

Envirothon New Brunswick

Soils and Land Use Learning Objectives

Key Point 1—Physical Properties of Soil and Soil Formation

Learning Objectives:

1. Understand the importance of soils and appreciate the relatively small amount of usable soil that exists on Earth.
 - a. Why is soil important?
 - b. How Much Soil Is There
2. Know the five soil forming factors, and understand how they influence soil properties.
 - a. Soil Forming Factors
3. Understand the origin and types of soil parent materials.
 - a. Soil Parent Materials
 - b. Atlantic Provinces Soil Parent Material Modes of Deposition
4. Understand basic soil forming processes: additions, losses, translocations, and transformations.
 - a. Soil Forming Processes
5. Recognize and understand features of Soil Profiles, and be able to use this information to determine basic soil properties and limitations.
 - a. Soil Profiles
6. Identify and describe soil characteristics (texture, structure, and color- using Munsell color charts).
 - a. Describing and Interpreting Soil Profiles
 - b. Soil Texture and Structure
 - c. Soil Landscapes of Canada

Key Point 2—Soil Ecosystems

Learning Objectives:

7. Recognize that biological diversity is important for soil health and hence plant, human and environmental health.
 - a. Soil Biodiversity
8. Understand how the hydrologic, carbon and nutrient cycles relate to soil management.
 - a. Hydrologic, Carbon, and Nutrient Cycles
9. Recognize that understanding soil ecosystems is important to soil management.
 - a. Soil Biology and Land Management

Key Point 3—Chemical Properties of Soil and Soil Fertility

Learning Objectives:

10. Understand the procedure for taking a soil sample and conducting nutrient analysis.
 - a. Soil Testing

11. Know that plants must receive essential micronutrients and macronutrients from the soil in order to be healthy, and understand that soil fertility relates to the physical and chemical properties of the soil in addition to the quantity of nutrients.
 - a. Plant Nutrients
12. Understand why soil fertility reflects the physical, chemical and biological state of the soil.
 - a. Introduction to soil fertility

Key Point 4—Soil Conservation and Land Use Management

Learning Objectives:

13. Compare different land uses and conservation practices and their impact on soils and erosion.
 - a. Effect of land use and management
 - b. Soil Erosion: Causes and Effects
14. Understand how soil is impacted by point & non-point source pollution & the importance of soil management to agriculture and clean water.
 - a. Sources of Pollution: Point and Nonpoint
15. Understand that soil management and environmental protection requires agricultural and resource managers to use spatial tools such as Geographic Information Systems (GIS), and Global Positioning Systems (GPS) in order to make the best possible resource decisions.
 - a. GIS, GPS, and Remote Sensing Technologies
 - b. The National Topographic System of Canada
16. Learn about career opportunities and the role of government in the management of natural resources.
 - a. Careers in Soil Science

Key Point 5—Web soil surveys & Soil Surveys

Learning Objectives:

17. Access and use published and on-line soil data and other resources to learn how land use affects soil, and the limitations of local soils.
 - a. Canadian Soil Information Service
 - b. Canadian Soil Publications
18. Understand the eight Land Capability Classes and how they are important in determining appropriate land use.
 - a. Land Capability Classification
19. Understand soil drainage classes and be able to recognize the characteristics of hydric soils and know how soils fit into the definition of wetlands.
 - a. Soil Drainage Classes
 - b. Hydric Soils Additional Resources
 - c. Why is soil important

Key Point 6 – Geology

Learning Objectives:

20. Explain the impact of geomorphology on landforms and landscapes, and how these processes relate to soil formation.
21. Identify unique geological features of the state/province, nation, and world.
22. Describe the role of tectonic plate movement to create landforms and geologic events (such as earthquakes and volcanic eruptions) and how it impacts soil formation.
23. Describe the characteristics of the three major types of rocks (igneous, sedimentary, and metamorphic) and give examples of each.
24. Identify and describe the layers of the Earth (crust, mantle, outer core, inner core) and how they were formed.
25. Describe how the rock type of a parent material determines what minerals are present in a soil.
26. Explain the importance of different types of weathering (mechanical and chemical) in soil formation.
27. Describe how geology influences topography, on both micro and macro scales.