

1. A moist soil is sampled to determine its water content. Upon collection, the soil sample weighs 150 g. After oven drying, the sample weighs 120 g. The sample has a bulk density of 1.3 g/cm^3 , good granular structure, and a Munsell color of 10YR3/2.

• Calculate the gravimetric water content, Θ_m (show work for partial credit, 2 pts):

$$\begin{aligned}\Theta_m &= \text{wt water} / \text{oven-dry wt soil} \\ &= 150 \text{ g} - 120 \text{ g} / 120 \text{ g} \\ &= 30 / 120 = 0.25 \text{ (or 25\%)}\end{aligned}$$

• Calculate the volumetric water content, Θ_v (show work for partial credit, 2 pts):

$$\begin{aligned}\Theta_v &= \Theta_m \times D_b \\ &= 0.25 \times 1.3 \text{ g/cm}^3 \\ &= 0.325 \text{ (or 32.5\%)}\end{aligned}$$

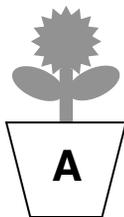
2. Consider a landscaping site in the Moscow area. The soil type is the same across the site, as are all topographic factors. An organic mulch (e.g. bark) is added to the surface of planting bed A, while planting bed B has a bare surface. Use **A**, **B**, or **no difference** to answer the following questions.

_____ **A** _____ The January soil temperature at 10 cm will be highest in which planting bed?

_____ **B** _____ The July soil temperature at 10 cm will be highest in which planting bed?

_____ **A** _____ The soil in which planting bed will warm up more slowly in the spring?

3. Consider two pots with sunflowers growing in them. Both pots contain the same volume of soil, but Pot A contains a silty clay and Pot B contains a loamy sand. Answer the following questions using these answers: **A**, **B**, **no difference**.



_____ **A** _____ Which Pot/soil can hold more plant-available water?

_____ **A** _____ If both soils contain 12% water by volume, which soil is more likely to be at wilting point?

_____ **A** _____ If both soils are at field capacity, which contains more water?

_____ **B** _____ If both soils contain 12% water by volume, the sunflower in which pot can more easily extract water?

no difference _____ If both soils are at wilting point, the sunflower in which pot is experiencing the greatest difficulty in extracting water?

4. The soil moisture state after a soil at $\psi = 0$ has been allowed to drain freely for 2-3 days is called **field capacity**.
5. The process in which nutrients are added to an aquatic system, resulting in algal blooms and subsequent depletion of dissolved oxygen is called **eutrophication**.
6. The term used to describe the overall physical condition of a soil for plant growth is **tilth**.
7. The program set up to take highly erodible cropland out of production in the US is known as the **Conservation Reserve Program**.
8. A commonly used device to keep sediment from leaving an urban construction site is known as a(n) **silt fence**.
9. Consider the Universal Soil Loss Equation (Soil loss = RKLSCP). A farm in Red Clay, Georgia has an R factor of 360, while a farm in Slug Meadows, Oregon has a value of 90. Assume all other factors are equal.

Which farm will experience more erosion? **Red Clay** How much more? **4 times**

10. TRUE (+) or FALSE (-):
- Optimal growth of most plants occurs when soils are saturated.
- +** A silt loam will hold approximately 4 times more plant available water than will a sand.

IMAGES

11. **Dust Bowl** What event discussed in class is illustrated with this map?
12. **A** These 2 maps show the amount of soil erosion in the US for the years 1982 and 2007. Which map (A or B) represents 1982?
13. **A** Which of these images represents the highest C factor in the USLE?
- C** Which of these images represents the lowest C factor in the USLE?

EXTRA CREDIT

What is the approximate annual erosion for Palouse region croplands?

10-12 tons/Acre/yr