

Science Content Standard and Benchmarks Grade 4	Main Elements of Soils Module and Activities that Apply to the Standards
Standard: Benchmark 1:1, 1:2, 1:3, 1:5	Students complete a soil profile, including observations and interpreting how soil composition affects the growth of plants at the site. Students then culture their soil sample in order to answer the question, "Are there things living in our soil that we cannot see?" Students will use proper laboratory techniques, including creation of a control plate, to determine the presence or absence of bacteria. Students will keep a notebook with observations and colony counts in order to communicate their findings.
3:3, 3:4 <i>8th grade benchmarks</i> 3:2	Students will begin to explore the diversity of life as illustrated through the soil profile. Students will test questions such as, "What happens when I add a poison to the soil? What sample of soil has the most abundance of life, including plants, animals, and bacteria?" "How do humans affect soil, in both positive and negative ways?"
4:2	Students will dig a soil profile, make observations about color and texture of the soil, and record measurements about depth of soil layers.
6:2, 6:3	Students will explore how scientists have begun to discover more life forms within recent history and begin to discuss how science is ever-changing as new technology and new ideas allow us to investigate further.

Mathematics Content Standard and Benchmarks Grade 4	Main Elements of Soils Module and Activities that Apply to the Standards
Standard: Benchmark 1:1, 1:3	Students will make estimations of bacterial growth and colony numbers, present data in a table format, and look for patterns in bacterial growth related to the soil sample. Students will employ a laboratory notebook to illustrate and communicate their findings.
2:2	Students will be counting and grouping their bacterial colonies and relating to samples.
5:1, 5:3	Students will complete a soil profile, estimating depth, measuring depth of various layers, and determining highest concentration of various soil materials.
6:1, 6:2	Throughout the entire soil profile investigation, students will be collecting data in their science notebooks, relating data to others, and presenting data in differing formats to illustrate results of findings.

The content standards that are addressed in the module are the following:

Science Content Standards:

Content Standard 1: Students through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate the results and form reasonable conclusions of scientific investigations.

Benchmarks (End of Grade 4)

1. develop the abilities necessary to safely conduct scientific inquiry, including (a step-by-step sequence is not implied): (a) asking questions about objects, events, and organisms in the environment, (b) planning and conducting simple investigations
2. select and use appropriate tools including technology to make measurements (including metric units) and represent results of basic scientific investigations
3. use data to describe and communicate the results of scientific investigations
5. identify a valid test in an investigation

Content Standard 2: Students, through the inquiry process, demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems.

Benchmarks (End of Grade 4)

2. examine, measure, describe, compare and classify objects in terms of common physical properties

Content Standard 3: Students through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.

Benchmarks (End of Grade 4)

3. describe and use models that trace the life cycles of different plants and animals and discuss how they differ from species to species
4. explain cause and effect relationships between nonliving and living components within ecosystems; and explain individual response to the changes in the environment including identifying differences between inherited, instinctual, and learned behaviors

Benchmarks (End of Grade 8)

2. explain how organisms and systems of organisms obtain and use energy resources to maintain stable conditions (e.g. food webs, photosynthesis, respiration)

Content Standard 4: Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.

Benchmarks (End of Grade 4)

1. describe and give examples of earth's changing features
2. describe and measure the physical properties of earth's basic materials (including soil, rocks, water and gases) and the resources they provide,

Content Standard 5: Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures and societies.

Benchmarks(End of Grade 4)

1. describe and discuss examples of how people use science and technology
3. simulate scientific collaboration by sharing and communicating ideas to identify and describe problems

Content Standard 6: Students understand historical developments in science and technology.

Benchmarks (End of grade 4)

1. give historical examples of scientific and technological contributions to communities, cultures, and societies, including Montana American Indian examples
2. describe how scientific inquiry has produced much knowledge about the world and a variety of contributions toward understanding events and phenomenon within the universe.

Mathematics Content Standards:

Content Standard 1: Students engage in mathematical processes of problem solving and reasoning, estimation, communication, connections, and applications, and using appropriate technology.

Benchmarks (End of Grade 4)

1. solve problems from many contexts using a variety of strategies (e.g. estimate, make a table, look for a pattern, and simplify the problem). Explain the methods for solving these problems.
3. communicate mathematical ideas in a variety of ways (e.g. written, verbal, concrete, pictorial, graphical, algebraic).

Content Standard 2: Students demonstrate understanding of and an ability to use numbers and operations.

Benchmarks(End of Grade 4)

2. use the number system by counting, grouping and applying place value concepts.

Content Standard 5: Students demonstrate understanding of measureable attributes and an ability to use measurement process.

1. estimate, measure, and investigate length, capacity, weight, mass, area, volume, time, and temperature.
3. apply measurement skills to everyday situations

Content Standard 6: Students demonstrate understanding of and an ability to use data analysis, probability, and statistics.

1. collect, organize, and display data
2. construct, read, and interpret displays of data, including graphs