

2023 Science Challenger D1 Life Science QUESTIONS

1. Which of the following is NOT an organelle?
 - a. Mitochondria
 - b. Golgi Apparatus
 - c. Macrosome
 - d. Peroxisome
2. A frog eats a fly in a mangrove swamp. What kind of an animal is a frog?
 - a. Amphibian
 - b. Reptile
 - c. Mammal
 - d. Endotherm
3. Which of the following is the most diverse group of organisms?
 - a. Insects
 - b. Animals
 - c. Plants
 - d. Prokaryotes
4. What organ system is the heart from?
 - a. Nervous System
 - b. Endocrine System
 - c. Respiratory System
 - d. Cardiovascular System
5. How long ago did the first organisms arise?
 - a. Around 9.8 billion years ago
 - b. Around 3.5 billion years ago
 - c. Around 1.23 billion years ago
 - d. Around 753 million years ago
6. How many stages of the cell cycle are there?
 - a. 3
 - b. 4
 - c. 5
 - d. 10
7. Where does most of the energy for biological processes (ie. photosynthesis) come from?
 - a. Heat From the Earth's Crust
 - b. Heat that was Already Here
 - c. The Sun
 - d. All of the Other Stars in the Vast Galaxy

8. What is the theory pertaining to the evolution of the mitochondria and chloroplast called?
 - a. Theory of Evolution
 - b. Theory of Organelle Evolution
 - c. Theory of Organelle Inheritance
 - d. Endosymbiosis Theory

9. Which of the following is NOT correct regarding the differences between prokaryotic and eukaryotic cells?
 - a. Eukaryotic cells have membrane bound organelles; prokaryotic cells don't
 - b. Eukaryotic cells primarily use double-stranded DNA; prokaryotic cells primarily use double-stranded RNA
 - c. Eukaryotic cells have linear chromosomes; prokaryotic cells have circular chromosomes
 - d. Eukaryotic cells are typically larger than prokaryotic cells

10. Which cells are the most efficient in terms of absorbing nutrients and releasing wastes?
 - a. Big cells, as they have more organelles to help with nutrient/waste exchange
 - b. Small cells, as they have more surface area for nutrient/waste exchange
 - c. Middle-sized cells that are not too large or not too small, adhering to the goldilock's principle of cell homeostasis.
 - d. All cells are equally efficient in terms of absorbing nutrients and expelling waste.

11. Extinction has occurred since life on Earth began. Why are scientists so concerned about it now?
 - a. One of the greatest periods of mass extinction is occurring right now
 - b. Extinction is occurring at a pace faster than before
 - c. Human activity is responsible for today's mass extinctions
 - d. All of the above

12. What is the movement of water molecules through a semipermeable membrane from an area of lower solute concentration to an area of higher solute concentration? [Solute = particle dissolved in water].
 - a. Osmosis
 - b. Diffusion
 - c. Water Transport
 - d. Absorption

13. What is the function of ribosomes in a cell?
 - a. Storing genetic material
 - b. Regulating the cell cycle
 - c. Protein synthesis
 - d. Transporting nutrients/waste

14. What does the small intestine do in your body?
- Absorb nutrients from food
 - Absorb water from food
 - Produce digestive enzymes
 - Break down larger molecules
15. What are enzymes, and what do they do?
- Large molecules that store genetic information in cells
 - Small molecules that provide energy to cells
 - Proteins that catalyze chemical reactions in cells
 - Carbohydrates that help in cellular communication
16. Which of the following accurately describes the process of allosteric regulation?
- Allosteric regulation involves the binding of an activator molecule to the active site of an enzyme, enhancing its activity
 - Allosteric regulation occurs when a competitive inhibitor binds to the active site of an enzyme, preventing substrate binding
 - Allosteric regulation involves the binding of a regulatory molecule to a site other than the active site of an enzyme, resulting in a conformational change that alters enzyme activity
 - Allosteric regulation occurs when an enzyme is irreversibly inhibited through covalent modification of its active site
17. What is the function of hemoglobin in humans?
- To transport oxygen
 - To receive light waves
 - To absorb energy
 - To transport bacteria to white blood cells
18. Ryan cuts the tail of a rat off and allows the rat to reproduce. Which of the following would be true about its offspring?
- They would be born without a tail
 - They would be born with a smaller tail than normal rats
 - They would be born without a tail, but will eventually grow one as they get older.
 - They would be born with a tail.
19. Which of the following is NOT a step in the water cycle?
- Condensation
 - Evaporation
 - Vaporization
 - Surface Runoff
20. What do autotrophs do in photosynthesis?
- They produce the carbohydrates necessary using the carbon in CO₂

- b. They obtain energy from the food they consume
 - c. They allow produce proteins that allow the plant to absorb water
 - d. They create bonds between H₂O and CO₂ which allows the plant to grow
21. How many distinct phases are there in the interphase step of the cell cycle?
- a. 2
 - b. 3
 - c. 4
 - d. 5
22. What is responsible for the color of light?
- a. Speed
 - b. Frequency of the wave
 - c. Altitude
 - d. Wavelength
23. All of the following are non-renewable resources except...
- a. Oil
 - b. Wind energy
 - c. Coal
 - d. Natural Gas
24. Where does the electron transport chain of cellular respiration occur?
- a. The inner membrane of the mitochondria
 - b. The inside of NADH
 - c. The nucleus of atoms
 - d. In the golgi apparatus
25. Which of the following is not of the four major organic molecules?
- a. Nucleic acids
 - b. Lipids
 - c. Carbohydrates
 - d. Organelles
26. Binary fission is an example of...
- a. Cellular Respiration
 - b. Prokaryotic Cell Division
 - c. The Krebb's Cycle
 - d. Eukaryotic Cell Division
27. What is the primary reason for wind?
- a. Tornados and Hurricanes
 - b. The rotation of the Earth on its axis
 - c. The unequal heating of the Earth's surface

- d. The flapping wings of flying animals
28. Ryan who has black hair and is tall and Sara who has brown hair and is short have a son. Assuming Mendelian genetics, if Sara's brown hair genes are dominant but short genes are not, what is MOST likely to be true about their son?
- a. He is tall with brown hair.
 - b. He is tall with black hair
 - c. He is short with brown hair.
 - d. He is short with black hair
29. Which is not on the food chain?
- a. Primary Consumers
 - b. Apex Predators
 - c. Producers
 - d. Reproducer
30. What is the process of the chemical breakdown of a substance often used by bacteria, microorganisms, or yeast?
- a. Photosynthesis
 - b. Meiosis
 - c. Fermentation
 - d. Fertilization