**Practice Questions – Chapter 1**

**Environmental Problems, Their Causes, and Sustainability**

1. Describe what is meant by the phrase “*an environmentally sustainable society*” as related to the human population.

2. Distinguish between (a) natural capital (b) natural resources (c) natural services (d) solar capital (e) natural capital degradation.

3. What is the difference between *economic growth* and *economic development*?

Describe **two** basic ways that economic growth can be accomplished.

4. Distinguish between *developed countries* and *developing countries*. Give **three** key characteristics of each one.

5. Define and give **three** examples of environmental degradation.

6. What is an “*ecological footprint*”? Using specific countries as examples, explain the difference between the footprint of a developing and developed country.

7. What is “*culture”*? Describe **three** major cultural changes that have occurred since humans arrived on earth. Why has each change led to more environmental degradation? What is the *environmental* or *sustainability revolution*?

8. Identify **five** basic causes of the environmental problems we face today.

9. What is “*poverty”*? In what way do (a) poverty or (b) affluence affect the environment. Explain the problems w efface by not including the harmful environmental costs in the prices of goods and services.

10. Distinguish between *planetary management*, *stewardship*, and an *environmental world view*.

**Define Vocabulary Words**

Exponential growth

Environment

Environmental Science

Environmentalism

Sustainability

Gross Domestic Product (GDP)

Per capita GDP

Per capita GDP PPP

Resource

Conservation

Renewable resource

Non-renewable resource

Sustainable yield

Point sources

Non- point sources

**Practice Questions – Chapter 2**

**Science, Matter, Energy, and Systems**

1. Distinguish between *inductive reasoning* and *deductive reasoning*. Give an example of each. Explain why scientific theories and laws are the most important results of science.

2. What is *energy?* What is *energy quality*? Distinguish between *high quality energy* and *low quality energy*. Give an example of each.

3. What is the *2nd Law of Conservation of Energy (1st Law)* and why is it

important in relation to environmental science?

4. What is the *Law of Thermodynamics*? Explain why this law means that we can

never reduce or recycle high quality energy.

5. What is a *feedback loop*? Distinguish between a *positive feedback loop* and a

*negative feedback loop* and give an example of each.

6. What is the difference between a *time delay* and a *synergistic interaction in a*

*system* and give an example of each.

**Define Vocabulary Words**

Model

Peer review

Paradigm shift

Frontier Science

Natural Radioactive Decay

Nuclear fusion

Nuclear fission

Radioisotope

Chain reaction

Tipping point

**Practice Questions – Chapter 3**

**Ecosystems: What are they and how do they work?**

1. Distinguish between *terrestrial biomes* and *aquatic life zones* and give an

example of each. What **three** interconnected factors sustain life on earth?

2. Describe with a diagram, what happens to solar energy as it flows to and fro

from earth. What is the *natural greenhouse effect* and why is it important for

life on earth?

3. Distinguish between *abiotic* and *biotic* components in ecosystems and give

**two** examples of each. What is the *range of tolerance* for a specific abioic

factor- name and describe? Define and give an example of a *limiting factor*.

What is the *limiting factor principle*?

4. What **two** processes sustain ecosystems and the biosphere. How are they

linked? Explain the importance of microbes.

5. What happens to energy as it flows through the food chain and food webs of

an ecosystem.

6. Discuss the difference between *gross primary productivity (GPP)* and *net*

*primary productivity (NPP*) and explain their importance.

7. What is a *biogeochemical cycle* (nutrient cycle)? Describe the unique

properties of the *hydrologic cycle*.

8. Describe the (a) carbon (b)nitrogen (c) phosphorous and (d) sulfur cycles and

describe how human activities are affecting each cycle.

**Define Vocabulary Words**

Genetic diversity

Habitat

Ecosystem

Biosphere

Troposphere

Stratosphere

Hydrosphere

Geosphere

Trophic level

Autrotrophs

Heterotrophs

Decomposers

Detritivores

Biomass

Ecological efficiency

Pyramid of energy flow

Biogeochemical cycles

**Practice Questions – Chapter 4**

**Biodiversity and Evolution**

1. What are the **four** major components of *biological diversity*? What is the

importance of biodiversity?

2. What is an *endemic species*? Why is it vulnerable to extinction? Distinguish

between *mass extinction* and *background extinction*.

3. What is *species diversity*? Distinguish between *species richness* and species

diversity and give an example of each.

4. Describe the “Theory of Island Biogeography”. Illustrate your answer.

5. What is an “ecological niche”? Distinguish between *generalist species* and

*specialist species* and give an example of each.

6. What are the reasons that the amphibians are vanishing? List some reasons

why we should protect them.

7. Describe the role of a beaver as a foundation species.

8. Give **three** reasons why we should protect sharks from being driven to

extinction.

**Define Vocabulary Words**

Biological evolution

Natural selection

Adaptive trait

Differential reproduction

Speciation

Geographic isolation

Reproductive isolation

Genetic engineering

Native species

Non-native species

Indicator species

Keystone species

Foundation species

**Practice Questions – Chapter 5**

**Biodiversity, Species Interactions, and Population Control**

**1.** Describe and give an example of *resource partitioning* and explain how it can

increase *species diversity*.

**2.** What is *population dynamics*? Why do most populations live in clumps?

**3.** Describe **four** variables that govern changes in population size and write an

equation showing how they interact.

**4.** Distinguish between *r-selected* and *k-selected* species and give an example of

each type. Define population density and explain why it can affect the size of

some but not all populations.

**5.** What is *ecological succession*? Distinguish between *primary ecological*

*succession* and *secondary ecological succession* and give an example of each.

Explain why succession does not follow a predictable path.

**6.** Define *carrying capacity (k) .* What two fundamental characteristics reflect

(k). What occurs if/when a population exceeds carrying capacity (k). Explain

why there is a *lag time* between the *overshoot* of carrying capacity and the

*population dieback*.

**7.** Describe each of the following species interactions and give an example of

each : (a) interspecific competition (b) intraspecific competition (c) predation

(d) territoriality (e) symbiosis.

**Define Vocabulary Words**

Species diversity

Mutualism

Habitat islands

Pioneer species

Mimicry

Lichens

Coevolution

Biotic potential

Intrinsic rate of increase

Exponential growth

Environmental resistance

Logistic growth

Parasitism

Commensalism

Climax community

**Practice Questions – Chapter 6**

**The Human Population and it’s Impact**

1. Define crude birth rate, crude death rate, emigration rate and immigration rate.

Write an *equation* to mathematically describe the relationship between these

rates and the rate of population change. What five countries had the largest

numbers of people in 2008?

2. What is *fertility rate?* Distinguish between *replacement level fertility (RLF)*

and *total fertility rate (TFR*). Explain why reaching the replacement level

fertility will not stoop global population growth until about 50 years have

passed (assuming that death rates do not rise).

3. Describe *population growth* in the United States and explain why it is high

compared to those of most other developed countries and China. Is the United

States overpopulated? Explain.

4. List **five** factors that can affect the birth rate and fertility rate of a country.

Distinguish between *life expectancy* and *infant mortality rate* and explain how

they affect the population size of a country.

5. Using *population age structure diagrams*, explain how the age structure of a

country creates *population growth momentum*. How does it affect economic

growth?

6. What is the *demographic transition model* ? Describe the **four** stages. List

social, political and economic issues that can be addressed to help developing

countries undergo a demographic transition.

7. What is *family planning*? Describe the roles family planning, reducing

poverty, and elevating the status of women in slowing population growth.

8. Describe China’s and India’s efforts to control their population growth.

**Vocabulary Words**

Age structure

Infant mortality rate

Population density

Life expectancy

Zero population growth

Population change

**Practice Questions – Chapter 7**

**Climate and Terrestrial Biodiversity**

1. Describe **three** major factors that determine how air circulates in the

lower atmosphere.

2. Describe how the properties of air, water, and land affect global air

circulation. How is heat distributed to different parts of the ocean?

3. How does *global air circulation* and ocean currents lead to the

formation of forests, grasslands and deserts that make up the earth’s

terrestrial biomes.

4. Describe the general effects of the following microclimates:

(a*)rain shadow effect* – how does it lead to the formation of inland

deserts

(b)*cities* – why do they have more haze and smog, higher temperatures

and lower wind speeds than the surrounding country side.

5. Compare the biodiversity and stratification in three major types of

forests : (a)tropical (b) deciduous (c) evergreen.

5. Describe how the **three** major types of grasslands differ in their climate

and vegetation. Why have many of the world’s temperate grasslands

disappeared ?

7 Describe how the **three** major types of deserts differ in their climate and

vegetation. How do plants and animals survive?

8 Describe **two** ways in which human activities have affected the world’s

(a)deserts (b) grasslands (c) forests and (d) mountains.

**Vocabulary Words**

Climate

Weather

Cells

Prevailing winds

Greenhouse effect

Biomes

Permafrost

**Practice Questions – Chapter 8**

**Aquatic Biodiversity**

1. What is an aquatic life zone? Distinguish between a *salt water (marine)*

life zone and a *fresh water* life zone. What major types of organisms live

at the top, middle and bottom layers in each of these zones.

2. Define “*plankton*” and describe **three** types of plankton. Distinguish

among *nekton*, *benthos*, and *decomposers* and give an example of each.

3. What are the three major life zones in the ocean? Explain why “*coasta*l”

zones are the high *Net Primary Productivity - NPP* areas? (address what

factors contribute to this high NPP characteristic)

4. Distinguish between an *estuary* and a *coastal wetland* and explain why

they have high net primary productivity. What factors contribute to the

temperature and salinity in an estuary.

5. What is a *mangrove forest*? What is it’s economic and ecological

importance?

6. Describe (a) **three** economic and (b) **three** ecological services provided by

coral reefs.

7. Describe **three** major threats to the world’s coral reefs. How much of this

is anthropogenic impact? (discuss coral bleaching)

8. What is a *lake*? What **four** zones are found in most lakes? What is

“cultural eutrophication” ? What are the **two** major causes of cultural

eutrophication?

9. What is a”*watershed*”? Describe the **three** zones that a stream passes

through as it flows from the mountains to the sea.

10. Give **three** examples of *inland wetlands* and explain (a) the ecological and

(b) the economic importance of such wetlands.

11. Describe **three** ways in which humans are disrupting and degrading fresh

water systems.

**Vocabulary Words**

Euphotic zone

Abyssal Zone

Bathyal zone

Oligotrophic lake

Euphotic lake

Hypereutrophic lake

Mesotrophic lake

Intertidal zone

Coastal Zone

Open sea

Surface water

Run off

Watershed

**Practice Questions – Chapter 9**

**Sustaining Biodiversity : The Species Approach**

1. Distinguish between *background extinction* and *mass extinction*. Describe

how scientists estimate extinction rates.

2. Give **four** reasons why many extinction experts believe that human activities

are not causing a **sixth** mass extinction.

3. What is the difference between *threatened* and *endangered* species. List five

characteristics that make species extinction prone.

4. What is *HIPPCO*? In order, what are the **six** largest causes of premature

extinction of a species resulting from anthropogenic activities.

5. Why are *island species* specially vulnerable to extinction?

6. What is *habitat fragmentation* and how does it threaten many species?

7. Describe the *poaching* of wild species and give **three** examples of species that

are threatened by this activity. Describe the threat to some forms of wild life

from increased hunting for “*bush meat*”.

8. Describe **two** *international treaties* that are used to help protect species.

Describe the *US Endangered Species Act*. How successful has it been ? What

is the controversy surrounding this act.

9. Describe the roles of *wild life refugees*, *gene banks, botanical gardens, wild*

*life farms*, *zoos* and *aquariums* in protecting some species. Give specific

examples as you explain these various methods.

10. Give two (each category) examples of *non-native* species that have been

introduced (a) *deliberately* and (b) *accidentally*. List **three** ways to limit the

impacts of non-native species.

11. Describe what is happening in the following scenarios:

(a) *honey bees in the US* – address their ecological and economical roles

(b) *polar bears* – global warming

(c) the *biomagnification of pesticides in the food web*

**Vocabulary Words**

Local extinction

Ecological extinction

Biological extinction

Instrumental value

Intrinsic value

Biophilia

Environmental indicators

Gene banks

Egg pulling

Captive breeding

Precautionary Principle

**Practice Questions – Chapter 10**

**Sustaining Terrestrial Biodiversity**

1. What (a) **three** major ecological and (b) t**hree** economic benefits do forests

provide.

2. What are **four** ways to reduce the harmful impacts of diseases and insects on

forests?

3. Describe what effects projected global warming might have on forests.

4. What parts of the world are experiencing the greatest forest losses? Define

“*deforestation*” and list **three** of its major harmful environmental effects.

5. List **three** factors underlying causes of tropical deforestation. List **three**

human activities which actually destroy the tropical forests.

6. Describe the *“Green Belt Movement”*. What are **four** ways to protect tropical

forests and use them more sustainably?

7. What are **two** types of forest fires? What are **three** ecological benefits of

occasional surface fires?

8. What are **three** ways to reduce the harm to forests and people from forest

fires.

9. Distinguish between *overgrazing* and *undergrazing* of rangelands. What are

**three** ways to reduce overgrazing and use rangelands more sustainably?

10. What major *environmental threats* affect national parks? How could national

parks in the US be used more sustainably?

11. What is *wilderness* and why is it important? Describe what Costa Rica has

done to establish *nature reserves*. How has a tropical dry forest been restored

in Costa Rica?

12. What is a “*biological hotspot*” and why is it important to protect areas where

deteriorating ecosystem services threaten the heath and well being of life

forms?

13. What is “*ecological restoration*”? What are the **four** parts of a strategy for

carrying out *restoration* and *rehabilitation* in an area?

14. Describe **three** examples of *reconciliation ecology*.

**Vocabulary Words**

Selective cutting

Clear cutting

Strip cutting

Rangelands

Pastures

Wilderness

Prescribed fires

Healthy Forest Restoration

Restoration

Rehabilitation

Replacement

**Practice Question – Chapter 11**

**Sustaining Aquatic Biodiversity**

1. Why is marine biodiversity higher (a) *near coasts* than in the *open sea* and (b)

on the ocean’s bottom than at the surface?

2. Describe the effects of (a) trawler fishing (b) purse seine fishing (c) long –

lining (d) drift – net fishing (e) invasive species and (f) climate change.

3. What *laws and treaties* have been used to help sustain aquatic species?

Describe *international efforts* to protect whales from overfishing and

premature extinction.

4. Describe and discuss the limitations of **three** ways to estimate the sizes of fish

populations. How can the *precautionary principle* help in managing fisheries

and large marine systems?

5. Describe how consumers can help to sustain fisheries, aquatic biodiversity and

ecosystems by making careful choices in purchasing seafood.

**Vocabulary Words**

By catch

High seas

Marine protected areas

Integrated coastal management

Maximum sustained yield (MSY)

Optimum sustained yield (OSY)

Precautionary principle for managing fisheries

**Practice Questions – Chapter 12**

**Food, Soil and Pest Management**

1. Which **three** systems supply most of the world’s food? Compare the energy sources,

environmental impacts, yields and sustainability of traditional and industrial

agriculture.

2. Summarize “*food distribution*” problems. Discuss the possibility of increasing world

food production by (a)increasing crop yields (b) cultivating more land (c) choosing

unconventional and (d) perennial crops. Explain, using examples to support your

answer.

3. Describe **three** environmental impacts from agriculture.

4. Describe **two** advantages and **two** disadvantages of *genetically engineered foods*.

5. Define *sustainable agriculture*. Summarize how the US could move toward creating

a more sustainable agriculture system.

6. Describe **three** advantages and **three** disadvantages of industrialized food

productions. What are **three** ways that we can produce meat more humanly,

efficiently and sustainably?

7. What is *aquaculture*? Describe **two** advantages and **two** disadvantages of the process.

8. What is a *pest*? List **five** pesticides and what are they treating?

9. Describe **three** advantages and **thre**e disadvantages of *modern pesticides*. What are

**two** *laws and treaties* that help protect us from the harmful effects of pesticides?

10. Describe **seven** alternatives to conventional pesticides.

11. Define “*integrated pest management*” and discuss **three** advantages.

12. What is *“soil conservation*”? Describe it in relation to the United States.

13. What is *“ soil erosion*” ? Describe **five** ways to reduce soil erosion.

14. What is “*soil salinization*”? Describe ways to clean it up.

15. Compare the following as ways to restore soil fertility. List both advantages and

disadvantages :

Organic fertilizer

Commercial inorganic fertilizer

Animal manure

Green manure

Compost

16. What is *organic agriculture*? Describe it’s advantages over conventional agriculture.

**Vocabulary Words**

Food security, Food insecurity, Under nutrition, Malnutrition

Famine, Over nutrition, Industrialized agriculture,

Subsistence Agriculture, Intensive agriculture, Polyculture, Slash and Burn

Green Revolution, Fishery, Aquaculture, Desertification,

Salinization, Water logging

**Practice Questions – Chapter 13**

**Water Resources**

1. What percentage of the earth’s fresh water is available to us? How is most of

the world’s fresh water used? Describe the availability and use of fresh water

resources in the United States.

2. How many people in the world lack regular access to (a) safe drinking water

and (b) do not have access to basic sanitation?

3. What is *drought*? What are (a) **three** causes and (b) **three** harmful effect of

drought?

4. What are (a) **three** advantages and (b) **three** disadvantages of withdrawing

ground water?

5. Describe the problem of *ground water depletion* in the (a) United States

(Ogallala) and (b) the world (use specific example – Aral Sea). Describe

**three** ways that slow groundwater depletion may be presented.

6. What is a *dam*? What is a *reservoir*? What **three** (a) advantages and (b) three

disadvantages of large dams?

7. Describe the *Three Gorges Dam*? What are (a) **three** advantages and (b)

**three** disadvantages associated with the building of this dam?

8. Define *desalinization* and distinguish between distillation and reverse

osmosis as methods for distilling water. What are limitations of this process

and how might they be overcome?

9. Describe the **four** irrigation methods. List and describe ways to reduce water

waste in (a) developed and (b) developing countries.

10. List **seven** ways to reduce domestic water waste. Which **three** can you use to

reduce your water wastage?

11. What is a *flood plain*? Why do people like to live thee?

12. Describe **three** human activities that increase the possibility of flooding.

List **three (**a) advantages and (b) **three** disadvantages of floods.

**Vocabulary Words**

Groundwater

Zone of saturation

Water table

Aquifers

Natural recharge

Lateral recharge

Surface water

Surface runoff

Watershed

Drought

Sink holes

Land subsidence

Reservoir

California Water Project

**Practice Questions – Chapter 14**

**Geology and Nonrenewable minerals**

1. Briefly describe the layers of the Earth’s interior. Illustrate with a drawing.

2. Define *minera*l, *rock, sedimentary rock, igneous rock,* and *metamorphic*

*rock.* Describe the *rock cycle*. Why is it important?

3. Describe how *earthquakes* are caused. What are the **three** different kinds?

How is the severity measured? Describe **three** ways that the losses may be

reduced.

4. What is a *tsunami*? How is it caused? Describe **three** effects that they may

cause.

5. Describe the nature and effects of a *volcanic eruption*.

6. List **three** types of mineral resources and give **one** example of each.

Distinguish between *high grade and low grade ore*.

7. Describe the major harmful effects of (a)extracting, (b)processing and (c)

using nonrenewable mineral resources.

8. Describe **three** harmful effects of mining.

9. What is *smelting* and what **are three** harmful environmental effects?

10. What **five** nations supply most of the world’s nonrenewable mineral

resources? How dependent is the United States on other countries for

important nonrenewable mineral resources?

11. What is a *depletion curve*? Describe **three** types of depletion curves for a

mineral resource.

12. Describe the advantages and disadvantages of the *nanotechnology*

*revolution.* What are **five** possible options when a mineral becomes

*economically depleted*?

13. Describe the opportunities of increasing mineral supplies by mining

lower-grade ores. What are **two** advantages and **two** disadvantages of

*biomining*?

14. Describe the *opportunities* and *limitations* of getting minerals from the

ocean.

**Vocabulary Words**

Tectonic plates

Lithosphere

Weathering

Reserves

Surface mining

Subsurface mining

Overburden Spoils

Open pit mining

Strip mining

Contour strip mining

Area strip mining

 Mountain top removal

**Practice Questions – Chapter 15**

**Nonrenewable energy**

1. What major energy resources do the world and the United States rely on?

What is “*net energy*” and why is it important in evaluating energy

resources?

2. What is crude *oil (petroleum)* and how is it extracted from the earth and

redefined? What is *a petrochemical* and why are such chemicals

important?

3. Who controls most of the world’s oil supply? How much of the world’s

annual oil production does the United States use and what percentage of

the oil it uses is imported?

4. What are **three** major advantages and disadvantages of using

conventional oil as an energy resource?

5. Discuss **two** pros and **two** cons of drilling for oil in Alaska’s Arctic

National Wildlife Refuge.

6. What is *oil sand* or *tar sand* and how is it extracted and converted to

heavy oil? What is *shale oil* and how is it produced? What are **two**

major advantages and **two** major disadvantages of using *heavy oils*

produced from oil sand and oil shales as energy resources?

7. What is the difference between *natural gas*, *liquefied petroleum gas*

*(LPG*) and *liquefied natural gas (LNG*)? What are **three** major

disadvantages and advantages of using natural gas as an energy resource?

What are some problems involved with increasing our use of LNG?

8. What is *coal*? How is it formed? Which kind of coal is most preferred for

burning? List **two** advantages and **two** disadvantages of using coal as a

fuel source.

9. How does a *nuclear fission reactor* work and what are it’s major safety

features? What factors have hindered the development of nuclear power?

What are **two** advantages and **two** disadvantages of relying on nuclear

power as a way to produce electricity?

10. How can we deal with the *highly radioactive wastes* produced by nuclear

power plants? What are our options for safely retiring worn out nuclear

plants?

11. Discuss the question of whether using nuclear power can help to

significantly slow projected global warming. Discuss **two** pros and **two**

cons of building safe nuclear reactors.

**12.** What is *nuclear fusion*? What is it’s potential as an energy resource?

**Vocabulary Words**

Net Energy

Coal liquefaction

Kerogen

Coal Gassification

Synthetic natural gas (SNG)

**Practice Questions – Chapter 16**

**Energy Efficiency and Renewable Energy**

1. Distinguish between energy conversion and energy efficiency. How much of the

energy used in the United States is wasted unnecessarily? What are three major

advantages of reducing energy waste? List three reasons why this source of energy

has been neglected?

2. Describe three ways to save energy and money in (a) industry, (b) transportation (c)

buildings.

3. What is cogeneration (combined heat and power or CHP)? Describe the trends in fuel

efficiency in the United States since the 1970’s. Explain why the price of gasoline is

much higher than what consumers pay at the pump.

4. Distinguish among hybrid, plug-in hybrid, and fuel cell motor vehicles.

5. List five advantages of relying more on a variety of renewable sources of energy and

describe two factors holding back such a transition.

6. Distinguish between passive solar heating and active solar heating and discuss two

advantages and two disadvantages of such systems.

7. What are three advantages and three disadvantages of using flowing water to produce

electricity in hydropower plants? What is the potential for using tides and waves to

produce electricity?

8. What are three advantages and three disadvantages of using wind to produce

electricity?

9. What are biofuels? What are three advantages and three disadvantages of using (a)

biodiesel and (b) ethanol to power motor vehicles? Evaluate the use of (a)corn

(b)sugarcane (c) cellulose plants to produce ethanol.

10. What are three sources of geothermal energy? What are two major advantages and

two major disadvantages of using geothermal energy as a source of heat and to

produce electricity?

11. List three general conclusions of energy experts about possible future energy paths

for the world. List five major strategies for making the transition to a more

sustainable energy future.

12. Describe three roles that governments play in determining which energy resources we

use. Describe what the state of California has done to improve energy efficiency and

rely more on various forms of renewable energy.

**Vocabulary Words**

Green architecture

Superinsulated

Straw bale house

Heliostats

Crop residues

Bagasse

Hydrothermal reservoirs

**Practice Questions – Chapter 17**

**Environmental Hazards and Human Health**

1. Give an example of a risk from each of the following: (a) *biological hazards*

(b) *chemical hazards* (c*) physical hazards* (d) *cultural hazards* and (e) *life*

*style choices*.

2. In terms of *death rates*, what are the world’s **four** most serious diseases?

Distinguish between an *epidemic* and a *pandemic*? Describe the threat from

flu and the effects of a global flu pandemic.

3. Describe the global threat from *tuberculosis*. What are **two** causes and **two**

possible solutions for the increasing *genetic resistance in microbes* to

commonly used antibiotics?

4. Describe the health threats from the global *HIV/AIDS* pandemic and **six** ways

to reduce this threat.

5. Describe the threats from (a) *hepatitis B* (b) *West Nile* (c) *SARS* viruses.

6. Describe the threat from *malaria* for 40% of the world’s people. How can we

reduce this threat?

7. Give **three** examples of problems being studied in the new field of ecological

*medicine.* What is *Lyme disease* and how can individuals reduce their chance

of getting it?

8. List **five** ways to reduce the global threat from *infectious diseases*.

9. What is a *toxic chemical*? Describe the toxic legacy from *PCB’s*. Describe the

toxic effects of various forms of *mercury* and ways to reduce these threats.

10. Give an example of a particular chemical that can affect the (a) immune (b)

nervous and (c) endocrine system.

11. Describe how the toxicity of an animal can be estimated by using lab animals,

and discuss the limitations of this approach.

12. What are *hormonally active agents*? What risks do they pose? How can we

reduce these risks? What is the potential threat from *bisphenol A* ?

**Vocabulary Words**

Risk Dose

Risk assessment Response

Risk management Dose response curve

Pathogen Risk analysis

Non transmissible disease LD 50

Infectious disease Synergistic reaction

Transmissible disease Epidemiology

Mutagens

Teratogens

Carcinogens

Toxicology

Toxicity

**Practice Questions – Chapter 18**

**Air Pollution**

1. Describe **three** significant differences between the “*troposphere*” and the

“*stratosphere*”. Why is the troposphere thicker over the equatorial regions

than over the poles?

2. What is *air pollution*? Summarize the history of air pollution. Distinguish

between “*primary pollutants*” and “*secondary pollutants*” and give an

example of each.

3. Distinguish between “*industrial smog*” and “*photochemical smog*” in terms of

their chemical composition and formation.

4. List and briefly describe **five** natural factors that help to reduce outdoor air

pollution and **six** natural factors that help to worsen it.

5. Draw and describe a “*temperature inversion*”? How can it affect air pollution

levels?

6. What is *acid deposition* and how does it form? Describe **three** specific

impacts on (a) plants (b) lakes (c) human built structures and (d) human

health.

7. Describe **three** ways to prevent acid deposition and **two** ways to clean it up.

8. What are the top **four** indoor air pollutants, (a) their sources and (b) their

health effects.

9. What is the “*sick building syndrome*”? Describe **three** ways that this can be

cleaned up.

10. Identify the **six** outdoor air pollutants for which the EPA has established

*National Ambient Air Quality Standards (NAAQS*).

11. Describe air pollution laws in the United States. List the advantages and

disadvantages of using an *emission trading program*.

12. Identify (a) **three** prevention and (b) **three** clean-up approaches for reducing

emissions of *SO2, NO2 and PM* from stationary sources such as *coal-burning*

*power plants* and mobile sources such as *cars.*

**Vocabulary Words**

Primary pollutant

Secondary pollutant

Industrial Smog

Photochemical smog

Emission Trading Policy

Acid rain

D**e**nsity

Atmospheric pressure

Ozone layer

**Practice Questions – Chapter 19**

**Climate Change and Ozone Depletion**

1. Describe “*global warming*” and cooling over the past 900,000 years and

during the last century. How do scientists get information about past

temperatures and climates?

2. What is the “*greenhouse effect*”? Why is it so important to life on earth?

3. Identify the **six** “*greenhouse gases*” and the major source of each. Which

are the **two** predominant naturally occurring gases? Which **four** have

risen in the last fifty years?

4. Describe the role played by *oceans* in the regulation of atmospheric

temperatures. What are **three** factors that could decrease its effect in

moderating temperature increases?

5. Describe how each of the following might affect global warming and its

resulting effects on *global climate*: (a) cloud cover and (b) air pollution.

6. What is the scientific consensus about global temperature change during

the last half of the 20th century and about projected temperature changes

during this century?

7. Briefly discuss the possible effects, based on projections of “*global*

*warming*” on: (a)food production (b) water supplies (c) forests (d) sea

level (e)weather (f) biodiversity (g) human health (h) environmental

refugees.

8. What is *carbon capture and storage (CCS)* ? Describe **six** associated with

capturing and storing carbon dioxide emissions.

9. List **four** things that governments could do to help slow projected climate

change. What are the pros and cons of the *Kyoto Protocol*?

10. Describe how human activities have depleted *ozone in the stratosphere*.

List (a) **three** potential human health impacts and (b) **three** non-human

impacts of stratospheric ozone depletion. Describe the relationships

between higher UV levels and three types of skin cancer.

11. What are the major characteristics of *CFCs* which made them so attractive

for use? List **three** places where they were used. List **five** non-CFC

compounds which deplete stratospheric ozone. What are **four** CFC

substitutes?

12. What is the “*Montreal Protocol*”?

**Vocabulary Words**

Glacial and interglacial periods

Greenhouse Effect

Carbon Capture and Storage

Cap and Trade Approach

Chlorofluorocarbons

**Practice Questions – Chapter 20**

**Water Pollution**

1. What is *water pollution*? Distinguish between *point sources* and *nonpoint*

*sources* of water pollution and give an example of each. Describe **four**

chemical and **two** biological methods that scientists use to measure water

quality.

2. List **nine** major types of water pollutants and give an example of each. List

**three** diseases transmitted to humans by polluted water.

3. Describe how *streams* can cleanse themselves and how these cleansing

processes can be overwhelmed. Describe the state of *stream pollution* in

(a) developed and (b) developing countries.

4. Distinguish between *eutrophication* and *cultural eutrophication*. List **three**

ways to prevent or reduce cultural eutrophication.

5. What are the major sources of *ground water contamination* in the United

States? Describe the threat from *arsenic* in groundwater. List **three** ways to

prevent or clean up groundwater contamination.

6. Describe *US Laws* for protecting drinking water quality. What are three

environmental problems caused by the wide spread use of bottled water.

7. How are *coastal waters* and *deeper ocean waters* polluted? What causes

harmful *algal blooms* and what are their harmful effects? Describe oxygen

depletion in the *Northern Gulf of Mexico*.

8. How serious is *oil pollution* of the oceans? Describe, using the *Exxon*

*Valdez* oil spill as an example. What can be done to reduce such pollution?

9. What is a *septic tank*? How does it work? Describe how *primary sewage*

*treatment* and *secondary sewage treatment* is used to purify water.

**Vocabulary Words**

Point source

Nonpoint source

Oxygen Sag Curve

Oligotrophic Lake

Slowly degradable waste

Non degradable waste

**Practice Questions – Chapter 21**

**Solid and Hazardous Waste**

1. What is the difference between (a) solid waste (b) industrial solid waste

(c) municipal solid waste (d) hazardous (toxic) waste? Give **one** example

of each.

2. Give **two** reasons for sharply reducing the amount of the *solid* and

*hazardous waste* we produce.

3. Describe the production of solid waste in the United States and what

happens to such waste. What criteria should be used for dealing with

solid waste?

4. What is *garbology*? Distinguish among *reducing*, *reusing* and *recycling*

as strategies for waste reduction. Explain why reusing and recycling

materials are so important and give two examples of each.

5. What is the difference between *primary (closed loop)* and *secondary*

*recycling* and give **one** example of each. Describe **two** approaches to

recycling household wastes and evaluate each approach.

6. Describe **three** ways in which (a) industries and (b) communities can

reduce resource use, waste and pollution. What are **three** factors that

discourage recycling?

7. What are the major advantages and disadvantages of using *incinerators*

to burn solid and hazardous waste? Distinguish between *open dumps* and

*sanitary landfills*.

8. What is *phytoremidiation*? What are **three** advantages and **three**

disadvantages of using it to remove or detoxify hazardous wastes?

9. What are **three** advantages and **three** disadvantages of disposing of

liquid wastes in (a) *deep underground wells* and (b) *surface*

*impoundments*?

10. What is a *secure hazardous waste landfill*? What is a *brownfield*?

Describe the regulation of hazardous waste in the United States under the

*Resource Conservation and Recovery Act (RCRA)* and the

*Comprehensive Environmental Response, Compensation and Liability*

*(or Superfund) Act*.

11. What is *environmental justice*? How well has it been applied in locating

and cleaning up hazardous waste sites in the United States?

12. Describe regulation of hazardous wastes at the global level through the

*Basel Convention* and the treaty to control persistent organic pollutants.

**Vocabulary Words**

Waste management Primary recycling

Waste reduction Secondary recycling

Integrated waste management

Municipal Recovery Facility (MRF)

Reduce

Reuse

Recycle

**CHAPTER 22**

**Sustainable cities**

1. Distinguish between *urbanization* and *urban growth*. Describe **two**

factors that increase the population of a city.

2. List **four** trends in global urban growth. Describe **fou**r phases of

urban growth in the United States.

3. What is *urban sprawl*? List **six** factors that have promoted urban

sprawl in the United States. List **five** undesirable effects of urban

sprawl.

4. What are **four** advantages of urbanization? What are **four**

disadvantages of urbanization? Why are most cities and urban areas

not sustainable?

5. What is *noise pollution*? How can it be reduced?

6. What is *land-use planning*? What is *zoning* and what are its

limitations?

7. What is *smart growth*? List **five** tools used to promote smart growth.

Describe **five** tools used by the US city of Portland, Oregon.

8. What are the **five** *guiding principles* of *new urbanization*?

9. What is cluster *development*? List **five** goals of *ecocity* and *ecovillage*

design. Describe **three** strategies used within ecovillages to make

their neighborhoods more sustainable.

**Vocabulary Words**

Natural increase

Megacities

Urban heat island

Full cost pricing

Land use planning

Zoning

Walkability

Mixed Use Diversity

Quality Urban Design

Environmental sustainability

**Practice Questions - Chapter 23**

**Economics, Environment, and Sustainability**

1. What is an *economic system*? Describe the interactions among

*demand, supply,* and *market prices* in a market economic system.

Explain why and how governments intervene in market

economic systems.

2. List **five** strategies that *ecological* and *economic* economists

would use to make the transition to more sustainable ecoeconomics.

3. Describe ways in which economists can estimate the economic

values not included in the market prices of goods and services?

4. Describe how economists can estimate the optimal levels for

pollution control and resource use.

5. Define *cost – benefit analysis* and discuss its advantages and

limitations.

6. Why do *products* and *services* cost more than most people think?

What is the *genuine progress indicator* and how does it differ

from the *gross domestic product* economic indicator?

7. What is *full-cost pricing* and what are some benefits of using it to

determine the market values of goods and services? Give **three**

reasons why it is not widely used.

8. Describe **three** benefits of shifting from environmentally

unsustainable to more environmentally sustainable government

subsidies and tax breaks.

9. What are **three** major advantages and disadvantages of using

*green taxes*? What are **three** requirements for implementing

green taxes?

10. What is the *cap-and- trade approach* to implementing

environmental regulation, and what are the major advantages and

disadvantages of this approach?

11. What are some environmental benefits of *selling services* instead

of *goods*? Give **two** examples of this approach.

12. What is *poverty*? How is it related to *population growth* and

*environmental degradation*? List **three** ways in which

governments can help to reduce poverty.

**Vocabulary Words**

Economic system

High- throughput economy

Matter recycling

Natural capital

 Discount rate

Reuse economy

Human capital

Low throughput economy

Manufactured capital

Full-cost pricing

**Practice Questions – Chapter 24**

**Politics, Environment and Sustainability**

**1.** What are the **four** stages of a *policy life cycle* in democracies?

**2.** Describe **two** features of *democratic governments* that hinder their ability

to deal with environmental problems.

**3.** Explain **nine** principles that decision makers can use in making

environmental policy and **five** strategies for implementing these principles

**4.** What are **three** major *environmental laws*? Explain why developing

environmental policy is a difficult and controversial process.

5. What does it mean to say that we should *think globally and act locally*?

Give an example of such an action. What are **four** ways to provide

environmental leadership.

5. List **six** reasons why it is difficult to win an administrative law suit. What

is *SLAPP* ? Distinguish between *arbitration* and *mediation* in dealing with

a lawsuit?

6. Describe the roles of *grassroots* and *mainstream* environmental

organizations and give an example of each type of organization.

6. Explain the importance of *environmental security*, relative to *economic* and

*military* security. List **two** pieces of good news and **two** pieces of bad news

about *international efforts* to deal with global environmental problems.

7. Describe efforts by the Netherlands to develop and implement a national

environmental plan. What are **four** guidelines for shifting to more

*environmentally sustainable societies*?

**Vocabulary Words**

Politics

Environmental policy

Democracy

Lobbying

Environmental law

Statutory law

Administrative law

Common law

Plaintiff

Defendant

**Practice Questions – Chapter 25**

**Environmental Worldviews, Ethics and Sustainability**

1. What is an *environmental worldview*? Distinguish among the following

*environmental* worldviews*: planetary management, stewardship*,

*environmental wisdom*, and *deep ecology*.

2. List **three** issues involved in deciding which species to protect from

premature extinction as a result of our activities. Discuss the controversy over

whether we can effectively manage the earth.

3. What is *sustainability*, if not all about sustaining resources for human use?

List **six** guidelines for achieving more sustainable and compassionate

societies.

4. What are **three** examples of *basic needs*? What are **five** examples of more

*qualitative needs*? List a **dozen** steps that are among the important steps that

can be taken to make the transition to more sustainable societies.

5. Describe **three** traps that lead to *denia*l, *indifference* and *inaction* concerning

the *environmental problems* we face. What are the principles of the *Earth*

*charter*?

6. List **seven** components of the environmental or *sustainability revolution*.

**Vocabulary Words**

Environmental ethics

Sense of place

Voluntary simplicity