

9

Culture, Society, and Environmental Quality

Conservation is a great moral issue, for it involves the patriotic duty of ensuring the safety and continuance of the nation.

—Theodore Roosevelt

This chapter is the last content review chapter. It contains the odds and ends about cultures, societies, and other topics that will be tested on the AP Environmental Science Exam, for which there is no specific heading in the course outline.

By now, you've probably almost completed a course in AP Environmental Science, which means that you realize that what's good for the environment is usually good for people because we live in an ecosystem on Earth just as all other plants and animals do. At this point, the idea of pursuing environmentally thoughtful courses of action, through government policy as well as our day-to-day actions, must seem like a great idea, right? Well, if environmental protection is good, why do we often get the message that it will cost us more, that people will lose jobs, or that it will infringe on our liberties in some way? The answer is that, to a certain extent, all of these things *will* happen. However, the health of humankind is dependent on the health of the earth, and often certain sacrifices must be made for the greater good of the earth.

In this chapter, we will first review the importance of **sustainability**. We will then move on to discuss public policy making, give you a brief history of environmental activism in the United States, and then go through the important acts and amendments that you'll need to know for the test. We'll wrap up the chapter with a discussion of green taxes—and then we'll be done. Let's begin!

THE IMPORTANCE OF BEING SUSTAINABLE

What does the term “sustainable” mean to you? How much would you be willing to sacrifice in order to sustain environmental quality? These are questions that all citizens should ask themselves before entering the voting booth.

To environmentalists, sustaining environmental quality usually means working in the biotic and abiotic environments in a way that ensures they are capable of functioning sustainably. However, along with maintaining a sustainable environment, maintaining the health and happiness of the human species would also be a part of most environmentalists' goals for Earth. The human species cannot exist in a nonsustainable environment; after all, humans are part of a larger ecosystem, just as all other species of living things are. Our advantage, however—or rather, our responsibility—lies in the fact that we are the most technologically advanced and capable species on the planet. We are also the ones causing the most damage.

As environmentally literate, reasonable citizens, we know that we're sometimes obliged to make choices that may not make everyone happy, but we strive to make choices that will ultimately benefit the greatest possible number of people.

The United States comprises only about 5 percent of the world population but consumes about 40 percent of the world's total resources, including about 30 percent of the world's energy resources. If every country consumed global resources to this extent, we would need more resources to live than Earth can supply. This is because most of the resources that we rely upon are limited—recall the fossil fuels we burn, the way that we use water, and the rate at which we produce and dispose of waste.

PUBLIC POLICY

The exploitation of public resources has been the motivation behind environmental policy at the international, national, state, and local level for as long as public policies have been made. Strictly speaking, **policy** is defined as a plan or course of action—as of a government, political party, or business—intended to influence and determine decisions, actions, and other matters.

While policies that we make as a nation are usually fairly easy to enforce—because they often have our collective best interests as a nation in mind—international policy, as is established through the United Nations (UN), is only achievable and realistic if the affected countries all cooperate with decisions that are made collectively. For example, in the 1994 International Conference on Population and Development (which was sponsored by the UN), one of the goals agreed on by the participants at the conference was to enroll 90 percent of all boys and girls in primary school by 2010. However, this policy can be put into action only if the countries that signed the agreement are willing to carry out the necessary steps.

There are ways in which the UN can attempt to force countries to follow mandates that are agreed on by the majority; these include withholding borrowing power through the World Bank; trade rules; and withholding aid. However, there are often certain environmentally significant countries that don't belong to the UN, didn't sign whatever agreement is at issue, or that just don't have the infrastructure to enforce the objective—however worthy. Additionally, international agencies often don't have the power to control what happens inside a particular country.

Much more effective are international policies that are put into effect through treaties that the countries involved have all agreed to; their governments have all ratified the treaty. Obviously, policies that countries agree to are most often ones that benefit these countries in some way, so it isn't too surprising that they are more readily enforced. In other words, international laws that are not agreeable are not usually followed because they don't provide countries with incentives. Moreover, it is not possible to punish countries that don't follow these policies.

As we touched upon above, it's understandably much easier to enforce laws and policies in the United States than it is for us to police the other nations of the world. In the United States, state and local laws have an effect on the environment, but if there is a conflict between state or local law and federal law, most times federal law will take precedence. However, in some cases states have legislated controls that are even stricter than those the federal law requires. In these cases, the state laws are the ones enforced, rather than the more lenient federal law. Additionally, some laws are passed and enforced regionally because of particular geographic needs; one example of this is the difference in water laws to the east and west of the Mississippi River.

East of the Mississippi River, water laws are based on the principle that the upstream consumers control the water but, by law, cannot impede or reduce its flow or change its quality. A number of lawsuits based on this premise have been filed and are currently pending. One example is the diversion of water from the Apalachicola-Chattahoochee-Flint (ACF) and Alabama-Coosa-Tallapoosa (ACT) river basins. The state of Georgia would like to divert water from these basins to supply the growing needs of the urban area of Atlanta. The states of Alabama, Tennessee, and Florida, which are downstream from the diversion, are concerned about the flow and quality of water that will reach them if this diversion project is carried out. This controversy is still in the court system.

While we're on the topic, Atlanta is a good example of a city whose ecological footprint is far larger than the resources that are available on the land it occupies. (Remember an ecological footprint is the amount of resources available to support a population and absorb its wastes.) City lawmakers are rightfully concerned about water shortages in the near future.

On the other hand, water laws west of the Mississippi are based on **water rights**. West of the Mississippi, it's held that the person who first files a claim on a water resource has rights to the use of the water. The amount of water an individual with a water right has claim to each year is determined by water flow that year (and also by how much water the individual wants!). But, regardless of the amount of water present or the place where the right was claimed, the oldest person who made the water claim gets to use his share of water before anyone else can partake. Obviously, water rights in the West do not require sharing, as they do in the East.

ENVIRONMENTAL POLICY IN THE UNITED STATES — A SHORT HISTORY

Although the first laws of the United States, such as those contained in the Constitution, do not mention the environment specifically, the Bill of Rights includes the Fifth amendment, which prohibits the taking of private property for public use without just compensation. This has been interpreted to include the “preventing of serious public harm” by those who wish to take private property and do something on it that will affect the environment or those around them in a negative way. Basically, this means that your neighbor cannot decide to build a small nuclear power plant on his residential property because this would violate zoning laws.

Early laws did not mention the environment because when these laws were written, there was so much land and so many resources in the United States that it was unimaginable that they could ever be in danger of being used up. In fact, many early laws, such as the Homestead Act of 1862, encouraged the settlement and exploitation of western lands. Others, such as the Mineral Lands Act of 1866, encouraged the use of resources, and unfortunately this exploitative act is still in effect for many mining regulations.

Shortly after the Civil War, as people continued to migrate to the West, it was realized that the United States did not have an endless supply of land or resources. In fact, in order to preserve some of the lands in the West that were being very quickly settled, the first national park, Yellowstone National Park, was established in 1872. Further legislative action in 1891 created the forest reserves, which made these lands off limits to logging in order to protect the land from being overharvested and to maintain the existing watersheds. This legislation marked the beginning of the federal government assuming an environmentally protective role.

POLITICAL AND CULTURAL ACTIVISM

During this time period there were several men who stood out as early environmental activists, including Henry David Thoreau (1817–1862). Thoreau's book *Walden* describes his retreat from society and the quiet years that he spent living on Walden Pond studying nature.

Another important writer and scientist of this time period was George Perkins Marsh (1812–1939), whose book *Man and Nature* helped the American public understand that there are limits to natural resources. His plan for the conservation of resources is the basis for many of the resource conservation principles that we try to adhere to today. Another early environmental advocate was John Muir, a nature preservationist who founded the Sierra Club in 1892. He led a campaign for the protection of lands from human exploitation and advocated low-impact recreational activities such as hiking and camping; these ideas did not become popular until the 1960s.

As far as political leaders, arguably the most environmentally active president in the history of the United States was Theodore Roosevelt (1858–1919). Roosevelt was interested from an early age in the workings of the environment and even began his own natural history museum as a child. Interestingly enough, that collection became a part of the founding collection for New York's American Museum of Natural History.

Roosevelt's term as president has been called the **Golden Age of Conservation** because of the many environmentally friendly laws and policies he put into effect. During his presidency (1901–1909) he increased area of national forest lands by 400 percent (up to 194,000,000 acres), establishing 150 new national forests and adding area to others. He established the first 51 bird reserves, signing the first one into existence by asking his advisors, "Is there any law which prohibits me from declaring this island a bird refuge?" When his advisors determined that there was not, he signed the bill with gusto, announcing, "Very well, then, I so declare it." Additionally, he established five national parks, including the Grand Canyon, four national games preserves, eighteen national monuments (established under the 1906 Antiquities Act), twenty-four reclamation projects, and seven conservation commissions.

Roosevelt also appointed the first chief of the United States Forest Service, Gifford Pinchot (1865–1946), in the history of the United States. Pinchot applied the principles of sustainable harvest and multiple-use to wildlife protection, recreation, and resource extraction.

As you're probably well aware, the 1960s were a turbulent time in U.S. history, when the baby boomers born after World War II came of age and began expressing their opinions to the world. The book *Silent Spring*, written by Rachel Carson in 1962, awoke in many Americans an awareness of the state of the environment. The air was dirty, the water was polluted, and hazardous wastes were collecting in landfills all over the country. Also at this time, the Apollo space missions allowed Americans to see planet Earth from afar for the first time, and this popularized the term "spaceship Earth." Paul Ehrlich's 1968 book *The Population Bomb* warned of the myriad problems that would arise along with the quickly increasing human population, and an entertainer named John Deuschendorf took the stage name of John Denver and began to popularize the environmental movement through song.

A multitude of environmental laws and policies were initiated during the presidency of Richard Nixon. For example, the first Earth Day was celebrated on April 22, 1970. Also in 1970, Nixon signed into law the National Environmental Policy Act (NEPA); this act created the Council on Environmental Quality and required the submission of an environmental impact statement before any major federal action could be taken. One of his major environmental contributions was to consolidate two agencies that had environmental responsibilities into a bureau called the Environmental Protection Agency (EPA). Finally, two major legislative actions were enacted in this new era of environmental awareness in the United States. The first was the Clean Air Act of 1963, which we have mentioned many times in these pages, and the second was the Clean Water Act (introduced in 1972).

There is your brief history of environmental activity and activists in the history of the United States. At this point, we'll list some important environmental laws that you should be aware of for this exam, starting with the 1963 Clean Air Act. The ones in bold are those that have had a particularly significant impact. Make flashcards of all of these so that you know them cold for test day!

SOME MAJOR ACTS

As you just learned, a few pieces of legislation helped form the environmental policy of the United States. The table below shows some of the legislation important in U.S. environmental policy. If you want to see specific laws that deal with particular problems like endangered species, clear water or mine pollution, go back to those chapters!

Date	Name of Legislation	What It Did
1970	1970 National Environmental Policy Act	Created the Council on Environmental Quality that resulted in the creation of the Environmental Protection Agency (EPA) from the consolidation of various environmental agencies. It also mandates that federal agencies prepare <i>environmental impact statements</i> .
1983	1983 International Environmental Protection Act	Authorized the president to assist countries in protecting and maintaining wildlife habitats and in developing sound wildlife management and plant conservation programs. Special efforts should be made to establish and maintain wildlife sanctuaries, reserves, and parks; enact and enforce anti-poaching measures; and identify, study, and catalog animal and plant species, especially in tropical environments.
1990	1990 Pollution Prevention Act	Designed to promote source reduction (stop pollution from being produced).
1990	1990 Environmental Education Act	Established the Office of Environmental Education within the Environmental Protection Agency to develop and administer a federal environmental education program.

WHAT HAVE WE DONE FOR US LATELY?

Although some environmental bills and amendments have been added since 1985, lately there has been a distinct anti-environmental movement influencing government actions. Large, established environmental groups such as the Sierra Club have declined in membership, which is an interesting litmus test of environmentalism in America. However, hope lies in the fact that new grassroots environmental organizations are currently growing throughout the United States. Non-governmental organizations (NGOs) like Greenpeace and the World Wildlife Fund also play a role in protecting the environment. Four environmental issues that are expected to take center-stage in the twenty-first century include

- climate change
- water shortages and water supplies
- population growth
- loss of biodiversity

Keep your eye out for discussions of these topics in the news, and listen critically to campaigning politicians to see where they stand on these issues. They will prove to impact you personally in more and more ways as time goes by. The discussion of how to best reduce greenhouse gas emissions, for example, currently revolves around what's called **cap-and-trade policy**, an approach that provides economic incentives for limiting emissions of pollutants.

HOW ELSE DO WE MAKE ENVIRONMENTAL PROGRESS?

Most often, the United States government has approached environmental issues by passing "command and control" laws. These laws set limits on factors, such as the amounts of pollution that are allowable from various sources, and they establish penalties for those that go over the limits. Wildlife has always been protected by similar types of legislation. There is no doubt that these laws have led to cleaner air and water as well as the conservation of soil and other natural resources. Endangered and threatened species have also both been protected, and some extremely endangered species have even been able to recover somewhat.

However, there have always been problems with this approach. For example, consider the Endangered Species Act. Red-cockaded woodpeckers are endangered because the open forests with big, old pine trees have been replaced by forests with younger, smaller pines. Also, periodic natural fires, which historically kept the pinewoods open, have been suppressed because humans have settled in these areas. Periodic fires are needed to control the brushy understory and keep the pinewoods open. Creating yet another problem for the endangered bird, timber owners have been known to kill them in order to avoid preserving their habitat. However, it's very hard to prove what happens to these birds—are they being exterminated by landowners or are they simply migrating elsewhere or declining in number for other reasons?

GREEN TAXES

Nevertheless, there are other approaches that are more successfully used to continue environmental improvement without forcing the enactment of other types of command and control. Over time it has become clear that the act of punishing actions that hurt the environment is not nearly as effective as rewarding actions that help the environment. Since the 1970s, the United States has substantially increased taxes on labor and modestly increased taxes on income while allowing actions that create pollution and cause resource depletion to remain largely untaxed. The result is that the tax system of the United States encourages resource depletion and discourages investments in machinery and labor. A worldwide discussion is taking place about how to move away from taxing "goods," such as investments and employment (activities we should be encouraging), and toward taxing "bads," like pollution, which we would like to discourage. Pollution taxes have now been embraced by a growing number of mainstream economists and policy makers, and are just one of a new group of taxes called **green taxes**.

A green tax shift is a fiscal policy that lowers taxes on income, including wages and profit, and raises taxes on consumption, particularly the unsustainable consumption of non-renewable resources. Some taxes that could be lowered by the implementation of a green tax shift are payroll and income taxes, and the following is a list of taxes that could be implemented or, if currently in existence, increased:

- Carbon taxes on the use of fossil fuels
- Taxes on the extraction of mineral, energy, and forestry products

- License fees for fishing and hunting
- Taxes on technologies and products that are associated with substantial negative externalities
- Garbage disposal taxes
- Taxes on effluents, emissions, and other hazardous wastes

Additionally, taxes on certain forms of consumption may occur through the feebate approach, in which additional fees are imposed on less sustainable products—such as sport-utility vehicles—and then pooled to fund rebates on more sustainable alternatives, such as hybrid electric vehicles.

In short, the three main goals of green taxes are

- the generation of revenue to correct past pollution damage and reduce future pollution
- to change behavior
- to use the funds received from pollution taxes for restoration

In this scheme, taxes serve as policy tools, as well as a way to protect the environment.

Market permits are also being used somewhat successfully to encourage reduction in pollutants. **Market permits** work in this way: Companies are allowed to buy permits that allow them to discharge a certain amount of substances into certain environmental outlets. If they can reduce their discharge, they are allowed to sell the remaining portion of their permit to another company. Economically speaking, it is to a company's advantage to reduce its discharge and sell the remainder of its allowable discharge to another company. But perhaps a better idea is for the government to buy back the unused permits rather than have them sold to another industry; this would reduce the overall discharge.

Many people think that subsidies (which are giveaways or tax breaks on certain resources to encourage their use) are hurting the environment more than they're helping it; detractors think that subsidies only encourage the use of unsustainable products.

Note that all policies, treaties, and laws are important to our environment. However, for purposes of the AP Environmental Science Exam, you will probably only be asked questions concerning United States federal laws, which is why we suggested that you commit the table of acts you saw earlier in this chapter to memory. International treaties, summits, and policies such as those that are directed from the United Nations or one of its agencies will probably come up on future exams, but that isn't your problem.

GLOBALIZATION

As you can imagine, our world is becoming more and more interconnected. Aircraft can fly around the world in a few hours; we have instant communication worldwide via phones, television, and the Internet. This is called **globalization**, and it affects society, the economy, and the environment. Positive effects can be seen in new economic opportunities, our expanded access to information, and the interactions of many societies. For example, grapes can be grown in Chile, shipped north, and be sold in your supermarket in less than a week. There are also several negative impacts of globalization. In certain parts of China, large piles of unusable electronic components have been creating water pollution problems as rainwater leaches out heavy metals. The rapid spread of emerging diseases, increased levels of air pollution and hazardous waste, and the loss of marine fish stocks are just a few more examples of globalization's negative impacts.

Remember when you read about the Commons, resources owned by no one but accessible by everyone? This concept is important when we consider global access to those resources. Fresh water, clean air, ample supplies of fish, and access to fertile croplands are all examples of the global Commons. It is important to use these resources sustainably because they are the foundations for economic and social development.

Poverty and greed can cause people to use resources in an unsustainable manner and to cause damage to the environment. Cutting down important rain forest habitats to raise crops and accepting companies that generate a lot of harmful pollutants are two examples of how people's hunger for money can lead to unsustainable practices. Unfortunately, the economically disadvantaged people who allow unsustainable practices to continue are also the ones most susceptible to environmental issues brought about by climate change, and have the least amount of resources to combat the health and environmental problems that result.

International organizations such as the World Bank and the United Nations are two examples of institutions that are trying to ameliorate the poverty issue. The World Bank uses loans to reduce poverty and to help foster improvements in biodiversity, environmental policies, land management, pollution management, and water resources management. The United Nations, through its Environmental Program, seeks to promote international cooperation, develop regional programs to promote sustainability, and to assess global, regional, and national environmental trends.

There are several international agreements that cover pollution issues. Review some of them in the table below.

Date	Name of Agreement	What It Did
1978	Montreal Accord	Cut the emissions of CFCs that damage the ozone layer. This was amended in Copenhagen (1992) to include other key ozone-depleting chemicals.
1992	Basel Convention on the Control of the Transboundary Movements of Hazardous Wastes	169 parties aimed to protect human health and the environment against the adverse effects resulting from the generation, management, transboundary movements and disposal of hazardous and other wastes.
1997	Kyoto Protocol	Required the participating 38 developed countries to cut their greenhouse gas emissions back to 5% below 1990 levels.

One more chapter, in which we'll review laboratories, and you're done with the content review portion of the book! Learn the terms and try the drill to make sure you've grasped all of the content in the chapter.

KEY TERMS

Study these terms and you will be sure to write excellent essays.

Golden Age of Conservation

sustainability

water rights

EPA

NGO

cap-and-trade policy

green taxes

globalization

market permits

Kyoto Protocol

CHAPTER 9 QUIZ

Directions: Each of the questions or incomplete statements below is followed by five suggested answers or completions. Select the one that is best in each case.

1. The release of CFCs was banned under an international treaty written in which of the following cities?
 - (A) Montreal
 - (B) New York
 - (C) New Delhi
 - (D) Kyoto
 - (E) Washington

2. Which of the following is a function of the Hazardous Materials Transportation Act?
 - (A) Dictates how sanitary landfills are to be built
 - (B) Defines which materials are labeled "Hazmat"
 - (C) Limits point source water pollution
 - (D) Defines the maximum amounts of six different air pollutants
 - (E) States how mines must be reclaimed

3. Which of the following policies prevents the harassment, capture, injury, or killing of all species of whales, dolphins, seals, and sea lions, as well as walruses, manatees, dugongs, sea otters, and polar bears?
 - (A) National Fisheries Act
 - (B) CITES
 - (C) Clean Water Act
 - (D) The Marine Mammal Protection Act
 - (E) Maritime Safety Act

4. When a large federal project might have a significant impact on the environment, which of the following must be drafted?
 - (A) A cost-benefit analysis
 - (B) A interagency review
 - (C) A report from the geographical information system
 - (D) An environmental impact statement
 - (E) A needs statement

5. Rachel Carson described which of the following problems to Americans?
 - (A) Pesticide bioaccumulation and poisoning
 - (B) The beauty of nature
 - (C) Loss of sustainable forest practices
 - (D) The problem of the *Tragedy of the Commons*
 - (E) America's diminishing oil reserves

6. Which of the following established the “emissions trading policy”?
- (A) Clean Water Act
 - (B) Resource Conservation and Recovery Act
 - (C) Asbestos Hazard Emergency Response Act
 - (D) The Kyoto Protocol
 - (E) Clean Air Act
7. All of the following deal with the study of environmental economics EXCEPT
- (A) the study of the impact of goods on the ecosystem
 - (B) understanding the economic cost of pollution
 - (C) developing policy alternatives to pollution-based industry
 - (D) the relative environmental costs and benefits of proposed policies
 - (E) the location of new mineral reserves
8. The listing of threatened species and the purchase of land to protect their habitats is legislated in which of the following?
- (A) Federal Noxious Weed Act
 - (B) Endangered Species Act
 - (C) Convention on Biological Diversity
 - (D) Fish and Wildlife Conservation Act
 - (E) Migratory Bird Conservation Act
9. Which of the following philosophies would be held by someone with a holistic viewpoint on the management of the Earth’s resources?
- (A) There are no problems; let’s do whatever we want.
 - (B) The free market works best, and the government should not interfere.
 - (C) We can manage most problems with technology.
 - (D) The biodiversity of the Earth is the most important issue and we need it to sustain us.
 - (E) Humans are the most dominant species on the planet, and we can solve any environmental problem.
10. Which of the following best describes the goal of environmentally sustainable economic growth?
- (A) Allowing rapid population growth so there will be more workers
 - (B) Exploration to find more natural resources
 - (C) Increasing the quality of goods without depleting the natural resources needed to make the goods
 - (D) Cutting down forests and replacing them with rangeland
 - (E) Growing more crops by using larger amounts of fertilizer

11. A cap-and-trade policy might be effective in controlling which type of the following pollutants?
 - (A) thermal pollution in rivers
 - (B) organic waste pollution in oceans
 - (C) underground water pollutants
 - (D) noise pollution in a city
 - (E) carbon dioxide in the atmosphere

12. Which of the following can be classified as an NGO?
 - (A) World Wildlife Fund
 - (B) Bureau of Land Management
 - (C) Fish and Wildlife Commission
 - (D) International Trade Commission
 - (E) Department of Defense

Free-Response Question

1. The town council of Hilltop Valley has just received a proposal from its advisory panel to build a new coal-fired power plant on the western edge of the county where Hilltop Valley is located. The plant will be located along the back of the county's major river so that water can easily be transported to the plant.
 - (a) Describe two parts of the Clean Air Act that will impact the building of this plant. Give one example of a compound that would be impacted under the National Ambient Air Quality Standards (NAAQS) and discuss the regulation of hazardous air pollutant levels.
 - (b) Describe two positive and two negative impacts that the plant might have on the region.
 - (c) Opponents of the plant say that they will use the Endangered Species Act (ESA) to prevent the plant's construction. Describe how the ESA could be successfully used to stop construction.
 - (d) Describe a goal of the Pollution Prevention Act of 1990 and give one example of how the plant can reduce a pollutant it might emit.

ANSWERS AND EXPLANATIONS

Multiple-Choice Answers

1. **A** The Montreal Protocol was signed in 1987 by 36 nations concerned with the depletion of the ozone layer by chlorofluorocarbons (CFCs). The pact stated that CFCs had to be reduced 35 percent between 1989 and 2000. There was a further refinement of the agreement in Copenhagen, Denmark in 1992.

2. **B** HMTA was passed in 1975 with the intention of defining what a hazardous material was and setting rules for Hazmat shipment.

3. **D** The Marine Mammal Protection Act, established in 1972, is legislation that protects marine mammals in the world's oceans.
4. **D** Large federal projects that might have a large impact on the environment must produce an environmental impact statement. This is mandated by the 1969 National Environmental Policy Act.
5. **A** In 1962, Rachel Carson published the book *Silent Spring*. In this book she describes the problems associated with the overuse of pesticides—mostly DDT. She explains how pesticides were affecting bird populations in the United States. The book, along with her advocacy, changed the way people thought about the impact of pesticides.
6. **E** The CAA enabled 110 of the most polluting power plants in 21 states to buy and sell pollution rights. This regulated how much pollution (SO₂) each plant could produce. If the plant produces an amount under the level, it receives a “credit” which can be kept or sold to another plant that is producing pollution over the limit of permitted emissions.
7. **E** Environmental economics is the study of the impact of the goods and services economy, particularly market systems of allocation on environmental quality and ecological integrity. It also takes into consideration the economic basis for pollution problems and policy alternatives. Discussions of environmental issues always include monetary and economic considerations. For example, what are the relative costs and benefits of proposed policies?
8. **B** The Endangered Species Act was passed by Congress in 1973 to provide protection for species that are threatened with extinction. This act authorizes Federal Agencies to undertake conservation programs to protect species listed as endangered or threatened, and to purchase land to protect habitats.
9. **D** Holistic viewpoints center on the belief that we are one of many species on the planet, and that we interact with all species. They also believe that if we harm the planet, we harm ourselves. The other options are all “planet management” viewpoints.
10. **C** Sustainability depends on the long-term utilization of resources; this is described in (C). The other options could cause resources to be used up more rapidly.
11. **E** A cap-and-trade policy limits carbon dioxide in the atmosphere by implementing caps and offering incentives for reducing emissions.
12. **A** WWF is an organization that is not associated with any branch of government.

Free-Response Answer

1. (a) The CAA sets two standards: National Ambient Air Quality Standards for six outdoor pollutants and the national emissions standards for over 100 toxic pollutants. The NAAQS sets limits on pollutants that people or the environment may be exposed to over a certain period of time. Carbon monoxide, ozone, sulfur dioxide, and nitrogen dioxide are compounds of concern to people near the plant. The second set of standards describes specific limits of hazardous air pollutants. Examples include lead, mercury, and radionuclides.
(2 points maximum—1 to describe the goal of each standard [NAAQS & hazardous air pollutant] and 1 for a correct example for each)

- (b) Positive results include more employment, reliable electricity, lower cost electricity, less dependence on foreign energy sources, greater tax revenues, and a positive impact on the local economy.

Negative impacts include more air pollution, more water pollution (thermal is an example), the issue of ash disposal, the need to build infrastructure to support the plant (railroads for coal, roads to and from the plant), and the loss of the natural beauty of the area.
(4 points maximum—1 point for each positive and each negative impact)

- (c) ESA could be used if a threatened or endangered species is found in or near the area where the plant is to be built. The act allows for the conservation of ecosystems that support the endangered or threatened species. It is possible that the plant would not be built in order to conserve the ecosystem in which the species lives.
(2 points maximum—1 point for defining the goal of the ESA and 1 point for stating that the plant could not be built)

- (d) PPA is designed to promote source reduction (stopping pollution from being produced). Sulfur reductions could occur by burning low-sulfur coal or by using fluidized-bed coal combustion. The sulfur and nitrogen oxides can be removed by mixing coal and limestone and burning it in a large volume of air. Another process is to wash the coal with water and remove pyritic sulfur particles.
(2 points maximum—1 for correctly stating the PPA goal and 1 for a correct example of how to reduce pollutants before they are made. Note: No credit would be given for examples like scrubbers or catalysts because they clean up the pollutants after they are produced. PPA focuses on ways to lower the amounts produced, not how to clean them up after production.)