KS3 Biology

Structure and function of living organisms

Cells and organisation

1. What is a cell?
2. Why are cells described as the fundamental unit of living organisms?
3. What is a unicellular organism?
4. What is a multicellular organism?
5. How can a light microscope be used to observe cells?
6. How can a cell image viewed through a light microscope be recorded?
7. What is the function of the cell wall?
8. What is the function of the cell membrane?
9. What is the function of the cytoplasm?
10. What is the function of the nucleus?
11. What is the function of the vacuole?
12. What is the function of mitochondria?
13. What is the function of chloroplasts?
14. Which cell structures are found in both plant and animal cells?
15. Which cell structures are found in plant cells but not animal cells?
16. What is diffusion?
17. In which direction do particles move during diffusion?
18. What role does diffusion have in moving materials into and out of cells?
19. How are some unicellular organisms structurally adapted to survive?
20. What is a structural adaptation?
21. What is a tissue?
22. What is an organ?
23. What is an organ system?
24. What is an organism?
25. What is the correct order of organisation from cells to organisms?

The skeletal and muscular systems

1. What is the human skeleton?
2. What are the four main functions of the human skeleton?
3. How does the skeleton support the body?
4. How does the skeleton protect internal organs?
5. How does the skeleton help the body move?
6. How does the skeleton help make blood cells?

7. What is a joint?
8. What is the function of a joint?
9. What is cartilage?
10. What is the function of cartilage at a joint?
11. What are ligaments?
12. What is the function of ligaments?
13. What are tendons?
14. What is the function of tendons?
15. What is biomechanics?
16. How do muscles and bones work together to produce movement?
17. What happens to a muscle when it contracts?
18. How can the force exerted by a muscle be measured?
19. What is an antagonistic pair of muscles?
20. Why do muscles work in antagonistic pairs?
21. What happens when one muscle in an antagonistic pair contracts?
22. What happens to the other muscle when its partner contracts?
23. What is an example of an antagonistic pair of muscles?
24. How do antagonistic muscles move a bone in different directions?
25. Why are muscles needed to move bones?

Nutrition and digestion

1. What are the seven components of a healthy human diet?
2. Why does the body need carbohydrates?
3. Why does the body need lipids?
4. Why does the body need proteins?
5. Why does the body need vitamins?
6. Why does the body need minerals?
7. Why does the body need dietary fibre?
8. Why does the body need water?
9. What is meant by a person's energy requirement?
10. Why does the body need energy from food?
11. What factors can affect a person's daily energy requirement?
12. How can energy requirements in a healthy daily diet be calculated?
13. What is meant by an imbalance in the diet?
14. What is obesity?
15. What is starvation?
16. What is a deficiency disease?
17. How can a lack of a particular nutrient cause a deficiency disease?
18. What are the main organs of the human digestive system?
19. What is the function of the mouth in digestion?
20. What is the function of the stomach in digestion?
21. What is the function of the small intestine in digestion?
22. What is the function of the large intestine in digestion?

23. What is an enzyme?
24. How do enzymes help digest food?
25. What is the importance of bacteria in the human digestive system?

Nutrition and digestion — Plant nutrition

1. What process do plants use to make carbohydrates?
2. Where in a plant are carbohydrates made by photosynthesis?
3. What is needed for photosynthesis to take place?
4. Why do plants need carbohydrates?
5. How do plant roots obtain water from the soil?
6. How do plant roots obtain mineral nutrients from the soil?
7. Why do plants need mineral nutrients?
8. Why is water important to plants?
9. How are roots adapted to absorb water and mineral nutrients?
10. How do plants use the carbohydrates made by photosynthesis?
11. What is the role of leaves in photosynthesis?
12. Why are leaves well suited to making carbohydrates by photosynthesis?
13. What is the source of the water used by plants for photosynthesis?
14. What is the source of the mineral nutrients needed by plants?
15. Why are mineral nutrients important for healthy plant growth?
16. How do roots help plants obtain substances from the soil?
17. What would happen to a plant if it could not obtain enough water?
18. What would happen to a plant if it could not obtain enough mineral nutrients?
19. Why do plants need both water and mineral nutrients from the soil?
20. How are water and mineral nutrients transported from roots to the rest of a plant?
21. How does photosynthesis provide carbohydrates for plants?
22. Why are carbohydrates important to plants?
23. What is the relationship between leaves, roots and plant nutrition?
24. How do plants obtain the materials they need for healthy growth?
25. How do photosynthesis and root absorption help a plant survive?

Gas exchange systems

1. What is gas exchange?
2. What is the function of the human gas exchange system?
3. What are the main structures of the human gas exchange system?
4. What is the function of the trachea?
5. What is the function of the bronchi?
6. What is the function of the bronchioles?
7. What is the function of the alveoli?
8. How are alveoli adapted for efficient gas exchange?

9. Which gases are exchanged between the alveoli and the blood?
10. What is inhalation?
11. What happens to the diaphragm during inhalation?
12. What happens to the volume of the chest during inhalation?
13. What happens to the pressure inside the lungs during inhalation?
14. What is exhalation?
15. What happens to the diaphragm during exhalation?
16. What happens to the volume of the chest during exhalation?
17. What happens to the pressure inside the lungs during exhalation?
18. How does a change in pressure cause air to move into and out of the lungs?
19. What is lung volume?
20. How can lung volume be measured?
21. How does exercise affect breathing?
22. How can asthma affect the gas exchange system?
23. How can smoking damage the gas exchange system?
24. What are two effects of smoking on the lungs?
25. What is the role of stomata in gas exchange in plants?

Reproduction

Human reproduction

1. What is reproduction?
2. What are the main organs of the male reproductive system?
3. What are the main organs of the female reproductive system?
4. What is the function of the testes?
5. What is the function of the sperm ducts?
6. What is the function of the penis?
7. What is the function of the ovaries?
8. What is the function of the oviducts?
9. What is the function of the uterus?
10. What is the function of the vagina?
11. What are gametes?
12. What are the male and female gametes in humans?
13. What happens during the menstrual cycle?
14. What is fertilisation?
15. Where does fertilisation normally occur in humans?
16. What is gestation?
17. Where does the foetus develop during pregnancy?
18. What is the function of the placenta?
19. How can maternal lifestyle affect the developing foetus?
20. How can smoking during pregnancy affect the foetus?

21. How can alcohol consumption during pregnancy affect the foetus?
22. How does the placenta provide the foetus with substances needed for growth?
23. How does the placenta prevent the mother's and foetus's blood from directly mixing?
24. What happens during birth?
25. What are the main stages of human reproduction from fertilisation to birth?

Plant reproduction

1. What are the main reproductive structures of a flower?
2. What is the function of the anther?
3. What is the function of the stigma?
4. What is the function of the ovary?
5. What is the function of the ovule?
6. What is pollination?
7. What is insect pollination?
8. What is wind pollination?
9. What is the difference between insect-pollinated and wind-pollinated flowers?
10. How are insect-pollinated flowers adapted for pollination?
11. How are wind-pollinated flowers adapted for pollination?
12. What happens when pollen lands on a suitable stigma?
13. What is fertilisation in flowering plants?
14. Where does fertilisation take place in a flowering plant?
15. What happens to an ovule after fertilisation?
16. What happens to the ovary after fertilisation?
17. What is a seed?
18. What is a fruit?
19. Why are seeds dispersed away from the parent plant?
20. What are some different methods of seed dispersal?
21. How can wind disperse seeds?
22. How can animals disperse seeds?
23. How can water disperse seeds?
24. What measurements could be taken in a quantitative investigation of seed dispersal?
25. How can the effectiveness of different seed dispersal mechanisms be compared?

Health

1. What is a drug?
2. What is a recreational drug?

3. What is meant by substance misuse?
4. What is the difference between a medicinal drug and a recreational drug?
5. How can recreational drugs affect behaviour?
6. How can recreational drugs affect physical health?
7. How can recreational drugs affect the brain?
8. How can recreational drugs affect the nervous system?
9. How can recreational drugs affect coordination?
10. How can recreational drugs affect a person's ability to make decisions?
11. How can recreational drugs affect heart rate?
12. How can recreational drugs affect breathing?
13. How can recreational drugs affect normal body functions?
14. What is drug dependence?
15. How can repeated use of some recreational drugs lead to dependence?
16. Why can drug dependence make it difficult to stop using a drug?
17. Why can taking too much of a recreational drug be dangerous?
18. How can recreational drugs affect short-term behaviour?
19. How can recreational drugs affect long-term health?
20. How can substance misuse affect everyday life?
21. How can recreational drugs affect the senses?
22. How can recreational drugs affect movement and coordination?
23. How can recreational drugs affect judgement?
24. Why can different recreational drugs have different effects on the body?
25. Why is it important to understand the effects and risks of recreational drugs?

Material cycles and energy

Photosynthesis

1. What is photosynthesis?
2. What are the reactants needed for photosynthesis?
3. What are the products of photosynthesis?
4. What is the word summary for photosynthesis?
5. Where does the energy for photosynthesis come from?
6. Which organisms carry out photosynthesis?
7. How do plants use sunlight during photosynthesis?
8. What are organic molecules?
9. Why are organic molecules made during photosynthesis important to living organisms?
10. How does photosynthesis provide an energy store for plants?
11. Why do animals depend on photosynthetic organisms for energy?
12. Why do almost all living organisms on Earth depend on photosynthesis?

13. How does photosynthesis help maintain oxygen levels in the atmosphere?
14. How does photosynthesis affect carbon dioxide levels in the atmosphere?
15. Why are plants and algae important for the balance of gases in the atmosphere?
16. What is the function of a leaf in photosynthesis?
17. How are leaves adapted to absorb sunlight?
18. How are leaves adapted to allow carbon dioxide to enter?
19. How are leaves adapted to transport water to photosynthesising cells?
20. Why are most leaves broad and thin?
21. Why do leaves contain chlorophyll?
22. How are chloroplasts adapted for photosynthesis?
23. How does the arrangement of cells inside a leaf help photosynthesis?
24. How do stomata help a leaf carry out photosynthesis?
25. How do the adaptations of leaves make photosynthesis more efficient?

Cellular respiration

1. What is cellular respiration?
2. Why is cellular respiration needed by living organisms?
3. What happens to organic molecules during cellular respiration?
4. How does cellular respiration provide energy for life processes?
5. What is aerobic respiration?
6. What are the reactants of aerobic respiration?
7. What are the products of aerobic respiration?
8. What is the word summary for aerobic respiration?
9. What is anaerobic respiration?
10. When does anaerobic respiration occur in humans?
11. What are the products of anaerobic respiration in humans?
12. What is the word summary for anaerobic respiration in humans?
13. What is fermentation?
14. Which types of organisms can carry out fermentation?
15. What are the products of anaerobic respiration in microorganisms?
16. How does anaerobic respiration in microorganisms differ from anaerobic respiration in humans?
17. How do the reactants of aerobic and anaerobic respiration differ?
18. How do the products of aerobic and anaerobic respiration differ?
19. Why does anaerobic respiration provide less energy than aerobic respiration?
20. What happens to muscles when there is not enough oxygen for aerobic respiration?
21. What causes the need for anaerobic respiration during vigorous exercise?
22. How can anaerobic respiration affect an organism?
23. How does aerobic respiration differ from anaerobic respiration in terms of oxygen?

24. How does anaerobic respiration allow cells to release energy when oxygen is limited?
25. Why is respiration essential for all living organisms?

Interactions and interdependencies

Relationships in an ecosystem

1. What is an ecosystem?
2. What is meant by the interdependence of organisms?
3. Why do organisms in an ecosystem depend on one another?
4. What is a food web?
5. What do arrows in a food web represent?
6. How can a change in one population affect other populations in a food web?
7. Why are insects important to many flowering plants?
8. What is insect pollination?
9. How do insect-pollinated crops depend on insects?
10. Why is insect pollination important for human food security?
11. What could happen to food production if insect pollinators declined?
12. How can organisms affect their environment?
13. How can an organism's environment affect its survival?
14. What is meant by environmental conditions?
15. How can changes in environmental conditions affect populations?
16. What are toxic materials?
17. How can toxic materials enter an ecosystem?
18. How can toxic materials accumulate in organisms?
19. Why can toxic materials become more harmful as they pass through a food web?
20. How can toxic materials affect organisms in an ecosystem?
21. How can the removal of one species affect an ecosystem?
22. How can changes in food availability affect organisms in an ecosystem?
23. Why can changes in one part of an ecosystem affect organisms elsewhere in the ecosystem?
24. How can human activities such as pollution and habitat destruction disrupt relationships between organisms in an ecosystem?
25. Why is understanding interdependence important when managing ecosystems?

Genetics and evolution

Inheritance, chromosomes, DNA and genes

1. What is heredity?

2. How is genetic information passed from one generation to the next?
3. What is a chromosome?
4. Where are chromosomes found in cells?
5. What is DNA?
6. Where is DNA found in a cell?
7. What is a gene?
8. How are genes related to DNA?
9. How are genes and chromosomes related?
10. How does genetic information influence the characteristics of an organism?
11. What is a species?
12. What does it mean for two organisms to belong to different species?
13. What is variation?
14. What is continuous variation?
15. What is discontinuous variation?
16. How can continuous variation be measured?
17. How can variation between individuals be represented using a graph?
18. Why do individuals of the same species vary?
19. Why can some organisms compete more successfully than others?
20. How can variation lead to natural selection?
21. How can changes in the environment make organisms less well adapted?
22. How can poor adaptation to environmental change lead to extinction?
23. What is biodiversity?
24. Why is maintaining biodiversity important?
25. What are gene banks, and how can they help preserve hereditary material?