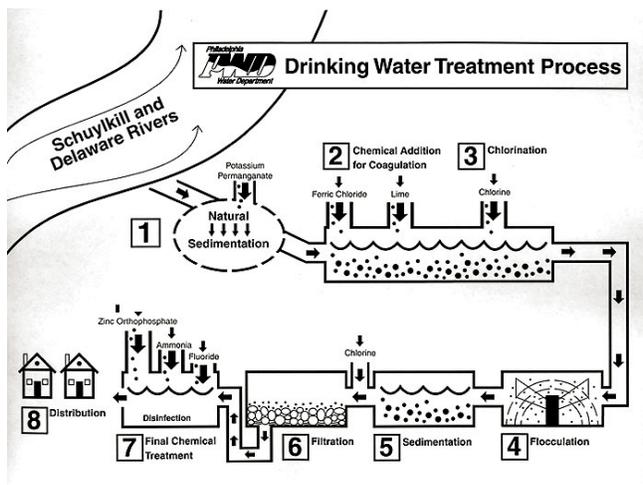


Unit 4 Formative Assessment – Freshwater (*Streams, Rivers, Groundwater*)

1. The picture below shows typical steps in water treatment. Match the treatment step with its description below.

1. Natural Sedimentation... **G**
2. Chemical Addition for Coagulation... **A**
3. Chlorination... **D**
4. Flocculation... **H**
5. Sedimentation... **F**
6. Filtration... **B**
7. Final Chemical Treatment... **C**
8. Distribution... **E**

- A. Chemicals are added and mixed into the water.
- B. The water is drawn through fine filters, made of sand, and crushed coal, to remove any remaining particles.
- C. Fluoride is added to prevent tooth decay, ammonia is added to counter chlorine taste, and zinc orthophosphate is added to reduce pipe corrosion.
- D. Chlorine is added to kill disease-causing organisms.
- E. The treated water is ready to be distributed to the community.
- F. The smaller particle joined together, settle.
- G. Water is pumped from the river and stored in reservoirs to allow the heaviest particles to settle and the lightest materials to float.
- H. The water and chemicals are mixed to help the small particles coagulate or bind together.



2. There are a number of chemical, biological and physical tests that can be done to determine water quality. List two of each type of test and indicate its purpose.

****Physical:**

Turbidity – Determines amount of solid, suspended particles (JTU)

Temperature- Determines amount of dissolved oxygen

****Chemical:**

**pH – Measures presence of hydrogen ions.
Change water pH → determines pollution level**

Dissolved Oxygen – Water's oxygen supply & is inversely proportional to water temp (ppm)

Nitrates – Nutrient supply for plants/animals to build protein (food) (ppm)

Phosphates – Nutrient supply for plant/animal growth (ppm)

****Biological:**

Coliform Bacteria – Indicates presence of animal fecal matter in water

Other Life Forms – Indicates relative water health to support other organisms

3. Potable water is

- a. **Safe to drink**
- b. Not safe to drink
- c. Needs to be purified before drinking

4. Flood events

- a. **Occur more often when the water table is high.**
- b. Occur more often when the water table is low.
- c. Are not affected by the water table.
- d. Only occur in wet climates.

5. Which of the following is NOT an effect of sediment in water?

- a. Sediment can result in decreased resistance to disease.
- b. Sediment prevents fish from seeing their food and habitat.
- c. Sediment in water raises water temperatures.
- d. **Sediment helps to purify water.**

6. Which factor is most important in determining the erosive power of a stream?

- a. Stream discharge
- b. Dissolved load
- c. **Stream velocity**
- d. Channel width

7. When a soil is impermeable, it

- a. Has not water in it at all.
- b. Has large pore spaces.
- c. Allows water to flow freely through it.
- d. **Does not allow water to pass through it.**

8. Which of these features is a landform associated with karst topography?

- a. **Sinkholes**
- b. Streams
- c. natural levees
- d. Deltas

9. What are the major environmental problems associated with the use of ground water?

**** Overuse (Non-coastal) – Leads to Karst Topography**

**** Overuse (Coastal) - Saltwater Intrusion**

**** Overuse (General) – Aquifer depletion & subsidence**

**** Contamination – Pumping wells/Cone of Depression**

10. What type of stream valley is formed primarily by a fast running mountain stream?

- a. **V shaped**
- b. U shaped
- c. W shaped (multiple valleys)
- d. S Shaped with lots of meanders

11. Why are leaking landfills and septic tanks of concern to people who use groundwater?

**** Leakage pollution could contaminate groundwater that is used for wells, as well as other bodies of water (rivers, streams, oceans)**

12. What type of rock is often associated with formation of caverns and karst topography?

- a. Soapstone
- b. Lemonstone
- c. Pearstone
- d. **Limestone**

13. All of the following elements or compounds in water are harmful except

- a. Arsenic
- b. Lead
- c. Mercury
- d. **Calcium**

14. A successful well should be located

- a. **Below the water table in an aquifer**
- b. Near a hot springs
- c. In impermeable material like clay
- d. In a karst dry cave

15. Define transpiration. How is it a part of the water cycle?

**** Plants release water vapor (evaporation) into the atmosphere through its stoma.**

**** The evaporated water vapor can then condense and form cloud droplets/precipitation to continue precipitation over land/water.**

16. What causes sinkholes or subsidence? How can they be prevented?

**** Sinkholes and subsidence are caused when there is less fresh water in an aquifer due to overuse and the land above sinks or collapses.**

**** *Excessive pumping of groundwater/wells.***

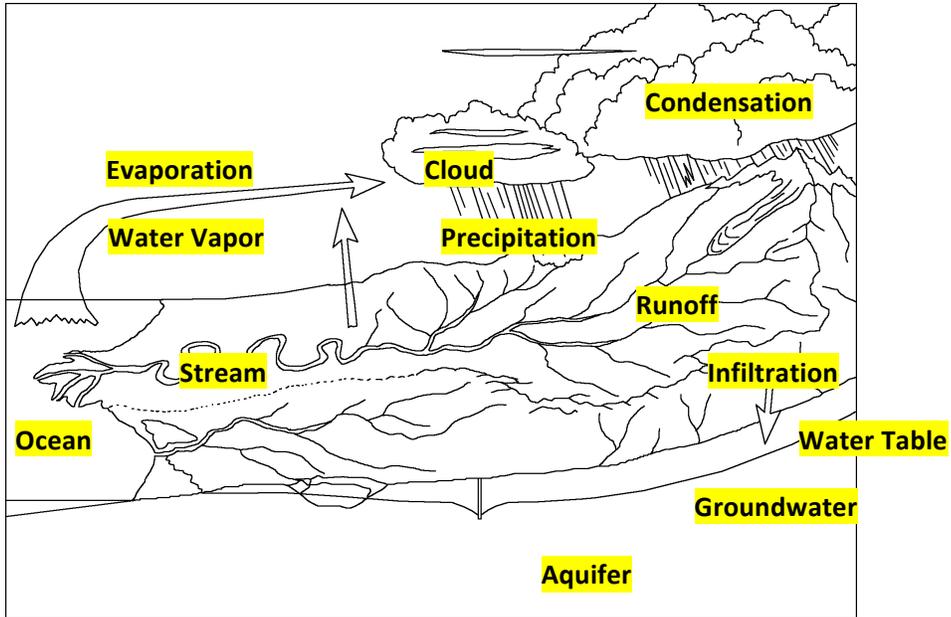
**** Subsidence can be prevented by re-charging (re-supplying water) the aquifer.**

17. Where do we find most of the water on Earth? The most freshwater on Earth?

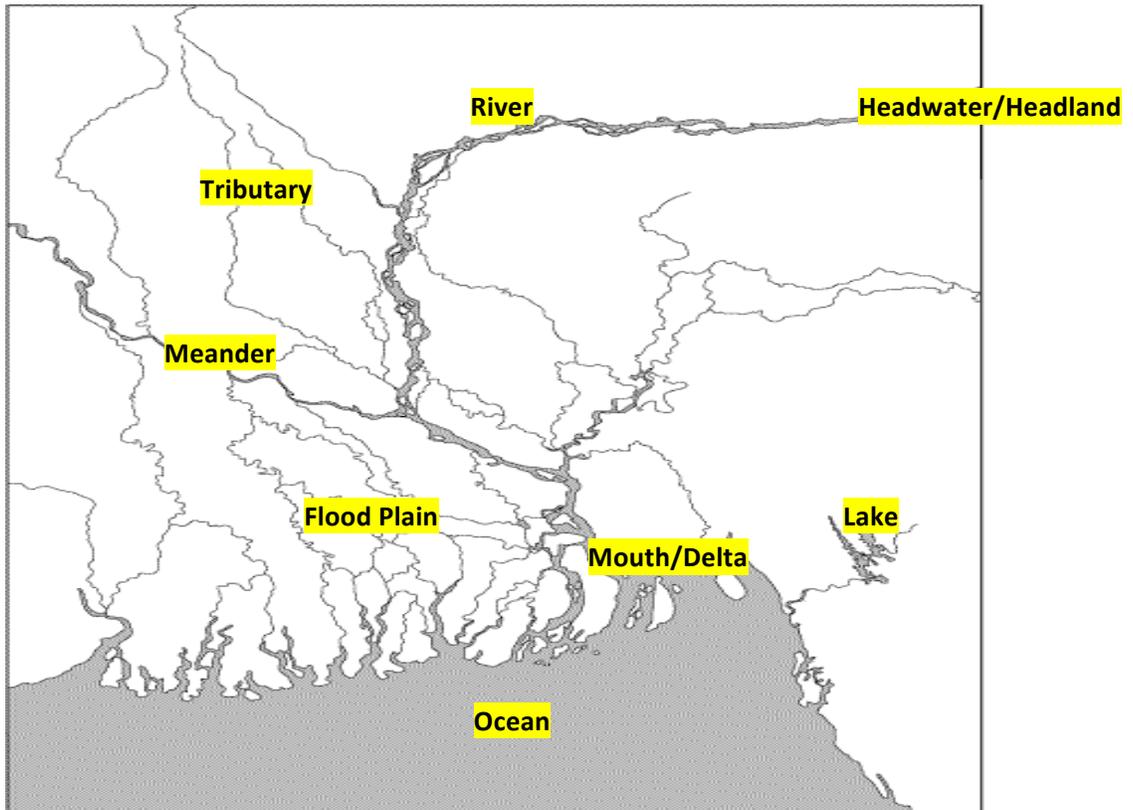
**** Most water is found in the oceans (~97%)**

**** Most fresh water is found on land (glaciers, icebergs, ice sheets, groundwater, lakes, rivers) (~3%)**

18. On the water cycle diagram, label the following: evaporation, condensation, precipitation, ground water, run off, stream, water vapor, ocean, aquifer, water table, cloud and infiltration.



19. Label a river system. Include the terms headlands, tributary, river, delta, mouth, ocean, flood plain, lake, and meander. Part of the terms can be labeled on the picture below.



20. Which is the longest river in North Carolina?

- a. **Neuse**
- b. Savannah
- c. Tar
- d. Cape Fear

21. What river had the widest mouth in America?

**** Neuse River – Stretches 248 miles from Falls Lake Reservoir Dam to its mouth at Pamlico Sound. Neuse River is not only the longest river in NC, but at its mouth, it is the widest river in America (6 miles across)**

22. For infiltration to occur, the ground must be (choose two):

- a. **Permeable**
- b. saturated
- c. impermeable
- d. **unsaturated**

23. What type of soil would allow the most infiltration of water?

- a. clay
- b. silt
- c. sand
- d. **gravel**

24. The most freshwater is used for:

- a. **agriculture**
- b. drinking
- c. landscaping
- d. industry

25. Define river basin and watershed.

**** Watershed and river basin are synonyms of one another. They are land areas that drain into a major river (including its tributaries), as well as lakes.**

26. Saltwater intrusion most impacts:

- a. Lakes and ponds
- b. reservoirs
- c. **groundwater**
- d. cropland

27. Which of the following are point sources of pollution?

- a. Fertilizer runoff
- b. agriculture waste
- c. **paint poured down a factory drain**
- d. salt and gasoline from rural roads

28. Which of the following is NOT a non-point source of pollution?

- a. Road run off of gasoline and oil
- b. salt from icy roads

c. Partially treated wastewater from a water treatment plant

29. How can we protect ground water?

**** Legislation – Stricter limits on groundwater overuse (*conservation*) to prevent aquifer depletion/contamination**

30. Define stream load. How do most streams carry the majority of their load?

**** Capacity of a stream/river that can carry sediments.**

**** Types of stream loads include bed loads (large particles), suspension loads (small particles that float), and solution loads (dissolved). Most streams carry their load in suspension.**

31. What factors impact a stream's ability to erode and transport material downstream?

**** Stream Velocity – Rate of water flow**

**** Discharge – Depth and width of stream to be able to transport/carry materials downstream**

32. What kind of topography is represented in the picture below?

Limestone Bedrock = Karst Topography

