OREGON ENVIROTHON 2025 TEAM #_____

SOILS AND LAND USE Test Total: _____/ 50 points

Part I: SOIL FORMATION

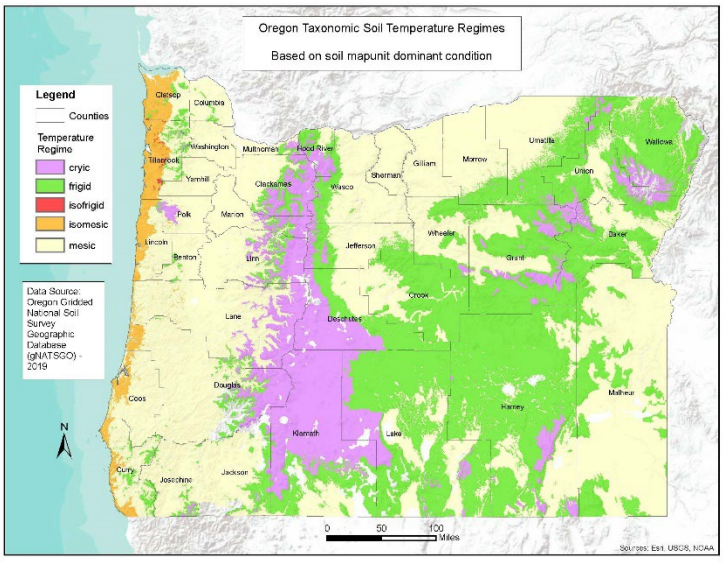
1) Name the missing soil formation factors known by their acronym **CLORPT**. [2 points]
   CLimate
   Organisms
   Relief
   Parent material
   Time

2) Erosion is an example of a/an: [1 point]
   a) addition
   b) loss
   c) translocation
   d) transformation

3) Topsoil is usually darker than deeper soil layers due to the presence of… [1 point]
   a) lime
   b) rain
   c) organic matter
   d) pH

4) Which soil forming factor relates closest to geology? [1 point]
   a) Critters
   b) Relief
   c) Parent material
   d) Time

5) What is cryoturbation? [1 point]
   a) Mixing of soil layers due to frost heave
   b) Residuum
   c) Frozen worms
   d) Glacial till



6) Based on the map to the right, where is cryoturbation most likely to occur? [1 point]
   a) Willamette Valley, Columbia River Basin, and Snake River basin (pale yellow)
   b) High lava plains, Cascade Range, and other high peaks (purple)
   c) Between a and b (green)
   d) On the coast (orange and red)

____/ 7 points

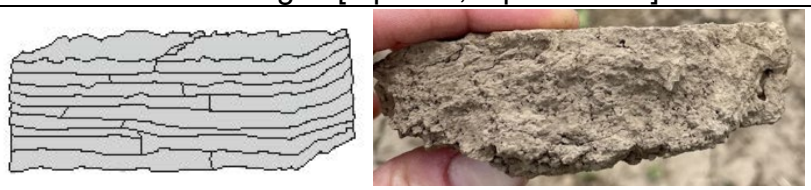
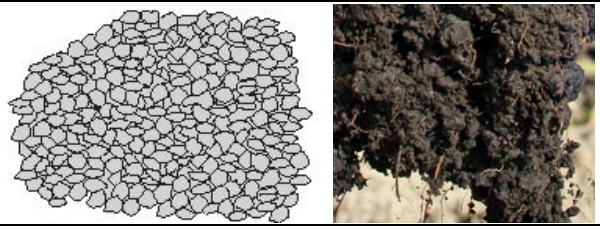
Part II: SOIL CHARACTERISTICS

7) What is the mineral soil layer below the A horizon called? [1 point]
   a) topsoil
   b) B horizon
   c) bedrock
   d) O horizon

8) What are the three main soil particle size classes? [1 point]
   a) Clay, organic, gravel
   b) Sand, silt, gravel
   c) Cobbles, loam, mulch
   d) Sand, silt, clay

9) Which soil characteristic does soil texture influence? [1 point]
   a) color
   b) flavor
   c) erosion potential
   d) depth to bedrock

10) Match each soil structure with the correct images [3 points, 1 point each]

A. blocky	__C__	
B. granular	__A__	
C. platy	__B__	

11) K_{sat}, or saturated hydraulic conductivity is a measure of... [1 point]
   a) How easily liquids can move through a layer of soil
   b) Bulk density
   c) The inverse logarithm of the concentration of hydronium ions
   d) Soil moisture

____/ 7 points

12) pH influences which soil characteristic? [1 point]
    a) depth to bedrock
    b) color
    c) nutrient availability
    d) texture

13) Determine the texture and color of the soil sample. Use **Soil Texture By Feel Flow Chart** and **Munsell Color Book** provided**.** [6 points total]

Texture [3 points]	**Munsell Color Notation** (moist) [3 points]
1 point for any texture touching it on the texture triangle	1 point each for hue, value, and chroma ½ point each for next color chip or page

____/ 7 points

Part III: SOIL CLASSIFICIATION AND LAND USE

14) Which of the following is not true about forest soils? [1 point]
   a) They are usually too steep or rocky for growing crops
   b) They periodically burn in forest fires
   c) They are too dry to support trees
   d) They provide wildlife habitat, filter water, and sequester carbon

15) What clue do wildfires leave behind in Oregon forest soils? [1 point]
   a) an A-horizon
   b) moss
   c) sand
   d) charcoal

16) Landslides or mass movement occurs in Western Oregon forest soils due mostly to which soil forming factor? [1 point]
   a) Organic matter
   b) Organisms
   c) Relief (topography)
   d) Time

17) Which is the coldest soil temperature regime (see map on page 1)? [1 point]
   a) mesic
   b) cryic
   c) frigid
   d) isomesic

18) What is the name of the soil tool provided? [1 point]
   a) spade
   b) bucket auger
   c) bulk density tester
   d) soil sieve

19) Match the soil classification to the soil characteristics. [5 points, 1 point each]

A. Shallow depth to root restricting layer	__D__	Characterized by an O horizon made of decomposed leaf and/or needle litter
B. F slopes (61-80% slopes)	__E__	May have hydric soils which may include gleyed colors, redoximorphic features, and/or O horizon
C. Excessively drained soil drainage class	__A__	Presence of an R horizon
D. Forest soils	__C__	Sandy soil textures which rapidly percolate water
E. Wetlands	__B__	High likelihood of runoff and erosion; too steep to build on or farm

____/ 10 points

Part IV: SOIL SURVEY

Use the **Soil Map and interpretations** for a portion of Clatsop County to answer the following questions:

20) At what scale was this soil survey **mapped**? [1 point]

___1:20,000_____

21) What is the **scale of the printed map**? [1 point]

_____1:41,700_____

22) What is the Map Unit Name of map symbol **59F**? [1 point]

___Svensen loam 60 to 90 percent slopes __

23) Name the two soil map units with the highest Forest Productivity for Douglas-fir. [2 points, 1 point each]

Map unit symbol	Map unit name
20C	Grindbrook silt loam 7 to 20 percent slopes
21D	Grindbrook silt loam bedrock substratum, 3 to 30 percent slopes

24) More than half of the soil map units in this part of Clatsop County do not have a rating for Forest Productivity for Douglas-fir. Notice their slope range. Why do you think these soil map units do not have a rating? [2 points]

____Answer must include being flatter/ having a lower slope (1 point) and a reason (1 point). Reasons include: competing with agriculture or development/building, flooding, land value, depth to water table/ wetness, etc.____

25) Name two of the three **limitations** (rating reasons) to Fire Damage Susceptibility rating in this area. [2 points, 1 point each]

- **____Water erosion___**
- **____Content of sand____**
- **____Wind erosion____**

____/ 9 points

26) Choose one of the above limitations and explain why this limitation would make the soil more susceptible to fire damage. [3 points] Score 1 point for naming the limitation, 1 point for drawing a conclusion, 1 point for the connection to the soil- these answers are provided within the last two pages of the map packet.

Water erosion would occur after a fire. If a soil was susceptible to water erosion it would be vulnerable without forest cover (trees, understory, and Oi layer). Steep slopes increase the vulnerability to water erosion.
Sandy soils are more susceptible to formation of a water repellant layer. High rock fragment content increases the rate of heat transfer into the soil.
Wind erosion would occur after a fire. If a soil was susceptible to water erosion it would be vulnerable without forest cover (trees, understory, and Oi layer).

27) Compare the Forest Productivity for Douglas-fir with the Fire Damage Susceptibility ratings for map unit 59F Svensen loam 60 to 90 percent slopes. [3 points]

Must provide both ratings (2 points). The comparison is the remaining 1 point and should include the discussion of at least one soil map unit characteristic like water erosion suceptibility, sand content, or percent slope.

28) This area is next to the city of Astoria, at the mouth of the Columbia River. What do you think would happen if a forest fire ignited here? Would you expect erosion or landslides? Why or why not? Use the soil map in your answer. [4 points]

Yes, there would be erosion or landslides (1 point). They should mention removal of vegetation/trees (1 point), discuss the soil map (1 point), and potential for hazards to the city of Astoria and/or the Columbia River (1 point).

____/ 10 points