Science PSSA Practice Test (Sample)

Study Guide

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Questions

1. **Which process involves a series of steps including data collection, hypothesis formulation, and conclusion stating?**
   - **A. Research method**
   - **B. Scientific inquiry**
   - **C. Scientific method**
   - **D. Experimental design**

2. **Which process is responsible for the gradual building up of soil as a result of the decomposition of plant and animal matter?**
   - **A. Weathering**
   - **B. Erosion**
   - **C. Decomposition**
   - **D. Humification**

3. **Which type of energy is derived from the earth's internal heat?**
   - **A. Geothermal energy**
   - **B. Solar energy**
   - **C. Nuclear energy**
   - **D. Wind energy**

4. **What is the primary driver of the water cycle?**
   - **A. The moon**
   - **B. The sun**
   - **C. The wind**
   - **D. The ocean**

5. **What is the term for the addition of more waste than a resource can handle?**
   - **A. Overconsumption**
   - **B. Pollution**
   - **C. Degradation**
   - **D. Contamination**

6. Which of the following describes a primary producer?

A. A plant that creates energy through photosynthesis

B. An organism that feeds on other organisms

C. A decomposer that recycles nutrients

D. An animal that feeds on plants and animals

7. What does "pollution from multiple sources" refer to in environmental science?

A. Point source pollution

B. Acid rain

C. Nonpoint source pollution

D. Thermal pollution

8. Which molecule contains the genetic information and makes up chromosomes?

A. RNA

B. Protein

C. DNA

D. Carbohydrate

9. What geological process is characterized by the bending or folding of rocks due to stress from converging plates?

A. Subduction

B. Uplift

C. Weathering

D. Compression

10. What is the name of the force that pulls on a material?

A. Compression

B. Tension

C. Shear

D. Flexion

Answers

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

Explanations

1. Which process involves a series of steps including data collection, hypothesis formulation, and conclusion stating?

A. Research method

B. Scientific inquiry

C. Scientific method

D. Experimental design

The correct answer is the scientific method, as it is a systematic approach used to investigate phenomena, acquire new knowledge, or correct and integrate previous knowledge. This process encompasses several critical steps that include the collection of data through observation and experimentation, formulating a hypothesis which serves as a testable explanation, conducting experiments to gather evidence, and finally drawing conclusions based on the data analyzed. The scientific method emphasizes logical reasoning and empirical evidence, which helps ensure that conclusions are based on observable and replicable results. While the research method is a broad term that can refer to various approaches for conducting any kind of research, scientific inquiry is a wider scope that focuses on the search for understanding through questioning and exploration, not strictly a structured sequence of steps. Experimental design, on the other hand, refers specifically to the planning of experiments, including the methods and procedures, which is a part of the scientific method but not its entirety. Therefore, the scientific method is the most comprehensive answer that encapsulates the entire process from data collection to the conclusion.

2. Which process is responsible for the gradual building up of soil as a result of the decomposition of plant and animal matter?

A. Weathering

B. Erosion

C. Decomposition

D. Humification

The process responsible for the gradual building up of soil due to the decomposition of plant and animal matter is humification. During humification, organic material from decayed plants and animals is broken down by microorganisms and transformed into humus, which is a dark, nutrient-rich component of soil. This process is essential for soil fertility, as it enriches the soil with nutrients necessary for plant growth. Humus contributes to the soil structure, enhances moisture retention, and helps bind soil particles together, which promotes a healthy ecosystem for various organisms. The input of decomposed organic matter through humification plays a critical role in the formation of fertile soil, making it vital for agricultural practices and natural ecosystems.

3. Which type of energy is derived from the earth's internal heat?

A. Geothermal energy

B. Solar energy

C. Nuclear energy

D. Wind energy

Geothermal energy is the correct answer because it specifically refers to the energy that is generated and stored in the Earth’s interior. This energy originates from the natural heat produced by the Earth's molten core, as well as from the decay of radioactive materials within the Earth. Geothermal energy is harnessed to produce electricity and can also be used for direct heating applications. The process includes drilling deep into the Earth to access hot water or steam, which is then brought to the surface to be converted into usable energy. In contrast, solar energy is derived from the sun's radiation, nuclear energy comes from the splitting of atomic nuclei, and wind energy is generated by harnessing the kinetic energy of moving air. Each of these energies comes from different sources and processes, which is why they do not fit the criteria of being derived from the Earth's internal heat.

4. What is the primary driver of the water cycle?

A. The moon

B. The sun

C. The wind

D. The ocean

The primary driver of the water cycle is the sun. Solar energy plays a crucial role in this process by providing the heat necessary for evaporation, which is the first step in the water cycle. When the sun heats water in oceans, rivers, and lakes, it transforms it into water vapor, allowing it to rise into the atmosphere. Once this water vapor cools, it condenses to form clouds, which can eventually lead to precipitation (rain, snow, etc.) when the droplets become heavy enough. This precipitation returns water to the Earth's surface, where it can flow back into bodies of water, be absorbed by soil, or take part in groundwater systems, thus continuing the cycle. While other factors like the wind and ocean currents do influence the movement and distribution of water in the atmosphere and affect climate patterns, they do not initiate the water cycle. The moon plays a role in influencing tides, which are important for coastal ecosystems but are not the primary driver of the water cycle. Similarly, oceans hold a significant amount of water and are affected by the water cycle, but they are not the force that drives it. Therefore, the sun is the fundamental source of energy that powers the entire water cycle.

5. What is the term for the addition of more waste than a resource can handle?

A. Overconsumption

B. Pollution

C. Degradation

D. Contamination

The addition of more waste than a resource can handle is termed pollution. Pollution refers to the introduction of harmful substances or contaminants into the environment at levels that exceed the environment's capacity to process or neutralize them. This can lead to detrimental impacts on ecosystems, air quality, water sources, and overall environmental health. For example, when factories release excessive amounts of toxic waste into rivers, the natural systems in place may not be enough to filter out or degrade these pollutants, leading to pollution. This term encompasses various forms of contamination, including air pollution from industrial emissions and water pollution from runoff. In contrast, overconsumption related to resource use may lead to depletion but does not specifically address the excess waste produced. Degradation refers to a decline in quality or function of an ecosystem or resource, while contamination often implies the presence of harmful substances but does not necessarily highlight the aspect of exceeding the capacity of the environment to manage waste.

6. Which of the following describes a primary producer?

A. A plant that creates energy through photosynthesis

B. An organism that feeds on other organisms

C. A decomposer that recycles nutrients

D. An animal that feeds on plants and animals

A primary producer is an organism that generates its own energy through processes like photosynthesis, which enables it to convert sunlight into chemical energy stored in organic compounds. In ecosystems, primary producers, such as plants, algae, and some bacteria, are crucial because they form the base of the food chain, providing energy and nutrients for consumers, which are organisms that cannot produce their own food. This ability to harness energy from the sun is what distinguishes primary producers from other types of organisms, such as consumers that rely on consuming other organisms for energy and decomposers that break down dead organic material but do not produce energy directly. Thus, the role of a plant creating energy through photosynthesis accurately reflects the definition of a primary producer within an ecological context.

7. What does "pollution from multiple sources" refer to in environmental science?

A. Point source pollution

B. Acid rain

C. Nonpoint source pollution

D. Thermal pollution

"Pollution from multiple sources" is best described by nonpoint source pollution. This type of pollution does not originate from a single identifiable source but rather comes from various sources that are often spread out over a large area. For example, runoff from agricultural fields, urban areas, or construction sites can all contribute to the pollution in a water body. This makes it challenging to control or manage since the pollutants are dispersed and can combine during rain events or through surface runoff. In contrast, point source pollution refers to pollutants that come from a single, identifiable source, like a pipe from a factory discharging waste into a river. Acid rain is a specific type of pollution caused by the atmospheric deposition of sulfur dioxide and nitrogen oxides, resulting from industrial activity, whereas thermal pollution pertains to the degradation of water quality due to excessive heat.

8. Which molecule contains the genetic information and makes up chromosomes?

A. RNA

B. Protein

C. DNA

D. Carbohydrate

The molecule that contains genetic information and makes up chromosomes is DNA (deoxyribonucleic acid). DNA is a long molecule composed of nucleotides, which are the building blocks of genetic information. This structure contains the instructions needed for the development, functioning, growth, and reproduction of all known living organisms and many viruses. Within the cells, DNA is organized into structures called chromosomes, which ensure the correct distribution of genetic material during cell division. Each chromosome carries a specific set of genes, which are sections of DNA that encode particular proteins or traits. While RNA plays a crucial role in the process of translating genetic information from DNA into proteins, it does not contain the genetic information itself nor does it form chromosomes. Proteins are the products of gene expression, and carbohydrates serve various roles in cellular structure and energy storage but are not involved in storing genetic instruction. Therefore, DNA is the key molecule when discussing genetic information and chromosomal structure.

9. What geological process is characterized by the bending or folding of rocks due to stress from converging plates?

A. Subduction

B. Uplift

C. Weathering

D. Compression

The geological process characterized by the bending or folding of rocks due to stress from converging plates is known as compression. Compression occurs at convergent plate boundaries, where tectonic plates push against each other. This immense pressure causes the crust to deform, leading to the bending or folding of rock layers, which can result in the formation of mountain ranges and other geological features. While uplift refers to the rising of regions of the Earth's crust, it does not specifically address the bending or folding that is a result of plate convergence. Weathering involves the breaking down of rocks into smaller pieces, which does not encompass the processes associated with stress from plate movement. Subduction, on the other hand, is the process where one tectonic plate moves under another, leading to different geological phenomena, but it does not specifically describe the bending or folding of rocks as compression does. Understanding these distinctions helps clarify why compression is the correct answer in this context.

10. What is the name of the force that pulls on a material?

A. Compression

B. Tension

C. Shear

D. Flexion

The correct answer, tension, refers to the force that pulls on a material, causing it to stretch. This force occurs when an object is subjected to forces that act in opposite directions. For example, when a rope is pulled from both ends, tension develops, leading to the elongation of the rope. Understanding tension is crucial in various fields, such as engineering and physics, where it affects the integrity and behavior of structures and materials under load. In contrast, compression refers to a force that pushes or compresses a material, often leading to a decrease in volume. Shear involves forces that cause parts of a material to slide past each other in opposite directions, and flexion deals with bending moments that produce curvature in a material. Each of these forces plays a significant role in understanding the physical behavior of materials, but tension specifically highlights the stretching or pulling aspect.