**APES Study Guide**

**Unit 10: AIR POLLUTION, CLIMATE DISRUPTION & OZONE DEPLETION**

 *In this unit we will examine indoor and outdoor air pollution. In addition we will study, the science of climate change and ozone depletion as well as important background information on atmospheric science and climate.*

**Textbook Reference:**

Chapter 18 – Air Pollution

Chapter 19 – Climate Disruption and Ozone Depletion

**Vocabulary:**

*Directions: Review key vocabulary, words may appear in quizzes and/or tests. You are not required to write the definitions but are encouraged to review them online*

Chapter 18

acid deposition

air pollution

atmospheric pressure

carbon oxides

industrial smog

nitrogen oxides

nitric acid

ozone

ozone layer

particulates

photochemical smog

primary pollutants

secondary pollutants

stratosphere

sulfur dioxide

sulfuric acid

temperature inversion

troposphere

volatile organic compounds (VOCs)

Chapter 19

carbon capturing and storage (CCS)

ozone

**Study Guide Questions (SGQ):**

*Directions:**Answer in complete sentences in your composition books. (must be handwritten)*

Chapter 18

1. Describe the major differences between the troposphere and stratosphere.
2. What is air pollution?
3. Distinguish between primary pollutants and secondary pollutants and give an example of each.
4. Describe the effects of lead as a pollutant and how we can reduce our exposure to this chemical.
5. Describe a chemical method and a biological method for detecting air pollutants.
6. Distinguish between industrial smog and photochemical smog in terms of their chemical composition and formation.
7. What is a temperature inversion and how can it affect air pollution levels?
8. What is acid deposition and how does it form? What are its major environmental impacts on vegetation, lakes, human-built structures, and human health.
9. List three major ways to reduce acid deposition.
10. What is the major indoor air pollutant in many developing countries?
11. What are the top four indoor air pollutants in the United States?
12. Describe indoor air pollution by radon- 222 and what can be done about it.
13. Briefly describe the human body’s defenses against air pollution, how they can be overwhelmed, and the illnesses that can result.
14. Approximately, how many people die prematurely from air pollution each year in the world and in the United States? What percentage of these deaths are caused by indoor air pollution?
15. Describe air pollution laws in the United States.
16. Summarize the positive effects of such laws and discuss how the laws can be improved.
17. List the advantages and disadvantages of using an emissions trading program.
18. Summarize the major ways to reduce emissions from power plants and motor vehicles.

Chapter 19

1. Describe atmospheric warming and cooling over the past 900,000 years and during the last century.
2. How do scientists get information about past temperatures and climates?
3. What is the greenhouse effect and why is it so important to life on the earth?
4. How have human activities affected atmospheric greenhouse gas levels during the last 275 years and especially in the last 30 years?
5. List the major human activities that add CO2, CH4, and N2O to the atmosphere.
6. After studying past climate change and the nature of the earth’s climate system for almost three decades, what two general conclusions did most of the world’s climate scientists agree on about atmospheric warming over the past 30 years? How did scientists arrive at these two general conclusions, and why was this such a rare event?
7. How do scientists use models to make projections about future temperature changes?
8. How can positive feedback loops affect future temperature changes and thus global climate? Give two examples of such loops.
9. Describe the contribution of waste heat from energy conversion devises to projected climate disruption.
10. Describe how each of the following might contribute to projected atmospheric warming and resulting global climate disruption: (a) CO2 emissions, (b) a hotter sun, (c) the oceans, (d) cloud cover and (e) air pollution. What are three effects of increasing atmospheric CO2 levels on the oceans?
11. Briefly describe how projected climate disruption is likely to affect: (a) drought, (b) ice cover, (c) permafrost, (d) sea levels, (e) extreme weather, (f) biodiversity, (g) crop yields, and (e) human health during this century.
12. List seven examples of climate tipping points we could be approaching.
13. What are five factors that make it difficult to deal with the problem of projected climate disruption?
14. Describe the interactions among science, politics and climate.
15. Describe John Sterman’s bathtub analogy as it applies to CO2 emissions.
16. What are three major prevention strategies and three major cleanup strategies for dealing with projected climate disruption?
17. List six steps that governments could take to help slow projected climate disruption.
18. What is a pollutant and why is CO2 being classified as a pollutant?
19. What are the advantages and disadvantages of using taxes on carbon emissions or energy use to help reduce greenhouse gas emissions?
20. What is cap-and-trade and what are the advantages and disadvantages of using it to help reduce greenhouse gas emissions?
21. What are the pros and cons of developing an international treaty to help deal with the threat of projected climate disruption?
22. What is the U. S. city of Portland, Oregon, doing to help reduce its greenhouse gas emissions?
23. What is China doing to help reduce its contribution to the climate disruption?
24. What is the United States doing to help reduce its contribution to this problem?
25. List five ways in which you can reduce your carbon footprint.
26. List five ways in which we can prepare for the possible long- term harmful effects of climate change.
27. Describe how human activities have depleted ozone in the stratosphere, and list five harmful effects of such depletion.
28. How are the problems of atmospheric warming and ozone depletion connected?