

# APES AODM

APES students may earn up to five (5) points on one exam grade per quarter by completing the corresponding questions below. The source for these questions is your textbook, though you are not limited to your textbook in finding the answers.

**The answers must be in complete sentences. AODM is due to [www.turnitin.com](http://www.turnitin.com) by the announced date prior to the end of each quarter.**

Points are awarded based on the accuracy and detail provided in the answers.

Group work will not be accepted. No final grade may exceed a 100%.

## The Exams

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## Chapters 1-2 Take Home Exam

1. Describe two environmentally beneficial forms of exponential growth.
2. Explain why you agree or disagree with the following propositions:
  - a. stabilizing population is not desirable because, without more consumers, economic growth would stop
  - b. the world will never run out of resources because we can use technology to find substitutes and to help us reduce resource waste
3. What do you think when you read that (a) the average American consumes 30 times more resources than the average citizen in India, and (b) human activities are projected to make the earth's climate warmer? What feelings help perpetuate such problems, and which can help solve them?
4. Explain why you agree or disagree with each of the following statements
  - a. humans are superior to other forms of life
  - b. humans are in charge of the earth
  - c. nature has an almost unlimited storehouse of resources for human use
  - d. technology can solve our environmental problems
  - e. humans do not have any obligation to future generations
  - f. humans do not have any obligation to other forms of life
5. What ecological lesson can we learn from the controlled experiment on the clearing of forests described in the Core Case Study that opens chapter two?
6. Think of an area you have seen where some significant change has occurred in a natural system. What is a question you might ask in order to start a scientific process to evaluate the effects of this change, similar to the process described in the Core Case Study that opens chapter two?
7. Describe a way in which you have applied the scientific process described in this chapter (figure 2-2) in your own life, and state the conclusion you drew from this process. Describe a new problem that you would like to solve using this process.
8. If there is no "away" where organisms can get rid of their wastes, why is the world not filled with waste matter?
9. Use the second law of thermodynamics to explain why a barrel of oil can be used only once as a fuel, or in other words, why we cannot recycle high-quality energy.
10. Imagine you have the power to revoke the law of conservation of matter for one day. What are three things you would do with this power?

## Chapters 3-4 Ecosystems and Evolution

1. How would you explain the importance of tropical rain forests to people who think that such forests have no connection to their lives?
2. Explain why (a) the flow of energy through the biosphere depends on the cycling of nutrients, and (b) the cycling of nutrients depends on gravity.
3. Use the second law of thermodynamics to explain why many poor people in developing countries live on a mostly vegetarian diet.
4. Why do farmers not need to apply carbon to grow their crops but often need to add fertilizer containing nitrogen and phosphorus?
5. What changes might take place in the hydrologic cycle if the earth's climate becomes (a) hotter or (b) cooler? In each case, what are two ways in which these changes might affect your lifestyle?
6. Explain what could happen to the ecosystem where American Alligators (Core Case Study chapter 4) live if the alligators went extinct. Name a plant species and an animal species that would be seriously affected, and describe how each might respond to these changes in their environmental conditions.
7. Describe the major differences between the ecological niches of humans and cockroaches. Are these two species in competition? If so, how do they manage to coexist?
8. Is the human species a keystone species? Explain. If humans were to become extinct, what are three species that might also become extinct and three species whose populations would probably grow?
9. How would you respond to someone who tells you:
  - a. That he or she does not believe in biological evolution because it is "just a theory"?
  - b. That we should not worry about air pollution because natural selection will enable humans to develop lungs that can detoxify pollutants?
10. How would you respond to someone who says that because extinction is a natural process, we should not worry about the loss of biodiversity when species become prematurely extinct as a result of our activities?

## Chapters 5-6 Populations

1. Use the second law of thermodynamics to explain why predators are generally less abundant than their prey.
2. Explain why most species with a high capacity for population growth (high biotic potential) tend to have small individuals (such as bacteria and flies) while those with a low capacity for population growth tend to have large individuals (such as elephants and whales).
3. List three factors that have limited human population growth in the past that we have overcome. Describe how we overcame each of these factors. List two factors that may limit human population growth in the future.
4. Why are pest species likely to be extreme examples of r-selected species? Why are many endangered species likely to be extreme examples of K-selected species?
5. In your own words, restate the following quotation by Sir Francis Bacon: "*We cannot command nature except by obeying her*". Do you agree with this notion? Why or why not?
6. List three ways in which you could apply some of what you learned in chapter 6 to making your lifestyle more environmentally sustainable.
7. Identify a major local, national, or global environmental problem, and describe the role of population growth in this problem.
8. Do you believe that the population is too high in (a) the world, (b) the United States, and (c) the Raleigh/Durham area? Explain.
9. Should everyone have the right to have as many children as they want? Explain. Is your belief on this issue consistent with your environmental worldview?
10. Some people believe our most important goal should be to sharply reduce the rate of population growth in developing countries where 97% of the world's population growth is expected to take place. Others argue that the most serious environmental problems stem from high levels of resource consumption per person in developed countries, which use 88% of the world's resources and have much larger ecological footprints per person than do developing countries. What is your view on this issue? Explain.

## Chapters 7-8 Biomes

1. What would happen to (a) the earth's species and (b) your lifestyle if the winds stopped blowing?
2. List a limiting factor for each of the following ecosystems:
  - a. a desert
  - b. arctic tundra
  - c. temperate grassland
  - d. the floor of a tropical rain forest
  - e. a temperate deciduous forest
3. Why do deserts and arctic tundra support a much smaller biomass of animals than do tropical forests?
4. Why do most animals in a tropical rain forest live in its trees?
5. Why do most species living at high latitudes or high altitudes tend to have generalist ecological niches while those living in the tropics tend to have specialist ecological niches?
6. What are three steps governments and industries could take to protect remaining coral reefs? What are three ways in which individuals can help to protect those reefs?
7. Why do aquatic plants such as plankton tend to be very small, whereas most terrestrial plants such as trees tend to be larger and have more specialized structures such as stems and leaves for growth?
8. Why are some aquatic animals, especially marine mammals such as whales, extremely large compared to terrestrial animals?
9. Suppose a developer builds a housing complex overlooking a coastal salt marsh and the result is pollution and degradation of the marsh. Describe the effects of such a development on the wildlife in the marsh, assuming at least one species is eliminated as a result.
10. How does a levee built on a river affect species such as deer and hawks living in a forest overlooking the river?

## Chapter 9 Species Approach

1. List three ways in which you could apply concept 9-3 (pg. 193) to make your lifestyle more environmentally sustainable.
2. What are three aspects of your lifestyle that directly or indirectly contribute to the premature extinction of some bird species (pg. 195)? What are three things that you think should be done to reduce the premature extinction of birds?
3. Do you accept the ethical position that each species has the inherent right to survive without human interference, regardless of whether it serves any useful purpose for humans? Explain. Would you extend this right to the *Anopheles* mosquito, which transmits malaria, and to infectious bacteria? Explain.
4. What would you do if
  - a. your yard and house were invaded by fire ants
  - b. you found bats flying around your yard at night
  - c. deer invaded your yard and ate your shrubs, flowers, and vegetables?
5. Which of the following statements best describes your feelings towards wildlife? You may select more than one.
  - a. As long as it stays in its space, wildlife is okay.
  - b. As long as I do not need its space, wildlife is okay.
  - c. I have the right to use wildlife habitat to meet my own needs.
  - d. When you have seen one redwood tree, elephant, or some other form of wildlife, you have seen them all, so lock up a few of each species in a zoo or wildlife park and do not worry about protecting the rest.
  - e. Wildlife should be protected.
6. Environmental groups in a heavily forested state want to restrict logging in some areas to save the habitat of an endangered squirrel. Timber company officials argue that the well-being of one type of squirrel is not as important as the well-being of the many families who will be affected if the restriction causes the company to lay off hundreds of workers. If you had the power to decide this issue, what would you do and why? Can you come up with a compromise?
7. What is HIPPCO?
8. Describe the poaching of wild species and give three examples of species that are threatened by this illegal activity.
9. Describe two international treaties that are used to help protect species.
10. Describe the roles of wildlife refuges, gene banks, botanical gardens, wildlife farms, zoos and aquariums in protecting some species.

## Chapters 10-11 Sustaining Biodiversity

1. Do you support the reintroduction of the gray wolf into the Yellowstone ecosystem in the United States (Core Case Study)? Explain. Do you think the reintroduction of wolves should be expanded to areas outside the park? Explain.
2. Some argue that growing oil palm trees in plantations in order to produce biodiesel fuel will help us lessen our dependence on oil and will cut vehicle CO<sub>2</sub> emissions. Do you think these benefits are important enough to justify burning and clearing some tropical rain forests? Why or why not? Can you think of ways to produce biofuels, other than cutting trees? What are they?
3. Are you in favor of establishing more wilderness areas in the United States, especially in the lower 48 states? Explain. What might be some drawbacks of doing this?
4. How should nature reserves be designed and connected? Describe what Costa Rica has done to establish nature reserves.
5. Describe the Green Belt Movement.
6. What do you think are the three greatest threats to aquatic biodiversity and ecosystem service? Why?
7. Should fishers who harvest fish from a country's publicly owned waters be required to pay the government fees for the fish they catch? Explain. If your livelihood depended on commercial fishing, would you be for or against such fees?
8. Why do you think about half of all attempts to create new wetlands fail to replace lost wetlands? Give three reasons why a constructed wetland might not provide the same level of ecological services as a natural wetland.
9. Do you think the plan for restoring Florida's Everglades will succeed? Give three reasons why or why not?
10. Dams on some rivers provide inexpensive hydroelectric power, but they also disrupt aquatic ecosystems. Do you think the benefits of these dams justify the ecological damage they cause? Explain. If you see this as a problem, describe a possible solution.

## Chapters 12-13 Food and Water

1. What are two safeguards that you would want in place before large areas of the world were planted with golden rice (Core Case Study)?
2. Explain why you support or oppose greatly increased use of (a) genetically modified food and (b) polyculture.
3. Suppose you live near a coastal area and a company wants to use a fairly large area of coastal marshland for an aquaculture operation. If you were an elected local official, would you support or oppose such a project? Explain. What safeguards or regulations would you impose on the operation?
4. Explain how widespread use of a pesticide can (a) increase the damage done by a particular pest and (b) create new pest organisms. If increased mosquito populations threatened you with malaria or West Nile virus, would you want to spray DDT in your yard and inside your home to reduce the risk? Explain. What are the alternatives?
5. Imagine that everyone in the world began eating only locally produced foods tomorrow. Describe a benefit and a harm that would arise from such a change to (a) yourself, (b) your community, and (c) the world.
6. List three ways in which human activities are affecting the water cycle. How might these effects impact your lifestyle? How might your lifestyle be contributing to these effects?
7. How do human activities increase the harmful effects of prolonged drought? Which of these activities are historical, and which are ongoing? Suggest ways to alter some of these activities in order to make them less harmful.
8. Explain why you are for or against (a) raising the price of water while providing lower rates for the poor and lower middle class, and (b) providing government subsidies to farmers for improving irrigation efficiency.
9. Calculate how many liters and gallons of water are wasted in 1 month by a toilet that leaks 2 drops of water per second. (1 liter of water equals about 3,500 drops and 1 liter equals 0.265 gallon.)
10. How do human activities increase the harmful effects of flooding? Describe an example from the news of how people are trying to change any of these activities to reduce their harmful effects. What are some ways in which other activities can be similarly altered?



## Chapters 14-16 Renewable and Nonrenewable Energy

1. List three ways in which decreasing the need to mine gold and reducing its harmful environmental effects could benefit you (Core Case Study Ch. 14)
2. Explain why you support or oppose each of the following proposals concerning extraction of hard-rock minerals on public land in the United States:
  - a. Halting the practice of granting title to public land for actual or claimed hard-rock mineral deposits
  - b. Requiring mining companies to pay a royalty of 8-12% on the gross income they earn from hard-rock minerals that they extract from public lands
  - c. Making hard-rock mining companies legally responsible for restoring the land and cleaning up environmental damage caused by their activities.
3. To continue using oil at the current rate (not the projected higher exponential rates), we must discover and add to global oil reserves the equivalent of two new Saudi Arabian supplies every 10 years. Do you think this is possible? If not, what effects might the failure to find such supplies have on your life and on the lives of your children or grandchildren?
4. List three actions you can take to reduce your dependence on oil and gasoline in order to save you money and help to slow depletion of the world's oil. Which of these things do you already do or plan to do?
5. Explain why you are for or against increasing oil imports to the United States. If you favor reducing dependence on oil imports, what do you think are the three best ways to do this?
6. Some people in China point out that the United States and European nations fueled their economic growth during the industrial revolution by burning coal, with little effort to control the resulting air pollution, and then sought cleaner energy sources later when they became more affluent. China says it is being asked to clean up before it becomes affluent enough to do this, without greatly slowing its economic growth. How would you deal with this contradiction? Since China's air pollution has implications for the entire world, what role, if any, should the developed nations play in helping it to reduce its dependence on coal and to burn coal more cleanly and efficiently?
7. Explain why you agree or disagree with the following proposals made by various energy analysts as ways to solve U.S. energy problems:
  - a. Find and develop more domestic supplies of oil, particularly offshore
  - b. Place a heavy federal tax on gasoline and imported oil to help reduce the waste of oil resources and encourage use of other alternatives
  - c. Increase dependence on coal
  - d. Increase dependence on nuclear power
  - e. Phase out all nuclear power plants by 2025
8. Imagine that the United States has completed a transition to using only renewable energy, as Iceland plans to do (Core Case Study Ch. 16). Do you think that you would have to give up any of the conveniences you now enjoy? If so, what are they? Describe any adjustments you might have to make in your way of living.
9. Should buyers of energy-efficient vehicles receive large rebates, funded by taxes on gas-guzzlers? Explain.
10. Imagine that you are in charge of the U.S. Department of Energy. What percentage of your research and development budget will you devote to fossil fuels, nuclear power, renewable energy, and improving energy efficiency? How would you distribute your funds among the various types of renewable energy (wind, solar, hydropower, geothermal)? Explain your thinking.

## Chapters 17-19 Health, Air Pollution and Climate Change

1. How can changes in the age structure of a human population increase the spread of infectious diseases? How can the spread of infectious diseases such as HIV/AIDS affect the age structure of human populations?
2. Workers in a number of industries are exposed to higher levels of various toxic substances than are the general public. Should workplace levels allowed for such chemicals be reduced? What economic effects might this have?
3. Explain why you agree or disagree with the proposals for reducing the death toll and other harmful effects of smoking listed in the Case Study on pg. 462. Do you believe there should be a ban on smoking indoors in all public places? Explain.
4. Would you support legislation requiring the use of pollution prevention based on the precautionary principle in deciding what to do about risks from chemicals in the United States? Explain.
5. Photochemical smog is largely the result of motor vehicle emissions. Considering your use, now and in the future, of motor vehicles, what are three ways in which you could reduce your contribution to photochemical smog?
6. Should all tall smokestacks be banned in an effort to promote greater emphasis on preventing air pollution and acid deposition? Explain.
7. Explain how sulfur impurities in coal can increase the acidity of rainwater and deplete soil nutrients.
8. A top U.S. presidential economic advisor once gave a speech in Williamsburg, Virginia, to representatives of governments from a number of countries. He told his audience not to worry about global warming because the average global temperature increases predicted by scientists were much less than the temperature increase he had experienced that day in traveling from Washington, D.C., to nearby Williamsburg. What was the flaw in his reasoning?
9. What changes might occur in (a) the global hydrologic cycle and (b) the global carbon cycle if the atmosphere experiences significant warming? Explain.
10. One way to slow the rate of CO<sub>2</sub> emissions is to reduce the clearing of forests – especially in tropical developing countries where intense deforestation is taking place. Should the United States and other developed countries pay poorer countries to stop cutting their forests? Explain.

## Chapters 20-21 Water Pollution and Waste

1. What were two important roles played by scientists who studied Lake Washington as discussed in the Core Case Study that opens chapter 20? Explain how the story might have been different if the scientists had not fulfilled each of these roles.
2. Lake Washington and Puget Sound now face problems similar to those of the past. Describe the nature of those problems and suggest possible solutions.
3. A large number of dead fish are found floating in a lake. How would you determine whether they died from cultural eutrophication or from exposure to toxic chemicals?
4. If you were a regulator charged with drawing up plans for controlling water pollution, briefly describe one idea for controlling water pollution from each of the following sources:
  - a. An effluent pipe from a factory going into a stream
  - b. A parking lot at a shopping mall bordered by a stream
  - c. A farmer's field on a slope next to a stream
5. What role does population growth play in (a) groundwater pollution problems and (b) coastal pollution problems?
6. Do you think that manufacturers of computers and television sets and other forms of e-waste should be required to take them back at the end of their useful lives for repair, remanufacture, or recycling? Explain. Would you be willing to pay more for these products to cover the costs of such a takeback program? If so, what percent more per purchase would you be willing to pay?
7. Find three items you regularly use once and then throw away. Are there other reusable items that you could use in place of those disposable items? Compare the cost of using the disposable option for a year versus the cost of using the alternatives.
8. Would you oppose having a hazardous waste landfill, waste treatment plant, deep-injection well, or incinerator in your community? For each of these facilities, explain your answer. If you oppose these disposal facilities, how do you believe the hazardous waste generated in your community should be managed?
9. Give your reasons for agreeing or disagreeing with each of the following proposals for dealing with hazardous waste:
  - a. Reduce the production of hazardous waste and encourage recycling and reuse of hazardous materials by charging producers a tax or fee for each unit of waste generated.
  - b. Ban all land disposal and incineration of hazardous waste to protect air, water, and soil from contamination and to encourage reuse, recycling, and treatment of wastes to make them less hazardous.
  - c. Provide low-interest loans, tax breaks, and other financial incentives to encourage industries that produce hazardous waste to reduce, reuse, recycle, treat and decompose such waste.
10. What is environmental justice and how well has it been applied in locating and cleaning up hazardous waste sites in the United States?

## Chapter 22 Sustainable Cities

1. Curitiba, Brazil (Core Case Study) has made significant progress in becoming a more environmentally sustainable and desirable place to live. What steps, if any, has your community taken along these lines?
2. List five ways in which you think a city could encourage residents to recycle.
3. Do you think that urban sprawl is a problem and something that should be controlled? Develop three arguments to support your answer.
4. One issue debated at a U.N. conference was the question of whether housing is a universal *right* or just a *need*. What is your position on this issue? Defend your choice.
5. If you own a car or hope to own one, what conditions, if any, would encourage you to rely less on the automobile and to travel to school or work by bicycle, on foot, mass transit, or by carpool?
6. What are four advantages of urbanization? What are four disadvantages of urbanization?
7. Describe four phases of urban growth in the United States.
8. Describe some of the problems faced by the poor who live in urban areas. How can governments help to reduce these problems? Describe the urban problems in Mexico City, Mexico.
9. What are the five guiding principles of new urbanization?
10. Do you believe the United States should develop a comprehensive and integrated mass transit system over the next 20 years, including an efficient rapid-rail network for travel within and between its major cities? How would you pay for such a system?

## Chapters 23-24 Economics and Politics

1. According to one definition, *sustainable economic development* involves meeting the needs of the present human generation without compromising the ability of future generations to meet their needs. What do you believe are the needs referred to in this definition? Compare this definition with the characteristics of a low-throughput economy described in figure 23-13.
2. Is environmental regulation bad for the economy? Explain. Describe harmful and beneficial forms of environmental regulation.
3. Do you believe we have an ethical responsibility to leave the earth's natural systems in as good a shape as they are now or better? Explain. How is meeting this responsibility related to the discount factor (pg. 616)
4. Suppose that over the next 20 years, the environmental and health costs of goods and services are internalized until their market prices more closely reflect their total costs. What harmful effects and what beneficial effects might such full-cost pricing have on your lifestyle?
5. Pick an environmental problem that affects the area where you live and decide where in the policy cycle (figure 24-2) the problem could best be placed. Apply the cycle to this problem and describe how the problem has progressed (or will likely progress) through each stage.
6. Government agencies can help to keep an economy going or to boost certain types of economic development by, for example, building or expanding a major highway through an undeveloped area. Proponents of such development have argued that requiring environmental impact statements for these projects interferes with efforts to help an economy. Do you agree? Is this a problem? Why or why not?
7. Describe efforts by the Netherlands to develop and implement a national environmental plan, or green plan. What are four guidelines for shifting to more environmentally sustainable societies?
8. Describe the roles of grassroots and mainstream environmental organizations and give an example of each type of organization.
9. Explain how and why U.S. environmental laws have been under attack since 1980. How effective have the attacks been?
10. 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?