NWEA Science Measures of Academic Progress (MAP) Practice Test (Sample)

Study Guide

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Questions

1. What is friction?

- **A. A force that accelerates motion**
- **B. A force that resists motion**
- **C. A measurement of temperature**
- **D. A type of energy**

2. What is the primary purpose of chlorophyll in plants?

- **A. To absorb sunlight**
- **B. To produce water**
- **C. To store energy**
- **D. To help in respiration**

3. What does equilibrium refer to in scientific terms?

- **A. Movement**
- **B. Instability**
- **C. Balance**
- **D. Disorder**

4. What are trophic levels in ecology?

- **A. The different types of habitats**
- **B. The various adaptations of organisms**
- **C. The different stages in a food chain, representing energy transfer**
- **D. The categories of species in an ecosystem**

5. What is a non-renewable resource?

- **A. A resource that can be regenerated in a short time**
- **B. A resource that cannot be replaced on a human timescale**
- **C. A resource sourced from nature**
- **D. A resource that is always available**

6. What are abiotic factors?

- **A. Living components of an ecosystem**
- **B. Non-living chemical and physical parts of the environment**
- **C. Interactions between various species**
- **D. The genetic diversity within a population**

7. How is "texture" commonly defined in sound?

- **A. The pitch of a sound**
- **B. The speed of a sound wave**
- **C. The layers of sound**
- **D. The volume of sound produced**

8. What does the term "ice" refer to in a geological context?

- **A. A type of mineral found in glaciers**
- **B. A period of extremely cold temperatures when part of the planet's surface was covered with massive ice sheets**
- **C. A frozen form of water found in polar regions**
- **D. A synonym for snow**

9. What causes ocean currents?

- **A. Gravity alone**
- **B. Wind, Earth's rotation, and water density differences**
- **C. Moon phases**
- **D. Thermal expansion only**

10. Which of the following is NOT an abiotic factor?

- **A. Water**
- **B. Soil**
- **C. Animals**
- **D. Temperature**

Answers

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

Explanations

1. What is friction?

A. A force that accelerates motion

B. A force that resists motion

C. A measurement of temperature

D. A type of energy

Friction is defined as a force that resists the relative motion of two surfaces that are in contact with each other. It acts in the opposite direction to the movement or attempted movement of an object. This resistance occurs due to the interactions at the microscopic level between the surfaces. For example, when you push a box across the floor, friction acts against the direction of the push, making it harder to move the box. This interaction is a fundamental concept in physics that plays a crucial role in everyday activities, from walking to driving, where it prevents slipping. Understanding friction helps in explaining why certain surfaces may feel rougher or smoother and how they affect the ease with which objects can slide against one another. The other options do not accurately capture the essence of friction; rather they describe different physical concepts.

2. What is the primary purpose of chlorophyll in plants?

A. To absorb sunlight

B. To produce water

C. To store energy

D. To help in respiration

Chlorophyll plays a crucial role in the process of photosynthesis, which is how plants convert light energy into chemical energy. Its primary function is to absorb sunlight, particularly in the blue and red wavelengths. This absorbed light energy is essential for transforming carbon dioxide and water into glucose and oxygen, which are vital for the plant's growth and metabolism. By capturing sunlight, chlorophyll allows plants to harness solar energy, making it fundamental for their survival and for the production of oxygen that supports life on Earth. While other functions related to energy storage and respiration are important for a plant's overall physiological processes, they are not the primary role of chlorophyll itself. Chlorophyll's main function is specifically centered on light absorption, making it integral to the survival of plants and the broader ecosystem.

3. What does equilibrium refer to in scientific terms?

A. Movement

B. Instability

C. Balance

D. Disorder

Equilibrium in scientific terms refers to a state of balance where opposing forces or influences are equal. In various scientific contexts, such as chemistry, physics, and biology, equilibrium indicates that the system is stable and not changing, meaning all acting forces are balanced. For example, in a chemical reaction, equilibrium is reached when the rate of the forward reaction equals the rate of the backward reaction, resulting in constant concentrations of reactants and products. Similarly, in ecology, it can refer to a stable population size where the birth rate equals the death rate. The concept of equilibrium is central to understanding stability in various systems; it signifies an absence of net change, allowing for predictions about the system's behavior. Unlike movement, instability, or disorder, equilibrium suggests a harmonious and steady state.

4. What are trophic levels in ecology?

A. The different types of habitats

B. The various adaptations of organisms

C. The different stages in a food chain, representing energy transfer

D. The categories of species in an ecosystem

Trophic levels are a foundational concept in ecology that refer to the different stages in a food chain. Each trophic level represents a specific position of organisms in a sequence of energy transfer. At the base are primary producers, typically plants and photosynthetic organisms, that convert sunlight into usable energy. The next level consists of primary consumers, or herbivores, that feed on these producers. Following them are secondary consumers, or carnivores, which eat herbivores, and this pattern continues up the chain with tertiary consumers and beyond. Understanding trophic levels is essential because they help illustrate how energy flows through an ecosystem. Each transfer of energy between levels involves a significant loss of energy, usually as heat, making the ecosystem's structure and function reliant on these interactions. This concept is critical when studying ecosystems, as it provides insight into population dynamics, species interactions, and the overall health of an environment.

5. What is a non-renewable resource?

A. A resource that can be regenerated in a short time

B. A resource that cannot be replaced on a human timescale

C. A resource sourced from nature

D. A resource that is always available

A non-renewable resource is defined as a resource that cannot be replaced on a human timescale. This means that the formation of these resources takes millions of years, and once they are depleted, they cannot be readily or quickly replenished within a timeframe that is relevant to human use. Examples of non-renewable resources include fossil fuels, such as coal, oil, and natural gas, as well as minerals like gold and copper. In contrast, a resource that can be regenerated in a short time would be considered renewable. Resources sourced from nature can include both renewable and non-renewable types, and a resource that is always available does not accurately capture the essence of non-renewable resources, as they are finite and limited in nature. Understanding this distinction is crucial when considering resource management and sustainability.

6. What are abiotic factors?

A. Living components of an ecosystem

B. Non-living chemical and physical parts of the environment

C. Interactions between various species

D. The genetic diversity within a population

Abiotic factors are the non-living chemical and physical parts of the environment that influence the ecosystem. These factors include elements such as sunlight, temperature, water, soil, and atmospheric gases, all of which play crucial roles in determining the types of organisms that can thrive in a particular environment. For instance, the amount of sunlight affects photosynthesis in plants, which in turn supports the entire food web. Similarly, temperature and water availability can dictate the types of animals and plants that can survive in a particular habitat. Understanding abiotic factors is essential for studying ecosystems since they shape the living environment. For example, in a desert, the abiotic conditions of high temperatures and low water availability lead to the adaptation of specific flora and fauna suited to those challenges. This comprehension helps in areas such as ecology, conservation, and environmental management, where the relationship between living organisms and their non-living surroundings is key to maintaining ecological balance.

7. How is "texture" commonly defined in sound?

A. The pitch of a sound

B. The speed of a sound wave

C. The layers of sound

D. The volume of sound produced

"Texture" in sound refers to the layers of sound that combine to create a musical or auditory experience. It encompasses how many different sounds or voices are present, how they interact, and whether they are harmonizing, contrasting, or blending together. This could include the combination of instruments in an orchestra or the layering of vocals in a song. The complex relationships between these different layers are what give music its richness and depth. In contrast to texture, pitch refers to the perceived frequency of a sound, indicating how high or low it seems. Speed of sound relates to how quickly sound waves travel through different media, while volume pertains to the loudness or softness of a sound. Each of these aspects contributes differently to our understanding of sound, but they do not encompass the concept of texture in the way that layers of sound do.

8. What does the term "ice" refer to in a geological context?

A. A type of mineral found in glaciers

B. A period of extremely cold temperatures when part of the planet's surface was covered with massive ice sheets

C. A frozen form of water found in polar regions

D. A synonym for snow

In a geological context, the term "ice" most accurately refers to a period of extremely cold temperatures during which part of the Earth's surface was extensively covered with massive ice sheets. This concept is closely linked to significant geological events known as ice ages, where substantial portions of the planet were enveloped in glaciers, impacting the climate and geography of those regions. Understanding this definition is crucial because it relates to earth's climatic history and the effects of glaciation on ecosystems and landforms over time. The presence of these ice sheets can be evidenced in various geological formations and sediments left behind as they receded, highlighting their importance in the study of Earth's geological and climatic evolution.

9. What causes ocean currents?

A. Gravity alone

B. Wind, Earth's rotation, and water density differences

C. Moon phases

D. Thermal expansion only

Ocean currents are primarily driven by a combination of factors, which includes wind, the rotation of the Earth, and variations in water density due to differences in temperature and salinity. Wind plays a crucial role by transferring energy to the surface of the ocean, creating surface currents. These currents follow the wind patterns influenced by Earth's rotation, which also contributes to the Coriolis effect that causes currents to turn and spiral rather than flow in straight lines. Additionally, the density of seawater, which can change based on temperature (thermal stratification) and salinity (haline stratification), leads to movements of water known as thermohaline circulation. This process helps create deep ocean currents that are driven by the sinking of denser water and the rising of less dense water. This multi-faceted approach to understanding ocean currents emphasizes the importance of various natural forces in governing oceanic movements, making the chosen answer the most comprehensive and accurate reflection of the underlying concepts.

10. Which of the following is NOT an abiotic factor?

A. Water

B. Soil

C. Animals

D. Temperature

Abiotic factors are the non-living components of an ecosystem that influence the living organisms within it. These factors include elements such as water, soil, air, sunlight, and temperature. In the context of the question, animals do not fall into the category of abiotic factors because they are indeed living organisms, classified as biotic factors. Biotic factors are the living parts of an ecosystem, which include all forms of life, such as plants, animals, and microorganisms. Water, soil, and temperature, on the other hand, are all essential non-living factors that affect the survival and interactions of the biotic components in an ecosystem. Therefore, the identification of animals as the one that is not an abiotic factor accurately reflects the distinction between living and non-living elements in ecological studies.