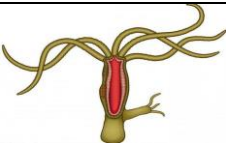
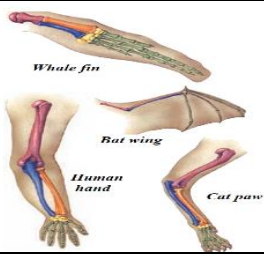
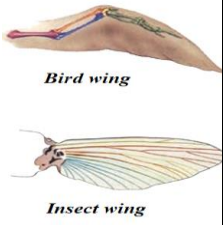
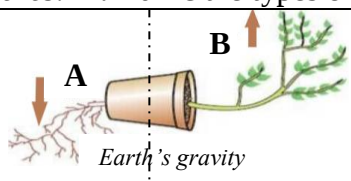
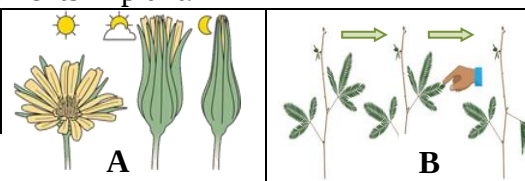
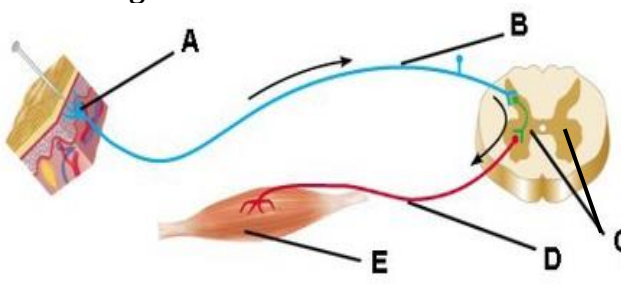
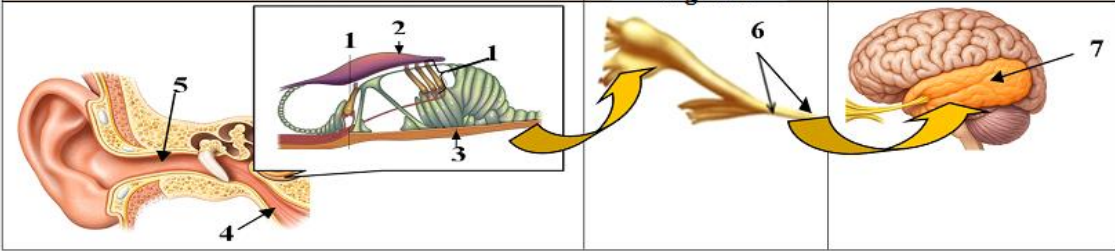
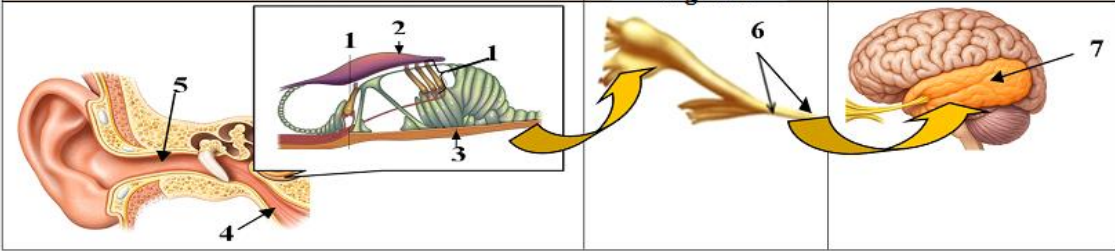
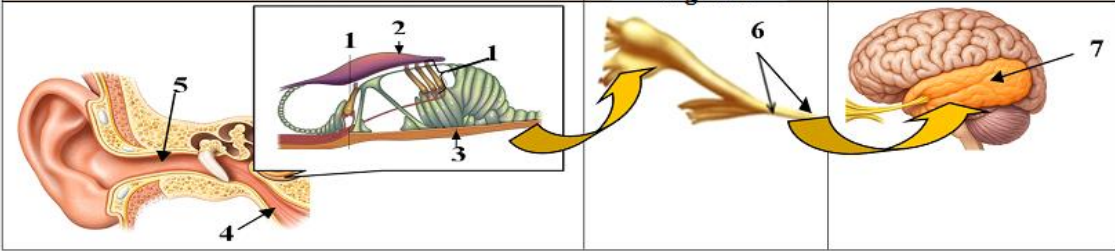
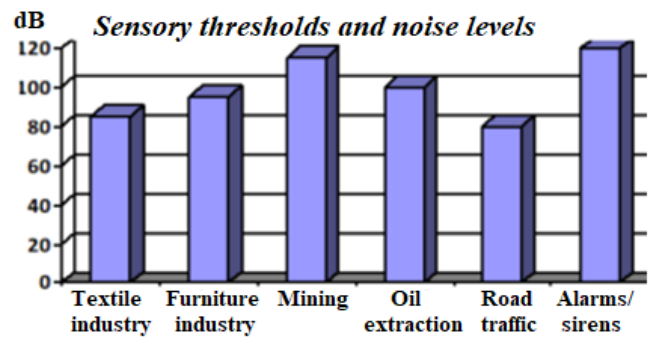
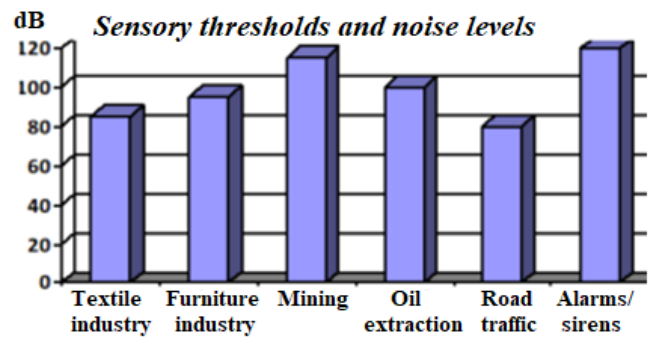
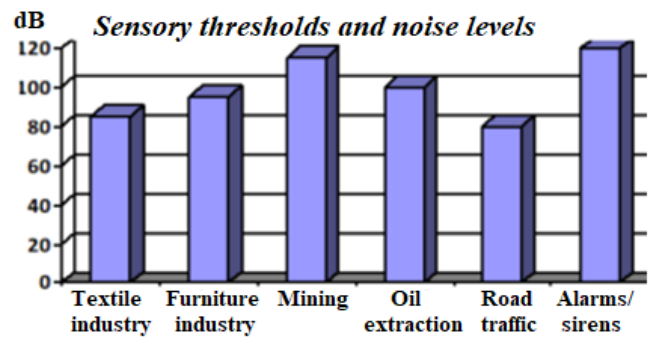


№	ITEMS			Score		
Diversity in the living world and evolutionary characteristics of the living world						
1.	The territory of the Republic of Moldova presents a mosaic of ecosystems that support the development of a rich and diverse biodiversity. Analyse the images below and complete the blank spaces in the table by assigning the names of the taxa to which the species distributed on the territory of the Republic of Moldova belong.			L	L	
				0	0	
				1	1	
				2	2	
				3	3	
				4	4	
				5	5	
	Species	 Dog rose (<i>Rosa canina</i>)	 Tulip (<i>Tulipa suaveolens</i>)	 Roman snail (<i>Helix pomatia</i>)		
	Class					
	Species	 Noble crayfish (<i>Astacus fluviatilis</i>)	 Lake frog (<i>Pelophylax ridibundus</i>)	 Sand lizard (<i>Lacerta agilis</i>)		
Class			 Reptiles			

2.	a) Identify the adaptations of the organisms presented in the images below to conditions of low humidity (<i>complete the table</i>).				L	L
	Plant adaptations		Animal adaptations		0	0
					1	1
					2	2
					3	3
					4	4
					5	5
3.	b) Describe the metabolic function of the organic substances that are stored in large quantities in the camel's hump. _____				6	6
4.	a) Complete the table with the anatomo-physiological characteristics of the representatives of the kingdom Animalia .				L	L
	Typical representatives				0	0
	Criteria				1	1
	Type of nervous system				2	2
					3	3
	Type of breathing (respiration)				4	4
					5	5
5.	b) Describe the ecological role of reptiles in the protection of agroecosystems. _____				6	6
					7	7
					8	8
6.	The evolution of the living world is supported by a large amount of scientific evidence.				L	L
	a) Provide an argument from embryology. _____				0	0
					1	1
	b) Analyse the images. Complete the table with arguments from <i>comparative anatomy</i> .				2	2
	Comparative anatomy				3	3
		Vestigial structures			4	4
						
Vital systems and processes						
7.	Write in the space provided the essence of the definitions for the following biological terms:				L	L
	Reflex - _____				0	0
					1	1
	Sensory analyser -_____				2	2
					3	3
					4	4

6.	Excitability is the capacity of organisms to respond to stimuli. In plants, the response is manifested through <i>oriented movements</i> and <i>non-oriented movements</i> , while in animals – through <i>reflexes</i> . I. Name the types of movements in plant.		L	L										
			0	0										
			1	1										
			2	2										
			3	3										
			4	4										
			5	5										
			6	6										
			7	7										
			8	8										
			9	9										
			10	10										
II. The diagram below shows the somatic reflex arc.														
			a) Write the name of the anatomical components/segments of the somatic reflex arc corresponding to the letters in the diagram. B _____ C _____ D _____ E _____											
b) State the function performed by component A.														
7.	The somatosensory system plays an essential role in the protection of the organism, spatial orientation and the maintenance of homeostasis. a) Column A lists examples of cutaneous receptors , while column B - their functions. Write in the provided space A the corresponding numbers from column B . <i>One number is extra!</i>		L	L										
	<table><thead><tr><th>A</th><th>B</th></tr></thead><tbody><tr><td>Merkel's disks _____</td><td>1. receive tactile stimuli of strong touch;</td></tr><tr><td>Meissner's corpuscles _____</td><td>2. receive low-frequency vibrations;</td></tr><tr><td>Vater-Pacini corpuscles _____</td><td>3. generate nerve impulses in response to temperatures above 30⁰ C;</td></tr><tr><td></td><td>4. are stimulated by vibrating objects and skin movement over rough surfaces.</td></tr></tbody></table>		A	B	Merkel's disks _____	1. receive tactile stimuli of strong touch;	Meissner's corpuscles _____	2. receive low-frequency vibrations;	Vater-Pacini corpuscles _____	3. generate nerve impulses in response to temperatures above 30 ⁰ C;		4. are stimulated by vibrating objects and skin movement over rough surfaces.	0	0
A	B													
Merkel's disks _____	1. receive tactile stimuli of strong touch;													
Meissner's corpuscles _____	2. receive low-frequency vibrations;													
Vater-Pacini corpuscles _____	3. generate nerve impulses in response to temperatures above 30 ⁰ C;													
	4. are stimulated by vibrating objects and skin movement over rough surfaces.													
			1	1										
			2	2										
			3	3										
			4	4										
			5	5										
			6	6										
			7	7										
b) State the functions of the cells located in the epidermis: <i>Melanocytes</i> - _____ _____ <i>Keratinocytes</i> - _____ _____														
c) Describe the exocrine function of the structures located in the skin, using the following biological terms: <i>thermoregulation, inorganic substances, sebum, excess water and mineral salts, organic substances, sweat glands, sebaceous glands</i> . _____ _____ _____														

8.	Each sensory analyser is composed of three fundamental segments. a) Name the segments of the auditory analyser (<i>complete the table</i>). <table><tr><td></td><td><i>Intermediate segment</i></td><td></td></tr><tr><td></td><td></td><td></td></tr></table> b) Write the names of the structures of auditory analyser corresponding to the numbers in the diagram. <table><tr><td>External ear: ☐ _____</td><td rowspan="4"><i>The nerve impulse transmission pathway from the receptor to the central nervous system:</i> ☐ _____ _____ _____</td><td><i>The cortical lobe in which the auditory sensation is formed:</i> ☐ _____ _____ _____</td></tr><tr><td>Middle ear: ☐ _____</td></tr><tr><td>Organ of Corti: ☐ _____ ☐ _____ ☐ _____</td></tr><tr><td></td></tr></table> c) Indicate the function of the structure labelled 4 in the image above. d) Name the type of receptor to which the organ of Corti belongs (<i>according to the stimulus energy</i>). 		<i>Intermediate segment</i>					External ear: ☐ _____	<i>The nerve impulse transmission pathway from the receptor to the central nervous system:</i> ☐ _____ _____ _____	<i>The cortical lobe in which the auditory sensation is formed:</i> ☐ _____ _____ _____	Middle ear: ☐ _____	Organ of Corti: ☐ _____ ☐ _____ ☐ _____		L	L
	<i>Intermediate segment</i>														
															
External ear: ☐ _____	<i>The nerve impulse transmission pathway from the receptor to the central nervous system:</i> ☐ _____ _____ _____	<i>The cortical lobe in which the auditory sensation is formed:</i> ☐ _____ _____ _____													
Middle ear: ☐ _____															
Organ of Corti: ☐ _____ ☐ _____ ☐ _____															
		0	0												
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		6	6												
		7	7												
		8	8												
		9	9												
		10	10												
		11	11												

9.	Prolonged exposure to noise levels exceeding 85 dB can damage the hearing. The diagram below shows the average noise levels recorded in various work environments. Analyse the diagram carefully! <table><tr><td></td><td> a) Identify the working environments: <i>that are not harmful for the auditory analyser.</i> <i>That present the highest risk to the auditory analyser.</i> </td></tr></table> b) Suggest two prophylactic measures for individuals exposed to environments with high levels of noise pollution. Argue each proposed method. 1. _____ _____ _____ 2. _____ _____ _____		a) Identify the working environments: <i>that are not harmful for the auditory analyser.</i> <i>That present the highest risk to the auditory analyser.</i> 	L	L
	a) Identify the working environments: <i>that are not harmful for the auditory analyser.</i> <i>That present the highest risk to the auditory analyser.</i> 				
		0	0		
		1	1		
		2	2		
		3	3		
		4	4		
		5	5		
		6	6		

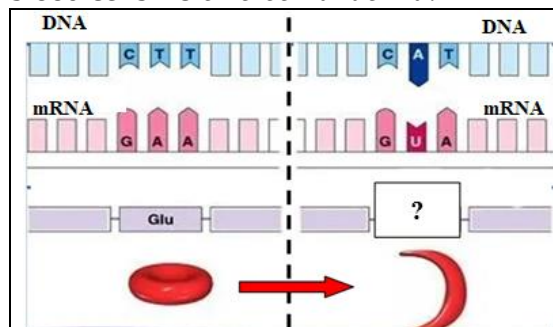
10.	Read the text carefully. Solve the tasks. <i>A five-year-old child presents at the ENT (ear, nose, throat) clinic with his mother, who has noticed that he is irritable, crying and frequently bringing his hand to his ear. Following a thorough examination, the doctor established the diagnosis – otitis.</i> a) Indicate one <i>clinical</i> symptom of otitis, based on which the doctor established the diagnosis quickly and correctly. b) Name the pathogenic agent that causes otitis. c) State 2 prophylactic measures that can be implemented to promote a health-preserving behaviour and prevent otitis. Support your answer. 1. 2.	L 0 1 2 3 4 5 6	L 0 1 2 3 4 5 6
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Basis of genetics and organism improvement/genetic engineering

11.	Write, in the space provided, the essence of the definitions for the following biological terms: Genotype - Mutation -	L 0 1 2 3 4	L 0 1 2 3 4
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12.	I. a) Write down the nucleotide sequence in mRNA transcribed from the following DNA fragment. DNA 5' CCG AGC TCG TTT AAA CGG CCC TTA 3' 3' GGC TCG AGC AAA TTT GCC GGG AAT 5' mRNA	L	L																																										
		0	0																																										
		1	1																																										
		2	2																																										
		3	3																																										
		4	4																																										
		5	5																																										
		6	6																																										
		7	7																																										
	b) Write down the sequence of amino acids in the polypeptide chain, encoded by this mRNA (use the genetic code). _____ _____ c) Name two properties of the genetic code. 1. _____ 2. _____ <table><tr><th colspan="6">Genetic code</th></tr><tr><th>First base</th><th colspan="3">Second base</th><th colspan="2">Third base</th></tr><tr><th>End 5'</th><th>U</th><th>C</th><th>A</th><th>G</th><th>End 3'</th></tr><tr><td>U</td><td>Phe Phe Leu Leu</td><td>Ser Ser Ser Ser</td><td>Tyr Tyr Stop Stop</td><td>Cys Cys Stop Try</td><td>U C A G</td></tr><tr><td>C</td><td>Leu Leu Leu Leu</td><td>Pro Pro Pro Pro</td><td>His His Gln Gln</td><td>Arg Arg Arg Arg</td><td>U C A G</td></tr><tr><td>A</td><td>Ile Ile Ile Met (Start)</td><td>Thr Thr Thr Thr</td><td>Asn Asn Lys Lys</td><td>Ser Ser Arg Arg</td><td>U C A G</td></tr><tr><td>G</td><td>Val Val Val Val</td><td>Ala Ala Ala Ala</td><td>Asp Asp Glu Glu</td><td>Gly Gly Gly Gly</td><td>U C A G</td></tr></table>	Genetic code						First base	Second base			Third base		End 5'	U	C	A	G	End 3'	U	Phe Phe Leu Leu	Ser Ser Ser Ser	Tyr Tyr Stop Stop	Cys Cys Stop Try	U C A G	C	Leu Leu Leu Leu	Pro Pro Pro Pro	His His Gln Gln	Arg Arg Arg Arg	U C A G	A	Ile Ile Ile Met (Start)	Thr Thr Thr Thr	Asn Asn Lys Lys	Ser Ser Arg Arg	U C A G	G	Val Val Val Val	Ala Ala Ala Ala	Asp Asp Glu Glu	Gly Gly Gly Gly	U C A G		
Genetic code																																													
First base	Second base			Third base																																									
End 5'	U	C	A	G	End 3'																																								
U	Phe Phe Leu Leu	Ser Ser Ser Ser	Tyr Tyr Stop Stop	Cys Cys Stop Try	U C A G																																								
C	Leu Leu Leu Leu	Pro Pro Pro Pro	His His Gln Gln	Arg Arg Arg Arg	U C A G																																								
A	Ile Ile Ile Met (Start)	Thr Thr Thr Thr	Asn Asn Lys Lys	Ser Ser Arg Arg	U C A G																																								
G	Val Val Val Val	Ala Ala Ala Ala	Asp Asp Glu Glu	Gly Gly Gly Gly	U C A G																																								

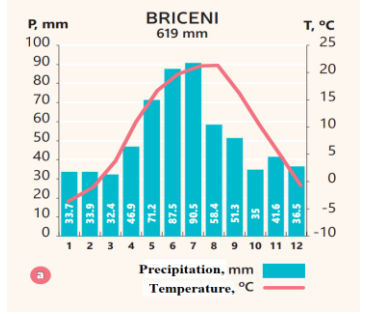
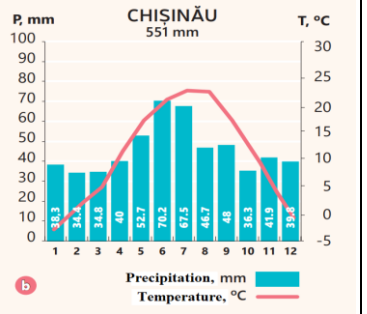
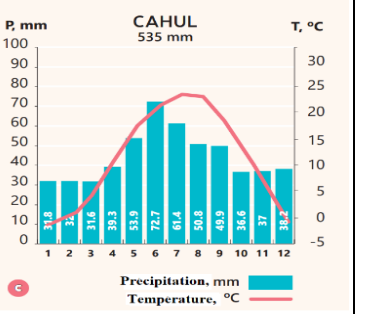
II. Analyse the image below illustrating the mutation responsible for sickle-shaped red blood cells – *sickle-cell anaemia*.



- a) Name** the nitrogenous base of the nucleotide that was replaced.
-
- b) Identify** the amino acid (?) included in the structure of the altered protein.
-
- c) Write** the type of gene mutation represented in the image.
-
-

[illegible]

Ecology and environmental protection

14.	I. a) Write in the space provided the essence of the definition for the following biological term: Biocenosis - _____ b) Characterise the agroecosystem "Wheat field" presented in the image below, according to the following criteria:  Human intervention - Self-regulation capacity - II. Analyse carefully the information presented below. Agriculture, the main branch of the national economy, is severely affected by climate change. The graphs below show climographs from different meteorological stations on the territory of our country (average values for the period 1960–2020, over the 12 months of the year). Analyse the climographs carefully. BRICENI 619 mm  CHIȘINĂU 551 mm  CAHUL 535 mm  a) Circle, on the image, the autumn month with the lowest level of precipitation in the central region of the country. b) The grapevine is a crop that represents the Republic of Moldova, being closely linked to the traditions and economy of the country. This crop is more commonly cultivated in the central and southern regions of the country. Explain why this crop is less frequently cultivated in the <i>northern</i> part of the country (use the data from the graphs above). c) Indicate the benefits of planting trees (afforestation) in the southern region of the Republic of Moldova, in the context of climate change, on: air - soil - Wheat represents one of the most important agricultural crops, having an essential role in ensuring food security. This cereal plant constitutes the main raw material for obtaining Bread.  d) Suggest a modern biotechnological method for wheat breeding for the development of sustainable agriculture in the southern region of the country. Support your answer. 	L	L
		0	0
		1	1
		2	2
		3	3
		4	4
		5	5
		6	6
		7	7
		8	8
		9	9
		10	10
		11	11