

AP Environmental Science

Chapter 1: Studying the State of Our Earth

Objectives: Students should be able to...

1.1 - define the field of environmental science and discuss its importance.

- 1.1.1 Differentiate between environmentalism, environmental studies and environmental science
- 1.1.2 Differentiate between environmentalist and environmental scientist
- 1.1.3 Define biotic and abiotic and give examples of each

1.2 - identify ways in which humans have altered and continue to alter our environment.

- 1.2.1 Identify examples of how humans have altered the environment
- 1.2.2 Describe factors that have played a role in how humans have altered the environment

1.3 - describe key environmental indicators that help us evaluate the health of the planet.

- 1.3.1 Define ecosystem services and list examples
- 1.3.2 Identify the role of environmental indicators and why they are useful
- 1.3.3 Explain how biodiversity can be used as an environmental indicator
- 1.3.4 Define biodiversity and compare and contrast the three types of biodiversity
- 1.3.5 Explain how food production can be used as an environmental indicator
- 1.3.6 What are the current trends in total and per capita grain consumption
- 1.3.7 Explain how temp and CO₂ can be used as an environmental indicator
- 1.3.8 Describe the role of greenhouse gases and what it means to be anthropogenic
- 1.3.9 Explain how the human population can be used as an environmental indicator
- 1.3.10 Describe the current trend in human population size & identify the size of the human population
- 1.3.11 Explain how resource depletion can be used as an environmental indicator
- 1.3.12 Identify natural resources and their effects on the environment

1.4 - define sustainability and explain how it can be measured using the ecological footprint.

- 1.4.1 Summarize what occurred on Easter Island and its connection to sustainability
- 1.4.2 List the requirements to living sustainably
- 1.4.3 Define sustainable development and how it differs from sustainability
- 1.4.4 Define biophilia
- 1.4.5 Define ecological footprint & list the factors that go into calculating an individual's ecological footprint

1.5 - explain the scientific method and its application to the study of environmental problems.

- 1.5.1 Define null hypothesis and explain why it can be necessary
- 1.5.2 Describe the importance of replication and sample size in data collection
- 1.5.3 Differentiate between accuracy and precision
- 1.5.4 Describe the importance of a control group
- 1.5.5 Explain why natural experiments might be needed and what their limitations are

1.6 - describe some of the unique challenges and limitations of environmental science.

- 1.6.1 Define baseline data and what its role is in scientific experiments
- 1.6.2 Explain the role subjectivity plays in environmental science
- 1.6.3 Explain the role Interactions play in natural and human systems.
- 1.6.4 Define environmental equity
- 1.6.5 Define environmental justice and its connection to wealth and other socioeconomic factors

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Chapter 2: Environmental Systems

2.1 - Define systems within the context of environmental science

- 2.1.1 Define an environmental system and cite examples
- 2.1.2 Describe how systems vary in size
- 2.1.3 Identify smaller systems within a larger system

2.2 Explain components and states of matter

- 2.2.1 Describe the constituents of matter
- 2.2.2 Differentiate between mass and matter
- 2.2.3 Compare and contrast three different types of chemical bonds
- 2.2.4 Identify water's unique properties
- 2.2.5 Indicate how water's unique properties accounts for life on Earth
- 2.2.6 Compare and contrast the four types of organic molecules

2.3 Distinguish between the various forms of energy and discuss the first and second law of thermodynamics

- 2.3.1 Differentiate between power and energy
- 2.3.2 Compare and contrast potential and kinetic energy
- 2.3.3 Explain chemical energy
- 2.3.4 Describe the first and second laws of thermodynamics

2.4 Describe the ways in which ecological systems depend on energy inputs

- 2.4.1 Describe how living organism convert one form of energy to another
- 2.4.2 Explain how energy determines the sustainability of the environment for growing food

2.5 Explain how scientists keep track of inputs, outputs and changes in complex systems

- 2.5.1 Compare and contrast an open system with closed
- 2.5.2 Define steady state
- 2.5.3 Define feedback loops
- 2.5.4 Explain how changes in input and output rates affect systems

2.6 Describe how natural systems change over time and space

- 2.6.1 Cite examples of environmental conditions that vary among ecosystems
- 2.6.2 Discuss why it necessary to track changes in ecosystems over space and time