

Aquatic Science Fall Final Review

Electronic copies of all notes, powerpoints, and textbook chapters are available on my web site

Unit 1 – Intro to Freshwater Ecology (Notes, powerpoint, and Guide to Freshwater Ecology Chapters 1, 2, and 4)

1. What are the distinguishing characteristics of the four main types of wetland: Marsh, swamp, bog, and fen.

Marshes – Seasonal or permanent shallow water originating from surface water runoff and floodwaters. The marsh is dominated by soft-stem woody vegetation.

Swamps – Areas characterized by very wet soils during the growing season and standing water during certain times of the year. Swamps are dominated by trees and scrubs. Swamps occur in freshwater or saltwater floodplains.

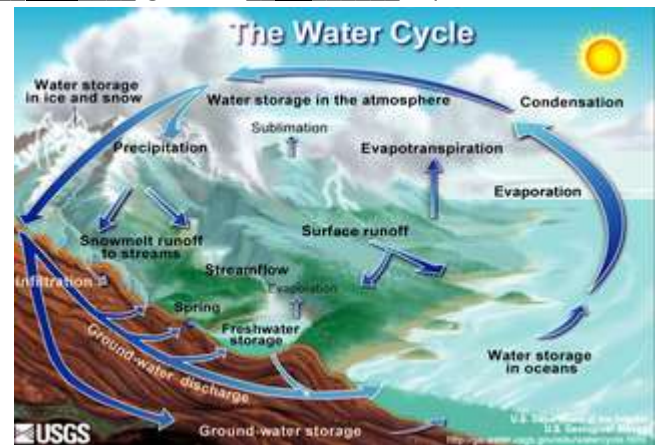
Bogs – Characterized by floating, spongy peat deposits covered by a thick layer of sphagnum moss with evergreen trees and shrubs. Bog ecosystems support carnivorous plants like pitcher plants. Bogs, more acidic than fens, are typically found in the northern US.

Fens – Groundwater-fed, peat-forming wetlands that are covered by grasses, sedges, and reeds with willow and birch trees. Fens, more alkaline than bogs, are typically found in the northern US.

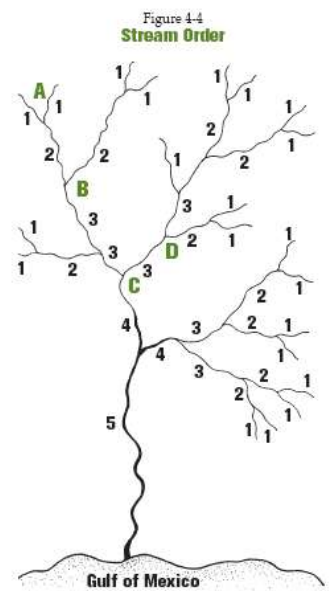
2. How can you tell a marsh from a swamp? **Marshes are dominated by grasses, swamps are dominated by trees.**
3. What percentage of the world's water is found in the oceans 97% glaciers 2% liquid freshwater <1%

4. What unique characteristic of water insulates aquatic organisms in cold climate from extreme cold temperatures? **Ice is less dense than liquid water. This means that lakes and the ocean in extremely cold areas will develop a protective layer of ice on the surface that insulates the water underneath.**

5. Diagram the water cycle and identify the different processes.



6. Within which river basin in Waco located? **Brazos River**
7. What is the only naturally formed lake in Texas? **Caddo Lake**
8. What is the difference between a lentic and lotic system? **Lentic is still water (ponds and lakes) lotic is flowing water (streams and rivers)**
9. What is the difference between a perennial, intermittent, and ephemeral stream? **perennial is always flowing, intermittent is sometimes flowing sometimes dry depending on the season, ephemeral is always dry except during a rainstorm**
10. Draw a diagram showing 1st, 2nd, and 3rd order streams **See diagram**
11. What is a riparian zone? **A zone of vegetation that borders a stream or river**
12. What are the stages of lake succession and do lakes become deeper or shallower with age? **Lakes become shallower over time as the fill in with sediment until they**



eventually become a wetland and then dry land

13. What is a drainage basin? **A geographic area within which all streams and rivers drain into a single outlet.**
14. What is a watershed? **Similar to a drainage basin except that the term watershed is generally used more broadly to include all the habitat and activity within a drainage basin.**

Unit 2 – Water Pollution (*notes and Guide to Freshwater Ecology Chapter 3*)

15. What is the leading cause of water pollution in the U.S.? **Agriculture**
16. What is the difference between point source and nonpoint source pollution? **Point source pollution comes from a single discharge pipe such as from a factory or refinery. Nonpoint source pollution comes from a dispersed area such as lawns and parking lots.**
17. What are some examples of both point source and nonpoint source pollution? **Point source: Factories, refineries, water treatment plants. Nonpoint source: Farms, golf courses, lawns, highways, parking lots.**
18. What is cultural eutrophication? **When human activities (such as overfertilizing) cause a lake to become overloaded with nutrient pollution and experience algal blooms**
19. What is the process of nitrification? **The process where ammonia is broken down by bacteria into nitrites and then further broken down by other bacteria into nitrates.**
20. What is the preferred pH range for most aquatic organisms? **6-8**
21. Why is fecal coliform bacteria (*E. coli*) used as an indicator species and what does its presence indicate? **Fecal coliform bacteria naturally grow in the intestines of humans and other animals. It is used as an indicator species because it indicates that human or animal waste is in the water.**
22. Aquatic species can be divided classified into pollution intolerant, intermediate, and pollution tolerant species. What mix of species would we expect to find in a healthy stream? **A mix of all types of species.**
23. What is the difference between acute and chronic toxicity? **Acute toxicity: causes fatality right away or quickly. Chronic toxicity is the long-term effect of sublethal levels of a substance which alters growth, reproduction, or development of aquatic organisms.**
24. Nitrates and phosphates are examples of what kind of pollution? **Plant nutrients**
25. What are the negative effects of higher water temperature on fish? **Warmer water contains less dissolved oxygen which stresses fish.**
26. What class of pollutants causes algal blooms? **Plant nutrients**

Unit 3 – Macro and Micro invertebrates (*Notes, powerpoint, and Chapters 5 and 6 in Guide to Freshwater Ecology*)

27. Protozoa and Algae are classified into which kingdom? **Protists**

28. What is the main difference between protozoa and algae? **Protozoa are animal-like protists, algae are plant-like protists**
29. Which kingdom are macroinvertebrates classified as? **animal**
30. When a group of algal cells join together it is called a **colony**
31. Many protozoa use either flagella or cilia as means of propulsion. What is the difference between flagella and cilia? **flagella is a single long whip-like tail used for propulsion. Cilia are when a protist is covered with many small hairs that move to cause propulsion**

Unit 4 – Water Resources (*Notes, powerpoint, and Chapter 13 of the Living in the Environment textbook*)

32. What is the world's leading cause of illness? **Unsafe drinking water**
33. What percentage of the world's water supply is liquid freshwater that is available to living organisms? **0.024%**
34. What is an aquifer? **Aquifers are a geologic layer consisting of underground caverns and porous layers of sand gravel and bedrock where groundwater flows.**
35. Throughout the world most water is used for what purpose? **Agriculture**
36. How does Saudi Arabia obtain the majority of its drinking water? **Desalination**
37. What are the two main types of desalination and how do they work? **Distillation: Works by boiling the water and capturing the steam. Reverse Osmosis: Works by pushing the water through filter membranes under extreme pressure to filter out the salt.**
38. What is the world's largest known aquifer? **Ogallala Aquifer**
39. According to experts, what is the main reason why so much water is wasted in the U.S.? **Water is too cheap**
40. What effect does deforestation and destroying vegetation have on flooding? **Makes flooding worse**
41. What effect does urban development have on flooding? **Makes it worse**

Unit 5 – Intro to Oceanography (*notes, powerpoint, prologue and Chapter 1 of Introduction to the World's Oceans*)

42. Who holds the record for the deepest dive in history and what was the name of their vessel? **Piccard and Walsh on the Trieste (in 2012 the film director James Cameron also dove to the deepest part of the Mariana Trench but that is not on the test)**

43. Who was the first European explorer to cross the Atlantic and set foot in North America? **Leif Ericson**
44. Competition between which two countries led to the great voyages of discovery in the 1400s? **Spain and Portugal**
45. Who developed the law of universal gravitation which explains the tides? **Newton**
46. What was Ben Franklin's contribution to oceanography? **First map of the Gulf Stream current**
47. Which 19th century explorer froze his vessel into the polar ice pack in order to chart the current systems of the polar seas? **Nansen**
48. Which oceanographer found the Titanic? **Ballard**
49. According to geologists, what is the approximate age of the earth? **4.6 billion years old**
50. Which female oceanographer is one of the world's leading experts in deep sea submersible diving? **Sylvia Earle**
51. The length of time required for the earth to complete one orbit of the sun is called a year
52. The earth is tilted 23.5 degrees on its axis. How does this cause the changes in the seasons? **Winter in the Northern Hemisphere is when it is tilted away from the sun. Summer is when it is tilted towards the sun.**
53. The vertical reference lines on globes and charts that run from pole to pole are called longitude
54. The horizontal reference lines on globes and charts are called latitude
55. The prime meridian passes directly through Royal Naval Observatory Greenwich England
56. What is the difference between a map and a chart? **Maps show land features. Charts show water (or sky) features.**
57. One degree of latitude is equal to **60** nautical miles
- 58. omit**
59. How did sailors determine their latitude at sea before the invention of GPS? **By measuring the angle of elevation of celestial bodies like the north star and the sun**

Unit 6 – The Seafloor (*notes, powerpoint, and Chapter 2 of introduction to the World's Oceans*)

60. Bathymetry is the study of the sea floor
61. What is a fathom? **6 ft**
62. What is the difference between an active and passive continental margin? **An active margin is where a two plates come together at the edge of a continent forming a subduction zone. They are characterized by mountains, volcanos and trenches.**

A passive margin is when the edge of a continent is on the middle of the plate and there are no plate boundaries. They are characterized by flat coastlines and the lack of dramatic geological features such as the Florida coast.

63. The submerged outer edge of a continent is called the continental margin
64. Which classification of sea floor makes up the bulk of the world's oceans? **Deep ocean basin**
65. How were submarine canyons formed? **They were carved by rivers during the ice ages when the water level was much lower and the continental shelves were exposed as dry land**
66. What are hydrothermal vents and where are they found? **They are hot water vents found near the mid-ocean ridge**
67. The world's longest living animals are found at the mid ocean vents. They are: **tube worms**
68. What is "marine snow?" **Marine snow is when dead plankton and other organisms fall through the water settle on the bottom of the ocean as sediment**
69. Flat-topped seamounts eroded by wave action are called guyots
70. Are ocean trenches found where plates are separating or colliding? **Where plates are colliding**
71. What is a subduction zone? **A zone where two tectonic plates are colliding and one plate slips under the other**
72. Where are subduction zones found? **Any place two tectonic plates are colliding**
73. What is the world's deepest ocean trench? Mariana Trench
74. Why is the abyssal plain so flat? **Because it becomes covered with a thick layer of sediment over millions of years that hides all the geographic features**
75. What are "black smokers?" **hydrothermal vents (the hottest type)**