

OREGON ENVIROTHON 2014

AQUATIC ECOLOGY TEST

TEAM: # _____

Note to Teams: If you notice that the kits and specimens are being used by other teams, continue on to the next question and return to the problem later. If you notice that a kit is missing pieces, please notify one of the test administrators.

1. Collect a water sample and analyze it with the test kits. Record the values you discover for the following parameters: (5 points)

- a) Temperature: _____
- b) pH: _____
- c) Dissolved Oxygen: _____
- d) Phosphate: _____

What is the water quality classification for this sample according to the Oregon Water Quality Standards for Salmon and Steelhead? (1 point)

Class AA _____ Class A _____ Class B _____

2. Identify the macroinvertebrates in your sample dish. You can use common names. For example, "mosquito larvae." (3 points)

- a) _____
- b) _____
- c) _____

3. Based on your macroinvertebrate sample, is it likely that the macroinvertebrates you found came from the same source as your water sample? Why or why not? (3)

____/12 pts

4. What is one sustainable farming practice that can reduce the amount of water needed? (1)

- a) Only water crops once a week
- b) Plant most crops in existing wetlands
- c) Use subsurface drip irrigation to reduce water loss through evaporation
- d) Use more fertilizer so the plants grow faster and so need less water overall **Answer C**

5. Which is true of a watershed? (1)

- a) In a watershed, nothing that happens upstream can effect downstream.
- b) In a watershed, only activities in a riparian zone will effect water quality.
- c) Two adjacent watersheds will always have the same amount of water discharge.
- d) All of the land uses in a watershed can effect water quality. **(D)**

6. Using sustainable farming practices can protect aquatic habitats. For each of these practices, state how they relate to healthy water. (6 points)

PRACTICE	How it helps aquatic habitats
Select crops and varieties suited for site	Reduce inputs, reduce pollutants, reduce need for water
Encourage diversity of species on site	Protect balance in aquatic species, reduce need for pesticides
Minimize land under agricultural production	Reduce soil erosion, preserve habitat, more likely to protect riparian areas
Planning that provides long-term financial stability for farmers and their family	Reduce chances of non-farm land development that could harm water
Use integrated pest management	Reduce inputs of pesticides, encourage natural habitat preservation
Irrigation that minimizes loss to evaporation	Leave more water instream and reduce chances of pollutants in run-off

____/ 8 pts

7. What does the presence of an aquatic biological indicator tell us? (1)

- a) This species is a nuisance and must be removed from this ecosystem as soon as possible.
- b) This species needs certain conditions to survive, so if the species is here, we can make assumptions about the condition of the water.
- c) An indicator species is always protected under the Endangered Species Act.
- d) If there is a shortage of biological indicators, we know that there are pollutants in the water. (B)

8. How do harmful concentrations of lead generally get into drinking water? (1 point)

- a) Lead occurs naturally in high concentrations in certain areas of the world.
- b) Lead is added to water to remove the chorine after chlorine has been added.
- c) Lead is leached from transmission pipes to your house from the drinking water facility.
- d) Lead is leached from the pipes inside houses.

(D)

9. Take these four materials and put them in order of their permeability along the line below: clay, gravel, solid rock, and fine sand. (2 point)

Least permeable -----> most permeable

_____ _____ _____ _____
Solid Rock **Clay** **Fine Sand** **Gravel**

10. What three interacting processes characterize all stream systems? (3 points)

- A. _____ **biological processes**
- B. _____ **geomorphic processes**
- C. _____ **hydrologic processes**

____ / 7 pts

11. If you have a GIS for your watershed, list four layers you could use to investigate watershed health? (4)

1. _____

2. _____

3. _____

4. _____

streams/lakes, wetlands, topography, land use, canopy cover, various water quality parameters

12. Which of the following is *not* a likely use for GIS? (1)

- a) Complex spatial analyses
- b) Public education through improved visualization
- c) Determining food consumption rates for endangered species
- d) Urban land use planning (c)

13. Water has a very high surface tension, meaning that it tends to group together in drops rather than spread out in a thin film. Surface tension is responsible for capillary action. In which of the following processes is capillary action occurring? (1 point)

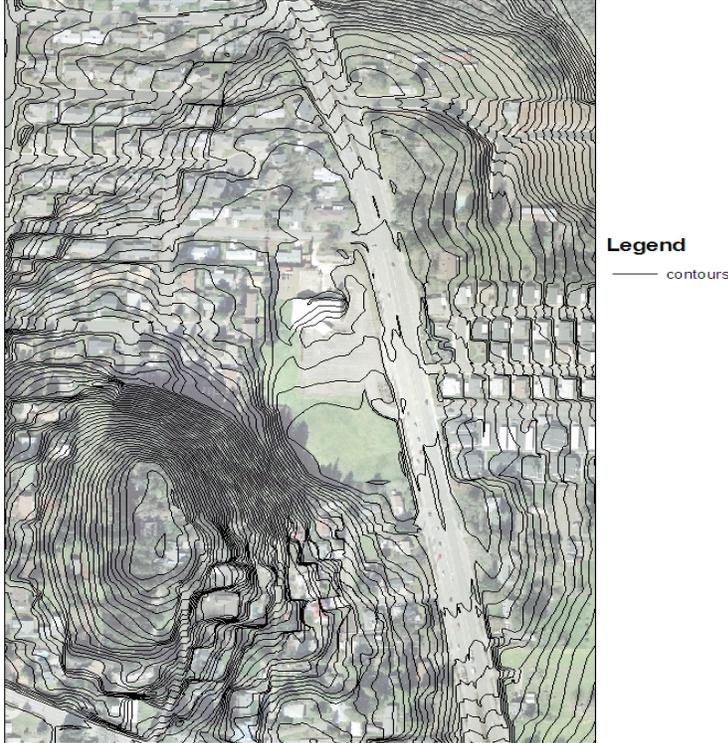
- a) Water moving through tree roots
- b) Water flowing through a stream
- c) Cloud formation through condensation
- d) Water evaporating off the surface of a lake(a)

14. List three water pollutants that come from urban areas that are also found in rangelands. Answers may vary. (3 points)

E. coli, Nutrients/fertilizer, Pesticides, Herbicides, Mud, other acceptable answers.

____ / 9 pts

12. On the map below, put an X on the top of the hill. (1 point)



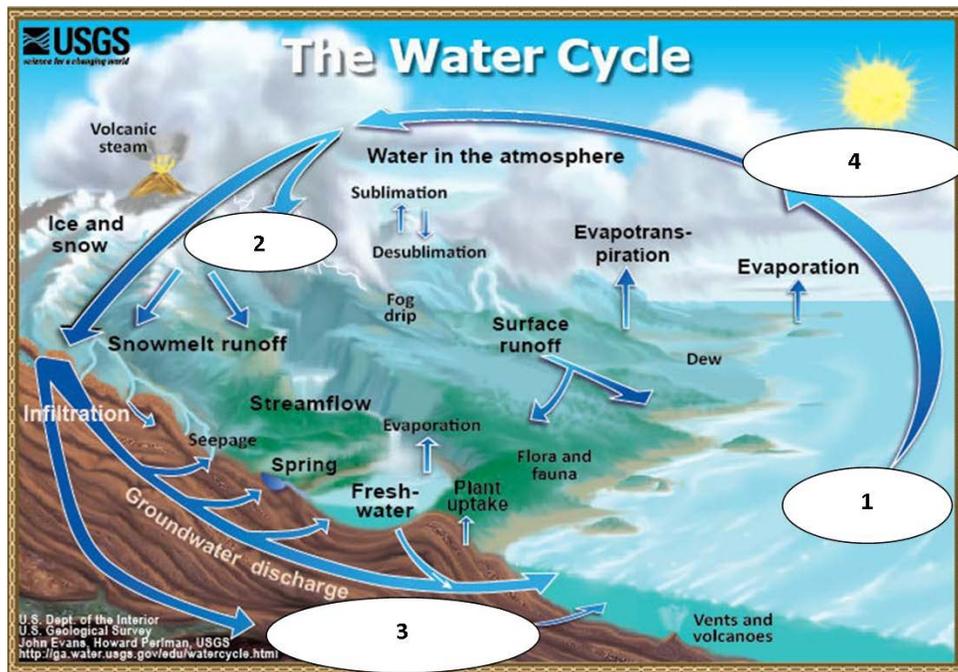
13. On topographic maps, you can tell which direction a stream is flowing by looking for a distinctive pattern in the contour lines. Which statement below is true? (1)

- a) Look for a series of concentric circles and the stream will follow the contour lines.
- b) Look for a series of V's and they will point downstream.
- c) Look for a series of V's and they will point upstream.
- d) Look for the flattest area on the map, where the contour lines are closest together, and you will find downstream. (c)

14) List the three main types of aquifers (3 points).

Basalt, layered soil, bedrock

___ /5 pts



15. Name the numbered elements from the Water Cycle diagram above. (4)

- 1. _____ Ocean
- 2. _____ Precipitation
- 3. _____ Groundwater storage
- 4. _____ Condensation

16. Impervious surfaces do which of the following? (1 point)

- a) Reduce condensation
- b) Reduce infiltration
- c) Increase evapotranspiration
- d) Reduce runoff (b)

____ / 5 pts

18. State four ways to reduce non-point source pollution. (4 points)

1. _____

2. _____

3. _____

4. _____

(streambank stabilization, riparian buffers, reduce impervious surfaces, increase infiltration, reduce pesticide use, others)

_____ Page 1/ 12 Points Possible

_____ Page 2/ 8 Points Possible

_____ Page 3/ 7 Points Possible

_____ Page 4/ 9 Points Possible

_____ Page 5/ 5 Points Possible

_____ Page 6/ 5 Points Possible

_____ Page 7/ 4 Points Possible