

1.           **eating dirt**           The Lithuanian woman featured in the video clip seen in class is in the Guinness Book of Records for doing what?

2. List 3 essential plant macronutrients that plants obtain from air and water rather than soil solids:

          **Ca, Mg, K, N, P, K, S**          

3. Give the plant-available form of 3 macronutrients:

          **Ca<sup>2+</sup>, Mg<sup>2+</sup>, K<sup>+</sup>, NH<sub>4</sub><sup>+</sup>, HPO<sub>4</sub><sup>2-</sup>, K<sup>+</sup>, SO<sub>4</sub><sup>2-</sup>**          

4. List 3 micronutrients that plants obtain from soil:

          **Fe, Mn, Cu, Zn, Mo, Cl, Ni, B**          

4. Answer the following, assuming all other factors to be equal.

  **A**   Soil A is a silty clay loam, Soil B is a silt loam. Which soil contains more organic matter?

  **C**   Soil C receives 30" of mean annual precipitation (MAP), Soil D receives 15" of MAP. Which contains more organic matter?

  **F**   Soil E has been under conventional tillage for 100 years; Soil F was also cultivated, but has been in the Conservation Reserve Program for the past 15 years. Which contains more organic matter?

  **G**   Pile G contains a mix of fresh wood chips and wheat straw; Pile H contains a mix of fresh kitchen wastes and alfalfa hay. Which pile will N immobilization likely occur?

  **I**   Soil I is a hydric soil; Soil J is well drained. Which contains more organic matter?

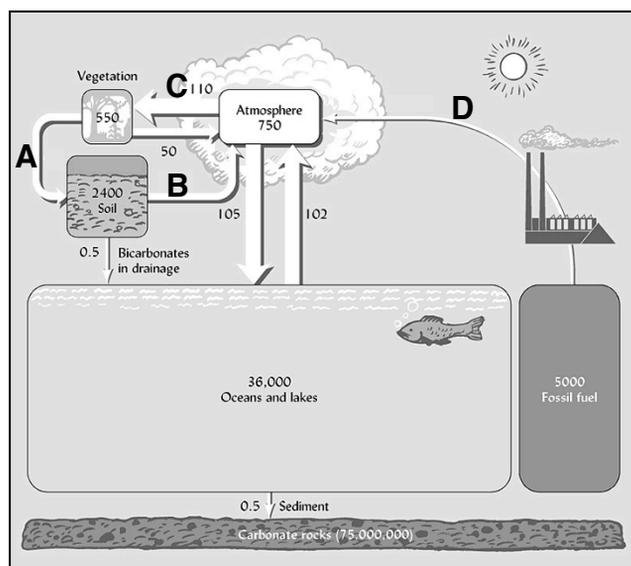
5. Use this C cycle figure to answer the following:

**photosynthesis** What process is indicated by the letter C?

**respiration or decomposition** What process is indicated by the letter B?

  **A**   Which process, A, B, or D, represents carbon sequestration?

  **B**   Which carbon flux is greater – that represented by the arrow labeled B or D?



6. TRUE (+) or FALSE (-):

      -       Ammonium is more readily leached from soils than is nitrate.

      -       The composting process will occur most rapidly under warm, anaerobic conditions.

      +       Some cyanobacteria are capable of both N fixation and photosynthesis.

      -       One of the reasons for the failure of Biosphere 2 was that the artificial soils were deficient in organic matter.

7. In class, we mentioned several specific ways in which organic matter is beneficial to overall soil properties. List 2 of these.

**increased CEC, increased water-holding capacity, improved soil tilth,**

### Images

8.       **composting**       What commercial process is shown here?

9.       **N<sub>2</sub> fixation**       The nodule (indicated by the arrow) on the legume roots shown here contains bacteria that are able to perform what specific process?

10.       **B**       One of these grassland soils is from an area receiving ~15" of mean annual precipitation (MAP); the other is from an area that receives ~30" MAP. Assuming both soils have approximately the same mean annual temperature, which soil comes from the area with 30" MAP?

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