



MATURITNÍ TÉMATA

Školní rok:	2025/2026		
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Předmětová komise:	Biologie Chemie		
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Počet výtisků:	4		
Výtisk č.:			

1. Structure and functions of eukaryotic cells.

- Identify organelles from the diagrams and photographs. Distinguish between plant and animal cells.
- Describe the functions of the organelles identified.
- Discuss how unicellular organisms (Protozoans) are specialised for their way of life.

2. Skeleton. Muscles and movement in animals.

- Describe bones in the human body.
- Describe the structure of the bone and types of bone connections.
- Name types of muscles and explain how their structure is related to their function in the human body and describe the mechanism of muscle contraction.

3. Animal nutrition.

- With reference to the diagram indicate the parts of the digestive system and describe the main processes taking place in each part of digestive system.
- Describe feeding in other animals (carnivores, herbivores and ruminants).
- Discuss what a healthy diet entails.

4. Nutrition in green plants.

- Draw and label the structure of a leaf.
- Describe the mechanism of photosynthesis; light dependent and light independent stages and speak about factors that influence the rate of photosynthesis.
- Discuss the differences in algal photosynthetic pigments.

5. Blood, heart, blood vessels. Immunity.

- Name the types of blood cells and describe their functions. Blood clotting.
- Describe the anatomy of the human heart and circulatory system. Describe the cardiac cycle and explain how the beating of the heart is controlled.
- Describe the role of the immune system. Compare the non-specific and specific immunity response. AIDS.

6. **Location and function of different tissues and organs found in angiosperms.**
 - a. *Draw tissue types: parenchyma, collenchyma, sclerenchyma.*
 - b. *Describe the function of different tissue types.*
 - c. *Discuss growth and hormonal control in plant life cycles.*
7. **Water and mineral absorption, transport and transpiration in plants.**
 - a. *Describe the structure of the root, stem and leaves according to the passage of water through a flowering plant.*
 - b. *Name metamorphoses of plant organs.*
 - c. *Discuss how a plant controls transpiration and name factors that influence transpiration.*
8. **Gas exchange and the biochemistry of respiration.**
 - a. *Describe the structure of the human respiratory system and explain how each part relates to its function.*
 - b. *Describe the biochemistry of cellular respiration. Explain the difference between aerobic and anaerobic respiration. Name diseases of the human respiratory system.*
 - c. *Speak about the phylogeny of the respiratory system.*
9. **Fundamental differences between prokaryotes and eukaryotes.**
 - a. *Draw and describe the structure of a bacterium. Bacterial diseases.*
 - b. *Cyanobacteria.*
 - c. *Identify given species of Protozoans and name the diseases they are responsible for.*
10. **Sense organs.**
 - a. *Discuss the role of sensory organs and state the basic categories of receptors.*
 - b. *Describe the principal parts of the eye of the vertebrates and explain how the eye generates sensations. Compare vision in vertebrates and other animals. Eye diseases and conditions.*
 - c. *With reference to the diagram describe the structure and function of the human ear.*
11. **Nervous system and nervous co-ordination in humans and other animals.**
 - a. *Describe a nerve cell and the two ways signals are transmitted.*
 - b. *Describe the organisation of the nervous system in humans. Identify and name functions of main parts of the human brain and the spinal cord.*
 - c. *Phylogeny of the nervous system.*
12. **Hormones in animals**
 - a. *Name the major endocrine glands in humans and name the hormones they secrete.*
 - b. *Describe the role of these hormones and problem caused by the malfunctions.*
 - c. *Discuss the role of hormones secreted by other animals (amphibians, arthropods)*
13. **Excretory system. Mammalian kidney. The skin.**
 - a. *Describe the structure and function of the human kidney; nephron.*
 - b. *Discuss the phylogeny of excretory system in different animal phyla.*
 - c. *Describe the structure and the function of the skin using a diagram and describe other types of the body coverings in different animals.*
14. **Human reproduction, development of embryo and foetus.**
 - a. *Name the parts of the reproductive systems, shown on the diagram and describe the function of major parts.*
 - b. *Describe the hormonal control of human reproduction, the menstrual cycle, pregnancy and birth.*
 - c. *Contraceptive methods.*
15. **Cell division. Mitosis. Meiosis and gametogenesis.**
 - a. *Discuss the importance of the cell cycle.*
 - b. *Describe the stages of mitosis and discuss its importance.*
 - c. *Describe the stages of meiosis and state its contribution to the variability. Gametogenesis.*

16. Fungi.

- a. Describe the structure of fungal body, nutrition and reproduction.*
- b. Classification of Fungi.*
- c. Characterise the role of Fungi in ecosystems. Trophic levels. Food pyramids.*

17. Thallobionta.

- a. Describe the body of lower plants. Types of thallus. Characterize the division: Rhodophyta and Chlorophyta.*
- b. Compare class Charophyceae and division Bryophyta and Equisetophyta.*
- c. Discuss the adaptations that enabled plants to colonise the land.*

18. Cormobionta.

- a. Describe the life cycle of seed plants in comparison to mosses and ferns.*
- b. Describe the floral structure, the pollination and the fertilisation in flowering plants, seed formation and seed development.*
- c. Discuss major differences between monocot and dicot plants.*

19. Cellular and molecular basis of inheritance.

- a. Describe the structure of DNA and explain DNA replication. Describe the genetic code – nucleotide, triplets that specify amino acids. Describe mechanism of transcription and translation.*
- b. Describe the structure of a chromosome, autosomes and gonosomes.*
- c. Discuss diseases caused by mutations.*

20. Patterns of inheritance in multicellular organisms.

- a. Explain terms: gene, locus, allele, chromosome, genotype, phenotype, karyotype, clone, offspring, gonochorist, mammal type and bird type.*
- b. Describe Gregor Mendel's discoveries (Law of Segregation, Law of Independent Assortment). Explain the terms codominance and incomplete dominance.*
- c. Name autosomal diseases and gonosomal diseases.*

21. Origin of life on Earth and human evolution.

- a. Describe how life on Earth appeared. (Theory of evolutionary abiogenesis, endosymbiosis).*
- b. Describe, with reference to the pictures, hominisation and sapientation.*
- c. Identify ancestors of Homo sapiens sapiens and describe their principal characteristics.*

22. Systems of classification. Concept of species.

- a. Explain the biological terms: artificial and natural classification, binomial nomenclature, convergent and divergent evolution, homologous, analogous structures.*
- b. Describe the kingdom Chromista.*
- c. Describe problematic groups that are difficult to classify (viruses, Euglena) Viral diseases.*

23. Major phyla and classes of invertebrates with examples.

- a. Characterise animal kingdom and describe its features.*
- b. Multicellular organisms and their development: body layers, body cavities, diploblastic, triploblastic, protostomes, deuterostomes, symmetry, segmentation. Give examples.*
- c. Compare different groups of invertebrates Identify and classify given organisms and discuss how they have adapted for living in their habitats.*

24. Major groups of Chordates.

- a. Characterise major features of Chordates.*
- b. Compare different groups of animals in subphylum Vertebrata.*
- c. Identify and classify given organisms and describe how they are adapted for living in a particular habitat.*

25. Ecology and environmental issues.

- a. Describe major biotic and abiotic factors which may affect organisms and population size.*
- b. Characterise an ecosystem and discuss main features of an ecosystem.*
- c. Discuss current ecological issues of your choice e.g. greenhouse effect, ozone hole, deforestation, desertification, eutrophication or others.*