

ÉRETTSÉGI VIZSGA • 2010. május 12.

BIOLÓGIA ANGOL NYELVEN

KÖZÉPSZINTŰ ÍRÁSBELI VIZSGA

2010. május 12. 8:00

Az írásbeli vizsga időtartama: 120 perc

Pótlapok száma	
Tisztázati	
Piszkozati	

**OKTATÁSI ÉS KULTURÁLIS
MINISZTERIUM**

Important information

Before you start working read the instructions below carefully.

You have 120 minutes to complete your intermediate level examination. Your questions are either multiple choice or open-ended ones.

When answering **multiple choice questions** you need to write one or two CAPITAL LETTERS into the empty boxes. These are the letters of the correct answer or answers. Make sure that your answers are unambiguous, otherwise they will not be accepted. If you want to correct your answer **CROSS OUT THE WRONG ONE AND WRITE THE CORRECT LETTER NEXT TO IT**.

A	D
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correct

A	DC
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acceptable

DD

wrong

When **answering open-ended questions**, you need to write technical terms, a few words, a whole sentence or several sentences. Write your answers on the dotted (.....) line. **MIND YOUR GRAMMAR** because if your answer is not understandable because of bad grammar, or because it is illegible (e.g. it is not clear what the subject of the sentence is), it will not be acceptable even if it contains the correct terms.

Each correct answer is awarded 1 mark, unless otherwise indicated.

Use black or blue pen!

Don't write anything into the grey boxes.

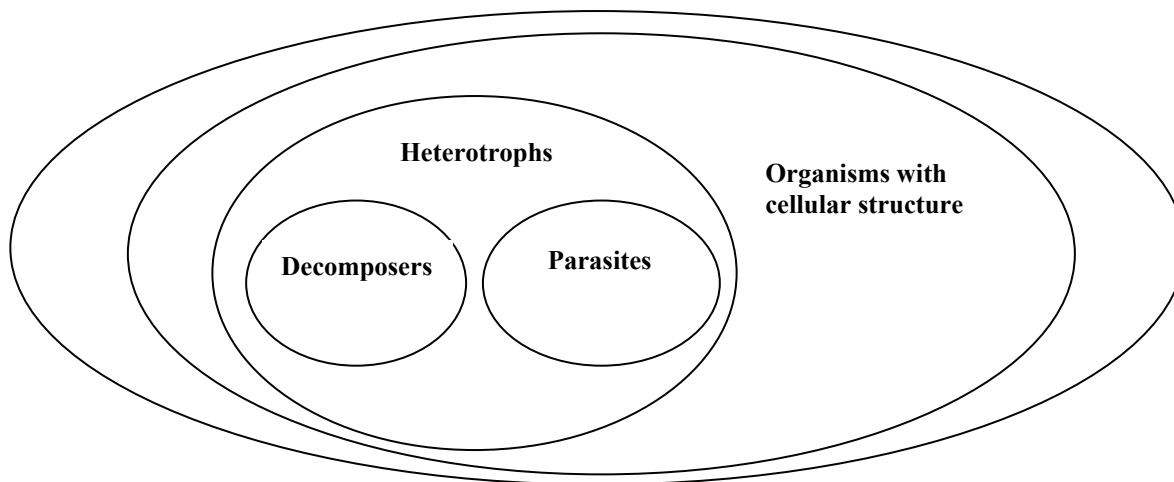
Good luck for your exam.



I. Different life forms

8 points

Based on their descriptions below allocate the following species to their appropriate groups. Write their numbers into the correct circles in the figure below.



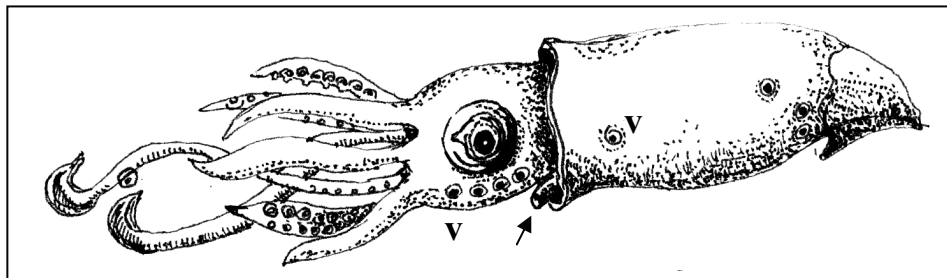
1. The seeds of **dodder species** (aranka) germinate near the host plants. The young dodder plant wraps itself around the host plant and inserts its haustoria into the phloem vessels of the host plant. They do not perform photosynthesis.
2. **Streptococcus pneumoniae** is a bacterium causing pneumonia.
3. The **common rough woodlouse** (érdes pinceászka) is a kind of crustacean belonging to the group of arthropods. It lives in damp and dark cellars, under tree barks, cracks in walls, and feeds on decomposing plant matter.
4. **Downy mildew**, (szőlőperonoszpóra) a fungal parasite of grapevine, grows its hyphae into the leaf cells and consumes the cell sap. It then grows its reproductive hyphae out of the stomata onto the lower surface of the leaf to form a white greyish mycelial growth.
5. It was in 1892 that Dimitrij Ivanovskij discovered that the mosaic disease of the tobacco was caused by a **virus**.
6. **Cultivated button mushroom** (termesztett csiperke) produced in cellars are grown on mature, manure compost that contains straw.)
7. **Ulothrix zonata** is a filamentous green alga of about 30 cm in length that lives in clean, fresh water streams. In its cells, ring shaped chloroplasts can be observed under the microscope.
8. In **Paramecium caudatum** (papucsállatka) the cilia of the oral groove drive single celled organisms into the mouth of the cell to be enclosed in food vacuoles.

1.	2.	3.	4.	5.	6.	7.	8.	total

II. Lantern squid (Csodalámpás polip)

8 points

The lantern squid shown in the picture is a deep ocean dweller species found more than 1200m below the surface. It is named after its light organ (indicated with a 'v' in the figure) which contains light-emitting bacteria. With the help of this organ, the lantern squid lures in its prey. It also helps the animal find its mating partner of the opposite sex.

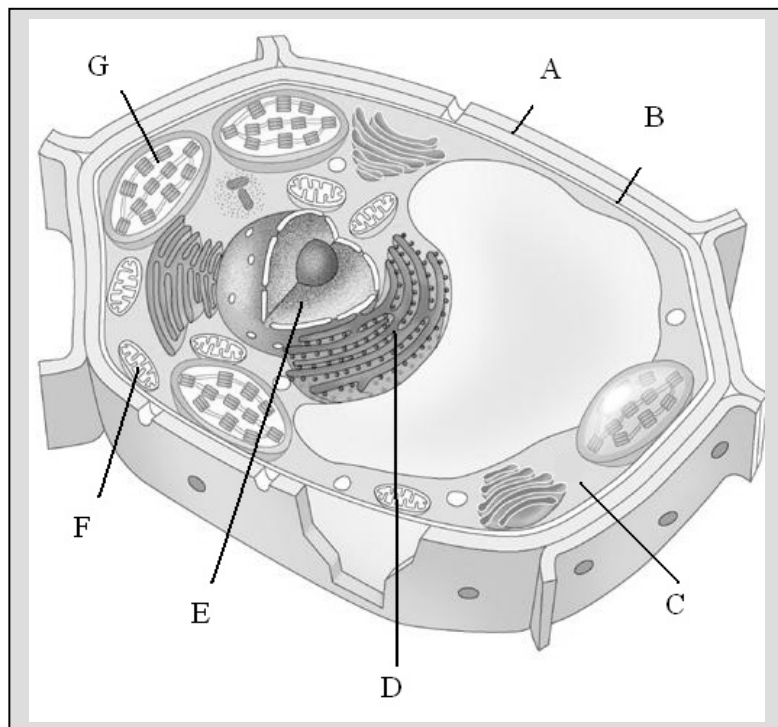


1. Which group (class) of molluscs does the lantern squid belong to?
.....
 2. What is the name of the species interaction that can be observed between the lantern squid and the bacteria?
.....
 3. Water flows to the gills of the lantern squid through the opening indicated by the arrow in the figure. Where does this opening lead to?
.....
 4. The eye of the lantern squid is similar in many respects to that of humans. What structural feature do they have in common (the one feature that distinguishes the eye of the lantern squid from the eye of other invertebrates)?
.....
 5. If in danger, the lantern squid is able to move rapidly backwards. How is this achieved?
.....
 6. Choose the correct statements from the ones below and write their letters into the boxes. (3 points)
- A. The bacteria living in the lantern squid are able to carry out photosynthesis.
 - B. The lantern squid relies on the oxygen derived from the chemical breakdown of water for breathing.
 - C. The lantern squid is a heterotrophic eukaryotic organism.
 - D. The lantern squid can turn into its medusa form during asexual reproduction.
 - E. The lantern squid requires oxygen for its life processes.
 - F. The central nervous system of the lantern squid is made up of its brain and spinal cord.
 - G. The lantern squid has separate sexes.

1.	2.	3.	4.	5.	6.	total

III. The cell

10 points



In this figure you can see a cell.

1. What kind of cell is shown in the figure?

Write the letters of the correct answers into the boxes.

2 points

- A. Animal cell
- B. Plant cell
- C. Prokaryotic cell
- D. Eukaryotic cell
- E. Fungus cell

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Write the name of the corresponding cellular organelle and its letter next to each of the following statements.

	Name of the cellular organelle	Letter
2. It is made up of a lipid bilayer and controls the movement of materials in and out of the cell.		
3. It is the site of RNA synthesis		
4. Ribosomes are located on its surface where protein synthesis is carried out.		
5. It determines the shape of the cell		
6. The synthesis of glucose also takes place here.		

7. Name the biochemical process whose intermediate steps are carried out in the cell organelle indicated by letter F and whose by-products are simple inorganic substances

.....

8. Write down the equation of this chemical reaction if the substance we start off from is glucose.

.....

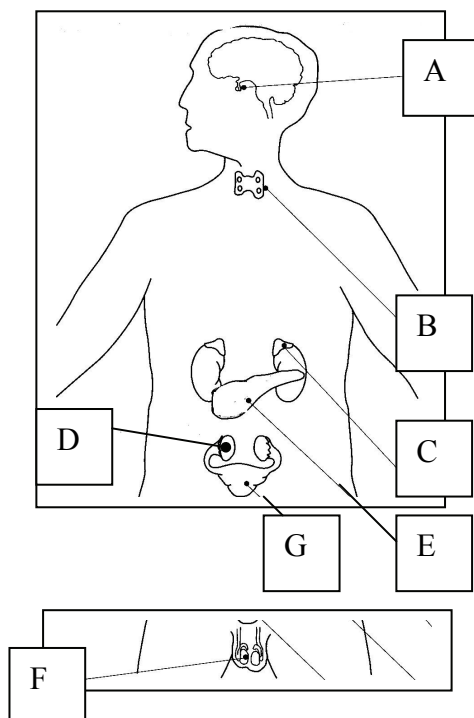
9. Which tissue might the cell above be derived from? *Write the letter of the correct answer into the box.*

- A. Epidermal tissue
- B. Meristematic tissue
- C. Epithelial tissue
- D. Chlorenchyma tissue
- E. Vascular tissue

1.	2.	3.	4.	5.	6.	7.	8.	9.	total

IV. Endocrine glands

10 points



The positions of the human endocrine glands are shown in the figure. (A separate figure shows the male reproductive organ.) Match the letters indicating each gland to their biological function.

The same letter may be used more than once.

1.	It produces the male sex hormones and sperm cells.	
2.	Due to the effect of its hormone, the lining of the uterus builds up in the second half of the menstrual cycle.	
3.	An increasing amount of its hormone is produced in response to rising blood sugar levels.	
4.	Adrenalin is released from its medulla in response to stressful situations	
5.	The release of one of its hormones is inhibited by the hormone of gland B through a negative feedback.	
6.	It produces a hormone which increases the break-down of glucose and the temperature of the body.	
7.	Through its hormonal production it regulates the different stages of the menstrual cycle.	
8.	It releases a hormone into the bloodflow which brings about the smooth muscle contraction of the uterus.	
9.	A hormone is released in here which indicates the embedding of the embryo and the onset of pregnancy.	
10.	This gland is primarily responsible for the appearance of female secondary sexual characteristics.	

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	total

V. Cichlids (bölcsőszájú halak)

10 points

The Austrian ethologist, Konrad Lorenz described the reproduction of cichlids in one of his essays titled 'Fishblood'.

"In 1941 I got hold of two pairs of big, beautiful South-American *Herichtys cynoguttatus*, which are called 'blue spotted hero fish' in Germany. This is a very telling name: it has a varied pattern of drop-shaped dark blue spots against a velvet black background which is breathtakingly beautiful, and during their spawning period they take such a heroic stand against even the most formidable enemy that they undoubtedly deserve their name. Originally, I had five little fish which - at this time - neither had blue spots, nor did they seem particularly heroic. After a few weeks of ample feeding, however, blue spots began to appear on one of the two biggest fish along with the heroic behaviour pattern. The next morning one of the four, with a smaller stature, put on her courtship dress, too. However, her bluish black blouse without the decorative blue spots gave her sex (female) away. The male straight away set about luring his darling into his home. In the end, the couple positioned themselves above their nesting site and protected their territory desperately."

1. How do most fish reproduce? *Write the letter of the correct answer into the box below.*

- A. They are hermaphrodite and have external fertilisation
- B. They are hermaphrodite and have internal fertilisation
- C. They have separate sexes and external fertilisation
- D. They have separate sexes and internal fertilisation
- E. Asexually

Match the letters of the following ethological terms with the numbered sentences of the text. *Write the appropriate letter next to each statement below. Each correctly answered line is awarded 1 point.*

- A. Aggression
- B. Territorial behaviour
- C. Communication
- D. Sustenance/survival behaviour

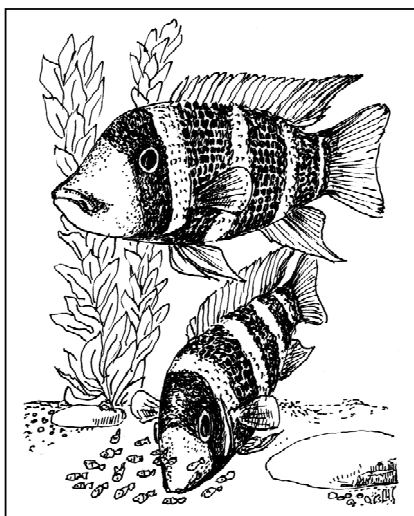
2. during their spawning period they take such a heroic stand against even their most formidable enemy...		
3. blue spots began to appear on one of the two biggest fish		
4. her bluish black blouse without the decorative blue spots gave her sex (female) away		
5. In the end the couple positioned themselves above their nesting site and protected their territory desperately.		

6. What is it that directly triggers the changes in appearance and behaviour during the reproductive period in sexually mature individuals. *Give your answer in one sentence.*

.....

.....

Lorenz also describes the parental care of a related species:



"The jewel cichlid (bíborsügér) parents carry the young ones back to the nesting site where they spend their early life until they are quite a few weeks old. The female positions herself above the nesting site and by displaying different movements she starts calling the offspring. The ornamented dorsal fin of the female has a special role to play in this situation. The blue gems of the rapidly moving fins give off flashes of light like a light telegraph. The offspring are attracted by the signals and gather together in the nesting site under the mother fish. In the meantime, the male patrols the pool in search of possible latecomers. However, instead of begging them to go home, the male simply sucks them into his mouth, swims to the nesting site and blows them out there.

The ones 'taken care of' in this way sink to the bottom and stay there. Due to a very wisely designed reflex action, the swim bladder of the sleeping fish kids contracts and, as a result, they become more dense than the water lying on the bottom just like pebbles."

An African cichlid (Afrikai bölcsőszájú sügér) couple is gathering together their offspring

7. Such intense parental care for the offspring is rarely seen in fish. What is the general relationship between the number of offspring and the amount of parental care invested?

.....

.....

8. Another characteristic feature of cichlids and their close relatives, which is not typical of other fish, is that the male and female stay together for a while after mating. How does the faithfulness of the couple relate to the extent of parental care required?

- A. There is no link between the two.
- B. In species requiring intensive parental care the couples usually live in temporary relationships.
- C. In species requiring intensive parental care the individuals live in polygamy.
- D. In species requiring intensive parental care it is more common for the couples to live in permanent relationship.
- E. 'Unfaithful' partners both spend a lot of energy on caring for the offspring.

☐

9. The flashing light of the female's dorsal fin acts for the behaviour of the offspring as a

- A. Motivation
- B. Key stimulus
- C. Stimulus threshold
- D. Supernormal stimulus
- E. Threat

☐

10. The author also mentions the swim bladder of the little fish. Describe the general function of the swim bladder in fish.

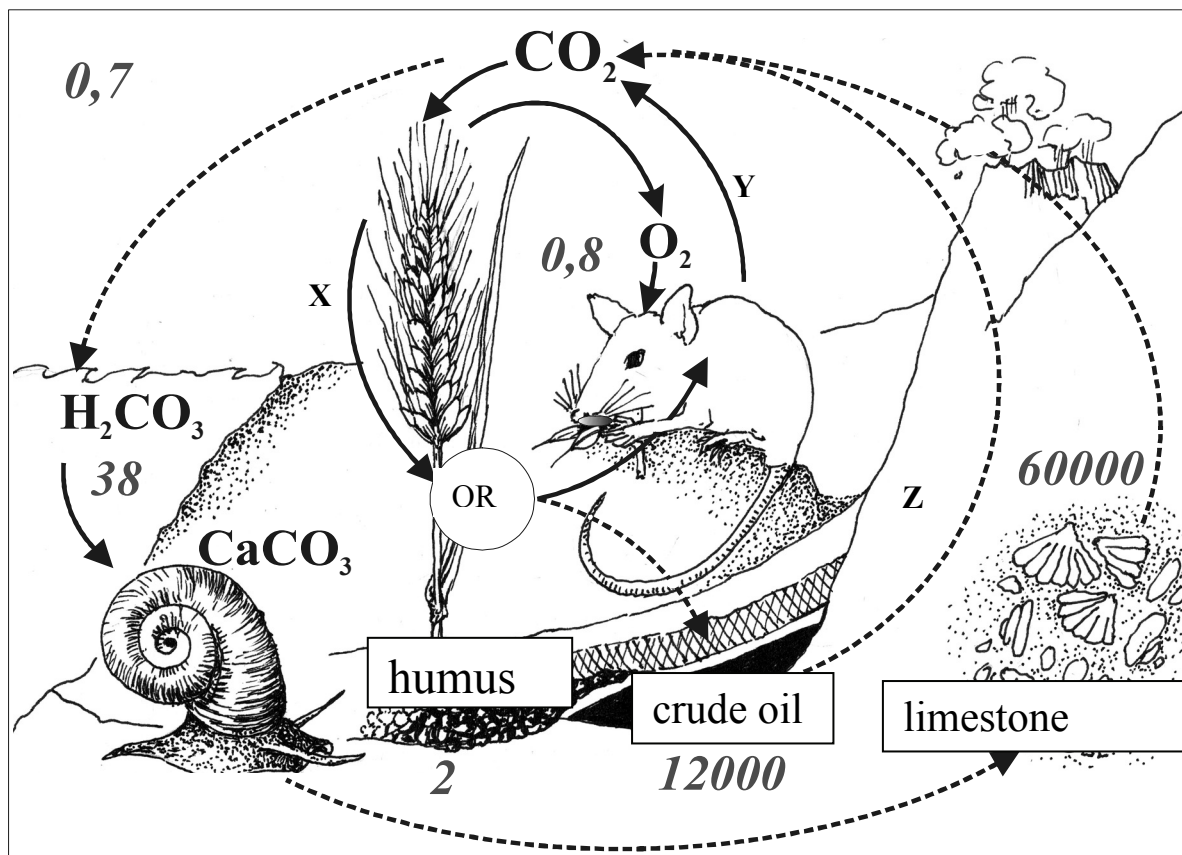
.....

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	total

VI. The carbon cycle in nature

9 points

The figure below shows the cycling of carbon, hydrogen and oxygen in nature.



The solid lines link the various steps in biological cycles, whereas the dotted lines show the stages in bio-geochemical cycles (abiotic factors are also involved). Letters 'OR' stand for organic matter in biological cycles.

H_2CO_3 refers both to carbonates and hydrocarbonates dissolved in water, the humus involves all the dead organic matter in the soil, crude oil includes all types of hydrocarbons, while limestone indicates all types of carbon stones.

The numbers indicate the estimated total mass of each type of matter expressed in hundred thousand megatonnes (Mt).

After studying the figure thoroughly decide whether the following statements are true or false. Write T (for true) and F (for false) next to each statement as appropriate in the box.

1.	The smaller part of the Earth's carbon resources is found in organic form, while the bigger part is present in inorganic form	
2.	The letter X indicates biological oxidation	
3.	The processes designated by letter Y and Z both involve the release of gases produced in oxidation reactions.	
4.	Some parts of the organic matter are left out of the biological cycle of matter.	
5.	More than ten times as much carbon dioxide is dissolved in the oceans than there is present in the air.	
6.	In animals, the atmospheric oxygen is directly used to make carbon dioxide.	
7.	The formation of crude oil reduces the amount of carbon dioxide present in the atmosphere.	

8. As a result of industrial activities the proportions are changing. The rising carbon dioxide level in the atmosphere is soon going to cause severe problems. Name one human activity, which changed the rate of any of the processes shown in the figure and, in turn, resulted in increased carbon dioxide levels. Describe briefly the possible problems associated with increased green house effects. (2 points)

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1.	2.	3.	4.	5.	6.	7.	8.	total

VII. Results of Mendel

10 points

George Mendel, one of the founders of genetics, experimented with the common garden pea. In a series of experiments, after careful preparation, he crossed two varieties which showed two contrasting forms (round and wrinkled seeds) of the same characteristic (parental generation). The result was all round seeds (first filial generation), but after crossing them together both parental characteristics appeared in the second filial generation. Match the statements below with the generation they refer to and write the letter of the correct answer into the boxes next to each statement. (We can ignore the possibility of mutations and suppose that the characteristic is controlled by two alleles of one gene.)

- A. It is true for the parental generation.
- B. It is true for the second filial generation.
- C. It is true for both generations
- D. It is true for neither generation

1.	Half the individual plants had wrinkled seeds. (They germinated from wrinkled seeds)	
2.	One third of the individuals had wrinkled seeds. (They germinated from wrinkled seeds)	
3.	Based on the phenotype of the individuals it was possible to tell their genotypes (concerning the characteristic in question).	
4.	Only haploid sex cells were formed	
5.	One half of the individuals were heterozygous.	
6.	One half of the genes in their somatic cells were of paternal, while the other half were of maternal origin.	
7.	Half the sex cells of any randomly chosen individual carried the dominant allele, while the other half of the sex cells contained the recessive allele.	
8.	The cells of the leaves are diploid.	
9.	Each individual was heterozygous	
10.	The somatic cells of any randomly chosen individual were of the same genotype	

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	total

VIII. Digestion and fermentation

10 points

Compare the digestion of carbohydrates in the human body and the fermentation taking place in the muscles. Write the letter of the correct answer into the boxes.

- A. Starch digestion
- B. Fermentation in muscles
- C. Both
- D. Neither

1.	Hydrolysis	
2.	ATP molecules are produced during the process.	
3.	For this biochemical process molecular oxygen is needed.	
4.	Carbon dioxide and water are its inorganic end products.	
5.	It takes place in cytoplasm.	
6.	It is carried out on the surface of ribosomes.	
7.	One part of it is carried out in the matrix (inner space) of mitochondria.	
8.	The process starts in the salivary glands.	
9.	It is performed by enzymes.	
10.	The end products are organic molecules.	

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	total

IX. Elements of the Body

5 points

Match the elements below to their typical biological function. Write the symbol of the element in the box next to the statement. Only one element is to be matched with each statement.

Ca I S C N Fe

1. It is required for the synthesis of the hormone produced by the parathyroid gland. No other hormone contains this element.	
2. It occurs in all organic matters	
3. It is not the component of all organic matters but it is found in all proteins and nucleic acids.	
4. In its absence, the oxygen binding ability of the red blood cells is disturbed	
5. An important source of its ion is milk and dairy products. This is why the consumption of dairy products is essential for healthy bone development.	

1.	2.	3.	4.	5.	total

	maximum score	achieved score
I. Different life forms	8	
II. Lantern squid	8	
III. The cell	10	
IV. Endocrine glands	10	
V. Cichlids	10	
VI. The carbon cycle in nature	9	
VII. Results of Mendel	10	
VIII. Digestion and fermentation	10	
IX. Elements of the body	5	
Total	80	
The total score of the written examination (achieved score 1.25)	$80 \cdot 1.25 = 100$	

marking teacher

Date:

	elért pontszám egész számra kerekítve/ achieved score rounded to an integer	programba beírt egész pontszám/ integer score written into the programe
Feladatsor(az írásbeli vizsgarész pontszáma)/ Paper (written part of the examination) score		

javító tanár / marking teacher

jegyző / administrator

Dátum/Date:

Dátum/Date: