**APES Study & Review – Water Resources and Pollution Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| Percentage of Earth’s salt water =  Percentage of Earth’s fresh water =  Percentage of frozen fresh water =  Percentage of freshwater available for human use = | Define watershed: | |
| List 4 causes of water scarcity: | Define groundwater: | |
| Ways to increase water supply Advantage Disadvantage  1.  2.  3.  4.  5. | | |
| Summarize a key lesson learned from the following case studies:  *Colorado River*  *Egypt’s Aswan Dam*  *The California Water Project*  *The James Bay Project*  *The Aral Sea disaster* | | |
| What can be learned from the Ogallala Aquifer experience? | | Distinguish between *riparian rights* and *prior appropriation* to regulate water use. |

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| What percentage of water is wasted through the world?  Describe measures that can be taken to reduce water losses through each of the following:  *irrigation*  *industry*  *home use* | |
| Summarize the lessons learned from the problems that were generated by the development of the Columbia River Basin.  Summarize the plans to address those problems. | |
| List three ways that humans contribute to flooding. | List four strategies humans employ to minimize the risks of flooding. |
| List and describe four ways humans use to control flooding. | |

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| Types of water pollutants Example  1.  2.  3.  4.  5.  6.  7. | |
| List three strategies to determine the presence of infectious agents in water. | Summarize the three major sources of water pollution. |
| Draw an oxygen sag curve to illustrate what happens to dissolved oxygen levels in streams below points where degradable  oxygen-demanding wastes are added. | |
| Compare problems of lake water pollution to those of stream pollution. | |
| Describe the difference between eutrophication and cultural eutrophication. | |
| Describe what is happening to the quality of coastal waters and how coastal waters can be protected. | |
| Describe the status of ocean dumping and oil spills in the ocean. | |
| List four ways to prevent coastal water pollution. | List four ways to cleanup coastal water pollution. |
| List the major pollutants of groundwater. | Explain why cleanup of groundwater is so difficult. |
| Briefly describe two major laws that protect water quality in the United States. | |
| Distinguish between primary, secondary, and tertiary sewage treatment. | |
| Describe how public drinking water is purified. | |

**FRQs**

1. With increasing human population and increasing affluence comes an increase in the consumption of energy. Typically, developed nations have relied on fossil fuels to supply their growing industrial needs. However, with the knowledge of environmental problems associated with conventional fuels, nations are looking at “cleaner” sources of electrical production, such as hydroelectric power.

a. Identify and describe 3 benefits of utilizing large dams over the use of fuels such as coal to supply power.

b. Discuss 3 environmental problems associated with large dams.

c. Identify and explain the function of 2 structural pieces of dam technology and how it produces electricity.

d. List one major dam that is on the Colorado River and the reservoir it creates.

2. There is much evidence to indicate that humans are a major factor in the extinction of species. Some researchers estimate that one-fifth of the Earth’s current species will be extinct by 2030. Assume that you are an environmental scientist employed by the US Fish and Wildlife Service. You have been assigned to write a report examining the effect of four types of human activity on the biodiversity of aquatic systems, both freshwater and saltwater. The report must include the type of habitat affected and the specific effects of the human activity. Here are some areas to include.

a. How have agricultural activities affected fresh water and coastal zones?

b. How does tourism affect biodiversity and water quality?

c. How has increasing demand for shrimp, and therefore shrimp farms, impacted the coastal zones?

d. How does fishing affect biodiversity in: (i.) coastal zones, (ii.) open sea, (iii.) streams, (iv.) lakes

3. Two years ago, there was a significant fish kill on a small tributary of one of the major rivers in the eastern part of the USA. After investigating the problem for some time, officials of the State Environmental Protection Agency were unable to pinpoint the source of the problem. Instead, they concluded that pollutants in the runoff from the spring rains were the most likely the source of the problem.

a. Describe TWO man-made contributors and ONE natural contributor of non-point water pollution.

b. Describe FOUR strategies that can be used to control and manage water pollution from the non-point sources.

c. Give TWO reasons why it is harder to control water pollution from non-point sources than from point sources.

d. Name TWO contaminants that are more likely to come from non-point sources than from point sources.

4.



Oil spills can be devastating in scope and damage. Since 1900, there have been many oil spills around the world

that have had significant ecological and economic impacts.

a. Using the data in the graph above, determine the maximum volume of oil estimated to have been spilled during the Deepwater Horizon (BP) incident.

b. Describe TWO environmental problems that can result from oil spills in coastal areas.

c. Identify one economic impact that results from oil spills in coastal areas.

d. Chemical dispersants have been used in cleanup efforts following major oil spills.

(i) Discuss both one advantage and one disadvantage of the use of chemical dispersants for oil spill cleanup.

(ii) Identify either one biological or one physical method (other than chemical dispersal) used for oil spill cleanup in coastal waters or on beaches and describe how the method is used.

e. Catastrophic spills make up less than 20 percent of the oil that pollutes marine waters. Identify one other source of oil contamination and explain how the oil from this source enters marine waters.

f. Petroleum has many uses as a raw material for consumer goods. Identify one substitute for petroleum in a specific consumer product (other than fuel).