Western Governors University (WGU) BIO1010 C190 Introduction to Biology Practice Exam (Sample)

Study Guide

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Questions

1. What is meant by a ‘biological species’?

   A. A group of organisms that are all genetically identical

   B. A group of organisms that can interbreed and produce fertile offspring

   C. A single organism with unique genetic traits

   D. A population of organisms within a given habitat

2. What is the process by which two or more species evolve in tandem?

   A. Speciation Event

   B. Coevolution Event

   C. Genetic Drift

   D. Artificial Selection

3. What is the main function of enzymes in biological reactions?

   A. To decrease activation energy

   B. To speed up reactions by increasing substrate concentration

   C. To act as reactants in chemical reactions

   D. To provide energy for the reaction

4. What type of relationship involves one species benefiting at the expense of another species?

   A. Symbiosis

   B. Commensalism

   C. Parasitism

   D. Mutualism

5. What is the basic unit of life?

   A. Atom

   B. Cell

   C. Molecule

   D. Tissue

6. What role does the endocrine system play in the body?

A. It manages the immune response to pathogens

B. It regulates bodily processes through hormones and maintains homeostasis

C. It controls skeletal muscle contraction and movement

D. It processes sensory information from the environment

7. Which term is synonymous with the evolutionary development of an organ in an organism?

A. Gene Flow

B. Homology Event

C. Phylogenetic Event

D. Mutation

8. What is the main purpose of photosynthesis?

A. To convert solar energy into chemical energy

B. To break down glucose for energy

C. To release oxygen as a byproduct

D. To produce carbon dioxide

9. What best describes a chemical produced by pheromones?

A. A substance that alters environmental conditions

B. A substance that influences the growth of plants

C. A substance that affects the behavior of conspecifics

D. A substance that causes physical changes in the environment

10. What is a genotype?

A. The expression of physical traits of an organism

B. The genetic constitution of an organism

C. The environment in which an organism lives

D. The average genetic variation in a population

Answers

1. B
2. B
3. A
4. C
5. B
6. B
7. C
8. A
9. C
10. B

Explanations

1. What is meant by a ‘biological species’?

A. A group of organisms that are all genetically identical

B. A group of organisms that can interbreed and produce fertile offspring

C. A single organism with unique genetic traits

D. A population of organisms within a given habitat

A biological species is defined as a group of organisms that can interbreed in nature and produce fertile offspring. This definition emphasizes reproductive isolation, meaning that members of the same species are capable of mating with one another and producing offspring that can also reproduce. This concept is fundamental in understanding how species are classified and differentiated from one another. The ability to produce fertile offspring distinguishes a biological species from other classifications, as it highlights the genetic continuity within that group. The concept is important in the study of evolution and ecology, as it helps in understanding the dynamics of populations, adaptation, and speciation. This definition aligns with modern biological research and the study of biodiversity, as they consider reproductive compatibility a key factor in species identification.

2. What is the process by which two or more species evolve in tandem?

A. Speciation Event

B. Coevolution Event

C. Genetic Drift

D. Artificial Selection

The process by which two or more species evolve in tandem is referred to as coevolution. This phenomenon occurs when the evolutionary trajectories of interacting species influence one another. For example, in predator-prey relationships or plant-pollinator interactions, changes in one species can induce adaptive changes in the other, leading to a reciprocal evolutionary effect. This ongoing relationship can result in specialized adaptations that enhance survival, reproductive success, and ecological balance between the species involved. Coevolution highlights the interconnectedness of life and can result in complex biological outcomes, such as the development of mutualistic relationships or the arms races seen in predator-prey dynamics.

3. What is the main function of enzymes in biological reactions?

A. To decrease activation energy

B. To speed up reactions by increasing substrate concentration

C. To act as reactants in chemical reactions

D. To provide energy for the reaction

Enzymes primarily function to decrease the activation energy required for biological reactions. This is significant because activation energy is the energy barrier that must be overcome for a reaction to proceed. By lowering this barrier, enzymes allow reactions to occur more readily and efficiently, facilitating metabolic processes within living organisms. When the activation energy is decreased, the reaction can occur at a much faster rate and under milder conditions than would otherwise be possible. This is crucial for sustaining life, as many biochemical reactions need to happen quickly and at temperatures that are compatible with cellular functions. Enzymes achieve this by binding to substrates and stabilizing the transition states, thus making it easier for the transformation to occur. While increasing substrate concentration can enhance the rate of reactions, it is not the primary role of enzymes. They are not reactants themselves nor do they provide energy for reactions; rather, they function as catalysts that remain unchanged after the reaction is completed, ready to facilitate further reactions. This distinction highlights the unique and essential role that enzymes play in biological systems.

4. What type of relationship involves one species benefiting at the expense of another species?

A. Symbiosis

B. Commensalism

C. Parasitism

D. Mutualism

The correct answer is the type of relationship known as parasitism. In parasitism, one species, the parasite, benefits from the relationship by deriving nutrients or some advantage from the host species, which is typically harmed in the process. The host may experience various negative effects, such as illness, weakened health, or even death, as a direct result of the parasite's presence and activities. To illustrate, consider a classic example where a tapeworm lives in the intestines of its host, absorbing nutrients intended for the host itself. While the tapeworm thrives, the host suffers from malnutrition and potential health complications due to the parasite's siphoning of its resources. This type of interaction contrasts with mutualism, where both species benefit, and commensalism, where one species benefits while the other is neither helped nor harmed. Symbiosis broadly refers to any close and prolonged interaction between species, which can encompass mutualism, commensalism, and parasitism, but it doesn't specify the nature of the benefits or harms involved.

5. What is the basic unit of life?

A. Atom

B. Cell

C. Molecule

D. Tissue

The basic unit of life is the cell. Cells are the smallest structural and functional units of living organisms, serving as the building blocks from which all living things are constructed. Every organism, whether unicellular or multicellular, is composed of cells. They carry out essential functions necessary for survival, such as metabolism, energy production, and reproduction. In multicellular organisms, cells differentiate into various types to form tissues and organs, but regardless of their complexity, all life relies on cells to maintain biological processes. The study of cells and their interactions is foundational to understanding biology, highlighting the importance of the cell in the context of life itself.

6. What role does the endocrine system play in the body?

A. It manages the immune response to pathogens

B. It regulates bodily processes through hormones and maintains homeostasis

C. It controls skeletal muscle contraction and movement

D. It processes sensory information from the environment

The endocrine system is crucial for regulating bodily processes through the production and release of hormones, which act as chemical messengers. These hormones travel through the bloodstream to target organs and tissues, influencing various functions such as growth, metabolism, reproduction, and mood. Furthermore, the endocrine system plays a vital role in maintaining homeostasis, which is the body's ability to maintain a stable internal environment despite external changes. This balance is essential for the proper functioning of the body's systems, allowing for adaptation and stability over time. In contrast to managing the immune response, controlling muscle contractions, or processing sensory information, the primary function of the endocrine system revolves around hormonal regulation and maintaining homeostasis, making it a foundational component of the body's overall regulatory mechanisms.

7. Which term is synonymous with the evolutionary development of an organ in an organism?

A. Gene Flow

B. Homology Event

C. Phylogenetic Event

D. Mutation

The term that describes the evolutionary development of an organ in an organism is referred to as a phylogenetic event. When discussing the evolution of structures or organs, phylogeny encompasses the changes and adaptations that occur over time in response to environmental pressures, genetic changes, or other evolutionary mechanisms. It illustrates the evolutionary history and relationships among organisms, which helps explain how particular organs have developed and diversified across different species. This process involves examining ancestral traits and how they have been modified in descendant species through evolution. Understanding phylogenetic events provides insight into the evolutionary biology of organisms by clarifying how various structures have originated and evolved in relation to their environment and other species over vast timescales.

8. What is the main purpose of photosynthesis?

A. To convert solar energy into chemical energy

B. To break down glucose for energy

C. To release oxygen as a byproduct

D. To produce carbon dioxide

The main purpose of photosynthesis is to convert solar energy into chemical energy, which is stored in the form of glucose. This process occurs in plants, algae, and some bacteria, primarily in their chloroplasts. During photosynthesis, these organisms utilize sunlight to synthesize glucose from carbon dioxide and water, releasing oxygen as a byproduct. The glucose produced serves as an essential energy source for the plant itself and, indirectly, for other organisms that consume the plant, forming the basis of the food chain. This energy conversion is a critical component of life on Earth, as it provides the energy necessary for growth, reproduction, and overall survival of most living organisms.

9. What best describes a chemical produced by pheromones?

A. A substance that alters environmental conditions

B. A substance that influences the growth of plants

C. A substance that affects the behavior of conspecifics

D. A substance that causes physical changes in the environment

Pheromones are specialized chemical signals that are released by an organism and are detected by others of the same species, known as conspecifics. The primary function of pheromones is to communicate information regarding various social and reproductive behaviors. For instance, they can signal readiness to mate, mark territory, or even alert others to danger. When considering the characteristics of pheromones, it is clear that their role is to influence the behavior of individuals within the same species. This interaction can lead to coordinated activities such as mating behaviors or alarm responses among group members. Therefore, the description of pheromones as a substance that affects the behavior of conspecifics captures their primary function accurately. In contrast, while pheromones may indirectly influence environmental conditions or plant growth through ecological interactions, their primary role is centered on communication between members of the same species. This distinction is fundamental in understanding how pheromones operate within biological systems.

10. What is a genotype?

A. The expression of physical traits of an organism

B. The genetic constitution of an organism

C. The environment in which an organism lives

D. The average genetic variation in a population

A genotype refers specifically to the genetic constitution or makeup of an organism. It encompasses the alleles that an individual inherits from its parents, which contribute to the organism's potential to express certain traits. The genotype serves as a blueprint for the traits an organism may display, although the actual traits manifesting, known as the phenotype, may also be influenced by environmental factors. Understanding the genotype is fundamental in genetics as it helps to explain hereditary patterns and the likelihood of certain traits appearing in offspring. It allows researchers and scientists to analyze the genetic basis of diseases, traits, and even behaviors within a population.