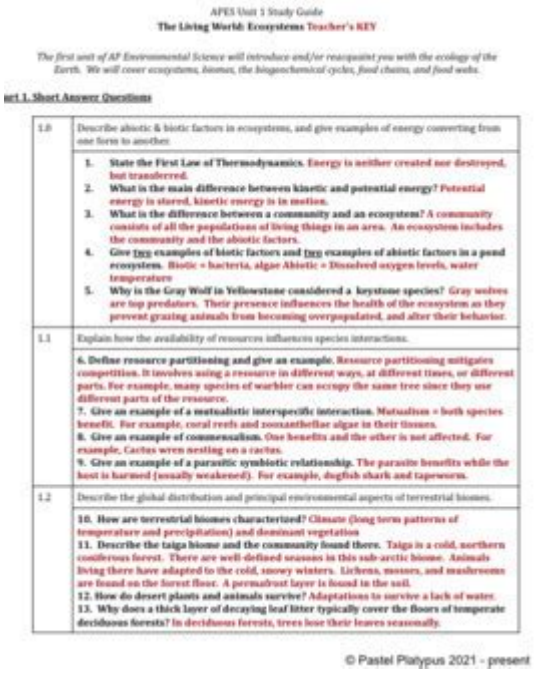
Environmental Science Unit 1 Study Guide Answers



APES Unit 1 Study Guide
The Living World: Ecosystems Teacher's KEY

The first unit of AP Environmental Science will introduce and/or reacquaint you with the ecology of the Earth. We will cover ecosystems, biomes, the biogeochemical cycles, food chains, and food webs.

art 1. Short Answer Questions

1.0	Describe abiotic & biotic factors in ecosystems, and give examples of energy converting from one form to another.
	1. **State the First Law of Thermodynamics.** Energy is neither created nor destroyed, but transferred. 2. **What is the main difference between kinetic and potential energy?** Potential energy is stored, kinetic energy is in motion. 3. **What is the difference between a community and an ecosystem?** A community consists of all the populations of living things in an area. An ecosystem includes the community and the abiotic factors. 4. **Give two examples of biotic factors and two examples of abiotic factors in a pond ecosystem.** Biotic = bacteria, algae Abiotic = Dissolved oxygen levels, water temperature 5. **Why is the Gray Wolf in Yellowstone considered a keystone species?** Gray wolves are top predators. Their presence influences the health of the ecosystem as they prevent grazing animals from becoming overpopulated, and alter their behavior.
1.1	Explain how the availability of resources influences species interactions.
	6. **Define resource partitioning and give an example.** Resource partitioning mitigates competition. It involves using a resource in different ways, at different times, or different parts. For example, many species of warbler can occupy the same tree since they use different parts of the resource. 7. **Give an example of a mutualistic interspecific interaction.** Mutualism = both species benefit. For example, coral reefs and zooxanthellae algae in their tissues. 8. **Give an example of commensalism.** One benefits and the other is not affected. For example, Cactus wren nesting on a cactus. 9. **Give an example of a parasitic symbiotic relationship.** The parasite benefits while the host is harmed (usually weakened). For example, dogfish shark and tapeworm.
1.2	Describe the global distribution and principal environmental aspects of terrestrial biomes.
	10. **How are terrestrial biomes characterized?** Climate (long term patterns of temperature and precipitation) and dominant vegetation 11. **Describe the taiga biome and the community found there.** Taiga is a cold, northern coniferous forest. There are well-defined seasons in this sub-arctic biome. Animals living there have adapted to the cold, snowy winters. Lichens, mosses, and mushrooms are found on the forest floor. A permafrost layer is found in the soil. 12. **How do desert plants and animals survive?** Adaptations to survive a lack of water. 13. **Why does a thick layer of decaying leaf litter typically cover the floors of temperate deciduous forests?** In deciduous forests, trees lose their leaves seasonally.

Environmental science unit 1 study guide answers are crucial for students looking to excel in their understanding of the foundational concepts in environmental science. This study guide serves as a comprehensive resource that will help you navigate the intricate topics covered in Unit 1. From fundamental ecological principles to the impact of human activities on the environment, this guide will provide detailed answers and explanations to enhance your learning experience.

Overview of Environmental Science

Environmental science is an interdisciplinary field that integrates various scientific disciplines to understand the environment and the challenges it faces. It encompasses biology, chemistry, geology, atmospheric science, and social sciences to analyze the interactions between humans and the natural world.

Key Components of Environmental Science

1. Ecology: The study of organisms and their interactions with one another and their environment.
2. Biogeochemistry: The study of the chemical processes that occur in the

environment, including nutrient cycles.
3. Geosciences: The study of Earth’s physical structure, processes, and history.
4. Atmospheric Science: The study of the Earth's atmosphere and its interactions with the land and oceans.
5. Social Sciences: Understanding the human dimension, including economics, politics, and culture, and how they influence environmental policies.

Unit 1: Fundamental Concepts

Unit 1 typically covers essential concepts that form the basis of environmental science. Here, we will break down some of these fundamental topics and provide answers to common study questions.

1. The Ecosystem

An ecosystem is a community of living organisms interacting with their physical environment. Understanding ecosystems is crucial for environmental science as they demonstrate how life is interconnected.

Key Components of Ecosystems:

- Biotic Factors: Living components such as plants, animals, and microorganisms.
- Abiotic Factors: Non-living elements like water, air, soil, and sunlight.

Study Questions:

- What is an ecosystem?
- How do biotic and abiotic factors interact within an ecosystem?

Answers:

An ecosystem is a dynamic complex of plant, animal, and microorganism communities and their non-living environment interacting as a functional unit. Biotic factors influence the population dynamics of species, while abiotic factors determine the conditions for life.

2. Biodiversity

Biodiversity refers to the variety of life on Earth, including the diversity of species, genetic variations, and ecosystems.

Importance of Biodiversity:

- Ecosystem Services: Biodiversity contributes to ecosystem resilience and stability.
- Economic Value: Many industries, such as agriculture and pharmaceuticals, rely on diverse biological resources.

Study Questions:

- Define biodiversity.
- What are the main threats to biodiversity?

Answers:

Biodiversity is the variety of life in a particular habitat or ecosystem. The main threats to biodiversity include habitat destruction, climate change, pollution, overexploitation, and invasive species.

Human Impact on the Environment

Understanding how human activities impact the environment is a significant focus in environmental science.

1. Pollution

Pollution occurs when harmful substances are introduced into the environment, leading to adverse effects on ecosystems and human health.

Types of Pollution:

- Air Pollution: Emissions from vehicles and industrial processes.
- Water Pollution: Contaminants entering water bodies from agricultural runoff or industrial discharge.
- Soil Pollution: The presence of toxic chemicals in soil due to improper waste disposal.

Study Questions:

- What are the major types of pollution?
- How can pollution be mitigated?

Answers:

Major types of pollution include air, water, and soil pollution. Mitigation strategies involve implementing stricter regulations, promoting clean energy sources, improving waste management practices, and raising public awareness about pollution prevention.

2. Climate Change

Climate change refers to significant alterations in temperature, precipitation, wind patterns, and other elements of the Earth's climate system.

Causes of Climate Change:

- Greenhouse Gas Emissions: Primarily from fossil fuel combustion.
- Deforestation: Reduces carbon storage capacity.
- Industrial Activities: Contributes to increased levels of greenhouse gases.

Study Questions:

- What are the primary causes of climate change?
- What are its potential impacts on the environment?

Answers:

The primary causes of climate change include greenhouse gas emissions from human activities, deforestation, and industrial activities. Potential impacts include rising sea levels, increased frequency of extreme weather events, and loss of biodiversity.

Understanding Sustainability

Sustainability is a central theme in environmental science, focusing on meeting the needs of the present without compromising the ability of future generations to meet their own needs.

Principles of Sustainability

1. Conservation of Resources: Using natural resources wisely to prevent depletion.
2. Renewable Energy Sources: Transitioning to energy systems that can be replenished naturally.
3. Waste Reduction: Minimizing waste through recycling and sustainable practices.

Study Questions:

- What does sustainability mean in the context of environmental science?
- How can individuals contribute to sustainability?

Answers:

Sustainability in environmental science refers to the capacity to endure in a relatively ongoing way across various domains of life. Individuals can contribute to sustainability by reducing waste, conserving energy, supporting renewable energy initiatives, and advocating for sustainable practices in their communities.

Conclusion

In summary, **environmental science unit 1 study guide answers** provide invaluable insights into the foundational concepts that will prepare students for more advanced topics in environmental science. By understanding ecosystems, biodiversity, human impacts, and sustainability, students can develop a well-rounded perspective on the challenges facing our planet and the solutions that can be implemented to foster a healthier environment for future generations. As you study these concepts, remember that the knowledge gained can empower you to make informed decisions and contribute positively to environmental conservation efforts.

Frequently Asked Questions

What are the key components of an ecosystem covered in Unit 1?

The key components include abiotic factors like soil, water, and climate, and biotic factors such as plants, animals, and microorganisms.

How does energy flow in an ecosystem according to Unit 1?

Energy flows through ecosystems in a one-way stream, from primary producers to various levels of consumers, following the food chain.

What is the significance of the nitrogen cycle as discussed in Unit 1?

The nitrogen cycle is crucial for converting nitrogen from the atmosphere into forms usable by living organisms, thus playing a vital role in ecosystem productivity.

What human activities impact ecosystems as outlined in Unit 1?

Human activities such as deforestation, pollution, urbanization, and agriculture significantly disrupt natural ecosystems and their balance.

What role do producers play in an ecosystem based on Unit 1 content?

Producers, primarily plants and algae, convert solar energy into chemical energy through photosynthesis, forming the base of the food chain.

What are the types of biodiversity highlighted in Unit 1?

Unit 1 highlights three types of biodiversity: genetic diversity, species diversity, and ecosystem diversity, each contributing to ecosystem resilience and stability.

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