South Puget Sound Regional

Envirothon . 2017
4 . 26 . '17

ANSWER KEY

2017 Soils & Land Use Exam

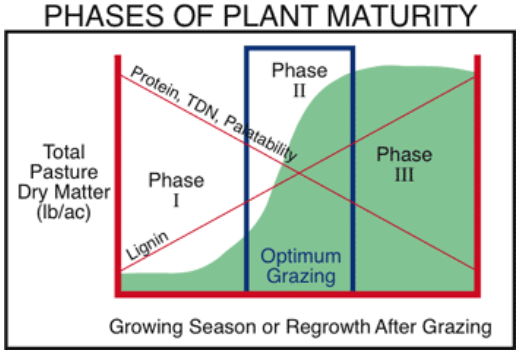
80 Possible points

1. Which nutrient is held very loosely by soil colloids and leaches out of the soil profile into water during the rainy season? 5 points
   - **A. NO3- Nitrate**
   - B. K Potassium
   - C. Ca Calcium

2. If the soil has a pH of 6.8 and a buffer index of 6.2, will the soil become more basic or more acidic over time? 5 points
   - **A. More Acidic**
   - B. More Basic

3. Draw a line matching each Phase with the corresponding letter. 6 points (2 for each correct match)

Phase I	Forage reaches to maturity stage, growth rate slows, and plants start to become senescent. The plants decrease in quality as reserves move into seed production. The crowns are higher up on the plants and you are at risk of damaging plants from grazing.
Phase II	First growth phase of plants exiting dormancy, growth rate increase, and plants begins to grow new leaves from base of the crown and new roots. You are at the risk of over grazing.
Phase III	Plants reaches early bud growth stage and is at it's peak in sugar and protein production. There is a fast growth rate and rebuilding of reserves. High quantity and high quality of forage results. This is best time to harvest hay.



4. **True** or False: When livestock graze forage, the same amount of grass that is defoliated from above is a mirror image to the amount of root mass that dies below. If the grass is 12 inches high and it grazed for 4 inches, then 8 inches of the plants are eaten from the top and 8 inches of the plants roots die off and break down into organic matter.

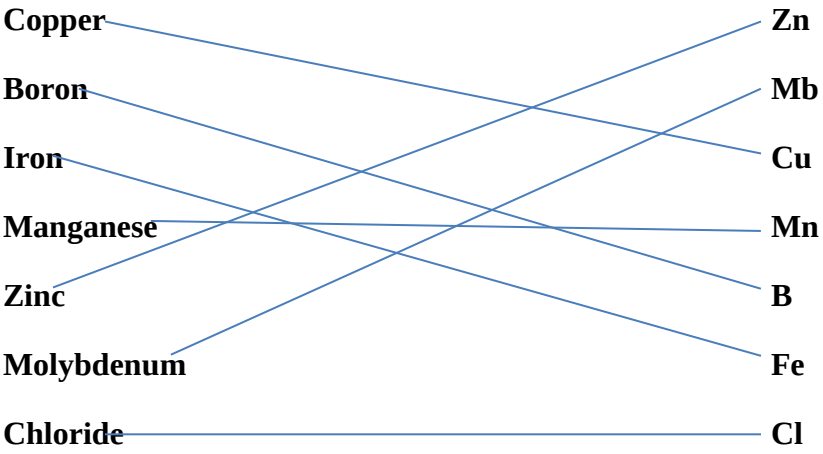
4 points

6 points (2 for each correct answer)

5. Name the 3 major macronutrients: **Nitrogen** **Phosphorus** **Potassium**

6. Match micronutrients with their element symbol

7 points (1 for each correct match)



2 points

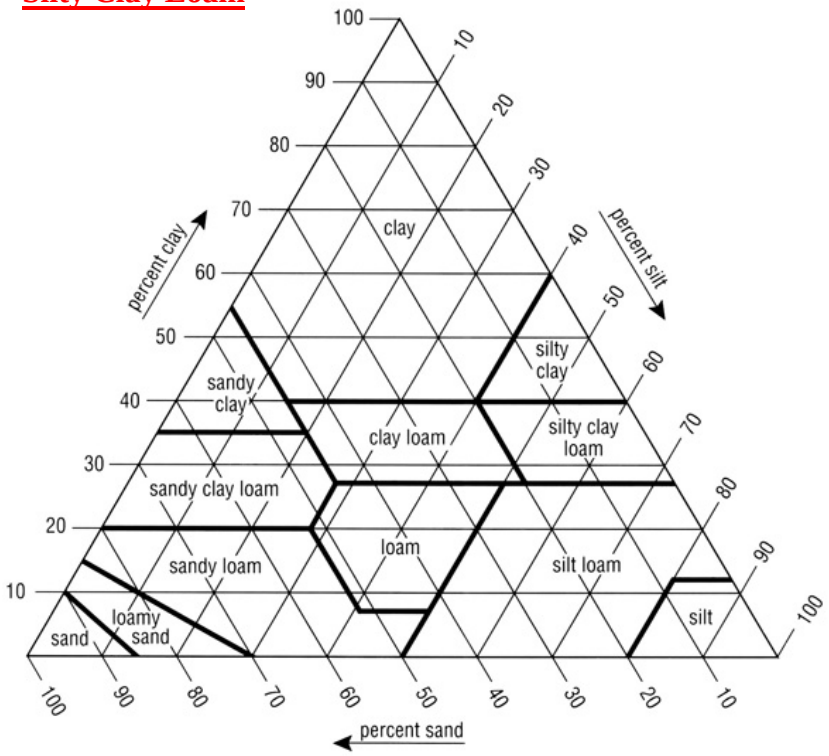
7. True or **False**: Cation exchange capacity does not affect how nutrients are held within the soil and made available to plants.

2 points

8. True or **False**: A sandy loam soil contains a high amount of clay.

9. Using the soil triangle, determine what the soil texture is of a sample that is 18% Clay, 22% Silt and 60% Sand **Sandy loam** 5 points

10. Using the soil triangle, determine what the soil texture is of a sample that is 35% Clay, 55% Silt and 10% Sand **Silty Clay Loam** 5 points



11. What are the two macronutrients that leach from the soil profile and have a major impact on water quality? **Nitrogen** **Phosphorous** 2 points

12. Soils formed due to the transportation or deposition of running water are called: 4 points

A. Colluvial
B. glacial till
C. Residual
D. Alluvial

13. Fill in the blank: Soils contain different mineral deposits. Soils that are red are high in **Iron**. Soils that are black are high in **Carbon**. 4 points

14. Label the layers of a the soil profile below, using the multiple choice options . 6 points

A Horizon – Top Soil: Mineral matter mixed with humus

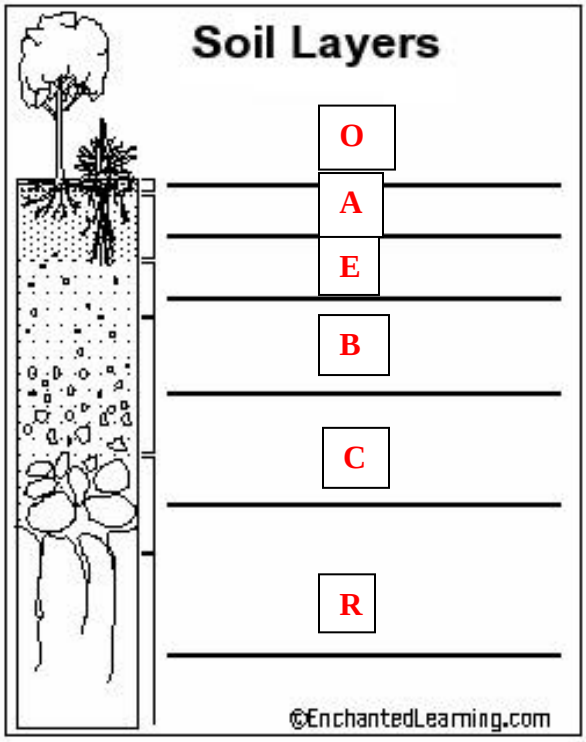
R Horizon –Bedrock: Unweathered Parent Material

B Horizon – Accumulation of clay colloids

C Horizon – Partially altered parent material

O Horizon – Decomposing Organic Matter

E Horizon – Subsoil: Zone of leaching



15. True or **False**: Water travels faster through clay than sand, therefore sand has a higher water holding capacity. 2 points

Hands-on portion on next page…

16. You are a farmer attempting to build a barn on your property, the barn is represented by the bottle with the barn picture on it. You are considering three different sites for the barn, these are represented on the table by the three plates with sponges on them. To determine which site will be best for the construction, place the bottle on each site.

5 points

a. Which site is best suited for the barn construction, and why?

CORRECT: SITE B= DRY

A= moderately wet

C=water logged

2 points

b. Based on your observation of the "soil" on the site you selected, which of these soil types do you think it is?

i. **Well drained *Sandy***

ii. Moderately drained *Silty*

iii. Water retaining *Clay*

c. Now that you have selected a site for the barn construction, use the plant cards provided to develop a planting plan. Choose three Washington native plants to plant around the barn that are best suited to the soil type.

8 points

i. **kinnikinnik**

ii. **beach strawberry**

iii. **madrone**

these three in any order are correct.

IF students for some reason answer part A incorrectly and say that site **A** or **C** is best for building a barn they can still receive the points from parts **B** and **C IF** they answer with the correct soil type (water retaining or moderately drained) AND they select the hydrophilic plants in their planting plan: skunk cabbage, devil's club and maidenhair fern.