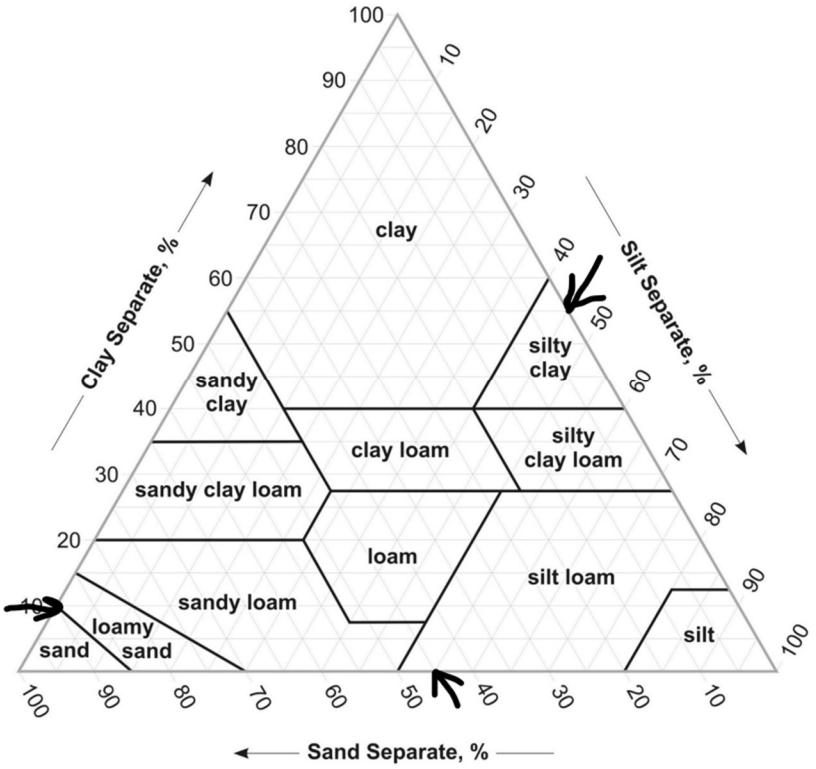
**2026 Iowa Envirothon State Soils** **April 27, 2026**

1. Using the textural triangle with arrows provided below, if the soil is made up of 10% clay, 45% sand, and 45% silt. What is the soil textural type:

    a. Silt Loam
    b. Sandy Loam
    c. Clay Loam
    d. Loam*
    e. Clay




2. What is the texture of the soil marked "A horizon" in the bucket?

    a. Silt Loam
    b. Silty Clay Loam
    c. None of these options fit the texture
    d. Sandy Loam
    e. Loam

3. Using the Munsell color book provided. What is the Hue of the soil marked "B horizon" in the bucket?

    a. 10YR
    b. N
    c. 7.5Y
    d. 2.5YR
    e. None of the above

4. Use the clinometer provided to determine which slope range listed below matches the slope that you measure between the two stakes.

    a. 0-2%
    b. 2-5%
    c. 5-9%
    d. 9-14%
    e. 14-18%

5. _____ is the ability of a soil to hold and exchange cations. This is one of the most important chemical properties in soil and generally is closely related to soil fertility.

    a. Calcium carbonate (CaCO3)
    b. Cation-exchange capacity*
    c. Soil fertility index
    d. Soil ped
    e. The Haney Test

6. Regarding the Revised Universal Soil Loss Equation (RUSLE2), the T factor is _____.

    a. the typical rainfall for the year the erosion is reviewed in the field
    b. that maximum amount of soil loss in tons per acre last year, will permit crop productivity to be sustained economically and indefinitely*
    c. the soil erosion factor and is a relative index of the susceptibility of bare, cultivated soil to particle detachment and removal and transport by rainfall
    d. the soil erosion factor and is a relative index of the susceptibility of bare, cultivated soil to particle detachment and removal and transport by wind
    e. an index relating to topography based on slope gradient and slope length

7. _____ are formed under conditions of saturation, flooding, or ponding that occur long enough during the growing season to develop anaerobic conditions (lack of oxygen) in the upper 6 to 10 inches of the soil profile. These soils are common in wetland areas.

    a. Calcium carbonate soils
    b. Carbonated soils
    c. Hydric soils*
    d. Sandy soil
    e. None of the above

8. What soil pH level appears to be the most desirable for an Iowa row crop farmer who is using a corn-soybean crop rotation? (see Table 1 below).

    a. 4.7
    b. 5.0
    c. 5.7
    d. 6.8*
    e. 7.5

***Table 1. Relative yield of selected crops grown in a corn, small grain, legumes or timothy rotation at different pH levels. (adapted from Smith and Doran 1996)***

| | pH | | | | |
|---|---|---|---|---|---|
| | **4.7** | **5** | **5.7** | **6.8** | **7.5** |
| **Crop** | **Relative Average Yield** | | | | |
| Corn | 34 | 73 | 83 | 100 | 85 |
| Wheat | 68 | 78 | 89 | 100 | 99 |
| Oats | 77 | 93 | 99 | 98 | 100 |
| Barley | 0 | 23 | 80 | 95 | 100 |
| Alfalfa | 2 | 9 | 42 | 100 | 100 |
| Soybean | 65 | 79 | 80 | 100 | 93 |
| Timothy | 31 | 47 | 66 | 100 | 95 |

9. Earthworm _____ is digested material that is excreted back into the soil. This material is enriched with nutrients (N, P, K, and Ca) and microorganisms during its passage through the worm's digestive system.

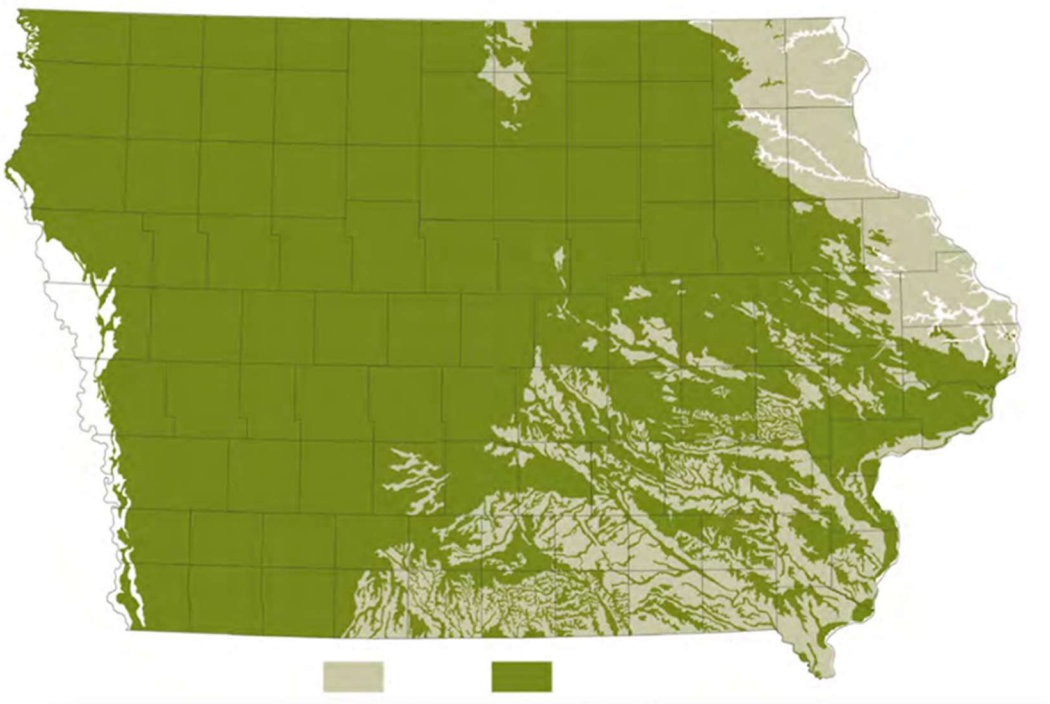
    a. skin
    b. cast*
    c. hypoxia
    d. mast
    e. blood

10. Forested soil and certain other soils that are intensely leached commonly contain a (an) ___ horizon located at the surface or a few inches below the surface. Note: This horizon is usually lighter in color, lower in organic matter, and contains less clay than the topsoil or the overlying horizon, if one is present.

    a. A
    b. B
    c. C
    d. R
    e. E*

11. Which of the following describes the distribution of the two dominant **Soil Orders** in Iowa? (see Diagram of Iowa below).

    a. **Mollisols** are the most common and are found in areas that were historically prairie (green) and Alfisols are more abundant in the south and east where forests were more common (tan). *
    b. **Entisols** are the most common and are found in areas that were historically prairie (green) and Mollisols are more abundant in the south and east where forests were more common (tan).
    c. **Histosols** are the most common and are found in areas that were historically prairie (green) and Mollisols are more abundant in the south and east where forests were more common (tan).
    d. **Alfisols** are the most common and are found in areas that were historically prairie (green) and Mollisols are more abundant in the south and east where forests were more common (tan).



12. Even though it is not officially designated by the Iowa state legislature, the highly productive soils of the _____ soil series are widely regarded as the State Soil of Iowa.
    a. Clarion
    b. Muscatine
    c. Monona
    d. Okoboji
    e. Tama*

***Polk County Soil Survey Questions (Book is available for Use)***

13. When looking at the Series Description for Palms (Part One, page 102), the following is true about the Palms Series in Polk Co.

    a. Palms Series is a somewhat poorly drained, organic material soil.
    b. Palms Series is a moderately well drained, loess soil.
    c. Palms Series is a very poorly drained, organic material soil. *
    d. Palms Series is a well drained, alluvial soil.
    e. Palms Series is a very poorly drained, aeolian sand soil.

14. A farmer is building a new house in the country on an acreage in Polk County and asked what limitations there will be to install a septic tank. In looking at the Polk County Soil Survey, it shows the acreage is within a 138C2 soil type. Using the engineering soil interpretations tables found in part 2, pgs. 121-132 for sanitary facilities (terms are defined for those tables on pg. 104), what would be the risk in the septic tank failing?

    a. The limitations should be recognized but generally can be overcome by good management or special design.
    b. Overcoming the limitations is difficult or impractical. Increased maintenance may be required.
    c. Soils have no limitations or that the limitations can be easily overcome.
    d. Good performance and low maintenance can be expected.
    e. C and D are both correct *

15. In the maps on Sheet 14 of 55, the Elkhart SW Quadrangle, when looking in sections 30 and 31 what is the Soil Map Unit (SMU) symbol for the area that is the diamond shape around the Interstate 35 on the map.

    a. 507
    b. 55
    c. 138B
    d. 4946 *
    e. 107

16. What is the name of the soil series for the SMU symbol in question above (Hint: names are found in the soil legend)?

    a. Clarion loam, moderately coarse substratum, 2 to 5 percent slopes
    b. Orthents-Urban land complex, 0 to 5 percent slopes*
    c. Nicollet loam, 1 to 3 percent slopes
    d. Webster silty clay loam, moderately coarse substratum, 0 to 2 percent slopes
    e. Canisteo clay loam, moderately coarse substratum, 0 to 2 percent slopes

17. What properties did field soil scientist note when making the soil survey (pg.13)?

    a. color, texture, size, and shape of soil aggregates*
    b. scientists name, address, favorite color, and phone number
    c. number of livestock and resources concern of the participants
    d. hydric soil, vegetation, and hydrology
    e. All the above

18. In the block diagram on pg. 22, this soil is most likely found toeslope/drainage way landscape position.

    a. Tama
    b. Loess
    c. Fayette
    d. Colo-Judson *
    e. Downs

19. The primary reason for taking a soil sample of your garden, lawn and/or farmland is to

    a. determine data for using the soil loss equation when calculating soil loss
    b. determine soil texture and structure
    c. know your soil nutrient status and pH*
    d. determine the soil type and name
    e. all the above are correct

20. Urban Soil Survey is vital work that can help identify

    a. healthy urban ecosystems
    b. determine where to focus restoration efforts
    c. manage stormwater
    d. mitigate urban heat island impacts
    e. All the above*

21. Managing soil health (improved soil function) is mostly a matter of maintaining suitable habitat for the myriads of creatures that comprise the:

    a. Revised Universal Soil Loss Equation
    b. Soil Food Web*
    c. Haney Test
    d. Microbial Web
    e. Source of Spiderman's Superpowers

22. What natural event in our world would soil organisms relate to a conventional tillage practice such as discing in a cropped field.

    a. An Earthquake
    b. A Hurricane
    c. A Tornado
    d. A Forest Fire
    e. All the Above*

23. Soil Microorganisms are responsible for:

    a. Rocks and Silt in the Soil
    b. Plant Diversity and Root Depth in the Soil
    c. Evaporation of Water in Pore Linings and Soil Cation Exchange Capacity
    d. Decomposition of Organic Matter and Releasing Plant Available Nutrients*
    e. Living Rhizospheres and Calcium Carbonates found in soil pores

24. _____ is the community of organisms living all or part of their lives in the soil.

    a. Soil Food Web*
    b. Soil Microorganisms
    c. Soil Judging Teacher Working Group
    d. Web Soil Survey
    e. Soils Working Group

25. Organisms in the soil food web cycle crop nutrients and release organic glues that increase _____.

    a. protozoa
    b. organic matter
    c. organic carbon
    d. soil aggregate stability*
    e. earth worm activity