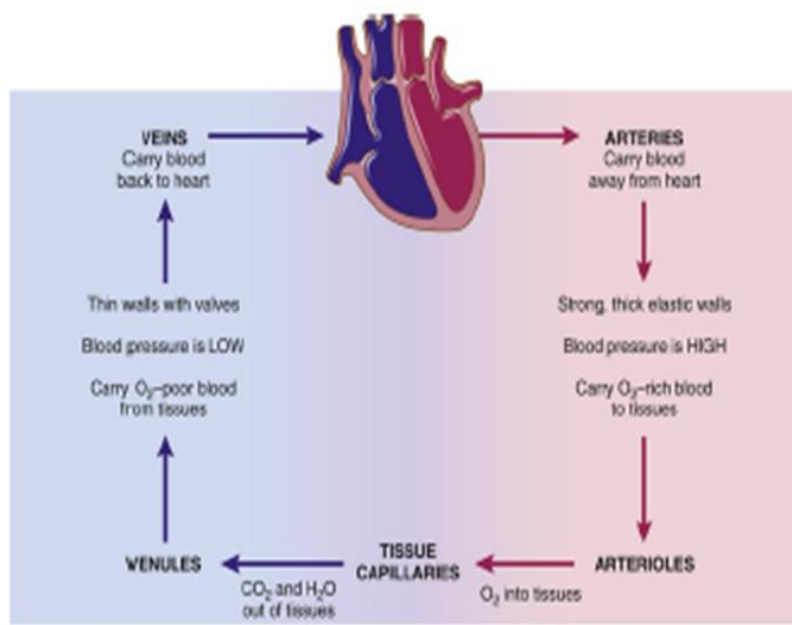


Figure 6.
Relationship and
characteristics of
blood vessels

CIRCULATION OF BLOOD

Arteries, arterioles, veins, venules, and capillaries, together with the heart, form a circulatory system for the flow of blood. **Figure 7** is a more detailed

representation of the entire circulatory system. Blood that is deficient in oxygen flows through two large veins, the **venae cavae**, on its way from the tissue capillaries to the heart. The blood became oxygen-poor at the tissue capillaries when oxygen left the blood and entered the body cells.

Oxygen-poor blood enters the **right side of the heart** and travels through that side and into the **pulmonary artery**, a vessel that divides in two: one branch leading to the left lung, the other to the right lung. The arteries continue dividing and subdividing within the lungs, forming smaller and smaller vessels (arterioles) and finally reaching the **lung capillaries**. The pulmonary artery is unusual in that it is the only artery in the body that carries blood deficient in oxygen.

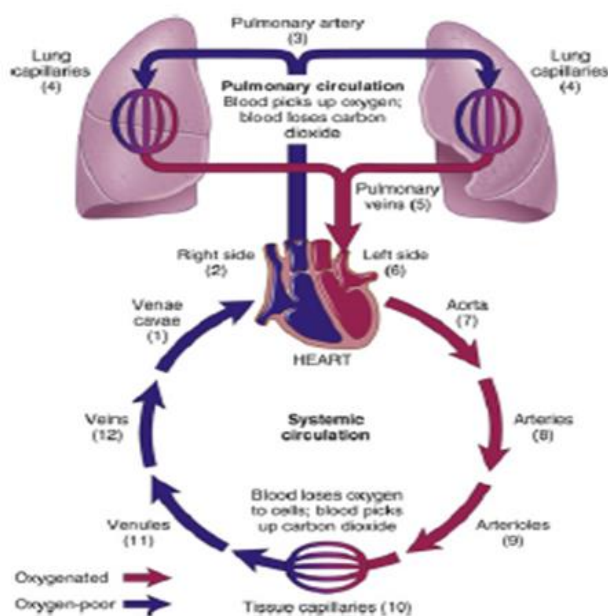


Figure 7.
Schematic diagram of the pulmonary circulation (blood flow from the heart to lung capillaries and back to the heart) and systemic circulation (blood flow from the heart to tissue capillaries and back to the heart).

While passing through the lung (pulmonary) capillaries, blood absorbs the oxygen that entered the body during inhalation. The newly oxygenated blood next returns immediately to the heart through **pulmonary veins**. The pulmonary veins are unusual in that they are the only veins in the body that carry oxygen-rich (**oxygenated**) blood. The circulation of blood through the vessels from the heart to the lungs and then back to the heart again is the **pulmonary circulation**.

Oxygen-rich blood enters the **left side of the heart** from the pulmonary veins. The muscles in the left side of the heart pump the blood out of the heart through the largest single artery in the body, the **aorta**. The aorta moves up at first (ascending aorta) but then arches over dorsally and runs downward (descending aorta) just in front of the vertebral column. The aorta divides into numerous branches called **arteries** that carry the oxygenated blood to all parts of the body. The names of some of these arterial branches will be familiar to you.

The **carotid** arteries supply blood to the head and neck. Axillary, **brachial** (*brachi/o* means arm), splenic and renal arteries are examples of branching arteries from the aorta.

The relatively large arterial vessels branch further to form smaller **arterioles**. The arterioles, still containing oxygenated blood, branch into smaller **tissue capillaries**, which are near the body cells. Oxygen leaves the blood and passes through the thin capillary walls to enter the body cells. There, food is broken down, in the presence of oxygen, and energy is released.

This chemical process also releases **carbon dioxide (CO₂)** as a waste product. Carbon dioxide passes out from the cell into the tissue capillaries at the same time that oxygen enters. Thus, the blood returning to the heart from tissue capillaries through **venules** and **veins** is filled with carbon dioxide but is depleted of oxygen.

As this oxygen-poor blood enters the heart from the venae cavae, the circuit is complete. The pathway of blood from the heart to the tissue capillaries and back to the heart is the **systemic circulation**.

The **pulse** is the beat of the heart as felt through the walls of arteries.

Ex. 4.1. Translate into Ukrainian and learn glossary of essential terms:

№	English term	Ukrainian equivalent	№	English term	Ukrainian equivalent
1.	pulmonary artery/veins		8.	oxygenated blood	
2.	right/left side of the heart		9.	pulmonary circulation	
3.	valve		10.	aorta	
4.	venae cavae		11.	carbon dioxide	
5.	capillary		12.	pulse	
6.	vein/venule		13.	lung capillaries	
7.	systemic circulation		14.	artery/arteriole	

Ex. 4.2. Match the listed structures with the descriptions that follow.

<i>Aorta</i>	<i>arteriole</i>	<i>capillary</i>	<i>pulmonary artery</i>	<i>venule</i>	<i>pulmonary vein</i>
--------------	------------------	------------------	-------------------------	---------------	-----------------------

1. Smallest blood vessel _____ 2. Small artery _____
 3. Carries oxygenated blood from the lungs to the heart _____

4. Largest artery in the body _____ 5. Carries oxygen-poor blood to the lungs from the heart _____
6. Small vein _____

ANATOMY OF THE HEART

The human heart weighs less than a pound (300-450 grams), is roughly the size of an adult fist, and lies in the thoracic cavity, just behind the breastbone in the mediastinum (between the lungs).

The heart is a pump consisting of four chambers: two upper chambers called **atria** (*sing.* **atrium**) and two lower chambers called **ventricles**. It is actually a double pump, bound into one organ and synchronized very carefully. Blood passes through each pump in a definite pattern. Pump station number one, on the right side of the heart, sends oxygen-deficient blood to the lungs, where the blood picks up oxygen and releases its carbon dioxide. The newly oxygenated blood returns to the left side of the heart to pump station number two and does not mix with the oxygen-poor blood in pump station number one. Pump station number two then forces the oxygenated blood out to all parts of the body. At the body tissues, the blood loses its oxygen, and on returning to the heart, to pump station number one, blood poor in oxygen (rich in carbon dioxide) is sent out to the lungs to begin the cycle anew.

Oxygen-poor blood enters the heart through the two largest veins in the body, the **venae cavae**. The **superior vena cava** drains blood from the upper portion of the body, and the **inferior vena cava** carries blood from the lower part of the body.

The venae cavae bring oxygen-poor blood that has passed through all of the body to the **right atrium**, the thin-walled upper right chamber of the heart.

The right atrium contracts to force blood through the **tricuspid valve** (cusps are the flaps of the valves) into the **right ventricle**, the lower right chamber of the heart. The cusps of the tricuspid valve form a one-way passage designed to keep the blood flowing in only one direction. As the right ventricle contracts to pump oxygen-poor blood through the **pulmonary valve** into the **pulmonary artery**, the tricuspid valve stays shut, thus preventing blood from pushing back into the right atrium. The pulmonary artery then branches to carry oxygen deficient blood to each lung.

The blood that enters the lung capillaries from the pulmonary artery soon loses its large quantity of carbon dioxide into the lung tissue, and the carbon

dioxide is expelled. At the same time, oxygen enters the capillaries of the lungs and is brought back to the heart via the **pulmonary veins**. The newly oxygenated blood enters the **left atrium** of the heart from the pulmonary veins. The walls of the left atrium contract to force blood through the **mitral valve** into the **left ventricle**.

The left ventricle has the thickest walls of all four heart chambers (three times the thickness of the right ventricular wall). It must pump blood with great force so that the blood travels through arteries to all parts of the body. The left ventricle propels the blood through the **aortic valve** into the **aorta**, which branches to carry blood all over the body. The aortic valve closes to prevent return of aortic blood to the left ventricle.

The four chambers of the heart are separated by partitions called **septa** (*sing. septum*). The **interatrial septum** separates the two upper chambers (atria), and the **interventricular septum**, a muscular wall, lies between the two lower chambers (ventricles).

Ex. 4.3. Translate into Ukrainian and learn glossary of essential terms:

№	English term	Ukrainian equivalent	№	English term	Ukrainian equivalent
1.	ventricle		8.	mitral valve	
2.	superior vena cava		9.	pulmonary valve	
3.	inferior vena cava		10.	tricuspid valve	
4.	right/left atrium		11.	aortic valve	
5.	septum		12.	interatrial/ interventricular septum	
6.	atrium (<i>pl. atria</i>)				
7.	right/left ventricle				

Ex. 4.4. Match the listed structures with the descriptions that follow.

<i>inferior vena cava</i>	<i>mitral valve</i>	<i>superior vena cava</i>	<i>tricuspid valve</i>
<i>ventricle</i>	<i>atrium</i>		

1. Valve that lies between the right atrium and the right ventricle _____
2. Brings oxygen-poor blood into the heart from the upper parts of the body _____
3. Upper chamber of the heart _____
4. Valve that lies between the left atrium and the left ventricle _____
5. Brings blood from the lower half of the body to the heart _____
6. Lower chamber of the heart _____

Ex. 4.5. Label the parts of the heart on the picture (Figure 8).

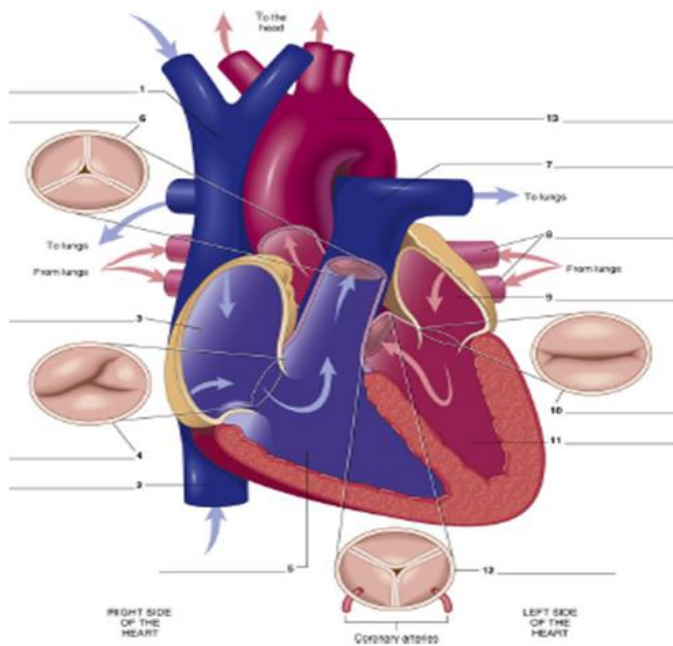


Figure 8. Structure of the heart. Blue arrows indicate oxygen-poor blood flow. Red arrows show oxygenated blood flow.

V. LYMPHATIC AND IMMUNE SYSTEM

The lymphatic system and the immune system are considered together because aspects of their functions in the body are very closely related.

Lymph is a clear, watery fluid that surrounds body cells and flows in a system of thin walled lymph vessels (the lymphatic system) that extends throughout the body.

Lymph differs from blood, but it has a close relationship to the blood system. Lymph fluid does not contain erythrocytes or platelets, but it is rich in two types of white blood cells (leukocytes): **lymphocytes** and **monocytes**. The liquid part of lymph is similar to blood plasma in that it contains water, salts, sugar, and wastes of metabolism such as urea and creatinine, but it differs in that it contains less protein. Lymph actually originates from the blood. It is the same fluid that filters out of tiny blood capillaries into the spaces between cells. This fluid that surrounds body cells is called **interstitial fluid**. Interstitial fluid passes continuously into specialized thin-walled vessels called **lymph capillaries**, which are found coursing through tissue spaces. The fluid in the lymph capillaries, now called **lymph** instead of interstitial fluid, passes through larger lymphatic vessels and through clusters of lymph tissues (**lymph nodes**), finally

reaching large lymphatic vessels in the upper chest. Lymph enters these large lymphatic vessels, which then empty into the bloodstream.

Ex. 5.1. Label the figure according to the descriptions in the text.

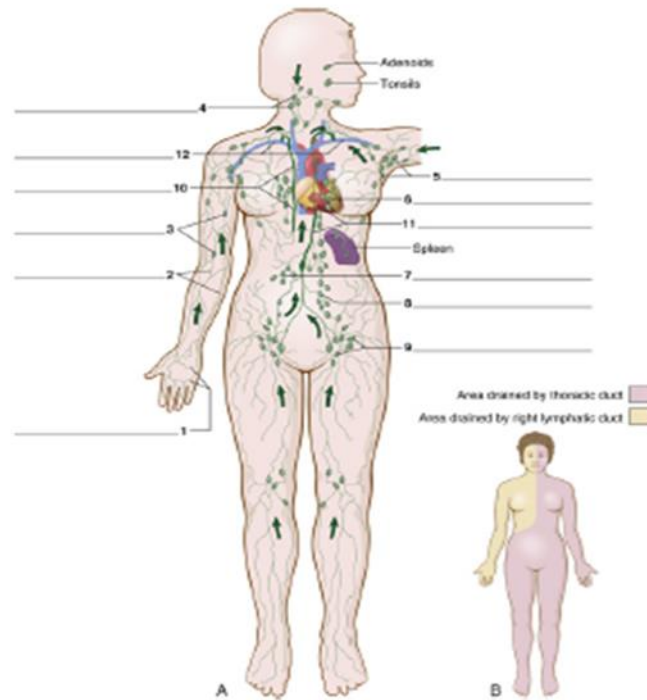


Figure 9. Lymphatic system.

Lymph capillaries begin at the spaces around cells throughout the body. Like blood capillaries, they are thin-walled tubes. Lymph capillaries carry lymph from the tissue spaces to larger **lymph vessels**. Lymph vessels have thicker walls than those of lymph capillaries and, like veins, contain valves so that lymph flows in only one direction, toward the thoracic cavity. Collections of stationary lymph tissue, called **lymph nodes**, are located along the path of the lymph vessels.

Major sites of lymph are **the cervical (neck), axillary (armpit), mediastinal (chest), mesenteric (intestinal), paraaortic (lumbar), and inguinal (groin)** regions. Remember that tonsils are masses of lymph tissue in the throat near the back of the mouth (oropharynx), and adenoids are enlarged lymph tissue in the part of the throat near the nasal passages (nasopharynx).

Lymph vessels all lead toward the thoracic cavity and empty into two large ducts in the upper chest. These are the right **lymphatic duct** and **the thoracic duct**. The thoracic duct drains the lower body and the left side of the head, whereas the right lymphatic duct drains the right side of the head and the chest (a much smaller area). Both ducts carry the lymph into **large veins** in the neck, where the lymph then enters the bloodstream.

Lymph nodes not only produce lymphocytes but also filter lymph and trap substances from infectious, inflammatory, and cancerous lesions. Special cells called **macrophages**, located in lymph nodes (as well as in the spleen, liver, and lungs), swallow (**phagocytose**) foreign substances. When bacteria are present in lymph nodes that drain a particular area of the body, the nodes become swollen with collections of cells and their engulfed debris and become tender. Lymph nodes also fight disease when specialized lymphocytes called B-lymphocytes (B-cells), which are present in the nodes, produce antibodies. Other lymphocytes present in nodes are T-lymphocytes (T-cells). They attack bacteria and foreign cells by accurately recognizing a cell as foreign and destroying it. T-cells also help B-cells make antibodies. B-cells mature in bone marrow, whereas T-cells originate in the thymus gland.

Ex. 5.2. Translate into Ukrainian and learn glossary of essential terms:

№	English term	Ukrainian equivalent	№	English term	Ukrainian equivalent
1.	lymph		10.	lymph nodes	
2.	lymphocytes		11.	cervical (neck)	
3.	monocytes		12.	axillary (armpit)	
4.	nasopharynx		13.	interstitial fluid	
5.	thymus gland		14.	inguinal (groin)	
6.	oropharynx		15.	macrophages	
7.	paraaortic (lumbar)		16.	lymph capillaries/vessels	
8.	mesenteric (intestinal)		17.	lymphatic/thoracic duct	
9.	phagocytose		18.	mediastinal (chest)	

IMMUNE SYSTEM

The immune system is specialized to defend the body against **antigens** (such as toxins, bacterial proteins, or foreign blood cells). This system includes **leukocytes** such as **neutrophils**, **monocytes**, and **macrophages**, which are phagocytes found in blood and tissues throughout the body. In addition, **lymphoid organs**, such as the lymph nodes, spleen, thymus gland, tonsils, and adenoids, produce **lymphocytes** and **antibodies**.

Natural and Adaptive Immunity

Immunity is the body's ability to resist foreign organisms and toxins that damage tissues and organs. **Natural immunity** is **resistance present at birth**. It

is not dependent on previous exposure to an antigen. With natural immunity, after an initial exposure to an antigen, there is no memory of the initial encounter. An example of natural immunity is the body's handling of a bacterial infection. White blood cells respond immediately to the intruding antigens. **Neutrophils** travel to the infected area and ingest bacteria. Other white blood cells, such as **monocytes, macrophages, and lymphocytes (NK or natural killer cells)**, also participate in the body's natural immunity against infection. Typically, there is no **immunological memory** (ability to remember antigens on pathogens) with natural immunity.

In addition to natural immunity, a healthy person can develop **adaptive immunity** (the body's ability to **recognize** and **remember** specific antigens in an immune response). **Lymphocytes (T- and B-cells)** are part of adaptive immunity. **T-cells recognize** and **remember** specific antigens and produce stronger attacks each time the antigen is encountered. **B-cells** secrete **antibodies** against antigens. Think of what happens when you have a cold or the flu:

You are exposed to a viral antigen. Your B-cells secrete antibodies, which not only destroy the virus but remain in the blood so that when the virus reappears, at a later time, you have adaptive immunity to it! Another example of adaptive immunity is that achieved with **vaccination**. You are given an injection of a killed virus or protein that does not make you ill, but stimulates your B-cells to secrete antibodies against that virus or protein. If you are exposed to the virus or protein at a later time, you will have a more rapid **immunologic response** because of the antibodies already made (adaptive immunity).

In certain instances, more immediate adaptive immunity is necessary. Poisons (toxins) that rapidly cause major damage (for example, snake venom) can be counteracted by giving ready-made antibodies, called **antitoxins**, produced in another organism. Injections of other ready-made antibodies, such as **immunoglobulins**, can boost your adaptive immunity before you travel to a foreign country. Infants acquire adaptive immunity when they receive **maternal antibodies** through the placenta, before birth, or in breast milk.

Adaptive immunity has two components: **humoral immunity** and **cell-mediated immunity**. Humoral immunity involves **B-cells (B- lymphocytes)**, whereas cell-mediated immunity involves **T-cells (T- lymphocytes)**. In **humoral immunity, B-cells** produce **antibodies** after exposure to specific antigens (viruses and bacteria). This is what happens:

The B-cell matures into another cell called a **plasma cell**. It is the plasma cell that produces antibodies called **immunoglobulins**, which block the effects of antigens. Examples of immunoglobulins (**Ig = immunoglobulin**) are **IgM, IgA, IgG, IgE, and IgD**. One maternal immunoglobulin, **IgG**, crosses the placenta to provide immunity for newborns. Another, **IgE**, is important in allergic reactions and in fighting parasitic infections.

Ex. 5.3. Translate into Ukrainian and learn glossary of essential terms:

№	English term	Ukrainian equivalent	№	English term	Ukrainian equivalent
1.	antigen		8.	vaccination	
2.	leukocytes		9.	toxins/antitoxins	
3.	neutrophils		10.	immunoglobulin	
4.	lymphoid organ		11.	humoral immunity	
5.	antibodies		12.	maternal antibodies	
6.	natural/adaptive immunity		13.	immunological memory	
7.	cell-mediated immunity		14.	immunologic response	

Ex. 5.4. Match the listed terms with the descriptions that follow.

<i>right lymphatic duct</i>	<i>adenoids</i>	<i>interstitial fluid</i>	<i>spleen</i>
<i>lymph thymus gland</i>	<i>capillaries</i>	<i>lymph node</i>	<i>thoracic duct</i>

1. Collection of stationary lymphatic tissue along lymph vessels _____
2. Large lymphatic vessel that drains lymph from the lower and left side of the body _____
3. Organ in the left upper quadrant of the abdomen that destroys worn-out erythrocytes, activates lymphocytes, and stores blood _____
4. Mass of lymphatic tissue in the nasopharynx _____
5. Lymphoid organ in the mediastinum that conditions T cells to react to foreign cells in the immune response _____
6. Tiniest lymphatic vessels _____
7. Large lymphatic vessel in the chest that drains lymph from the upper right part of the body _____
8. Fluid in the spaces between cells _____

VI. ENDOCRINE SYSTEM

The endocrine system is an information signaling system which uses blood vessels as information channels. **Glands** located in many regions of the body release into the **bloodstream** specific chemical messengers called **hormones** (from the Greek word *hormōn*, meaning urging on) that regulate the many and varied functions of an organism. For example, one hormone stimulates the growth of bones, another causes the maturation of sex organs and reproductive cells, and other controls the metabolic rate (metabolism) within all the individual cells of the body. In addition, one powerful endocrine gland below the brain secretes a wide variety of different hormones that travel through the bloodstream and regulate the activities of other endocrine glands.

Hormones produce their effects by binding to **receptors**, which are protein recognition sites in the various **target tissues** on which the hormones act. The receptors initiate specific biologic effects when the hormones bind to them. Each hormone has its own receptor, and binding of a receptor by a hormone is much like the interaction of a key and a lock.

Endocrine glands, no matter which hormones they produce, secrete their hormones directly into the bloodstream. **Exocrine glands** send chemical substances (tears, sweat, milk, saliva) via ducts to the outside of the body. Examples of exocrine glands are sweat, **mammary**, mucous, **salivary**, and **lacrimal** (tear) glands.

The last gland on this list, the **pineal gland**, is included as an endocrine gland because it is ductless, although less is known about its endocrine function. Located in the central portion of the brain, the pineal secretes melatonin. **Melatonin** may be linked to the body's "biologic clock" and is thought to induce sleep. The pineal gland has been linked to a mental condition, **seasonal affective disorder (SAD)**, in which the person suffers from depression in winter months. Melatonin secretion increases with **deprivation of light** and is inhibited by sunlight. **Calcification** of the pineal gland can occur and can be an important radiologic landmark when x-rays of the brain are examined.

Hormones are also secreted by endocrine tissue in other organs apart from the major endocrine glands. Examples are **erythropoietin** (kidney), **human chorionic gonadotropin** (placenta), and **cholecystokinin** (gallbladder). **Prostaglandins** are hormone-like substances that affect the body in many ways. First found in semen (produced by the prostate gland) but now recognized in cells throughout the body, prostaglandins have three functions: (1) stimulate the

contraction of the uterus; (2) regulate body temperature, **platelet aggregation**, and acid secretion in the stomach; and (3) have the ability to lower blood pressure.

Ex. 6.1. Label the following glands on the given picture (see Figure 10).

<i>parathyroid glands (four glands)</i>	<i>adrenal glands (one pair)</i>	<i>pituitary gland</i>
<i>pancreas (islets of Langerhans)</i>	<i>ovaries in female (one pair)</i>	<i>pineal gland</i>
<i>testes in male (one pair)</i>	<i>thyroid gland</i>	

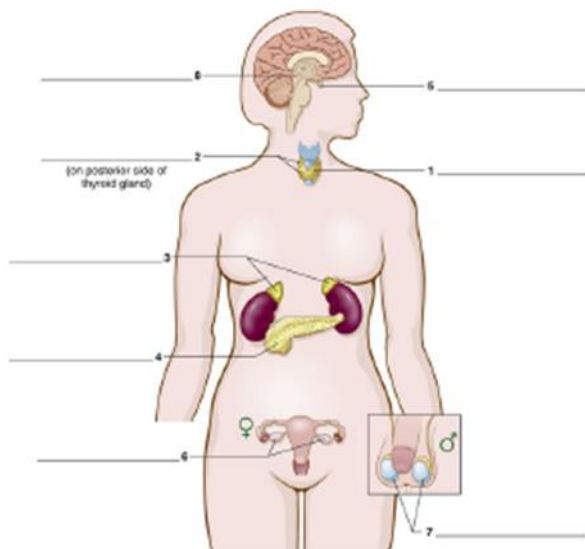


Figure 10.
The endocrine system.

Ex. 6.2. Translate into Ukrainian and learn glossary of essential terms:

№	English term	Ukrainian equivalent	№	English term	Ukrainian equivalent
1.	endocrine/exocrine glands		7.	seasonal affective disorder	
2.	mammary/salivary/lacrimal glands		8.	human chorionic gonadotropin	
3.	erythropoietin		9.	target tissues	
4.	cholecystokinin		10.	glands	
5.	prostaglandin		11.	melatonin	
6.	pineal gland				

Ex. 6.3. Match the endocrine gland with its location.

<i>adrenal medulla</i>	<i>ovary</i>	<i>pancreas</i>	<i>parathyroid</i>	<i>testis</i>	<i>thyroid</i>
<i>pituitary (hypophysis)</i>		<i>adrenal cortex</i>			

1. behind the stomach _____; 2. posterior side of the thyroid gland _____;
- _____ 3. inner section of glands above each kidney _____;
4. in the scrotal sac _____; 5. on either side of the trachea _____;
6. outer section of gland above each kidney _____; 7. lower abdomen of a female _____; 8. below the brain in the sella turcica _____.

VII. DIGESTIVE SYSTEM

The digestive system consists of many parts. They are the oral cavity, esophagus, stomach, small and large intestines, the liver, the pancreas, gallbladder and others.

The food we eat is propelled through the **digestive tract** by muscular contractions. The digestive tract is also called the **alimentary tract** or **alimentary canal**. The term gastrointestinal tract technically only refers to the stomach and intestines but is often used as a synonym of the digestive tract.

The first division of the digestive tract is the **mouth**, or **oral cavity**. Important structures of the oral cavity are the teeth, the tongue, the soft and hard palates, and salivary glands. Digestion begins when the person chews the food. The food is broken into smaller pieces by the teeth and is mixed with saliva secreted by the salivary glands.

From the mouth food passes through **the pharynx** to **the esophagus**. The major accessory structures of the pharynx and the esophagus are mucous glands.

The esophagus opens into **the stomach**. It rests in the upper abdomen. It is a dilated portion of the digestive tract. The stomach receives food from esophagus, and its mixing action reduces the food to a semi-liquid mixture. The stomach walls contain many glands from which acid and enzymes are released into the stomach and mixed with ingested food.

The stomach opens into **the small intestine**. The small intestine is a thin-walled tube approximately 6.5 meters long. It is located in the lower and central portions of the abdominal and pelvic cavities. It is composed of the **duodenum, jejunum, and ileum**. The first segment of the small intestine is **the duodenum**. The major accessory structures in this segment of the digestive tract are the **liver, the gallbladder, and the pancreas**. The next segment of the small intestine is **the jejunum**. Small glands exist along its length, and it is the major site of absorption. The last segment of the small intestine is **the ileum**, which is similar

to the jejunum except that fewer digestive enzymes and more mucus are secreted and less absorption occurs in the ileum.

The last section of the digestive tract is **the large intestine**. It is divided into cecum, colon, and rectum. Its major accessory glands secrete mucus. It absorbs water and salts and concentrates indigested food into feces. The first segment is **the cecum**, with the attached vermiform appendix. The cecum is followed by **colon** and **rectum**. The rectum joints the **anal canal**, which ends at the **anus**.

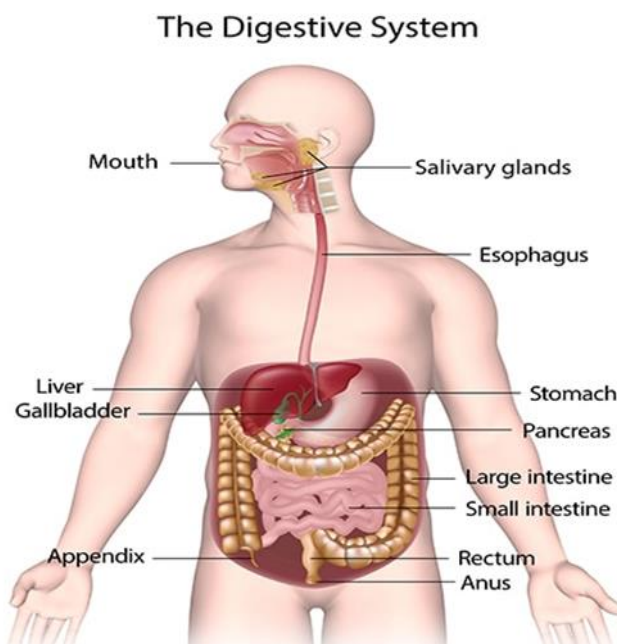


Figure 11.

The functions of the digestive system are to ingest food, masticate the food, propel the food through the digestive tract, add secretions to the food and digest the food; and absorb water, electrolytes, and other nutrients from the digested food. Once these useful substances are absorbed, they are transported through the circulatory system to cells where they are used. Undigested matter is moved out of the digestive tract and excreted through the anus. The processes of propulsion, secretion, and absorption are regulated by nervous and hormonal mechanisms.

Ex. 7.1. Translate into Ukrainian and learn glossary of essential terms:

№	English term	Ukrainian equivalent	№	English term	Ukrainian equivalent
1.	digestive/ alimentary tract		8.	the liver, gall- bladder, pancreas	

2.	small/large intestine		9.	cecum, colon, rectum	
3.	digestive system		10.	jejunum	
4.	oral cavity		11.	ileum	
5.	esophagus		12.	anal canal	
6.	stomach		13.	anus	
7.	duodenum				

Ex. 7.2. Match the following digestive system structures with their meanings below.

<i>anus</i>	<i>cecum</i>	<i>colon</i>	<i>duodenum</i>	<i>esophagus</i>	<i>gallbladder</i>
<i>ileum</i>	<i>jejunum</i>	<i>liver</i>	<i>pancreas</i>	<i>pharynx</i>	<i>sigmoid colon</i>

1. Consists of ascending, transverse, descending, and sigmoid sections _____
2. Small sac under the liver; stores bile _____
3. First part of the large intestine _____
4. End of the digestive tract opening to the outside of the body _____
5. Second part of the small intestine _____
6. Tube connecting the throat to the stomach _____
7. Third part of the small intestine _____
8. Large organ in the RUQ; secretes bile, stores sugar, produces blood proteins _____
9. Throat _____
10. Lowest part of the colon _____
11. First part of the small intestine _____
12. Organ under the stomach; produces insulin and digestive enzymes _____

VIII. URINARY SYSTEM

When foods containing proteins are used by cells in the body, nitrogenous waste products (**urea, creatinine, and uric acid**) are released into the bloodstream. The urinary system removes these nitrogenous wastes from the blood so that they do not accumulate and become harmful. As blood passes through the kidneys, the kidneys filter nitrogenous wastes to form **urine** (composed of water, salts, and acids). Urine leaves the body through the ureters, urinary bladder, and urethra. Every day, the kidneys process about 200 quarts of blood to filter out 2 quarts of urine.

Besides removing urea and other nitrogenous wastes from the blood, the kidneys maintain the proper balance of water, electrolytes, and acids in body fluids. **Electrolytes** such as **sodium (Na⁺)** and **potassium (K⁺)** are small molecules that conduct an electrical charge. Electrolytes are necessary for proper functioning of muscle and nerve cells. The kidney adjusts the amounts of water and electrolytes by secreting some substances into the urine and holding back

others in the bloodstream for use in the body. This is an example of **homeostasis**, which is the body's ability to maintain an equilibrium within its internal environment. Home/o means sameness.

In addition to forming and excreting (eliminating) urine from the body, the kidneys secrete an enzyme called **renin** (RE-nin) and a hormone called **erythropoietin** (eh-rith-ro-POY-it-in). **Renin** raises blood pressure (to keep blood moving through the kidney). **Erythropoietin (EPO)** stimulates red blood cell production in the bone marrow. The kidneys also secrete **calciferol**, an active form of vitamin D, necessary for the absorption of calcium from the intestine. In addition, the kidneys degrade and eliminate hormones such as insulin and parathyroid hormone from the bloodstream.

The **kidney** is one of two bean-shaped organs behind the abdominal cavity (retroperitoneal) on either side of the spine in the lumbar region. A cushion of adipose (fatty) tissue and fibrous connective tissue surrounds each kidney for protection. Each kidney (about the size of a fist) weighs about 4 to 6 ounces. The kidneys consist of an outer **cortex** region (cortex means bark, as the bark of a tree) and an inner **medulla** region (medulla means marrow). The **hilum** is a depression on the medial border of the kidney. Blood vessels and nerves pass through the hilum.

The **ureter** is one of two muscular tubes (16 to 18 inches long) lined with mucous membrane. Ureters carry urine in peristaltic waves from the kidneys to the urinary bladder.

The **urinary bladder**, a hollow, muscular sac, is a temporary reservoir for urine. The **trigone** is a triangular region at the base of the bladder where the ureters enter and the urethra exits.

The **urethra** is a tube that carries urine from the urinary bladder to the outside of the body. The process of expelling urine through the urethra is called **urination** or **voiding**. The external opening of the urethra is the **urinary meatus**.

Ex. 8.1. Translate into Ukrainian and learn glossary of essential terms:

№	English term	Ukrainian equivalent	№	English term	Ukrainian equivalent
1.	urinary system		9.	homeostasis	
2.	urea		10.	renin	
3.	creatinine		11.	calciferol	
4.	uric acid		12.	kidney	

5.	sodium		13.	medulla	
6.	potassium		14.	hilum	
7.	urination (voiding)		15.	ureter	
8.	urinary bladder/ meatus				

IX. REPRODUCTIVE SYSTEM

Sexual reproduction is the union of **the ovum** (female sex cell) and **the sperm** (male sex cell). Each sex cell, known as a **gamete**, has half the number of chromosomes needed to create a new organism. In **fertilization**, nuclei of the two gametes unite to form a single nucleus with half of the chromosomes and genetic code from each parent.

Special organs called **gonads** in males and females produce the egg and sperm cells. The female gonads are the **ovaries**, and the male gonads are the **testes**. After an ovum leaves the ovary during **ovulation**, it travels down one of two **fallopian tubes** leading to the **uterus** (womb). If **coitus** (copulation, sexual intercourse) has occurred, millions of sperm cells travel into the fallopian tubes, but only one sperm cell can penetrate the ovum. This is **fertilization**. The fertilized ovum is then known as a **zygote**. After many cell divisions, a ball of cells forms, and the zygote is called an **embryo** (2 to 8 weeks) and finally a **fetus** (8 to 38 or 40 weeks). The period of development within the uterus is **gestation**, or **pregnancy**.

The female reproductive system consists of organs that produce **ova** (*sing. ovum*) and provide a place for the growth of the embryo. In addition, the female reproductive organs supply important hormones that contribute to the development of female secondary sex characteristics (body hair, breast development, structural changes in bones and fat).

The eggs, or ova, are present from birth in the female ovary but begin to mature and are released from the ovary in a 21- to 28-day cycle when secondary sex characteristics develop. The occurrence of the first cycle is called **menarche**. Menstrual cycles continue until **menopause**, when all eggs have been released, hormone production diminishes, and menstruation ends. If fertilization occurs during the years between menarche and menopause, the fertilized egg may grow and develop within the uterus. A new, blood vessel-rich organ called a **placenta** (connected to the embryo by the umbilical cord) develops to nourish the embryo, which implants in the uterine lining. Various hormones are secreted from the

ovary and from the placenta to stimulate the expansion of the placenta. If fertilization does not occur, hormonal changes result in the shedding of the uterine lining, and bleeding, or **menstruation**, occurs. The hormones of the ovaries, **estrogen** and **progesterone**, play important roles in the processes of menstruation and pregnancy, and in the development of secondary sex characteristics. The **pituitary gland**, located at the base of the brain, secretes other hormones that govern the reproductive functions of the ovaries, breasts, and uterus.

The male sex cell, the **spermatozoon** (sperm cell), is microscopic—in volume, only one third the size of a red blood cell and less than 1/100,000 the size of the female ovum. A relatively uncomplicated cell, the sperm is composed of a head region, containing nuclear hereditary material (chromosomes), and a tail region, consisting of a **flagellum** (hair-like process). The flagellum makes the sperm motile and makes it look somewhat like a tadpole. The spermatozoon cell contains relatively little food and cytoplasm, because it lives only long enough (3 to 5 days) to travel from its point of release from the male to where the egg cell lies within the female reproductive tract (fallopian tube). Only one spermatozoon out of approximately 300 million sperm cells released during a single **ejaculation** (ejection of sperm and fluid from the male urethra) can penetrate a single ovum and result in fertilization of the ovum. If more than one egg is passing down the fallopian tube when sperm are present, multiple fertilizations are possible, and twins, triplets, quadruplets, and so on may occur. Twins resulting from the fertilization of separate ova by separate sperm cells are called **fraternal twins**. Fraternal twins, developing with separate placentas, can be of the same sex or different sexes and resemble each other no more than ordinary brothers and sisters. Fraternal twinning is hereditary; the daughters of mothers of twins can carry the gene.

Identical twins result from fertilization of a single egg cell by a single sperm. As the fertilized egg cell divides and forms many cells, it somehow splits, and each part continues separately to undergo further division, each producing an embryo. The split usually occurs between the third and fifth days of embryonic development. Most identical twins have one placenta and two amniotic sacs. Identical twins have the same DNA and are, therefore, of the same sex and of very similar form and feature. The organs of the male reproductive system are designed to produce and release billions of spermatozoa throughout the lifetime of a male from puberty onward. In addition, the male reproductive system

secretes a hormone called **testosterone**. Testosterone is responsible for the production of the bodily characteristics of the male (such as beard, pubic hair, and deeper voice) and for the proper development of male gonads (**testes**) and accessory organs (**prostate gland** and **seminal vesicles**) that secrete fluids to ensure the lubrication and viability of sperm.

Ex. 9.1. Translate into Ukrainian and learn glossary of essential terms:

№	English term	Ukrainian equivalent	№	English term	Ukrainian equivalent
1.	reproductive system		11.	sperm, spermatozoon	
2.	ovum		12.	zygote	
3.	gamete		13.	embryo	
4.	fertilization		14.	fetus	
5.	gonads		15.	gestation	
6.	ovaries/testes		16.	menarche	
7.	estrogen and progesterone		17.	umbilical cord	
8.	uterus (womb)		18.	ejaculation	
9.	fallopian tubes		19.	testosterone	
10.	flagellum		20.	amniotic sac	

Ex. 1-9.1. Answer the following questions.

1. What is the system of a human body? 2. What does the damage of any of the human body systems lead to? 3. What is the function of skeletal system? 4. What are three types of muscle tissue? 5. What does the nervous system of the body consist of? 6. What is the role of the central nervous system? 7. What does the peripheral nervous system do? 8. What is the responsibility of autonomic nervous system? 9. What is the respiratory system responsible for? 10. What is the body's transport system and how does it work? 11. What does the lymphatic system do? 12. What is the immune system? 13. What does the endocrine system consist of? 14. How does the digestive system of the body work? 15. What is responsibility of the urinary system? 16. Describe the work of the reproductive system.

Ex. 1-9.2. Choose the best word for each sentence. Use each word only once.

<i>Digestive</i>	<i>Reproductive</i>	<i>Alveoli</i>	<i>Involuntary</i>
<i>Inflammatory</i>	<i>Capillaries</i>	<i>Aorta</i>	<i>Stomach</i>
<i>Bronchial tubes</i>	<i>Veins</i>	<i>Hormones</i>	<i>Waste</i>

1. Food is broken down into proteins in _____system.
2. _____ carry waste products away from cells and bring blood back to the heart.
3. _____ system can be male and female.
4. The _____ system works by excreting the invaders from your body.
5. The bronchioles end in the _____, or air sacs.
6. The primary bronchi branch off into smaller _____.
7. _____ are chemicals that control body functions, such as metabolism, growth, and sexual development.
8. The smallest blood vessels are called _____ and they are found in body tissue.
9. Muscles in the _____ are _____.
10. The _____ combines with water to form urine.

Ex. 1-9.3. Say whether these statements are true or false. Make any corrections if necessary.

1. Organs of the human body can work alone by themselves. _____
2. The cardiovascular system is made up of a group of organs that transport blood throughout the body. _____
3. Oxygen-rich blood leaves the left side of the heart and enters the biggest artery, called the vein. _____
4. The trachea branches into two alveoli which go to the lungs. _____
5. The urinary system eliminates waste from the body, in the form of urine. _____
6. When the inflammatory response fails, the anatomic response goes to work. _____
7. After food is chewed and swallowed, it goes down the esophagus and enters the small intestine. _____
8. The central nervous system consists of the brain and spinal cord. _____

Ex. 1-9.4. Match each of the following terms with the correct definition.

- | | |
|----------------------------|--|
| 1. The marrow | <i>a)</i> is made up of group of glands that produce the hormones. |
| 2. The nervous system | <i>b)</i> is the biggest artery that carries oxygen-rich blood. |
| 3. The respiratory system | <i>c)</i> is our body's defense system against infections and diseases. |
| 4. The aorta | <i>d)</i> is soft, fatty tissue that produces red blood cells, many white blood cells and other immune system cells. |
| 5. The vein | <i>e)</i> eliminates waste from the body in the form of urine. |
| 6. The inflammatory system | <i>f)</i> is made up of the brain, the spinal cord and nerves. |
| 7. The immune system | <i>g)</i> brings air into the body and removes carbon dioxide. |
| 8. The endocrine system | <i>h)</i> is the vessel that carries waste products away from the cells and brings blood back to the heart. |
| 9. The digestive system | <i>i)</i> allows humans to produce children. |
| 10. The urinary system | <i>j)</i> works by excreting the invaders from the human body. |

11. The reproductive system *k)* is made up of organs that break down food into proteins, vitamins, minerals, etc. which the body needs for energy, growth and repair.

Ex. 1-9.5. Give English equivalents.

Кісткова система, приєднаний хрящ, суглоби, гладка м'язова тканина, серцева м'язова тканина, сухожилля, мозок, спинний мозок, альвеолярний мішок, серцево-судинна система, система органів кровотворення, зв'язки, кістковий мозок, гіпофіз, кишечник, слизова оболонка, запліднювати, імунна реакція.

Ex. 1-9.6. Fill in the blanks with words from previous exercise.

1. The primary bronchi branch off into even smaller bronchial tubes, or bronchioles, which end in the _____. 2. The _____ gland is responsible for releasing the human growth hormone. 3. The nervous system consists of the _____, nerves and the _____. 4. _____, which is soft and fatty tissue, is found inside bones. 5. The _____ is made up of a group of organs that transport blood throughout the body. 6. _____, which are involuntary, are located inside organs, such as the stomach and _____. 7. The skeletal system is made up of bones, _____ and _____. 8. The _____ consists of a network of vessels that help circulate body fluids. 9. The _____ fights infection by gobbling up antigens.

Ex. 1-9.7. Match the synonyms. Use them in your own sentences.

To fulfill	to renovate
To require	to form
Motion	protection
To respond	to consist of
To eliminate	to achieve
To prevent	movement
To repair	to react
To be made up of	to need
To shape	to stop
Defense	to cancel

Ex. 1-9.8. Translate into English.

1. Усі системи органів тісно пов'язані в організмі людини і залежать одна від іншої. 2. Кожна система органів виконує свої особливі функції. 3. Кісткова система відповідає за рух, підтримку, рівновагу та форму людського тіла.

4. М'язова система складається з скелетно-м'язової, гладкої м'язової та серцевої м'язової тканин. 5. Нервова система надсилає, отримує та опрацьовує нервові імпульси по всьому тілу. 6. Периферійна нервова система складається з черепно-спинних нервів, які розгалужуються від мозку та спинного мозку. 7. Система органів кровотворення також слугує захисною системою людського організму. 8. Білі кров'яні клітини, що називаються лімфоцитами, виробляють антитіла, які ведуть бій з хворобою в організмі людини. 9. Травна система є життєво необхідною, тому що вона забезпечує людину енергією, підтримує ріст та відновлення організму. 10. Система людського організму це сукупна функціональна одиниця, що складається з різних органів, які працюють в цілковитій злагодженості одного з іншим.

GRAMMAR SECTION

FUTURE FORMS

Form	Meaning	Example	Time expressions
Future Simple (will + bare infinitive)	<ol style="list-style-type: none"> 1. <i>decisions made at the moment of speaking</i> 2. <i>Predictions about the future, based on what we think, believe or imagine, using the verbs think, believe, expect, etc.; the expressions be sure, be afraid, etc.; and the adverbs probably, certainly, perhaps, etc.</i> 3. <i>promises, threats, warnings, requests and hopes</i> 4. <i>for a future fact</i> 5. <i>actions, situations and events which will definitely happen in the future and which we can't control.</i> 6. <i>to make an offer shall (instead of will) is used</i> 7. <i>to ask for suggestions or instructions</i> 	<p><i>It's getting dark. I'll turn on the light.</i></p> <p><i>I'm afraid I'll be a little late.</i></p> <p><i>I'll probably buy the dress.</i></p> <p><i>In the future people will probably live on other planets.</i></p> <p>Will you open the window, please?</p> <p><i>The Queen will be in Paris tomorrow.</i></p> <p><i>She'll be 18 next week.</i></p> <p>Shall I do the washing up? (= Do you want me to do the washing up?)</p> <p><i>Where shall I put your books?</i></p> <p><i>What shall we do tonight?</i></p>	<p>tomorrow, the day after tomorrow, tomorrow, tonight, soon, next week/month, next year/summer, in a week, in a month, etc.</p>

be going to	<p>1. <i>actions intended to be performed in the near future</i></p> <p>2. <i>planned actions or intentions</i></p> <p>3. <i>evidence that something will definitely happen in the near future</i></p> <p>4. <i>things we are sure about or we have already decided to do in the near future</i></p>	<p><i>She is going to visit her parents tomorrow.</i></p> <p><i>Now that they have settled in their new house, they are going to have a party.</i></p> <p><i>Look at the dark clouds in the sky! It's going to rain.</i></p> <p><i>He is going to be promoted. (The boss has decided to do it.)</i></p>	
Future Continuous (will + be + Ving)	<p>1. <i>to say that something will be in progress at a stated future time</i></p> <p>2. <i>for actions which will definitely happen in the future as a result of a routine or arrangement</i></p> <p>3. <i>when we ask politely about someone's plans for the near future</i></p>	<p><i>He'll be sunbathing in Hawaii this time next week.</i></p> <p><i>She will be waiting for us at the cinema at seven o'clock.</i></p> <p><i>Will you be going out today? – Yes, why?</i></p>	this time next week/month/year
Future Perfect (will + have + Ved)	<i>actions that will have finished before a stated future time</i>	<p><i>She will have come back by the end of July.</i></p> <p><i>She won't have finished writing the essay until 8 o'clock.</i></p>	before, by, by then by the time, till/ until/ (only in negative sentences).
Future Perfect Continuous (will + have been + Ving)	<i>to emphasise the duration of an action up to a certain time in the future</i>	<i>By the end of this year she will have been working here for two years.</i>	
Present Simple	<i>referring to timetables or a fixed event.</i>	<p><i>The plane reaches London at 9.00 sharp.</i></p> <p><i>The party begins at 8 pm.</i></p>	
Present Continuous (am/is/are + Ving)	<p><i>for fixed arrangement in the near future</i></p> <p>common verbs: meet, play, come, go, see, fly, stay, have, arrive, leave</p>	<p><i>Sally is seeing her dentist this week. (She has fixed an appointment.)</i></p> <p><i>I'm having a party on Saturday. (I've invited all the guests so it is already arranged)</i></p>	

1. Match the following sentences with the correct tense description.

1.	Look out! The dog is going to bite you.	a.	fixed arrangement in the near future
2.	I'll be flying to Brazil this time tomorrow.	b.	action which will be finished before a stated future time
3.	She is worried that he'll be angry.	c.	timetable

4.	By May she'll have been living abroad for five years.	d.	fear about the future
5.	The Kyiv train arrives at 6.00.	e.	evidence that something will definitely happen in the near future
6.	The men are delivering the furniture tomorrow.	f.	future intention
7.	When I'm older, I'm going to learn to drive.	g.	action in progress at a stated future time
8.	I think I'll go home now.	h.	duration of an action up to a certain time in the future
9.	He'll have finished the work by tomorrow afternoon.	i.	action intended to be performed in the near future
10.	Will you be staying with us this Easter?	j.	on-the-spot decision
11.	I'm sure you'll have a wonderful holiday.	k.	something we are not sure about yet
12.	She'll probably come early.	l.	polite enquiry about people's arrangements
13.	I'm going to buy a new car tomorrow.	m.	prediction about the future

2. Underline the correct item.

1. I **am taking/take** the 5 o'clock train to Kyiv tomorrow. 2. This time tomorrow, I **will be hiking/will hike** in the Lake District. 3. Tom **will have thought/thinks** of a solution by the time we see him. 4. They can't say exactly when, but they **will have been finishing/will have finished** the job by Thursday. 5. By September, they **are working/will have been working** on the new road for two years. 6. Liam **won't have been writing/won't have written** his report until after lunch. 7. Chris thinks she **will be earning/will have earned** more money soon. 8. **Do you go/Will you be going** to the supermarket later? Could you pick up some rice for dinner, please? 9. Beth and I **watch/will be watching** a film this evening. 10. We're **having/have** a party at the weekend. Come along! 11. I wonder if he **will talk/talks** to me again. 12. The football match **starts/will be starting** at 10 o'clock. 13. I **will have finished/will finish** my exams by the end of June. 14. If we **go/will go** to Greece in the summer, we **will visit/visit** the islands. 15. We can't get into the office until Jane **arrives/will arrive** with the key.

3. Match the sentences and fill in the correct tense.

1.	She'll call us	a.	until it _____(stop) raining.	1.	
2.	I don't know	b.	as soon as I _____(can).	2.	
3.	What _____ (you do)	c.	if you _____(come) home late.	3.	
4.	Turn the light off	d.	as soon as she _____(reach) Paris.	4.	
5.	Don't go out	e.	if you have an accident?	5.	
6.	I _____(write) to you	f.	what _____(you/buy)?	6.	
7.	He will be angry	g.	when he _____(leave).	7.	
8.	If I give you \$5,	h.	before you _____(go) to bed.	8.	

4. Put the verbs in brackets into Future Perfect or Future Perfect Continuous.

1. By 5pm they _____ (play) football for three hours. 2. By next summer, we _____ (build) the bridge. 3. I _____ (redecorate) the room before you return from your trip. 4. By the end of the year we _____ (live) in Australia for four years. 5. The train _____ already _____ (leave) by the time we arrive. 6. By the time my mother comes home, we _____ (play) computer games for two hours. 7. Tom _____ (write) his third novel by the end of this year. 8. By the time he arrives in Kyiv, Alex _____ (drive) for five hours. 9. This film _____ probably _____ (not finish) until midnight. 10. How long _____ you _____ (study) English by the end of this term? 11. By 5 o'clock I _____ (do) this crossword puzzle for three hours. 12. He hopes he _____ (make) a million pounds by the time he is thirty-five. 13. I _____ (read) the book by tomorrow night. 14. By Friday I _____ (work) on this project for two weeks. 15. Hopefully, he _____ (cook) dinner for us by the time we get home.

5. Fill in: will or be going to.

1. We don't have any bread. – I know, I _____ get some from the shop.
 2. We don't have any bread. – Really? I _____ get some from the shop then.
 3. Why do you need to borrow my suitcase? – I _____ visit my mother

in Scotland next month. 4. I'm really cold. – I _____ turn the heating on. 5. Are you going to John's party tonight? – Yes. Are you going too? I _____ give you a lift. 6. What are your plans after you leave university? –I _____ work in a hospital in Africa. I leave on the 28th. 7. Are you ready to order? –I can't decide... OK, I _____ have the steak, please. 8. Are you busy tonight? Would you like to have coffee? – Sorry. I _____ work in the library. I've been planning to study all day. 9. Why are you carrying a hammer? – I _____ put up some pictures.

6. Fill in *will*, *to be going to* or the *Present Continuous*.

1. My father _____ (go) to Australia next week. 2. What are your plans for the future? – I _____ (start) an IT course! 3. I don't think schools _____ (change) very much in the next few years. 4. Our computer broke down yesterday, so we _____ (buy) a new one soon. 5. Look at that man on the bridge! He _____ (jump)! 6. I think that people _____ (live) on the moon by 2050. 7. Peter is not studying hard enough. He _____ (fail) his exams. 8. The sun is shining and the sky is so blue. It _____ (be) a nice day. 9. The phone is ringing! – OK, I _____ (answer) it! 10. I hope robots _____ (do) the housework in the future. 11. I can't find my glasses! – Don't worry, I _____ (help) you find them. 12. Those cars are going too fast! They _____ (crash). 13. I'm going out. Do you want to come with me? – Why not? I _____ take my sweater. 14. Mum, can I go out now? I promise I _____ (do) my homework later! 15. It's Diana's birthday tomorrow! – What _____ (buy) her? 16. My daughter _____ (be) 15 on May 2nd!

7. Choose the correct item.

- | | | | |
|-------------------|------------------------------|-------------------------|--------------|
| 1. A) go | B) will have gone | C) will have been going | D) am going |
| 2. A) will fly | B) will have flown | C) will be flying | D) will have |
| 3. A) will travel | B) will have been travelling | C) will be travelling | D) will be |

- | | | | |
|--------------------------|------------------------------|-------------------------------|------------------------|
| 4. A) won't be | B) won't have been | C) am not being | D) am not |
| 5. A) will look | B) will have been
looking | C) am looking | D) going to
look |
| 6. A) will be
staying | B) will have stayed | C) going to stay | D) stay |
| 7. A) spend | B) will have spent | C) will be spending | D) going to
spend |
| 8. A) attend | B) will have attended | C) will be attending | D) will have
been |
| 9. A) visit | B) will have visited | C) will have been
visiting | D) am visiting |
| 10. A) will also
plan | B) will also have
planned | C) also going to
plan | D) am also
planning |

Dear Sally,

You won't believe where I (1) _____ next month. This time next month I (2) _____ to southern California for a one-month student exchange trip. By the time I get to California, I (3) _____ for 11 hours, but I have a feeling I (4) _____ bored on the plane with all the great films they show.

I (5) _____ forward to meeting my host family. I (6) _____ at their home in Sherman Oaks which is not far from the beach. So, I (7) _____ my afternoons either swimming, snorkeling or surfing. The boys go to a nearby state school, which I (8) _____ during my time there. By the end of the month, I (9) _____ many of their theme parks, museums and aqua parks. I (10) _____ on visiting Disneyland and Universal Studios.

Anyway, I certainly don't know what it'll be like until I get there. So, I promise to write to you then.

Bye for now,

Ann

8. Open the brackets. Use Future Simple, Future Continuous, Future Perfect, Future Perfect Continuous.

1. I _____ (play) tennis tomorrow afternoon. 2. Do you think you will pass the exam? – I hope so. I _____ (revise) for it for two weeks when I take it. 3. I _____ (tell) you everything when I go back. 4. I suppose the concert _____ (finish) by 6 o'clock. 5. By tomorrow morning, I _____ (leave) already. 6. This time next week we _____ (lie)

on the beach in Egypt. 7. Ann _____ (wait) for us at the theatre at 6 o'clock. 8. We could buy Lisa a new piano for her birthday. – Good idea. When she turns twenty, she _____ (play) the piano for twelve years. 9. I _____ (water) the plants at 9 o'clock tomorrow morning. 10. Next month we _____ (be) married for 25 years. 11. Tomorrow at 9 o'clock she _____ (write) a very important exam. 12. Your French is not perfect. – Don't worry. I _____ (learn) it for a year by the time I leave for France. 13. Don't phone me between 8 am and 12 pm. I _____ (work). 14. John is very upset today. I _____ (try) to talk to him. 15. By the end of the week he _____ (spend) all his money. 16. Sorry. But I can't come at 5. I _____ (play) football with my mates. 17. I think she _____ (pass) tomorrow's exam. 18. I can visit you at 5. We _____ (finish) the game by then. 19. In half an hour everybody _____ (watch) the film. 20. _____ Julia _____ (have) her passport by the time we get the plane ticket?

9. Translate into English using Future forms.

1. Я отримаю візу до вересня. 2. Результати оголосять завтра вранці. 3. Коли я прийду до школи, урок вже буде тривати 15 хвилин. 4. Завтра з 10 до 12 ранку я буду готуватися до екзамену. 5. Поки діти прокинуться, я приготую сніданок. 6. Вона закінчує університет в червні. 7. Ти будеш чекати її, коли сьогодні ввечері прибуде її літак? 8. Наступного тижня мої батьки святкують золоте весілля. 9. Він збирається мити машину? 10. Цей день я запам'ятаю на все життя. 11. Вона повертається в понеділок. 12. Як тільки вона навчиться друкувати, я влаштую її на роботу. 13. Ви не забули забронювати місця? – О ні, я забув. Зараз я їм зателефоную. 14. Якщо я продовжу свою дієту, я схудну на 10 кілограмів до кінця місяця. 15. Ліфт не поїде, доки ви не натиснете цю кнопку. 16. До кінця цього року він навчатиметься тут п'ять років.

REPORTED SPEECH

When the main verb of a sentence is in a past tense, verbs in subordinate clauses are normally in a past tense also and we have to follow the rules of **sequence of tenses**.

Direct speech means the words actually spoken. We put direct speech in quotation marks (*'I'm bored'*). We use it when we want to repeat the exact words. But usually there is no need to repeat the exact words. In **reported speech** we only give the meaning of what was said (*He said he was bored.*).

Report structures contain two clauses. The first clause is the reporting clause, which contains a reporting verb such as *say, tell, ask*. If we report people's thoughts and feelings we may use verbs as *think, feel, believe*, etc. The second clause in a report structure is the reported clause, which contains the information that you are reporting. The reported clause can be a 'that'-clause, a 'to'-infinitive clause, an 'if'-clause, or a 'wh'-word clause. Indirect statements are usually introduced by **say**, or **tell + object**.

Tense changes in reported speech

Original words	Reported statement
Present simple 'We work for a big law firm in the city.'	Past simple They said they worked for a big law firm in the city.
Present continuous 'I'm reading a book.'	Past continuous She said she was reading a book.
Past simple 'He decided to accept the offer.'	Past perfect He said he had decided to accept the offer.
Past continuous 'I wasn't telling the truth.'	Past perfect continuous She admitted she hadn't been telling the truth.
Present perfect simple 'My friend hasn't come yet.'	Past perfect simple She said her friend hadn't come yet.
Present perfect continuous 'I've been waiting for ages.'	Past perfect continuous He complained (that) he had been waiting for ages.
be going to 'I'm going to stay at home tonight'.	was/were going to She said (that) she was going to stay at home that night.
Most modal verbs (can, will, must) 'I can't say any more.' 'You must stop smoking'. 'The results will be later'.	could, would, had to She added that she couldn't say any more. The doctor said (that) I had to/must stop smoking. He said that the results would be later.
Some verb forms don't change Past Perfect: 'I hadn't met your sister before.' Modal verbs: could, would, should, mustn't . 'We could go to France for the day.' 'You mustn't talk during the exam.'	He said (that) he hadn't met my sister before. Helen suggested that we could go to France for the day. He insisted (that) we mustn't talk during the exam.
Other changes in reported speech	

Pronouns and possessives		Words for time and places	
direct	reported	direct	reported
I	he/she	today	that day
me	him/her	tonight	that night
my	his/her	tomorrow	the next day / the following day
mine	his/hers	next week/month, etc.	the next / the following (week, month, etc.)
you	I/we	ago	before
your	my/our	yesterday	the day before / the previous day
yours	mine/ours	last (week, month, year, etc.)	the last / the previous (week, month, etc.)
we	they	now	then
us	them	here	there
our	their	this (place)	that (place)
ours	theirs		

10. Transform direct statements into reported speech.

1. 'I have something to show you,' I said to her. 2. I'm going away tomorrow, mother,' he said. 3. 'I've been in London for a month but I haven't had time to visit the Tower,' said Rupert. 4. 'I'll come with you as soon as I am ready,' she replied. 5. 'I wrote to him the day before yesterday,' she said. 6. 'I am going to do it tomorrow,' he said. 7. 'I can't live on my basic salary,' said Peter. 8. 'My younger brother wants to be a tax inspector,' said Mary. 9. 'He isn't at home,' said Ann. 'He left two days ago.' 10. 'I was thinking of going by bus,' said Paul. 11. 'Our team hasn't been doing very well lately,' said John. 12. 'The government has made the right decision,' claimed the Prime Minister. 13. 'Sarah would love a holiday,' thought Mark. 14. 'I must finish this report,' said Sarah. 15. 'I'm going to postpone the examination,' announced Prof. Williams. 16. 'I need to go to the supermarket before it closes,' remembered Janet.

11. Match the sentences with an appropriate reporting verb.

- | | |
|---|--------------------|
| 1. 'If you do it again, I'll leave,' | a) she whispered. |
| 2. 'I'm now going to read out the results,' | b) he answered. |
| 3. 'Could you bring me the wine list?' | c) she shouted. |
| 4. 'Of course, I'll bring it right away,' | d) she threatened. |
| 5. 'Our team will easily beat you,' | e) she announced. |
| 6. 'Please, give me another chance,' | f) he claimed. |
| 7. 'Shhh! The baby's sleeping,' | g) he asked. |

- | | |
|--|------------------|
| 8. 'I'm innocent of all the charges,' | h) she begged. |
| 9. 'First of all, you press the button,' | i) he boasted. |
| 10. 'Careful! The water's deep!' | j) he explained. |

12. Read the text and find the odd words.

I think the interview went well. He wanted to know whether a number of things about me and what I had been doing in the last few years. First, he asked me if I have had had a nice trip down from Manchester and how long it had been taken be to get there. He also wanted to know whether or it had been snowing in Manchester. The chitchat over, he asked from me how old I was and where I was born although I had sent him my CV by post. He then asked how long I had lived in Manchester and I told him. His next question was the whether I was married and whether I had a family or not. I explained him that I was separated and that I had one daughter. He asked me how long did I had worked as an editor and how much I was had being paid in my present job. He asked me what was I liked most about my job and who had told me about their company. The main questions he asked me were about the qualities of a good manager. Finally, he asked how much have I expected to be paid. I think the interview went very well.

13. Change the following into indirect questions beginning with the words given.

1. "Can I leave the room?" I asked _____.
2. "How is Johnny getting on at school?" She asked _____.
3. "Are you happy here?" She asked me _____.
4. "Does he live in a large flat?" She wondered _____.
5. "Are the summers very hot there?" He enquired _____.
6. "Have you always lived in the old town?" They asked him _____.
7. "Do you want coffee or tea?" They asked me _____.
8. "Is he coming or not?" Did he say _____.
9. "Who built that castle?" She wanted to know _____.
10. "Where did you go this summer?" He enquired _____.
11. "How far is the stadium?" He wanted to know _____.

12. "Did he bring the book back?" I didn't know _____.
13. "Who bought the Picasso painting?" He wondered _____.
14. "Where did you get such a lovely pullover?" She asked her sister _____.
-

14. Complete the reported orders, requests, advice and warnings. Use *tell, order, ask, beg, advise, threaten, warn, say, complain, announce, remind, apologise, admit, offer, invite*.

1. The doctor said, 'I think you should go to a gym.' _____
2. 'I wouldn't buy a new car if I were you.' _____
3. My mother said, 'Will you please tidy your room?' _____
4. Tom said, 'I'm getting married in July.' _____
5. 'I'm sorry I lost your umbrella.' _____
6. Dad said, 'Be careful – there's ice on the roads.' _____
7. He said, 'You must remember to book the hotel later.' _____
8. The doctor said, 'Stop working so hard.' _____
9. 'Would you like me to open the windows?' _____
10. 'My advice is that you shouldn't give up your job yet,' Dad told me. _____
-
11. The police officer shouted: 'Get out of the car!' _____
12. 'We have broken the office window.' _____
13. Tom said, 'Would you like to join our team in the quiz competition?' _____
-
14. 'Please – oh, please – give us the sweets.' _____
15. Alisa said, 'I can't walk any further.' _____
16. 'Don't touch the oven or you'll get burnt,' she said to the children. _____
-
17. 'The service is very slow in this café, isn't it?' Dave said. _____
-
18. Mary told Jim, 'If you do that again, I'll have to tell your mother.' _____
-
19. 'I'm so sorry I was late. My car broke down,' Chris said to Angela. _____
-
20. 'Let's have fish for dinner,' said Tom. _____

15. Choose the correct answer:

1. "You can move in immediately." She told me I *a) would move in / b) can move in / c) could move in* immediately. 2. "The people who I looked after are very well."

She said that the people who she **a) were looking after / are b) have looked after / are c) had looked after / were** very well. 3. “You look brown. Have you **a) been b) gone c) did** on holiday?” “Yes, we’ve **a) now b) just c) already** got back.” 4. “I need £100 deposit.” Then she said she **a) needs b) had needed c) needed** £100 deposit. 5. “Are you ready?” she asked. She asked **a) if I was b) when I am c) to be** ready. 6. “Why is he smiling?” I wanted to know **a) why he was smiling b) why is he smiling c) why he is smiling**. 7. “When will you be here?” she asked. She asked me when **a) I would be b) would I be c) she will be** there. 8. “Do you need a pen?” Anne asked me **a) did I need b) if I needed c) whether she needed** a pen. 9. “What are you talking about?” Dick asked me what **a) am I talking about b) I was talking about c) he is talking about**. 10. “Don’t walk on the bridge.” He warned us **a) to walk b) don’t walk c) not to walk** on that bridge. 11. “Please be quiet.” I asked them **a) be b) not to be c) to be** quiet. 12. “Shall I call a taxi?” He asked me if **a) he should call b) I should call c) should he call** a taxi. 13. “Open your mouth.” The dentist told me **a) to open his mouth b) open your mouth c) to open my mouth**. 14. “Don’t be late.” The teacher told us **a) not to be late b) not being late c) we don’t be late**. 15. The teacher said, “Pick up your book, Mike.” The teacher told Mike **a) pick up his book b) to pick up her book c) to pick up his book**. 16. Janet said that she was hungry. Janet said, “**a) I was hungry. b) I am hungry. c) She is hungry.**” 17. Mike says his father is ill. Mike says, “**a) My father is ill b) His father is ill c) My father was ill.**” 18. We said that we were leaving on Saturday. We said, “**a) You are leaving on Saturday. b) We leave on Saturday. c) We are leaving on Saturday.**” 19. The secretary told me that Mr. Rich had gone out. The secretary told me, “**a) Mr. Rich was going out. b) Mr. Rich goes out. c) Mr. Rich has gone out.**” 20. Bill said he didn’t like to study. Bill said, “**a) You don’t like to study. b) I don’t like to study. c) He doesn’t like to study.**” 21. The old lady said she wasn’t feeling well. The old lady said, “**a) I’m not feeling well. b) I don’t feel well. c) She hasn’t been feeling well.**” 22. Carol said that she would see me the next day. Carol said, “**a) You will see me tomorrow. b) I will see you tomorrow. c) She will see you tomorrow.**” 23. You told me that you would be careful. You said to me, “**a) You will be careful. b) I will be careful. c) Be careful.**” 24. He asked me what I was reading. “**a) What do you read? b) What**

you are reading? c) What are you reading? he asked me. 25. I asked the clerk if they had a double room. “*a) Have you got a double room? b) Did you have a double room? c) Is there a double room?*” I asked the clerk. 26. I asked her what her name was. “*a) What is your name? b) What my name was? c) What is her name?*” I asked her. 27. My father told me to do my homework. My father said, “*a) You do your homework. b) Do your homework. c) I don't do my homework.*” 28. He warned me not to touch the wire. “*a) I don't touch the wire. b) Touch the wire. c) Don't touch the wire.*” he warned me.

16. Translate into English:

1. Вона сказала, що вони думали продати будинок, але вирішили цього не робити. 2. Він сказав, що коли бачив їх, вони грали в теніс. 3. Петро сказав, що коли вони жили в Парижі, вони часто бачились з Томом. 4. Енн сказала, що вирішила не купувати будинок, оскільки він був далеко від центра міста. 5. Брат попередив, що зможе допомогти мені завтра. 6. Вона хвалилася, що вміла читати, коли їй було три роки. 7. Він сказав, що не може відкрити сейф, тому що забув код. 8. Джек повідомив, що їде у відрядження сьогодні. 9. Ганна пообіцяла віддати борг через тиждень. 10. Сьогодні за сніданком він сказав, що буде зайнятий весь день. 11. Хелен повідомила, що повернеться сюди через кілька днів. 12. Вона сказала, що купила подарунок для своєї мами. 13. Він пообіцяв матері, що приїде завтра вранці. 14. Сестра попередила мене, що затримається на роботі сьогодні ввечері. 15. Я не знала як користуватися новим приладом і Ганна порадила мені почитати інструкцію. 16. Він пояснив, що знає це місто добре, тому що прожив тут все життя. 17. Мене попросили піти на пошту та відправити листи. 18. Мене запитали, де я була весь цей час. 19. Він сказав, що якби він мав інструменти, він би полагодив праску. 20. Батько сказав, що через місяць буде 25 років, як він працює на цій фірмі.

UNIT 2

I. MICROBIOLOGY

Microbiology is the study of **microorganisms**, which are microscopic and unicellular organisms. This includes **eukaryotes** such as fungi and **protists**, and **prokaryotes**. **Viruses**, though not classed as living organisms, are also studied. Microbiology typically includes the study of the immune system, or Immunology. And immune systems obviously interact with **pathogenic** microbes.

Microbiology includes virology, mycology, parasitology, bacteriology and other branches. Microbiological procedures usually must be **aseptic**, and use a variety of tools such as **light microscopes** with a combination of **stains and dyes**, **agar plates in petri dishes**, biochemical test and **running tests** against particular growth conditions.

Microbiology is researched actively. Many microbes are responsible for beneficial processes such as industrial fermentation, antibiotic production and others. Bacteria can be used for the industrial production of amino acids. *Corynebacterium glutamicum* is one of the most important bacterial species with an annual production of more than two million tons of amino acids.

A variety of biopolymers, such as **polysaccharides**, polyesters, and polyamides, are produced by microorganisms. Microorganisms are used for the biotechnological production of biopolymers with **tailored properties** suitable for high-value medical application such as tissue engineering and **drug delivery**.

Microorganisms are beneficial for **microbial biodegradation** of domestic, agricultural and **industrial wastes**. The ability of each microorganism **to degrade toxic waste** depends on **the nature of each contaminant**.

There are also various claims concerning the contributions to human and animal health by consuming **probiotics** (bacteria potentially beneficial to the digestive system) and/or **prebiotics** (substances consumed to promote the growth of probiotic microorganisms). Recent research has suggested that microorganisms could be useful in the treatment of cancer.

Ex. 1.1. Translate into Ukrainian and learn glossary of essential terms:

№	English term	Ukrainian equivalent	№	English term	Ukrainian equivalent
1.	microbiology		7.	aseptic	

2.	microorganism		8.	agar plate	
3.	eukaryotes		9.	petri dish	
4.	protists		10.	running tests	
5.	prokaryotes		11.	polysaccharides	
6.	pathogenic				

Learn and translate the following words and word combinations: light microscope, stains and dyes, tailored properties, agricultural and industrial wastes, to degrade toxic waste, the nature of contaminant, drug delivery, microbial biodegradation, industrial fermentation

Ex. 1.2. Find the appropriate definitions to the following words:

1. eukaryotes ____	a) small infectious agents that can replicate only inside the living cells of organisms
2. viruses ____	b) are the fermenters that leaven the bread or brew the beer.
3. antibiotics ____	c) organisms whose cells contain complex structures enclosed within membranes
4. enzymes ____	d) is a disease-producing agent, especially a virus, bacterium, or other microorganism
5. mycology ____	e) the branch of biology concerned with the study of fungi
6. cancer ____	f) organisms that lack a cell nucleus or any other membrane-bound organelles
7. microbiologist ____	g) proteins that catalyse (i.e., increase or decrease the rates of) chemical reactions
8. prokaryotes ____	h) powerful medicines that fight bacterial infections
9. pathogen ____	i) a class of diseases in which a group of cells display uncontrolled growth
10. yeasts ____	j) biological scientists who study organisms so small that, generally, they can only be seen with a microscope.

Ex. 1.3. Fill in the gaps in these sentences:

1. Microbiology is the study of _____, which are microscopic and unicellular organisms. 2. Viruses, though not classed as _____, are also studied. 3. Many microbes are responsible for _____ such as industrial fermentation, antibiotic production and others. 4. _____ are beneficial for microbial biodegradation of domestic, agricultural and industrial wastes. 5. Recent research has suggested that microorganisms could be useful in the _____ of

cancer. 6. Microorganisms are used for the _____ of biopolymers with tailored properties suitable for high-value medical application.

Ex. 1.4. Read the text attentively again and say which statements are true to the fact or false.

1. Microbiology is the study of microorganisms. _____ 2. Microbiology typically includes the study of the immune system. _____ 3. A virologist is a specialist in microbiology. _____ 4. Microbiology is researched passively. _____ 5. Bacteria can be used for the industrial production of all acids. _____ 6. The ability of each microorganism to degrade toxic waste depends on the nature of each contaminant. _____ 7. Probiotics are the substances consumed to promote the growth of probiotic microorganisms. _____

Ex. 1.5. Answer the following questions.

1. What is microbiology? 2. Is microbiology connected with immunology? How? 3. Which branches of microbiology do you know? 4. Where are microbes used? 5. What do you know about *Corynebacterium glutamicum*? 6. What is produced by microorganisms? 7. What is probiotic? What is prebiotic? What is the difference between them? 8. How can we biodegrade different wastes? 9. Could microorganisms be useful in the treatment of cancer?

II. BACTERIA

Bacteria are very small **single-celled** organisms (microorganisms) that exist in enormous numbers almost everywhere. They live in soil, water, air and in living and dead animals and plants. A gram of soil can contain up to a thousand million bacteria, and there may be hundreds of thousands in a single drop of milk.

Bacteria differ from each other mainly in where and on what they live, and in the shape of their single cells. There are the spherical **coccus** types such as *Staphylococcus* and *Streptococcus*, which often occur in chains or masses, and the rod-shaped **bacillus** type such as ***Mycobacterium***, which causes tuberculosis. Other disease-causing bacteria are ***Eberthella typhi*** (typhoid), and *Vibrio cholerae* (cholera). The type of bacterium which forms a coil or spiral is *Spirillum*.

Although bacteria cells are more complicated than viruses they are still very simple. Their structure has been worked out with optical microscopes which magnify by one hundred thousand times. All bacteria have a degradation

outer cell wall so their food must be soluble before it can be absorbed into the cell. In some bacteria there is a protecting layer of jelly enclosing the cell wall, and also one or more **minute** fibres (flagella) used for swimming. Inside the cell there is a coil of DNA and other chemical substances, but there is no definite nucleus or any of the other structures found in plant and animal cells.

Reproduction of bacteria is usually by fission: an individual cell enlarges and splits into two, each of the resulting pair being an **exact replica** of the parent cell (in the absence of mutation). Filamentous species reproduce by the elongation and branching of their filaments. A few bacteria multiply by a **budding process**. Methods of reproduction are almost invariably asexual, though a form of '**sexual**' **mating** has been rarely observed.

In the laboratory most bacteria can be **induced** to 'grow' (reproduce) in liquid or on solid culture media. Nutrient requirements, atmospheric conditions correct pH value (acidity or alkalinity) of the medium, osmotic pressures and temperatures are rendered optimum for the multiplication of species **in vitro**. Some bacteria will grow in a simple defined medium consisting of a few salts in aqueous solution (trace elements are provided by the **impurities** found in all chemicals, even those described as 'pure'). Others, including many pathogenic species, require protein degradation products, such as digested meat, in the constitution of media suitable for their growth. Some fastidious pathogens need media enriched with blood or other highly nutritious substances. Bacteria usually reproduce by simply splitting in two. When temperature conditions are favourable, about 37°C for most bacteria, they can divide about once every 30 minutes. In theory, one bacterium could form about 140 000 000 000 000 bacteria at the end of 24 hours. In fact, this does not happen because the supply of food soon runs out, poisonous wastes accumulate, and after a time no more bacteria can survive. Although most bacteria reproduce by dividing in two, some bacteria can reproduce sexually, during which the contents of one bacterium flow into another.

Bacteria are very tough. Different kinds can live in almost every environment, from hot **springs** to arctic frost. Many can form a type of **spore** under certain conditions. A spore is capsule inside which a bacterium can survive for years of drying out, intense heat or disinfectant. Few of disease bacteria can make spores.

Ex. 2.1. Translate into Ukrainian and learn glossary of essential terms:

№	English term	Ukrainian equivalent	№	English term	Ukrainian equivalent
1.	bacterium		8.	budding process	
2.	coccus		9.	sexual mating	
3.	bacillus		10.	induce	
4.	Mycobacterium		11.	in vivo	
5.	Eberthella typhi		12.	impurities	
6.	minute		13.	spring	
7.	exact replica		14.	spore	

Learn and translate the following words and word combinations: rod-shaped bacillus type, disease-causing bacteria, optical microscope, tough outer cell wall, a protective layer of jelly, a coil of DNA, elongation and branching, in liquid or on solid culture media, correct pH value of the medium, in aqueous solution, to require protein degradation products, fastidious pathogens, under certain conditions.

Ex. 2.2. Fill in the missing words.

<i>rod-shaped</i>	<i>fastidious</i>	<i>bacteria</i>	<i>splitting</i>	<i>nutritious</i>
<i>spherical</i>	<i>coccus</i>	<i>tough</i>	<i>outer</i>	

1. Staphylococcus come in _____ types. 2. Those _____ that cause tuberculosis are _____. 3. All bacteria have a _____ cell wall. 4. Bacteria usually reproduce by simply _____ in two. 5. Some _____ pathogens need media enriched with blood or other highly _____ substances.

Ex. 2.3. Fill in the proper preposition.

1. Reproduction _____ bacteria is usually _____ fission. 2. Some fastidious pathogens need media enriched _____ blood or other highly nutritious substances. 3. A gram _____ soil can contain _____ to a thousand million bacteria. 4. Bacteria differ _____ each other mainly _____ where and on what they live. 5. A few bacteria multiply _____ a budding process. 6. Their structure has been worked _____ with optical microscopes which magnify by _____ one hundred thousand times. 7. Some bacteria will grow _____ a simple defined medium consisting _____ a few salts in aqueous solution.

Ex. 2.4. Say whether the following statements are true or false.

1. Methods of reproduction of bacteria are mainly asexual. _____ 2. Bacteria never multiply by budding. _____ 3. Bacteria usually reproduce by dividing into numerous parts. _____ 4. Bacteria can't be grown in the laboratory. _____ 5. Numerous requirements have to be met in order to make bacteria reproduce in vitro.

_____ 6. The medium enriched with nutritious substances is required for some pathogenic bacteria. _____

Ex. 2.5. Translate the following sentences into English.

1. Бактерії – це дуже маленькі одноклітинні мікроорганізми, які існують майже всюди. 2. Бактерії відрізняються один від одного формою їхніх окремих клітин, а також де і на чому вони живуть. 3. Структуру бактерій досліджують за допомогою оптичних мікроскопів. 4. Хвороботворні мікроби не є численними. 5. Бактерії є найстарішими з живих організмів. 6. Розмноження бактерій зазвичай відбувається шляхом ділення: окрема клітина збільшується і розпадається на дві, кожна з отриманих пар є точною копією батьківської клітини. 7. Деякі бактерії розмножуються шляхом брунькування. 8. Різні види бактерій можуть жити майже в будь-якому середовищі, від гарячих джерел до арктичних морозів. 9. Деякі хвороботворні бактерії можуть утворювати спори.

III. WHAT IS A VIRUS?

A **virus** is a tiny **parasite** living, growing and reproducing its kind inside a host cell. When viruses damage or destroy the cells they invade, they produce virus diseases: polio, smallpox and rabies are typical examples. Viruses are the smallest microbes.

"**Virus**", or "**the virus**", has also become a fashionable medical diagnosis. It is usually applied to minor disturbances of the stomach or intestines ("stomach flu") and to upper respiratory tract infections related to the common cold. It is as good an explanation as any for transitory infections, of unproved origin, which make a person feel miserable and weaken him for a considerable length of time.

Nature of viruses. Viruses were first discovered in 1892 by a Russian scientist, D. Iwanowski, who noted infective agents that would pass through a filter that stopped ordinary bacteria. Hence they were originally called filterable viruses. First to be discovered was the tobacco mosaic virus, a plant virus that puts spots on tobacco leaves.

In 1898, Loeffler and Frosch discovered the virus that causes hoof-and-mouth disease in cattle and in 1901, Walter Reed and his associates found the virus that causes yellow fever in man. Since then, a great many viruses, all parasites on the cells of plants, lower animals or human beings, have been identified. Viruses that are parasites on bacteria are called bacteriophage (phage).

Closely related to viruses are rickettsia, microbes which are parasites on host cells but which are too large to pass through the porcelain filters that let viruses through. The principal rickettsial disease is typhus.

The exact nature of viruses has not yet been settled. They are on the borderline between the living and the dead. A "live" virus can apparently be reconstituted out of inorganic chemicals (the tobacco mosaic virus) and will multiply or replicate itself within cells. This is the area where chemistry and biology seem to merge.

The crux of the matter appears to lie in the nucleus of the virus, made up of nucleic acid and nucleoproteins. The outer coat of the virus, which can be stripped, is a protein. The nucleic acids – chemicals – have a special configuration in their molecular form. They are twin spirals, like spiral springs, one turning to the right, the other to the left.

Under certain circumstances of virus reproduction, they split apart and then join together again. This is much the same process that occurs when the chromosomes in the nucleus of a living cell split apart and re-join to form new cells. In other words, viruses act much like genes, and greater similarities between them may be found. The process of wild multiplication of cancer cells also has much in common with virus duplication.

How big are viruses? They are unbelievably small – millionths of an inch in length, breadth and thickness. The largest known virus, that of parrot fever (psittacosis) – measuring 450 millimicrons – is only about 1/20 the size of a red blood cell. The smallest virus, that of hoof-and-mouth disease, measures only 10 millimicrons.

Viruses come in all kinds of shapes – spheres, balls, ovals (egg-shaped), cubes, rhomboids, commas, and rods.

Habitats. Viruses can be found almost anywhere there is life, including within prokaryotes. A phage is a virus that infects prokaryotes. Phages are estimated to be the most widely distributed and diverse entities in the biosphere, even more numerous than prokaryotic organisms. Phages can be found everywhere their hosts are found, such as in soil, in the intestines of animals, or in seawater. Up to 10⁹ virions (a complete virus particle) have been found in a millilitre of seawater, and up to 70 percent of marine bacteria may be infected by phages. They are also found in drinking water and in some foods, including fermented vegetables and meats, where they control the growth of bacteria.

Ex. 3.1. Translate into Ukrainian and learn glossary of essential terms:

№	English term	Ukrainian equivalent	№	English term	Ukrainian equivalent
1.	virus		8.	to split apart	
2.	parasite		9.	to occur	
3.	host cell		10.	similarity	
4.	to reconstitute		11.	duplication	
5.	to replicate		12.	psittacosis	
6.	to merge		13.	rickettsia	
7.	nucleic acid		14.	rabies	

Learn and translate the following words and word combinations: to damage or destroy cells, minor disturbances, transitory infection, unproved origin, infective agent, to settle the nature of viruses, to join together again, to form new cells, to have much in common.

Ex. 3.2. Choose the best word for each sentence. Use each word only once.

<i>fashionable</i>	<i>bacteria</i>	<i>bacteriophage</i>	<i>messengers</i>	<i>originally</i>
<i>associates</i>	<i>nucleus</i>	<i>minor</i>	<i>infective</i>	<i>microbes</i>

1. "Virus" has also become a _____ medical diagnosis. 2. It is usually applied to _____ disturbances of the stomach. 3. In 1892 a Russian scientist noted _____ agents that would pass through a filter that stopped ordinary _____. 4. Hence they were _____ called filterable viruses. 5. In 1901 Walter Reed and his _____ found the virus that causes yellow fever in man. 6. Some microbes are age-old enemies, the invisible _____ of tuberculosis and cholera and other scourges. 7. Bacteria lack the cell _____ found in other microbes. 8. Typhus is caused by _____ which are called rickettsia. 9. Viruses that are parasites on bacteria are called _____.

Ex. 3.3. Say whether these statements are true or false. Make any corrections if necessary.

1. Viruses are the largest microbes. _____ 2. The exact nature of viruses has already been settled. _____ 3. The outer coat of the virus is a protein. _____ 4. A "live" virus can be reconstituted out of organic chemicals _____ 5. The principal rickettsial disease is smallpox. _____ 6. There are no similarities between genes and viruses. _____ 7. The largest known virus is as big as a red blood cell. _____ 8. Bacteriophage is a bacterium. _____ 9. The virus that causes hoof-and-mouth disease is the largest in size. _____ 10. Phages can be found everywhere their hosts are found. _____

Ex. 3.4. Give English equivalents.

Вірусна хвороба, модний діагноз, , розмноження вірусу, нуклеїнові кислоти, верхні дихальні шляхи, незначні порушення шлунку/кишечника, паразитувати на бактеріях, тютюнова мозаїчна хвороба, інфекційний агент.

Ex. 3.5. Fill in the blanks with words from previous exercise.

1. When viruses damage or destroy the cells they invade, they produce _____ . 2. “The virus” is a _____ usually applied to _____ of _____. 3. Ivanovsky showed that the _____ was caused by a filterable infectious agent. 4. D. Iwanowski noted _____ that would pass through a filter that stopped ordinary bacteria. 5. Under certain circumstances of _____, they split apart and then join together again. 6. Virus can infect also the upper _____. 7. The _____ have a special configuration in their molecular form. 8. Bacteriophage are viruses that _____.

Ex. 3.6. Answer the following questions.

1. What is a virus? 2. When do viruses produce diseases? 3. When were viruses discovered? 4. How are viruses that are parasites on bacteria called? 5. How can a “live” virus be reconstituted? 6. What is the configuration of the nucleic acid? 7. When do viruses split apart and then join together again? 8. In what kinds of shapes do viruses come?

Ex. 3.7. Translate into English.

1. Мікроби це мікроорганізми, що населяють нашу планету. 2. Менінгіт може бути викликаний як бактеріями, так і вірусами. 3. Хвороботворні мікроби не є численними. 4. Бактерії є найстарішими з живих організмів. 5. Вірус – це крихітний паразит, який живе, росте і розмножується всередині клітини-господаря. 6. Вірусна хвороба ослаблює людський організм на дуже довгий період. 7. Точне походження вірусів ще досі не встановлено. 8. Молекули нуклеїнових кислот мають форму подвійних спіралей. 9. Віруси мають багато спільних рис з генами. 10. Віруси можуть знищити клітини, в які вони вторгаються.

IV. EBOLA VIRUS

Ebola is the virus that causes Ebola virus disease. Ebola virus disease is a serious illness that causes viral hemorrhagic fever and is deadly in up to 90

percent of cases. Ebola damages blood vessel walls and inhibits the blood from clotting. This results in internal bleeding that can be life-threatening. Ebola outbreaks have garnered serious attention as there is no known treatment, vaccine, or cure for the disease. These outbreaks have primarily affected people in tropical regions of Central and West Africa. Ebola is typically transmitted to humans through close contact with the bodily fluids of infected animals. It is then transmitted between humans through contact with blood and other bodily fluids. It can also be picked up through contact with contaminated fluids in an environment. Ebola symptoms include fever, diarrhea, rash, vomiting, dehydration, impaired kidney and liver function, and internal bleeding.

Ebola Virus Structure

Ebola is a single-stranded, negative RNA virus that belongs to the virus family Filoviridae. Marburg viruses are also included in the Filoviridae family. This virus family is characterized by their rod-shape, thread-like structure, varied length, and their membrane enclosed capsid. A capsid is a protein coat that encloses the viral genetic material. In Filoviridae viruses, the capsid is also enclosed in a lipid membrane that contains both host cell and viral components. This membrane assists the virus in infecting its host. Ebola viruses can be relatively large measuring up to 14,000 nm in length and 80 nm in diameter. They often take on a U shape.

Ebola Virus Infection

The exact mechanism by which Ebola infects a cell is not known. Like all viruses, Ebola lacks the needed components to replicate and must utilize the cell's ribosomes and other cellular machinery to replicate. Ebola virus replication is thought to occur in the host cell's cytoplasm. Upon entering the cell, the virus uses an enzyme called RNA polymerase to transcribe its viral RNA strand. The viral RNA transcript synthesized is similar to messenger RNA transcripts that are produced during normal cellular DNA transcription. The cell's ribosomes then translate the viral RNA transcript message to create viral proteins. The viral genome instructs the cell to produce new viral components, RNA, and enzymes. These viral components are transported to the cell membrane where they are assembled into new Ebola virus particles. The viruses are released from the host cell through budding. In budding, a virus uses components of the host's cell membrane to create its own membrane envelope which encloses the virus and is eventually pinched off from the cell membrane. As more and more viruses exit the cell through budding, cell membrane components are slowly used up and the

cell dies. In humans, Ebola primarily infects the inner tissue linings of capillaries and various types of white blood cells.

Ebola Virus Inhibits Immune Response

Studies indicate that the Ebola virus is able to replicate unchecked because it suppresses the immune system. Ebola produces a protein called Ebola Viral Protein 24 that blocks cell signaling proteins called interferons. Interferons signal the immune system to increase its response to viral infections. With this important signaling path blocked, cells have little defense against the virus. The mass production of viruses triggers other immune responses that negatively impact organs and causes a number of the severe symptoms seen in Ebola virus disease. Another tactic employed by the virus to evade detection involves cloaking the presences of its double-stranded RNA that is synthesized during viral RNA transcription. The presence of the double-stranded RNA alerts the immune system to mount a defense against infected cells. The Ebola virus produces a protein called Ebola Viral Protein 35 (VP35) that prevents the immune system from detecting the double-stranded RNA and thwarts an immune response. Understanding how Ebola suppresses the immune system is key to the future development of treatments or vaccines against the virus.

Ex. 4.1. Translate into Ukrainian and learn glossary of essential terms:

№	English term	Ukrainian equivalent	№	English term	Ukrainian equivalent
	fever			single-stranded	
	blood clotting			rod-shaped	
	internal bleeding			to infect a cell	
	life-threatening			virus replication	
	outbreak			viral proteins	
	bodily fluids			to pinch off	
	contaminated			to use up	
	rash			eventually	
	dehydration			to trigger	

Learn and translate the following words and word combinations: viral hemorrhagic fever, to inhibit the blood from clotting, to garner serious attention, impaired kidney and liver function, thread-like structure, membrane enclosed capsid, exact mechanism, needed components, to utilize the cell's ribosomes, cellular machinery, to replicate unchecked, to suppress the immune system, to have little

defence, to impact organs negatively, to evade detection, to cloak the presence, thwart an immune response.

Ex. 4.2. Match the word with its definition.

- | | |
|----------------|---|
| 1. fever | a) the sudden start of disease |
| 2. to clot | b) the protein shell of a virus |
| 3. dehydration | c) an area of small red spots on your skin, caused by an illness or an allergic reaction to something |
| 4. outbreak | d) a medical condition in which the temperature of your body is very high and you feel ill |
| 5. capsid | e) to squeeze someone's skin between your thumb and finger so that it hurts them |
| 6. rash | f) become thick and stop flowing |
| 7. trigger | g) to stop a physical process from happening or developing |
| 8. to suppress | h) a dangerous lack of water in the body |
| 9. to thwart | i) to cause someone to do or say something |
| 10. to cloak | j) to prevent someone from doing something |
| 11. to pinch | k) to cover or hide something with something else |

Ex. 4.3. Fill in the sentences with the words from the box.

<i>symptoms</i>	<i>inhibits</i>	<i>survivors</i>	<i>triggered</i>	<i>capsid</i>
<i>antibodies</i>	<i>discovered</i>	<i>suppress</i>	<i>recovery</i>	<i>assist</i>
<i>detected</i>	<i>replication</i>			

1. Studies show that _____ of Ebola virus infection have _____ that can be _____ in the blood up to 10 years after _____. 2. The report has _____ a fierce response from the governor. 3. _____ assembly is complex, and occurs with the help of scaffold proteins. 4. These drugs should _____ your appetite. 5. Drinking coffee _____ the absorption of iron from your diet. 6. Ebola virus _____ is thought to occur in the host cell's cytoplasm. 7. This membrane _____ the virus in infecting its host. 8. Scientists later _____ that the two outbreaks were caused by two genetically distinct viruses. 9. Many common illnesses can have the same _____ as EVD.

Ex. 4.4. Match the words 1-11 with the words a-k to form word combinations.

- | | |
|---------------------------------|---|
| 1. to cause viral | a) the immune system |
| 2. to damage | b) against the virus |
| 3. a protein coat that encloses | c) belong to the virus family Filoviridae |

- | | |
|---------------------------------|----------------------------------|
| 4. the virus suppresses | d) blood vessel walls |
| 5. response to | e) the viral genetic material |
| 6. to have little defense | f) hemorrhagic fever |
| 7. to thwart | g) the host cell through budding |
| 8. a single-stranded virus that | h) from clotting |
| 9. released from | i) its double-stranded RNA |
| 10. the presences of | j) an immune response |
| 11. to inhibit the blood | k) viral infections |

Ex. 4.5. Say whether the following statements are true or false. Correct any false statements.

1. Ebola is a single-stranded, positive RNA virus that belongs to the virus family Filoviridae. _____ 2. These viral components are transported to the nucleoid where they are assembled into new Ebola virus particles. _____ 3. Ebola is typically transmitted to humans through close contact with the bodily fluids of infected animals. _____ 4. Ebola primarily affected people in Europe. _____ 5. It is then transmitted between humans through the air. _____ 6. Ebola viruses can be relatively large. _____ 7. They often take on an S shape. _____ 8. In humans, Ebola primarily infects the inner tissue linings of capillaries and various types of red blood cells. _____ 9. The Ebola virus is able to replicate controlled. _____ 10. Interferons signal the immune system to increase its response to viral infections. _____ 11. The mass production of viruses triggers other immune responses that negatively impact organs. _____ 12. Ebola Viral Protein 35 prevents the immune system from detecting the single-stranded RNA and thwarts an immune response. _____

Ex. 4.6. Translate into English:

1. Вірусна хвороба Ебола є однією з найсмертоносніших вірусних захворювань. Вона була виявлена в 1976 році, коли два послідовних спалахи смертельної геморагічної лихоманки відбулися в різних частинах Центральної Африки. Перший спалах стався в Демократичній Республіці Конго у селі біля річки Ебола, яка дала вірусу назву. Другий спалах стався на території нинішнього Південного Судану.

2. Симптоми можуть з'явитися від 2 до 21 дня після контакту з вірусом, у середньому від 8 до 10 днів. Перебіг хвороби зазвичай прогресує від «сухих» симптомів таких як лихоманка, ломота і втома, а потім переходить до «мокрих» симптомів, наприклад, діарея та блювота, коли людині стає дедалі гірше.

3. Ебола є важким захворюванням. Відновлення від Еболи залежить від належної підтримки клінічної допомоги та імунної відповіді пацієнта.

Дослідження показують, що ті, хто пережив інфекцію вірусом Ебола, мають антитіла, які можна виявити в крові до 10 років після одужання.

Ex. 4.7. Answer the following questions on the text:

1. What kind of disease is Ebola? 2. What organs does it damage? 3. Is there any treatment for the disease? 4. How is Ebola transmitted to humans? 5. How is it transmitted between humans? 6. What are the symptoms of Ebola? 7. Is Ebola single- or double-stranded? 8. What family does Ebola virus belong to? 9. How is this virus family characterized? 10. What is a capsid? 11. What is the function of a lipid membrane? 12. How large is Ebola virus? 13. What is the mechanism by which Ebola infects a cell? 14. What is an impact of Ebola on the immune system? 15. What is interferon? 16. What does another tactic employed by the virus to evade detection involve?

Ex. 4.8. Retell the text “Ebola Virus” using your active vocabulary.

Ex. 4.9. Choose the correct word.

VACCINATION FOR SMALLPOX

Edward Jenner, the discoverer of vaccination for smallpox, was born at a time when the patterns of British medical practice and education were **(1) coming/undergoing** gradual change.

Jenner was a country youth, the son of a clergyman. Because Edward was only five when his father died, he was **(2) brought up/grown** by an elder brother who was also a clergyman. Edward **(3) visited/attended** grammar school and at the age of 13 was apprenticed to a **(4) near/nearby** surgeon. In the following eight years Jenner **(5) acquired/inquired** a **(6) sound/superficial** knowledge of medical and surgical practice that helped him much in his future work. On **(7) graduating/completing** his apprenticeship at the age of 21, he went to London and became the house pupil of John Hunter, who was on the staff of St. George’s Hospital and was soon to become one of the most **(8) prominent/top** surgeons in London. Even more important, however, he was an anatomist, biologist, and experimentalist of the first **(9) rank/range**; not only did he collect biological **(10) specimens/specimen** but he also concerned himself with problems of physiology and function.

Smallpox was **(11) widespread/broadspread** in the 18th century, and occasional outbreaks of special intensity resulted in a very **(12) high/highly** death rate. Jenner, even as an apprentice, had been impressed by the fact that a person who had **(13) been ill /suffered** an attack of cow pox, a relatively harmless disease that could be **(14) contracted/contacted** from cattle, could not take the smallpox, **(15) that is/so** could not become infected whether by accidental or intentional exposure to the smallpox.

Thinking over this phenomenon Jenner **(16) concluded/completed** that cow pox not only protected against smallpox but also could be transmitted from one person to another **(17) as/like** a deliberate mechanism of protection.

The story of the great breakthrough is well known. Complications were many. Vaccination seemed **(18) common/simple**, but the vast number of persons who practiced it did not necessarily **(19) precede/follow** the procedure that Jenner had recommended, and deliberate or unconscious innovations often **(20) collaborated/lessened** the effectiveness. Pure cow pox vaccine was not always easy to obtain, nor was it **(21) easy/common** to preserve or transmit.

Despite errors and occasional chicanery, the process of vaccination spread **(22) fastly/rapidly** and the death rate from smallpox plunged. Jenner, although he received worldwide recognition and many honours, **(23) made/did** no attempt to enrich himself through his discovery and actually devoted so much time to the cause of vaccination that his **(24) private/personal** practice and his **(25) private/personal** affairs suffered **(26) severely/several**. In 1802 Parliament voted him a sum of £10,000 and in 1806 a **(27) father/further** sum of £20,000.

Jenner not only received honours but also **(28) aroused/ arouse** opposition and found himself subjected to attacks and calumnies, **(29) in spite/despite** which he continued his activities **(30) in behalf/in sake** of vaccination. His wife, **(31) sick by/ill with** tuberculosis, died in 1815, and Jenner retired from public life.

Ex. 4.10. Read the text and do the assignments below.

CORONAVIRUS HEIGHTENS GLOBAL ALARM

Nations around the world are preparing for a possible major outbreak of a new deadly virus. The coronavirus, which started in the Chinese city of Wuhan, has already killed 17 people. It has spread to the USA, Japan, Korea and Thailand.

More than 540 people have caught the virus and are in hospital. The World Health Organization (WHO) is meeting to decide whether the outbreak is a global health emergency. China is urging people not to panic ahead of the Chinese New Year next week. Millions of Chinese will be travelling across the country to spend the holiday season with their families. Meanwhile, the city of Wuhan has suspended its public transport systems to help stop the spread of the virus.

The new coronavirus is suspected to have come from illegally traded animals in a Wuhan market. The virus mutated and spread from an animal to a human. There are fears it could mutate and spread further. Scientists say the virus is contagious and can be passed from person to person through the air. Dr Linfa

Wang, a virologist at the Duke-National University of Singapore, said the new coronavirus is in the same family as SARS, but it's different from SARS. He said people needed to look for pneumonia-like symptoms, such as fever, cough and difficulty breathing. Fu Ning, a 36-year-old woman from Beijing, said: "I feel fearful because there's no cure for the virus."

Ex. 4.10-A. Match the synonyms. Use them in your own sentences.

1.	nations	a.	crisis
2.	preparing	b.	danger signs
3.	deadly	c.	changed
4.	emergency	d.	getting ready
5.	panic	e.	transferred
6.	mutated	f.	freak out
7.	contagious	g.	countries
8.	passed	h.	antidote
9.	symptoms	i.	lethal
10.	cure	j.	catching

Ex. 4.10-B. Match the words or phrases in two columns to form the word-combinations from the text.

1.	a possible major	a.	and spread further
2.	More than 540 people have	b.	to panic
3.	the outbreak is a global health	c.	symptoms
4.	China is urging people not	d.	outbreak
5.	public	e.	emergency
6.	illegally traded animals	f.	no cure for the virus
7.	There are fears it could mutate	g.	is contagious
8.	Scientists say the virus	h.	transport
9.	pneumonia-like	i.	in a Wuhan market
10.	I feel fearful because there's	j.	caught the virus

Ex. 4.10-C. Choose the right answer:

- 1) What are nations doing for a possible major viral outbreak?
 - a) very little
 - b) panicking
 - c) preparing
 - d) worrying
- 2) How many countries has the coronavirus spread to?
 - a) eight
 - b) 17
 - c) three
 - d) four
- 3) Who is meeting to decide if the coronavirus is an emergency?
 - a) the WHO
 - b) the UN
 - c) UNESCO
 - d) NATO
- 4) What is China urging people not to do?
 - a) kiss
 - b) drink in public
 - c) panic
 - d) cough

- 5) What has the city of Wuhan suspended?
 a) schools b) public transport c) markets d) city officials
- 6) Where do people suspect the coronavirus came from?
 a) insects b) a tourist c) an animal market d) a mysterious laboratory
- 7) What are the fears the coronavirus might do?
 a) double in size c) close the city of Wuhan
 b) kill birds d) mutate and spread further
- 8) How does the virus pass from person to person?
 a) through the air b) skin contact c) through blood d) in food
- 9) What is Linfa Wang's job?
 a) a virologist b) a violinist c) a urologist d) a pacifist
- 10) What is a Beijing resident fearful of?
 a) an epidemic c) running out of masks
 b) there being no cure d) animals

Ex. 4.10-D. Say whether the following statements are true or false. Correct any false statements.

1. Nations are not preparing for a possible virus outbreak. _____ 2. The coronavirus has spread to four countries. _____ 3. Over 1,540 people are in hospital because of the virus. _____ 4. The article said China suspended public transport in eight different cities. _____ 5. Scientists suspect the coronavirus came from insects in a market. _____ 6. The coronavirus passes from person to person through the air. _____ 7. The coronavirus belongs to the same virus family as SARS. _____ 8. One of the symptoms of coronavirus is breathing difficulties. _____

Ex. 4.10-E. Answer the following questions on the text:

1. What do you know about the coronavirus? 2. How worried are you about the coronavirus? 3. What would you do if there was an outbreak in your country? 4. How can we make sure there is no outbreak? 5. What has your country told you about the coronavirus? 6. What would happen if millions of people panicked? 7. What would you do if your city was in lockdown? 8. Should China stop all flights out of Wuhan? 9. How serious is a global pandemic? 10. What do you know about anti-microbial resistance? 11. What can governments do to stop a pandemic? 12. Should we worry more about measles than the coronavirus? 13. Will you worry if you get a fever and cough? 14. Do you think scientists will find a cure for the coronavirus? 15. What questions would you like to ask the virologist?

Speaking

1. You think **masks** are the best things to prepare for an epidemic. Tell the others three reasons why. Tell them what is wrong with their things. Also, tell the others which is the least important of these (and why): water or hand sanitizer.
2. You think **hand** sanitizer is the best thing to prepare for an epidemic. Tell the others three reasons why. Tell them what is wrong with their things. Also, tell the others which is the least important of these (and why): masks or water.

GRAMMAR SECTION

CONDITIONAL SENTENCES

Zero and First Conditionals

Situation	If-clause	Result clause	Examples
Zero conditional (factual or real conditional)	<i>simple present</i>	<i>simple present</i> (expresses facts, habits, rules or general truths);	Water <i>boils</i> if the temperature <i>reaches</i> 100°C.
		<i>modals (can, should, might) + basic form</i> ;	If the power <i>goes out</i> , we <i>can't watch</i> TV.
		an imperative verb (gives instructions)	If it's hot here, <i>open</i> the window.
First conditional (possible conditional)	<i>simple present</i>	<i>simple future</i> (expresses things that may happen in the future, such as: offers, predictions, superstitions, plans, promises, suggestions, advice or warnings.	If I <i>have</i> enough time tomorrow, I <i>will write</i> to my parents. If you <i>vote</i> for me, I <i>will change</i> the future. If you <i>leave</i> the milk out, it <i>will spoil</i> .
		If the result is only possible, not certain, we use <i>might</i> (not <i>will</i>).	If it's hot, we <i>might</i> go to the beach.
		We can use <i>unless</i> to mean 'if...not'	<i>Unless</i> you pay for the broken window, I'll phone the police. (= If you don't pay, ...)

1. Translate into Ukrainian:

1. They will clean the hall tomorrow if they have no classes.
2. We will see him rehearsing a new role in case we are allowed to stay in the theatre.
3. If you read the book you will learn how well Marion Anderson was received in many countries.
4. It will be a sensation if they come again.
5. He will buy these brushes unless he finds better ones.
6. If he reads the book he will learn how Marion Anderson worked at her voice.
7. Suppose you see a record with Marion Anderson, buy one for me, please.
8. The actress will agree to play in the film unless the shooting is done in the afternoon when she is not busy.
9. The film will be a success provided some shots are retaken.
10. She says she can give me this book on condition it is returned in two days.

2. Complete the sentences using either zero or first conditional with the verbs in parentheses:

1. If I have enough apples, I (bake) _____ an apple pie this afternoon.
2. I will fix your bicycle if I (have) _____ a screwdriver of the proper size.
3. I (make) _____ a tomato salad for the picnic tomorrow if the tomatoes in my garden are ripe.
4. Jack will shave today if he (have) _____ a sharp razor.
5. Sally always answers the phone if she (be) _____ in her office.
6. An aerosol spray can will explode if you (throw) _____ it into a fire.
7. If the teacher (be) _____ absent tomorrow, class will be cancelled.
8. This box has got to be in Chicago tomorrow. I'm going to send it by express mail. I'm sure if I (send) _____ it today by overnight express, it (arrive) _____ in time.
9. If something (be) _____ lighter than water, it (float) _____.
10. Jack will feel a lot better if he (to stop) _____ smoking.
11. If Mark (listen) _____ to the instructions, he will know what to do.
12. If Mary comes, I (tell) _____ definitely _____ her what happened.
13. I (change) _____ my car if I get a better job, but I'm not sure.
14. We've decided we (lend) _____ them our car if they pay for the petrol.
15. Alan hasn't decided but he thinks that if his health doesn't improve, he (move) _____ to another town.

3. Translate into English.

1. Він допоможе вам підготувати доповідь, якщо у нього буде вільний час.
2. Вони закінчать свій фільм на наступному тижні, якщо усе буде гаразд.
3. Ми підемо до музею завтра, якщо він буде відкритий.
4. Це буде чудово, якщо він напише музику до нашого фільму.
5. Ми почнемо репетицію за умови, що п'єса сподобається акторам.
6. Я впевнений, що він поїде туди, навіть якщо піде дощ.
7. Він погодиться прийти на вечір за умови, що його не будуть просити співати.
8. Вона виступатиме у концерті за умови, що ви будете їй акомпанувати.
9. Якщо в мене буде достатньо яблук, я спечу для вас яблучний пиріг.
10. Якщо ви володієте більш ніж двома іноземними мовами, ви легко знайдете роботу.
11. Вона переїде до Лондона, якщо знайде там роботу.
12. Ми підемо на цю вечірку, якщо нас запросять.

Second Conditionals

Situation	If-clause	Result clause	Examples
Second conditional (Unreal present/future)	<i>simple past</i>	<i>would + basic form</i> We use the 2 nd conditional: - to imagine life is different,	If I <i>had</i> enough money, I <i>would buy</i> a house. If I <i>won</i> the lottery, I'd <i>buy</i> a new car.

		- to ask hypothetical questions, - to give advice, - to give reasons why you can't do something	What <i>would</i> you <i>do</i> if you <i>quit</i> your job? If I <i>were</i> you, I'd <i>talk</i> to my boss before I quit my job. If I <i>wasn't</i> so busy, I <i>would</i> <i>invite</i> you over for dinner.
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4. Translate into Ukrainian:

1. If I had money, I would travel round the world. 2. If I were you, I would take an umbrella. 3. If I were a bird, I could fly. 4. I would buy that vase if I had enough money. 5. If I were you, I wouldn't tell anyone about it. 6. If I won \$1,000,000, I would buy myself a villa by the sea. 7. If I were staying in Vancouver, we could visit them. 8. If I had the day off, I would go shopping. 9. If I had a problem, I would ask for help. 10. If I had a computer, you could work at home. 11. If I were you, I would speak to the instructor. 12. If you lived in that neighborhood, you would know Joseph Taylor. 13. I would go to the meeting if I were not so busy. 14. If you spoke more slowly, I would understand you better. 15. If he were here now, he would help us.

5. Complete the sentences using second conditional with the verbs in parentheses:

1. I am not an astronaut. If I (be) _____ an astronaut, I (take) _____ my camera with me on the rocket ship next month. 2. That sounds like a good job offer. I (accept) _____ it if I (be) _____ you. 3. It is expensive to call across the ocean. However, if transoceanic telephone calls (be) _____ cheap, I (call) _____ my family every day. 4. I (write) _____ to her if I (know) _____ her address. 5. I (mind, not) _____ living in this country if the traffic (be, not) _____ so bad. 6. If you (move) _____ to the UK you (have) _____ to learn to speak English. 7. She (buy) _____ it if she (know) _____ she needed it. 8. The salad (taste) _____ better if you (add) _____ some garlic. 9. We (grow) _____ our own vegetables if we (have) _____ a garden. 10. I (buy, not) _____ that coat if I (be) _____ you. 11. You are always tired. If you (go, not) _____ to bed so late every night, you (be, not) _____ tired all the time. 12. I think there are too many cars. If there (be, not) _____ so many cars, there (be, not) _____ so much pollution. 13. Tom (read) _____ more if he (have) _____ more time. 14. If your mother (be) _____ here, I'm sure she (let, not) _____ you eat all those chocolates. 15. I (be) _____ happy to live in the north of Sweden if it (be, not) _____ for the long nights in the winter.

6. Complete the sentences using first or second conditional with the verbs in parentheses:

1. If I (to be) _____ free tomorrow, I would join you with pleasure. 2. If she (to bring) _____ her work this week, I would be able to look it through and then she will finish it in time. 3. If your brother (to be) _____ here now, he would be surprised at your behavior and I am sure he would not approve of it. 4. If we (to be) _____ not writing this exercise now I would give you my pen. 5. If it (to be raining) _____ now, the children would not be running about in the garden. 6. If your friend (to go) _____ to the booking office now, she will buy a ticket. 7. If she (to want) _____ to see us, she will come to our place tomorrow. 8. If I (not to be) _____ busy with this article, I would help you about the house. 9. If the students (to work) _____ regularly, they will pass their exams. 10. If you (to have) _____ no watch, I would buy you one. But you have a watch, and not a bad one.

Third Conditionals

Situation	If-clause	Result clause	Examples
Third conditional (Imaginary situation that did not happen in the past)	<i>past perfect</i>	<i>would have + past participle</i>	If I <i>had had</i> enough time, I <i>would have written</i> to my parents yesterday.
		We use 3 rd conditional: - to regret about the past; - to wish we could change something in the past; - to tell someone off about something they did in the past	If I <i>had taken</i> better care of myself, I <i>wouldn't have got</i> sick. If you <i>had called</i> me, I <i>would have come</i> . If she <i>had replied</i> to my message, I <i>wouldn't have been</i> so worried.

7. Translate into Ukrainian:

1. If we hadn't left so early, we would have missed the plane. 2. If I had been invited to the party, I would have gone. 3. If he had known, he would have told us about it. 4. If he had locked his car, it wouldn't have been stolen. 5. He wouldn't have missed the meeting if he had been on time. 6. If you hadn't been driving so fast, you wouldn't have crashed into that tree. 7. We wouldn't have got lost if you had brought a map. 8. If he'd known about the meeting, I'm sure he would have come. 9. I would have stayed longer if he had asked me to. 10. If he hadn't committed the crime, he wouldn't have been arrested.

8. Complete the sentences using third conditionals with the verbs in parentheses:

1. If Charlie Chaplin (die) _____ in 1989, he (be) _____ 100 years old. 2. If he (try) _____ harder, he (win) _____. 3. If Jane (come)

_____ on her usual train, I (see) _____ her. 4. John F. Kennedy (die, not) _____ in 1963 if he (go, not) _____ to Dallas. 5. I (phone) _____ you if I (lose, not) _____ your phone number. 6. I (go, not) _____ to the museum if I (know) _____ it was shut. 7. I'm sorry you had to take a cab to the airport. If you (tell) _____ me, I (give) _____ you a ride gladly. 8. I got wet because I didn't take my umbrella. However, I (get, not) _____ wet if I (remember) _____ to take my umbrella with me yesterday. 9. Many people were not satisfied with the leader after he took office. If they (know) _____ more about his planned economic program, they (vote, not) _____ for him. 10. You made a lot of unnecessary mistakes in your composition. You (get) _____ a better grade if you (use) _____ either a dictionary or the spell checker on your computer to check your spelling. 11. Ann, (you, take) _____ that job if you (know) _____ that you had to work nights? 12. If the weather (be) _____ nice yesterday, we (go) _____ to the zoo. 13. Linda wasn't at home yesterday. If she (be) _____ at home yesterday? I (visit) _____ her. 14. I'm sorry, Mom. If I (realize) _____ my father was sleeping, I (make, not) _____ so much noise when I came in. 15. Last night Alex ruined his sweater when he washed it. If he (read) _____ the label, he (wash, not) _____ it in hot water.

Mixed Conditionals

Situation	If-clause	Result clause	Examples
Mixed conditional	<i>past perfect</i>	<i>would + basic form</i> <i>Past action → Present result</i>	If I <i>had woken up</i> earlier, I <i>would be</i> at work already.
	<i>past simple</i>	<i>would have + past participle</i> <i>Unreal present condition → Past result</i>	If he <i>wasn't injured</i> , he <i>would have played</i> in the game.

9. Translate into Ukrainian:

1. If I were you, I would have invited her. 2. He would have won the race if he were a fast runner. 3. If she had saved her money, she would be going on holiday. 4. She would be at the meeting if she had been told about it. 5. If you had warned me, I wouldn't be in a difficult situation now. 6. I would have given him some advice if I knew him better. 7. He would have won the race if he trained every day. 8. If he had taken his job seriously, he wouldn't be unemployed now. 9. If I had eaten breakfast

several hours ago, I wouldn't be hungry now. 10. If he were a good student, he would have studied for the test.

10. Change the following statements into conditional sentences of a mixed type.

1. I'm hungry now because I didn't eat dinner. But if I _____ dinner, I _____ hungry now. 2. The room is full of flies because you left the door open. If you _____ the door open, the room _____ full of flies. 3. You are tired this morning because you didn't go to bed at a reasonable hour last night. But if you _____ to bed at a reasonable hour last night, you _____ tired this morning. 4. I didn't finish my report yesterday, so I can't begin a new project today. But if I _____ my report yesterday, I _____ to begin a new project today. 5. Helen is sick because she didn't follow the doctor's orders. But if Helen _____ the doctor's orders, she _____ be sick. 6. I am not you, so I didn't tell him the truth. But if I _____ you, I _____ him the truth. 7. I don't know anything about plumbing, so I didn't fix the leak in the sink myself. But if I _____ something about plumbing, I _____ the leak in the sink myself. 8. I received a good job offer from the oil company, so I won't seriously consider taking the job with the electrical firm. But if I _____ a good job offer from the oil company, I _____ seriously _____ taking the job with the electrical firm. 9. He is not a good student because he didn't study for the test yesterday. But if he _____ a good student, he _____ for the test. 10. I didn't work hard when I was young, so I am poor now. But if I _____ hard when I was young, I _____ poor now. 11. He didn't do it yesterday so he can't go out tonight. But if he _____ it yesterday, he _____ out now. 12. We put on the raincoats while it was raining, so we are OK now. But if we _____ the raincoats while it was raining, we _____ a bad cold now. 13. I didn't book the holiday on time, so now I'm sitting at home. But if I _____ the holiday on time, I _____ sitting at home now. 14. I didn't practise much, I can't win now. If I _____ more, I _____ now. 15. They didn't support our product when we asked them so they don't get a discount now. If they _____ our product when we asked them, they _____ a discount now.

11. Choose the correct options to complete the following conditional sentences.

1. If I hadn't fought for our relationship, we _____ together now.
a) wouldn't have been b) wouldn't be c) weren't
2. I would be happier if I _____ 'yes' when he asked me to marry her.
a) would say b) said c) had said

3. If John drinks too much coffee, he _____ ill.
 a) get b) will get c) got
4. If you weren't such a jerk, they _____ you to yesterday's party.
 a) would have invited b) would invite c) had invited
5. If you _____ a map, as I told you, we wouldn't be lost now.
 a) had taken b) took c) would have taken
6. If I didn't love you, I _____ you last year.
 a) wouldn't marry you b) wouldn't have married c) hadn't married
7. If she had her laptop with her, she _____ (email) me.
 a) would email b) would have emailed had emailed
8. If I had more time, I _____ you last night.
 a) would have called b) would call c) called
9. If you _____ that job, you would be miserable now.
 a) would accept b) would have accepted c) had accepted
10. I'm afraid of flying. If I _____ afraid of flying we'd have travelled by plane.
 a) weren't b) hadn't been c) wouldn't have been
11. If I _____ to the party, I wouldn't have met Amanda.
 a) didn't go b) don't go c) hadn't gone
12. If you _____ dad's car without permission last night, you might be in trouble.
 a) would have taken b) took c) had taken
13. You wouldn't have this job if I _____ you for the interview.
 a) wouldn't have prepared b) hadn't prepared c) didn't prepare
14. If Luke _____ in the UK, I will see him more often.
 a) lived b) lives c) had lived
15. If she goes to the library, she _____ more.
 a) studies b) studied c) will study

12. Write sentence chains with if to show how things could have been different.

Example: *If he hadn't bought a bicycle, he wouldn't have gone for a ride in the country. If he hadn't gone for a ride in the country, he wouldn't have fallen off. If he hadn't fallen off.....*

He bought a bicycle → went for ride in the country → fell off → woke up in hospital → met a beautiful nurse → wrote a bestselling novel about her → got rich → married the beautiful nurse and had three children → lived happily ever after.

Verb forms following WISH

	Verb form in "true" sentences	Verb forms following WISH	Wish is used when the speaker wants reality to
A wish	a) She will not tell me.	I wish she would tell me.	

about the future	b) He <i>isn't going to be</i> here. c) She <i>can't come</i> tomorrow.	I wish he <i>were going to be</i> here. I wish she <i>could come</i> tomorrow.	be different, to be exactly the opposite. Verb forms similar to those in conditional sentences are used. Wish is followed by a noun clause.
A wish about the present	d) I <i>don't know</i> Spanish. e) It <i>is snowing</i> now. f) I <i>can't speak</i> French.	I wish I <i>knew</i> Spanish. I wish it <i>weren't snowing</i> now. I wish I <i>could speak</i> French.	
A wish about the past	g) John <i>didn't arrive</i> . h) Mary <i>couldn't come</i> .	I wish John <i>had arrived</i> . I wish Mary <i>could have come</i> .	

13. Underline the corresponding verb form.

1. I wish you (*saw, had seen*) this film. I am sure you would have liked it. 2. I wish you (*came, had come*) earlier. We should have gone to the museum together. 3. I wish you (*had, had had*) time to read this article. Now you would be able to answer all the questions. 4. I wish she (*informed, had informed*) us about of her arrival. We should have met her at the station. 5. I wish all the students (*work, worked*) regularly. They would get better knowledge and their speech would be more fluent. 6. I wish you (*saw, had seen*) Nick. He would have told you many interesting things. 7. I wish you (*bought, had bought*) a ticket for a plane. We should go there together. 8. I wish you (*spoke, had spoken*) with me yesterday, I should have told you some facts and you would not feel ill at ease now.

14. Using the information in parentheses, complete the sentences.

1. (*The sun isn't shining.*) I wish the sun _____ right now. 2. (*Our classroom doesn't have any windows.*) I wish our classroom _____ windows. 3. (*I wanted you to go.*) I wish you _____ with us to the concert last night. 4. (*I don't know how to dance.*) I wish I _____ how to dance. 5. (*Bill didn't get the promotion.*) I wish Bill _____ the promotion. He feels bad. 6. (*It's cold today. I'm not wearing a coat.*) I wish I _____ a coat. 7. (*I don't have enough money to buy this house.*) I wish I _____ enough money. 8. (*I quit my job.*) I wish I _____ my job until I'd found another one. 9. (*I can't go with you.*) I wish I _____ with you tomorrow. 10. (*My friend won't lend me his car.*) I wish he _____ me his car for my date tomorrow night. 11. (*No one offered to help.*) I wish someone _____ to help us find our way when we got lost in the middle of the city. 12. (*You can't meet my parents.*) I wish you _____ them. 13. (*Jerry didn't come to the meeting.*) I wish he _____ to the meeting. 14. (*Natasha can't bring her children.*) I wish Natasha _____ her children with her tomorrow. They would be good company for mine. 15. (*I wanted to win.*) I wish we _____ the game last night.

15. Complete the sentences with an appropriate form of the verbs in parentheses.

1. We need some help. I wish Tom (be) _____ here now. If he (be) _____, we could finish this work very quickly. 2. We had a good time in Houston over vacation. I wish you (come) _____ with us. If you (come) _____ with us, you (have) _____ a good time. 3. I wish it (be, not) _____ so cold today. If it (be, not) so cold, I (go) _____ swimming. 4. I missed part of the lecture because I was daydreaming, and now my notes are incomplete. I wish I (pay) _____ more attention to the lecturer. 5. Did you study for the test? – No, but I wish I (have) _____ because I flunked it. 6. Is the noise from the TV in the next apartment bothering you? – Yes. I'm trying to study. I wish he (turn) _____ it down. 7. What a beautiful day! I wish I (lie) _____ in the sun by the sea instead of sitting in a classroom. 8. I wish we (have, not) _____ to go to work today. 9. He couldn't have said that! You must have misunderstood him. – I wish I (have) _____, but I'm sure I heard him correctly. 10. Ann doesn't like her job as a nurse. She wished she (go, not) _____ to nursing school. 11. I know that something's bothering you. I wish you (tell) _____ me what it is. Maybe I can help. 12. My feet are killing me! I wish I (wear) _____ more comfortable shoes. 13. I wish most world leaders (meet) _____ in the near future and reach some agreement on environmental issues. 14. I know I should give up smoking. I wish you (stop) _____ nagging me about it. 15. Alfred doesn't like his job as a house painter. He wishes he (can paint) _____ canvasses instead of houses for a living.

16. Translate into English:

1. Шкода, що ваші друзі не зателефонували мені. Я б дала їм вашу адресу, і ви могли б зустрітися. 2. Шкода, що я не замовила квитки заздалегідь. 3. Шкода, що йде дощ. 4. Шкода, що він хворіє зараз. 5. Шкода, що його немає в місті зараз, вона б допомогла мені. 6. Шкода, що він нічого не сказав про свою хворобу раніше. 7. Шкода, що вам не вдалося переконати його прийти сюди. 8. Шкода, що цей фільм ніде не йде. 9. Шкода, що зима триває так довго.

17. Translate into English:

1. Ви б почували себе краще, якби не лягали спати так пізно (to keep late hours). 2. Ми б не запізнилися на літак, якби не взяли таксі. 3. Ми б могли піти на каток, якби не було так холодно. 4. Ви б себе добре сьогодні почували, якби прийняли вчора ліки. 5. На вашому місці, я б більше проводив часу на свіжому повітрі. 6. Ви б краще знали мову, якби більше читали книжки в оригіналі. 7. Ви б не розбили вазу, якби були обережнішими. 8. Я повернуся не пізніше шостої години, якщо мене не затримають в університеті. 9. Ви б були вже здорові, якби ви вчасно звернулися до лікаря. 10. Якщо буде дощ, я залишусь вдома.

MODAL VERBS

Meaning	Present/Future	Past
<i>ability / lack of ability</i>	He can / can't draw. They can't ski very well. She is able to work quickly. She will be able to go there.	He could / was able to draw when he was three. (ability in the past, repeated action) She was able to finish her Science project (past single action)
<i>possibility</i>	She can find the solution to the problem. (90% certain; it's very possible) It could be serious. (50% certain; it's possible) He may be ill. (50% certain; it's possible that he's ill) We might need some help. (40% certain; perhaps we need some help)	He could have lost his job. (thankfully he didn't) They may have gone on holiday. (perhaps they did) We might have needed to ask for help. (perhaps we needed to)
<i>probability</i>	Robert should be home soon. (90% certain; future only; it's probable) They ought to win the Champion's League. (90% certain; they will probably win)	She should have finished the report by now. (He has probably finished) They ought to have sent the parcel by now. (They have probably sent it by now)
<i>logical assumption</i>	He must be rich. (90% certain – I'm sure he is rich) They can't be tired. They've just woken up. (negative; I'm sure they aren't tired) She couldn't possibly be a pilot. She can't fly a plane. (negative; I'm sure she isn't a pilot)	He must have broken his leg. (positive; I'm sure he has broken his leg) You can't have lost your book. It's in your bag. (negative; I'm sure you haven't lost it) It couldn't have been David you saw. He's in Brazil. (negative; I'm sure it was him)
<i>asking for permission</i>	Can/Could I open the window, please? (can – informal; could – more polite) May/Might I play the lead role? (may – formal; might -more formal)	
<i>giving or refusing permission</i>	We can/are allowed to use a dictionary in class. (informal; general permission) You can't/are not allowed to bring mobile phones into class. (informal; refusing permission) You may take a seat. (formal; giving permission; You are allowed to) I'm afraid you can't/mustn't write in pencil. (informal; refusing permission – You aren't allowed to) Visitors may not touch the exhibits. (formal; refusing permission – It's forbidden – written notice)	We could/were allowed to carry one item of luggage on the plane. (general permission) She was allowed to go camping in the forest. (permission for one particular action; NOT: She could go ...) We couldn't/were not allowed to leave school without permission (no difference in meaning)
<i>prohibition</i>	You can't speak during the exam. (you aren't allowed to) You mustn't leave litter on the beach. (it's forbidden)	We couldn't speak during the exam. (we weren't allowed to)

	You may not eat in the laboratory. (formal – it's not allowed)	
<i>obligation/ duty</i>	You must pay a membership fee to join the club. (it's a law) We ought to support a charity. (it's the right thing to do, but we don't always do it)	He had to have a passport to travel abroad. They ought to have been more helpful. (it was the right thing to do, but they didn't do it)
<i>necessity</i>	I must leave now. It's late. (I'm obliged to, I say so) Tom has to hand in his assignment tomorrow. (necessity coming from outside the speaker; he's obliged to) Ann has got to train harder. She's unfit. (informal; needs to) My bedroom needs painting/ needs to be painted. (it's necessary)	I had to pay my school fees. (I was obliged to) Ann had to lock the windows before she left. (She needed to) My bedroom needed painting/ to be painted . (it was necessary)
<i>absence of necessity</i>	You don't have to/don't need to/needn't pay; it's free (it isn't necessary – absence of necessity)	He didn't have to/didn't need to pay; it was free (it wasn't necessary for him to pay and he didn't; absence of necessity) He needn't have brought his laptop with him after all. (it wasn't necessary for him to bring his laptop, but he did)
<i>advice</i>	You should/ought to stay in bed, you're ill. (general advice; I advise you) You had better tidy up your bedroom (advice on a specific situation; it is a good idea) Shall I apply for the job? What do you think? (asking for advice; Is it OK if...?)	You should/ought to have stayed in bed. (but you didn't) It would have been better if you hadn't got angry. (but you did) Should I have applied for the job?
<i>criticism</i>		She could at least have apologized to us (but she didn't). She should have been more friendly (but she wasn't). You really ought to have been more sensitive (it was the right thing to do, but you didn't do it).
<i>requests (asking sb to do sth)</i>	Can you help me, please? (informal request) Could you make me some tea? (polite request) May I see you in private? (formal request) Might I see you in private? (very formal request) Will you get me my glasses, please? (familiar; Can you...?) Would you mind waiting outside? (more polite and formal than Could you...?)	
<i>offers (offering to do sth)</i>	Can I/we explain this to you? (informal) Shall I/we explain this to you? (informal) Would you like some more tea?	

<i>suggestions</i> (<i>making suggestions</i>)	Shall we go to the cinema tonight? (Let's...) I/We can revise for the test on Monday, if you like. I/We could go shopping together.	
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18. Put in *can* / *can't* / *could* / *couldn't*. If none is possible, use *be able to* in the correct tense. (Modal verbs of Ability)

1. _____ you swim when you were 10? 2. We _____ get to the meeting on time yesterday because the train was delayed by one hour. 3. He _____ arrive at the party on time, even after missing the train, so he was very pleased. 4. He's amazing. He _____ speak 5 languages including Chinese. 5. I _____ drive a car until I was 34, then I moved to the countryside so I had to learn. 6. I looked everywhere for my glasses but I _____ find them anywhere. 7. I searched for your house for ages. Luckily, I _____ find it in the end. 8. She's 7 years old but she _____ read yet – her parents are getting her extra lessons. 9. I read the book three times but I _____ understand it. 10. James _____ speak Japanese when he lived in Japan, but he's forgotten most of it now. 11. I _____ understand the chapter we had to read for homework. It was so difficult. 12. I _____ lift this box – it's too heavy! Would you help me? 13. Lucy _____ make it to our meeting after all. She's stuck in traffic at the moment. 14. John _____ play tennis really well. He's champion of his club. 15. Unfortunately, I really _____ sing at all! No-one in my family is musical either. 16. When the car broke down, I was really pleased because I _____ solve the problem. 17. Julian _____ play excellent golf when he was only ten. 18. My grandmother _____ use a computer until last month. Since then, she's been taking lessons at the library. 19. I _____ open this window. I think it's stuck! 20. Gill _____ play the piano. She's never studied it.

19. Underline one of the modal verbs in brackets to complete the sentence.

1. They (can/might) be away for the weekend but I'm not sure. 2. You (may/might) leave now if you wish. 3. (Could/May) you open the window a bit, please? 4. He (can/could be French, judging by his accent. 5. (May/Can) you play the piano? 6. Listen, please. You (may not/ might not) speak during this exam. 7. They (can't/ may not) still be out. 8. You (couldn't/might not) smoke on the bus. 9. With luck, tomorrow (can/could) be a sunny day. 10. You (can/might) be right but I'm going back to check anyway. 11. The exam (can/might) be easy. You never know. 12. I (can/might) go to the party but I'm not sure yet. 13. Students (may/might) study in the library from five to nine in the evening. 14. (May/Could) you lend me 40 Euros till Monday?

20. Write the missing word in each sentence. Choose from the modal verbs in the box below.

<i>will</i>	<i>must</i>	<i>should</i>	<i>can</i>	<i>may</i>	<i>could</i>	<i>might</i>
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1. You _____ borrow the books in this section of the library. 2. To apply for financial aid, you _____ fill out an application form. 3. We _____ to get some milk on the way home. 4. Students _____ stay home if they have the flu. 5. You _____ leave your coats on the bed in the other room. 6. _____ you clean up your room before you go outside? 7. He _____ take a biology class in the spring. 8. I think you _____ wear your blue shirt with those pants. 9. You _____ fix those shoes with some shoe glue. 10. You _____ want to try on some of the salad. 11. You _____ check to see if that book is available on-line. 12. You _____ make a copy of this document. 13. You _____ be nice to your little brother. 14. You _____ have automobile insurance to drive a car in California.

21. Complete the sentences with *can*, *can't*, *could*, *couldn't*, *must* or *mustn't*. Sometimes more than one answer is possible.

1. She is a small baby. She _____ eat meat, but she _____ drink milk. 2. He is so ill that he _____ see the doctor. 3. It's raining heavily. You _____ take your own umbrella. 4. We _____ pick the flowers in the park. It's forbidden. 5. I _____ sing now but I _____ sing very well when I was a child. 6. Mike is only nine months old. He _____ eat nuts yet. 7. He has a lot of weight so he _____ run so fast. 8. I'm very tall, so I _____ play basketball. 9. You _____ park that car there. It's a no-parking zone. 10. Many students in Great Britain _____ wear a uniform when they go to school. 11. George has travelled a lot. He _____ speak 4 languages. 12. I _____ come with you now because I'm studying for my test. 13. Footballers _____ touch the ball with their hands. 14. _____ I use your phone? 15. I'm sorry I _____ come yesterday. I had to work late. 16. You _____ speed through the city. It's dangerous! 17. You have been coughing a lot recently. You _____ smoke so much. 18. I'm very tired today. I _____ clean my room now, but I'll do it tomorrow. 19. I _____ eat lasagna when I was a child, but I like it today. 20. We _____ go to the bank today. We haven't got any money left. 21. You _____ sleep in that room. It's full of boxes and other stuff. 22. I _____ swim very far these days, but ten years ago, I _____ swim over to the other side of the lake. 23. You have a bad headache, so you _____ go to bed

earlier. 24. I _____ feed the baby now, so _____ you do it for me? 25. Tourists _____ take their passports with them when they go abroad.

22. Complete the sentences using: *can, can't, must, mustn't, need, needn't, should, shouldn't.*

1. You _____ finish your work, because it's late. 2. We _____ get up early, we _____ be late. 3. Don't be nervous! You _____ be calm. You _____ be nervous. 4. John _____ translate the English text. He _____ learn more. 5. People _____ smoke in this building, because it's forbidden. 6. These boys are too young, they _____ go to the disco. 7. The windows aren't dirty, you _____ clean them. 8. It's very hot in summer. We _____ water the flowers twice a week. 9. The mother _____ go to the bank, because she hasn't got any money. 10. Jim and Jack have a lot of horses. They _____ ride a horse. 11. I _____ help you, because I don't know the solution. 12. Before dinner people _____ wash their hands. 13. We _____ leave the meeting early, we _____ stay until the end. 14. This girl _____ drink so much cola. It's not healthy. 15. Susan has a lot of free time, she _____ hurry. 16. It's a fantastic movie. You _____ see it. 17. You _____ learn to ride a bike. It's very useful. 18. We _____ forget to visit our grandparents at the weekend. 19. Jim _____ remember to feed his cat before he goes to work. 20. Children _____ eat a chocolate every day. 21. This family _____ buy a bigger house, because this house is too small for them. 22. My friend _____ relax more, because he is depressed. 23. Our mother is very old and ill, she _____ work in the garden. 24. This flat isn't big enough, you _____ rent this one. 25. These documents are very important, we _____ lose them. 26. This dog isn't hungry, you _____ feed it. 27. I _____ speak German fluently, because I always learn hard. 28. Tom _____ forget to turn off the TV before he goes to bed. 29. Julia _____ remember to turn off the lights before she goes away. 30. You _____ go home. You _____ stay here if you want. 31. I _____ write an essay now. I _____ do it tomorrow. 32. You _____ be afraid of my dog, because it's very friendly. 33. Our children _____ sing well. They don't have a good ear for music. 34. Children _____ watch Tv so much. They _____ learn more. 35. I _____ forget to do the English homework. 36. Peter _____ work hard, but he is lazy. 37. We _____ eat less chocolate. We are very fat. 38. Children _____ go to school every day. 39. I feel bad, I _____ go to the doctor. 40. You _____ be late, this meeting is very important.

23. Complete the sentences with a modal verb from the box below. Sometimes more than one answer is possible.

<i>may</i>	<i>might</i>	<i>might not</i>	<i>will</i>	<i>can</i>	<i>can't</i>	<i>could</i>	<i>must</i>
<i>mustn't</i>	<i>must have</i>	<i>needn't</i>	<i>don't need</i>	<i>needn't have</i>	<i>should have</i>		

1. We _____ be able to win, but I don't think we have a good chance.
 2. That _____ be John. He said he was going to travel to Australia. 3. When I was younger, I _____ sing very well. 4. I think you _____ relax more. You have been working too much lately. 5. I _____ ask you to help me later. 6. She _____ left the house quietly. I didn't hear her. 7. You _____ to go shopping this weekend. We've got everything at home. 8. You _____ go in without a ticket. All seats are reserved. 9. All passengers _____ put on their seatbelts during take-off and landing. 10. At what age _____ you get a driving license in your country? 11. You _____ watered the plants. Dad has already done it. 12. In the US, young men _____ join the army. It's voluntary. 13. I promise I _____ stop smoking. 14. Mom, _____ you pass me the sugar please? 15. If you want to be a teacher, you _____ attend a teacher's training college. 16. They _____ taken the wrong train. Otherwise, they would be here by now. 17. He's not picking up the phone. He _____ be home yet. 18. You _____ taken my advice and gone to the doctor. Your cold is not going to get better if you wait. 19. You _____ park in a no-parking area. It's forbidden. 20. I _____ go to the cinema to watch a movie, but I'm not sure.

24. Complete the sentences with a modal verb from the box below. Sometimes more than one answer is possible.

<i>may</i>	<i>might</i>	<i>can</i>	<i>can't</i>	<i>should</i>	<i>shouldn't</i>	<i>must</i>	<i>mustn't</i>
<i>have to</i>	<i>has to</i>	<i>don't have to</i>	<i>doesn't have to</i>	<i>needn't</i>			

1. _____ I use your pen, please? 2. You really _____ see that new documentary. It's fantastic. 3. You _____ write 30 sentences for homework because you have misbehaved. 4. You _____ to write 300 lines. 30 will be enough. 5. Please, excuse me but I really _____ go now. 6. John, you _____ speak so quickly. Nobody _____ understand you! 7. We _____ watch TV tonight. We haven't decided yet. 8. If you've got such a bad cough, you _____ smoke. 9. I am happy to inform you that I _____ come to work next week. 10. You _____ make so much noise. The baby is sleeping in the next room. 11. She _____ work hard because she's a single parent and has little money. 12. You _____ to go now. The train leaves in an hour, so you've still got some time left. 13. According to the

weather report it _____ rain this afternoon. 14. He _____ speak Italian fluently because he spent 5 years there. 15. That _____ be John over there. He said he would be in America this week. 16. You _____ take the test seriously, even if you already have enough good grades to pass. 17. I _____ go out tonight, but I don't think so. I feel too tired. 18. _____ Mary come with us? 19. _____ speak French. I _____ speak English quite well. 20. You _____ take an ID card with you if you enter the stadium. Otherwise you won't get in.

25. Complete each sentence B so that it has a similar meaning to sentence A. Use a modal verb from the box and the correct form of the verb in brackets.

<i>can't</i>	<i>may</i>	<i>might not</i>	<i>must</i>
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1. A : I'm sure schools 50 years ago weren't the same as they are nowadays (BE)
B : Schools 50 years ago _____ very different from nowadays.
2. A : It's possible Josef went to school by bus . (TAKE)
B : Josef _____ the bus to school.
3. A : I'm sure their holiday wasn't very nice because the weather was so bad (HAVE).
B : With such terrible weather , they _____ a very nice holiday.
4. A : I wonder if Jane remembers how to get here (FORGET).
B : Jane _____ how to get here.
5. A : I'm sure Chloe isn't still looking for her watch (FIND).
B : Chloe _____ her watch by now.
6. A : We are going in the wrong direction (MISS).
B : Yes, we _____ a turning.
7. A : Shakespeare and Voltaire weren't alive at the same time, so they definitely never met (KNOW).
B : Shakespeare and Voltaire weren't alive at the same time , so they _____ each other .
8. A : Alison looks happy about her exam results, so she's certainly done well (DO)
B : Alison looks happy about her exam results, so she _____ well.
9. A : I'm not sure its right to blame Ray for that mistake (MAKE).
B : Ray _____ that mistake.
10. A : Joe can't open the door . Maybe he can't remember where he put the key (LOSE)
B : Joe can't open the door. He _____ the key.

26. Complete the sentences with a modal verb from the box below. Sometimes more than one answer is possible.

<i>can</i>	<i>can't</i>	<i>couldn't</i>	<i>could have</i>	<i>had to</i>	<i>might</i>	<i>must</i>
<i>mustn't</i>	<i>would</i>	<i>needn't</i>	<i>should have</i>			

1. It's quite warm outside so you _____ put on a coat. 2. You _____ go home now. You _____ finish writing those emails. They _____ wait until tomorrow. 3. He _____ gone to the doctor when he started feeling ill. Now it's going to take longer for him to recover, 4. According to the weather report it _____ rain today, but I'm not so sure about it. 5. My mother gave me an important letter to post, so I _____ forget to post it. 6. You _____ come if you don't want to. 7. Children _____ play with matches. 8. That _____ be Harry. He said he was going to Paris. What's he doing here? 9. We will _____ take a taxi to the airport, otherwise we _____ miss our plane. 10. I _____ like to go to the cinema with you this weekend. How about it? 11. When I went to Spain for the first time, I _____ speak a word of Spanish. 12. This jewellery is very valuable. My grandmother gave it to me. You _____ look after it carefully and mustn't lose it. 13. She felt ill and _____ leave the office earlier. 14. You _____ be very thirsty. I'll bring you something to drink right away. 15. You _____ buy a lottery ticket this weekend. You _____ win up to 3 million dollars. 16. You _____ informed me about the flight delay. 17. _____ you pass me the sugar, please? 18. You _____ smoke in public places or restaurants. It's against the law.

27. Complete the sentences with *can/can't, could/couldn't, might/might not* and the verb in brackets.

1. Accept their offer. You _____ (get) a better opportunity. 2. Sarah phoned Jane yesterday. They _____ (talk) for a long time because Jane had to go out. 3. John and Anna have a wonderful view from their hotel room. They _____ (see) the whole of the city. 4. Ann won the race. She was so tired after the race that she _____ (not stand up). 5. They _____ (come) to the party tonight. They're very busy. They have a lot of things to do at home. 6. Grandma needs her glasses. She _____ (see) nothing without them. 7. You don't have to shout. I _____ (hear) you very well. 8. We _____ (go) to Greece this summer, but we haven't booked anything yet. 9. He _____ (play) last week because he was injured. 10. She's very good at music. She _____ (play) three instruments. 11. Don't worry too much about that mistake. It _____ (be) important. 12. We _____ (go) abroad for our holiday this year, because we _____ (afford) the air fare. 13. When my sister was little, she _____ (swim) before she _____ (walk).

28. Choose the correct option.

1. Your hair's too long. I think you _____ get it cut.
A) have to B) should C) * D) shouldn't
2. Your clothes smell, and you've got a cough. You _____ smoke.
A) don't have to B) should C) shouldn't D) have to
3. I'm going to bed. I _____ be up early tomorrow.
A) should B) shouldn't C) don't have to D) have to
4. I'd like to meet your boyfriend. You _____ invite him round.
A) must B) have to C) mustn't D) don't have to
5. I _____ tell my parents where I am, then they don't worry.
A) should B) don't have to C) have to D) shouldn't
6. You _____ come with me if you don't want to. I'll go on my own.
A) don't have to B) must C) should D) shouldn't
7. Our train leaves in two minutes! We _____ hurry.
A) would B) have to C) must D) don't have to
8. If you need some help with your homework, you _____ go to the library.
A) should B) mustn't C) have to D) shouldn't
9. If you've got a ticket, you _____ queue. You can go straight in."
A) shouldn't B) don't have to C) have to D) should
10. You _____ tell lies. It's wrong.
A) don't have to B) should C) have to D) shouldn't
11. Geoff works too much. I think he _____ take it easy.
A) must B) have to C) should D) don't have to
12. My bedroom is a real mess. I _____ clean it.
A) have to B) must C) don't have to D) should
13. There's a wonderful new restaurant opened in town. You _____ go there.
A) shouldn't B) must C) don't have to D) should
14. You can borrow my tennis racquet, but you _____ keep it very well. It was very expensive.
A) don't have to B) should C) must D) have to
15. It's my mother's birthday tomorrow. I _____ buy her a present.
A) must B) have to C) shouldn't D) don't have to
16. You _____ have a driving license if you want to drive a car.
A) should B) have to C) have D) had to
17. I don't think people _____ get married until they're 21.
A) have to B) would C) should D) are
18. They liked the hotel because they _____ do any cooking.
A) have to B) had to C) should D) didn't have to

19. I _____ swim when I was three.
 A) could B) can C) have to D) must
20. She _____ work on Monday. It's her day off.
 A) doesn't have to B) must C) have to D) shouldn't
21. You _____ sit so close to the TV. It's bad for your eyes.
 A) don't have to B) have to C) shouldn't D) can
22. You _____ do the washing-up. I've got a washing machine.
 A) should B) have to C) mustn't D) don't have to
23. "I'm working 16 hours a day." - "I think you _____ talk to your boss."
 A) have to B) can C) mustn't D) should
24. "I can't sleep." - "You _____ drink coffee at night."
 A) must B) shouldn't C) don't have to D) have

29. Fill in *can, could, have to* in the necessary form.

1. I _____ work very hard because I have an exam next week. 2. You _____ work hard after your exam. You can have a holiday. 3. I phoned the plumber because I _____ smell gas in the kitchen. 4. Jane and John saved and saved, and finally they _____ buy the house of their dreams. 5. My father is a customs official so he always _____ wear a uniform at work, but my mother is a teacher so she _____ wear one. 6. _____ you speak French before you moved to Paris? 7. I can't see the small print very well. I think I _____ wear glasses soon. 8. I phoned yesterday, but I _____ get an answer. Where were you? 9. _____ we _____ have any vaccinations before we go to Barbados? 10. I went for a ten-mile run last Saturday. It nearly killed me! I _____ move on Sunday. 11. _____ your grandmother _____ leave school when she was only fourteen? 12. Speak up! I _____ hear you! 13. If I fail my exam, _____ I _____ take it again? 14. _____ you _____ find all the things you wanted at the shops? 15. _____ I borrow your dictionary? 16. I'd love _____ help you, but I can't. I'm sorry. 17. The police _____ find the man who had stolen my car. He was sent to prison. 18. When we got to the top of the mountain we _____ see for miles. 19. Children in my country _____ go to school when they're 7. 20. I _____ get into my house last night because I'd lost my key. 21. I'm learning Spanish because I want _____ speak when I'm in Mexico.

30. Put in "*must+infinitive*" or "*must+have+participle*":

1. Anna always does really well on exams. She _____ (study) a lot. 2. That woman drives a very expensive car. She _____ (have) a lot of money. 3. You _____ (practise) a lot before you gave your speech. It was really good. 4. When my sister got home yesterday there were flowers on the table. Her husband

_____ (buy) them. 5. Where is my umbrella? I saw it earlier, so it _____ (be) in this room. 6. I couldn't find my glasses. Mother thought I _____ (leave) them at my office. 7. It _____ (be) cold outside. That man in the street is wearing a coat. 8. All my plants _____ (be) dead! I forgot to water them before I went on holiday. 9. Tom is so late! He _____ (miss) the bus! 10. Anna has a huge library in her house. She _____ (love) books. 11. Oh no, I don't have my keys! I _____ (leave) them in the taxi. 12. When I got home, I found the ice cream had melted. It _____ (be) too hot in the car. 13. If you haven't eaten all day, you _____ (be) hungry. 14. It _____ (rain) a lot in the night. There are puddles everywhere. 15. John _____ (eat) all the biscuits! There are none left.

31. Translate into English using modal verbs:

1. Ви зможете взяти участь у обговоренні цього питання? 2. Він не міг працювати в саду, оскільки йшов дощ. 3. Мері не могла запросити так багато гостей на вечірку. 4. Ольга не могла повірити, що він зараз у Києві. 5. Я зможу тобі дати книжку на кілька днів після того, як прочитаю її сам. 6. Невже це правда? 7. Не може бути, щоб Стів приїхав. Ми лише вчора отримали телеграму. 8. Джері, можливо, приїде через тиждень, оскільки він, напевно, отримав наше запрошення. 9. Лео дав мені статтю, щоб я міг перекласти її вдома. 10. Цей лист потрібно відправити наступного тижня. 11. Мені потрібно йти туди? – Ні, не потрібно. 12. Марк змушений буде піти в офіс завтра. 13. Дощ лив як з відра і він був змушений взяти парасольку. 14. Микола обов'язково повинен піти на цю зустріч. 15. Що потрібно зробити, щоб бути здоровим? 16. Ви змушені будете прийти до мене, якщо ліки не допоможуть. 17. Джек, напевно не зрозумів, що помилився. 18. Очевидно, Оскар недосвідчений хірург. 19. Цю виставу, напевно, варто подивитися. 20. Через погану погоду, матч, напевно, відклали. 21. Ця монета, напевно, дуже цінна. 22. Мені слід йти туди зараз? 23. Не слід купувати костюм без примірки. 24. Якщо ви не хочете запізнитися на літак, вам слід взяти таксі. 25. Вам слід було б розказати Майклу про це раніше. 26. Я думаю Ганні слід було б вибачитись тоді. 27. Цей товар можна купити скрізь. 28. Наш план потрібно виконати до кінця тижня. 29. Їм не прийшлося брати таксі. Вони добрались до аеропорту вчасно на автобусі. 30. Лео не було необхідності посилати цей лист авіапоштою. 31. Ользі не потрібно було йти в магазин сьогодні. Мама все купила. 32. Даремно ти полив квіти в саду. Завтра буде дощ.

UNIT 3

I. GENETICS

Since prehistoric times, man has recognized the influence of **heredity** and has applied its principles to the improvement of cultivated crops and domestic animals. Most of the mechanisms of heredity, however, remained a mystery until the 20th century, when scientifically supported information became available.

Genetics may be defined as the study of the way in which *genes* operate and the way in which they are transmitted from parents to offspring. Modern genetics involves study of the mechanism of gene action - the way in which the genetic material affects physiological reactions within the cell. Although genes determine the features an individual may develop, the features that actually develop depend upon the complex interaction between genes and their environment. Genetics overlaps many different branches of biology such as biochemistry, cytology, microbiology, etc., and many other sciences; e.g., chemistry, physics, mathematics, sociology, psychology, and medicine.

Classical genetics, which remains a basis for all other topics in genetics, is concerned primarily with the method by which genetic traits classified as **dominant** (always expressed), **recessive** (subordinate to a dominant trait), **intermediate** (partially expressed), or **polygenic** (due to multiple genes) are transmitted in plants and animals. These traits may be **sex-linked** (result from the action of a gene on the **sex, or X, chromosome**) or **autosomal** (result from the action of a gene on a chromosome other than a sex chromosome). Classical genetics began with Mendel's study of inheritance in garden peas and continues with studies of inheritance in many different plants and animals.

Cytogenetics blends the skills of cytologists, who study the structure and activities of cells, with those of geneticists, who study the relationship between the mechanism of heredity and cellular activities. Cytologists discovered chromosomes and the way in which they duplicate and separate during cell division at about the same time that geneticists began to understand the behaviour of genes at the cellular level. The close correlation between the two disciplines led to their combination. **Molecular genetics** includes the study of the molecular nature of the gene and the method by which genes control the activities of the cell.

A study of genes in populations of animals, **population genetics**, provides information on past migrations, evolutionary relationships and extents of mixing

among different varieties and species, and methods of adaptation to the environment. Statistical methods are used to analyze *gene distributions* and **chromosomal variations** in populations.

Some geneticists specialize in **human genetics**. When classical geneticists first determined the principles of heredity in plants, fruit, flies, mice, and other forms of life, they tried to interpret man's heredity in a similar way but found many traits that did not fit the patterns. As techniques improved, it was found that the method of inheritance of human characteristics is the same as that for other living things.

Geneticists use a wide range of methods and techniques in their research work. When animals that differ with respect to one or more primary traits are bred, and their offspring then are bred among themselves to give a second generation, the method of inheritance of the trait can be determined; the process is known as **experimental breeding**. **Cytogenetic techniques** are closely associated with experimental breeding. **Biochemical techniques** are used to determine the activities of genes within cells. Chemical tests are used to distinguish certain inherited characteristics of man; e.g., urinalysis and blood analysis reveal the presence of certain inherited abnormalities – **phenylketonuria (PKU)**, **cystinuria**, **alkaptonuria**, **gout**, and **galactosemia**. Mathematical techniques are used extensively in genetics. The laws of probability are applicable to **crossbreeding** and are used to predict ratios concerning the appearance of specific traits in offspring.

Nowadays genetic techniques are used nearly in all spheres of human activities. Agriculture and **animal husbandry** apply genetic techniques to improve plants and animals. Plant geneticists produce new species by special treatment; e.g., a **hybrid grain** has been produced from wheat and rye, and plants resistant to destruction by insect pests have been developed. Plant breeders use the techniques of **budding** and **grafting** to maintain desirable gene combinations originally obtained from crossbreeding. The use of the chemical compound **colchicine**, which causes chromosomes to double in number, has resulted in many new varieties of fruits, vegetables, and flowers. Animal breeders use **artificial insemination** to propagate the genes of prize bulls. Prize cows can transmit their genes to hundreds of offspring by hormone treatment, which stimulates the release of many eggs that are collected, fertilized, and transplanted to **foster mothers**.

Various industries employ geneticists; the brewing industry, for example, may use geneticists to obtain **strains of yeast** that produce large quantities of alcohol. The pharmaceutical industry has developed strains of **molds**, bacteria, and other microorganisms high in antibiotic yield.

Genetic techniques are used in medicine to diagnose and treat inherited human disorders. Knowledge of a family history of cancer or tuberculosis may indicate a hereditary tendency to develop these afflictions. Cells from embryonic membranes reveal certain genetic abnormalities, including **enzyme deficiencies**, that may be present in newborn babies, and thus permit early treatment. Many countries require a blood test of newborn babies to determine the presence of an enzyme necessary to convert an amino acid, phenylalanine, into simpler products. Phenylketonuria, which results from lack of the enzyme, causes permanent brain damage if not treated soon after birth. The presence of approximately 100 different types of human genetic diseases can be detected in embryos as young as 12 weeks; the procedure, called **amniocentesis**, involves removal and testing of a small amount of fluid from around the embryo.

Ex. 1.1. Translate into Ukrainian and learn glossary of essential terms:

№	English term	Ukrainian equivalent	№	English term	Ukrainian equivalent
	recognize			laws of probability	
	heredity			to be applicable	
	genetic material			crossbreeding	
	features			animal husbandry	
	trait			resistant	
	primary trait			insect pests	
	to discover			artificial	
	extents of mixing			prize bull/cow	
	with respect to			enzyme deficiency	
	to distinguish			brain damage	

Learn and translate the following words and word combinations: the influence of heredity, to apply principles to, mechanisms of heredity, complex interaction between, at the cellular level, Population genetics, adaptation to the environment, to use a wide range methods and techniques, to produce new species, budding and grafting, to diagnose and treat inherited human disorders.

Ex. 1.2. Match each of the following terms with the correct definition.

1.	Feature	a)	a part of a cell in a living thing that controls what it looks like, how it grows, and how it develops
2.	Heredity	b)	serious study of a subject, in order to discover new facts or test new ideas
3.	Gene	c)	a group of animals or plants whose members are similar and can breed together to produce young animals or plants
4.	Chromosome	d)	is a packaged and organized structure containing most of the DNA of a living organism
5.	Trait	e)	a part of something that you notice because it seems important, interesting, or typical
6.	Cell	f)	particular quality in someone's character
7.	Offspring	g)	the process by which mental and physical qualities are passed from a parent to a child before the child is born
8.	Research	i)	is the product of reproduction of a new organism produced by one or more parents
9.	Species	j)	the scientific study of cells in terms of their structure, function and chemistry
10.	Cytology	h)	the fundamental unit of living organisms

Ex. 1.3. Choose the best word for each sentence. Use each word only once.

<i>Molecular genetics</i>	<i>diseases</i>	<i>inheritance</i>	<i>molds</i>	<i>basis</i>
<i>strains</i>	<i>artificial</i>	<i>branches</i>		

1. Method of _____ of human characteristics is the same as that for other living things. 2. Classical genetics remains a _____ for all other topics in genetics. 3. Genetics overlaps many different _____ of biology such as biochemistry, cytology, microbiology, etc., and many other sciences; e.g., chemistry, physics, mathematics and sociology. 4. The presence of approximately 100 different types of human genetic _____ can be detected in embryos as young as 12 weeks. 5. The pharmaceutical industry has developed _____ of molds, bacteria, and other microorganisms high in antibiotic yield. 6. Animal breeders use _____ insemination to propagate the genes of prize bull. 7. _____ includes the study of the molecular nature of the gene and the method by which genes control the activities of the cell. 8. The pharmaceutical industry has developed strains of _____ bacteria, and other microorganisms high in antibiotic yield.

Ex. 1.4. Say whether these statements are true or false. Make any corrections if necessary.

1. Cytogenetic techniques are closely associated with experimental breeding. _____
2. Tissues from embryonic membranes reveal certain genetic abnormalities. _____
3. Modern genetics involves study of the mechanism of gene action. _____
4. Classical genetics began with Mendel's study of inheritance in garden plums. _____
5. Geneticists use a wide range of methods and techniques in their research work. _____
6. The laws of probability are applicable to *crossbreeding* and are used to foresee ratios concerning the appearance of specific traits in offspring. _____
7. A hybrid grain has been produced from wheat and corn. _____
8. The brewing industry may use geneticists to obtain *strains of yeast* that produce large quantities of alcohol. _____

Ex. 1.5. Answer the following questions.

1. Were mechanisms of heredity popular in science until the 20th century?
2. How Genetics may be defined?
3. What sub-disciplines does Genetics comprise?
4. What kind of Genetics is fundamental for all other topics in Genetics?
5. How genetic traits can be classified?
6. What information does population genetics provide on?
7. What methods and techniques are used by geneticists in their research work?
8. What industries does Genetics serve?
9. How do scientists use their knowledge of genetics in medicine?
10. What is cytogenetics?

II. VARIATION

Pre-reading

Discuss these questions with your partner. Then scan the text quickly to find the answers.

1. What is variation?
2. What is mutation?
3. Are mutations harmful or beneficial?
4. How do X-rays influence the mutation rate?

Ex. 2.1. Match the words with their definitions:

1.	ultimate	A	being the only one of its kind
2.	unique	B	similar in every detail; exactly alike
3.	distinguish	C	basic or fundamental
4.	source	D	the air, water and land in which people, animals and plants live
5.	feature	E	someone`s child or children; animal`s baby or babies
6.	spontaneous	F	a person or thing that is exactly like another

7.	twin	G	a thing, place, activity that you get something from
8.	offspring	H	a part of something that you notice because it seems important, interesting, or typical
9.	identical	I	to be able to recognize and understand the difference between two similar things or people
10.	environment	J	happening or done without being planned or organized

Ex. 2.2. Read and translate the given text and make essential assignments:

The Earth is inhabited by billions of organisms, every one of which is unique. Individuals belonging to different species are usually easy to distinguish; members of the same species may differ only in small ways; but even clones (such as identical twins) show some **subtle differences**. The differences between individuals of the same species are called **variation**. These differences may be the result of genetic differences, the influence of the environment, or a combination of genetic and environmental influences.

Genetic variation

Genetic differences reflect the genotype of an organism, that is, its **genetic make-up**. A **diploid organism** has two sets of chromosomes and two forms (alleles) of each particular gene. These alleles may be the same (the organism is **homozygous** for that gene) or different (the organism is **heterozygous** for that gene). If different, one of the alleles (the dominant allele) may mask the other allele (the **recessive allele**). The dominant allele is therefore expressed in either the heterozygous or the homozygous condition, whereas the recessive allele is expressed only in the homozygous condition. If an organism is **haploid** (that is, it has only one set of chromosomes), all its alleles will be expressed and will be reflected in its observable or measurable characters (the features or traits transmitted from parent to offspring).

Phenotypic variation: continuous and discontinuous

The measurable physical and biochemical characteristics of an organism, whether observable or not, make up its phenotype. The phenotype results from the interaction of the genotype and the environment. The genotype determines the potential of an organism, whereas the environmental factors to which it is exposed determine to what extent this potential is fulfilled. For example, in humans the potential height of a person is genetically determined, but a person cannot reach this height without an adequate diet. Phenotypic variation

(commonly referred to simply as variation) is of two main types: continuous and discontinuous.

In **continuous variation**, differences are slight and grade into each other. Characteristics such as human height and weight show continuous variation, and are usually determined by a large number of genes (they are polygenic) and/or considerable environmental influence.

In **discontinuous variation**, the differences are **discrete** (separate) and clear cut: they do not merge into each other. Discontinuous variations are generally caused by different alleles of one, two, or only a few genes.

Continuous variations are usually quantitative (they can be measured) whereas discontinuous variations are qualitative (they tend to be defined subjectively in descriptive terms). Thus, height in humans is a continuous variation given a value in metres, whereas height in sweet peas is a discontinuous variation described as 'tall' or 'dwarf'.

Mutations: more variation

Genetic variation **arises** partly from sexual reproduction by a combination of **independent assortment**, crossing over, and **random fertilisation**. However, these processes merely shuffle the existing pack of genes so that new combinations are made. The ultimate source of inherited variations is mutations.

A **mutation** is a change in the amount or the chemical structure of DNA. If the information contained within the mutated DNA is expressed (that is, transcribed into mRNA and translated into a specific **polypeptide chain**) it can cause a change in the characteristics of an individual cell or an organism. Mutations in the gametes of multicellular organisms can be inherited by offspring. Mutations of the body cells of multicellular organisms (somatic mutations) are confined to the body cells derived from the mutated cell; they are not inherited.

Mutations can happen **spontaneously** as a result of errors in DNA replication or errors during cell division, or they can be induced by various environmental factors (such as certain chemicals, X-rays, and viral infection). Factors that induce mutations are called mutagens.

Chromosome mutations and gene mutations

Alterations in the number or structure of chromosomes are called chromosome mutations. Chromosome mutations can happen during mitosis and meiosis when chromosomes are being condensed and pulled apart. **Homologous chromosomes** may fail to separate, resulting in non-disjunction. Chromosome

mutations also occur during interphase when DNA replicates, and during crossing over when sections of chromosomes are exchanged.

Gene mutations are changes in the nucleotide base sequence in a cistron (the portion of DNA that makes up a single gene). A change of a single nucleotide base pair is called a point mutation. There are a number of types of point mutation, including:

- substitution – the replacement of one nucleotide with another containing a different base
- deletion - the loss of a nucleotide
- insertion or addition - addition of an extra nucleotide.

Sickle-cell anaemia is an example of an inherited condition that results from a substitution. Gene mutations may also result from duplication (repetition of a portion of a nucleotide sequence within a cistron) and inversion (reversal of the portion of the nucleotide sequence in the cistron).

Most mutations, if expressed, are harmful. Note, however, that in diploid organisms such as ourselves, mutations usually result in recessive alleles. These are expressed only in the homozygous condition unless the mutation is on the X chromosome. Many mutations result in a change in the shape of a protein so that the protein cannot function properly (for example, the mutation that causes sickle-cell anaemia). Mutations that affect large sections of a gene, and chromosome mutations are often lethal. However, some mutations have no effect: a mutation may occur in a non-coding part of DNA; it may produce a different **codon** for the same amino acid; or the altered amino acid sequence may not affect the protein's shape or function. Occasionally, a mutation is beneficial, changing the phenotype so that an organism has a better chance of surviving and reproducing. Although beneficial mutations are very rare events, they are bound to happen sooner or later if there is a large number of individuals in a population. These mutations are of immense importance because they are the ultimate source of all variation: the raw material for the evolution of new species by natural selection.

Ex. 2.3. Translate into Ukrainian and learn glossary of essential terms:

№	English term	Ukrainian equivalent	№	English term	Ukrainian equivalent
1.	subtle differences		10.	to arise partly	
2.	genetic make-up		11.	variation	

3.	to mask		12.	to shuffle	
4.	recessive allele		13.	spontaneously	
5.	random fertilisation		14.	independent assortment	
6.	homozygous/heterozygous		15.	mutation/mutagens	
7.	diploid/haploid organism		16.	polypeptide chain	
8.	continuous/discontinuous variation		17.	homologous chromosomes	
9.	discrete differences				

Learn and translate the following words and word combinations: inherited variation, spontaneous mutations, to be easy to distinguish, observable or measurable traits, human height and weight, differences grade into each other, considerable environmental influence, multicellular organisms, to induce mutations, base sequence, to result from, to result in, beneficial mutation, natural selection, to be of immense importance.

Ex. 2.4. Using an English-English dictionary define the following genetic terms:

allele _____
homozygous _____
heterozygous _____
dominant _____
recessive _____
polygenic _____

Ex. 2.5. Fill in the gaps with the words and expressions from the text:

1. Mutations can either _____ spontaneously or _____ by agents called mutagens. 2. Mutations are usually thought of as _____ and they often are. 3. Occasionally, a mutation is _____, changing the phenotype so that an organism has a better chance of _____ and _____. 4. Genetic differences reflect the _____ of an organism, that is, its genetic _____. 5. Mutations that affect large sections of a gene and chromosome mutations are often _____. 6. Although beneficial mutations are _____, they are bound to happen sooner or later if there is a large _____ in a population. 7. A mutation is _____ in the amount or the chemical structure of DNA. 8. The genotype determines the _____ of an organism, whereas the

environmental factors to which it is exposed determine to _____.
 _____.

9. In continuous variations, differences are _____.

10. In discontinuous variations, the differences are _____.

Ex. 2.6. Find English equivalents to the following word combinations:

№	Ukrainian term	English equivalent
1.	виникати спонтанно	
2.	рівень спонтанних мутацій варіює	
3.	чинити негативний вплив	
4.	доза радіації	
5.	члени одного виду	
6.	вплив навколишнього середовища	
7.	видимі або вимірювані характеристики	
8.	взаємодія генотипу та навколишнього середовища	
9.	наявний набір генів	
10.	бути результатом заміщення	
11.	вражати великі набори генів	
12.	нуклеотидна послідовність	
13.	функціонувати потрібним чином	
14.	незначні відмінності	

Ex. 2.7. Answer the following questions:

1. What is variation and what does it result from? 2. What do genetic differences reflect? 3. What is phenotype? 4. What is the difference between the genotype and the phenotype of an organism? 5. What is a haploid organism? 6. If a diploid organism has two different alleles for the same gene, is it homozygous or heterozygous? 7. Is weight in humans an example of continuous or discontinuous variation? 8. Can you give an example of gene mutations? 9. When do chromosome mutations happen? 10. What is a point mutation? What does it include? 11. Are mutations harmful or beneficial? 12. Why are beneficial mutations of immense importance?

Ex. 2.8. Read and translate the short text without any dictionary:

Fact of life:

Mutations (changes in DNA) are the ultimate source of inherited variation. They can either arise spontaneously or be induced by agents called mutagens (such as X-rays, mustard gas, or ultraviolet radiation). The rate of spontaneous mutations varies

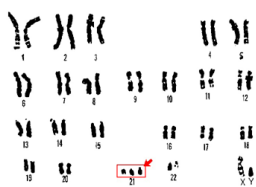
for different genes and in different organisms. Each human gene has about a one in 100.000 chance of mutating. Mutations are usually thought of as harmful, and they often are. However, because we have so many genes, even the healthiest of us probably have at least a few spontaneously mutated genes hidden in the recessive form which do not affect us. X-rays and other mutagens increase the mutation rate, and the higher the dosage of radiation, the higher the rate of mutation.

Ex. 2.9. Translate into English:

1. Мутації – це основна причина спадкових генетичних змін. 2. Кожен людський ген має шанс мутувати як 1 до 100000. 3. Рентгенівські промені та інші мутагени збільшують рівень мутації, і що вища доза радіації, то вищий рівень мутації. 4. Більшість виражених мутацій шкідливі. 5. Однак, випадкові мутації бувають корисними, змінюючи фенотип таким чином, що організм має більше шансів вижити і відтворитися. 6. Відмінності між особинами одного виду називаються генетичною мінливістю. 7. Вимірювані фізичні та біохімічні характеристики організму, будучи видимими чи ні, становлять його фенотип. 8. Характеристики, такі як людський зріст і вага, показують безперервну мінливість, і вони зазвичай визначаються великим набором генів і відчутним (помітним) впливом навколишнього середовища. 9. Генотип визначає потенціал організму, тоді як чинники навколишнього середовища, в якому він існує, визначають, якою мірою цей потенціал буде реалізовано. 10. Мутація – це зміна в кількості або структурі ДНК. 11. Мутації можуть відбуватися спонтанно або бути спричинені факторами навколишнього середовища (хімічні препарати, рентгенівські промені, вірусна інфекція). 12. Багато мутацій виражаються у зміні форми білка, що призводить до його неправильного функціонування. 13. Мутації, які вражають великі сектори генів, і хромосомальні мутації часто є смертельними. 14. Однак, корисні мутації є сировинним матеріалом для еволюції нових видів шляхом природної селекції (природного відбору).

III. DOWN'S SYNDROME AND GENETIC SCREENING

Pre-reading



Try to answer the following questions. Then check your answers by reading the text.

1. What do you know about Down's syndrome?
2. Who and what is the syndrome named after?
3. What do children with Down's syndrome look like?

Ex. 3.1. Match the words with their definitions:

1.	disability	A.	a fault or a lack of something that means that something is not perfect
2.	disease	B.	a small amount of a substance that a doctor or scientist collects in order to examine it
3.	defect	C.	happening or done without being planned or organized
4.	to prevent	D.	to be born with the same physical or mental characteristics as one of your parents or grandparents
5.	to inherit	E.	the final result of a meeting, discussion, war etc., especially when no one knows what it will be until it actually happens
6.	to observe	F.	to stop something from happening or stop someone from doing something
7.	sample	G.	the act of ending something or the end of something
8.	spontaneous	H.	to and notice something; to watch something or someone carefully
9.	outcome	I.	a physical problem that makes someone unable to use a part of their body properly
10.	termination	J.	an illness or unhealthy condition in your body, especially one caused by infection

Exercise 3.2. Read the given text and translate it into Ukrainian.

DOWN'S SYNDROME: TRISOMY 21

Down's **syndrome** is the most common single cause of learning disability in children of school age. Children with the syndrome typically have a round, flat face, and eyelids that appear **to slant upwards**. In addition to some learning disability, they also have an increased risk of infection (particularly respiratory and ear infections), and heart defects occur in about one-quarter of those with the syndrome.

The syndrome is named after John Langdon Down, a nineteenth century doctor who first described the condition in 1866. In 1959, the French **physician** Lejeune used **chromosome-staining techniques** to show that Down's syndrome is caused by an extra chromosome 21. Having one extra chromosome is known as **trisomy**, hence Down's syndrome is also known as **trisomy 21**. The extra chromosome usually comes from the egg cell due to **non-disjunction** of chromosome 21. About 70% of the non-disjunctions occur during meiosis I, when homologous chromosomes fail to separate; 30% occur during meiosis II, when sister **chromatids** fail to separate. Whether it occurs during meiosis I or

meiosis II, non-disjunction leads to trisomy. In a few cases, the **extra chromosome** can come from the father's sperm cell.

In about 3% of cases, Down's syndrome results from **translocation** of an extra chromosome 21. A region of the chromosome breaks off and rejoins with either the end of the other chromosome 21 or with another **non-homologous chromosome** (commonly chromosome 15). In these cases, a person may have the normal number of chromosomes, but one of the chromosomes will **be abnormally long**.

Genetic screening: amniocentesis and chorionic villus sampling

Because of the high risk of Down's syndrome among the babies of older mothers, in the UK mothers over the age of 35 years are usually offered free genetic screening by the National Health Service. **Genetic screening** refers to procedures used to examine an individual for the presence of a genetic disease or disorder. The most widely available genetic screening procedure for Down's syndrome is amniocentesis.

Amniocentesis is usually carried out at 15-16 weeks of pregnancy. It involves passing a very fine needle into the uterus, observed with an ultrasound image, and withdrawing a sample of **amniotic fluid** containing **fetal cells**. The **karyotype** of the fetal cells is then analyzed to test for Down's syndrome. The fetal cells can also be cultured in a suitable medium in a laboratory so that further tests, such as DNA analysis, can be carried out.

Amniocentesis is performed **under local anesthetic** and most women do not find it too uncomfortable. However, there is a 0.5-1 per cent risk of **spontaneous miscarriage** after the procedure. Therefore, amniocentesis is usually recommended only for those at high risk of carrying a Down's baby. In the 1970s, **chorionic villus sampling (CVS)** was developed in China. In CVS, a sample of cells is taken from the chorionic villus (small finger-like processes which grow from the embryo into the mother's uterus). The sample is obtained either by inserting a needle through the abdomen, or inserting a catheter. The fetal cells in the sample can then be analyzed in the same way as for amniocentesis.

CVS can be carried out between week 8 and week 12 of pregnancy. If the test shows the fetus has Down's syndrome, a decision about abortion can be made earlier than with amniocentesis. Early abortions are usually less difficult, both physically and mentally, than later abortions. However, a higher risk of miscarriage is associated with CVS than with amniocentesis.

Until recently, a mother's age was the only factor available **to assess the risk** for Down's syndrome. Now **biochemical markers** are being discovered for the condition. For example, women with a high risk of Down's syndrome pregnancies tend to have about twice as much **chorionic gonadotrophin** (a sex hormone produced in placenta cells) in their **blood serum** as women with normal pregnancies. Tests for these biochemical markers cannot show the presence of a Down's baby, but they can be used in conjunction with the mother's age **to predict the probable risk** of having a baby with Down's syndrome. If the risk is high, the mother can then decide whether to have an amniocentesis or CVS.

Genetic counselling

Genetic screening should be followed by **genetic counselling**, the giving of advice and information about the risks of a genetic disease and its outcome. Counselling is a very challenging task. Counsellors must have a good understanding of medical genetics and need to be well trained in sympathetic counselling techniques. They must give information which helps clients come to their own decision rather than **imposing their own views** on the clients. Clients should be made aware that the features of Down's syndrome vary widely. The condition often results in individuals with **severe mental disability** who require a great deal of support, but many people with Down's syndrome lead independent, long, and **fulfilling lives**, and they are often very loving individuals. It should not be **assumed** that mothers carrying a fetus with Down's syndrome would automatically opt for termination of pregnancy.

Ex. 3.3. Translate into Ukrainian and learn glossary of essential terms:

№	English term	Ukrainian equivalent	№	English term	Ukrainian equivalent
1.	genetic counselling		9.	syndrome	
2.	to slant upwards		10.	amniotic fluid	
3.	non-disjunction		11.	karyotype	
4.	genetic screening		12.	blood serum	
5.	be abnormally long		13.	chromatid	
6.	translocation		14.	to assume	
7.	extra chromosome		15.	to opt (for)	
8.	spontaneous miscarriage		16.	physician	
			17.	amniocentesis	

Ex. 3.4. Find the missing words

Verb	Noun	Adjective
increase		
	prevention	
		risky
inherit		
	performance	
		decisive
	analysis	

Ex. 3.5. Using an English-English dictionary define the following genetic terms:

Down's syndrome _____

trisomy-21 _____

non-disjunction _____

chromatid _____

genetic screening _____

spontaneous miscarriage _____

Ex. 3.6. Find Ukrainian equivalents to the following word combinations:

№	English term	Ukrainian equivalent
1.	chorionic villus sampling	
2.	under local anesthetic	
3.	preventative medicine	
4.	inherited diseases	
5.	to assess the risk for	
6.	genetic screening	
7.	challenging task	
8.	sympathetic counselling techniques	
9.	chromosome-staining techniques	
10.	non-homologous chromosome	
11.	imposing their own views on the clients	
12.	biochemical markers	
13.	chorionic gonadotrophin	
14.	to predict the probable risk	
15.	individuals with severe mental disability	
16.	to lead independent, long, and fulfilling lives	

Ex. 3.7. Fill in the gaps with the words and expressions from the text:

1. Advances in DNA technology have brought _____ in preventive medicine. 2. We can now _____ a large range of inherited diseases before birth. 3. In addition to some learning disability they also have _____ of _____. 4. The syndrome is named after John Langdon Down, _____, who first described the condition in 1866. 5. Down's syndrome is caused by _____. 6. Because of the high risk of Down's syndrome among the babies of older mothers, in the UK mothers over the age of 35 years are usually offered _____ by the National Health Service. 7. Genetic screening should be followed by genetic counselling, the giving of advice and information about _____. 8. Counselling is _____. 9. They must give information which helps clients _____ rather than _____ on the client. 10. It should not be assumed that mothers carrying a fetus with Down's syndrome would _____.

Ex. 3.8. Find English equivalents for the following word combinations:

№	Ukrainian terms	English equivalent
1.	досягнення в технології ДНК	
2.	великий спектр спадкових захворювань	
3.	підвищений ризик	
4.	вушні захворювання	
5.	безкоштовне генетичне обстеження	
6.	відповідне середовище	
7.	і фізично, і морально	
8.	технологія (методика) доброзичливої консультації	
9.	серйозна розумова відсталість	
10.	переривання вагітності	

Ex. 3.9. Answer the following questions. Use all information given before.

1. What is non-disjunction? 2. How do you think society should treat parents who choose to bring into the world a child with a genetic disorder? 3. Who or what is the syndrome named after? 4. What do children with Down's syndrome look like? 5. When can amniocentesis and chorionic villus sampling be carried out? 6. Could you compare

amniocentesis and CVS with respect to the risk of inducing a miscarriage? 7. What is Down's syndrome caused by? 8. What is a biochemical marker which can help a genetic counsellor assess the risk of Down's syndrome for a client? 9. What is genetic counselling like?

Ex. 3.10. Read and translate the short text without any dictionary:

Fact of life:

Throughout the world, the overall frequency of Down's syndrome is about three per 2000 births. The risk increases with the age of the mother. For mothers aged 20 years, one in 2000 babies has Down's syndrome; one in 900 for those aged 30 years; one in 100 for those aged 40 years; and one in 40 for those aged 45 years.

Advances in DNA technology have brought a new era in preventative medicine. We can now detect a large range of inherited diseases before birth, one of the most common of which is Down's syndrome.

Ex. 3.11. Translate into English using your active vocabulary:

1. По всьому світу ймовірність синдрому Дауна дорівнює 3 із 2000 народжених. 2. Ризик зростає з віком матері. 3. Діти із синдромом Дауна зазвичай мають кругле плоске обличчя з широко посадженими очима. 4. Окрім нездатності до навчання, вони також схильні до підвищеного ризику інфікування (особливо респіраторні та вушні інфекції), і, крім того, серцеві захворювання трапляються у кожного четвертого із синдромом Дауна. 5. Через високий ризик синдрому Дауна в новонароджених у Сполученому королівстві матерям, старшим за 35 років, зазвичай пропонується безплатне генетичне обстеження, що проводиться державною медичною службою. 6. Після генетичного обстеження проводять генетичну консультацію, яка дає поради та надає інформацію про ризик генетичного захворювання та його наслідки. 7. Консультація є дуже непростим завданням. 8. Консультанти повинні розумітися на медичній генетиці і повинні володіти методикою доброзичливого консультування. 9. Вони повинні давати інформацію, яка може допомогти клієнтам прийняти власне рішення, замість нав'язування клієнтам своєї точки зору. 10. Слід довести до клієнтів, що ознаки синдрому Дауна широко різняться. 11. Захворювання часто призводить до сильної розумової відсталості, яка вимагає великої турботи. 12. Але поряд із цим, багато людей із синдромом Дауна проживають довге, незалежне і повноцінне життя, і часто ці люди бувають дуже люблячими.

GRAMMAR SECTION

GERUND

Grammar notes	Examples
A gerund is the <i>-ing</i> form of a verb used as a noun. The negative form is formed by placing not before the gerund.	Smoking is bad for health. I enjoy reading books. The doctor suggested not drinking coffee too much.
A gerund can be the <i>subject</i> of a sentence.	Reading is my hobby.
A gerund can be the <i>object</i> of a sentence.	I enjoy walking in the park.
If the <i>object</i> is another verb, it ends in -ing : The following verbs can have the structure verb + preposition + gerund <i>succeed in, insist on, think of, dream of, approve of, decide against, feel like, look forward to.</i> The following verbs can have the structure verb + object + preposition + gerund (object) <i>congratulate on, accuse of, suspect of, prevent from, stop from, thank for, excuse for, forgive for.</i>	I feel like staying home tonight. Have you succeeded in finding a job yet? I'm looking forward to meeting her. I'm thinking of buying a house. I congratulated Tom on getting a new job. I forgot to thank them for helping me. Excuse me for being so late. They accused us of telling lies.
A gerund is used after the following verbs: <i>admit appreciate avoid</i> <i>consider deny (dis)like</i> <i>discuss enjoy finish</i> <i>mention mind miss</i> <i>postpone put off practise</i> <i>quit (give up) suggest understand</i>	Avoid eating foods with a lot of fat. Ann denied eating the cookies. Do you enjoy driving ? I don't mind opening the window. You should quit smoking . I can understand him <i>not inviting</i> Joan. Tom gave up smoking .
A gerund is used after prepositions <i>of, in, at, for, without, about, instead of, in spite of, on</i>	I'm thinking of changing my job. Teachers need to be good at listening . You can only live for a few days without drinking . He insisted on giving me a ride to the train station.
A gerund is used after fixed expressions: <i>can't help, can't stand, it's no use, (to be) worth, There's no point in, have difficulty, have trouble, a waste of money/time, (be) busy</i>	We're all busy preparing for Christmas. We had considerable difficulty finding anywhere to park. He was having trouble hearing her.
We often use go + gerund to describe activities such as <i>shopping, fishing, skiing, swimming, camping, running, dancing, etc.</i>	Let's go swimming in the sea. I go shopping every other day. We went fishing yesterday.

1. Rewrite each sentence so that it begins with an *-ing* form as a subject.

1. It can be very relaxing to collect fossils. _____
2. It can be difficult to give up smoking. _____
3. It isn't a good idea to do an exam without revising. _____
- _____
4. It is fun to learn a new sport. _____
5. It takes lots of hard work to learn a foreign language. _____

6. It was very exciting to see my favourite band play live. _____

7. It will never be possible to live on Mars. _____

8. It took long time to write the essay. _____

9. It is so tiring walking up this mountain! _____

10. It is illegal to drive without a licence. _____

11. It is not nice to laugh at other people. _____

12. It is quite difficult to find a parking space in the city centre. _____

13. It was not easy to get a good job. _____

14. It is a great honor to be awarded this generous prize. _____

15. It is unhealthy to drink a lot of coffee. _____

16. It would be great to win the lottery. _____

2. Use gerund as an object instead of the infinitives in brackets.

1. I love (to go) _____ to the movies. 2. I like (to live) _____ by the river. 3. Do you enjoy (to work) _____ in the supermarket? 4. Would you mind (to watch) _____ my thing for me while I go swimming? 5. She can't stand (to be) _____ around him. 6. He admitted (to cheat) _____ on the exam. 7. He always tries to avoid (to do) _____ his homework. 8. He is considering (to move) _____ to Kyiv. 9. He delayed (to pay) _____ his phone bill. 10. He denied (to steal) _____ the money. 11. Please, continue (to tell) _____ me your story. 12. She mentioned (to meet) _____ him for a tea earlier. 13. She practises (to speak) _____ Spanish whenever she gets the chance. 14. They suggested (to stay) _____ at a hostel. 15. I recall (to see) _____ an advertisement for that somewhere. 16. He'll consider (to hear) _____ your side of the story later, if he has time.

3. Open the brackets using a gerund after prepositions and fixed expressions:

1. We ran ten kilometres without (to have a rest) _____. 2. You can put people's lives in danger by (to drive) _____ too fast. 3. I'm fed up with (to ask) _____ you to be quiet. 4. There is no point in (to take) _____ your coat. It's warm outside. 5. She tried to be serious, but she couldn't help (to laugh) _____. 6. Helen has no chance of (to pass) _____ the exam. 7. Instead of (to eat) _____ at home we went to a restaurant. 8. I have no intention of (to apply) _____ for the job. 9. The station

isn't far. It's not worth (to go) _____ by taxi. 10. I think it's a waste of time (to read) _____ newspapers. 11. I had difficulty (to get) _____ a visa. 12. It's no use (to apply) _____ for the job. I know I wouldn't get it. 13. Ann has got a horse. She goes (to ride) _____ regularly. 14. I can't stand (to queue) _____ up. 15. I was so busy (to worry) _____ about Ann that I didn't even think about Tom.

4. Complete each sentence with preposition followed by gerunds.

1. Our neighbours apologized _____ so much noise. 2. It took us a long time, but we finally succeeded _____ the problem. 3. We have decided _____ a new car because we can't really afford it. 4. The weather was extremely bad and this prevented us _____ on a picnic. 5. I've always dreamed _____ in a small house by the sea. 6. I'm sorry I can't come to your party, but thank you very much _____ me. 7. My bag wasn't very heavy, but my brother insisted _____ it for me. 8. There's a fence around the lawn to stop people _____ on the grass. 9. I feel tired. I don't feel _____ any work. 10. Where are you thinking _____ your holiday this year? 11. Tom insisted _____ me to the station. 12. Mario spent all month preparing for the tennis match, but in spite _____ for many hours each day, he lost the match to Ivan. 13. He is an environmentalist who believes animals should be protected from hunters. He objects _____ wild animals for sport. 14. I look forward _____ you next time I'm in town. 15. Mom told us that she was tired _____ the dishes every night.

INFINITIVE

<p>An infinitive is <i>to + base form of the verb</i> The negative form is formed by placing <i>not</i> before <i>to</i>.</p>	<p>She asked me <i>to call</i> after 5 p.m. She appears not to worry about her weight.</p>
<p>These verbs can be followed directly by an infinitive with <i>to</i>: agree, (can/can't) afford, aim, appear, arrange, ask, attempt, choose, dare, decide, demand, deserve, expect, fail, have (=must), hope, learn, manage, mean, offer, plan, pretend, promise, refuse, seem, tend, threaten, want, wish, would like/love /hate/prefer</p>	<p>Tom dared to argue with the police. We've decided to go for a walk. I'd love to visit France. He refused to help us. Henry demanded to speak to the manager. She doesn't seem to be in love with him. I can't afford to buy a new car now.</p>
<p>Some verbs, like the ones below, need an object ((pro)noun) before the infinitive: verb + object + infinitive with to ask, beg, dare, encourage, expect, help, intend, invite, mean, need, order, require, want, wish, would like/love/hate/prefer</p>	<p>Mary wants her daughter/her to find a better job. We would like you to do the washing-up sometimes! She encouraged the horse to jump the fence.</p>

<p>The infinitive is used without <i>to</i>:</p> <ul style="list-style-type: none"> - after modal/auxiliary verbs: will, shall, would, could, can (but not be able to), may, might, must (but not have to), should (but not ought to), and needn't, (but not need to, which behaves like a normal verb); - after the following structures: had better, would rather/sooner, why not, why should we/why should we not - after verbs of perception + object (action has finished): feel, hear, notice, see, watch - after let's, let + object - after make + object 	<p>I may fly to Australia this summer. She will cook a meal for his birthday. I don't know. He can run very fast.</p> <p>You had better clean up your room. Susan would rather study for her exam tomorrow. Why not ask your neighbour for help? Why should we not go by car?</p> <p>I heard Peter sing a song. They saw him climb up the roof. He watched the thieves steal a car. Let's go for a walk through the park. Sandy let her child go out alone. She made Samantha clean the room.</p>
<p>The infinitive can follow adjectives, such as easy, hard, impossible, dangerous, safe, expensive, cheap, nice, good, interesting, exciting</p>	<p>Is safe to drink this water? The questions in the exam were impossible to answer. Jill is interesting to talk to.</p>
<p>The infinitive can often follow adjectives which express feelings or attitudes about the action in the infinitive: happy, glad, sorry, pleased, sad, disappointed, surprised, amazed, astonished, relieved</p>	<p>Ann was glad to see me. I was sorry to hear that your sister is ill. We were surprised to see Paul at the party. I was pleased to get a letter from you last week.</p>
<p>The infinitive can be used in the structure “It’s nice of somebody to do something”: Adjectives used in this way: kind, clever, sensible, mean, silly, stupid, careless, unfair, considerate</p>	<p>It was nice of you to drive me to the airport. I think it’s very unfair of him to criticize me. It was careless of you to make the same mistakes again and again. It’s kind of Sue to offer to help me.</p>
<p>The infinitive is used after the first/the last, the next, the only, the second, etc.</p>	<p>I was the only one to arrive on time. If I have any more news, you’ll be the first (person) to know.</p>
<p>The infinitive can also follow certain nouns.</p>	<p>It’s time to have a break. She made a decision to lose weight. He has permission to stay out late.</p>
<p>The infinitive is used to explain the purpose of an action.</p>	<p>Tom eats fast food to save time.</p>

5. Complete each sentence with a suitable verb.

- The judge ordered me _____ a fine.
- I asked John _____ us.
- There was a lot of traffic, but we managed _____ to the airport in time.
- They begged us _____.
- Did you promise _____ the children to the zoo?
- I expect you _____ on time.
- We’ve got a new computer in our office. I haven’t learnt _____ it yet.
- The flight attendant required the passengers _____ their tickets.
- Sarah agreed _____ late at the office.

10. It was a nice day, so we decided _____ for a walk. 11. I want you _____ happy. 12. I meant _____ some bread, but I forgot. 13. They don't have much money. They can't afford _____ out very often. 14. Henry invited the Johnsons _____ to the party. 15. I'm still looking for a job, but I hope _____ something soon.

6. Underline the right form of the verb:

1. He agreed **a) start b) to start c) starts** the job as soon as possible. 2. My teachers always expected me **a) did b) to do c) do** well in exams. 3. Let me **a) pay b) to pay c) paid** for the meal. You paid last time. 4. The dentist told me **a) will be b) be c) to be** more careful when I brush my teeth. 5. I asked Monica **a) buys b) buy c) to buy** some stamps. 6. You can't **a) parks b) to park c) park** your car outside the hospital. 7. My family is trying **a) decided b) decide c) to decide** where to go on holiday. 8. I'd like **a) went b) to go c) go** somewhere different for a change. 9. They refuse **a) to gone b) to go c) go** out on trips if it's too hot. 10. Last year we managed **a) found b) to find c) find** a holiday that suited everyone. 11. We decided **a) rent b) be rent c) to rent** a house with a swimming pool. 12. A woman from a travel agency helped us **a) to choose b) too choose c) chooses** a nice house. 13. When we arrived, the people next door invited us **a) have b) to have c) to had** a drink with them. 14. Everyone hopes **a) enjoy b) to enjoy c) be enjoyed** themselves on holiday but it isn't always easy. 15. I went to the shops **a) buy b) for to buy c) to buy** some shoes. 16. He told me he loved me. I didn't know what **a) to say b) say c) will I say**. 17. They can't help us **a) move b) move to c) moved** the house. 18. His parents don't allow him **a) stay up b) to stay up c) stayed up** after ten o'clock. 19. I want **a) you be b) you to be c) that you are** more careful with your homework in future. 20. I wasn't allowed **a) be gone b) go c) to go** out unless they knew where I was going. 21. We chose **a) travelled b) travel c) to travel** by boat rather than by plane. 22. I would hate **a) miss b) to miss c) missed** your party. 23. They can't promise **a) finish b) to finish c) finished** the work today. 24. I would sooner **a) to read b) read c) reads** a book than watch this film. 25. The mother let her daughter **a) to decide b) decide c) has decided** on her own.

7. Use a proper noun from the box to complete the sentences:

<i>decision</i>	<i>something</i>	<i>privilege</i>	<i>pity</i>	<i>e-mails</i>	<i>work</i>
<i>mistake</i>	<i>willingness</i>	<i>pleasure</i>	<i>ability</i>	<i>clients</i>	<i>offer</i>

1. The _____ to cooperate with others is as important as managing on our own. 2. Our _____ to close the firm was a difficult one to make. 3. We were surprised at his _____ to take us home. 4. She showed no _____ to help. 5. It's a _____ for them to lose such a good player. 6. It's a _____

for me to be invited to this conference. 7. It would be a _____ for you to hire him. 8. It's a _____ for us to have you here. 9. There is a lot of _____ to do around the farm. 10. I have some _____ to write. 11. She had two more _____ to call that afternoon. 12. Let's get _____ to eat.

8. Complete the sentences with infinitives.

1. I was glad _____ a letter from you. 2. I was relieved _____ that I had passed the exam. 3. Due is lucky _____ alive after the accident. 4. It was very foolish of Tom _____ lies to the police. 5. The soldiers were prepared _____. 6. The captain was the last man _____ the ship. 7. I was astonished _____ that he had left the country. 8. The children are anxious _____ to the circus. 9. It was stupid of him _____ rude. 10. My brother didn't feel like going anywhere. He was content _____ home and _____ a book. 11. It is necessary for everyone _____ the truth. 12. The students are motivated _____ English. 13. It was silly of you _____ the document without reading it. 14. Sally is afraid _____ home alone. 15. We were sorry _____ the bad news. 16. He was the only one _____ the danger.

9. Change these sentences so that to use an infinitive of purpose:

1. I went to Japan because I wanted to learn Japanese. 2. She made a cake because she wanted to please her friend. 3. They study a lot because they want to get good marks. 4. Amanda is going to the party because she wants to meet new people. 5. The children went to the park because they wanted to play football. 6. Jorge studied German because he wanted to get a new job. 7. We went to France because we wanted to eat lots of nice food. 8. She got a new computer because she wanted to write a book. 9. He has been running because he wants to lose weight. 10. We must study every day because we want to improve our English. 11. I exercise every day because I want to stay healthy. 12. He's saving money because he wants to buy a flat. 13. I drank coffee because I didn't want to fall asleep. 14. He got up very quietly because he didn't want to wake the children. 15. I went to the mechanic because I wanted him to fix my car. 16. I called my uncle because I needed to find out what time he would arrive. 17. I have been working extra hours because I need to earn more money. 18. I usually go to the supermarket so I can buy everything I need in one place. 19. I started running a course for helping new mothers look after their babies. 20. I'm learning another language so I have a better chance of promotion at work.

10. Put the verbs in brackets into the *infinitive* or *-ing* form:

1. Whenever we met, Ann avoided (look) _____ at me. 2. May I change the TV channel, or do you want (watch) _____ more of this program? 3. Joan is considering (change) _____ her major from pre-med studies to psychology. 4. Tom thanked us for (invite) _____ them to dinner and said that they wanted (have) _____ us for dinner next week. 5. If you delay (pay) _____ your bills, you will only incur more and more interest charges. 6. My lawyer advised me not (say) _____ anything further about the accident. 7. You should plan (arrive) _____ at the stadium early or you won't be able to get good seats. 8. My wife asked me (pick) _____ up some eggs at the supermarket on my way home from work. 9. Nobody has offered (buy) _____ the house next door, so I think they're going (lower) _____ the price. 10. Would you mind (peel) _____ that orange for me? 11. Stop (nag) _____! I'll get everything finished before I go to bed. 12. Drivers were warned (not park) _____ in the area. 13. The student with the highest average deserves (get) _____ an "A". 14. The doctor was forced (operate) _____ immediately to save the patient's life. 15. Tom is interested in (take) _____ an art class. 16. I was furious. I threatened never (speak) _____ to him again. 17. My parents appreciated (receive) _____ the thank-you note you sent them. 18. When I was in the army, I had to swear (obey) _____ my senior officers' orders. 19. The groom anticipated (enjoy) _____ the wedding ceremony. 20. John failed (pass) _____ the firefighter's examination and was quite upset.

Some verbs can be followed by either an infinitive or a gerund, sometimes with no difference in meaning, and sometimes with a difference in meaning.	
<p>The following verbs may be followed by <i>either</i> an infinitive or a gerund with little or no difference in meaning: begin, start, continue, like, love, prefer, hate, can't stand, can't bear.</p> <p>If the main verb is progressive, an infinitive (not a gerund) is usually used.</p>	<p><i>It began to snow. / It began snowing.</i> <i>I started to work. / I started working.</i></p> <p><i>It was beginning to rain.</i></p>
<p>The verbs remember, forget, regret, try may be followed by either an infinitive or a gerund but the meaning is different.</p> <p>Remember/Forget + <i>infinitive</i> = remember/forget to perform responsibility, duty, or task.</p> <p>Remember/Forget + <i>gerund</i> = remember (recall)/forget something that happened in the past.</p> <p>Forget followed by a <i>gerund</i> usually occurs in a negative sentence or in questions:</p>	<p>Tom always remembers/forgets to lock the door.</p> <p><i>I remember/never forget seeing</i> the Alps for the first time.</p> <p>Don't forget doing your homework tonight! Have you forgotten promising me that you would be never late again?</p>

Regret + <i>infinitive</i> = regret to say, to inform someone of some bad news.	I regret to tell you that you failed the test.
Regret + <i>gerund</i> = regret something that happened in the past.	I regret lending her money. She never paid me back.
Try + <i>infinitive</i> = make an effort to do	I'm trying to learn English.
Try + <i>gerund</i> = experiment with a new or different approach to see if it works.	The room was hot. I tried opening the windows, but that didn't help. So I tried turning on the fan.
Notice the patterns with prefer : Prefer + <i>gerund</i>	I prefer staying home to going to the concert. I'd prefer to stay home (rather) than (to) go to the concert.
Prefer + <i>infinitive</i> :	
Stop + <i>infinitive</i> = indicates that someone stops doing something in order to do something else	He stopped to smoke .
Stop + <i>gerund</i> = indicates that an action or event is no longer continuing:	On the way to Edinburgh, we stopped to look at an old castle. It's stopped raining . Let's go for a walk.

11. Put the verbs in brackets into the *infinitive* or *-ing* form:

1. Don't forget (call) _____ home as soon as you arrive at your destination.
2. I can't recall (see) _____ that old movie, but maybe I did many years ago.
3. I remember (go) _____ to France when I was three.
4. I'll never forget (meet) _____ the President.
5. We regret (say) _____ that we are unable to help you.
6. I'd prefer (go) _____ skiing this year rather than (go) _____ on a beach holiday.
7. I still remember (buy) _____ my first bicycle.
8. I don't regret (change) _____ my job.
9. Don't forget (write) _____ to Aunt Stacie.
10. I regret (leave) _____ school last year.
11. My father says I've got to stop (see) _____ you.
12. We regret (announce) _____ that the 9.20 flight has been cancelled.
13. Tom tried (study) _____ but he was very tired.
14. I regret (buy) _____ this dress. It doesn't look nice on me.
15. I don't remember (stay) _____ in this hotel before.
16. The television's not working. Try (plug) _____ it in.
17. Before you decide what to do, stop (think) _____ for a minute.
18. I prefer (listen) _____ to music to (watch) _____ TV.

12. Put the verbs in brackets into the *infinitive* or *-ing* form:

1. David gave up (smoke) _____ two years ago and now he feels much better.
2. A stranger stopped (smoke) _____ on the corner of the street.
3. The actors started (play) _____ at the moment we went into the theatre. Luckily, we were not late.
4. "I don't want (play) _____ the piano right now", protested the girl.
5. I had some problems with the translation and my brother offered (help) _____ me.
6. I enjoy (help) _____ my friends. Friendship means (help) _____ each other.
7. «Romeo and Juliet» is a very interesting and romantic

film. It is worth (see) _____. 8. The tourists from Great Britain came to Kyiv (see) _____ its wonderful places of interest. 9. My mother promised (cook) _____ a lot of tasty things on my birthday. 10. She likes (cook) _____ for our family. She is good at it. 11. My uncle is fond of (travel) _____. He has been to ten countries! 12. I'd like (travel) _____ all over the world when I grow up. 13. When did Mr. Busy learn (repair) _____ cars? – When he was fourteen. 14. Nick can't stand (repair) _____ his old bicycle every month. 15. I'd like (eat) _____ five cakes, I'm so hungry. 16. My little brother denied (eat) _____ my orange. 17. I hope (visit) _____ as many foreign countries as possible. 18. I like the idea of (visit) _____ the History Museum. 19. Pete finished (do) _____ his homework an hour ago. 20. Clever students want (do) _____ difficult exercises to improve their English. 21. Why don't you stop (watch) _____ TV? I don't think it's harmless. 22. Please try (come) _____ a little bit earlier next time. 23. I don't remember (see) _____ Tom. 24. I've forgotten (buy) _____ cheese. Let's go without it. 25. She regrets (tell) _____ you that lie about John. 26. They stopped (discuss) _____ where to go now. 27. If you want to have a lot of money, try (rob) _____ a bank. 28. The boys went on (look for) _____ the money they'd lost. 29. After describing the situation in general, he went on (talk) _____ about details. 30. She regrets (say) _____ she won't come to you. 31. Did you remember (say) _____ good-bye to everybody?

13. Put the verbs in brackets into the *infinitive* or *-ing* form:

Paul and Simon decided (go) _____ on an expedition in the mountains. They considered (tour) _____ Scotland, but then decided to go to Wales instead. Although Paul is accustomed to (walk) _____ in the hills and mountains, Simon had never been before. He normally objected to (do) _____ anything dangerous., but he agreed (take) _____ part this time. They remembered (take) _____ a lot of equipment with them to avoid (get) _____ into trouble but, unfortunately, during their trip there was a terrible storm. On their journey a professional mountaineer spotted them and they were made (stop) _____ their expedition temporarily. They agreed that it was no use (try) _____ to continue in such bad weather conditions so they ended up (set up) _____ camp in the mountains. Eventually the storm stopped and although they were cold, wet and starving, they couldn't resist (finish) _____ their climb. They thought it would make a good story to tell their friends.

UNIT 4. EVOLUTION

I. THEORIES OF EVOLUTION

Pre-reading

Working in pairs, try to answer the following questions before you read the text. When you have finished, check your answers by reading the text.

1. What is evolution? How does it happen?
2. What is a species?
3. What is natural selection?
4. What theory did Darwin develop?

Ex. 1.1. Read the given text and make your essential assignments:

One of the most fundamental questions in biology is: where do all living things come from? According to most biologists, the millions of species living on Earth today (including humans) are **descended from** other species that inhabited the world in the past. This change has come about by a process called **evolution**. Evolution happens when the genetic composition (**allele frequency**) of a population changes over successive **generations**. When the changes are sufficiently great, a new species may be formed. (A **species** is a group of closely related organisms potentially capable of interbreeding to produce fertile offspring.)

The mechanism of evolution.

Evolution is not a modern concept. Since ancient times, a number of philosophers and naturalists (including Confucius and Aristotle in Greece) have suggested that complex species **evolve from** simpler pre-existing ones by a process of continuous and gradual change. However, it was not until the 19th century that scientists came up with **plausible mechanisms** for evolution. The mechanism that is widely accepted among biologists today is called neo-Darwinism. It is modern theory based on the work of the nineteenth-century naturalist Charles Darwin.

Between 1831 and 1836, Darwin was the naturalist on board HMS Beagle, a research vessel engaged in mapping different parts of the world. After spending over three years **surveying** the coast of South America, the Beagle landed on the Galapagos Islands in the Pacific Ocean. Darwin compared the organisms on these islands with those on the South American mainland, and this led him to develop his theory of evolution. He **concluded** that, over **successive generation**, a new

species comes into being by slow and gradual changes from a pre-existing one. He believed that these changes are brought about by a process which he called **natural selection**.

Darwin's theory was based on three main **observations**:

1. Within a population are organisms with varying characteristics, and these variations are inherited (at least in part) by their offspring.

2. Organisms produce more offspring than are required to replace their parents.

3. **On average**, population numbers **remain relatively constant** and no population gets bigger indefinitely.

From these observations, Darwin concluded that within a population many individuals do not survive, or fail to reproduce. There is a "struggle for existence". For example, members of the same population **compete** to obtain limited resources, and there is a struggle **to avoid predation and disease**, or **to tolerate changes** in environmental conditions such as temperature. In this struggle for existence those individuals that are best **adapted to** their environment will have a selective advantage: they will be more likely **to survive** and produce offspring than less **well-adapted** organisms.

The origin of species

For more than 20 years, Darwin **collected evidence** to support his theory and **refined his ideas**. He delayed publishing his ideas until 1858, when Alfred Russel Wallace sent him a letter describing a theory of evolution identical to Darwin's own. Wallace was a British naturalist who had worked in the Malay Archipelago for eight years. He concluded from his research that some organisms live while others die because of differences in their characteristics, such as their ability **to resist disease** or escape predation. Darwin and Wallace published a paper jointly describing their theory of evolution by natural selection. However, Darwin's name has become more strongly linked with the theory because of a book he published on 24 November 1859. The book, entitled "The Origin of Species by Means of Natural Selection or the Preservations of Favoured Races in the Struggle for Life", has been called the most important biology book ever written. It not only gives a full description of the theory of evolution by natural selection, but also **contains a huge mass of evidence** to support the theory.

The reaction to Darwin.

Many people found it difficult to accept Darwin's ideas, especially the idea that modern humans and apes are probably descended from a **common ancestor**.

However, his theory is supported by so much evidence that the majority of biologists accept it. Evolution by natural selection has become a central theme which **underpins** much of modern biology. The modern theory of evolution is called neo-Darwinism because it **incorporates new scientific evidence**, particularly from genetics and molecular biology. For example, we know that the variations that are so important in natural selection come about by **random and spontaneous changes in genes**, particularly from **mutations in reproductive cells**. Despite modifications to Darwin's theory in neo-Darwinism, natural selection is still the **driving force** behind evolution, or the theory of evolution by the natural selection of inherited characteristics.

Ex. 1.2. Translate into Ukrainian and learn essential terms:

№	English term	Ukrainian equivalent	№	English term	Ukrainian equivalent
1.	well-adapted organisms		10.	to remain constant	
2.	to descend from		11.	on average	
3.	allele frequency		12.	to compete	
4.	generation		13.	evolution	
5.	species		14.	to refine ideas	
6.	to evolve from		15.	predation	
7.	to survey		16.	to underpin	
8.	to develop		17.	to incorporate	
9.	random changes		18.	observation	

Learn and translate the following words and word combinations: according to, inhabited the world in the past, sufficiently great, continuous and gradual change, widely accepted among biologists
to develop the theory, natural selection, with varying characteristics, struggle for existence, to obtain limited resources, best adapted to their environment, to escape predation, a full description of the theory of evolution, a common ancestor, to avoid predation and disease, to tolerate changes.

Ex. 1.3. Fill in the missing words:

Term (verb)	Noun	Adjective
exist
suggest
reproduce
develop

inherit	.....	.....
inhabit	.....	.....
evolve	.....	.....

Ex. 1.4. Using an English-English dictionary define the following genetic terms:

Evolution _____

Species _____

Generation _____

Natural Selection _____

Ancestor _____

Reproductive _____

Ex. 1.5. Match these words with their definitions:

1.	generation	A.	an illness or unhealthy condition in your body
2.	evolution	B.	the air, water and land in which people, animals and plants live
3.	evidence	C.	a member of your family who lived a long time ago
4.	reproduce	D.	the careful choice of a particular person or thing from among a group of similar people or things
5.	species	E.	to continue to live or exist
6..	survive	F.	to change into a larger, stronger, or more advanced state
7	ancestor	G.	to produce young animals from parents of different breeds or groups
8.	develop	H.	all the members of a group of things which have been developed from a previous group
9.	naturalist	I.	an animal's baby or babies
10.	environment	J.	the state of existing
11.	selection	K.	the gradual change and development
12.	disease	L.	to produce young animals or plants
13.	interbreed	M.	someone who studies plants or animals, especially outdoors
14.	offspring	N.	facts that make you believe that something exist or is true
15.	existence	O.	a group of closely related organisms

Ex. 1.6. Find English equivalents to the following word combinations:

№	Ukrainian term	English equivalent
1.	ЩО ПОХОДИТЬ ВІД	
2.	ТІСНО ПОВ'ЯЗАНИЙ	

3.	наступні покоління	
4.	ті, що живуть на землі	
5.	виробляти запліднене потомство	
6.	генетичний склад	
7.	дійти висновку	
8.	відносно постійний	
9.	збирати свідчення	
10.	чинити опір хворобі	
11.	генетика та молекулярна біологія	
12.	випадкові та спонтанні зміни	
13.	мутації в репродуктивних клітинах	
14.	більшість біологів	
15.	природний відбір	

Ex. 1.7. Answer the following questions. Use all information given before:

1. How does the evolution usually take place? 2. What led Charles Darwin to develop his theory of evolution? 3. What did Darwin mean by “natural selection”? 4. What are three main observations of Darwin’s theory? 5. What does “struggle for existence” mean? 6. What book has been called the most important biology book ever written? 7. Do the majority of biologists accept Darwin’s theory? 8. What is called neo-Darwinism?

Exercise 1.8. Match the sentence halves. Make complete sentences:

1.	According to most biologists, the millions of species living on Earth today	A.	are descended from other species that inhabited the world in the past.
2.	Evolution happens	B.	is called neo-Darwinism.
3.	The mechanism that is widely accepted among biologists today	C.	to support his theory and refined his ideas.
4.	Organisms produce more offspring	D.	which underpins much of modern biology.
5.	Members of the same population compete	E.	than are required to replace their parents.
6.	For more than 20 years, Darwin collected evidence	F.	come about by random and spontaneous changes in genes.
7.	Evolution by natural selection has become a central theme	G.	to obtain limited resources.

8. The variations that are so important in natural selection	H. when the genetic composition of a population changes over successive generations.
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Ex. 1.9. Read and translate the short text without any dictionary:

Fact of life: Highly sensitive dating techniques tell us that the Earth is between 4.5 and 5.0 thousand million years old. It is generally agreed by scientists that the Earth was originally devoid of life, and that the first living organisms arose by biochemical evolution from complex organic chemicals formed in the atmosphere and seas of early Earth. These first forms of life gave rise to countless millions of species. Most have become extinct, but some have evolved into organisms found today. According to the latest estimates, 20-30 million species share our planet.

II. NATURAL SELECTION

Pre-reading

With a partner consider the following questions and try to answer them. Then scan the text to check your answers.

1. What is natural selection?
2. What environmental factors effect on surviving and producing offspring?

Ex. 2.1. Read the given text and make your essential assignments:

SURVIVAL OF THE FITTEST

Darwin had the idea that natural selection is the mechanism that drives evolution after reading An Essay on the Principal of Population by Thomas Malthus, a clergyman and political economist. Malthus **argued** that, in time, the growth of human populations will **outstrip the food supply**, and that this will lead to “**famine, pestilence, and war**”. Darwin applied this idea to populations of other animals and of plants. In his book on the origin of species, Darwin wrote: “There is no exception to the rule that every organic being naturally increases at so high a rate that if not destroyed, the Earth would soon be covered by the **progeny** of a single pair”. In spite of reproducing quickly, no single species has completely over-run the planet, although the populations of some species may be increasing at any one particular time. Darwin concluded that populations are kept in check by a “**struggle for existence**” as they compete for limited resources and are **exposed to disease**. Environmental factors that **keep** populations **in check** are called selection pressures or environmental resistances. These include:

- disease

- competition for resources such as food and a place in which to live
- predation
- **lack of light**, water, or oxygen
- changes in temperature.

Those organisms best suited to the environmental conditions, with characteristics that give them an advantage in the “struggle for existence”, will have the best chance of surviving and producing offspring. Their high **natality** (birth rate) gives them a selective advantage. On the other hand, those with unfavourable characteristics are more likely to die. Their high **mortality** (death rate) gives them a selective disadvantage. Darwin argued that this difference in natality and mortality results in natural selection. As environmental conditions change certain characteristics within a randomly varying population are favoured, and natural selection occurs. This has become known as the “**survival of the fittest**”.

In evolution, **fitness** is defined as the ability of an organism to pass on its alleles to subsequent generations, compared with other individuals of the same species. The “fittest” individual in a population is the one that produces the largest number of offspring that survive to reproduce themselves. Natural selection by “survival of the fittest” means that the genetic characteristics of a population gradually change from generation to generation **in response to** changes in the environment. As we shall see in the following spreads, natural selection affects a gene pool by increasing the frequency of alleles that give an advantage, and reducing the frequency of alleles that give a disadvantage. (A **gene pool** is all the genes and their different alleles present in an **interbreeding population**.)

Three types of natural selection

Natural selection is not always a mechanism for change. There are three different types: **stabilizing selection**, **directional selection**, and **disruptive selection**. These are three different ways in which natural selection acts on the phenotypes in a population (the **observable** characteristics such as colour or height). Typically, the frequency in the population of each phenotype has a normal distribution, described by a **bell-shaped curve**.

Stabilizing selection happens in an unchanging environment. Extremes of the phenotype range are selected against, leading to a reduction in variation (more individuals tend to conform to the mean). Stabilizing selection occurs in the natural selection of birth mass in humans.

Directional selection favours one extreme of the phenotype range and results in a shift of the mean either to the right or to the left. This type of selection usually follows some kind of environmental change. The long neck of the giraffe is thought to have evolved in this way. Probably, when food was in short supply, only the tallest individuals could reach enough food to survive. They passed on their genes to the next generation.

Disruptive selection selects against intermediate phenotypes and favours those at the extremes. This leads to a **bimodal distribution** (the distribution curve has two peaks or modes) and two overlapping groups of phenotypes. If the two groups become unable to **interbreed**, then each population may **give rise to** a new species. Disruptive selection may have contributed to the evolution of Darwin's **finches**. Because there were few other birds to compete, finches with short strong **beaks** had exclusive use of nuts as a food source, while those with long slender beaks had almost exclusive use of insects. Those finches with an average, unspecialized beak were more likely to have been **in competition with** other species of bird and would have reproduced less successfully.

Ex. 2.2. Translate into Ukrainian and learn essential terms:

№	English term	Ukrainian equivalent	№	English term	Ukrainian equivalent
	growth			mortality	
	famine			gene pool	
	pestilence			fitness	
	progeny			in response to	
	to keep in check			to increase	
	natality			to give rise to	
	bell-shaped curve			lack of smth	
	environmental resistances			interbreeding population	
	selection pressures			observable characteristics	
	in competition with			bimodal distribution	
	stabilizing/ directional			to be exposed to disease	
	disruptive selection				

Learn and translate the following words and word combinations: to over-run the planet, struggle for existence, selection pressures, environmental resistances, to expose to disease, changes in temperature, best suited to the environmental conditions, to give an advantage in, the best chance of surviving and producing offspring, selective disadvantage, survival of the fittest, compared with other individuals, gradually change from generation to generation, to act on the phenotypes in a population, to become unable to interbreed.

Ex. 2.3. Answer the following questions.

1. What is meant by fitness in evolutionary terms?
2. Some individuals of the European swallowtail butterfly (*Papilio machaon*) pupate on brown stems or leaves; others pupate on green stems or leaves. Two distinct colour forms of the pupae are found, namely brown and green, with very few intermediates.
 - a. What type of natural selection does this example show?
 - b. Explain why the intermediate colour forms would be at a selective disadvantage?

Exercise 2.4. Fill in the missing words:

Term (verb)	Noun	Adjective
argue
occur
increase
compete
expose
survive
distribute
describe

Ex. 2.5. Using an English-English dictionary define the following genetic terms:

- Progeny _____
- Selection _____
- Fitness _____
- Gene pool _____
- Selection pressure _____
- Interbreeding _____

Ex. 2.6. Match these words with their definitions:

1	outstrip	A.	a group of closely related organisms
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2	origin	B.	a living creature such as a dog or cat
3	disease	C.	becoming firm, steady or unchanging
4	selection	D.	the situation, place, or physical matter from which something begins
5	species	E.	birth rate
6	plant	F.	prevents something from continuing in its usual way and causes trouble
7	animal	G.	an illness or unhealthy condition in your body
8	favourable	H.	to be greater in quantity than something else
9	natality	I.	an animal's baby or babies
10	directional	J.	a small part of the material inside the nucleus of a cell
11	stabilizing	K.	a living thing that has leaves and roots and grows in earth
12	disruptive	L.	to do something that produces an effect or change in someone or something
13	gene	M.	the careful choice of a particular person or thing from among a group of similar people or things
14	offspring	N.	suitable and likely to make something happen or succeed
15	affect	O.	pointing in a particular direction

Ex. 2.7. Find English equivalents to the following word combinations:

№	Ukrainian term	English equivalent
1	запаси їжі	
2	застосувати до	
3	походження видів	
4	незважаючи на	
5	обмежені ресурси	
6	фактори навколишнього середовища	
7	нестача світла, води, кисню	
8	висока народжуваність	
9	висока смертність	
10	призводить до природного відбору	
11	здатність організму	
12	генетичні характеристики	
13	у відповідь на зміни в навколишньому середовищі	
14	давати початок новому виду	
15	короткі сильні дзьоби	

Ex. 2.8. Answer the following questions. Use all information given before:

1. What might lead to famine, pestilence and war? 2. What is called selection pressures? 3. What environmental factors do selection pressures include? 4. What organisms will have the best chance of surviving and producing their offspring? 5. Why does the difference in natality and mortality result in natural selection? 6. What is meant by “survival of the fittest”? 7. How is fitness defined in evolution? 8. What are three types of natural selection? 9. What is the difference between them?

Ex. 2.9. Match the sentence halves. Make complete sentences:

1	Those organisms best suited to the environmental conditions, with characteristics that give them an advantage in the “struggle for existence”,	A	although the populations of some species may be increasing at any one particular time.
2	Environmental factors that keep populations in check	B	results in natural selection.
3	Darwin argued that this difference in natality and mortality	C	from generation to generation in response to changes in the environment.
4	In spite of reproducing quickly, no single species has completely over-run the planet,	D	will have the best chance of surviving and producing offspring.
5	The “fittest” individual in a population is the one that produces	E	in an unchanging environment.
6	Stabilizing selection occurs	F	are called selection pressures.
7	Natural selection by “survival of the fittest” means that the genetic characteristics of a population gradually change	G	the largest number of offspring that survive to reproduce themselves.
8	Stabilizing selection happens	H	in the natural selection of birth mass in humans.

Ex. 2.10. Read and translate the short text without any dictionary:

Fact of life:

You may think that natural selection results in change and diversification. This is not always the case. For example, natural selection helps to keep the average birth mass for human babies around 3.3 kg. Not surprisingly, extremely small or large babies have low rates of survival under natural conditions.

III. ARTIFICIAL SELECTION

Pre-reading

In a small group discuss the current problems associated with the artificial selection and then try and answer the following questions:

1. How do you understand artificial selection?
2. Do you have any ideas about how wheat cultivation began?
3. Can you explain the difference between inbreeding and outbreeding?

Ex. 3.1. Read the given text and make your essential assignments:

THE CULTIVATION OF WHEAT

Ever since farming began in the Middle East about 10 000 years ago, humans have been breeding animals and plants selectively **to produce specific desirable qualities**. Wheat was probably among the first crop to be cultivated. By **selective breeding** over thousands of generations, wild wheat has been converted into the modern types which produce much higher yields. In selective breeding, particular individuals are chosen and allowed to breed, whereas others are prevented from breeding. This means that alleles that give characteristics favoured by humans are retained, while those that give similar to directional selection, in that selection pressure brings about a gradual change in the genotype of a group of organisms. However, in **artificial selection** it is humans, not environmental factors, that act as the selection pressure, gradually bringing about changes in allele frequencies.

We can only speculate as to how wheat cultivation began. Perhaps people who gathered wild seeds for food observed that seeds spilled accidentally **sprouted** new plants from which more seeds could be **harvested**. This might have encouraged them to save some seeds **to sow** for the following season's crop.

Wild wheat sheds its grains as soon as they are **ripe**. This makes harvesting difficult. Therefore, grains were most likely to be gathered from plants that by chance retained their grains a little longer. By using this grain for the next crop, farmers would **inadvertently** have started the process of **selective breeding**.

The next stage in the cultivation of wheat would have been the **deliberate selection** of varieties with desirable qualities. Early farmers appear to have selected grains from plants which **gave the greatest yield**, and produced grain which was easy to separate from its husk. Eventually, over many generations, the variety of cultivated wheat changed. This led to the ancestor of our modern wheat, in which the grains are held so firmly that they must be removed by a

separate operation after harvest. Selective breeding of wheat continues today by a combination of inbreeding and outbreeding.

Inbreeding involves breeding between closely related individuals which **by chance**, possess some desirable character. In wheat, desirable characters include:

- high yield
- short stem length (allowing the plant to devote more energy to the production of seeds, which have a much higher value than straw from stems)
- **pest resistance** (for example, to fungal molds and rusts)
- high protein content of the grain.

Inbreeding is carried out to try and retain the desirable characters in future generations. Wheat plants are particularly suitable for selective breeding because they **self-pollinate** naturally. They are unlikely **to cross fertilize** without the **intervention** of the **plant breeder**.

Inbreeding allows a farmer to produce a uniform crop which is easy to harvest and has, given certain conditions, predictable characters. However, this uniformity of characters is at the expense of genetic diversity may be reduced to such an extent that every individual has identical alleles (a condition known as **complete homozygosity**). Such a wheat strain cannot be changed because there are no other alleles present that could produce genetically different plants. Another problem is that if genetically identical plants are **exposed to new diseases** to which the plants **have no resistance**, all the plants may be killed.

Similar techniques of selective breeding have been used **to develop domestic and farm animals**. Although complete homozygosity has not been reached in any animals, inbreeding increases the risk of a harmful recessive allele occurring in the homozygous condition and being expressed. Because of these disadvantages, inbreeding is not carried out indefinitely. New alleles are introduced by outbreeding with other stock.

Outbreeding involves crossing individuals from **genetically distinct strains**. The offspring from such a cross are called hybrids. If the parental stocks are pure breeding, the offspring are called F1 hybrids. F1 hybrids often have characters, such as grain yield in wheat, which are superior to the characters in either parent. This phenomenon is called **hybrid vigour** or **heterosis**. Hybrid vigour probably results from an increased heterozygosity arising from **the mixing of alleles**. Harmful recessive alleles are less likely to be present in the homozygous condition. Hybrid vigour is also thought to result from some form of interaction between particular combinations of alleles in the hybrid. Whatever

the explanation of hybrid vigour, if the descendants of F1 hybrids are continually inbred, the vigour decreases as the plant become more homozygous again.

Outbreeding depends on the availability of genetically distinct animals and plants. It is therefore important to maintain sources of genetic diversity. This may be done by maintaining seed banks of old or wild varieties of plants (the genetic diversity of wheat, rice, cabbages, and carrots is maintained in this way). Also, adults of old varieties of animals and plants with little or no commercial value may be maintained as a source of new alleles for **future breeding programmes**.

Ex. 3.2. Translate into Ukrainian and learn glossary of essential terms:

№	English term	Ukrainian equivalent	№	English term	Ukrainian equivalent
1.	to breed		17.	predictable	
2.	deliberate selection		18.	to reduce	
3.	desirable qualities		19.	to carry out	
4.	inbreeding		20.	to fertilize	
5.	outbreeding		21.	genetic diversity	
6.	crop		22.	resistance	
7.	to bring about		23.	domestic animals	
8.	to retain		24.	to involve	
9.	self-pollinate		25.	distinct	
10.	ripe		26.	strain	
11.	by chance		27.	plant breeder	
12.	intervention		28.	vigour	
13.	grain		29.	descendant	
14.	to sprout		30.	to maintain	
15.	to sow		31.	diversity	
16.	stem				

Learn and translate the following words and word combinations: to produce specific desirable qualities, selective breeding, artificial selection, to sow seeds, pest resistance, genetically different plants, to be exposed to new diseases, have no resistance, to develop domestic and farm animals, genetically distinct strains, the mixing of alleles, the descendants of hybrids
to maintain sources of genetic diversity, future breeding programmes.

Ex. 3.3. Fill in the missing words:

Term (verb)	Noun	Adjective
suit
resist

interact	.....	.....
value	.....	.....
cultivate	.....	.....

Ex. 3.4. Using an English-English dictionary define the following words:

Breeding _____

Desirable _____

Seed _____

Cultivation _____

Stem _____

Crop _____

Ex. 3.5. Match these words with their definitions:

1	decrease	A.	the seeds of crops
2	modern	B.	living in natural state, not changed or controlled by humans
3	famine	C.	the preparation and use of land for growing crops
4	yield	D.	to go down to a lower level
5	grain	E.	happening because someone has made it happen and not as a part of a natural process
6	hybrid	F.	physical and mental energy
7.	domestic animal	G.	breeding between closely related individuals
8.	wild	H.	time belonging to the present time
9.	cultivation	I.	to plant seeds on a piece of ground
10	artificial	J.	to produce crops, profits
11	vigour	K.	a thing, place activity, etc. that you get something from
12.	pollinate	L.	an animal or plant produced from parents of different breeds or types
13.	inbreeding	M.	an animal lives on a farm or in someone's home
14.	sow	N.	no food for a long time and many people or animals die
15.	source	O.	to make a flower or plant produce seeds by giving it pollen

Ex. 3.6. Find English equivalents to the following word combinations:

№	Ukrainian term	English equivalent
1	розводити тварин і рослини	
2	поступова зміна в генотипі	
3	вирощування пшениці	
4	процес добірного розмноження	

5	тісно пов'язані між собою особини	
6	зберегти бажані характеристики	
7	запилюватися природним шляхом	
8	що відбувається в гомозиготних умовах	
9	гібридна сила	
10	залежить від	
11	особливі комбінації	
12	присутні в гомозиготних умовах	
13	дикі різновиди рослин	

Ex. 3.7. Answer the following questions. Use all information given before:

1. How long have humans been breeding animals and plants selectively to produce specific desirable qualities? 2. What does selective breeding mean? 3. Which type of natural selection does artificial selection resemble? 4. Describe how wheat cultivation began. 5. What does inbreeding involve? 6. Why is inbreeding carried out? 7. What effect does: a) inbreeding; b) outbreeding have on the genetic diversity of a population? 8. What does outbreeding involve? 9. How is the offspring from outbreeding called? 10. What is called hybrid vigour? Give two possible explanations of hybrid vigour in plants produced by a cross between two different strains of pure-breeding plants.

Ex. 3.8. Match the sentence halves. Make complete sentences:

1.	Artificial selection is similar to directional selection, in that selection pressure brings about	A.	to try and retain the desirable characters in future generations.
2.	In selective breeding, particular individuals are chosen and allowed	B.	closely related individuals which by chance, possess some desirable character.
3.	Inbreeding involves breeding between	C.	crossing individuals from genetically distinct strains.
4.	Inbreeding is carried out	D.	to breed, whereas others are prevented from breeding.
5.	Outbreeding involves	E.	a gradual change in the genotype of a group of organisms.
6.	If the parental stocks are pure breeding,	F.	the vigour decreases as the plant become more homozygous again.
7.	If the descendants of F1 hybrids are continually inbred,	G.	on the availability of genetically distinct animals and plants.
8.	Outbreeding depends	H.	the offspring are called F1 hybrids.

Ex. 3.9. Read and translate the short text without any dictionary:

Fact of life:

With the advent of genetic engineering artificial selection has entered a new phase. It is now possible to breed clones of cattle and sheep which have genes for producing specific human proteins. What is more, nuclei of two different species can be combined to form a completely new type of animal. In this way, a hybrid that combines the characters of a sheep and a goat has been formed: this new species has been dubbed a “geep” by the popular press. Plants can also be genetically engineered to incorporate characters of a number of different species, for example, potatoes with a high starch content and high productivity can be genetically engineered to produce the beta-carotene of green vegetables and the vitamins of citrus fruits. One day it might be possible to design foods on a computer by choosing characteristics from a palette of tastes, colours, textures, and nutrients.

IV. HUMAN EVOLUTION: PRIMATE ANCESTORS

Pre-reading

With your partner try and answer these two questions. Then see if you were right by quickly scanning the text.

1. Do you agree with the statement that all humans are descendent from a common ancestor?
2. How do modern primates differ from their ancestral primates?

Ex. 4.1. Read the given text and make your essential assignments:

The theory of evolution applies just as much to humans as to other organisms. All humans are in the same way related and, in the words of Darwin, are “descended with modification” from a common ancestor. Although our social and technological developments have freed us from many of the effects of natural selection, our present-day physical and behavioural characteristics are rooted in the adaptations of our ancestors. So, by finding out more about our ancestors, we can learn more about ourselves.

Adaptation of primates

The classification of humans reflects our evolutionary relationships. About 150-170 million years ago, all mammals were small insectivores rather like the shrews of today. About 75 million years ago some of these insectivores adopted an arboreal (tree-dwelling) mode of life and evolved into lemur-like primates. The adaptations of these ancestral primates to their new tree-living mode of life are thought to have included a short nose, large eyes and prominent ears, long

flexible fingers with nail-like claws, and teeth well adapted for eating insects. These features are found in tarsiers (lemur-like primates) living today in Indonesia. Many other features that evolved in ancestral primates as adaptations to an arboreal life have been retained by modern primates.

These features include:

- **A prehensile (grasping) limb:** the hands (and often the feet) of primates have long and highly mobile digits so that they can grasp the branches of trees. The first digit can oppose the remaining four digits, giving primates a powerful grip. Primates have flattened nails that support pads of sensitive skin on the fingers or toes.

- **A mobile forearm:** the clavicle (collar bone) and scapula (shoulder blade) are adapted to allow a wide range of movements. Mobile forearms are essential for moving from tree to tree, and for manipulating objects in the hand; for example, to transfer food to the mouth or to bring an object to the eyes for closer examination.

- **Well developed stereoscopic vision:** the ability to judge distances is essential for leaping from branch to branch. Primates have large, well developed, forward-looking eyes with overlapping fields of view. The development of stereoscopic vision has been associated with a flattening of the face.

- **A reduce sense of smell:** it is not easy to locate scents through the canopies of trees and primates have a reduced sense of smell and a relatively small nose. Combined with the flattening of the face, a shorter nose is associated with the development of stereoscopic vision, and has allowed the development of facial muscles which play an important part in non-verbal communication.

- **An unspecialized digestive system:** primates have relatively unspecialised teeth and guts and they can exploit a wide range of food sources.

Although some primates have a specialized herbivorous diet, all primate families have some omnivorous members that have a mixed diet.

- **A skull modified for upright posture:** primates have an upright posture associated with having a forward-looking face. The skull rests on top of the vertebra and has a large opening, the foramen magnum, through which the medulla of the brain emerges and extends downwards as the spinal cord.

- **Reduced number of offspring:** life in the trees is difficult and dangerous, especially for young animals. Some arboreal animals, such as birds and squirrels, build nests in which the young can be protected until they are old enough to fend for themselves. Primates have adopted another strategy: from birth, the young

cling to the mother's body and only slowly gain independence. Primates produce few young but look after them for a long time: they have a long gestation period a prolonged period of dependency after birth.

- **A large brain:** an active life in the trees requires precise movements and therefore good muscular coordination, vision, tactile senses, memory, thought, and learning. These processes depend on a large and highly developed brain.

- **A social groupings:** all primates live to some degree in social groups in which members cooperate with each other. Complex social behaviour probably stems from the strong pair bond which enables a mother and her young to remain closely together for a long time. Lengthy rearing of a small number of young is most successful when the mother has support from other adults. The continued success of a group of animals depends on the recruitment of young helpers, and so evolves a social interdependency which is the basis of our own human society.

The groups of modern primates

At about the same time as the dinosaurs became extinct, about 65 million years ago, the primitive primates diverged quickly to give rise to two main suborders; the prosimians (meaning "before apes") and anthropoids (meaning "ape form"). The prosimians are represented today by lemurs, lorises, and tarsiers, and the anthropoids by monkeys, apes, and humans.

Monkeys are distinguished from apes in having long tails, and the forelimbs are not usually longer than the hindlimbs. They are believed to have evolved from two different groups of lemur-like animals which became isolated when continental drift separated Eurasia from North America. The North American group evolved into New World monkeys which died out in North America but somehow colonised South America. The Eurasia group gave rise to Old World monkeys, from which apes and humans evolved. There are several differences between Old World monkey and New World monkeys which show their separate evolution. For example, the nostrils of monkeys from South America are wide open and far apart, and New World monkeys have a long tail that is prehensile (adapted for grasping branches); the nostrils of monkeys from Africa and Asia are narrow and close together and no old World monkey has a prehensile tail.

Ex. 4.2. Translate into Ukrainian and learn glossary of essential terms:

№	English term	Ukrainian equivalent	№	English term	Ukrainian equivalent
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1.	to be rooted in			to flatten	
2.	adaptation			sensitive	
3.	ancestor			forearm	
	to find out			essential	
	to retain			vision	
	insectivores			to leap	
	shrew			scent	
	arboreal			guts	
	mode			omnivorous	
	prominent			nest	
	claw			to fend	
	nail			tactile senses	
	well adapted			bond	
	prehensile			forelimb	
	digit			hindlimb	
	grip			nostril	

Learn and translate the following words and word combinations: descended with modifications from a common ancestor, arboreal mode of life, ancestral primates, well adapted for eating insects, a prehensile limb, to allow a wide range of movements, to transfer food to the mouth, to locate scents, a prolonged period of dependency after birth, precise movements, social grouping, complex social behaviour.

Ex. 4.3. Fill in the missing words:

Term (verb)	Noun	Adjective
reflect
adapt
grasp
depend
support
extinguish
separate

Ex. 4.4. Using an English-English dictionary define the following genetic terms:

Primate _____

Limb _____

Adaptation _____

Sensitive _____

Independence _____

Ex. 4.5. Match these words with their definitions:

1	primate	A.	an animal that eats both meat plants
2	modern	B.	the smell of a particular animal or person that some other animals, for example dogs, can follow
3	insectivore	C.	able to move easily
4	mammal	D.	an animal is very like a human
5	omnivore	E.	the bones of person's or animal's head
6	brain	F.	a creature that eats insects for food
7.	scent	G.	connected with trees or living in trees
8.	mode	H.	time belonging to the present time
9.	ape	I.	the organ inside your head that controls how you think, feel and move
10	mobile	J.	one of the class of animals that drinks milk from its mother's body when it is young
11	digestion	K.	a member of the group of mammals that includes humans and monkeys
12.	arboreal	L.	a large monkey without a tail, or with a very short tail
13.	skull	M.	concerning human society and its organization, or the quality of people's lives
14.	social	N.	a particular way or style of behaving, living or doing something
15.	anthropoid	O.	the process of digesting food

Ex. 4.6. Find English equivalents to the following word combinations:

	Ukrainian equivalent	English equivalent
1	у певній мірі	
2	фізичні та поведінкові характеристики	
3	хапати гілки дерев	
4	ніжна шкіра на пальцях руки або ноги	
5	рухливе передпліччя	
6	підносити предмет до очей для уважного вивчення	
7	добре розвинений зір	
8	травна система	
9	змішана дієта	
10	великий і високо розвинений мозок	
11	передні та задні кінцівки	
12	кілька відмінностей	
13	хапальний хвіст	

Ex. 4.7. Answer the following questions. Use all information given before:

1. What has freed us from many of the effects of natural selection? 2. What does “arboreal mode of life” mean? 3. What features did ancestral primates have? 4. What features have been retained by modern primates? 5. What are the two main groups of modern primates? 6. How are monkeys distinguished from apes?

Ex. 4.8. Match the sentence halves. Make complete sentences:

1.	Although our social and technological developments have freed us from many of the effects of natural selection,	A.	can be protected until they are old enough to fend for themselves.
2.	About 75 million years ago some of these insectivores adopted an arboreal	B.	and for manipulating objects in the hand.
3.	Primates have flattened nails that support pads	C.	(tree-dwelling) mode of life and evolved into lemur-like primates.
4.	Mobile forearms are essential for moving from tree to tree,	D.	and they can exploit a wide range of food sources.
5.	The development of stereoscopic vision has been associated	E.	our present-day physical and behavioural characteristics are rooted in the adaptations of our ancestors.
6.	Primates have relatively unspecialized teeth and guts	F.	of sensitive skin on the fingers or toes.
7.	Some arboreal animals, such as birds and squirrels, build nests in which the young	G.	the prosimians (meaning “before apes”) and anthropoids (meaning “ape form”).
8.	The primitive primates diverged quickly to give rise to two main suborders;	H.	with a flattening of the face.

Ex. 4.9. Read and translate the short text without any dictionary:

Fact of life:

Lemurs are cat-like primates that live exclusively in the tropical rainforests of Madagascar. It is thought that ancestral lemurs became isolated on the island about 50 million years ago and gradually diversified into 40 species. Lemurs have retained numerous primitive characteristics while at the same time developing many features in parallel with monkeys and apes that evolved on the mainland. During this evolution, body mass gradually increased (the ancestral species was very small) which corresponds with a shift away from mainly nocturnal (night-time) activity to diurnal (day-time) activity. This evolutionary trend is also seen among the monkeys and apes. Primitive lemur species are small nocturnal animals that spend nearly all their time climbing and leaping in trees, living mainly on insects. Several other species of lemur

(including Lemur catta) live on the ground. These more advanced lemurs evolved to live in social groups, associated with their becoming diurnal. The young grow up within a troop and much time is spent learning the skills of life, individuals cooperate within the group to gather (fruit and leaves as well as insects) and avoid predators. However, none of the lemurs have the manual dexterity or intelligence of apes and monkeys.

GRAMMAR SECTION

LOGICAL CONNECTORS USED TO EXPRESS CONTRADICTIONS

Linking words (or conjunctions) are words or phrases that connect ideas or sentences within a text. Using linking words makes your text more readable and allows the reader to comprehend the opinion or information you are representing. **Contrast connectors** are used to present a contradiction between ideas.

Connector	Meaning	Example
But	adds statement which is different from what you have said before. It is used to connect contrasting ideas. You cannot use <i>but</i> at the beginning of a sentence (in written English).	I know the answer to the problem, <i>but</i> I do not know why it is.
However	indicates a contrast or contradiction and is more formal than <i>but</i> . You can use it at the beginning of a sentence	I want to come to your party tonight. <i>However</i> , I have to visit my parents. (In case you use <i>but</i> , the sentence should be: "I want to come to your party tonight but I have to visit my parents.")
Nevertheless	is used to say something which contrasts with what has just been said.	Milos said his English is terrible. <i>Nevertheless</i> , he got an 8.0 on his IELTS Writing test.
Note! We can use either <i>however</i> or <i>nevertheless</i> to indicate the second point we wish to make contrasts with the first point. The difference is that <i>nevertheless</i> is a bit more formal and emphatic than <i>however</i> .		
Nonetheless	links two contradictory thoughts	She did not like teaching, but she became a teacher <i>nonetheless</i> .
Even so	indicates something that is unusual or extreme	This hypothesis is true, but <i>even so</i> , further research is required.
At the same time	expresses two things which happen together	Some people can watch TV and play PlayStation games <i>at the same time</i> .
Conversely	expresses an idea that is different from or opposite to the other idea mentioned before	I thought she would not come to the party; <i>conversely</i> , she came to the party with her boyfriend.

Yet	adds something that is surprising after the first sentence which is mentioned before	It is a long-term business, <i>yet</i> it is more fun than other jobs.
Though	shows that two ideas are opposing one another	<i>Though</i> the meal was spicy, it was delicious.
Although	introduces a new statement that makes main statement surprising.	<i>Although</i> she loves her job, she decided to quit her job.
Even though	is used as a stronger way to say “ <i>though</i> ” or “ <i>although</i> ”	<i>Even though</i> I met all the criteria needed for the job, I was not hired.
In contrast	compares two things or people and says that the second one is very different from the first one	This child is short and fat. <i>In contrast</i> , her sister is tall and thin.
Whereas	compares two things which have significant differences from each other	Chicken meat is white, <i>whereas</i> cow meat is red.
On the other hand	to say something that is different from the first thing mentioned	I like playing football. <i>On the other hand</i> , my brother likes playing basketball.
Alternatively	proposes another possibility.	You can play football. <i>Alternatively</i> , you can go to the cinema with me.
Instead	means in place of something or someone else	Would you like to go to another place <i>instead</i> of cinema?
While	means throughout the time	I spilled the juice <i>while</i> I was pouring it.

1. Fill in the right contrast connector:

1. We have failed many times; _____, we still keep trying. 2. Your thoughts are very fanciful, but _____, they are worth imagining. 3. _____, I work part-time at a firm. 4. That woman was short and overweight, _____ somehow, she was attractive. 5. We had no money but, _____, we were very happy. 6. _____ to his big brother, he speaks English very well. 7. I think we can go far away for vacation, or _____, we can go where we went last year. 8. _____ of complaining, you should try to be a constructivist. 9. That man has much money. _____, he isn't happy at all. 10. My father will go to the work, _____ he has two painful operations. 11. _____ John was in London, he went to see Julie. 12. _____ he works hard, he is not successful in the course. 13. The place was so beautiful; _____, we did not want to spend our holiday in here. 14. His family made a lot of effort to make their son's lessons better; _____, he never made any effort. 15. I knew a lot about the subject already, _____ his presentation was interesting

_____. 16. The food was unsalted, but it was _____ delicious.
17. _____ he loves his teacher very much, he did not get used to his friends.
18. Her hair has a natural wave, _____ her sister's hair just straight. 19. They lost the game; _____, they continued to play. 20. I'm not sure what you are planning to do _____ I will always support you.

2. Choose the right option:

1. I use water when making pasta a) *however* b) *instead* c) *whereas* my mom uses eggs. 2. He is very handsome a) *even so* b) *but* c) *in contrast* he is a very rude person. 3. Valerie was excited to attend summer camp; a) *even so* b) *however* c) *yet*, she still had to finish packing. 4. I'd like to eat out, but a) *in contrast* b) *conversely* c) *on the other hand* I should be trying to save money. 5. There are a lot of spelling mistakes; a) *even so* b) *yet* c) *however*, it's quite a good essay. 6. John couldn't attend the conference so Mary went a) *conversely* b) *instead* c) *nevertheless*. 7. a) *Conversely* b) *However* c) *Though*, young people are not so interested in fixed political programmes. 8. They would criticize me, or worse a) *yet* b) *even though* c) *in contrast*, pay me no attention. 9. a) *On the contrary* b) *In contrast* c) *Otherwise*, public sector workers enjoyed a rise in basic pay of 3.4 per cent. 10. a) *nevertheless* b) *on the contrary* c) *even though* I work by myself, there are other people I can interact with. 11. a) *Nevertheless* b) *Otherwise* c) *Alternatively*, the show is beautifully made and edited and as totally watchable as ever. 12. It is not an idea around which the community can unite. a) *Nevertheless* b) *In contrast* c) *On the contrary*, I see it as one that will divide us. 13. You can't think about it a) *nevertheless* b) *otherwise* c) *alternatively* it holds you back. 14. We could go to the Indian restaurant, or a) *nevertheless* b) *otherwise* c) *alternatively*, we could try that new Italian place.

3. Translate into English using the right connector.

1. Мало хто з гітаристів вміє співати так добре, як грає; Однак Едді є винятком. 2. Стара система мала недоліки, але все ж вона була кращою ніж нова. 3. Край був надзвичайно гарний. Тим не менш, Джерард не міг уявити, що проведе там решту свого життя. 4. У мене страшенно боліла голова, але не зважаючи на це я все одно пішла на концерт. 5. Скандинавські круїзи дуже популярні влітку; навпаки, Карибський басейн найбільш популярний взимку. 6. Ми з нею приїхали одночасно зовсім випадково. 7. Вчора було холодно, а сьогодні навпаки дуже спекотно. 8. Давайте підемо гуляти замість того, щоб грати у відеоігри. 9. Подорожуючи, вона сумувала за домашнім затишком. 10. У той час як знання можна отримати з книжок, навички можна отримати лише на практиці.

RELATIVE CLAUSES

There are two types of relative clauses, defining and non-defining. In the grammar chart below, you can see the main differences between them.

DEFINING VS NON-DEFINING RELATIVE CLAUSES

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DEFINING	NON-DEFINING
NO COMMAS	BETWEEN COMMAS
<p>NECESSARY INFORMATION. Essential to distinguish which thing or person we are talking about.</p> <p><i>I called my brother who lives in Ontario.</i></p> <p>(=I have more than one brother and I called the one that lives in Ontario)</p>	<p>EXTRA INFORMATION. Not necessary to distinguish which thing or person we are talking about.</p> <p><i>My brother, who lives in Ontario, is older.</i></p> <p>(=I have only one brother and I'm just mentioning that he lives in Ontario)</p>
WE CAN USE THAT	WE CANNOT USE THAT
<p>We CAN use THAT instead of WHO/WHICH.</p> <p><i>That's the mug WHICH/THAT I bought in Paris.</i></p> <p><i>I didn't know the man WHO/THAT was there.</i></p>	<p>We CANNOT use THAT instead of WHO/WHICH.</p> <p><i>These bikes, WHICH cost a fortune, are made in Japan. (NOT that cost a fortune)</i></p>
RELATIVE PRONOUNS CAN BE OMITTED	RELATIVE PRONOUNS CANNOT BE OMITTED
<p>We CAN omit WHO/WHICH/THAT when they are followed by SUBJECT + VERB</p> <p><i>Do you like the song (WHICH/THAT) I wrote?</i></p> <p><i>That's the man (WHO/THAT) I like.</i></p>	<p>We CANNOT omit WHO/WHICH</p> <p><i>They introduced me to John, who I liked immediately. (NOT John, I liked immediately)</i></p>

t e s t - e n g l i s h . c o m

We usually use *that*, not *which*, after *all*, *everything*, *nothing*, *the only...* and **superlatives**. We do **not** use *What* in these cases.

For example: I've told you *all that* I know.

The only thing that matters to me is your happiness.

4. Say whether the relative clauses are *essential* (necessary) or *not essential* (extra) to the meaning of the main sentence.

1. Paul, who is a famous actor, went to school with my brother. _____
2. The pen which I left on that table has disappeared. _____
3. The man who is repairing our car is very friendly. _____
4. David, who grew up in Canada, speaks fluent French. _____
5. The man whose car was stolen has gone to the police station. _____
6. Rye, where my grandmother lives, is near the sea. _____
7. Roger, whose car has broken down, is late for work. _____
8. The Acropolis, which attracts many tourists, is in Athens. _____
9. The teacher who teaches math is popular in the school. _____
10. Here is the report that he brought us yesterday. _____
11. David, who works really hard, got a promotion. _____

12. The food that I like best of all is spaghetti. _____ 13. Fred, whose mother lives in Edinburgh, has gone to Scotland. _____ 14. The building which was next to the school fell down. _____ 15. Jane, whose brother is also a doctor, works at the hospital.

5. Fill in the *relative pronoun*. Put *commas* where necessary. Say whether the *relative clauses* are *essential* (necessary) or *not essential* (extra) to the meaning of the main sentence.

1. Brian _____ is still at school is the captain of our local team. _____
2. The restaurant _____ we celebrated my birthday has closed. _____ 3. Mrs. Jones is the woman _____ is in charge of this company. _____ 4. London _____ is the capital of England attracts many foreign visitors. _____ 5. The book _____ I'm reading is about China. _____ 6. Mr. Smith _____ runs our company is in hospital. _____ 7. Neville _____ family are rich has just bought a Mercedes. _____ 8. The girl _____ I met on the bus looks just like my sister. _____ 9. Peter Smith _____ had an accident is in hospital. _____ 10. The apples _____ grow on these trees are delicious. _____ 11. This apple pie _____ I made yesterday tastes great. _____ 12. This jumper _____ I bought in Ireland is pure wool. _____ 13. The man _____ wife is seriously ill is very sad. _____ 14. This parrot _____ comes from Africa is a clever mimic. _____ 15. The priest _____ married us has gone to work in Africa. _____

6. Join the sentences using *who, when, where, which* or *whose*.

1. She's the girl. She works in the library. _____
2. Corfu is an island. It has many beautiful beaches. _____
3. Here's the alarm clock. I bought it yesterday. _____
4. Jim is a man. He met the Queen last year. _____
5. That's the beach. I used to go swimming there. _____
6. Steven lives in Bradford. It is a city in the north of England. _____
7. July was the month. My sister was born then. _____
8. I've spoken to John. His house was burgled last Monday. _____
9. That is the radio. I won it in the competition. _____
10. There is the hospital. I was born there. _____
11. This is my new coat. I bought it in yesterday's sale. _____
12. This is the factory. My father used to work here. _____
13. America is the country. The best hamburgers are made there. _____
14. I have ten cousins. None of them are girls. _____
15. The supermarket has 30 employees. Most of them work part-time. _____

7. Complete the sentences with relative pronouns from the box.

<i>that</i>	<i>when</i>	<i>where</i>	<i>which</i>	<i>who</i>	<i>whom</i>	<i>whose</i>	<i>why</i>
-------------	-------------	--------------	--------------	------------	-------------	--------------	------------

1. Is he the person _____ lives with you? 2. The man, _____ wife is a famous violinist, can play the piano himself. 3. The Johnson family, _____ son moved to the U.K., lives in Canada. 4. Can you tell me about the policeman, _____ you spoke with this morning? 5. The bad weather is the reason _____ I didn't come to practice yesterday. 6. Food _____ is imported from other countries is often more expensive than local food. 7. I know a great restaurant _____ we can get good food. 8. The policeman talked to the children _____ mothers were waiting outside. 9. I helped the old lady _____ books fell on the floor. 10. Do you know _____ there are no elephants in South America? 11. My parents remember the time _____ there was no internet. 12. The cake _____ my mother made tasted really great. 13. The fireman rescued the girl _____ was trapped on the third floor. 14. The woman _____ dog barks all the time lives together with her daughter. 15. I often visit my grandparents, _____ live a few blocks down the street. 16. Avatar, _____ we saw a few days ago, won several Oscars. 17. My dad knows a man _____ brother works in the White House. 18. I visited one of my uncles, _____ lives on the other side of town. 19. The office is a place _____ I can do my work without being disturbed. 20. Give this medicine to the parents _____ child is ill. 21. Most of the people _____ she met were asylum seekers. 22. My classmate, _____ studied hard for the test, failed. 23. There is a cafeteria _____ we can have lunch. 24. The man _____ sold me the car is my neighbor.

8. Spot the mistakes and correct them.

The town 1) which I was born has changed greatly over the last 50 years. Now there is a modern shopping centre in the place 2) that my school used to be and all the children 3) whose went there have grown up and moved away. The local cinema, 4) that was built several years ago, used to be a dance hall 5) which big bands played. The park, 6) where was my favourite place as a child, is now a car park. Some things are still the same though. Mrs. Jones, 7) whom is now seventy years old, still lives in the High Street and Mr. Jones still owns the baker's shop, 8) that his two sons now run instead of him. The hospital 9) where I was born in is still standing, although it is now much bigger than it was at the time 10) which I was born. On the day 11) which my family and I left our home town we were all very sad.

9. Translate into English using relative clauses.

1. Будинок, де жили мої дідусь і бабуся, зносять. 2. Узбережжя Суссексу, яке знаходиться на півдні Англії, дуже красиве. 3. Не кожен, хто приходить до мене на свято, приносить мені подарунок. 4. Каліфорнія, яка знаходиться на західному узбережжі Америки, приваблює актрис, серферів і музикантів. 5. Це ті діти, мати яких поліцейська. 6. Куріння – шкідлива звичка, яка щороку стає причиною багатьох смертей. 7. Різдво – час, коли люди купують один одному подарунки. 8. 1666 – є роком, коли велика пожежа знищила більшу частину Лондона. 9. Це собака, яка завжди гавкає, коли до неї наближаєшся. 10. В тесті було декілька запитань, на які я не зміг відповісти. 11. Супермаркет, який знаходиться біля нашого будинку, працює по неділях. 12. Намисто – це те, що носять на шиї. 13. Матч, про який ви говорили, закінчився катастрофою. 14. Саймон, мати якого вегетаріанка, не їсть м'яса. 15. Туристів, які мали дійсні паспорти, пустили в країну.

Relative pronouns are the words that introduce relative clauses. They can act as the subject or the object of the relative clause.

RELATIVE PRONOUNS

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WHO

WHICH

WHOSE

	SUBJECT	OBJECT	POSSESSION
	BEFORE VERB . CANNOT BE OMITTED	BEFORE SUBJECT + VERB . CAN BE OMITTED	AFTER POSSESSOR/OWNER . CANNOT BE OMITTED
PEOPLE 	WHO/THAT That's the man who/that stole the money.	WHO/WHOM*/THAT We need to find people (who/whom*/that) we can trust. <small>*RARELY USED. VERY FORMAL</small>	WHOSE This is the story of a man whose ideas saved lots of lives.
THINGS ANIMALS 	WHICH/THAT That is the dog which/that attacked me the other night.	WHICH/THAT I'll wear the trousers (which/that) I bought in Paris.	WHOSE/OF WHICH The film, whose title (=the title of which) is unknown, will be set in the '60s.

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11. The book _____ I'm reading is very exciting.

12. Miss Hunter _____ works at the bank has been promoted.

13. A) Rewrite these sentences, putting the preposition at the end.

Example: Computer programming is something about which I know little.

Computer programming is something (which/that) I know little about.

1. It was a mistake for which they have already apologized. It was a mistake _____
- _____.
2. Mathematics is a subject in which she has little interest. Mathematics is a subject _____.
3. It was the guerrillas to whom they sold the weapons. It was the guerrillas _____.
4. It was the Queen to whom the Prime Minister sent the letter. It was the Queen _____
- _____.
5. It was the bank from which he borrowed money. It was the bank _____.
6. That was the year in which I was born. That was the year _____.
7. August 24 is the day on which our country celebrates its independence. August 24 is the day _____
- _____.
8. That's the hospital in which the twins were born. That's the hospital _____.
9. That is the island on which we spent our honeymoon. That is the island _____.
10. These are the reasons for which I chose to marry him. _____.

B) Rewrite sentences 7-10 above using the relative adverb *when, where* or *why*.

Example: That was the year when I was born.

7. _____
8. _____
9. _____
10. _____

14. Read the text and think of the relative which best fits each space. Use only one word.

THE RETURN OF THE NATIVE

1980 was the year *when* (0) I first went back to the small village _____ (1) I was born. I was only three years old _____ (2) my parents went to settle in the States. _____ (3) I now consider my home. But like a lot of first-generation Americans _____ (4) parents were constantly talking about 'home' as another country. I was curious to find out more about this place from _____ (5) we had emigrated more than twenty years before. The reason _____ (6) I hadn't visited the land of my parents earlier – something _____ (7) I now regret – perhaps had something to do with the way _____ (8) they would always talk about it as if it were my real home, _____ (9) for me was the States. The first impression I got on

arriving in Santa Maria was the heat, _____ (10) was unbearable. The people _____ (11) were waiting to greet me at the airport were all incredibly friendly and they spoke of the time _____ (12) I was a child in the village as if it was yesterday. My grandfather, _____ (13) eyes filled with tears when he saw me, and who I would be staying _____ (14) while on the island, looked incredibly like my father. _____ (15) hair had recently started to go grey. The village itself, _____ (16) was a two-hour journey up the mountain, was simply stunning.

15. Translate into English using relative clauses.

1. Цей новий фільм про хлопчика, який втратив батьків в автокатастрофі.
2. DVD-рекордер, який я купив у цьому магазині кілька днів тому, не працює.
3. Це книга, яку я рекомендував прочитати.
4. Це готель, де ви зупинялися минулого року?
5. Мій тато, який багато подорожує в справах, зараз в Австралії.
6. Є кілька причин, чому я не маю права надавати вам будь-яку інформацію.
7. Ми зупинилися у відомому готелі Rockstar, де був критий басейн.
8. Чи писали ви тому, хто запропонував вам роботу?
9. Це історія про молоду жінку, чий п'ятирічний син раптово зникає.
10. Тенісний корт, на якому вони зазвичай грають, зараз не доступний.
11. Це трапилося в той час, коли мій тато був без роботи.
12. Де гроші, які я дав тобі вчора?
13. Це той чоловік, з яким я розмовляв днями.
14. Містер Філдс, чия сестра є одним із провідних експертів у цій країні, говорив про небезпеки вірусу.
15. Він не сказав нам, чому прийняв таке безвідповідальне рішення.
16. Подарунок, який я отримала від батьків, був справді фантастичним.
17. Мені потрібно купити подарунок для мами, у якої наступного тижня день народження.
18. Молодіжний хостел, де ми зупинялися минулого тижня, був справді чудовим.

PASSIVE VOICE

The Passive Voice is used

- 1) when the agent (the person who does the action) is unknown, unimportant or obvious from the context:
Java **was developed** in 1995
- 2) to make statements more polite or formal.
My new vase **has been broken**. (It's more polite than saying "You've broken my new vase")

3) when the action is more important than the agent – as in news reports, formal notices, instructions, processes, headlines, advertisements etc. Java was designed to create Internet applications.		
4) to put emphasis on the agent. Java was invented by Sun Microsystems.		
The Passive voice is formed by using the appropriate tense of the verb <i>to be + past participle</i>		
Present Simple	Waitresses and waiters serve customers.	Customers are served by waitresses and waiters.
Present Continuous	Tom is preparing that report.	That report is being prepared by Tom.
Present Perfect	She has suggested a new idea.	A new idea has been suggested .
Past Simple	Tom opened the door.	The door was opened by Tom.
Past Continuous	Tom was translating the article.	The article was being translated by Tom.
Past Perfect	He had returned the book to the library.	The book had been returned to the library.
Future Simple	The trick won't fool me.	I won't be fooled by the trick.
Future Perfect	They will have learned the poem by the evening.	The poem will have been learned by the evening.
Present Infinitive	She can buy an envelope in the post-office.	An envelope can be bought in the post-office.
Perfect Infinitive	She must have left her report at home.	Her report must have been left at home.

16. Change the following active sentences to passive sentences:

1. People grow corn in Iowa. _____ in Iowa.
2. Someone made this antique table in 1734. _____ in 1734.
3. Someone has stolen my purse. _____.
4. Someone was making the coffee when I walked into the kitchen. _____
 _____ when I walked into the kitchen.
5. Translators have translated that book into many languages. _____
 _____ into many languages.
6. Jim's daughter drew that picture. _____
 _____ Jim's daughter.
7. Is Professor Rivers teaching that course this semester? _____ this semester?
8. When did someone invent the radio? _____?
9. The mail carrier had already delivered the mail by the time I left for school this morning. _____
 _____ by the time I left for school this morning.
10. Someone will serve dinner at six. _____ at six.
11. The teacher is giving a test in the next room right now. _____ in the next room right now.
12. I will have finished my homework by the time I go out on a date tonight. _____
 _____ by the time I go out on a date tonight.

17. Use the words in the following list to complete the sentences. All the sentences are passive. Use any appropriate tense.

<i>build</i>	<i>cause</i>	<i>confuse</i>	<i>divide</i>	<i>expect</i>	<i>frighten</i>	<i>kill</i>
<i>offer</i>	<i>order</i>	<i>report</i>	<i>spell</i>	<i>surprise</i>	<i>surround</i>	<i>wear</i>

1. An island _____ by water. 2. The *-ing* form of “sit” _____ with a double *t*. 3. Even though construction costs are high, a new dormitory _____ next year. 4. The class was too large, so it _____ into two sections. 5. A bracelet _____ around the wrist. 6. The Johnson’s house burned down. According to the inspector, the fire _____ by lightning. 7. Albert got a ticket for reckless driving. When he went to traffic court, he _____ to pay a fine of \$100. 8. I read about a hunter who _____ by a wild animal. 9. The hunter’s fatal accident _____ in the newspaper yesterday. 10. I didn’t expect Lisa to come to the meeting last night, but she was there. I _____ to see her there. 11. Last week I _____ a job at a local bank, but I didn’t expect. 12. The children _____ in the middle of the night when they heard strange noises in the house. 13. Could you try to explain this math problem to me again? Yesterday in class I _____ by the teacher’s explanation. 14. Is the plane going to be late? – No. It _____ to be on time.

18. Rewrite the following sentences in the Passive.

a) Leave out the italicized words:

1. *They* punished this man for something he hadn’t done. _____ he hadn’t done. 2. *Everyone* knows this piece of music quite well. _____ quite well. 3. Did the *government* take any important measures in the past few weeks? _____ in the past few weeks? 4. Do *they* perform this play regularly? _____ regularly? 5. I don’t think *anyone* can help me. _____ 6. The *soldier* kept the man prisoner. _____ .6. *They* built this tunnel two years ago. _____ two years ago. 7. *He* must finish his work before eight o’clock. _____ before eight o’clock. 8. *His friend* will never forget him. _____. 9. *No one* could possibly have recognized him. _____

b) Make the italicized words the subject of the sentence. Decide whether the agent should be mentioned or not.

1. The news didn't surprise *us*, so it didn't frighten us. _____
_____, so, it didn't frighten us.
2. Somebody has stolen *my car*. _____
_____.
3. Nobody has ever found *the secret*. _____
_____.
4. They approved of *our plan*. _____.
5. One speaks of *them* everywhere. _____.

c) Supply the by-phrase only if it contains relevant and essential information.

1. I will bring up this question at our next meeting. _____
_____.
2. We shall then deal with it more fully. _____
_____.
3. Have you looked into this matter? _____
_____.
4. The fact do not bear out your argument. _____
_____.
5. No one has ever looked after this house properly. _____
_____.
6. Is anybody attending to you? _____
_____.
7. They have turned down my application. _____
_____.
8. Thieves broke into the National Bank last night. _____
_____ last night.

19. Complete these sentences with the following verbs (in the correct form):

<i>arrest carry cause do make repair send spend wake up</i>

1. The situation is serious. Something must _____ before it's too late.
2. I should have received the letter by now. It might _____ to the wrong address.
3. A decision will not _____ until the next meeting.
4. Do you think that more money should _____ on education?
5. This road is in very bad condition. It should _____ a long time ago.
6. The injured man couldn't walk and had to _____ to hospital.
7. I told the hotel receptionist I wanted to _____ at 6.30 the next morning.
8. If you hadn't pushed the policeman, you wouldn't _____.
9. It's not certain how the fire started, but it might _____ by an electrical fault.

20. Rewrite the following sentences in the Active.

1. The school was struck by lightning. _____
2. This morning the burglar was arrested by the police. _____
_____.
3. One type of air pollution is caused by hydrocarbons. _____
_____.
4. An elaborate supper for the miners was prepared by Mr. Patel and his children. _____
_____.
5. The cookies were stolen by the Mad Hatter. _____
6. New York City's _____

Central Park was designed in 1857 by F. L. Olmsted and Calvert Vaux. _____

7. It was decided by the court that the contract was invalid. _____

_____ 8. The first commercially successful portable vacuum cleaner was invented by a janitor who was allergic to dust. _____

_____ 9. After Leonardo da Vinci's death, the Mona Lisa was purchased by King Francis I of France. _____

10. The allegorical novel Animal Farm was written by British author George Orwell during World War II. _____

21. Translate into English. Use the Passive voice in the proper tense form.

1. Роботу щойно завершено. 2. Доповідь слухали дуже уважно. 3. Його вчора ніде не бачили. 4. Телеграму отримують лише завтра. 5. У Києві будується нова станція метро. 6. Коли була написана ця пісня? 7. Його попросили взяти участь у концерті. 8. Про цю виставу багато говорять. 9. Нам порадили написати статтю англійською мовою. 10. Вас просять до телефону. 11. Мені дали цю книгу лише на тиждень. 12. Цей фільм не дубльований на українську мову. 13. Ця п'еса поставлена в нашому театрі. 14. Мене про це ніколи не запитували. 15. В дитинстві її навчали музиці. 16. Після лекції нам покажуть фільм про Україну. 17. Телеграму ще не відправили. 18. Цікаво, чи сказали йому про це вже, чи ні. 19. З вас будуть сміятися, якщо ви це скажете. 20. Ця фортеця побудована в XVII столітті. 21. Коли стаття буде написана, її помістять у журналі. 22. Твір вже написаний? 23. Ця доповідь була написана до того, як були зроблені нові відкриття в цій сфері. 24. Мені вже ставили таке запитання на екзамені. 25. Я впевнена, що вам поставлять багато запитань, коли ви будете розповідати про свою подорож Європою. 26. Йому раніше вже ставили подібні запитання, тому він знав, що відповісти. 27. Чому ви відмовились, коли вам запропонували цю роботу? 28. За хворою матір'ю доглядає її донька. 29. Чи послали за лікарем? У дитини висока температура. 30. Він зробив все, про що його просили.

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Навчально-методичне видання

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