

## APES- Chapter #10: Environmental Health, Pollution and Toxicology

Name: \_\_\_\_\_

**Learning Objectives:** Serious environmental health problems and diseases may arise from toxic elements in water, air, soil, and even the rocks on which we build our homes. After reading this chapter, you should understand:

- *How the terms **toxic, pollution, contamination, carcinogen, synergism, and biomagnifications** are used in environmental health*
- *What the classification and characteristics are of major groups of pollutants of environmental toxicology*
- *Why there is controversy and concern about synthetic organic compounds such as dioxin*
- *Whether we should be concerned about exposure to human-produced electromagnetic fields*
- *What the dose-response concept is and how it relates to **LD-50, TD-50 and ED-50, ecological gradients, and tolerance***
- *How the process of biomagnifications works and why it is important in toxicology*
- *Why the threshold effects of environmental toxins are important*
- *What the process of risk assessment in toxicology is and why such processes are often difficult and controversial*
- *What the precautionary principle is and why it is important*

### **Read: Toxic Air Pollution and Human Health: Story of a Southeast Houston Neighborhood**

1: *What are some of the chronic health effects of exposure to Benzene?*

2: *What are some of the potential sources of Benzene in the environment?*

3: *Why is it so hard to link health problems to toxic air pollution?*

4: *Why it is said that between a state of health and a state of disease is a gray zone of suboptimal health, a state of imbalance?*

5: **Explain what happened at Lake Nyos, Cameroon.**

6: *What is the difference between a pollutant and a contaminant?*

7: **Define** the following:

- Toxin:
- Toxicology:
- Carcinogen:
- Synergism:
  
- Point sources: **Give example:**
  
- Area sources (non-point): **Give example:**
  
- Mobile sources: **Give example:**

8: *Define the following: (Identify when they are used)*

- ppm:
- ppb:
- mg/L:
- $\mu\text{g}/\text{m}^3$ :

9: What is an ***Infectious Agent***? (*Give examples*):

### **A Closer Look 10.1**

#### **Sudbury Smelters: A Point Source**

10: *Explain what happened* to the area surrounding the Sudbury Smelter as a result of the release of heavy metal pollution into the air

11: What are some **common heavy metals** found in the environment? *What health hazards can they pose to humans*

12: What is the concept of *Body Burden*?

What are the body burdens for the following?

- **Antimony:**
- **Mercury:**
- **Arsenic:**
- **Cadmium:**
- **Lead:**

13: Define *biomagnification/bioaccumulation*:

14: Describe how *Cadmium* is a good example of biomagnification.

15: How does *Mercury* enter the environment?

16: Define *Methylation*:

17: Define *Volatilization*:

Read: A Closer Look 10.2- *Mercury and Minamata, Japan*

*What are the 4 major factors that must be considered in evaluating and treating toxic environmental pollutants?*

18: Define: *Persistent Organic Pollutant (POP)* and describe the properties that define them

Read: A Closer Look 10.3- *Dioxin: How Dangerous is it?*

*How is Dioxin produced?*

*What happened in Times Beach, Missouri?*

19: Give some examples of **HAA's**:

20: Explain how PCB's are harmful (*found in plastics*):

Read: A Closer Look 10.4- *Demasculinization and Feminization of Frogs*

*Explain how hormone disruptors (Endocrine disruptors) work*

21: How can *Thermal Pollution* affect a body of water and it's biodiversity? **Explain.**

22: What are *examples of particulates*?

23: Why is **asbestos** harmful to humans?

24: How can *EMF (Electromagnetic Fields)* be harmful to humans?

25: How is *noise pollution* measured?

26: What are some *voluntary exposures* to pollutants?

27: What is meant by the quote, “*everything is poisonous, yet nothing is poisonous*”?  
**Explain.**

28: Describe the “*dose-response*”. **Draw and label** the generalized dose-response curve.  
**Explain each step.**

29: *Define the following:*

- **LD-50:**
- **ED-50:**
- **TD-50:**
- **LD-0:**

30: Explain the concept of a *threshold dose*:

31: *Define:*

- **Behavioral tolerance:**

- **Physiological tolerance:**
- **Genetic tolerance:**

32: Explain the difference between an *acute and chronic effect*.

33: Explain the steps of **risk assessment**:

34: What is the *precautionary principle*?

Read: ***“Is Lead in the Urban Environment Contributing to Antisocial Behavior”***

35: What is the main point of the discussion about lead in the bones of children and behavior?

36: Why is it difficult to establish standards for acceptable levels of pollution? *In giving your answer, consider physical, climatological, biological, social, and ethical reasons.*

