2026 MN Envirothon - Soil and Land Use Study Guide

1. **Basics of soil formation and composition**
    a. Study the 5 soil forming factors and how they influence soil appearance and properties.
        i. https://extension.umn.edu/soil-management-and-health/five-factors-soil-formation
        ii. https://www.nrcs.usda.gov/resources/education-and-teaching-materials/soil-facts
    b. Learn to identify basic soil horizons (O, A, E, B, C, R) and their associated characteristics.
        i. https://iastate.pressbooks.pub/introsoilscience/chapter/soil-horizons/
2. **Basics of soil properties**
    a. Study basic soil properties such as texture, structure, and color.
        i. https://www.uhcl.edu/environmental-institute/texas-envirothon/documents/study-guide/soils-understanding-soils.pdf
    b. Learn how to use a soil textural triangle.
        i. https://aec.ifas.ufl.edu/media/aecifasufledu/teacher-repository/texture-triangle-worksheet.pdf
        ii. https://www.nrcs.usda.gov/sites/default/files/2022-11/texture-by-feel.pdf
    c. Study the influence of texture on permeability.
        i. https://www.uhcl.edu/environmental-institute/texas-envirothon/documents/study-guide/soils-understanding-soils.pdf
    d. Study the color characteristics of horizons.
        i. https://www.nrcs.usda.gov/sites/default/files/2022-11/color-of-soil.pdf
3. **Soil erosion and soil conservation**
    a. Learn to identify types of soil erosion.
        i. https://www.soils4teachers.org/erosion
    b. Study the influence of slope on runoff and water erosion.
        i. https://www.environment.nsw.gov.au/topics/land-and-soil/soil-degradation/hillslope-erosion
    c. Be able to identify some basic conservation practices that control soil erosion in both an agricultural and urban setting.
        i. https://www.soils4teachers.org/files/s4t/soil-erosion-conservation.pdf
        ii. https://www.soils4teachers.org/engineering-and-urban-soils
    d. Learn about essential plant nutrients.
        i. https://agrilifeextension.tamu.edu/library/gardening/essential-nutrients-for-plants/
4. **Soil survey and land use interpretations**
    a. Learn how to use the Web Soil Survey for your county or local area. Learn about soil maps and other soil information that can be found in the reports.

i. https://websoilsurvey.nrcs.usda.gov/app/
ii. https://extension.umn.edu/natural-resources-news/learn-about-your-land-using-web-soil-survey

5. **Resource concerns**
    a. Define resource concerns related to soils and describe why they are a problem, how they can be identified, and contributing factors. Concerns may include compaction, erosion, sediment deposition, etc.
        i. https://www.farmers.gov/conservation/concerns-tool/soil
    b. Identify specific agricultural best management practices to address resource concerns.
        i. https://mosh.umn.edu/management
6. **Minnesota soils**
    a. Learn about the Minnesota state soil
        i. https://www.soils.org/files/certifications/licensing/lester.pdf
    b. Learn the developmental age of Minnesota's soils
        i. https://extension.umn.edu/soil-management-and-health/five-factors-soil-formation#soil-master-horizons-1385110