APES Unit 7: Air Pollution Review Packet: *This review packet is meant to help prepare you for your exam, but it should **not** be the only thing that you use to study. This packet provides you with the opportunity to practice the skills necessary for your exam. Refer to the textbook and presentation slides for additional material.*

Part 1: Review Questions – Surface Layer

1. List the percentages of nitrogen, oxygen, and carbon dioxide in Earth's atmosphere.
2. What ecosystem service does the atmosphere provide?
3. Describe the Coriolis Effect.
4. Describe El Nino and La Nina.
5. What are the four layers of the atmosphere – what are characteristics found in each layer?
    a. Where is the "good" ozone found?
6. What are the benefits of stratospheric ozone? What are the harmful consequences of tropospheric ozone?
7. Know the difference between a primary and secondary air pollutant.
8. Identify the criteria pollutants, their characteristics, and where they come from.
    a. Particulate matter
    b. NOx
    c. SOx
    d. COx
    e. Hydrocarbons
    f. CFCs
    g. Ozone
9. Be familiar with all parts of the Clean Air Act.
10. Be able to describe thermal inversion and how it leads to smog.
11. Define VOC, Industrial smog, and photochemical smog.
    a. Relate photochemical smog to ozone pollution. When is it the worst, and why?
12. What is acid deposition and how does it occur? What are the environmental effects? Which gases cause acid rain? Equations.
13. Describe how the ozone is being depleted; identify which areas are the most affected. Know the chemical equation (flow chart) for CFC's and ozone depletion.
14. Be familiar with the Montreal Protocol and why it was so monumental in environmental protection.
15. Be familiar with technological advances to prevent air pollution like wet scrubbers, electrostatic precipitators, and catalytic converters.
16. Know the relationship between global climate change and global warming.
17. Know the five primary greenhouse gases. Which one is in the highest concentration in our atmosphere? Which one's are more potent?
18. Describe the process of the greenhouse effect. Understand why it is required for life on earth, but why it can be drastically changed with a slight increase in concentration of GHG.
19. Understand the positive feedback loop that's generated with CO2 in terms of being a greenhouse gas. Understand the negative feedback loop in terms of CO2's role in photosynthesis.

20. Understand the albedo effect and how different surfaces on earth reflect or absorb heat/UV radiation.
21. Be able to identify the relationship between temperature and CO2 concentrations. (Keeling curve)
22. Describe why ice cores and tree rings can be indicative of environmental conditions in the past.
23. Be able to describe the results of climate change as seen thus far on earth.
24. Understand CERLA and the importance of remediation after wildfires in urban areas. Know the toxic waste from urban fires.
25. Be familiar with the Kyoto Protocol and its regulations
26. Understand how forest fires lead to environmental disasters and air pollution- be familiar with toxic materials found in homes.
27. Understand how noise can be a pollutant- especially for sea life

Part 2: Practice Test - Application

Use the following choices to answer questions 1-3

a. Sulfur dioxide b. lead c. ozone d. hydrocarbonse. particulates

1. Most often cited as the causative factor for acid deposition.
2. Implicated in human neurological damage
3. Considered harmful in the troposphere but beneficial in the stratosphere

4. The polar regions radiate away more heat energy than they receive from the Sun in the course of a year. However, they are prevented from becoming progressively colder each year primarily by the:

a. Absorption of ultraviolet radiation by snow
b. Transport of heat through the atmosphere and oceans
c. Concentration of Earth's magnetic field lines at the poles
d. Release of latent heat to the atmosphere when the polar ice caps melt

5. The major source of radon in houses in the United States is:

a. Furniture and carpets
b. The underlying bedrock
c. The troposphere
d. Nuclear power plants

6. Acid rain is associated with which of the following?

a. Formation of the Antarctic ozone hole
b. Damage to tropical rain forests
c. The burning of fossil fuels, primarily coal.
d. The increasing pH of lake waters.

7. Ground level ozone in most United States cities results primarily from:

a. Burning fuel
b. Burning fuel for cooking
c. Producing electric power
d. Industrial emissions
e. Motor-vehicle exhaust

8. Smoke from forest fires is most likely to affect air quality over larger areas for many days when:

a. Smog is produced due to chemical reactions in the atmosphere
b. A persistent atmospheric inversion exists in the region
c. Oak trees are burned, releasing terpenes into the atmosphere
d. Primary, rather than secondary, forests are burned

9. Which of the following would be the most likely effect of acid deposition on a northern forest?

a. Decreased ability of trees to withstand cold weather
b. Decreased concentration of H^+ ions in the soil
c. Increased buffering capacity of the soil
d. Increased rates of photosynthesis in evergreen needles

10. Which of the following devices is used to remove sulfur dioxide from coal power plant emissions?

a. electrostatic precipitator b. baghouse filter c. catalytic converter d. scrubber

11. Which of the following is a common component of photochemical smog and is a reddish-brown gas with a pungent odor?

a. Carbon monoxide, CO
b. Nitrogen dioxide, NO_2
c. Ammonia, NH_3
d. Ozone, O_3
e. Methane, CH_4

12. Which of the following air pollutants is correctly paired with one of its major effects?

a. Particulates . . production of photochemical smog
b. Radon . . global climate change
c. sulfur oxides . . acid deposition
d. Lead . . skin cancer
e. Carbon oxides . . ozone layer depletion

13. Recent studies show that the decline of some tree populations in the northeastern United States is due to a combination of factors. Which of the following is the most important factor?

a. Toxic metals freed by acid deposition

b. Carbon dioxide produced by coal-fueled electric power plants
c. Carbon monoxide released in motor vehicle exhaust
d. Lead emissions produced by smelters
e. Radon produced in the Earth's crust

14. Which of the following is true about the region of the Earth's atmosphere known as the stratosphere?

a. It is the warmest layer of the atmosphere because it is closest to the Sun.
b. Most of the atmospheric water vapor is found in this layer
c. It is the layer of the atmosphere in which nearly all weather takes place
d. The highest concentration of naturally occurring ozone forms in this layer
e. It is characterized by steadily decreasing temperature with altitude

15. The drop in stratospheric ozone levels in the Southern Hemisphere (the "ozone hole") is most evident during which season?

a. Antarctic spring (October)
b. Antarctic autumn (April)
c. Antarctic summer only (January)
d. Antarctic winter only (July)
e. Both Antarctic summer and Antarctic winter (January and July)

16. True statements about ozone include which of the following?

I. It is a pollutant in the troposphere
II. It filters out most of the UVB radiation in the stratosphere.
III. Most of it is formed in the stratosphere by reaction between carbon dioxide and free oxygen atoms

a. I only b. II only c. III only d. I and II only e. I, II, and III

17. All of the following are likely consequences of indoor air pollution EXCEPT an increase in

a. The development and exacerbation of asthma
b. The risk of developing lung cancer
c. The risk of developing skin cancer
d. Flu-like symptoms, chronic fatigue, and nausea
e. Respiratory diseases leading to premature death

***READ: Be sure to complete AP Classroom Multiple Choice questions as well. Be sure to review past FRQ's on AP College Board website to study for the FRQ portion of this test. Also, any previous unit material can and will be included on this unit test!**