Water Quality Test School Name _____ Team # _____
Booth Invitational Students Names _____
January 21, 2012 _____
PART 1

1. The two major purposes of sampling in the water environment are
   a. to establish a baseline
   b. to determine the pollution
   c. to test for acid
   d. to decide whether or not you can drink it

2. How could you verify the origin of point-source pollution in a stream?
   a. test for O_2
   b. test downstream
   c. test for BOD
   d. test above and below the suspected source

3. Why is coliform bacteria used as an indicator of poor water quality?
   a. indicates acidic water
   b. indicates high O_2 levels
   c. indicates fecal contamination
   d. indicates high nitrate levels

4. If the trout population is decreasing and fish such as carp and catfish are increasing, what are the two best answers that could be found through a sampling program?
   a. temperature is decreasing and O_2 is increasing
   b. marked increase in the otter population
   c. nitrate and phosphate levels have decreased
   d. O_2 is decreasing and temperature is increasing

5. What percentage of the world's water is currently accessible for potable water supplies?
   a. 3%
   b. 2.5%
   c. 1%
   d. <0.05%

6. Benthic invertebrates can be a very informative group because they are sensitive to _____ and _____changes.
   a. chemical, physical
   b. turbidity, oxygen
   c. chemical, oxygen
   d. viruses & bacteria/ turbidity

7. The largest source of O2 in freshwater streams is the
   a. aquatic plants
   b. atmosphere
   c. chemical reactions in water
   d. from rocks and minerals

8. Which are **not** examples of nonpoint pollution?
   a. paper mills
   b. sewage outfall
   c. farms
   d. street runoff

9. What do we call the accumulation of heavy metals and pesticides in the food chain?
   a. biomagnification
   b. predation
   c. biogenesis
   d. necrosis

10. The test for turbidity describes what characteristics of water?
    a. solutes in solution and suspended material
    b. mineral concentration of the water
    c. suspended material in water
    d. metal concentration of water

11. A secchi disk is used to measure
    a. the dissolved material in water
    b. light penetration of a lake of pond
    c. flow of a stream
    d. the depth of silt on bottom of lake

12. The term water hardness is used to describe the concentrations of
    a. sodium and potassium
    b. zinc and lead
    c. lead and copper
    d. calcium and magnesium

13. In a eutrophic lake rich in nutrients you would find
    a. high DO in the upper layers and no DO in the bottom layers during summer
    b. no DO in upper layers and high DO in bottom layers during summer
    c. no DO in the lake at all during the summer
    d. none of the above

14. The alkalinity of a water sample may be defined as the
    a. ability of a water sample to evaporate at low temperatures
    b. capacity of a water sample to react with and neutralize acid
    c. capacity of a water sample to become toxic
    d. ability of a water sample to carry nutrients to plants

15. Grit chambers are used in which of the following water treatment stages?
    a. primary
    b. secondary
    c. tertiary
    d. disinfection and post aeration

16. What would best describe oxygen levels in a lake during a period of 24 hours?
    a. the levels would be the same for a 24 hour period, only seasonal differences
    b. low in mid afternoon, very high before dawn
    c. high in late afternoon, and low just before dawn
    d. High during dark hours, low during light hours.

17. A low BOD number indicates
    a. a high DO
    b. a low DO
    c. a lot of decomposition
    d. a lot of plant growth

18. Generally in the pH cycle, it is most acidic
    a. in morning
    b. in evening
    c. noon
    d. at night

19. The amount of oxygen in any body of water depends on
    a. the amount of animal species diversity
    b. the amount of plant species diversity
    c. water temperature, number of green plants and sunlight
    d. all of the above

20. If DO decreased while chlorides, nitrates and **ammonia** increased, one would most likely suspect pollution from
    a. sewage
    b. land runoff
    c. factory waste
    d. lawn fertilizers/ golf course

21. Highest levels of ___ can prevent aquatic plants and animals from building necessary proteins
    a. nitrates b. carbohydrates c. soda d. phosphates

22. How do warm summer months cause stratification in lakes?
    a. as water temperatures increase, density increases
    b. as water temperature at surface increases, density decreases
    c. the cooler bottom temperatures rise
    d. the cooler bottom temperatures sink
    e. b and d
    f. b and c

23. How does altitude affect DO levels?
    a. as altitude increases, oxygen levels decrease
    b. as altitude decreases, oxygen levels increase
    c. as altitude increases, oxygen levels increase
    d. a and b

24. The capacity for transmitting fluids is known as
    a. permeability b. fluid flow c. porosity d. transferability

25. The pH of healthy ponds and streams is approximately
    a. 4.0 b. 5.0 **c. 6.5** d. 8.0 e. 9.5

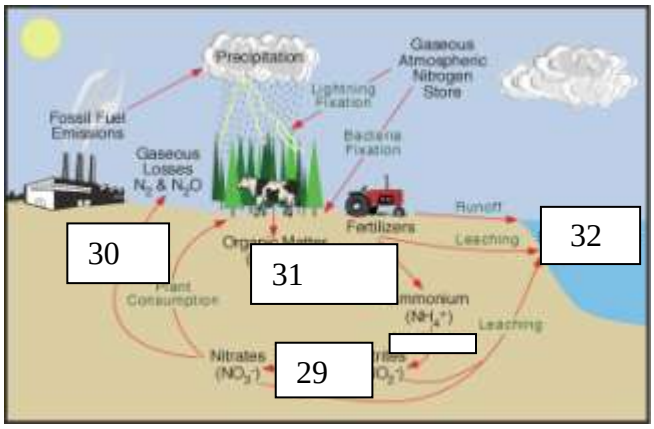
26. What happens in secondary sewage treatment?
    a. larger particles are filtered out through screens
    b. wastewater is held until organic matter is degraded and settling occurs
    c. nitrogen and phosphorous are removed
    d. none of the above

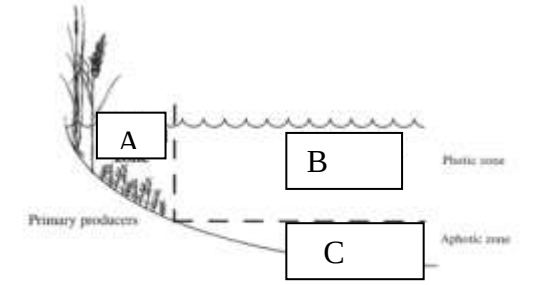
27. The leading water born disease in the US is
    a. gastroenteritis
    b. Giardia
    c. Typhoid fevor
    d. salmonella

28. What determines the boundaries of all water sheds?
    a. Governmental agencies
    b. Topography
    c. Vegetation
    d. Surface Runoff

Matching

29 __b__ a. denitrificatio
30 __a__ b. nitrification
31 ___d_ c. eutrophication
32 ___c_ d. mineralization





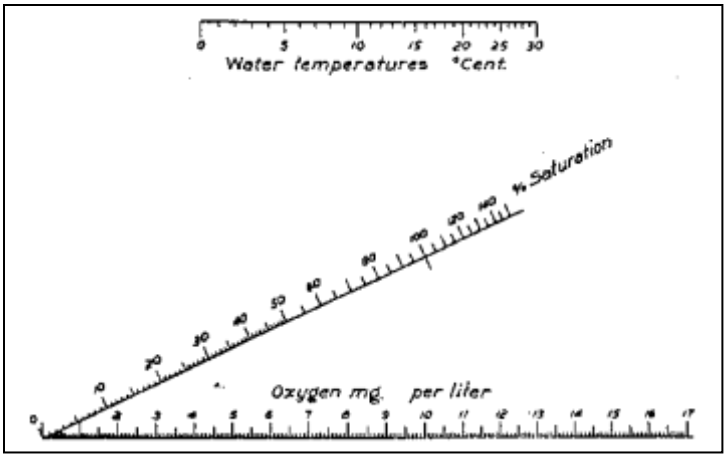
AQUATIC FRESHWATER ZONES

33. Which statement is correct about the above illustration?
    a. Zone A is the pelagic zone where most macroinvertebrates exist
    b. Zone B is theLittoral Zone where you will find many aquatic organisms.
    c. Zone C is the Profundal Zone where bacteria and macroinvertebrates live.
    d. Zone A is the Littoral Zone where phytoplankton lives.

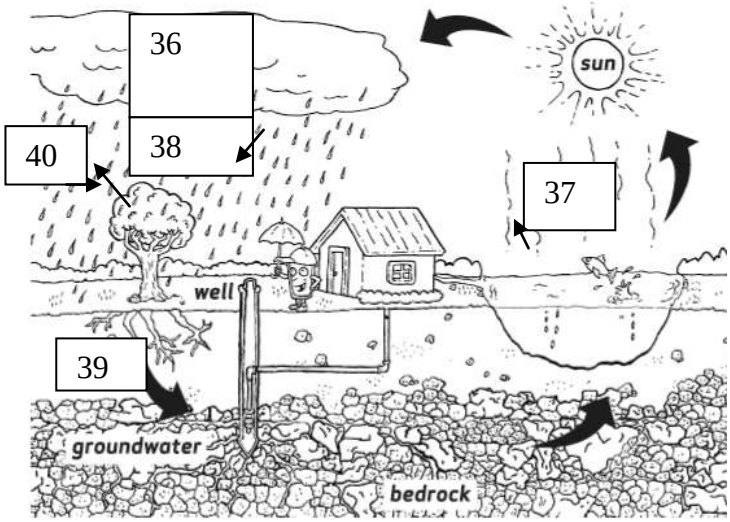
USE THE GRAPH ON THE FOLLOWING PAGE FOR 34 AND 35:

34. If the temperature of the water is 5 degrees Celsius and the DO is 10 mg/L, what is the % saturation? a. 60% b. 30% **c. 80%** d. 45%

35. If the amount of dissolved oxygen stays the same, but the temperature lowers, how does the %saturation change?
    a. it lowers b. it gets higher c. lower, then higher d. stays the same



Questions 34 & 35



(Infiltration, condensation, precipitation, evaporation, transpiration)

Write the correct process for each phase of the water cycle:

36. __conndensation___ 37. _evaporation_

38. _precipitation__ 39. infiltration__

40. _transpiration____

PART 2 MICROINVERTEBRATES : There are two samples from two different location. Identify the organisms and list the class in which each belongs. Common Name for Organism and 1-5 for class.

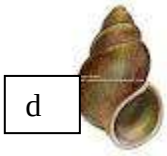
Sample 1

Organism	Class
a. dragonfly nymph	___2_____
b. water penny	___1_____
c. stonefly nymph	___1_____
d. gilled snail	___1_____
e. Riffle Beetle	___1_____

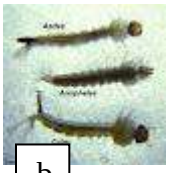
Sample 2

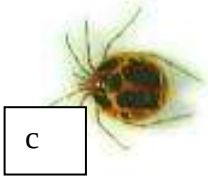
Organism	Class
a. Black Fly Larvae	__3_____
b. Mosquito Larvae	__5_____
c. Water Mite	___3_____
d. Blood Midge	___4_____
e. Tubifex	___4_____

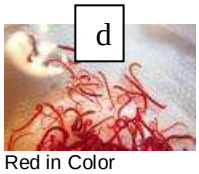
Sample 1



Sample 2







Red in Color

Which water sample would indicate the water has a higher quality? Explain why.

Sample 1

Part 2, cont.

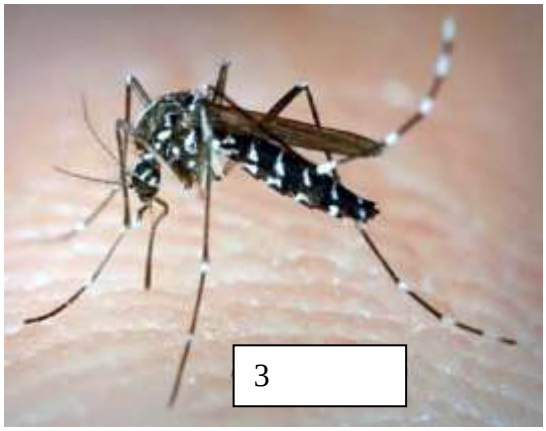
Identify the aquatic nuisance plant or animal and **next to the picture, describe the major issue(s) it can cause.**

choked Florida's waterways; blocks sunlight from reaching native aquatic plants, and starves the water of oxygen, often killing fish, prime habitat for mosquitos, the classic vectors of disease, the plants can unbalance natural lifecycles

1. Name **_Water Hyacinth __** (hint :flowers are mostly lavender to pink, 6 petals with purple/black freely hanging roots.)

Spiny waterfleas eat small animals (zooplankton), including Daphnia, which are an important food for native fishes. In some lakes, they caused the decline or elimination of some species of native zooplankton. They can clog eyelets of fishing rods and prevent fish from being landed.

2. Name**_Spiny Water Flea_** (hint: zooplankton, native to Europe and Asia, introduced in the Great Lakes Regions)



Has aggressive daytime human-biting behavior and ability to vector many viruses, including West Nile virus can outcompete and even eradicate other species with similar breeding habitats; The tiger mosquito is also relevant to veterinary medicine. For example, tiger mosquitoes are transmitters of *Dirofilaria immitis*, a parasitic round worm that causes heartworm in dogs and cats.[1]

3. Name _Asian Tiger Mosquito_ (Hint: easily recognized by the white and black stripes on the legs and body.)

PART 3 WATER MONITORING AND ANALYSIS

1. There are two water samples on the table in the back of the room. Using your salinometer measure the saltwater concentration between 1-10%.

Sample A _____ Sample B _____

2. What factors influence the amount of DO in water? (name 3)

_Temperature, pressure, salinity, flow rate, organic waste, decomposition__

3. Which statement is false about the factors that influence the pH of water?
   a. respiration of animals lowers pH
   b. Photosynthesis of animals raises pH
   c. Burning trash and leaves lowers pH
   d. Growing algae, not dead algae, can decrease pH

4. Which of the following would NOT be a cause of high BOD results?
   a. Pulp and paper mills
   b. acid rain
   c. municipal wastewater and septic effluent
   d. Eutrophication, high nitrate levels and hot weather

5. Complete the calculations to determine the Overall Water Quality Index: (WQI) Use the charts on the following page (convert to Q value and multiply by weighting factor.

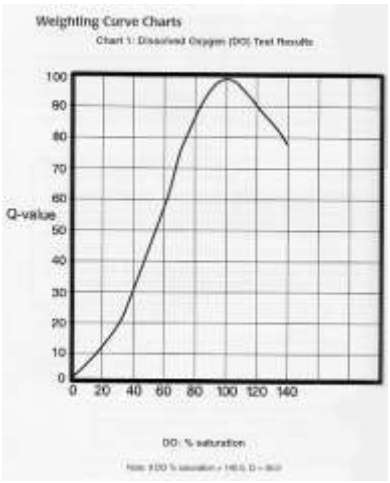
	Test	Test Results	Q Value	Weighting Factor	Total
1.	DO	40% Sat	_30_	0.17	5.1
2.	Fecal Coliform	200 colonies/100ml	_35___	0.16	5.6
3.	pH	8.3 units	__80__	0.11	8.8
4.	BOD	16 mg/L	__20__	0.11	2.2
5.	Temperature	0 ^{0} change	__91__	0.10	9.1
6.	Phosphate	1.00 mg.L	__40__	0.10	4,0
7.	Nitrates	10.0 mg/L	__50__	0.10	5.0
8.	Turbidity	4 inches	__29__	0.08	2.32
9.	Total Solids	300 mg/L	__60__	0.07	4.2
			Overall Water Quality Index		46.32

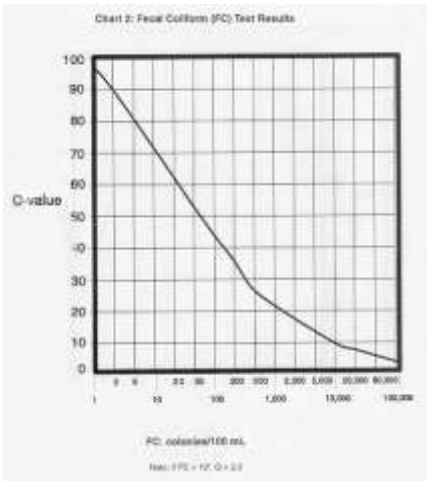
WATER QUALITY INDEX RANGES

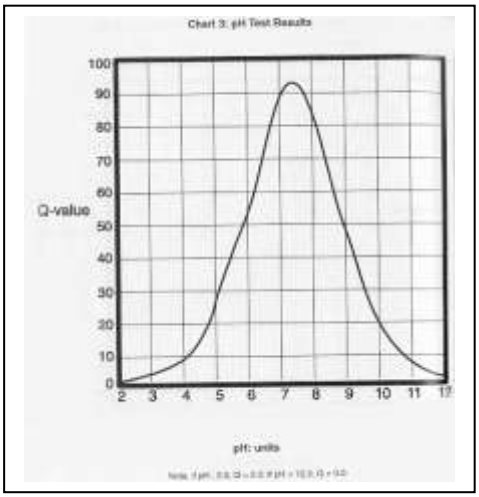
90-100 Excellent
70-90 Good
50-70 Medium
25-50 Bad
0- 25 Very Bad

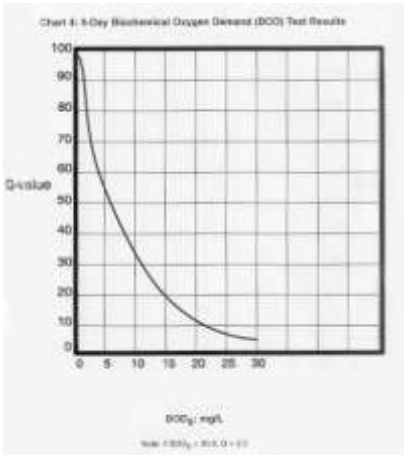
The range for this sampling is ____BAD_____

Weighting Curve Charts

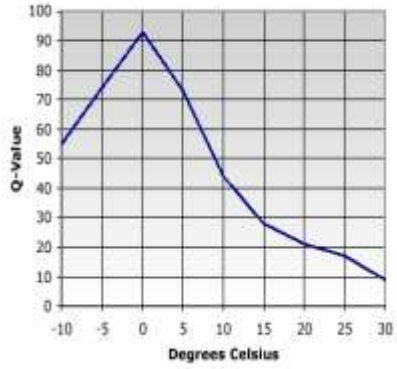




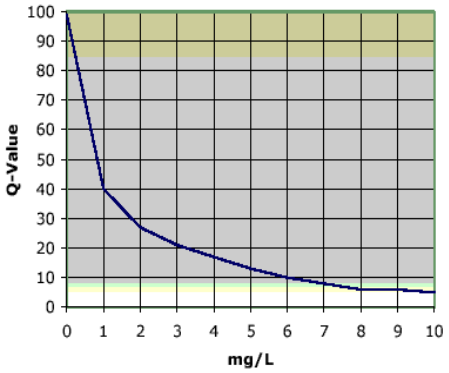




Temperature Results

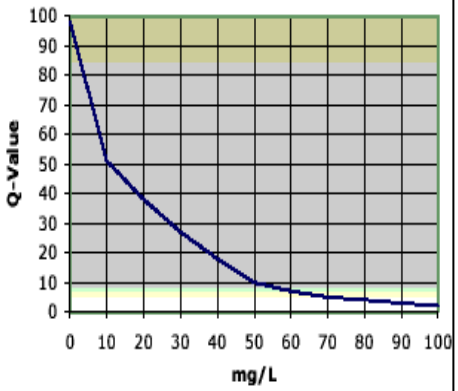


Phosphate Results



(Note: If phosphate > 10.0, Q=2.0)

Nitrate Results



(If Nitrates > 100.0, Q=1.0)