

AP Practice Test 100 Q's

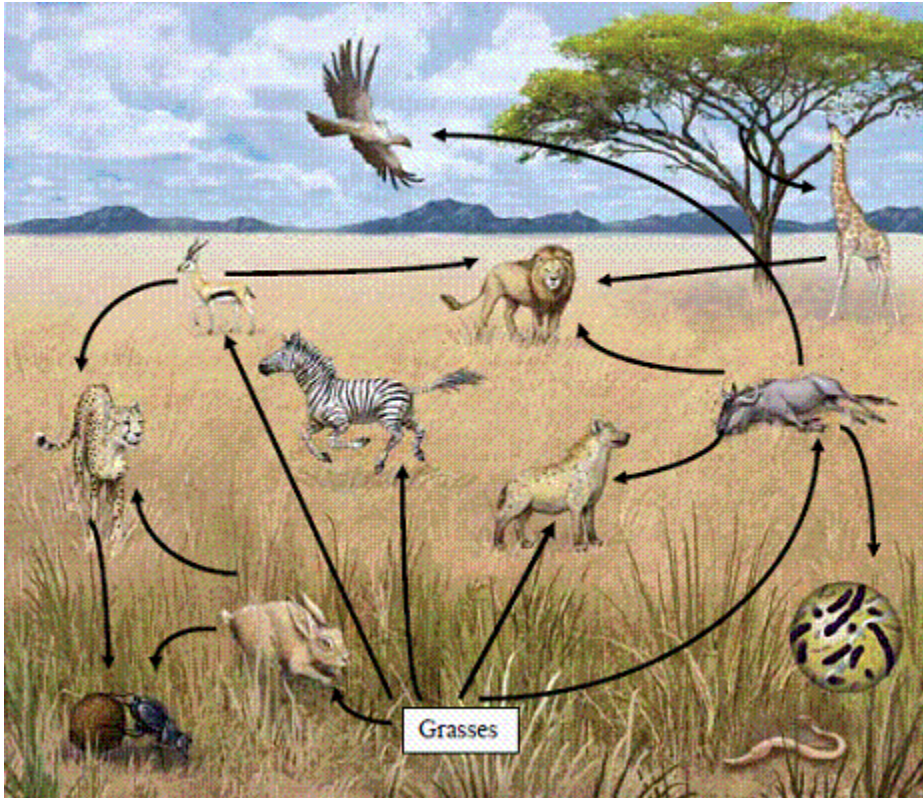
Multiple Choice

Identify the choice that best completes the statement or answers the question.

- _____ 1. Living in an environmentally sustainable way necessitates
- using Earth's resources efficiently whenever convenient.
 - living without basic ecosystem services.
 - living in a tent.
 - living in a rural area.
 - sensitivity to the needs of future generations.
- _____ 2. Five square miles is equal to _____ acres. (1 square mile = 640 acres)
- 0.32
 - 320
 - 2500
 - 3200
 - 32,000
- _____ 3. The concept of ecological footprint is measured in terms of the amount of
- resource an individual consumes daily.
 - land area.
 - resources an individual consumes over the course of a lifetime.
 - resources an entire nation consumes yearly.
 - resources an individual consumes yearly.
- _____ 4. An element is a substance that
- can be broken down into simpler components.
 - is made of many types of atoms.
 - is made up of molecules.
 - consists of one type of atom.
 - makes up energy.
- _____ 5. On the pH scale, _____ is neutral.
- 3
 - 4
 - 5
 - 6
 - 7
- _____ 6. According to the law of conservation of matter,
- matter can be created
 - matter cannot be destroyed
 - after a chemical reaction, the original atoms remain
- I only.
 - II only.
 - III only.
 - I and II.
 - II and III.
- _____ 7. The "ability to do work" is called
- power

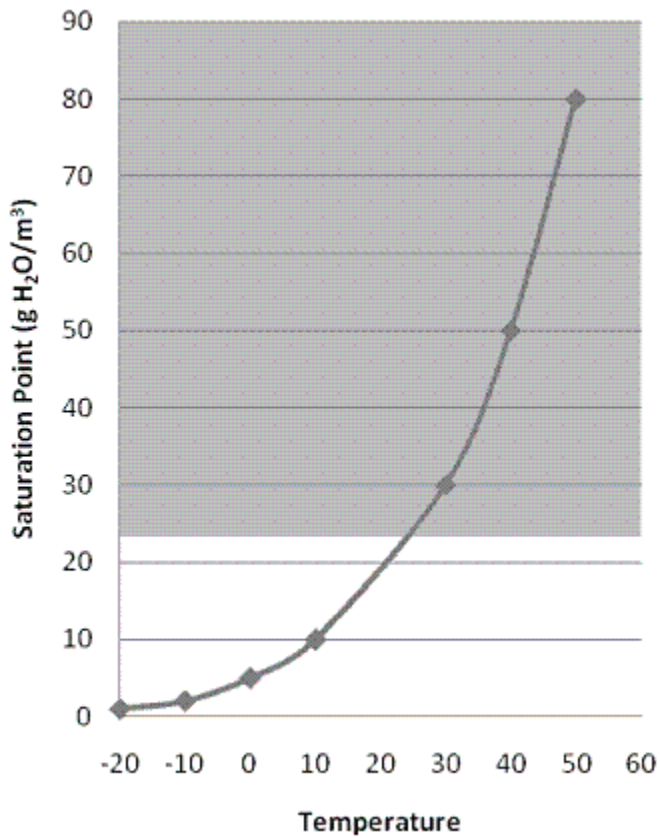
- b. joules
 - c. energy.
 - d. heat
 - e. radiation.
- _____ 8. In the electrical lines that transmit electricity between a power plant and a home, _____ percent of the energy is lost as heat and sound.
- a. 10
 - b. 30
 - c. 50
 - d. 70
 - e. 90
- _____ 9. A negative feedback loop is
- a. when feed back into the system increases the rate of progress.
 - b. seen in the example of increased greenhouse gases leading to global warming.
 - c. seen in the example of world population growth.
 - d. when a system responds to a change by returning it to its original state.
 - e. Both b and d.
- _____ 10. Choose the correct sequence for energy flow within an ecosystem
- a. Herbivores → producers → carnivores → scavengers
 - b. Producers → herbivores → carnivores → scavengers
 - c. Producers → carnivores → herbivores → carnivores
 - d. Scavengers → producers → herbivores → carnivores
 - e. Carnivores → scavengers → producers → herbivores
- _____ 11. Which of the following are needed for photosynthesis?
- a. Water, solar energy and carbon dioxide
 - b. Water, solar energy and glucose
 - c. Carbon dioxide, energy and glucose
 - d. Oxygen, water and energy
 - e. Oxygen and glucose

Figure 3-1



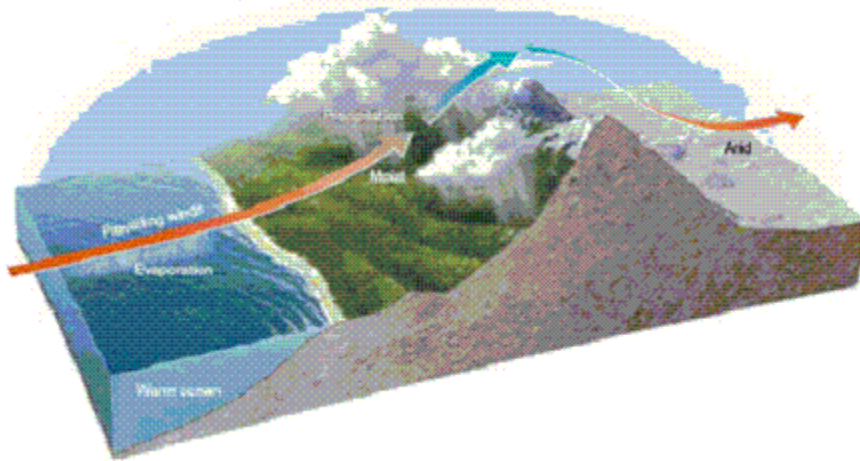
- ___ 12. Use Figure 3-1. Which of the organisms illustrated above would be considered a decomposer?
- Vulture
 - Zebra
 - Hyena
 - Bacteria
 - Hare
- ___ 13. What impact does deforestation have on the carbon cycle?
- Increase in amount of CO_2 in the atmosphere
 - Decrease in the amount of CO_2 in the atmosphere
 - Increase in the amount of photosynthesis
 - Increase in the amount of cellular respiration performed by autotrophs
 - Deforestation has no impact on the carbon cycle
- ___ 14. When nutrients are transported through soil with water, this process is known as
- Infiltration
 - Percolation
 - Decomposition
 - Leaching
 - Nitrification
- ___ 15. Which of the following is *not* a part of the carbon cycle?
- Transpiration
 - Combustion
 - Photosynthesis
 - Extraction
 - Respiration

Figure 4-2



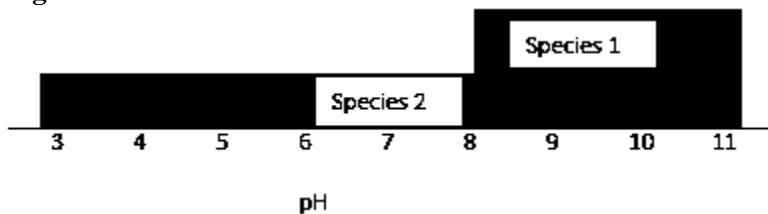
- _____ 16. Use Figure 4-2. Using the graph above, what conclusion can be drawn about the relationship between temperature and saturation point?
- As temperature increases, saturation point decreases exponentially
 - As temperature increases, saturation point increases exponentially
 - As temperature increases, saturation point increases linearly
 - As temperature increases, saturation point decreases linearly
 - There is a negative correlation between temperature and saturation point

Figure 4-6



- ___ 17. Use Figure 4-6. What phenomenon does the above figure represent?
- Mountain rain effect
 - Prevailing ocean winds
 - Desert formation
 - Climate change
 - Rain shadow effect
- ___ 18. Which of the following are examples of wetlands?
- Swamps
 - Marshes
 - Bogs
- I only
 - II only
 - III only
 - I and II
 - I, II, and III
- ___ 19. Which biome has plants with adaptations that prevent water loss, such as smaller leaves with few pores for gas exchange?
- Temperate rain forest
 - Woodland/shrubland
 - Temperate seasonal forest
 - Tropical rainforest
 - Subtropical desert

Figure 5-3



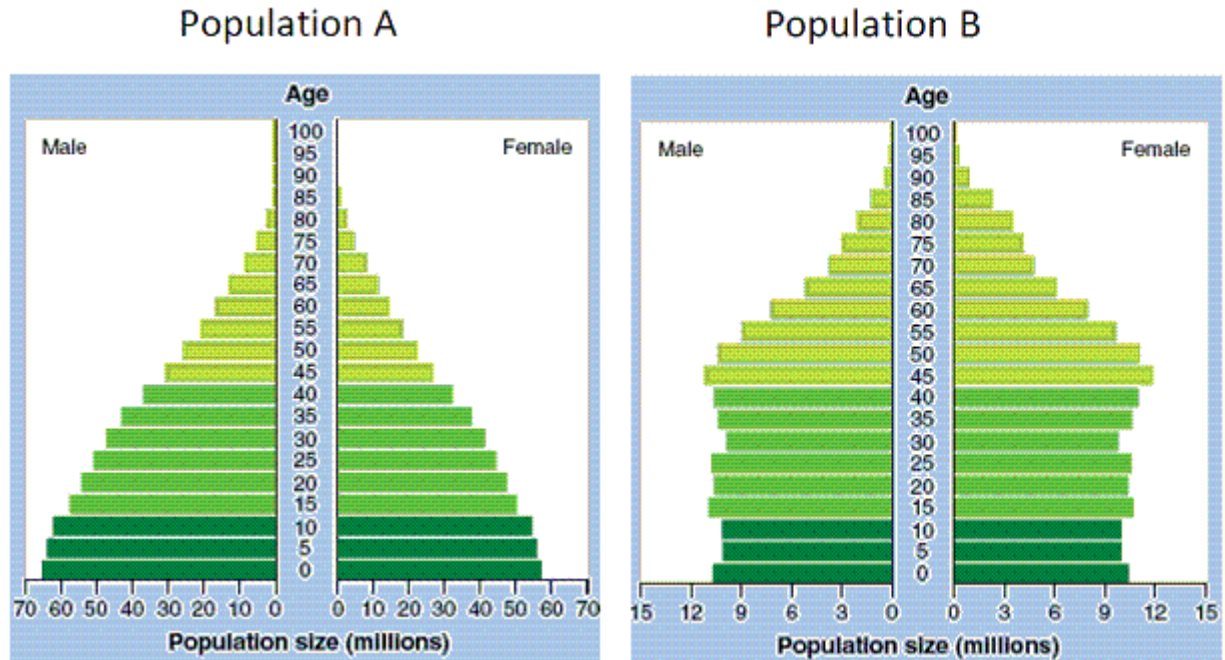
- ___ 20. Use Figure 5-3. Using the data provided, what is the pH range for the fundamental niche for species 2?
- 1-14

- b. 3-11
- c. 5-9
- d. 7
- e. 8-11

- _____ 21. The intrinsic growth rate of a population
- a. directly affects environmental resistance.
 - b. causes changes in birth rates without affecting death rates.
 - c. causes changes in death rates without affecting birth rates.
 - d. is the maximum rate at which a population may increase.
 - e. all of the above
- _____ 22. Many plants have their roots infected with a specialized fungus. The plant supplies carbon to the fungus, and the fungus supplies nutrients to the plant. This is an example of a _____ association.
- a. mutualistic
 - b. commensalistic
 - c. parasitic
 - d. successional
 - e. predator/prey
- _____ 23. The total fertility rate (TFR) is an estimate of
- a. the number of children that will survive to adulthood.
 - b. the number of years a typical infant will live.
 - c. the number of children each woman in a population will have.
 - d. the number of births per 1000 people per year.
 - e. the percentage of women in a population that are able to have children.
- _____ 24. Developing countries tend to have a(n) _____ age structure diagram.
- a. rectangular-shaped
 - b. inverted triangle
 - c. pyramid-shaped
 - d. square
 - e. round
- _____ 25. Populations whose age structure diagrams are narrower at the bottom than at the top have
- a. high death rates
 - b. the same proportion of individuals in each age group
 - c. a declining population
 - d. a high growth rate
 - e. all of the above
- _____ 26. Many sub-Saharan tribesmen of Africa regularly use the blood, milk, and fur of their livestock, without killing them. Based on this information alone we might classify this relationship as _____. However, the cattle actually derive an overall benefit because the herdsman also protect them from predators and help them find water and food. Therefore, this relationship should instead be classified as _____.
- a. commensalism; mutualism
 - b. mutualism; competition
 - c. parasitism; commensalism
 - d. parasitism; mutualism
 - e. predation; parasitism
- _____ 27. Using the rule of 70, a population growing at 10% would double in
- a. 7 years

- b. 10 years
- c. 15 years
- d. 17 years
- e. Not enough information to tell

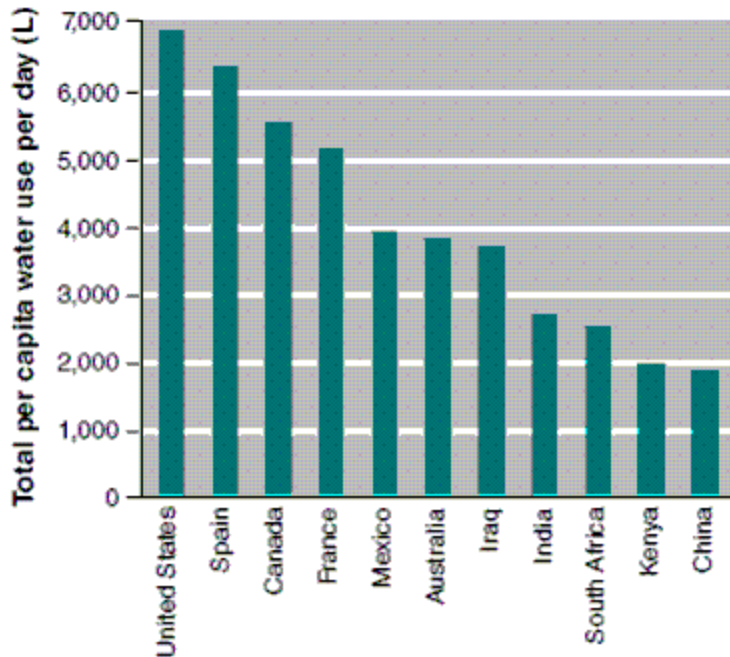
Figure 7-1



- ___ 28. Use Figure 7-1. Population A is most likely
 - a. rapidly growing.
 - b. rapidly declining.
 - c. stable or close to stable.
 - d. going to decline in a few decades.
 - e. There is not enough information to tell.
- ___ 29. Use Figure 7-1. In pyramid A, what is the approximate number of people in the bottom 3 cohorts (0-10)?
 - a. 200,000,000
 - b. 250,000,000
 - c. 350,000,000
 - d. 450,000,000
 - e. 500,000,000
- ___ 30. Use Figure 7-1. Population A would most likely be in which stage of demographic transition?
 - a. 1
 - b. 2
 - c. 3
 - d. 4
 - e. 5
- ___ 31. Which of the following chemical reactions are involved in the creation of acid rain?
 - I. sulfur dioxide and water vapor combine to create sulfuric acid
 - II. hydrogen and chlorine combine to create hydrochloric acid
 - III. sulfur and oxygen combine to create sulfur dioxide

- a. I only
 - b. II only
 - c. III only
 - d. I and II
 - e. I and III
- _____ 32. Topsoil is often considered to be found in what two horizons.
- a. O and A horizon.
 - b. O and B horizon.
 - c. A and B horizon.
 - d. A and C horizon.
 - e. parent material.
- _____ 33. The least weathered zone in a soil is the
- a. A horizon.
 - b. O horizon.
 - c. E horizon.
 - d. C horizon.
 - e. B horizon.
- _____ 34. The water table is
- a. anywhere water is visible on the surface.
 - b. where streams and lakes intersect.
 - c. the uppermost level at which water fully saturates rock or soil.
 - d. synonymous with groundwater.
 - e. where water under pressure rises.
- _____ 35. Eutrophic lakes
- a. have very low productivity as a result of acid rain.
 - b. have very high productivity as a result of high levels of nutrients.
 - c. have low nutrient levels.
 - d. are formed by glaciers.
 - e. usually have absolutely no fish.
- _____ 36. The effect(s) of dams include
- a. impediment to fish migration.
 - b. displacement of people.
 - c. reduction of fossil fuel use.
 - d. reduction of seasonal flooding.
 - e. all of these answers are correct.

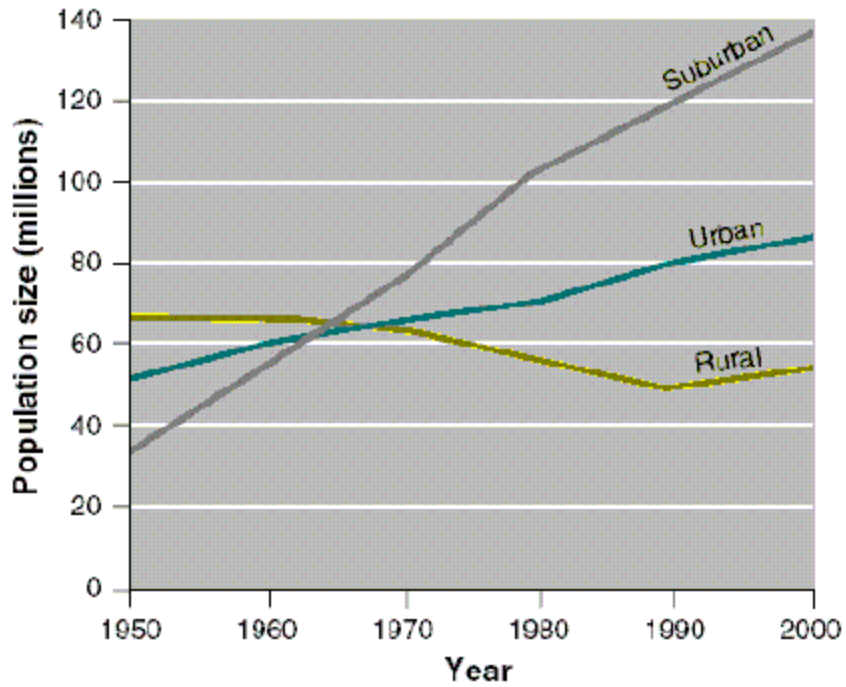
Figure 9-3



- ___ 37. Use Figure 9-3. According to the figure above, what is the approximate total water usage for South Africa, Mexico, and France?
- 6,000 L/per day
 - 11,700 L/per day
 - 13,000 L/per day
 - 15,000 L/per day
 - 23,500 L/per day
- ___ 38. You are selecting a new dishwasher. You do about 150 loads per year. The less efficient model uses 9 gallons per load. The more efficient model uses 6 gallons per load. How much money will be saved on water if you select the more efficient model and the price of water is \$0.75 per 1000 gallons?
- \$0.34
 - \$3.30
 - \$33
 - \$330
 - \$3000
- ___ 39. Gray water is suitable for
- drinking.
 - washing clothing.
 - washing cars.
 - watering plants.
 - both c and d.
- ___ 40. One example of the tragedy of the commons can occur when several farmers share the same pasture for feeding sheep. The root cause of this tragedy is that
- people are bad
 - sheep reproduce too quickly
 - the market cannot support too many farmers
 - the farmers believe that if I don't use it then someone else will.

- e. the cost of the sheep is lessened by bulk purchase power
- _____ 41. When looking at both private and public lands in the US the most common use is
- a. Timber Production
 - b. Grazing Land
 - c. Recreational
 - d. Defense
 - e. Residential
- _____ 42. The major complaint that environmental detractors of the Taylor Grazing Act have is that
- a. The negative externalities of grazing are not fully revealed
 - b. The taxes in grazing animals are too high
 - c. The fences erected as a result of this legislation are deleterious for wildlife
 - d. It allows too much grazing to take place
 - e. There are no environmental detractors to the Taylor Grazing Act
- _____ 43. Which of the following is NOT a result of urban sprawl?
- a. The average number of miles driven in the US annually has tripled over the past 50 years
 - b. Due to larger parcel size suburban populations use twice as much land area as similarly sized urban populations
 - c. Distance between work, goods, services, and home prevents pedestrian travel
 - d. Lower population densities make services such as mass transit economically prohibitive
 - e. Air pollution increases due to reliance on personal vehicles for transportation
- _____ 44. Eminent Domain is a tool that can be used to assist in smart growth. This tool allows
- a. Citizens to sue the government if they feel that they are being ignored
 - b. Citizens to sue the government if they feel that government practices are leading directly to urban blight
 - c. Governments to force land use restrictions on citizens to prevent urban blight
 - d. Governments to force land use restrictions on citizens to prevent any environmental problems (per the National Environmental Protection Act, NEPA)
 - e. Governments to acquire land at fair market value even if the owner does not wish to sell it

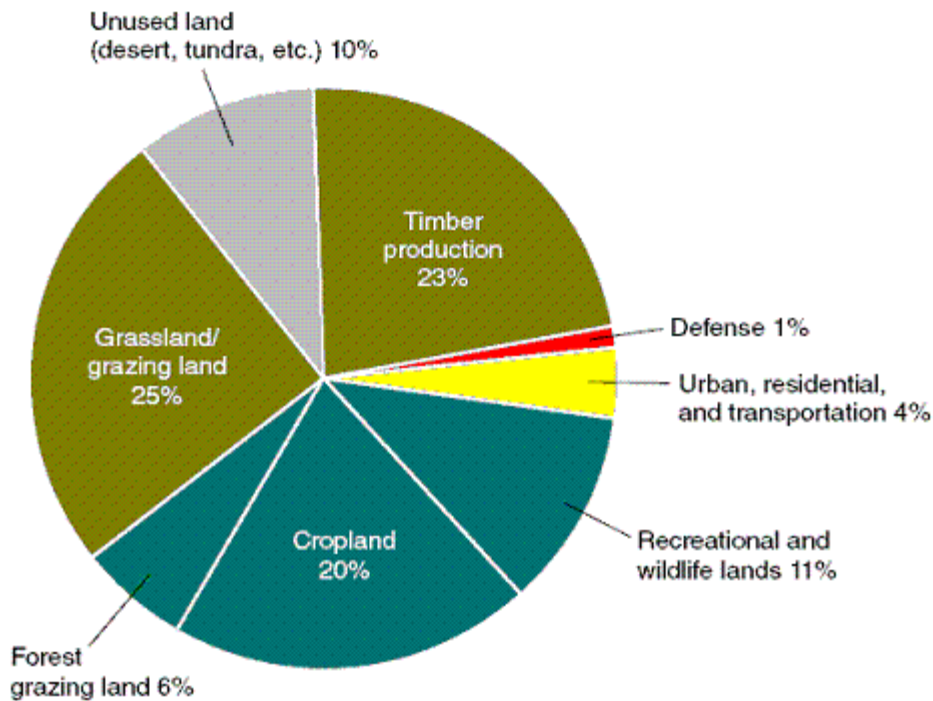
Figure 10-1



- ___ 45. Use Figure 10-1. What was the approximate US population in 2000?
- 150 million
 - 180 million
 - 230 million
 - 280 million
 - 330 million
- ___ 46. Use Figure 10-1. Urban populations increased approximately ___ % from 1950 to 2000.
- 3
 - 8
 - 40
 - 68
 - 80

Figure 10-2

Land Use in the U.S.



- ___ 47. Use Figure 10-2. What of the following land use areas would most likely have the least amount of fragmentation?
- Urban, residential and transportation
 - Desert and Tundra
 - Defense
 - Timber production
 - Croplands
- ___ 48. After many years of applying the selective pesticide provironex, a farmer notices that the applications seem less effective. This is likely due to
- The fact that provironex is fat soluble and has been bioaccumulating
 - Provironex is selective, so other pests are filling the niche from the exterminated ones
 - Provironex is persistent, and the farmer should apply less for better results
 - The target species has begun to evolve resistance
 - Provironex is a wide spectrum pesticide that needs to be fine tuned for the target species
- ___ 49. Scientists have inserted a gene for the production of vitamin A into rice. This practice of changing the genetic structure of agricultural products to improve desirable traits is known as
- Genetic Engineering
 - Transmodification
 - Selective Breeding
 - Natural Selection
 - Animal Husbandry
- ___ 50. Integrated Pest Management (IPM) is likely to use all of the following techniques EXCEPT
- Crop rotation
 - Intercropping
 - Planting herbicide resistant crops

- d. Habitat creation for pest predators
- e. Increased use of traditional pesticides

- _____ 51. Worldwide, the largest component of the human diet is
- a. Grain products
 - b. Meat products
 - c. Dairy products
 - d. Raw and processed sugars
 - e. Fruits and vegetables
- _____ 52. Currently the world's farmers grow enough grain to feed
- a. About a quarter of the world's population
 - b. About a third of the world's population
 - c. About half of the world's population
 - d. About 75% of the world's population
 - e. More than the world's population

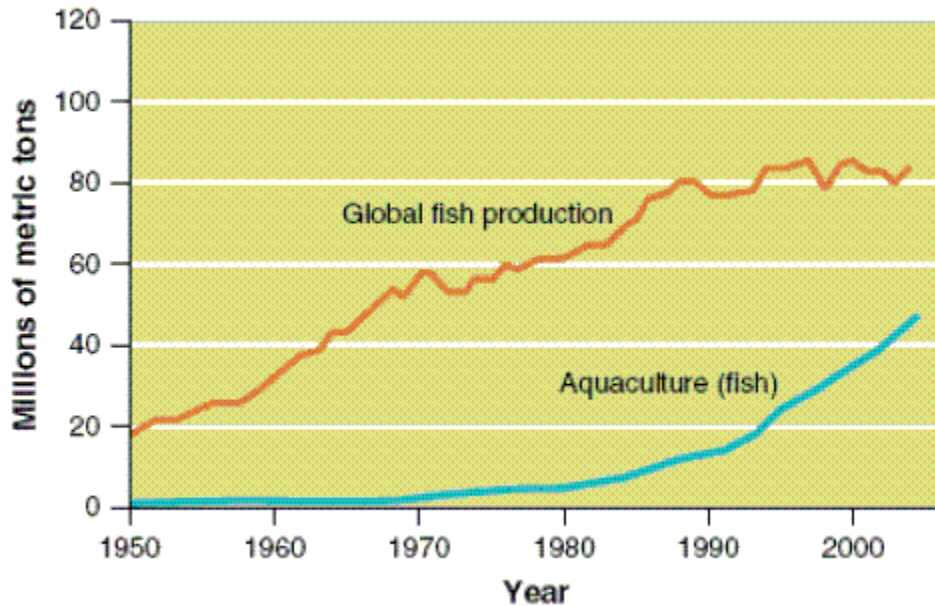
Figure 11-1

Recommended Daily Caloric Intake				
Males			Females	
Activity Level		Activity Level		
Age	Sedentary	Moderate	Sedentary	Moderate
2	1000	1000	1000	1000
4	1200	1400	1000	1000
6	1400	1600	1200	1400
8	1400	1600	1400	1600
10	1600	1800	1400	1800
12	1800	2200	1600	2000
14	2000	2400	1800	2000
16-18	2400	2800	1800	2000
19-20	2600	2800	2000	2200
21-25	2400	2600	1800	2000
26-40	2200	2600	1800	2000
41-45	2200	2400	1800	2000
46-50	2200	2400	1600	1800
51-60	2000	2400	1600	1800
61-65	2000	2400	1600	1800
66+	2000	2200	1600	1800

- _____ 53. Use Figure 11-1. Based on the above recommended daily allowances, which of the following categorical groups would require the largest caloric intake?

- a. Adolescent males
- b. Adolescent females
- c. Infant males
- d. Infant females
- e. Young men

Figure 11-2

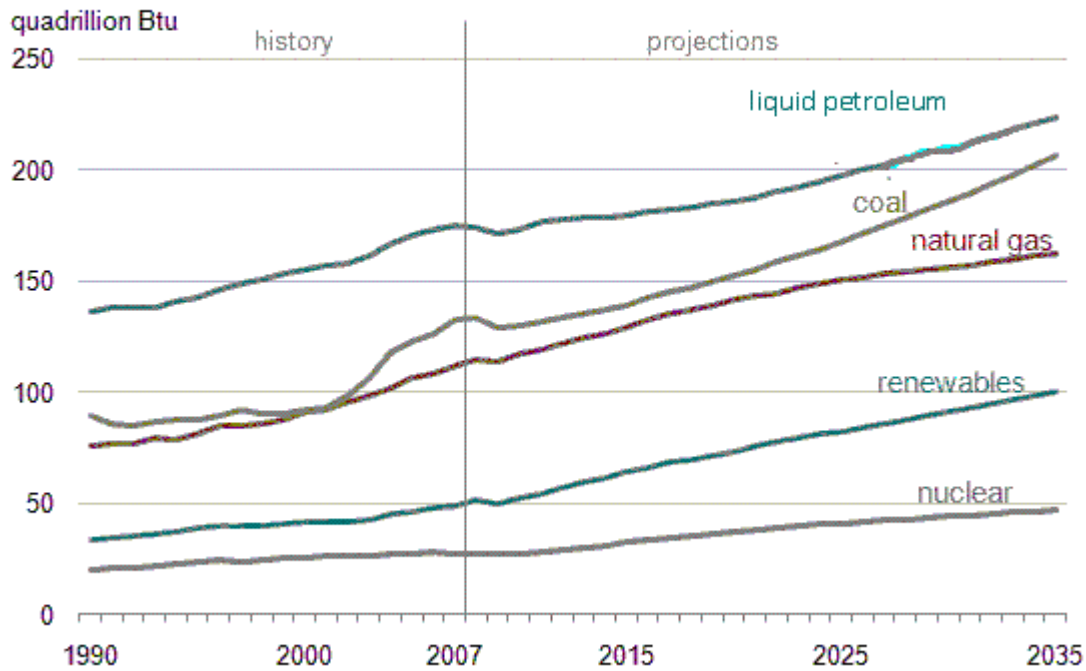


54. Use Figure 11-2. Between which years did Aquaculture fish production increase the most?
- a. 1950 and 1960
 - b. 1960 and 1970
 - c. 1970 and 1980
 - d. 1990 and 2000
 - e. It has not increased in the last 50 years

The following chart displays world marketed energy consumption based on a reference case developed by the US Energy Information Administration in which the energy consumption increases by 49% from 2007 to 2035.

Figure 12-1

Figure 2. World marketed energy use by fuel type

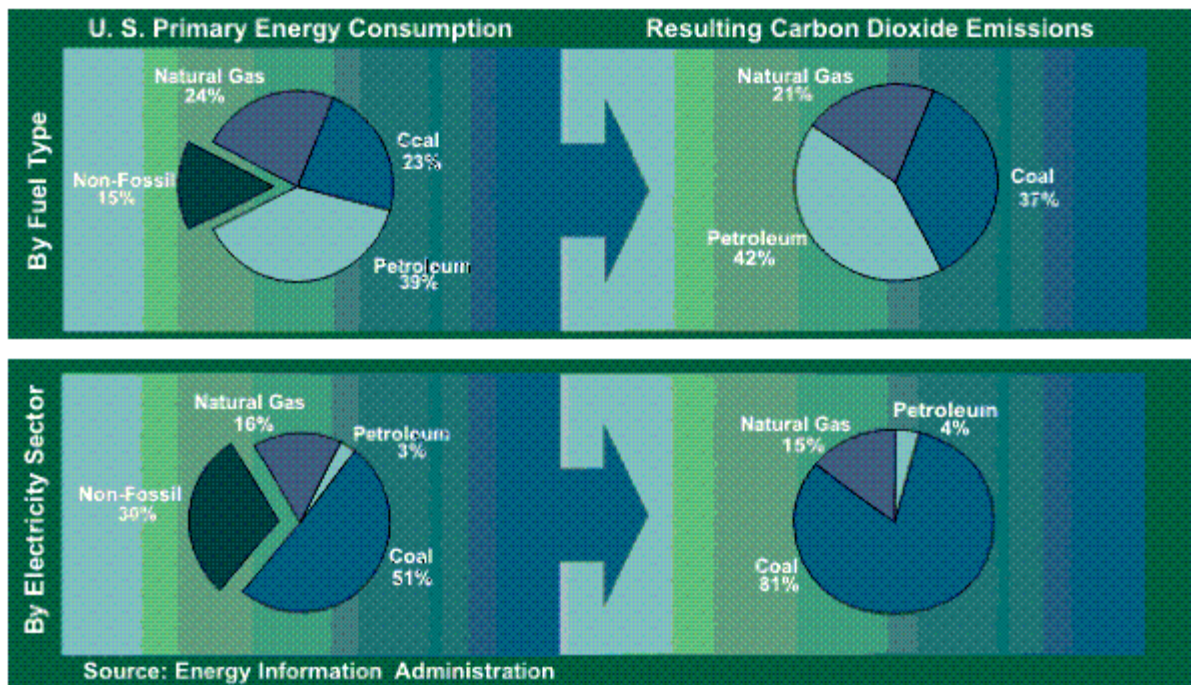


[Source: <http://www.eia.doe.gov/oiaf/ieo/highlights.html>]

55. Use Figure 12-1. Which of the following statements is reasonable, according to the information in the chart?
- Nuclear power will provide more energy than renewables by 2050.
 - By 2050, fossil fuels will no longer provide the majority of the world's energy.
 - In 2000, natural gas provided about as much energy as coal.
 - Renewables will be the largest source of energy in the near future.
 - The use of nuclear energy is decreasing over time.

Figure 12-3

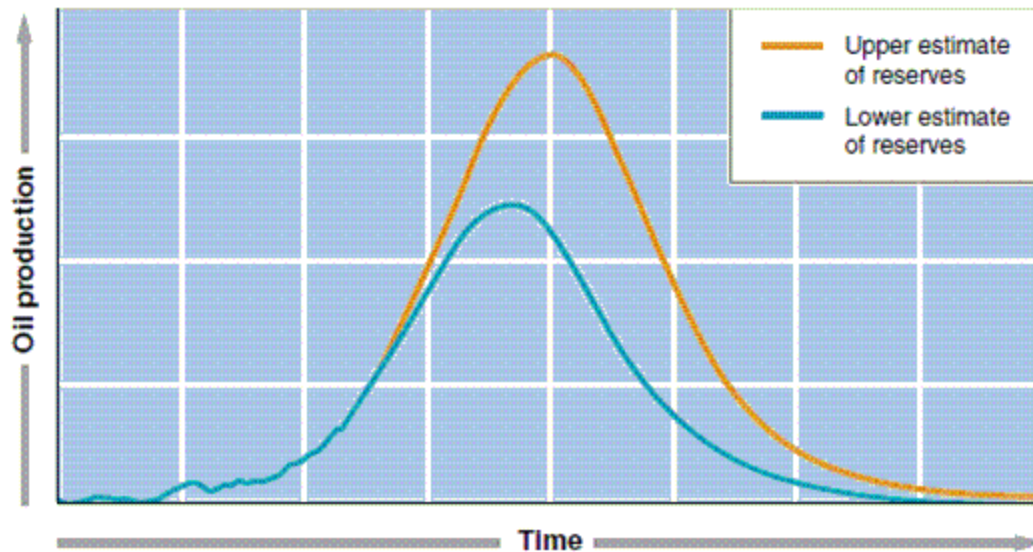
U.S. Primary Energy Consumption and Carbon Dioxide Emissions, 2001



[Source: <http://www.eia.doe.gov/oiaf/1605/ggcebro/chapter1.html>]

56. Use Figure 12-3. Which of the following fuel types produces the highest ratio of percent resulting CO₂ emissions to percent consumption?
- Natural gas
 - Non-fossil
 - Coal
 - Petroleum
 - The ratios are the same for all fuel types.

Figure 12-4



- ___ 57. Use Figure 12-4. Based on the curve, it is believed that finding new petroleum reserves
- will greatly increase the amount of time it will take to use up all available reserves
 - will greatly decrease the amount of time it will take to use up all available reserves
 - will slightly increase the amount of time it will take to use up all available reserves
 - will slightly decrease the amount of time it will take to use up all available reserves
 - will have no effect on the amount of time it will take to use up all available reserves
- ___ 58. In the use of coal to produce energy, which of the following does NOT decrease the energy efficiency of the process?
- extracting the coal from the ground
 - waste heat
 - cogeneration
 - energy required to build the power plant
 - the removal of the waste products
- ___ 59. The energy source that can provide the greatest amount of electricity generation in the United States due to its abundance is
- oil
 - coal
 - nuclear
 - hydroelectric
 - natural gas
- ___ 60. Environmental costs associated with the use of coal include all of the following except
- particulates that are released into the atmosphere when coal is burned
 - degradation to land due to mining techniques
 - the creation of highly radioactive waste
 - trace metals found in coal
 - the transportation of coal from mine to power plant
- ___ 61. If an average refrigerator uses 500 watts of energy per hour on a daily basis, and your energy cost is \$0.11 per kwh, approximately how much does the energy used by the refrigerator cost per month?
- \$1.30
 - \$13

- c. \$40
- d. \$55
- e. \$132

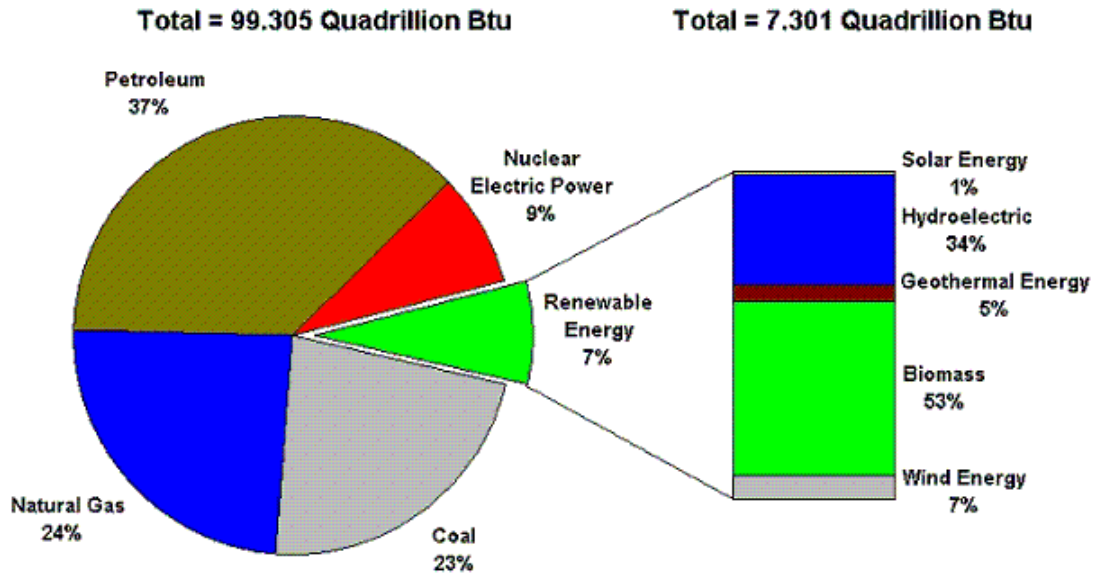
- _____ 62. Uranium-235 is considered ideal for nuclear reactors due to
- a. its wide distribution as a resource
 - b. its stable nature as an isotope
 - c. its high EROEI
 - d. its minimal production of radioactive waste
 - e. its fissionability
- _____ 63. Which of the following is the correct type of energy utilized to produce tidal power?
- a. Radiation
 - b. Kinetic energy
 - c. Solar energy
 - d. Potential energy
 - e. Heat energy

Table 13-1

Type of Television	On Mode Power Rating
50" Plasma Television	400 watts
52" LCD Television	220 watts
52" LCD Energy Star Television	120 watts

- _____ 64. Use Table 13-1. If a community has 200,000 homes and 1% of those homes have Plasma televisions, how many kWh of excess energy are being consumed every year (365 days) than if those homes had Energy Star LCD televisions instead?
- a. 350,000 kWh
 - b. 524,000 kWh
 - c. 818,000 kWh
 - d. 1,168,000 kWh
 - e. 4,906,000 kWh

Figure 13-1

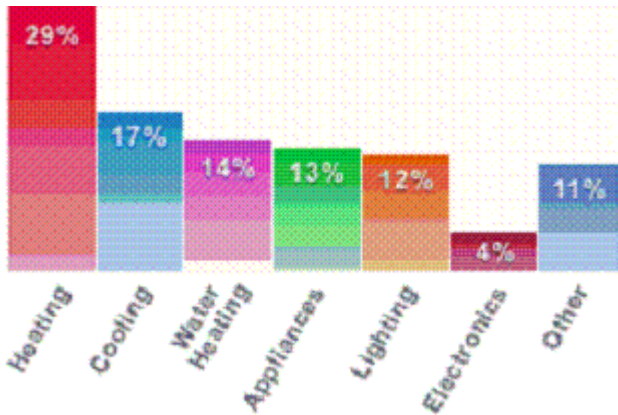


65. Use Figure 13-1. By looking at the chart above, what is the approximate percent of the US energy needs are served by biomass energy sources?
- 1%
 - 3.5%
 - 10%
 - 25%
 - 56%

Figure 13-2

Where Does My Money Go?

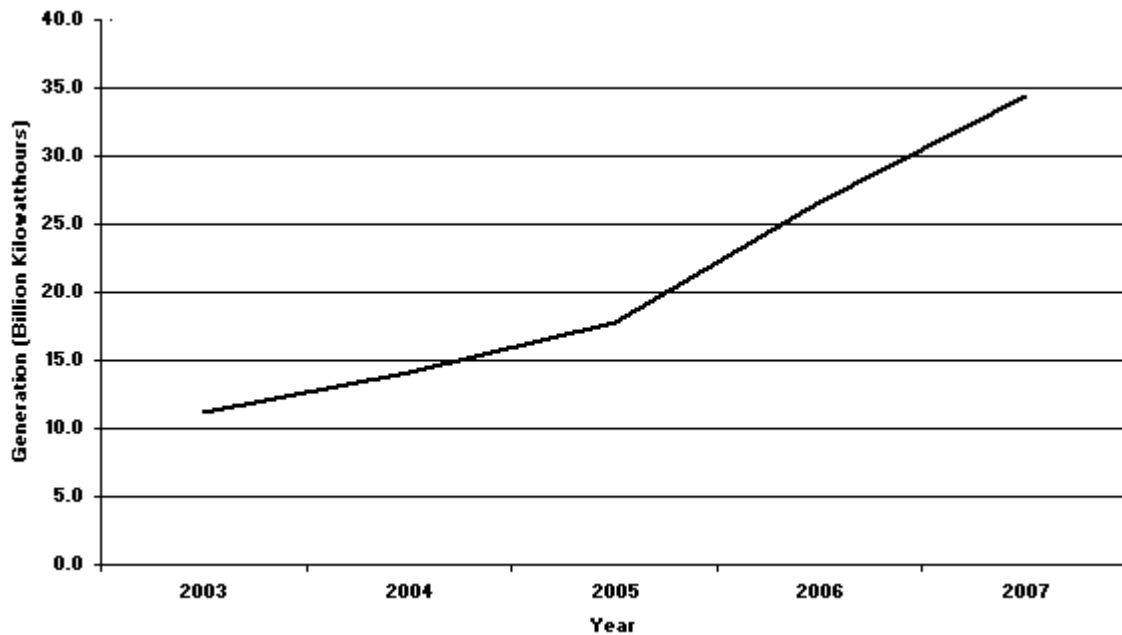
The annual energy bill for a typical single home is approximately \$2,200.



66. Use Figure 13-2. Which of the following increases in efficiency would save a typical household the most money?
- Increase heating efficiency by 5%.
 - Use 25% less energy for lighting.
 - Increase cooling efficiency by 12%.
 - Acquire appliances that are 15% more efficient.

- e. Reduce electronics usage by 50%

Figure 13-4

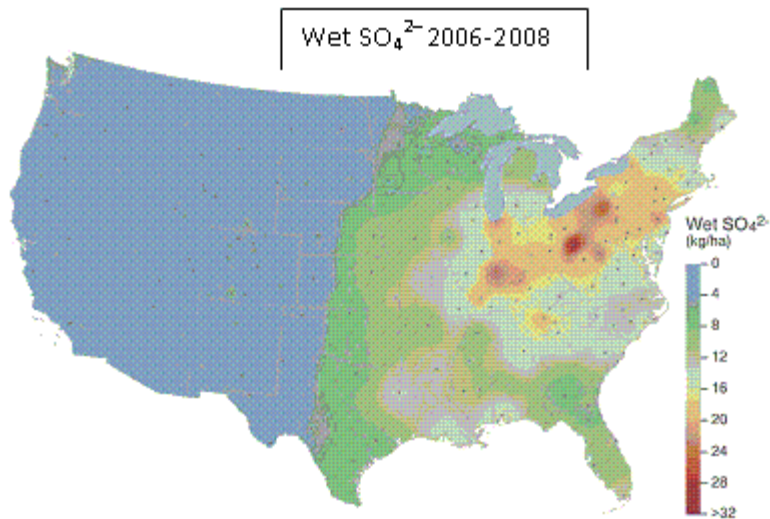
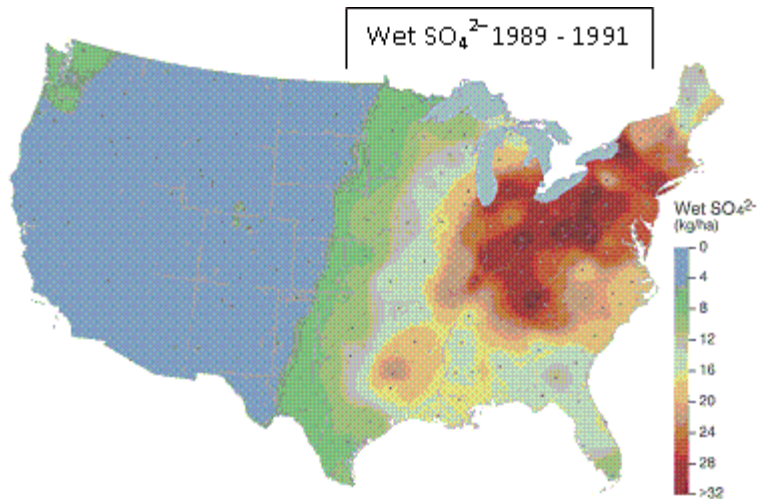


67. Use Figure 13-4. If the trend from 2006 to 2007 continued, approximately how many kWh would have been generated in 2008?
- 36×10^6
 - 36×10^9
 - 42×10^6
 - 42×10^9
 - 68×10^9
68. Put the items below in correct sequence for the generation of electricity using the wind
- generator converts mechanical energy into electrical energy
 - wind turns the wind turbine blade
 - the gear box transfers mechanical energy to the generator
 - electricity is transferred to the grid
- 1-2-3-4
 - 2-1-3-4
 - 2-3-1-4
 - 2-4-3-1
 - 4-2-3-1
69. Which country is known for having the most available geothermal energy in the world?
- Russia
 - Iceland
 - England
 - China
 - France

- _____ 70. Which form of energy production has a large environmental impact, a high cost of construction, and the potential to force the displacement of large numbers of people and wildlife?
- water impoundment systems
 - photovoltaic systems
 - wind farms
 - tidal power generating stations
 - geothermal power stations
- _____ 71. The BOD measurement of a liter of healthy water was found to be 20 mg. The BOD measurement of a liter of more polluted water was 120 mg. Which of the following statements is correct?
- the healthy water produced 6 times as much oxygen as the polluted water.
 - the polluted water produced 6 times as much oxygen as the healthy water.
 - the healthy water consumed 6 times as much oxygen as the polluted water.
 - the polluted water consumed 6 times as much oxygen as the healthy water.
 - None of these answers are correct.
- _____ 72. Concerns over the wide use of synthetic pesticides include all of the following unintended effects EXCEPT
- the pesticide may be lethal to nontarget species as well as target species
 - pesticide use leads to an altered species composition of the community
 - the chemistry of the inert ingredients
 - physiological side effects on pest and nonpest species
 - acidification of nearby streams
- _____ 73. Possible sources of petroleum in the ocean waters include all of the following EXCEPT
- naturally occurring plumes from oceanic trenches
 - natural seeps from the ocean floor
 - oil tanker transportation
 - oil platform leaks
 - tanker or platform accidents
- _____ 74. The material rotating in the North Pacific Gyre can best be described as
- solid waste composed of mostly plastics
 - organic waste dumped from cruiseships
 - medical waste dumped by the United States
 - coal slag dumped by China
 - solid waste from countries without landfills
- _____ 75. Ground level ozone is classified as a pollutant because it reduces lung functionality AND
- its concentrations are low but the particle size is high
 - it occurs in the atmosphere only
 - it is entirely anthropogenic in nature
 - it can degrade plant surfaces
 - it is an unstable molecule
- _____ 76. Which of the following correctly lists the 6 “criteria” air pollutants as specified under the Clean Air Act?
- Pb, SO₂, NO_x, CO, PM, and tropospheric O₃
 - Tropospheric O₃, SO₂, NO_x, PM, Pb, and CO₂
 - SO₂, NO_x, Hg, Pb, PM, and O₃
 - SO₄, NO_x, CO, PM, Pb, and tropospheric O₃
 - SO₂, NO_x, CO, Hg, PM, and tropospheric O₃
- _____ 77. The movement of large polluted air masses across the Pacific ocean into the northern United States is an example of

- a. the effects of the impact of the low air quality standards of ocean transport vehicles
 - b. a violation of the Montreal Protocol
 - c. the ill effects of increased UV radiation
 - d. a violation of the Clean Air Act
 - e. a reason that collaborative international air quality legislation would be useful
- ___ 78. The air pollutant that is a metal and is released primarily from the combustion of coal is
- a. lead
 - b. mercury
 - c. arsenic
 - d. sulfur
 - e. none of the above
- ___ 79. A thermal inversion, which can lead to serious pollution events, occurs when
- a. warm air that normally rises, does so taking the pollutants with it
 - b. warm air that normally rises stays close to the surface holding pollutants close to the surface
 - c. cool air that normally rises, does so taking the pollutants with it
 - d. cool air stays close to the surface but pollutants rise into the atmosphere
 - e. cool air stays close to the surface and is blanketed by a layer of warm air that traps pollutants
- ___ 80. The correct sequence of events for acid deposition are
- W. deposition of ions on vegetation or soil
 - X. secondary pollutants are formed
 - Y. combustion releasing SO_2 and NO_x
 - Z. dissociation of pollutants
- a. Z->X->Y->W
 - b. Y->X->Z->W
 - c. Y->Z->X->W
 - d. Y->W->X->Z
 - e. Z->Y->W->X
- ___ 81. Which of the following is NOT a problem associated with acid deposition?
- a. compromised aquatic systems
 - b. lowered pH of lakes
 - c. negative effects on human skin with contact
 - d. erosion of buildings and monuments made of marble
 - e. erosion of paint on painted surfaces

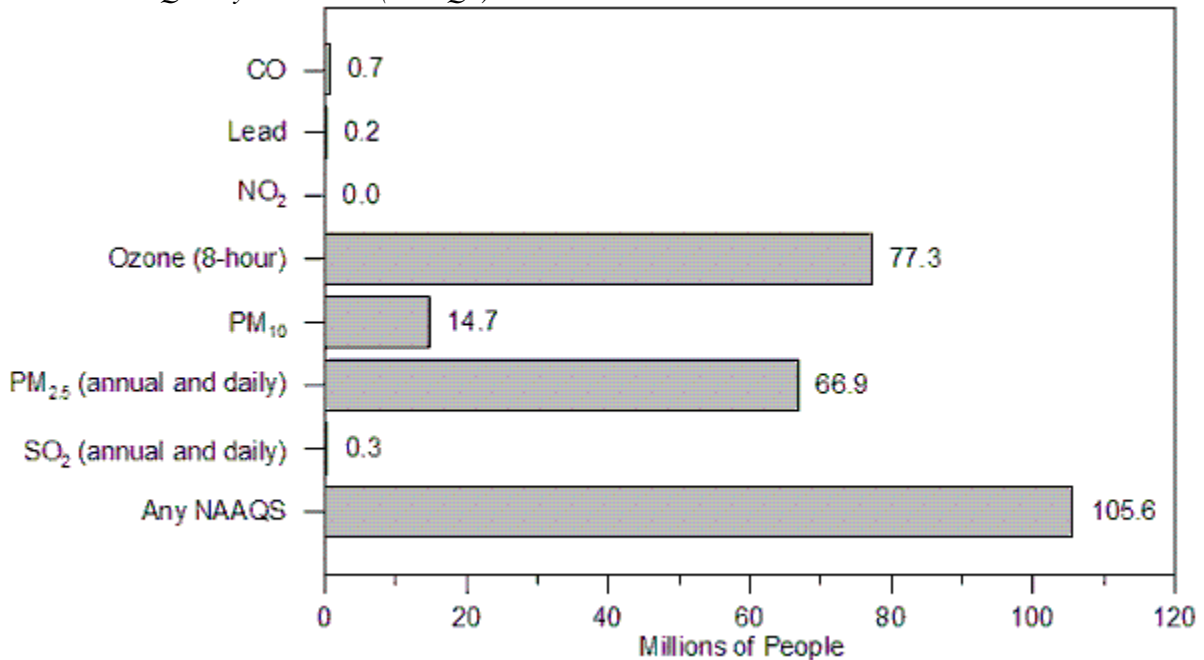
Figure 15-3



82. Use Figure 15-3. The change in acid deposition for the southern half of the state of Michigan from 1989-1991 to 2006-2008 is
- a decrease of approximately 5%
 - a decrease of approximately 50%
 - it has stayed relatively the same
 - an increase of approximately 1%
 - an increase of approximately 5%
83. The depletion of ozone over Antarctica is greatest during
- August through November
 - December through February
 - February through May
 - June through August
 - the ozone hole is consistent in size throughout the year

Figure 15-5

Number of people living in countries with air quality concentrations above the level of the primary national Ambient Air Quality Standards (NAAQS) in 2006.

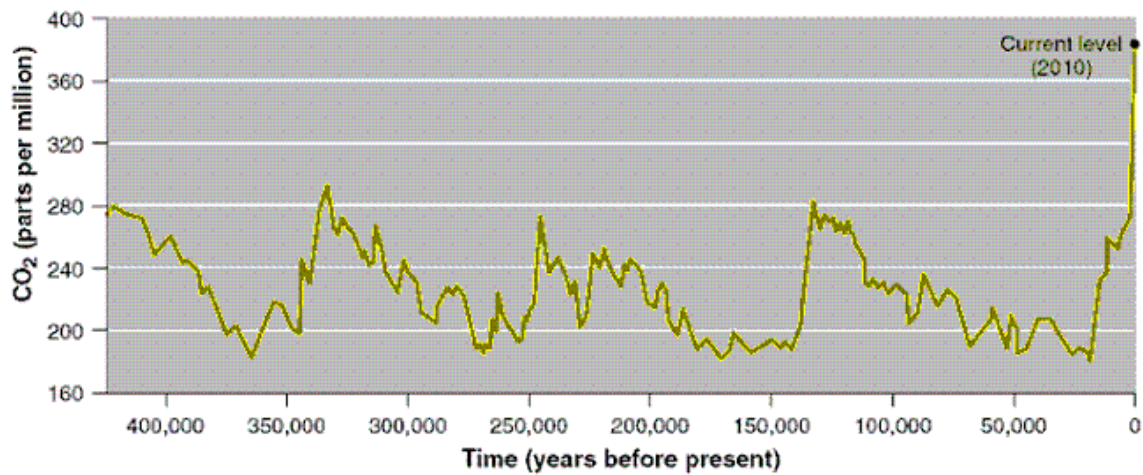


84. Use Figure 15-5. In 2006, the total population of the U.S. was approximately 300,000,000 people. About what percent of those people lived in counties where carbon monoxide levels exceeded the NAAQS?
- 0.2%
 - 0.7%
 - 2%
 - 20%
 - 70%
85. Which harmful substance was once commonly used as insulation?
- asbestos
 - mercury
 - lead
 - radon
 - ozone
86. In the waste stream, the most optimal way to achieve a reduction in MSW production is
- recycle metal components
 - reduce input by waste prevention
 - purchase recycled materials
 - compost organic waste
 - reuse water in a closed-loop system
87. Which of the following is/are environmental benefit/s of recycling aluminum?
- Reduces the effects on the land from mining
 - Reduces the effects of leaching in landfills
 - Reduces the energy required to transport and process mined ore
- I only

- b. II only
 - c. I and II only
 - d. I and III only
 - e. I, II, and III
- _____ 88. Which of the following is least likely to be a danger associated with leachate from a sanitary landfill?
- a. The leachate can leak into nearby soils
 - b. The leachate can leak into groundwater
 - c. The leachate can contain toxic metal compounds
 - d. The leachate can be at a high temperature
 - e. The leachate can be classified as toxic waste and have to be treated accordingly
- _____ 89. A landfill in Minnesota receives an average of 50 cm of rainfall per year. 60 percent of the water runs off the landfill. The landfill has a surface area of 5000 m². The leachate from the landfill is treated for cadmium and other toxic metals. The present leachate collection system is 80% efficient. What is the volume of leachate that is treated per year?
- a. 1600 m³
 - b. 1000 m³
 - c. 960 m³
 - d. 800 m³
 - e. 200 m³
- _____ 90. The US legislation that imposes a tax on targeted industrial facilities and then utilizes those funds to cleanup selected abandoned hazardous waste sites is
- a. NEPA
 - b. CWA
 - c. CERCLA
 - d. RCRA
 - e. NPA
- _____ 91. A historical pandemic disease caused by a bacterium and carried by rodents is
- a. Cholera
 - b. Tuberculosis
 - c. Plague
 - d. Swine Flu
 - e. Hepatitis
- _____ 92. Studies that last for only 1 to 4 days in which scientists measure mortality of organisms as a response to a dose of a chemical are known as
- a. acute studies
 - b. biomagnification studies
 - c. prospective studies
 - d. chronic studies
 - e. retrospective studies
- _____ 93. Which of the following factors are important in promoting species endangerment and ultimately extinction?
- I. habitat destruction
 - II. exotic species introduction
 - III. increased tropospheric ozone
- a. I
 - b. I and III
 - c. I and II

- d. III
e. I, II, and III
94. Which of the following poses the greatest obstacle to the protection of threatened or endangered species?
I. too much regulation makes action slow
II. lack of international treaties to protect species
III. enforcement of laws is lacking because of poor funding or support
a. I and II
b. II
c. I, II, and III
d. I and III
e. III
95. Which of the following energy sources is a chief contributor to greenhouse gas emissions as well as increasing environmental mobility of mercury?
a. Nuclear Power
b. Wind Power
c. Coal
d. Natural gas cogeneration
e. Hydropower

Figure 19-2



96. Use Figure 19-2. Between 400,000 and 10,000 years ago, the highest CO₂ concentration was approximately
a. 380 ppm
b. 320 ppm
c. 290 ppm
d. 200 ppm
e. 180 ppm

Table 19-1

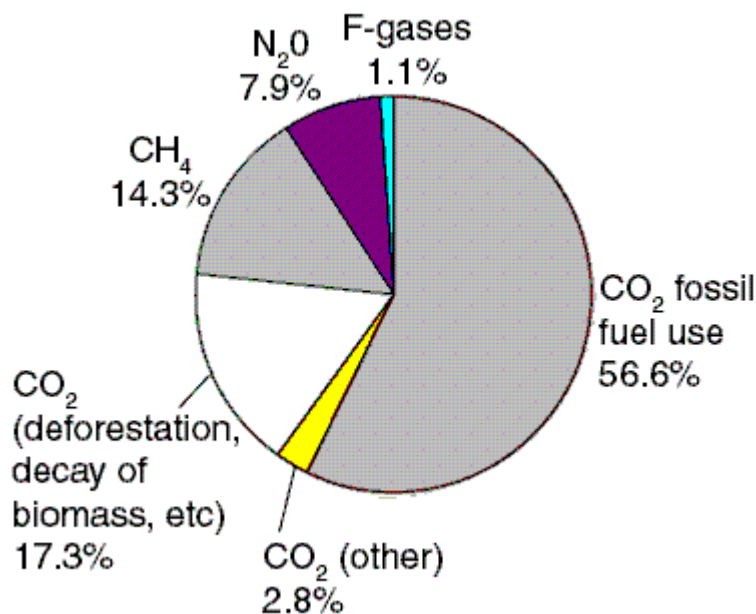
Greenhouse gas emission by livestock category in 2005

Animal Type	Total CO ₂ emission equivalent (millions of metric tons)
Beef cattle	168.3

Dairy cattle	51.2
Swine	21.0
Poultry	3.1

97. Use Table 19-1. In 2005, there were approximately 60.6 million swine in the U.S. About how much emissions did EACH of these swine produce?
- 0.035 metric tons
 - 0.35 metric tons
 - 3.5 metric tons
 - 35 metric tons
 - 3500 metric tons

Figure 19-3



98. Use Figure 19-3. Ignoring CO₂ emissions caused by fossil fuel use, which would be the best practice to reduce anthropogenic greenhouse gases?
- eliminate the use of ozone-depleting chemicals
 - convert wetlands into agricultural land
 - institute policies that reduce deforestation worldwide
 - increase the use of nitrogen based fertilizer
 - subsidize logging in the pacific northwest
99. The concentration of which of the following greenhouse gases is LEAST affected by human activity?
- water vapor
 - carbon dioxide
 - chlorofluorocarbons
 - methane
 - carbon monoxide
100. Approximately three billion people live on less than two U.S. dollars per day. This level of poverty has a resounding impact on the environment in the form of:
- heavy metal refining

- b. increased production of plastic
- c. reduction in water quality from lack of sanitation facilities
- d. reforestation of agricultural fields
- e. reduction in human population from inability to afford children

Essay

1. Free Response Questions #1

You have been put in charge of a new national park. Your goal is to help restore the biodiversity of the area while at the same time allowing visitors to the park.

- A. Describe TWO ways you could measure the health of the ecosystem. (2 points, one for each answer)
- B. Would you describe the national park as an open or a closed system and how would this help you in your management? (2 points, one for identifying an open system and one for how this would help in your management)
- C. There are many valuable services that ecosystems provide. List TWO ecosystem services that your park could provide and explain each. (2 points, one for each service with a complete description.)
- D. Knowing the type of biome your park is in will help you in both your conservation efforts as well as how and when people should come to the park. As you survey the park you find it has over 1 m of precipitation annually. The park has warm summers and cold winters. The park is dominated by broadleaf deciduous trees such as beech, maple, oak and hickory. Identify what biome your park is in, and how the knowledge affects how you plan to manage the park. (2 points, one for identifying that the park is in the temperate seasonal forest biome and one for describing how the biome might affect the management of the park).
- E. As you walk through the park you discover that one area has been altered due to human logging. This area contains large numbers of two species of trees that are valuable to the lumber industry, but has few other species of trees. The rest of the park consists of hundreds of different species of trees scattered randomly about. What specific measurements could you use to compare the biodiversity of the two areas? How does knowing this information help you in deciding how to manage the logged area? (2 points, one for how to evaluate the biodiversity and one for how this information will help you.)

2. Free Response Question #2

With an ever-increasing human population, people are moving to cities at a growing rate. This creates both social and environmental impacts.

- a. The world's growth rate was 1.14% in 2010. At this growth rate, about how many years will it take for the world population to double? (1 point)

- b. Identify TWO ways the move to cities will affect the soil in the area. (2 points)
- c. Describe TWO ways the enlarging city could affect the biodiversity. (2 points)
- d. Identify ONE human health issue that can result when people are living in a densely populated area. (1 point)
- e. Describe how wilderness areas are affected by urban sprawl as people move to cities. Describe TWO ways this impact could be reduced. (4 points; 2 points for the description of how wilderness areas are affected and 2 points for the two ways this could be reduced)

3. Free Response Question #3

The city of Fremont has outgrown its current coal burning power plant. The city council is considering many options, including different renewable energy sources, as well as rebuilding the existing power plant to accommodate the growing city.

- a) Identify TWO renewable energy sources the town could consider and describe a benefit and a cost of each. (6 pts; 2 pts for the two energy sources and a point for each benefit and cost)
- b) The current power plant has a capacity of 1000 MW and a capacity factor of 0.9. In Fremont, the average home uses approximately 1000 kWh of electricity per month. How many homes can the current power plant provide electricity for? (2 points; 1 for set up and 1 for correct answer)
- c) Many residents of Fremont have been experiencing lung and respiratory illnesses. It is discovered that the power plant is polluting a common that the residents all share, the air. Name a common other than the air and describe an economic solution for better managing this common. (2 points; 1 pt for the common and 1 pt for the solution)
- d) Name ONE strategy the government could enact to protect the common. (1 point)

4. Free Response Question #4

The city of Lakeville has a landfill on the south side of the city. This landfill has been open for 20 years and is nearly full. The town is considering installing methane collectors in the landfill to use for energy. This will help lessen the demand on the existing coal-burning power plant, which currently supplies the town with all of its energy.

- a. The town has 1000 homes, with the average home having 4 people. The average energy use per person is 2500 kWh per year. Calculate the yearly demand on the power plant for electrical energy. (2 pts, 1 for set up and 1 for correct answer)
- b. Give TWO practical strategies that members of the community could do to reduce their overall energy consumption. (2 pts, 1 for each strategy)

c. List and describe TWO environmental benefits and TWO environmental costs of using methane to make energy. (4 pts, 1 pt for each benefit and 1 pt for each cost)

d. Name ONE human health concern that is associated with landfills and suggest a solution to this problem. (2 pts, 1 pt for the human health concern and 1 pt for a solution)

AP Practice Test 100 Q's Answer Section

MULTIPLE CHOICE

1. ANS: E	PTS: 1	DIF: E	MSC: Concept based
2. ANS: D	PTS: 1	DIF: E	MSC: Analytical thinking
3. ANS: B	PTS: 1	DIF: M	MSC: Definitional
4. ANS: D	PTS: 1	DIF: E	MSC: Definitional
5. ANS: E	PTS: 1	DIF: E	MSC: Fact based
6. ANS: E	PTS: 1	DIF: M	MSC: Concept based
7. ANS: C	PTS: 1	DIF: E	MSC: Definitional
8. ANS: A	PTS: 1	DIF: E	MSC: Fact based
9. ANS: D	PTS: 1	DIF: E	MSC: Definitional
10. ANS: B	PTS: 1	DIF: M	MSC: Concept based
11. ANS: A	PTS: 1	DIF: E	MSC: Fact based
12. ANS: D	PTS: 1	DIF: E	MSC: Critical thinking
13. ANS: A	PTS: 1	DIF: E	MSC: Fact based
14. ANS: D	PTS: 1	DIF: E	MSC: Definitional
15. ANS: A	PTS: 1	DIF: E	MSC: Fact based
16. ANS: B	PTS: 1	DIF: M	MSC: Concept based
17. ANS: E	PTS: 1	DIF: E	MSC: Fact based
18. ANS: E	PTS: 1	DIF: E	MSC: Definitional
19. ANS: E	PTS: 1	DIF: E	MSC: Fact based
20. ANS: B	PTS: 1	DIF: M	MSC: Analytical thinking
21. ANS: D	PTS: 1	DIF: E	MSC: Definitional
22. ANS: A	PTS: 1	DIF: E	MSC: Concept based
23. ANS: C	PTS: 1	DIF: E	MSC: Definitional
24. ANS: C	PTS: 1	DIF: E	MSC: Fact based
25. ANS: C	PTS: 1	DIF: E	MSC: Fact based
26. ANS: D	PTS: 1	DIF: M	MSC: Critical thinking
27. ANS: A	PTS: 1	DIF: E	MSC: Analytical thinking
28. ANS: A	PTS: 1	DIF: M	MSC: Critical thinking
29. ANS: C	PTS: 1	DIF: M	MSC: Analytical thinking
30. ANS: A	PTS: 1	DIF: M	MSC: Critical thinking
31. ANS: E	PTS: 1	DIF: M	MSC: Concept based
32. ANS: A	PTS: 1	DIF: E	MSC: Definitional
33. ANS: D	PTS: 1	DIF: E	MSC: Concept based
34. ANS: C	PTS: 1	DIF: E	MSC: Definitional
35. ANS: B	PTS: 1	DIF: M	MSC: Definitional
36. ANS: E	PTS: 1	DIF: M	MSC: Concept based
37. ANS: B	PTS: 1	DIF: E	MSC: Analytical thinking
38. ANS: A	PTS: 1	DIF: M	MSC: Analytical thinking
39. ANS: E	PTS: 1	DIF: E	MSC: Concept based
40. ANS: D	PTS: 1	DIF: M	MSC: Critical thinking

41.	ANS: B	PTS: 1	DIF: E	MSC: Fact based
42.	ANS: A	PTS: 1	DIF: M	MSC: Concept based
43.	ANS: B	PTS: 1	DIF: M	MSC: Concept based
44.	ANS: E	PTS: 1	DIF: E	MSC: Concept based
45.	ANS: D	PTS: 1	DIF: M	MSC: Analytical thinking
46.	ANS: C	PTS: 1	DIF: D	MSC: Analytical thinking
47.	ANS: B	PTS: 1	DIF: M	MSC: Analytical thinking
48.	ANS: D	PTS: 1	DIF: E	MSC: Concept based
49.	ANS: A	PTS: 1	DIF: E	MSC: Definitional
50.	ANS: E	PTS: 1	DIF: E	MSC: Concept based
51.	ANS: A	PTS: 1	DIF: M	MSC: Fact based
52.	ANS: E	PTS: 1	DIF: E	MSC: Fact based
53.	ANS: E	PTS: 1	DIF: E	MSC: Analytical thinking
54.	ANS: D	PTS: 1	DIF: M	MSC: Analytical thinking
55.	ANS: C	PTS: 1	DIF: M	MSC: Analytical thinking
56.	ANS: C	PTS: 1	DIF: M	MSC: Analytical thinking
57.	ANS: C	PTS: 1	DIF: M	MSC: Fact based
58.	ANS: C	PTS: 1	DIF: E	MSC: Fact based
59.	ANS: B	PTS: 1	DIF: E	MSC: Fact based
60.	ANS: C	PTS: 1	DIF: M	MSC: Fact based
61.	ANS: C	PTS: 1	DIF: M	MSC: Analytical thinking
62.	ANS: E	PTS: 1	DIF: E	MSC: Fact based
63.	ANS: B	PTS: 1	DIF: M	MSC: Definitional
64.	ANS: C	PTS: 1	DIF: D	MSC: Analytical thinking
65.	ANS: B	PTS: 1	DIF: E	MSC: Analytical thinking
66.	ANS: B	PTS: 1	DIF: M	MSC: Analytical thinking
67.	ANS: D	PTS: 1	DIF: M	MSC: Analytical thinking
68.	ANS: C	PTS: 1	DIF: E	MSC: Fact based
69.	ANS: B	PTS: 1	DIF: E	MSC: Definitional
70.	ANS: A	PTS: 1	DIF: M	MSC: Fact based
71.	ANS: D	PTS: 1	DIF: M	MSC: Definitional
72.	ANS: E	PTS: 1	DIF: M	MSC: Concept based
73.	ANS: A	PTS: 1	DIF: M	MSC: Fact based
74.	ANS: A	PTS: 1	DIF: E	MSC: Fact based
75.	ANS: D	PTS: 1	DIF: M	MSC: Fact based
76.	ANS: A	PTS: 1	DIF: D	MSC: Fact based
77.	ANS: E	PTS: 1	DIF: M	MSC: Critical thinking
78.	ANS: B	PTS: 1	DIF: E	MSC: Fact based
79.	ANS: E	PTS: 1	DIF: M	MSC: Definitional
80.	ANS: B	PTS: 1	DIF: M	MSC: Concept based
81.	ANS: C	PTS: 1	DIF: M	MSC: Fact based
82.	ANS: B	PTS: 1	DIF: M	MSC: Analytical thinking
83.	ANS: A	PTS: 1	DIF: E	MSC: Fact based
84.	ANS: A	PTS: 1	DIF: E	MSC: Analytical thinking
85.	ANS: A	PTS: 1	DIF: E	MSC: Fact based
86.	ANS: B	PTS: 1	DIF: E	MSC: Concept based
87.	ANS: E	PTS: 1	DIF: M	MSC: Concept based

88.	ANS: D	PTS: 1	DIF: E	MSC: Fact based
89.	ANS: D	PTS: 1	DIF: M	MSC: Analytical thinking
90.	ANS: C	PTS: 1	DIF: M	MSC: Fact based
91.	ANS: C	PTS: 1	DIF: E	MSC: Fact based
92.	ANS: A	PTS: 1	DIF: E	MSC: Definitional
93.	ANS: C	PTS: 1	DIF: E	MSC: Fact based
94.	ANS: E	PTS: 1	DIF: D	MSC: Critical thinking
95.	ANS: C	PTS: 1	DIF: E	MSC: Fact based
96.	ANS: C	PTS: 1	DIF: E	MSC: Analytical thinking
97.	ANS: B	PTS: 1	DIF: E	MSC: Analytical thinking
98.	ANS: C	PTS: 1	DIF: M	MSC: Critical thinking
99.	ANS: A	PTS: 1	DIF: E	MSC: Fact based
100.	ANS: C	PTS: 1	DIF: E	MSC: Concept based

ESSAY

1. ANS:

You have been put in charge of a new national park. Your goal is to help restore the biodiversity of the area while at the same time allowing visitors to the park.

A. Describe TWO ways you could measure the health of the ecosystem. (2 points, one for each answer)

Answers could include:

Look for environmental indicators that describe the current state of an environmental system. Some common indicators are (table 1.1):

- human population
- ecological footprint
- total food production
- food production per unit area
- per capita food production
- carbon dioxide
- average global surface temperature
- sea level change
- annual precipitation
- species diversity
- fish consumption advisories
- water quality
- deposition rates of atmospheric particulates
- fish catch or harvest
- extinction rate
- habitat loss rate
- infant mortality rate
- life expectancy
- visibility

- B. Would you describe the national park as an open or a closed system and how would this help you in your management?** (2 points, one for identifying an open system and one for how this would help in your management)

Answers could include:

- The park is an open system where exchanges of matter and energy occur across system boundaries.
- This would help me manage because I would need to look at not only what is occurring in the park itself, but also the things coming into and leaving the park. For example, I could monitor the health of the park by testing the water quality in the rivers and lakes, measuring any water-borne pollution that is being carried into the park. I could also run tests on the rainfall to find chemical pollutants coming into the park. I would also know to be on the lookout for invasive species.

- C. There are many valuable services that ecosystems provide. List TWO ecosystem services that your park could provide and explain each.** (2 points, one for each service with a complete description.)

Answers could include:

- Provisions: Provisions are goods that humans can use directly such as lumber, food crops, medicinal plants, and natural rubber. Although supplying provisions is not one of the main purposes of a national park, some parks do allow limited resource extraction.
- Regulating services: These are the roles that the ecosystem provides for regulating environmental systems such as nutrient and hydrologic cycles. For example, many biomes remove carbon from the atmosphere, which slows climate change.
- Support systems: Natural ecosystems provide numerous support services for other human activities. For example, the park could benefit nearby agricultural lands by providing habitat for pollinators and predators that prey on agricultural pests.
- Resilience: This is the ability of the ecosystem to continue to exist in its current state. For example, different species may perform similar functions in an ecosystem, but differ in their susceptibility to disturbance. The national park may contain several of these species. If one is disturbed, the others will be able to perform the same function.
- Cultural services: Ecosystems provide cultural or aesthetic benefits to many people. For example, the awe-inspiring beauty of nature has instrumental value because it provides an aesthetic benefit, and many natural parks are chosen at least partially for their natural beauty.

- D. **Knowing the type of biome your park is in will help you in both your conservation efforts as well as how and when people should come to the park. As you survey the park you find it has over 1 m of precipitation annually. The park has warm summers and cold winters. The park is dominated by broadleaf deciduous trees such as beech, maple, oak and hickory. Identify what biome your park is in, and how the knowledge affects how you plan to manage the park.** (2 points, one for identifying that the park is in the temperate seasonal forest biome and one for describing how the biome might affect the management of the park).

Answers could include:

- The park is found in the temperate seasonal forest biome.
- Decomposition in the forest is very high which leads to the soils containing lots of nutrients. Due to rapid growth, amenities for recreational visitors, such as trails and campgrounds, will likely need frequent maintenance in order to remain safe and easily usable. Replanting any area that has been deforested would likely lead to relatively fast improvements and increases in biodiversity. Given the temperature variability, I would need to be prepared for many more visitors in the summer than in the winter.

- E. **As you walk through the park you discover that one area has been altered due to human logging. This area contains large numbers of two species of trees that are valuable to the lumber industry, but has few other species of trees. The rest of the park consists of hundreds of different species of trees scattered randomly about. What specific measurements could you use to compare the biodiversity of the two areas? How does knowing this information help you in deciding how to manage the logged area?** (2 points, one for how to evaluate the biodiversity and one for how this information will help you.)

Answers could include:

- I would evaluate the species richness and species evenness of both the logged area and the rest of the park. The logged area will have less species richness (fewer overall species) and less species evenness (the species are not evenly distributed).
- Knowing the species richness and species evenness of the rest of the park will give me a baseline that I can use to determine how much the logged area has changed, and what its composition would ideally be. It will help me learn what actions would be necessary to return the logged area to a more natural state.

PTS: 1

2. ANS:

With an ever-increasing human population, people are moving to cities at a growing rate. This creates both social and environmental impacts.

- a. The world's growth rate was 1.14% in 2010. At this growth rate, about how many years will it take for the world population to double? (1 point)

$$70/1.14 = 61 \text{ years}$$

- b. Identify TWO ways the move to cities will affect the soil in the area. (2 points)

Possible answers:

- Increased soil erosion
- Compaction of soil
- Depletion of soil nutrients
- Soil pollution from runoff
- Increased acid deposition
- Less water infiltrated into the soil

- c. Describe TWO ways the enlarging city could affect the biodiversity. (2 points)

Possible answers:

- Geographic isolation of species
- Reproductive isolation of species
- Pollutants (name a particular pollutant or where a pollutant comes from)
- Polluted runoff affecting the local water supply
- Introduction of invasive species

- D. Identify ONE human health issue that can result when people are living in a densely populated area. (1 point)

Possible answers:

- Diseases spread easier/faster when populations are dense

- Air pollution from cars and other sources can negatively affect respiratory health
- A variety of carcinogenic pollutants can increase cancer rates

E. Describe how wilderness areas are affected by urban sprawl as people move to cities. Describe TWO ways this impact could be reduced. (4 points; 2 points for the description of how wilderness areas are affected and 2 points for the two ways this could be reduced)

Possible answers for how wilderness areas are affected:

- Deforestation
- Increased erosion
- Soil degradation
- Mining for resources needed in the city can harm wilderness areas
- Rivers, lakes and aquifer levels may drop from overuse
- Runoff to surface water can harm water resources
- Fossil fuel combustion can lead to acid deposition
- Highway construction can lower biodiversity

Possible answers for how this could be reduced:

- Zoning
- Mixed land uses
- Green spaces such as public parks
- Regulations on water conservation
- Educating businesses and the public about energy efficiency
- Replanting trees
- Development of alternative energy sources that cause less or no pollution

PTS: 1

3. ANS:

FRQ # 3

The city of Fremont has outgrown its current coal burning power plant. The city council is considering many options, including different renewable energy sources, as well as rebuilding the existing power plant to accommodate the growing city.

- a) Identify TWO renewable energy sources the town could consider and describe a benefit and a cost of each. (6 pts; 2 pts for the two energy sources and a point for each benefit and cost)

Possible answers:

- Liquid biofuels
Benefits: Potentially renewable, can reduce fossil fuel dependence, reduces trade deficit, possibly more environmentally friendly than fossil fuels
Costs: Loss of agricultural land, higher food costs, lower gas mileage, possible net increase in greenhouse gas emissions
- Photovoltaic solar cells
Benefits: Nondepletable, no cost to harvest energy after initial investment
Costs: High input of metals and water to create, no recycling currently possible, geographically limited, high initial costs, storage batteries required for off-grid systems, requires lots of land
- Hydroelectricity
Benefits: Nondepletable, low cost to run, flood control, recreation
Costs: Geographically limited, high construction costs, damage to river ecosystems, siltation, loss of habitat and agricultural land, population displacement
- Tidal energy
Benefits: Nondepletable, no cost to harvest energy after initial investment
Costs: Disruptive effect on marine organisms, geographically limited
- Geothermal energy
Benefits: Nondepletable, no cost to harvest energy after initial investment, can be installed anywhere
Costs: Emits hazardous gases and steam, geographically limited
- Wind energy
Benefits: Nondepletable, no cost to harvest energy after initial investment, low up-front cost
Costs: Turbine noise, deaths of birds, geographically limited, aesthetically displeasing to some, storage batteries required for off-grid systems
- Hydrogen fuel cells
Benefits: Efficient, zero pollution
Costs: Production is energy-intensive, no distribution network, storage challenges

- b) The current power plant has a capacity of 1000 MW and a capacity factor of 0.9. In Fremont, the average home uses approximately 1000 kWh of electricity per month. How many homes can the current power plant provide electricity for? (2 points; 1 for set up and 1 for correct answer)

Answer:

Power plant generates: $1000 \text{ MW} \times 24 \text{ hours/day} \times 30 \text{ days/month} \times 0.9 = 648,000 \text{ MWh/month}$

Each house needs: $1000 \text{ kWh/month/home} \times (1 \text{ MWh}/1000 \text{ kWh}) = 1 \text{ MWh/month/home}$

$648,000 \text{ MWh/month} \div 1 \text{ MWh/month/home} = 648,000 \text{ homes}$

- c) Many residents of Fremont have been experiencing lung and respiratory illnesses. It is discovered that the power plant is polluting a common that the residents all share, the air. Name a common other than the air and describe an economic solution for better managing this common. (2 points; 1 pt for the common and 1 pt for the solution)

Possible answers:

Global fisheries- setting a quota, licensing requirements for fishing

Public land- assigning property rights, tax the use of the land

Water- assign property rights, charge for the use

- d) Name ONE strategy the government could enact to protect the common. (1 point)

Possible answers:

Write a law that requires the power plant to have scrubbers or other devices to protect the air.

Tax the power plant if it continues to pollute

Educate the people of the town as well as the owner of the power plant about air pollution and how this common could be better taken care of.

PTS: 1

4. ANS:

FRQ #4 Answer Key

The town of Fremont has a landfill on the south side of the city. This landfill has been open for 20 years and is nearly full. The town is considering installing methane collectors in the landfill to use for energy. This will help lessen the demand on the existing coal-burning power plant, which currently supplies the town with all of its energy.

a. The town has 1000 homes with the average home having 4 people. The average energy use per person is 2500 kWh per year. Calculate the yearly demand on the power plant for electrical energy. (2 pts, 1 for set up and 1 for correct answer)

1000 homes × 4 people × 2500 kWh/yr = 10,000,000 kWh/yr or 10,000 MWh/yr

b. Give TWO practical strategies that members of the community could do to reduce their overall energy consumption. (2 pts, 1 for each strategy)

Possible answers include turn off the lights when they leave the room, install energy-efficient light bulbs, open the windows when the temperature outside is comfortable, use energy-efficient appliances, weatherize houses, unplug electrical devices when not in use, etc.

c. List and describe TWO environmental benefits and TWO environmental costs of using methane from a landfill to make energy. (4 pts, 1 pt for each benefit and 1 pt for each cost)

Possible answers include:

Benefits	Costs
less air pollution than from burning coal	some air pollution is still generated by burning the methane
lessens the amount of waste in the landfill	methane can explode if not collected properly
no strip mining or other types of mineral extraction	methane is a greenhouse gas that if released can lead to global warming
readily available	

d. Name ONE human health concern that is associated with landfills and suggest a solution to this problem. (2 pts, 1 pt for the human health concern and 1 pt for a solution)

Possible answers include: contamination of groundwater from leachate due to leaks in the liner of the landfill, methane generation which can pose explosion risks, methane is a greenhouse gas and leads to global warming, etc.

Possible solutions include: reducing the amount of material being added to the landfill by encouraging reduce, reuse, recycle, incineration, composting, etc.

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