1.S: Environmental Science (Summary)

Summary

Science attempts to describe and understand the nature of the universe in whole or in part. Science has many fields; those fields related to the physical world and its phenomena are considered natural sciences. A hypothesis is a tentative explanation for an observation. A scientific theory is a well-tested and consistently verified explanation for a set of observations or phenomena. A scientific law is a description, often in the form of a mathematical formula, of the behavior of an aspect of nature under certain circumstances. Two types of logical reasoning are used in science. Inductive reasoning uses results to produce general scientific principles. Deductive reasoning is a form of logical thinking that predicts results by applying general principles. The common thread throughout scientific research is the use of the scientific method. Scientists present their results in peer-reviewed scientific papers published in scientific journals. Science can be basic or applied. The main goal of basic science is to expand knowledge without any expectation of short-term practical application of that knowledge. The primary goal of applied research, however, is to solve practical problems.

Sustainability refers to three simple concerns: the need to arrest environmental degradation and ecological imbalance, the need not to impoverish future generations and the need for quality of life and equity between current generations. Added up, these core concerns are an unmistakable call for transformation. Business-as-usual is no longer an option. The concept of ethics involves standards of conduct. These standards help to distinguish between behavior that is considered right and that which is considered wrong. The ways in which humans interact with the land and its natural resources are determined by ethical attitudes and behaviors. A frontier ethic assumes that the earth has an unlimited supply of resources. Environmental ethic includes humans as part of the natural community rather than managers of it. Sustainable ethic assumes that the earth’s resources are not unlimited and that humans must use and conserve resources in a manner that allows their continued use in the future. Countries are categorized by a variety of methods.
During the Cold War period, the United States government categorized countries according to each government’s ideology and capitalistic development. Current classification models utilize economic (and sometimes other) factors in their determination. Environmental justice is achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment. Many problems face indigenous people, including: lack of human rights, exploitation of their traditional lands and themselves, and degradation of their culture. Despite the lofty U.N. goals, the rights and feelings of indigenous people are often ignored or minimized, even by supposedly culturally sensitive developed countries.

**Review Questions**

1. Scientific research that produces knowledge without any immediate practical use is specifically known as…
   - A. Basic science
   - B. Applied science
   - C. Hypothesis-based science
   - D. Descriptive science
   - E. Retrospective science

2. Which one of the following fulfills the definition of a hypothesis?
   - A. Removing invasive species will result in greater biodiversity.
   - B. Introducing invasive species will harm an ecosystem.
   - C. Invasive species are non-native species that alter ecosystems.
   - D. Introducing invasive species will decrease biodiversity by displacing native species
   - E. Ecosystem productivity will decrease when invasive species are introduced.

3. Which one of the following is consistent with the frontier ethic?
   - A. Expanding the area covered by a wildlife sanctuary
   - B. Protecting a natural area as a national park
   - C. Sustainable logging of a forest
   - D. Transferring ownership of forestland from private ownership to the federal government
   - E. Extracting copper ore from mineral-rich deposit in a landscape rich in biodiversity

4. Which one of the following suggests that when the effects of a human activity are poorly understood, we must presume that some level of harm may exist to the environment, and thus must proceed with that activity carefully?
   - A. Sustainability ethic
   - B. Precautionary principle
   - C. Environmental harm dictum
   - D. Environmental injustice
   - E. Presumptive principle

5. Which one of the following demonstrates the concept of the “tragedy of the commons”?
   - A. Competing companies log as many trees as possible for financial gain until no trees are left
   - B. Public forest land is sold to a privately-owned investor group
   - C. Logging forests is dangerous work and ends up killing or injuring many workers
   - D. A careless hiker accidentally starts a wildfire that destroys hundreds of acres of forest
6. The equal sharing of Earth’s resources is specifically known as…
   A. Environmental justice
   B. Sustainability
   C. Environmental equity
   D. Ecological footprinting
   E. Mutualism

7. John Muir’s position on the proposed development in the Hetch Hetchy Valley of California in the early 1900s would best match which one of the following?
   A. Frontier ethic
   B. Sustainable ethic
   C. Land ethic
   D. Ethos ethic
   E. Darwinian ethic

8. Which one of the following is an example of inductive reasoning?
   A. Every lion you’ve seen on TV hunts gazelles, therefore all lions hunt gazelles.
   B. All tigers are mammals. All mammals are vertebrates. Therefore, tigers are vertebrates.
   C. Every lake contains water; therefore, Crater Lake contains water.
   D. Only plants have flowers. Tulips are a plant because they have flowers.
   E. The sun emits energy in the form of photons. Visible light is made of photons and thus light is a type of energy.

9. The fair treatment and meaningful involvement of all people regarding enforcement and implementation of environmental regulations and policies is known as what?
   A. Quid pro quo
   B. Environmental justice
   C. Environmental equity
   D. Habes corpus
   E. Ecologic inclusiveness

10. People and their culture that have existed continuously dating back to a time before their land was invaded or colonized by other societies are known as…
    A. Endemic
    B. Indigenous
    C. Exotic
    D. Incunable
    E. Invidious

See Appendix for answers

11. What is science?
12. Describe the process of scientific method.
13. What are inductive reasoning and deductive reasoning?
14. Describe the goals of basic and applied science.
15. Give one example of the link between basic and applied research.
16. What are peer-reviewed articles?
17. Explain the following terms: hypothesis, falsifiability, scientific law.
18. Name some indicators of global environmental stress.
19. Define sustainability.
20. Explain the following terms: frontier ethic, land ethic, environmental ethic.
21. What are developed countries according to the World Bank classification?
22. Define environmental justice.

Attributions


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