



MATURITNÍ TÉMATA

Školní rok:	2024/2025		
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Předmětová komise:	Biologie Chemie		
Předseda předmětové komise:	Mgr. František Brauner, Ph.D.		
Předmět:	Biology		
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Schváleno předmětovou komisí dne:	27. 8. 2024	Podpis:	
Schváleno ředitelem školy dne:		Podpis a razítko:	
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 particular reference to human diet. Healthy diet.

- With reference to the diagram indicate the parts of the digestive system and describe the main processes taking place in each part of DS.
- 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. **Describe the 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. Structure and function of the respiratory organs.**
 - 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. **Explain the fundamental differences which exist 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. Human life cycle.**
 - 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 in plants and animals. 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.**
- Describe the structure of fungal body, nutrition and reproduction.*
 - Classification of Fungi.*
 - Characterise the role of Fungi in ecosystems. Trophic levels. Food pyramids.*
- 17. Thallobionta.**
- Describe the body of lower plants. Types of thallus. Characterize the division: Rhodophyta and Chlorophyta.*
 - Compare class Charophyceae and division Bryophyta and Equisetophyta.*
 - Discuss the adaptations that enabled plants to colonise the land.*
- 18. Cormobionta - higher plants.**
- Describe the life cycle of seed plants in comparison to mosses and ferns.*
 - Describe the floral structure, the pollination and the fertilisation in flowering plants, seed formation and seed development.*
 - Discuss major differences between monocot and dicot plants.*
- 19. Cellular and molecular basis of inheritance. Chromosomes and genes.**
- 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.*
 - Describe the structure of a chromosome, autosomes and gonosomes.*
 - Discuss diseases caused by mutations.*
- 20. Patterns of inheritance in multicellular organisms. Monohybrid and dihybrid crosses, Mendel's Laws.**
- Explain terms: gene, locus, allele, chromosome, genotype, phenotype, karyotype, clone, offspring, gonochorist, mammal type and bird type.*
 - Describe Gregor Mendel's discoveries (Law of Segregation, Law of Independent Assortment). Explain the terms codominance and incomplete dominance.*
 - Name autosomal diseases and gonosomal diseases.*
- 21. Origin of life on Earth and human evolution.**
- Describe how life on Earth appeared. (Theory of evolutionary abiogenesis, endosymbiosis).*
 - Describe, with reference to the pictures, hominisation and sapientation.*
 - Identify ancestors of Homo sapiens sapiens and describe their principal characteristics.*
- 22. Systems of classification. Concept of species.**
- Explain the biological terms: artificial and natural classification, binomial nomenclature, convergent and divergent evolution, homologous, analogous structures.*
 - Describe the kingdom Chromista.*
 - Describe problematic groups that are difficult to classify (viruses, Euglena) Viral diseases.*
- 23. Major phyla and classes of invertebrates with examples. Body layers and body cavities.**
- Characterise animal kingdom and describe its features.*
 - Multicellular organisms and their development: body layers, body cavities, diploblastic, triploblastic, protostomes, deuterostomes, symmetry, segmentation. Give examples.*
 - 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.**
- Characterise major features of Chordates.*
 - Compare different groups of animals in subphylum Vertebrata.*
 - Identify and classify given organisms and describe how they are adapted for living in a particular habitat.*
- 25. Ecology and environmental issues.**
- Describe major biotic and abiotic factors which may affect organisms and population size.*
 - Characterise an ecosystem and discuss main features of an ecosystem.*
 - Discuss current ecological issues of your choice e.g. greenhouse effect, ozone hole, deforestation, desertification, eutrophication or others.*