PSLE Science – General Practice Test (Sample)

Study Guide

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Questions

1. What is the primary gas released during photosynthesis?

A. Carbon Dioxide

B. Nitrogen

C. Oxygen

D. Helium

2. What is it called when an object decreases in size or volume due to loss of heat?

A. Contraction

B. Expansion

C. Condensation

D. Compression

3. What is the difference between renewable and non-renewable resources?

A. Renewable resources can be created synthetically

B. Renewable resources can be replenished naturally, while non-renewable resources cannot

C. Non-renewable resources are always abundant

D. Renewable resources are fossil fuels

4. What term is used to describe an animal that eats both plants and other animals to derive energy?

A. Consumer

B. Herbivore

C. Decomposer

D. Producer

5. Which gas is essential for the process of photosynthesis in plants?

A. Nitrogen

B. Oxygen

C. Carbon Dioxide

D. Argon

6. Identify one adaptive trait of animals for survival.

A. Excessive growth

B. Camouflage, migration, or hibernation

C. Increased size

D. Regular mating behavior

7. What are characteristics passed down from the genes of animals called?

A. Genetics

B. Inheritance

C. Genomics

D. Evolution

8. What does the term "food web" represent?

A. A simple chain of predator and prey

B. A complex network of interconnected food chains

C. An isolated food chain

D. A hierarchy of living organisms

9. What term describes the flow of electrical energy through a conductor?

A. Voltage

B. Resistance

C. Current

D. Power

10. Which of the following states that green plants produce their own food?

A. Cellular respiration

B. Photosynthesis

C. Decomposition

D. Pollination

Answers

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

Explanations

1. What is the primary gas released during photosynthesis?

A. Carbon Dioxide

B. Nitrogen

C. Oxygen

D. Helium

The primary gas released during photosynthesis is oxygen. During the photosynthesis process, plants, algae, and some bacteria convert carbon dioxide and water into glucose and oxygen, using sunlight as energy. This reaction takes place mainly in the chloroplasts of plant cells, where chlorophyll captures light energy. As the plant takes in carbon dioxide from the air through tiny openings in its leaves called stomata, it also absorbs water from the soil. The light energy triggers a series of chemical reactions that transform these inputs into glucose, which the plant uses for energy and growth. Oxygen is produced as a byproduct of this process and is released into the atmosphere. This release of oxygen is crucial for life on Earth, as it provides the oxygen that most living organisms need to breathe. Furthermore, this process is significant for maintaining a balanced ecosystem, as plants produce oxygen while taking in carbon dioxide, thus regulating atmospheric gases.

2. What is it called when an object decreases in size or volume due to loss of heat?

A. Contraction

B. Expansion

C. Condensation

D. Compression

When an object decreases in size or volume due to loss of heat, the process is known as contraction. As materials cool, the particles within them typically move slower and are pulled closer together, which results in a decrease in volume. This is a fundamental concept in the study of thermodynamics and material science. For instance, when metals are heated, they expand; when they cool down, they contract. This principle is essential in various applications, such as ensuring that metal parts fit together properly in construction and manufacturing, as thermal contraction can affect how materials interact. In contrast, expansion refers to the increase in size or volume of an object as it gains heat. Condensation is the process where gas turns into liquid, often upon cooling, but it does not directly refer to the change in volume of solid objects. Compression involves applying pressure to reduce the volume of a substance, which may not necessarily be related to a loss of heat. Therefore, contraction is the most accurate term for the decrease in size or volume due to cooling.

3. What is the difference between renewable and non-renewable resources?

A. Renewable resources can be created synthetically

B. Renewable resources can be replenished naturally, while non-renewable resources cannot

C. Non-renewable resources are always abundant

D. Renewable resources are fossil fuels

The correct response highlights a fundamental aspect of resource management and environmental science. Renewable resources are defined by their ability to be replenished naturally within a short timescale, such as sunlight, wind, or biomass. This means that as we use these resources, they can be continuously generated and do not run out on a human timescale, allowing for sustainable use. In contrast, non-renewable resources, such as fossil fuels and minerals, are formed over millions of years and, once consumed, cannot be replaced within a human lifetime. The extraction and consumption of these resources lead to depletion, making them finite and limited. The other options do not accurately portray the essential characteristics that differentiate renewable from non-renewable resources. For example, the idea that non-renewable resources are always abundant is misleading, as many are rapidly depleting. Similarly, stating that renewable resources can be created synthetically confuses the natural replenishment aspect, and claiming that renewable resources are fossil fuels is incorrect, as fossil fuels are classified as non-renewable due to their long formation period and lack of rapid replenishment.

4. What term is used to describe an animal that eats both plants and other animals to derive energy?

A. Consumer

B. Herbivore

C. Decomposer

D. Producer

The term that describes an animal that eats both plants and other animals to derive energy is a consumer. Consumers are organisms that rely on other living beings for their nutritional needs. This group includes various entities such as herbivores, carnivores, and omnivores. In the context of the options provided, herbivores are animals that eat only plants, while decomposers break down dead organic matter to recycle nutrients back into the ecosystem. Producers, on the other hand, are organisms like plants that produce their own food through photosynthesis. Therefore, the only term that encompasses animals consuming both plants and animals is 'consumer'.

5. Which gas is essential for the process of photosynthesis in plants?

A. Nitrogen

B. Oxygen

C. Carbon Dioxide

D. Argon

Photosynthesis is a critical process by which plants convert light energy into chemical energy, ultimately producing food in the form of glucose. During this process, carbon dioxide plays a vital role as one of the raw materials. Plants absorb carbon dioxide from the atmosphere through small openings in their leaves known as stomata. In the presence of sunlight and water, the absorbed carbon dioxide undergoes a series of chemical reactions in the chloroplasts of plant cells, leading to the production of glucose and oxygen. While oxygen is indeed a byproduct of photosynthesis and essential for many forms of life, it is not required as a raw material for the photosynthesis process itself. On the other hand, nitrogen and argon do not play a direct role in photosynthesis. Nitrogen is primarily used for building proteins, and argon is an inert gas that does not participate in biological reactions. Thus, carbon dioxide is the essential gas needed for photosynthesis, making it the correct answer.

6. Identify one adaptive trait of animals for survival.

A. Excessive growth

B. Camouflage, migration, or hibernation

C. Increased size

D. Regular mating behavior

Camouflage, migration, or hibernation are all effective adaptive traits that enhance an animal's survival in its environment. Camouflage allows animals to blend in with their surroundings, which can help them avoid predators or become more effective hunters. For instance, a chameleon changes its color to match the environment, making it harder for prey and predators alike to spot it. Migration, on the other hand, enables animals to move from one region to another in search of better living conditions, food sources, or breeding grounds. For example, many bird species migrate south during winter to find warmer climates and access to food. Hibernation is a strategy used by some animals to survive harsh weather conditions. During hibernation, animals enter a state of dormancy, significantly slowing their metabolism to conserve energy when food is scarce. Bears are a well-known example of hibernating animals that sleep through the winter months. These adaptive traits are crucial for the survival of species by helping them respond to environmental changes, find resources, and avoid threats, reflecting a well-developed strategy for life in diverse ecosystems.

7. What are characteristics passed down from the genes of animals called?

A. Genetics

B. Inheritance

C. Genomics

D. Evolution

The correct answer is "Inheritance" because it specifically refers to the process through which traits and characteristics are passed down from parents to their offspring through genes. Inheritance involves the transmission of genetic information, which dictates various physical traits, behaviors, and biological functions found in animals and plants. Genetics, while closely related, is a broader field that studies the structure, function, and behavior of genes, including the principles of heredity. Genomics delves into the analysis of the entirety of an organism's genes and their interactions, which goes beyond just the concept of trait transmission. Evolution refers to the process by which species change over time through natural selection and genetic variation, but it does not specifically address how traits are inherited from one generation to the next.

8. What does the term "food web" represent?

A. A simple chain of predator and prey

B. A complex network of interconnected food chains

C. An isolated food chain

D. A hierarchy of living organisms

The term "food web" represents a complex network of interconnected food chains. In an ecosystem, various organisms do not only interact in a straightforward linear way but form multiple relationships with different species, reflecting the complexity of real-life feeding relationships. For instance, a single species might eat multiple types of food sources while also being preyed upon by various predators, leading to a web-like structure. This interconnectedness helps illustrate how energy and nutrients flow through an ecosystem, providing a more accurate depiction of ecological dynamics than a simple chain of predator and prey. A food web represents the diversity of these interactions, highlighting the importance of multiple species in maintaining balance within their ecosystem. This contrasts with the other options, which oversimplify or misrepresent the relationships typically found in nature. A simple chain of predator and prey fails to encompass the interactions among several organisms. An isolated food chain ignores the reality that species are often part of multiple food chains, and a hierarchy of living organisms doesn't capture the complexity of feeding relationships within an ecosystem. Therefore, understanding food webs is crucial to grasping ecological relationships and energy flow.

9. What term describes the flow of electrical energy through a conductor?

A. Voltage

B. Resistance

C. Current

D. Power

The term that describes the flow of electrical energy through a conductor is current. Current is defined as the rate at which electric charge flows through a conductor, such as a wire. It is measured in amperes (A) and represents the movement of electrons in the conductor. When an electrical circuit is completed, current allows electrical energy to transfer from one point to another to power devices or perform work. Voltage, on the other hand, refers to the potential difference that drives the flow of current. Resistance is the opposition to the flow of current in a conductor, and it impacts how much current will flow for a given voltage. Power relates to the rate at which energy is transferred or converted and is calculated using both current and voltage. Thus, while voltage, resistance, and power are important concepts in understanding electricity, current specifically indicates the flow of electrical energy.

10. Which of the following states that green plants produce their own food?

A. Cellular respiration

B. Photosynthesis

C. Decomposition

D. Pollination

The correct choice is photosynthesis, which is the process through which green plants, and some other organisms, convert sunlight into chemical energy. During photosynthesis, plants take in carbon dioxide from the air and water from the soil, using sunlight as energy to transform these raw materials into glucose (a type of sugar) and oxygen. The glucose produced serves as food for the plant, allowing it to grow, develop, and perform various functions. Additionally, the oxygen released during photosynthesis benefits other living organisms, making this process crucial for life on Earth. Cellular respiration is a different process where organisms, including plants, use oxygen to break down glucose into energy, carbon dioxide, and water. This is not the method by which plants produce their food. Decomposition refers to the breakdown of dead organic material by decomposers, returning nutrients to the soil rather than creating food. Pollination involves the transfer of pollen from one flower to another for reproduction, which is unrelated to how plants produce their food.