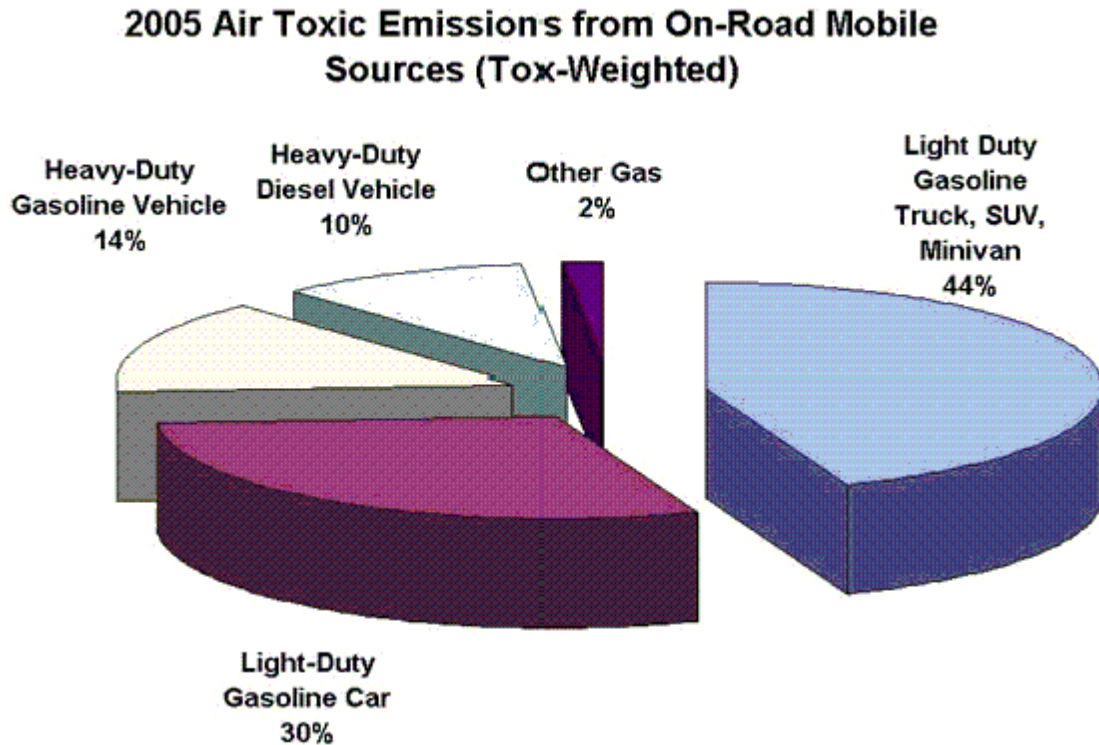


MULTIPLE CHOICE

Figure 15-1



1. Use Figure 15-1. If the objective is to reduce vehicular emissions of pollutants, which of the following would be the best choice?
 - a. Encourage the switching from trucks and SUVs to light-duty cars
 - b. Encourage the replacement of gasoline powered vehicles with electric vehicles
 - c. Encourage the transportation of goods via train as opposed to trucks
 - d. Encourage carpooling.
 - e. Encourage the replacement of gasoline powered vehicles with hybrid vehicles.
2. Use Figure 15-1. A daily measurement of toxic emissions in Maine measures 0.070 ppm. What amount of that would be attributed to gasoline powered automobiles such as a 4-door sedan?
 - a. 0.052 ppm
 - b. 0.039 ppm
 - c. 0.031 ppm
 - d. 0.021 ppm
 - e. 0.018 ppm

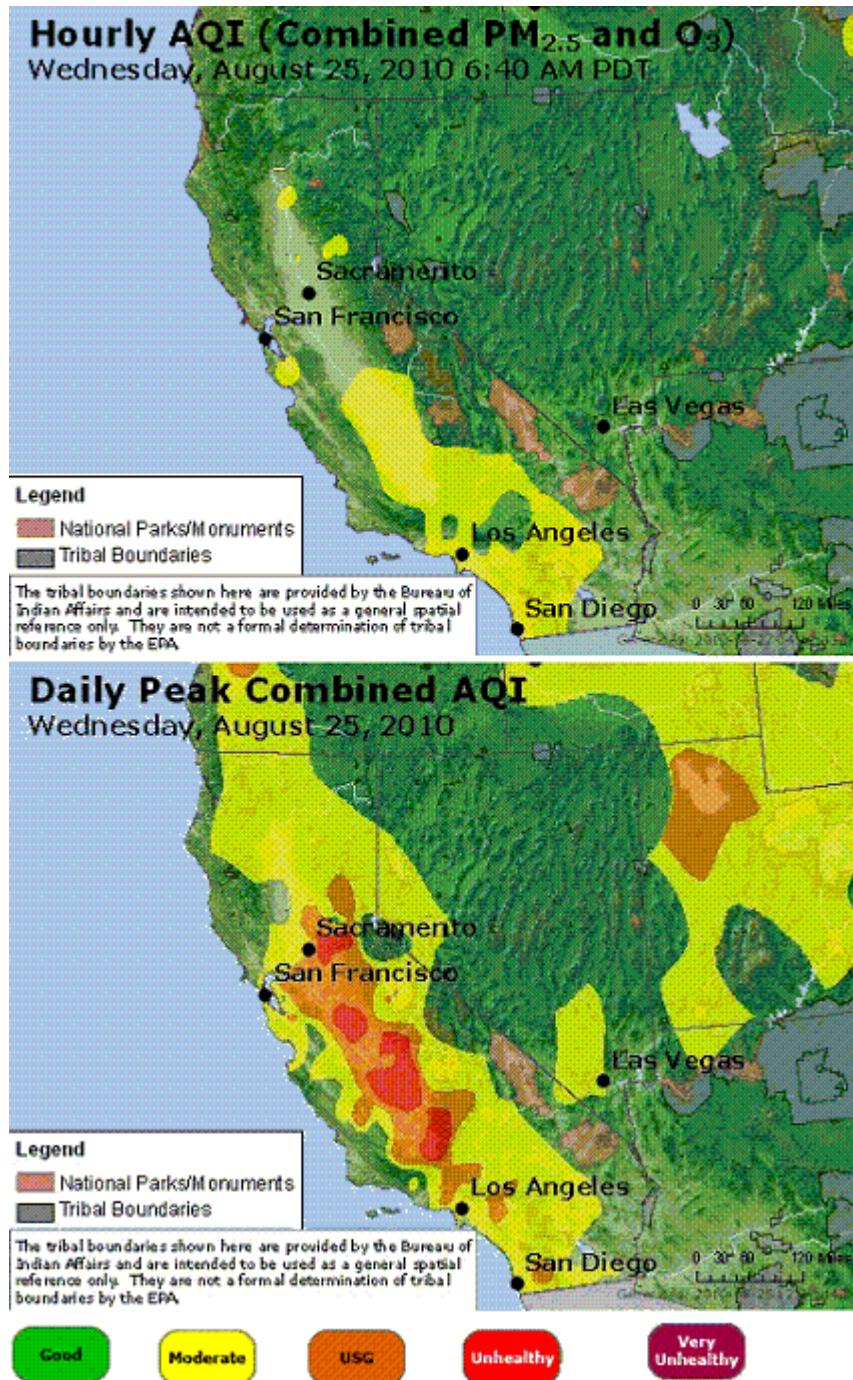
3. Use Figure 15-1. A daily measurement of toxic emissions in Maine measures 0.080 ppm. What amount of that would be attributed to heavy-duty vehicles?
 - a. 0.008 ppm
 - b. 0.011 ppm
 - c. 0.019 ppm
 - d. 0.035 ppm
 - e. 0.054 ppm
4. Which of the following practices would act to reduce vehicular exhaust in urban areas?
 - I. Establish “No Idling” zones
 - II. Require Enhanced Auto Inspections
 - III. Retrofit gasoline pumps with sleeves to collect VOC’s
 - a. I only
 - b. II only
 - c. II and III only
 - d. I and III only
 - e. I, II, and II
5. How does Chattanooga’s location make it more susceptible to pollution?
 - a. Its tropical location causes high temperatures, which increases air pollution.
 - b. Its coastal location exposes it to pollution from the sea.
 - c. Its extremely cold location means that the pollution from snow builds up over time.
 - d. Its location on a large, flat plain exposes it to the wind, which carries air pollution.
 - e. Its location in a bowl formed by mountains causes air pollution to get trapped.
6. Large urban areas that have problems associated with high levels of particulate pollution also have
 - I. Respiratory disease high above the national average
 - II. Limited visibility – Haze
 - III. Decreased water quality
 - a. I only
 - b. II only
 - c. I and II only
 - d. I and III only
 - e. I, II, and III
7. Early air pollution legislation in the United States sought to control all of the following EXCEPT
 - a. NO_x emissions
 - b. CO₂ emissions
 - c. open burning
 - d. sulfur content in fuel
 - e. emissions from industrial smokestacks
8. Possible economic benefits to legislation on air pollution would include all of the following EXCEPT
 - a. local businesses capitalize on new “clean” technologies
 - b. establishment of local manufacturers of “clean” technologies
 - c. creation of a municipal fleet of electric cars and buses
 - d. lowering the tax on a gallon of gasoline
 - e. population increase in local area

9. If a municipality wanted to take measures to decrease its air pollution, the largest impact would come from
 - a. switching its city fleets of vehicles to natural gas from gasoline
 - b. a voluntary recycling program
 - c. limiting the new businesses start-ups in the area
 - d. constructing new landfills
 - e. requiring specific materials be used in the manufacture of new homes
10. The members of a municipality involved in the air pollution issues of the urban area are
 - i. The local government
 - ii. The public
 - iii. The local industries
 - a. I only
 - b. III only
 - c. I and III only
 - d. I and II only
 - e. I, II and III
11. Ground level ozone is classified as a pollutant because it reduces lung functionality AND
 - a. its concentrations are low but the particle size is high
 - b. it occurs in the atmosphere only
 - c. it is entirely anthropogenic in nature
 - d. it can degrade plant surfaces
 - e. it is an unstable molecule
12. Which of the following correctly lists the 6 “criteria” air pollutants as specified under the Clean Air Act?
 - a. Pb, SO₂, NO_x, CO, PM, and tropospheric O₃
 - b. Tropospheric O₃, SO₂, NO_x, PM, Pb, and CO₂
 - c. SO₂, NO_x, Hg, Pb, PM, and O₃
 - d. SO₄, NO_x, CO, PM, Pb, and tropospheric O₃
 - e. SO₂, NO_x, CO, Hg, PM, and tropospheric O₃
13. 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
14. Which of the following is INCORRECT regarding SO₂?
 - a. It is a respiratory irritant
 - b. It can adversely affect plant tissues
 - c. It has only anthropogenic sources
 - d. It results from the combustion of coal and oil
 - e. It is a corrosive gas

15. Which of the following is INCORRECT regarding NO_x?
 - a. It occurs as NO₂ and NO gases
 - b. They occur as products of combustion in the atmosphere
 - c. Motor vehicles and fossil fuel combustion are the primary anthropogenic sources
 - d. They play a role in the production of stratospheric ozone
 - e. They play a role in the production of photochemical smog
16. Which of the following is INCORRECT regarding CO?
 - a. It is a product of respiration
 - b. It is an odorless, colorless gas
 - c. It is a product of incomplete combustion
 - d. It is a common vehicle emission
 - e. It can be a dangerous indoor pollutant
17. Which of the following is a secondary pollutant involved in photochemical smog?
 - a. Stratospheric O₃
 - b. Tropospheric O₃
 - c. CO
 - d. CO₂
 - e. SO₂
18. Which of the following pollutants bonds with hemoglobin thereby interfering with O₂ transport in the blood stream?
 - a. CO₂
 - b. CO
 - c. O₃
 - d. NO
 - e. PM
19. Which of the following is an anthropogenic source of nitrogen oxides?
 - a. Motor vehicles
 - b. Forest fires
 - c. Nitrogen fixation
 - d. Lightning
 - e. Planting of legumes by farmers
20. Which of the following pollutants would most adversely affect respiratory tracts?
 - a. Mercury
 - b. Lead
 - c. PM_{2.5}
 - d. PM₁₀
 - e. CO₂
21. Haze in the Amazon basin would most likely come from
 - a. slash and burn methodologies used to remove trees
 - b. microbial action in the river sediments
 - c. trade winds moving sea spray inland
 - d. cattle overgrazing the river basin
 - e. indigenous people's life styles

22. The smog that frequently exists in major metropolitan areas such as Los Angeles, CA is known as brown smog and consists primarily of what component?
 - a. fog
 - b. ozone
 - c. sulfate compounds
 - d. carbon particulate matter
 - e. smoke
23. Costs associated with atmospheric brown clouds such as those covering large areas in Asia include all of the following EXCEPT
 - a. fluctuating surface temperatures beneath the smog
 - b. light absorption causing reduced photosynthesis in plants
 - c. human respiratory problems
 - d. diminished allure of recreation areas
 - e. loss of tourism dollars
24. 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
25. Gasoline is a VOC. Which of the following is NOT a characteristic of gasoline that makes it a "VOC"?
 - a. gasoline evaporates at a typical atmospheric temperature
 - b. gasoline has a strong smell
 - c. gasoline is a hydrocarbon
 - d. gasoline is a hazardous compound
 - e. gasoline is an organic compound
26. Sulfates are considered secondary pollutants because
 - a. their emissions are difficult to regulate
 - b. they form more readily at night and in dry areas
 - c. they result from the transformation of primary pollutants
 - d. they originate from the burning of primarily coal
 - e. they are a component of grey smog

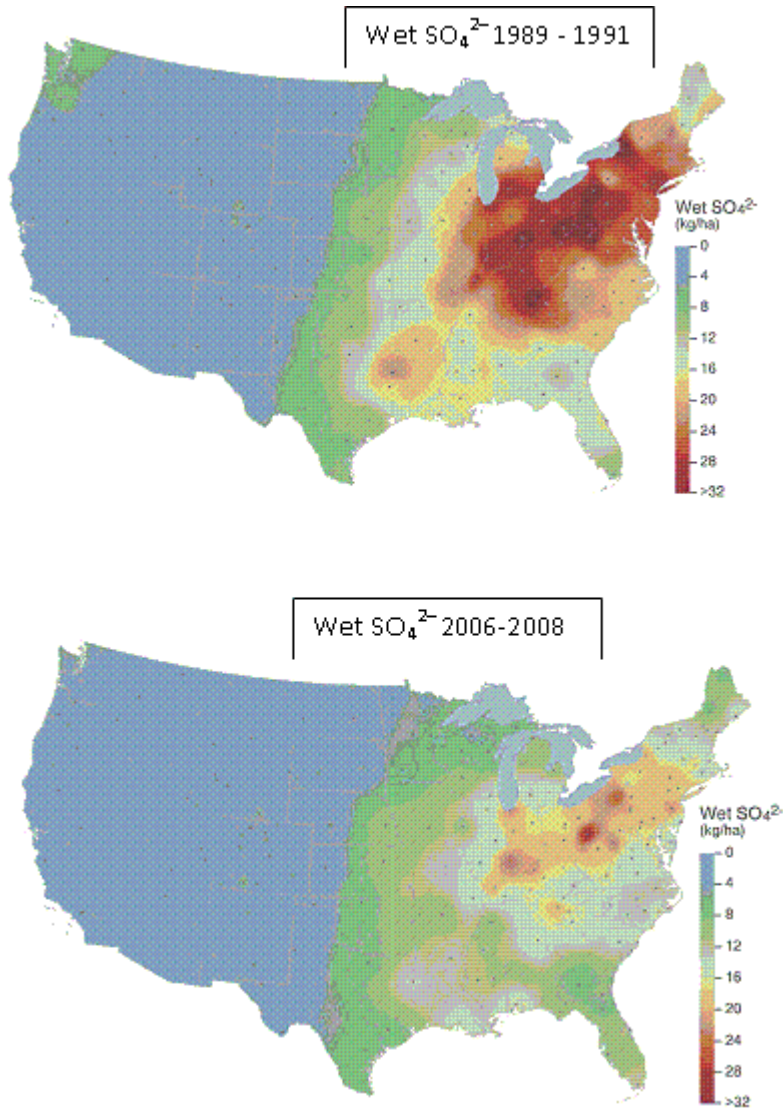
Figure 15-2



27. Use Figure 15-2. Which region shown on the maps appears to have the worst air quality?
- northern Nevada
 - southern Nevada
 - northern California
 - central California
 - Arizona

28. Use Figure 15-2. Which of the following statements about California air quality on Aug. 25, 2010, is correct?
- Every California city shown on the map had an unhealthy AQI at some point on that day.
 - In the early morning, most of California had an unhealthy AQI.
 - Most of the state never reached a Moderate AQI on that day.
 - The air quality between Sacramento and Los Angeles became much worse over the course of the day.
 - Air quality appears to be worst along the coast of the state.
29. A thermal inversion, which can lead to serious pollution events, occurs when
- warm air that normally rises, does so taking the pollutants with it
 - warm air that normally rises stays close to the surface holding pollutants close to the surface
 - cool air that normally rises, does so taking the pollutants with it
 - cool air stays close to the surface but pollutants rise into the atmosphere
 - cool air stays close to the surface and is blanketed by a layer of warm air that traps pollutants
30. Which of the following ranges correctly describes the pH of acid deposition?
- $\text{pH} < 5.6$
 - $7 > \text{pH} > 5.6$
 - $7 < \text{pH} > 5.6$
 - $\text{pH} < 8.6$
 - $7 < \text{pH} < 8.6$
31. The correct sequence of events for acid deposition are
- deposition of ions on vegetation or soil
 - secondary pollutants are formed
 - combustion releasing SO_2 and NO_x
 - dissociation of pollutants
- Z->X->Y->W
 - Y->X->Z->W
 - Y->Z->X->W
 - Y->W->X->Z
 - Z->Y->W->X
32. Which of the following is NOT a problem associated with acid deposition?
- compromised aquatic systems
 - lowered pH of lakes
 - negative effects on human skin with contact
 - erosion of buildings and monuments made of marble
 - erosion of paint on painted surfaces

Figure 15-3

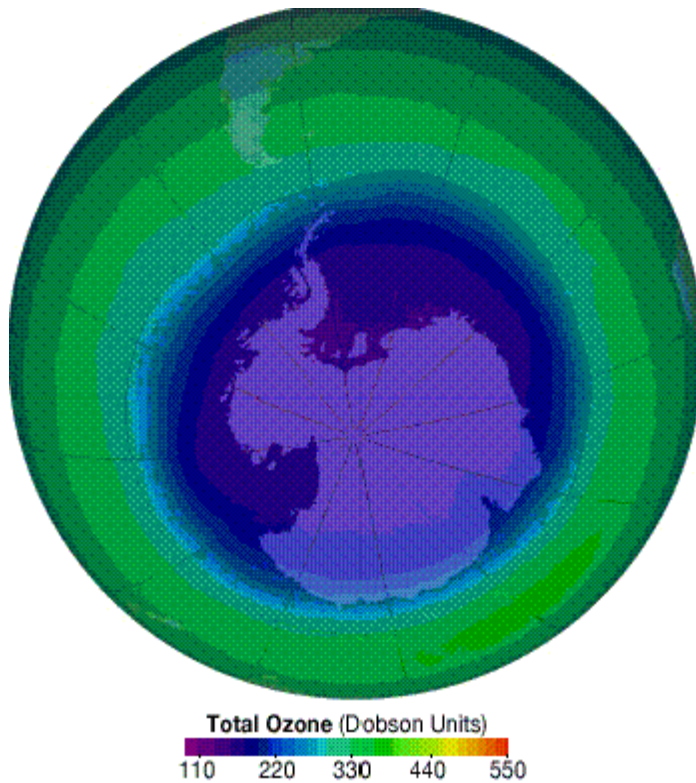


33. Use Figure 15-3. The change in acid deposition for the southern half of the state of Michigan from 1989-1991 to 2006-2008 is
- a decrease of approximately 5%
 - a decrease of approximately 50%
 - it has stayed relatively the same
 - an increase of approximately 1%
 - an increase of approximately 5%
34. Use Figure 15-3. Which piece of legislation is most likely to have caused the change over time shown in the figure?
- The Clean Air Act
 - The Clean Water Act
 - The NAAQS
 - The Montreal Protocol
 - The Kyoto Treaty

35. Catalytic converters in cars have been instrumental in removing which of the following pollutants from vehicle emissions?
- I. NO_x
 - II. CO
 - III. SO₄²⁻
- a. I only
 - b. II only
 - c. I and II only
 - d. I and III only
 - e. I, II, and III
36. Which of the following pollution control measures reduces nitrogen oxide emissions from the burning of coal?
- a. Electrostatic precipitators
 - b. Fabric filters
 - c. Scrubbers
 - d. Lowering coal burning temperatures
 - e. Fluidized bed combustion
37. In order to control tropospheric ozone it is necessary to limit
- I. VOC emissions
 - II. NO_x emissions
 - III. CO emissions
- a. I only
 - b. II only
 - c. III only
 - d. I and II only
 - e. I, II, and III
38. Aspects of sulfur allowances as provided for in the Acid Rain Program of the Clean Air Act include all of the following EXCEPT:
- a. a cost overrun for the entire program
 - b. an overall reduction in sulfur emissions in the United States
 - c. companies can emit amounts of sulfur proportional to the amounts they emitted prior to 1990
 - d. companies can sell sulfur allowances that they do not use to other companies
 - e. companies that emit quantities of sulfur above which they have allowances for must pay a fine.
39. The Clean Skies Initiative proposed a SO₂ emissions reduction from 11 million tons in 2002 to 4.5 million tons in 2010. What was the proposed total percentage decrease of SO₂ emissions?
- a. 6.5%
 - b. 41%
 - c. 47%
 - d. 59%
 - e. 65%

40. The Clean Skies Initiative proposed a SO₂ emissions reduction from 11 million tons in 2002 to 4.5 million tons in 2010. What was the proposed annual reduction of emissions, assuming that emissions are reduced at a constant rate?
- 6.5 million tons per year
 - 4.5 million tons per year
 - 1.2 million tons per year
 - 0.8 million tons per year
 - 0.3 million tons per year
41. In order to reduce the amount of ground-level pollutants (e.g. VOCs, NO_x, CO and tropospheric ozone), municipalities around the globe have instituted all of the following EXCEPT
- installing scrubbers on automobiles
 - permitting automobiles to be driven only every other day
 - expanding public transportation networks,
 - carpool/high occupancy vehicle lanes on interstates
 - charging user fees to use certain roads at certain times
42. The class of anthropogenic compounds responsible for the breakdown of stratospheric ozone are known as
- VOCs
 - CFCs
 - VFCs
 - CO_x
 - FCCs
43. The protective layer of oxygen and stratospheric ozone absorb over 99% of incoming
- solar radiation
 - UV radiation
 - UV-A and UV-B radiation
 - UV-B and UV-C radiation
 - UV-A and UV-C radiation
44. All of the following describe the production of stratospheric ozone EXCEPT
- it is a closed loop cycle
 - it is formed from the reaction of O with O₂ in the presence of ultraviolet radiation
 - it is formed from the reaction of C with O₂ in the presence of NO_x
 - without interference, there is a steady state of ozone being created and destroyed
 - the ozone absorbs UV-B and decomposes into O₂ and O
45. Which of the following is correct with regard to the effects of CFCs on ozone production?
- UV radiation frees a chlorine atom, which breaks down ozone.
 - Infrared radiation frees a chlorine atom, which breaks down ozone.
 - UV radiation frees a fluorine atom, which breaks down ozone.
 - Infrared radiation frees a chlorine atom, which breaks down ozone.
 - UV radiation frees a carbon atom, which breaks down ozone.
46. 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 15-4



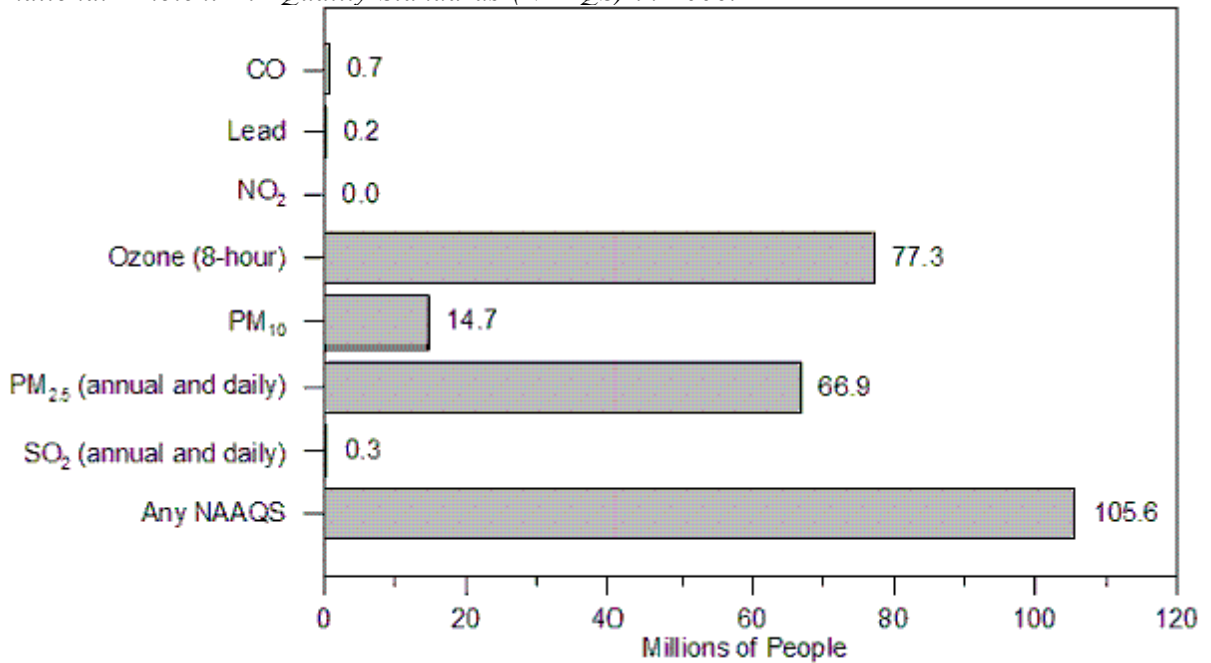
47. Use Figure 15-4. The “hole” in the ozone layer is
- greatest over the South Pole
 - greatest over the southern hemisphere
 - greatest over the Pacific Ocean
 - greatest over the Atlantic Ocean
 - consistent around the globe
48. Use Figure 15-4. The ozone layer is approximately ____ over Antarctica than it is over the surrounding areas.
- 3 times as concentrated
 - 2 times as concentrated
 - 4/5 as concentrated
 - 1/2 as concentrated
 - 1/10 as concentrated
49. Problems associated with the thinning ozone layer include all of the following EXCEPT
- increased incidences of asthma
 - increased incidences of skin cancer
 - increased incidences of cataracts
 - reduction in photosynthetic activity in plants
 - suppressed immune system

50. The agreement that allowed for a reduction, and eventual elimination, of CFC production and use is
- The Montreal Protocol
 - The Quebec Protocol
 - The Kyoto Protocol
 - The Clean Skies Initiative
 - The Clean Air Act
51. Which of the following does NOT hold true regarding indoor air pollution?
- Indoor air pollution causes more deaths than outdoor air pollution
 - Indoor air pollution is only a health risk in developing countries
 - CO is an indoor air pollutant
 - Respiratory problems are the primary health issue
 - VOCs are indoor air pollutants
52. Which of the following best describes the indoor air pollutant asbestos?
- a radioactive compound that can lead to lung cancer
 - a VOC found in furniture and carpets
 - a fibrous mineral that can cause respiratory diseases
 - a metal that can cause brain damage in children
 - it is routinely found in homes in developing countries
53. All of the following describe radon-222 EXCEPT
- it is a radioactive gas resulting from the natural decay of uranium
 - it seeps into homes through cracks in the foundation or soil
 - the effects can be reduced by simply increasing ventilation
 - it binds with hemoglobin in the blood and can lead to death
 - it exists in the igneous rock granite all around the world
54. The VOC that is common in particle board and carpeting glue and is dangerous to human health is/are
- hydrocarbons
 - formaldehyde
 - Radon-222
 - Asbestos
 - CFC's
55. A phenomenon associated with the buildup of toxic compounds and pollutants in an airtight space is known as
- sealed building syndrome
 - synthetic building syndrome
 - sick building syndrome
 - sick worker syndrome
 - insulated building sick worker syndrome
56. The major source of indoor air pollution in developing countries is
- using synthetic materials in construction of buildings
 - indoor cooking with biomass as a fuel
 - release of Radon-222 gas
 - using lead based paints on furniture and walls
 - smoking cigarettes

57. Specific reasons for sick building syndrome as identified by the EPA include all of the following except
- copy machines
 - mold and pollen
 - VOCs from carpet and furniture
 - faulty ventilation
 - CFCs
58. The compound that is the leading cause of ozone depletion is
- CO
 - CO₂
 - CFCs
 - NO_x
 - VOCs
59. The beneficial ozone is ____ and the dangerous ozone is ____.
- O₂, O₃
 - O₃, O₂
 - O₃, CFC
 - Tropospheric, stratospheric
 - Stratospheric, tropospheric

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.



60. Use Figure 15-5. The largest number of people affected by an air quality concentration above the standard (NAAQS) level in 2006 were affected by
- O₃
 - PM₁₀
 - CO
 - PM_{2.5}
 - SO₂
61. 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%
62. 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 PM_{2.5} levels exceeded the NAAQS?
- 67%
 - 35%
 - 22%
 - 15%
 - 5%

63. 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 any NAAQS was exceeded?
- a. 53%
 - b. 35%
 - c. 26%
 - d. 12%
 - e. 2%
64. Which type of pollution control is most difficult?
- a. choosing a fuel with fewer impurities
 - b. including catalytic converter on new automobiles
 - c. removing pollutants after they have been dispersed over a wide area
 - d. burning fuel at lower temperatures
 - e. reducing pollutants after combustion but before release into the atmosphere
65. Which harmful substance was once commonly used as insulation?
- a. asbestos
 - b. mercury
 - c. lead
 - d. radon
 - e. ozone