

OREGON ENVIROTHON 2023
AQUATIC ECOLOGY

TEAM # _____
Test Total: _____ / 50

***Note to teams:** If you notice that a kit is missing pieces, please notify one of the test administrators.*

Part I: Hands-On Analysis & Aquatic Macroinvertebrates

1. Collect a water sample and analyze it with the test kits. Record the values you find for the following parameters: [5 points]

- a. Temperature: _____
- b. pH: _____
- c. Dissolved Oxygen: _____
- d. Phosphate: _____
- e. Nitrate: _____

2. 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

3. Identify the macroinvertebrate within the sample dish; include both the common name and the life stage. [2 points]

4. Circle the correct words from the underlined choices. [2 points]

The macroinvertebrate in the sample dish could / could not have come from the same source as the water sample because this macroinvertebrate can / cannot tolerate water pollution.

5. Fill in the blanks with the words provided. [4 points]

Stoneflies undergo _____ metamorphosis. This means there is a distinct _____ stage, usually called nymphs or naiads, and a distinct _____ stage but no _____ stage.

larval complete incomplete adult pupal aquatic exoskeleton

____ / 14 points

Part II: Current Issue – Adapting to a Changing Climate

6. Climate stress is often experienced as the following forms of water stress except: [1 point]

- a) weather events
- b) desalination
- c) floods
- d) drought
- e) sea level rise

7. True or False? Climate change should impact precipitation in Oregon by decreasing winter precipitation and increasing summer precipitation. [1 point]

8. True or False? Although total precipitation is not expected to be significantly impacted by climate change in Oregon, we will have more rain and less snow. [1 point]

9. Fill in the blanks with the words provided. [4 points]

Over the past century, most of Oregon has warmed by about _____ degrees. In the coming decades, coastal waters will become more _____, and streams will be _____ and have _____ flows in summer.

cooler alkaline two warmer four eight acidic lower higher

10. MATCHING [4 points]

Although wetlands are vulnerable to climate change, they play a role in mitigation and adaptation. Put the letter of the role wetlands play in each of the given scenarios.

(V) vulnerable (susceptible to negative impacts of climate change)

(A) adaptation (adjust to new conditions caused by climate change)

- ___ a) Wetlands can offset changes in precipitation and snow melt by storing water and reducing the effects of drought and severe storms.
- ___ b) Carbon stored in wetland soil may be released to the atmosphere.
- ___ c) Loss of habitats suitable for amphibians and wetland invertebrates.
- ___ d) Wetlands help keep waters flowing in streams, which helps offset the effects of increases in summer droughts on salmon and other species.

___ / 11 points

Part III: The Water Cycle

11. Match the following components of the water cycle with the definition on the right. [5 points]:

- | | |
|------------------------|---|
| ___ Condensation | a. Water movement over the Earth's surface |
| ___ Evapotranspiration | b. Water movement from atmosphere to soil |
| ___ Spring | c. From a solid state into gaseous |
| ___ Infiltration | d. Directly from plants into atmosphere |
| ___ Sublimation | e. From a gaseous state to a liquid |
| | f. Flow of groundwater to the Earth's surface |

12. What must happen for water vapor to turn into liquid droplets? [1 point]

- a. It must be agitated.
- b. It must be heated.
- c. It must be cooled.
- d. It must be energized.

13. Which is the correct order in the water cycle? [1 point]

- a. Precipitation, evaporation, runoff, condensation
- b. Evaporation, run off, precipitation, condensation
- c. Evaporation, condensation, precipitation, runoff
- d. Runoff, condensation, evaporation, precipitation

___ / 7 points

Part IV: River Systems, Maps

14. Describe three benefits provided by trees in the riparian zone. [3 points]

a.

b.

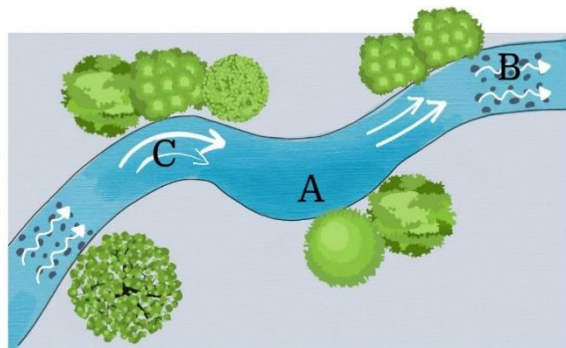
c.

15. Put the correct letter next to the term that describes the part of the river in the diagram to the right. [3 points]

___ riffle

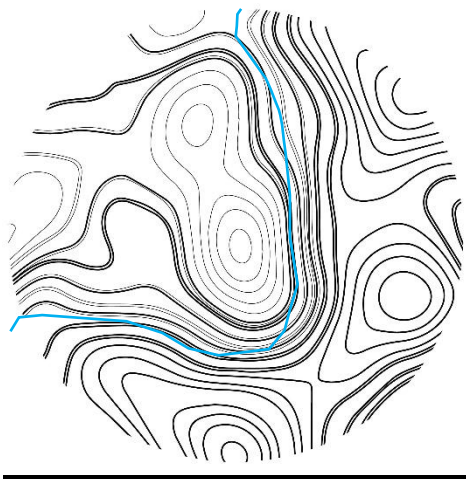
___ pool

___ run



16. On the image below [3 points]:

- Place an X on one mountain peak
- Circle the area with the steepest slope.
- Place an arrow(s) pointing downhill.



___ / 9 points

Part V: Human Impacts & Food Chains

17. In a water body experiencing artificial eutrophication, all the following conditions would be found except: [1 point]

- a. an increase in nitrogen
- b. an increase in phosphorus
- c. an increase in algae
- d. an increase in oxygen
- e. a decrease in pH

18 A farmer has livestock, row crops, and Christmas trees. For each commodity, describe one management practice the farmer could take to mitigate potential negative impacts to water quality. [3 points]

- a.
- b.
- c.

19. Place the letter of the term below on the line of the corresponding description. [3 points]

- ____ Barriers to this can eliminate many miles of valuable habitat.
- ____ Points of direct contact between streams and roads.
- ____ A common, generally less costly stream crossing, often undersized.

- a. stream crossing
- b. fish passage
- c. culvert
- d. resting pool
- e. bridge

21. Identify the trophic level for each of the following organisms found in an aquatic food chain. [2 points, 0.5 point each]

- ____ osprey
- ____ cattail
- ____ salmon
- ____ caddisfly
- a. Producer
- b. Primary consumer
- c. Secondary consumer
- d. Tertiary consumer
- e. Autotroph

____ / 9 points