

Science: Environmental Science
Unit 1: Soil

<p>Essential Understandings</p>	<ul style="list-style-type: none"> ▪ The four major components of soil are mineral material, air, water, and organic matter. ▪ There are four factors that influence soil formation; climate, topography, biota, and time. ▪ A soil profile can have up to six primary soil horizons: O, A, E, B, C, and R. ▪ There are seven primary soil properties which influence how a soil may be used for many purposes. They are soil texture, soil structure, soil consistence, soil depth, soil drainage class, soil reaction, and cation exchange capacity. ▪ Soil surveys involve predictions of soil behavior, soil limitations, soil series, and detailed soil maps to affect land use planning in a survey area. ▪ The main function of soils is to support all types of plants.
<p>Essential Questions</p>	<ul style="list-style-type: none"> ▪ How is soil defined and what are the components of soil? ▪ What are the five factors that influence the formation of soil? ▪ How do these factors drive the process of soil profile development? ▪ What is a soil profile and what are the six primary soil horizons that a profile is composed of? ▪ How does the process of erosion impact soil and what can be done to minimize soil losses? ▪ What is a soil survey and how are they used in judging soil profile characteristics? ▪ What are the common soil types and their respective uses as well as some common agricultural methods and pest management practices in Maine?
<p>Essential Knowledge</p>	<ul style="list-style-type: none"> ▪ Soils are essential for plant growth and for all life on earth. ▪ Mineral matter, air, water, and organic matter make up soil. ▪ Different soil types are formed by climate, aspect, vegetation, time, and parent material. ▪ Soil profiles are typically composed of the O, A, E, B, C, R, layers known as horizons. ▪ The properties of soil are determined by texture, structure, consistence, depth, drainage, pH, and cation exchange capacity. ▪ A web soil survey consists of a detailed report on-line of any location in the United States. ▪ Soil judging involves identifying some of the soil properties presented while examining an on-site student dug soil pit.
<p>Vocabulary</p>	<ul style="list-style-type: none"> ▪ <u>Terms</u>: soil: mineral, air, water, organic matter; soil formation: climate, topography, catena, slope aspect, biota, pedoturbation, parent material, glacial till, lodgment till, ablation till, hardpan, outwash(stratified drift), eskers, lacustrine sediments, marine

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	<p>sediments, alluvial, transformation, translocation, soil losses and additions, leaching, erosion (raindrop, sheet, rill, gully, and stream), microbial decomposition, platy, prismatic, blocky, granular, friable, bedrock, water table, redoximorphic features, anaerobic micro-organisms, biologic zero, pH, acidic, alkaline, cation exchange capacity, sedimentation, topsoil, infiltration capacity, permeability, soil (survey, series, maps), horizons(O,A,E,B,C,R), sand, silt, clay, rock fragment, textural triangle, soil conservation: contour farming, strip farming, terracing, waterways, windbreaks, tillage, fertilizer: (N,P,K), insecticides, herbicides, pesticides, bioaccumulation, biomagnification, integrated pest management.</p> <p>○</p>
<p>Essential Skills</p>	<ul style="list-style-type: none"> ▪ Carefully read and highlight the provided soil information packet and understand through class presentations the characteristics, formation, and importance of soil. ▪ Dig a prescribed soil pit and complete all parts of the soil management laboratory activity. ▪ Determine pH, nitrogen, phosphorus, and potash levels in collected soil samples. ▪ Evaluate the soil quality in a forest using physical, chemical, and biological tests at different depths. ▪ Review and answer practice assessment questions for textbook chapters 14 and 15 by matching terms and definitions, determining true or false statements, identifying correct multiple choice responses, or writing complete sentences to answer challenging questions.
<p>Related Maine Learning Results</p>	<p>C1 Understandings of Inquiry D2 Earth E1 Biodiversity E2 Ecosystems</p>
<p>Sample Lessons And Activities</p>	<ul style="list-style-type: none"> ▪ Groups of students will dig soil pits (3'x3') on campus and collect/test samples of each soil layer. ▪ Read Chapters 14 and 15 and answer the end of chapter review questions for each. ▪ Complete the Soil Management Lab with soil pit groups. ▪ Read and highlight any unknown information in the Soil Information packet (Maine Envirothon competition). ▪ Working in pairs complete the Soil Quality Lab Experiment for a forest soil type. ▪ Take notes of class demonstration and discussion for judging a soil profile using a score card.
<p>Sample Classroom</p>	<ul style="list-style-type: none"> ▪ Soil Management/Soil Quality Experiment Post-Lab Quizzes ▪ Chapter 14 and Chapter 15 Textbook Quizzes and Tests

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<p>Assessment Methods</p>	<ul style="list-style-type: none"> ▪ Soils Judging Scorecard ▪ Previous Envirothon Test Questions on Soils
<p>Sample Resources</p>	<ul style="list-style-type: none"> ▪ <u>Publications: Environmental Science: A Study of Interrelationships Eighth Edition by Enger/Smith</u> ▪ <u>Maine Envirothon Soils Information packet</u> ▪ <u>Cornell Soil Health Assessment Training Manual</u> ▪ <u>Munsell Soil Color Book</u> ▪ <u>A Study of Soil Science Second Edition by Dr. Henry D. Foth</u> ▪ <u>Lamotte Soil Handbook</u> <ul style="list-style-type: none"> ○ ▪ <u>Videos: Dirt: the Video</u> ▪ <u>You Tube: Soil Formation, Soil Types, Soil Structure</u> <ul style="list-style-type: none"> ○
<p>Technology Link</p>	<ul style="list-style-type: none"> ▪ http://www.brunswick.k12.me.us/curriculum