

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/hill-slope-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://agrillifeextension.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>