Environment 10th edition Hassenzahl Test Bank

SKU: 9781119393474-TEST-BANK

Package Title: Raven Testbank
Course Title: Environment 10e WileyPLUS
Chapter Number: 1

Question Type: Multiple Choice

1. The sun's energy provides earth with:

a) fossil fuels
b) energy-rich carbon compounds
c) patterns of temperature and precipitation
d) liquid water
e) All of these choices are correct

Answer: e

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.1 Explain how human activities and development affect the environment. TEMINAL LO
Learning Objective 2: LO 1.1.1 Explain how human activities affect global systems. ENABLING LO
Section Reference 1: 1.1 Human Impacts on Environment

2. In 2011, the global human population passed _____ billion.

a) 3
b) 5
c) 7
d) 8
e) 11

Answer: c

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.2 Describe how population growth and our choice of resources affect the environment. TERMINAL LO
Learning Objective 2: LO 1.2.2 Explain the impacts of population and affluence on consumption. ENABLING LO
Section Reference 1: 1.2 Population, Resources, and Environment

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3. The interdisciplinary study of humanity's relationship with other organisms and the non-living physical environment is termed:

a) ecology
b) sociology
c) political science
d) risk analysis
e) environmental science

Answer: e

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.4 Describe environmental science and the role of the scientific method. TERMINAL LO
Learning Objective 2: LO 1.4.1 Define environmental science, including the role of Earth systems in environmental science. ENABLING LO

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Section Reference 1: 1.4 Environmental Science

4. Highly developed countries are characterized by:

a) high rates of population growth
b) high per capita incomes
c) simple agricultural bases
d) 50% of the world's population
e) high rates if illiteracy

Answer: b

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.2 Describe how population growth and our choice of resources affect the environment. TERMINAL LO
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Section Reference 1: 1.2. Population, Resources, and Environment

5. The ability to meet humanity's current needs without compromising the ability of future generations to meet their needs is termed:

a) ecology.
b) environmental sustainability.

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c) natural balance.
d) synergism.
e) environmental science.

Answer: b

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.3 Define sustainability and sustainable development. TERMINAL LO
Learning Objective 2: LO 1.3.1 Define sustainability. ENABLING LO
Section Reference 1: 1.3 Sustainability

6. In solving environmental problems, a risk analysis is usually performed:

a) to provide public awareness and endorsement
b) to monitor the initial assessment and modeling of the problem
c) to solicit public opinion about how evidence should be interpreted when selecting a course of action
d) to analyze the potential effect of an intervention or doing nothing
e) a risk analysis is not necessary in resolving environmental problems

Answer: d

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.5 List the five stages in addressing environmental problems. TERMINAL LO
Learning Objective 2: LO 1.5.1 List and briefly describe the five stages in addressing environmental problems. ENABLING LO
Section Reference 1: 1.5 Addressing Environmental Problems

7. Examples of non-sustainable human activities or behaviors include:

a) recycling
b) attempts to limit human population growth
c) using technology to improve car mileage
d) use of nonrenewable resources as if they were present in unlimited quantities
e) conservation practices

Answer: d

Difficulty: Medium
Bloomcode: Application

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Learning Objective 1: LO 1.2 Describe how population growth and our choice of resources affect the environment. TERMINAL LO
Learning Objective 2: LO 1.2. Describe the three most important factors that determine human impact on the environment. ENABLING LO
Section Reference 1: 1.2 Population, Resources, and the Environment

8. The difference(s) between highly developed countries and less developed countries include

a) income levels
b) industrialization levels
c) fertility rates
d) infant mortality
e) All of these choices are correct

Answer: e

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.2 Describe how population growth and our choice of resources affect the environment. TERMINAL LO
Learning Objective 2: LO 1.2.2 Explain the impacts of population and affluence on consumption. ENABLING LO
Section Reference 1: 1,2 Population, Resources, and Environment

9. In 1950, the largest city in the world, with 12.3 million inhabitants, was __(1)___. By 2010 city (1) was surpassed by _____(2)_____ as the largest city in the world with 35.2 million inhabitants.

a) (1) Bombay, India; (2) Mexico City, Mexico
b) (1) Madrid, Spain; (2) Calcutta, India
c) (1) New York City, United States; (2) Tokyo, Japan
d) (1) Shanghai, P.R. China; (2) Bombay, India
e) (1) London, England; (2) New York City, United States

Answer: c

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.1 Explain how human activities and development affect global systems. TERMINAL LO
Learning Objective 2: LO 1.1.2 Describe the factors that characterize human development and how they impact environment and sustainability. ENABLING LO
Section Reference 1: 1.1 Human Impacts on Environment

10. Poverty is associated with all of the following EXCEPT:

a) low life expectancy
b) illiteracy
c) inadequate access to health services
d) balanced nutrition
e) unsafe drinking water

Answer: d

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.1 Explain how human activities and development affect global systems. TERMINAL LO
Learning Objective 2: LO 1.1.2 Describe the factors that characterize human development and how they impact environment and sustainability. ENABLING LO
Section Reference 1: 1.1 Human Impacts on the Environment

11. What activity/activities contribute(s) to making the human species the most significant agent of environmental change on Earth?

a) continued population growth
b) consuming non-renewable resources
c) eradicating unique species
d) ignoring the environment
e) All of these choices are correct

Answer: e

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.1 Explain how human activities and development affect global systems. TERMINAL LO
Learning Objective 2: LO 1.1.2 Describe the factors that characterize human development and how they impact environment and sustainability. ENABLING LO
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Section Reference 1: 1.1 Human Impacts on the Environment

12. The one central problem of environmental science that links all other problems together is that:

a) we are using up our supplies of fossil fuels
b) we are polluting the environment

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c) we are using too much fresh water
d) we are continually increasing the number of humans
e) we are depleting needed resources

Answer: d

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.1 Explain how human activities and development affect the environment. TERMINAL LO
Learning Objective 2: LO 1.1.2 Explain how human activities affect global systems. ENABLING LO
Section Reference 1: 1.1 Human Impacts on Environment

13. I = P x A x T model can be used to calculate which of the following?

a) urbanization
b) people overpopulation
c) industrialization
d) international fertility rates
e) human impact on the environment

Answer: e

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.2 Describe how population growth and our choice of resources affect the environment. TERMINAL LO
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14. A warmer atmosphere is likely to cause:

a) increased melting of glaciers and ice caps
b) changes in precipitation patterns
c) negative feedback between melting of ice sheets and atmospheric temperature.
d) increased melting of glaciers and ice caps and changes in precipitation patterns
e) all of these

Answer: e

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.4 Describe environmental science and the role of the scientific method. TERMINAL LO.
Learning Objective 2: LO 1.4.1 Define environmental science and briefly describe the role of Earth systems in environmental science. ENABLING LO
Section Reference 1: 1.4 Environmental Science

15. Which of the following stages comes LAST in addressing environmental problems?

a) risk analysis
b) political action
c) evaluation
d) scientific assessment
e) public education and involvement

Answer: c

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.5. List the five stages in addressing environmental problems. TERMINAL LO
Learning Objective 2: LO 1.5.1 List and briefly describe the five stages in addressing environmental problems. ENABLING LO
Section Reference 1: 1.5 Addressing environmental problems

16. In the scientific method, a hypothesis

a) is a statement of fact
b) makes a prediction that can be tested
c) is usually proven to be correct
d) can only be tested once
e) All of these choices are correct

Answer: b

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.4 Describe environmental science and the role of the scientific method. TERMINAL LO
Learning Objective 2: LO 1.4.2 Outline the scientific method. ENABLING LO
Section Reference 1: 1.4 Environmental Science

17. Theories:

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a) cannot be tested.
b) are the same as hypotheses.
c) can be used to predict the existence of as-yet unobserved things or phenomena.
d) are the same as facts.
e) are rarely shown to be true.

Answer: c

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.4 Describe environmental science and the role of the scientific method. TERMINAL LO
Learning Objective 2: LO 1.4.2 Outline the scientific method. ENABLING LO
Section Reference 1: 1.4 Environmental Science

18. An integrated explanation of numerous hypotheses is known as a:

a) fact.
b) law.
c) control.
d) theory.
e) guess.

Answer: d

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.4 Describe environmental science and the role of the scientific method. TERMINAL LO
Learning Objective 2: LO 1.4.2 Outline the scientific method. ENABLING LO
Section Reference 1: 1.4 Environmental Science

19. The discovery of the extent of the pollution problem in Lake Washington was based on:

a) the presence of certain types of fish.
b) the absence of certain types of fish.
c) the presence of certain species of worms.
d) the presence of certain type of bacteria.
e) satellite imaging of the lake.

Answer: d

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.5 List the five stages in addressing environmental problems. TERMINAL LO
Learning Objective 2: LO 1.5.2Briefly describe the history of the Lake Washington pollution problem of the 1950s and how it was resolved. ENABLING LO
Section Reference 1: 1.5 Addressing Environmental Problems

20. Pollution in Lake Washington resulted from:

a) excessive treated sewage input from the surrounding municipal development.
b) a population explosion of resident freshwater fishes.
c) excessive boat traffic.
d) large bird populations inhabiting the waters of the lake.
e) an oil tanker spill of home heating oil.

Answer: a

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.5 List the five stages in addressing environmental problems. TERMINAL LO
Learning Objective 2: LO 1.5.2Briefly describe the history of the Lake Washington pollution problem of the 1950s and how it was resolved. ENABLING LO
Section Reference 1: 1.5 Addressing Environmental Problems

21. Which of the following was not a consequence of the pollution of Lake Washington?

a) increase in phosphorus concentrations
b) rapid growth of cyanobacteria populations
c) increase in fish populations
d) decomposition of dead cyanobacteria
e) drop in dissolved oxygen concentration

Answer: c

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.5 List the five stages in addressing environmental problems. TERMINAL LO
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Section Reference 1: 1.5 Addressing Environmental Problems

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22. Which of the following statements about nutrients is false?

a) Nutrient chemistry is the same in both freshwater and marine systems.
b) Low levels of nutrients are desirable in freshwater lakes.
c) Both nitrogen and phosphorous are nutrients present in treated sewage.
d) Nutrients from sewage will have less impact on a larger body of water.
e) Nutrients affect growth of photosynthetic bacteria and algae in Puget Sound less than in Lake Washington.

Answer: a

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.5 List the five stages in addressing environmental problems. TERMINAL LO
Learning Objective 2: LO 1.5.2Briefly describe the history of the Lake Washington pollution problem of the 1950s and how it was resolved. ENABLING LO
Section Reference 1: 1.5 Addressing Environmental Problems

23. Which of the following was critical to the successful reversal of pollution trends in Lake Washington?

a) construction of a sewer to divert treated sewage from the lake
b) approval of a bill transferring responsibility for sewage to a regional government agency
c) increase in taxes to construct sewage facilities
d) environmental monitoring
e) All of these choices are correct

Answer: e

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.5 List the five stages in addressing environmental problems. TERMINAL LO
Learning Objective 2: LO 1.5.2Briefly describe the history of the Lake Washington pollution problem of the 1950s and how it was resolved. ENABLING LO
Section Reference 1: 1.5 Addressing Environmental Problems

24. "The Tragedy of the Commons" refers to:

a) an environmental theory promoting public ownership of lands and resources.
b) an economic theory promoting private ownership of lands and resources.

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c) an analogy describing the conflict between individual interest and management of shared resources.
d) events impacting the common people, particularly farmers, of developing countries.
e) environmental problems generated by farming practices.

Answer: c

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.3 Define sustainability and sustainable development. TERMINAL LO
Learning Objective 2: LO 1.3.2 Relate Garrett Hardin's description of the tragedy of the commons in medieval Europe to common-pool resources today. ENABLING LO
Section Reference 1: 1.3 Sustainability

25. Which of the following is a true statement regarding ecological footprints?
1) The ecological footprint of a single individual in the U.S. is greater than that of ten individuals in India
2) The ecological footprint of a single individual in the U.S. is 1.5 times that of an individual in France
3) India's total global footprint is greater than that of the France
4) If all people on earth had the same lifestyle as those in the U.S., we would need 3 more earth's to meet the demand for resources

a) 1
b) 2
c) 3
d) 4
e) 1 and 3

Answer: a

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.2 Describe how population growth and our choice of resources affect the environment. TERMINAL LO
Learning Objective 2: LO 1.2.3 Define ecological footprint. ENABLING LO
Section Reference 1: 1.2 Population, Resources, and the Environment

26. In order for a country to progress from a less developed country (LDC) to a moderately developed country (MDC), the country would have to:

a) increase rate of population growth
b) move from an industrial to agricultural economy base

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c) raise the per-capita income
d) maintain limited crop dependence
e) All of these choices are correct

Answer: c

Difficulty: Medium
Bloomcode: Application
Learning Objective 1: LO 1.1 Explain how human activities and development affect the environment. TERMINAL LO
Learning Objective 2: LO 1.1.2 Describe the factors that characterize human development and how they impact environment and sustainability. ENABLING LO
Section Reference 1: 1.1 Human Impacts on the Environment

27. Non-renewable resource IS TO renewable resource AS:

a) living is to non-living
b) limited supply is to sustainable supply
c) tree is to coal
d) wind energy is to fossil fuel energy
e) conservation is to overexploitation

Answer: b

Difficulty: Medium
Bloomcode: Analysis
Learning Objective 1: LO 1.2 Describe how population growth and our choice of resources affect the environment. TERMINAL LO
Learning Objective 2 LO 1.2.1 Differentiate between renewable and nonrenewable resources. ENABLING LO
Reference: 1.2 Population, Resources, and the Environment

28. In order to estimate human impact on the environment we can:

a) multiply the number of people times affluence per person times resources needed and wastes produced: I=P x A x T
b) multiply resource depletion times number of years divided by number of people: I = R x Y ÷ P
c) multiply birth rate times consumption patterns divided by available resources: I= B x C ÷ R
d) Divide number of people by resources needed and wastes produced: I = P ÷ T
e) None of these choices; the human impact cannot be measured

Answer: a

Difficulty: Medium
Bloomcode: Application
Learning Objective 1: LO 1.2 Describe how population growth and our choice of resources affect the environment. TERMINAL LO
Learning Objective 2: LO 1.2.4 Describe the three most important factors that determine human impact on the environment. ENABLING LO
Section Reference 1: 1.2 Population, Resources, and the Environment

29. In addressing environmental problems, several stages can be followed. For example, when it was discovered that the rat population on the island of Pumehana was out of control, scientists assessed the problem and formulated a model that suggested if a rat predator is introduced, then the rat population will be significantly decreased. The next step in addressing this environmental problem might be:

a) action. Scientists sprinkle rat poison throughout the island. Several residents die.
b) public education and involvement. Hold town meetings to inform island residents the costs of rat predator introduction, a rat sterilization program, rat bounty program, or no intervention.
c) political action. A rat-infested island does not lure tourists so something MUST be done.
d) a risk analysis. If a mongoose is introduced to control the rat, what are the possible effects of this intervention?
e) evaluation. After the release of the initial mongoose population, it is discovered that the mongoose is NOT a rat predator.

Answer: d

Difficulty: Medium
Bloomcode: Application
Learning Objective 1: LO 1.5 List the five stages in addressing environmental problems. TERMINAL LO
Learning Objective 2: LO 1.5.1 List and briefly describe the five stages in addressing environmental problems. ENABLING LO
Section Reference 1: 1.5 Addressing Environmental Problems

30. The Ehrlich/Holdren model assesses human impact on the environment based on all of the following factors EXCEPT:

a) the number of people.
b) the affluence per person.
c) the amount of resources used per person.
d) urbanization.

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e) the environmental effects of the technologies used to obtain and consume the resources.

Answer: d

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.2 Describe how population growth and our choice of resources affect the environment. TERMINAL LO
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Section Reference 1: 1.2 Population, Resources, and the Environment

31. What is the correct sequence of steps in the scientific method?
I. State the problem
II. Analyze and interpret the data
III. Develop a hypothesis
IV. Share the results with other scientists
V. Design and perform an experiment to test the hypothesis

a) I- II – III – IV - V
b) III – I – V – II - IV
c) I – III – V – II - IV
d) V – IV- III – II - I
e) V – II – I – III - IV

Answer: c

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.4 Describe environmental science and the role of the scientific method. TERMINAL LO
Learning Objective 2: LO 1.4.2 Outline the scientific method. ENABLING LO
Section Reference 1: 1.4 Environmental Science

32. In a positive feedback mechanism:

a) a change in some condition triggers a response that counteracts the changing condition
b) a change in some condition triggers a response that neutralizes the changing condition
c) a change in some condition triggers a response that intensifies the changing condition
d) all of these
e) none of these choices

Answer: c

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.4 Describe environmental science and the role of the scientific method. TERMINAL LO
Learning Objective 2: LO 1.4.1 Define environmental science and briefly describe the role of Earth systems in environmental science. ENABLING LO
Section Reference 1: 1.4 Environmental Science

33. To test a hypothesis about a given variable, experimental and control groups are tested in parallel. Which of the following best explains the dual experiments?

a) In the experimental group, a chosen variable is altered in a known way. In the control group, that chosen variable is not altered so a comparison can be made.
b) In the control group, a chosen variable is altered in a known way. In the experimental group that chosen variable is not altered so a comparison can be made.
c) In the experimental group, a chosen variable plus all other variables are altered. In the control group, the chosen variable is altered however all other variables are held constant.
d) In the experimental and control groups two different variables are altered.
e) Experimental and control group experiments are identical and run in parallel to get repeatable results.

Answer: a

Difficulty: Medium
Bloomcode: Application
Learning Objective 1: LO 1.4 Describe environmental science and the role of the scientific method. TERMINAL LO
Learning Objective 2: LO 1.4.2 Outline the scientific method. ENABLING LO
Section Reference 1: 1.4 Environmental Science

34. Which of the following represents an idea associated with environmental sustainability?

a) The capacity of the environment to absorb toxins is unlimited.
b) The human population continues to grow.
c) We are using fossil fuels as if they were present in unlimited supply.
d) The Earth's resources are not present in infinite supply
e) None of these choices

Answer: d

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Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.3 Define sustainability and sustainable development. TERMINAL LO
Learning Objective 2: LO 1.3.1 Define sustainability. ENABLING LO
Section Reference 1: 1.3 Sustainability

35. All of the following can be considered definitions of "theory" EXCEPT:

a) a theory is an explanation of scientific laws
b) a theory is an integrated explanation of numerous hypotheses, each supported by a large body of observations and experiments
c) a theory is a condensation and simplification of many data that previously appeared unrelated
d) a theory is a prediction for new data suggesting new relationships among a range of natural phenomena
e) a theory is an ethical principle based on a religious foundation

Answer: e

Difficulty: Medium
Bloomcode: Application
Learning Objective 1: LO 1.4 Describe environmental science and the role of the scientific method. TERMINAL LO
Learning Objective 2: LO 1.4.2 Outline the scientific method. ENABLING LO
Section Reference 1: 1.4 Environmental Science

36. In 1992, the United Nations had a conference on Environment and Development to consider all of the following issues EXCEPT

a) deterioration of the atmosphere
b) pollution
c) biodiversity decline
d) increasing natural disasters
e) destruction of forests

Answer: d

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.3 Define sustainability and sustainable development. TERMINAL LO
Learning Objective 2: LO 1.3.3 Briefly describe sustainable development. ENABLING LO

Section Reference 1: 1.3 Sustainability

37. What is the environmental significance of the process of “consumption”?

a) consumption can outstrip the natural resources available and lead to overexploitation of the environment
b) extravagant consumption can create an environment of raising one’s status among peers
c) the process of consumption is an economic act, providing the “demand” necessary for the “supply” of the environment
d) consumption can generate economic growth that relies significantly on the importation of natural resources, which benefits the environments of less-developed countries
e) consumption is strictly a social act and has no environmental significance

Answer: a

Difficulty: Medium
Bloomcode: Application
Learning Objective 1: LO 1.2 Describe how population growth and our choice of resources affect the environment. TERMINAL LO
Learning Objective 2: LO 1.2.2 Explain the impacts of population and affluence on consumption. ENABLING LO
Section Reference 1: 1.2 Population, Resources, and the Environment

38. Environmental sustainability implies:

a) the actions of humans directly impacting the wellbeing of the natural environment
b) future generations will have the resources necessary for quality of life
c) a shared global responsibility for conservation practices
d) the environment can function indefinitely without going into a decline from the stresses imposed by human society on natural systems
e) all of these choices

Answer: e

Difficulty: Medium
Bloomcode: Application
Learning Objective 1: LO 1.3 Define sustainability and sustainable development. TERMINAL LO
Learning Objective 2: LO 1.3.1 Define sustainability. ENABLING LO
Section Reference 1: 1.3 Sustainability

39. The current global ecological footprint of each person is about 2.7 hectares. The Earth presently has 11.4 billion hectares of productive land and water. If we divide this usable area by the global human population of approximately 6 billion, this means:

a) we have an ecological overshoot – we have exceeded our allotted footprint of 1.9 hectares per person
b) we have an ecological surplus – we have undershot our allotted footprint of 2.7 hectares per person
c) we have an ecological deficit – we have not reached our allotted footprint of 2.7 hectares per person
d) we have an ecological surplus – we have surpassed our allotted footprint of 1.9 hectares per person
e) we are in a sustainable condition – we are at our allotted footprint of 2.7 hectares per person

Answer: a

Difficulty: Medium
Bloomcode: Analysis
Learning Objective 1: LO 1.2 Describe how population growth and our choice of resources affect the environment. TERMINAL LO
Learning Objective 2: LO 1.2.3 Define ecological footprint. ENABLING LO
Section Reference 1: 1.2 Population, Resources, and the Environment

40. A journalist reports on what Hardin (1968) referred to as a "tragedy of the commons." The media story concerns:

a) a disaster that happened in the park
b) the technology divide that exists between the social classes of poverty and elite
c) the environmental costs that everyone must pay in the long run due to individual exploitation of resources for short-term gains.
d) the environmental costs that a widespread natural disaster brings to all walks of life
e) common understanding of the environmental pressures that threaten endangered species

Answer: c

Difficulty: Medium
Bloomcode: Application
Learning Objective 1: LO 1.3 Define sustainability and sustainable development. TERMINAL LO
Learning Objective 2: LO 1.3.2 Relate Garrett Hardin's description of the tragedy of the commons in medieval Europe to common-pool resources today. ENABLING LO
Section Reference 1: 1.3 Sustainability

41. A state agency has contacted you to do a scientific assessment of kudzu in a nature preserve in southern Georgia. They are concerned about the effects of the non-native invasive vine on a small rare plant that grows on the forest floor in the preserve, but which is found nowhere else in the state. Kudzu is only growing in the east side of the preserve because it hasn't yet had time to invade further. In order to assess the effects of kudzu on the rare plant, you set up the following experiment:
Site 1. On the east side of the park with the kudzu, you set up ten 1m x 1m plots on the forest floor. In each plot you count the number of individuals of the rare plant.
Site 2. On the west side of the park without the kudzu, you set up ten 1m x 1m plots of the forest floor. In each plot you count the number of individuals of the rare plant.
In this experiment, Site 2 is your:

a) variable.
b) control.
c) replication.
d) hypothesis.
e) treatment.

Answer: b

Difficulty: Medium
Bloomcode: Application
Learning Objective 1: LO 1.4 Describe environmental science and the role of the scientific method. TERMINAL LO
Learning Objective 2: LO 1.4.2 Outline the scientific method. ENABLING LO
Section Reference 1: 1.4 Environmental Science

42. A state agency has contacted you to do a scientific assessment of kudzu in a nature preserve in southern Georgia. They are concerned about the effects of the non-native invasive vine on a small rare plant that grows on the forest floor in the preserve, but which is found nowhere else in the state. Kudzu is only growing in the east side of the preserve because it hasn't yet had time to invade further. In order to assess the effects of kudzu on the rare plant, you set up the following experiment:
Site 1. On the east side of the park with the kudzu, you set up ten 1m x 1m plots on the forest floor. In each plot you count the number of individuals of the rare plant.
Site 2. On the west side of the park without the kudzu, you set up ten 1m x 1m plots of the forest floor. In each plot you count the number of individuals of the rare plant.
Which of the following represents the hypothesis that you are testing with this experiment?

a) Kudzu will eventually grow on the west side of the park.
b) Kudzu will kill off the trees in the preserve by strangling them.
c) Kudzu should be removed from the preserve because it is killing the rare plant.
d) Kudzu is negatively affecting populations of the rare plant in the preserve.

e) None of these choices is an appropriate hypothesis for your study.

Answer: d

Difficulty: Medium
Bloomcode: Application
Learning Objective 1: LO 1.4 Describe environmental science and the role of the scientific method. TERMINAL LO
Learning Objective 2: LO 1.4.2 Outline the scientific method. ENABLING LO
Section Reference 1: 1.4 Environmental Science

43. A state agency has contacted you to do a scientific assessment of kudzu in a nature preserve in southern Georgia. They are concerned about the effects of the non-native invasive vine on a small rare plant that grows on the forest floor in the preserve, but which is found nowhere else in the state. Kudzu is only growing in the east side of the preserve because it hasn't yet had time to invade further. In order to assess the effects of kudzu on the rare plant, you set up the following experiment:
Site 1. On the east side of the park with the kudzu, you set up ten 1m x 1m plots on the forest floor. In each plot you count the number of individuals of the rare plant.
Site 2. On the west side of the park without the kudzu, you set up ten 1m x 1m plots of the forest floor. In each plot you count the number of individuals of the rare plant.
Based solely on the data represented in the associated table, what can you report to the agency that contracted you to do this study?

Site	**Mean number of individuals of rare plant per plot**
Site 1	1.7
Site 2	4.2

a) Kudzu is shading out the rare plant.
b) The rare plant is unaffected by the presence of the kudzu.
c) Fewer individuals of the rare plant grow in the presence of kudzu when compared to areas without.
d) It will be impossible to remove kudzu from the park because it grows too fast.
e) Kudzu grows much faster than the rare plant and will dominate the preserve within a decade.

Answer: c

Difficulty: Medium
Bloomcode: Application
Learning Objective 1: LO 1.4 Describe environmental science and the role of the scientific method. TERMINAL LO
Learning Objective 2: LO 1.4.2 Outline the scientific method. ENABLING LO
Section Reference 1: 1.4 Environmental Science

44. Which of the following represents a common-pool resource?

a) fresh water
b) atmosphere
c) forests
d) marine fisheries
e) all of these choices are correct

Answer: e

Difficulty: Medium
Bloomcode: Application
Learning Objective 1: LO 1.3 Define sustainability and sustainable development. TERMINAL LO
Learning Objective 2: LO 1.3.2 Relate Garrett Hardin's description of the tragedy of the commons in medieval Europe to common-pool resources today. ENABLING LO
Section Reference 1: 1.3 Sustainability

45. The hypothesis that best describes the Lake Washington case study is that:

a) Lake Washington is unfit for public recreation.
b) increases in cyanobacteria numbers are a direct response to increased nutrient availability.
c) if the sewage is diverted, then the water quality of the lake will return to previous levels.
d) bacteria from municipal sewage are increasing in the lake.
e) human activity has had no impact on Lake Washington, it is undergoing a natural process.

Answer: b

Difficulty: Medium
Bloomcode: Application
Learning Objective 1: LO 1.5 List the five stages in addressing environmental problems. TERMINAL LO
Learning Objective 2: LO 1.5.2Briefly describe the history of the Lake Washington pollution problem of the 1950s and how it was resolved. ENABLING LO
Section Reference 1: 1.5 Addressing Environmental Problems

46. Which of the following is NOT a renewable resource?

a) trees
b) fishes

c) minerals
d) fresh water
e) fertile agricultural soil

Answer: c

Difficulty: Easy
Bloomcode: Knowledge
Learning Objective 1: LO 1.2 Describe how population growth and our choice of resources affect the environment. TERMINAL LO
Learning Objective 2: LO 1.2.1 Differentiate between renewable and nonrenewable resources. ENABLIGN LO
Section Reference 1: 1.2 Population, Resources, and the Environment

Question Type: Essay

47. How do you determine if a resource is renewable or nonrenewable? Give examples of both. What affects both of their usage?

Answer:

Difficulty: Medium
Bloomcode: Analysis
Learning Objective 1: LO 1.2 Describe how population growth and our choice of resources affect the environment. TERMINAL LO
Learning Objective 2: LO 1.2.1 Differentiate between renewable and nonrenewable resources. ENABLIGN LO
Section Reference 1: 1.2 Population, Resources, and the Environment
Solution: A nonrenewable resource (minerals: aluminum, tin, copper, and fossil fuels: coal, oil, natural gas) are present in limited supplies and are depleted by use. Natural processes do not replenish nonrenewable resources within a reasonable period on the human time scale. Some take millions of years to form. Usage is affected by: nation's population, how efficiently the resources are extracted and processed, how much of it is required or consumed by different groups.

A renewable resource (trees, fisheries, fertile agriculture soil, fresh water) is naturally replaced at a fairly rapid pace (on a scale of days to decades), and they can be used forever as long as they are not overexploited in the short term. In developing countries, forests, fisheries, and agricultural land are particularly important renewable resources because they provide food. Rapid population growth can cause the overexploitation of renewable resources. Renewable resources are potentially renewable because they must be used in a sustainable way (a manner that gives them time to replace or replenish themselves).

48. Define environmental sustainability. Discuss three reasons why experts in environmental science think that the human population is not operating sustainably.

Answer:

Difficulty: Hard
Bloomcode: Synthesis
Learning Objective 1: LO 1.3 Define sustainability and sustainable development. TERMINAL LO
Learning Objective 2: LO 1.3.1. Define sustainability. ENABLING LO
Section Reference 1: 1.3 Sustainability
Solution: The ability to meet humanity's current needs without compromising the ability of future generations to meet their needs is considered environmental sustainability. Many experts in environmental problems think human society isn't operating sustainably because of the following human behaviors:
-we are using nonrenewable resources such as fossil fuels as if they were present in unlimited supplies
-we are using renewable resources such as fresh water and forests faster than they are replenished naturally
-we are polluting the environment with toxins as if the capacity of the environment to absorb then is limitless.
-our numbers continue to grow despite Earth's finite ability to feed and sustain us and absorb our waste

49. What are green roofs? What are their environmental benefits? Why are new buildings the best locations for them?

Answer:

Difficulty: Medium
Bloomcode: Application
Learning Objective 1: LO 1.5 List the five stages in addressing environmental problems. TERMINAL LO
Learning Objective 2: LO 1.5.1 List and briefly describe the five stages in addressing environmental problems. ENABLING LO
Section Reference 1: 1.5 Addressing Environmental Problems
Solution: An Green roof is also called an eco-roof. It is a roof that is completely or partially covered with vegetation and soil. The environmental benefits are that: 1) The plants and soil are effective insulators (reducing heating and cooling energy consumption), 2) The rooftop mini-ecosystem filters pollutants out of the rainwater and reduces the amount of storm water in the sewers. 3) They provide wildlife habitat, even on the tops of buildings. 4) They can be used to grow vegetables. They can be added to existing buildings but it is often easier and less expensive to install them in new buildings. Modern green roofs, which are designed to support the additional weight of

soil and plants, consist of several layers that hold the soil in place, stop plant roots from growing through the rooftop and drain excess water, thereby preventing leaks.

50. Planet Earth is remarkably suited for life. Make connections between external environmental factors and the Earth's living organisms. Include in your discussion the concepts of habitability, evolution and emergence of dominant species.

Answer:

Difficulty: Hard
Bloomcode: Synthesis
Learning Objective 1: LO 1.1 Explain how human activities and development affect the environment. TERMINAL LO
Learning Objective 2: LO 1.1.1 Explain how human activities affect global systems. human impact on the environment. ENABLING LO
Section Reference 1: 1.1 Human Impacts on Environment
Solution: External environmental factors include climate, terrain, and availability of food, water and shelter. The moderate amount of sunlight received on Earth is enough to power photosynthesis, which supports almost all the life forms that inhabit Earth. Water is important both in the internal composition of organisms as well as providing habitat in oceans and lakes. Lakes, rivers and wetlands provide terrestrial organisms with fresh water. These external environmental factors have supported life on Earth for about 3.8 billion years. The combination of natural resources, geological processes and atmosphere provided the raw materials and energy needed for early life forms to arise and adapt. Early cells evolved over time into simple multicellular organisms – early plants, animals, and fungi. Today several million species inhabit the planet. However a single species has emerged as a dominant species in terms of impact on these external environment factors that support the Earth's living organisms. About 800,000 years ago, humans appeared in Africa. Over time, due to large brains and the ability to communicate, humans grew in number, expanded their range, and impacted the environment with demands on resources and bearing of technology.

51. Compare and contrast environmental science and ecology.

Answer:

Difficulty: Easy
Bloomcode: Comprehension
Learning Objective 1: LO 1.4 Describe environmental science and the role of the scientific method. TERMINAL LO
Learning Objective 2: LO 1.4.1 Define environmental science and briefly describe the role of Earth systems in environmental science. ENABLIGN LO
Section Reference 1: 1.4 Environmental Science

Solution: Ecology is a basic tool used in environmental science. Ecology is branch of biology that studies the interrelationships between organisms and their environment. Environmental science is much broader. Environmental science combines information from many disciplines, such as biology, geography, chemistry, geology, physics, economics, sociology, demography, cultural anthropology, natural resources management, agriculture, engineering, law politics and ethics.

52. What is an Ecological Footprint? Based on the average global ecological footprint of 2.7 hectares per person in conjunction with the growing global population, what are some of the short-term results we can observe? What would the long term outlook be? How does an American's ecological footprint differ from someone's in India?

Answer:

Difficulty: Hard
Bloomcode: Synthesis
Learning Objective 1: LO 1.2 Describe how population growth and our choice of resources affect the environment. TERMINAL LO
Learning Objective 2: LO 1.2.3 Define ecological footprint. ENABLING LO
Section Reference 1: 1.2 Population, Resources, and the Environment
Solution: An ecological footprint is the average amount of productive land, fresh water, and ocean required on a continuous basis to supply that person with food, wood, energy, water, housing, clothing, transportation, and waste disposal.

Some of the short-term results we can observe are: forest destruction, degradation of croplands, loss of biological diversity, declining ocean fisheries, and local water shortages. The long term outlook, if all consumption stays the same or grows, is potentially disastrous. In the United States, the ecological footprint is about 9.6 hectares while a person from India would have a footprint of less then 1 hectare. If all the people in the world had the same lifestyle and level of consumption as the average North American, and assuming no changes in technology, we would need four additional planets the size of earth.

53. Compare and contrast highly developed countries (HDCs) and less developed countries (LDCs). Include in your answer examples of countries in each category, a description of the gap between categories, and the similarities and differences that one might expect to see in these types of countries.

Answer:

Difficulty: Medium
Bloomcode: Analysis
Learning Objective 1: LO 1.1 Explain how human activities and development affect the environment. TERMINAL LO

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Learning Objective 2: LO 1.1.2 Describe the factors that characterize human development and how they impact environment and sustainability. ENABLING LO
Section Reference 1: 1.1 Human Impacts on the Environment
Solution: HDCs are the rich (haves) and LDCs are the poor (have nots). HDCs possess complex industrialized bases, low rates of population growth, and high per capita incomes. The United States, Canada, Japan and most of Europe fall into this category. The LDCs include Bangladesh, Mali, Ethiopia, and Laos. These countries are characterized by a low level of industrialization, a very high fertility rate, a very high infant mortality rate and a low per-capita income. Most economies of LDCs are agriculturally based rather than industrialized. Hunger, disease, and illiteracy are common in LDCs. However both categories of countries (HDCs and LDCs) are subject to global climate changes and environmental degradation. In LDCs the rapidly increasing populations tend to overwhelm and deplete the country's soils, forests, and other natural resources. In HDCs, extravagant consumers exhaust resources and degrade the global environment.

54. Create an illustrated dictionary entry for the term, "nonrenewable resource". Define the term, provide an example, a synonym and an antonym, and draw an illustration that represents the term.

Answer:

Difficulty: Medium
Bloomcode: Application
Learning Objective 1: LO 1.2 Describe how population growth and our choice of resources affect the environment. TERMINAL LO
Learning Objective 2: LO 1.2.1 Differentiate between renewable and nonrenewable resources. ENABLIGN LO
Section Reference 1: 1.2 Population, Resources, and the Environment
Solution: Nonrenewable resources, which include minerals (aluminum, tin, and copper) and fossil fuels (coal, oil, and natural gas), are present in limited supplied on the Earth and are depleted by use. Synonyms for nonrenewable resources might include disappearing or shrinking resources. Antonyms include resources replenished, restored, or renewable resources. Illustrations will vary but include the concept that natural processes will not restore nonrenewable resources within a reasonable period on the human time scale.

55. The Lake Washington case illustrates the five sequential steps used to address environmental problems. Align the history of the Lake Washington pollution problem to these steps of addressing environmental problems. Identify the solution(s) implemented to address this problem. Speculate on why the final outcome of dumping highly treated sewage into Puget sounds is not an ideal, long-term solution.

Answer:

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Difficulty: Hard
Bloomcode: Evaluation
Learning Objective 1: LO 1.5 List the five stages in addressing environmental problems. TERMINAL LO
Learning Objective 2: LO 1.5.1 List and briefly describe the five stages in addressing environmental problems. ENABLIGN LO
Section Reference 1: 1.5 Addressing Environmental Problems
Solution: The first stage is scientific assessment, the gathering of information. As suburban expansion around Seattle demanded increased sewage treatment plants, partially treated sewage was discharged into the lake. By the mid 1950's, scientists noted large masses of cyanobacteria in the lake, indicating a rise in dissolved nutrients. The problem was defined. The treated sewage effluent was raising the levels of dissolved nutrients in Lake Washington to the point of serious pollution. The scientists developed a hypothesis: if the pollution were stopped, the lake would recover.
In the second stage, risk analysis, it was important to weigh the options of remediation so that the solution to the problem would not create yet another problem. For Lake Washington, plans were made to further treat the sewage and divert the discharge to Puget Sound. Puget Sound's large area, marine water constitution and tide activity would sufficiently dilute and mix the excess nutrients.
In the third stage, public education and involvement, scientists wrote articles for the general public that explained what nutrient enrichment was and what problems it can cause. The public's awareness of why urgent action was necessary was increased.

In the fourth stage, political action, a course of action was developed in the form of a public referendum. Even though this action increased taxes, when the final votes were counted, treated sewage was diverted from the lake into new trunk sewers.

In the final stage of evaluation, the results of the action were monitored both to see that the problem was addressed and the initial assessment has improved. Water transparency returned to Lake Washington within a few years and by 1975, the lake was back to normal

56. Why would consumption overpopulation lead to what Hardin (1968) refers to as a "tragedy of the commons"?

Answer:

Difficulty: Easy
Bloomcode: Comprehension
Learning Objective 1: LO 1.3 Define sustainability and sustainable development. TERMINAL LO
Learning Objective 2: LO 1.3.2 Relate Garrett Hardin's description of the tragedy of the commons in medieval Europe to common-pool resources today. ENABLING LO
Section Reference 1: 1.3 Sustainability
Solution: In the tragedy of the commons, Hardin contends our inability to solve many environmental problems is the result of a struggle between short-term individual welfare and long-term environmental sustainability and societal welfare. In medieval Europe,

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shared pastureland was termed “the commons” and each individual could bring animals onto the commons to graze. The more animals an individual brought, the greater his individual gains. However if each individual maximized the commons, overgrazing caused the entire village to suffer. Likewise consumption overpopulation results from consumption-oriented lifestyles when each individual in a population consumes too large a share of resources. Highly developed countries represent only 20% of the world’s population, yet they consume significantly more than half of its resources causing the entire global village to suffer. The effect of consumption overpopulation and the tragedy of the commons is the same – degradation of the environment. In both cases the challenges of sustainability managing resources is key. Overgrazing and resource exploitation may benefit only a few, however everyone must pay the environmental cost of the short-term individual gains.

57. Outline how the scientific method is applied in order to solve environmental problems. Use a real-life example and correct terminology in your explanation.

Answer:

Difficulty: Medium
Bloomcode: Application
Learning Objective 1: LO 1.4 Describe environmental science and the role of the scientific method. TERMINAL LO
Learning Objective 2: LO 1.4.2 Outline the scientific method. ENABLING LO
Section Reference 1: 1.4 Environmental Science
Solution: The scientific method is the way a scientist approaches a problem, by formulating a hypothesis, and then testing it by means of an experiment in order to draw a conclusion about the problem. The first step is to recognize a question or unexplained occurrence in the natural world. Then an educated guess is made to predict a solution to the problem. A set of variables are identified and manipulated experimentally to collect data about the question. The data are then analyzed and interpreted so that a conclusion can be reached. The hypothesis is supported, rejected or modified and the results are shared with other scientists. Examples of this procedure will vary.

58. What is the relationship between variables and the control group in a well-designed scientific experiment?

Answer:

Difficulty: Easy
Bloomcode: Comprehension
Learning Objective 1: LO 1.4 Describe environmental science and the role of the scientific method. TERMINAL LO
Learning Objective 2: LO 1.4.2 Outline the scientific method. ENABLING LO
Section Reference 1: 1.4 Environmental Science

Solution: Each factor that influences a process is a variable. To test a hypothesis about a variable in a scientific experiment, we conduct two forms of the experiment in parallel. In the experimental group we alter the chosen variable in a known way (the independent variable). In the control group we do not alter that independent variable. In all other respects the two groups are the same and all other variables are held constant. The dependent variable is the measure of any changes in the independent variable as the experiment is run. We then compare the results (measurements) of the control group to the experimental group. These measurements compare an experiment in which a particular variable was manipulated and the identical experiment where this variable was not manipulated. The differences in results can then be attributed to that single independent variable.

59. Identify two types of human environmental impact that may be created locally, but that have global consequences. Briefly explain the global consequences of each event and discuss what actions would be needed to address each issue. Use the framework of the tragedy of the commons in developing your answer.

Answer:

Difficulty: Medium
Bloomcode: Application
Learning Objective 1: LO 1.3 Define sustainability and sustainable development. TERMINAL LO
Learning Objective 2: LO 1.3.2 Relate Garrett Hardin's description of the tragedy of the commons in medieval Europe to common-pool resources today. ENABLING LO
Section Reference 1: 1.3 Sustainability
Solution: The common-pool resources are experiencing environmental stress. The atmosphere, fresh water, forests, wildlife, and ocean fisheries can be considered common-pool resources. As actions are taken at the local level, the results of those actions are felt at the global level. One example of local practices that have global consequences is automobile exhaust emissions that pollute the atmosphere. The pollutants are carried around the globe in the jet streams; there are no barriers. The global consequence is ozone reduction that is felt by all. One possible action would be emission controls on automobiles in every country. The world needs effective legal and economic policies to prevent the short term degradation of our common-pool resources to ensure the long term wellbeing of our natural resources.