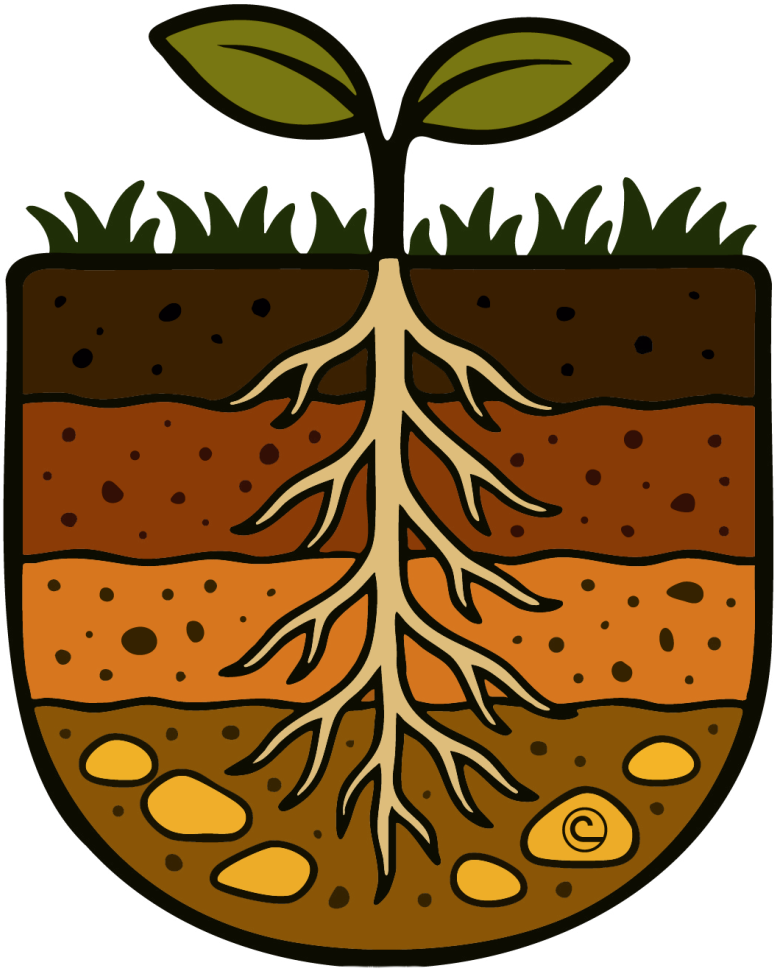
Soil.

Where it all Begins



Stewardship & Education

Instructors Guide 2026

LESSON PLANS & HANDS-ON ACTIVITIES K- 8TH GRADE

National Association of Conservation Districts

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Where it all Begins

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A trusted leader in voluntary, science-based conservation efforts, NRCS has been instrumental in supporting both technical assistance and educational outreach for soil health nationwide.

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Aimee Neeley Figgatt, NACD Stewardship & Education Coordinator. Guide development, layout, and design by Aimee Neeley Figgatt, NACD Stewardship & Education Coordinator. She created the guide's framework, instructional flow, and visual format, blending place-based learning with hands-on, adaptable content for informal education settings.

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Local Conservation Districts

The Role of Local Conservation Districts and NRCS in Natural Resource Education As the cornerstone of NACD's membership, local conservation districts play a vital role in community-driven natural resource education. Their dedication to locally led conservation and youth engagement has greatly influenced the essence of this guide. We extend our heartfelt appreciation to the district staff, boards, and educators who bring soil education to life, whether in classrooms, outdoor spaces, camps, libraries, or neighborhood gardens, every single day. Your commitment inspires every page of this resource. We take pride in our partnership with the NRCS, whose commitment to science-based conservation and soil health forms the basis for many practices and insights shared in this guide. NRCS staff nationwide continue to promote hands-on education, community resilience, and stewardship grounded in the principles of healthy soil.

Scotts Miracle-Gro Foundation

Special thanks to the Scotts Miracle-Gro Foundation for supporting NACD's efforts to engage the next generation of conservationists. Their continued investment in outdoor education and natural resource awareness is helping to cultivate curious, empowered young learners across the United States.

In ***Last Child in the Woods***, author Richard Louv reminds us that "passion is lifted from the earth itself by the muddy hands of the young."

This simple truth guides the work of conservation districts across the country, where hands-on, local education helps children build lasting relationships with the land. When young people explore the soil beneath their feet or follow the flow of water through their community, they are not just learning science—they are discovering their place in the natural world. These early, emotionally resonant experiences are essential to developing lifelong stewards of our natural resources.

Key Themes and Relevance to Conservation Education

1. Place-Based Learning

Louv emphasizes that children need to develop a personal connection to the places where they live—not just abstract environmental knowledge. He advocates for:

- Experiences in local parks, backyards, forests, streams, and schoolyards
- Learning that is rooted in immediate surroundings, helping children see themselves as part of the local ecosystem
- Recognition that children form stronger environmental ethics when they first fall in love with nature close to home

This deeply supports conservation district education, which focuses on local soil types, watershed issues, and regional biodiversity.

2. Hands-On Discovery

Rather than learning solely through textbooks or screens, Louv calls for:

- Unstructured outdoor play (digging in dirt, climbing trees, turning over rocks)
- Tactile learning, such as gardening, exploring animal tracks, building forts, and observing natural processes
- Activities that involve direct interaction with natural elements, like soil and water, which tie directly to the work of conservation districts

This mirrors the kinds of sensory-rich, exploratory learning that soil and water conservation programs often promote.

> **"Passion is lifted from the earth itself by the muddy hands of the young; it travels along grass-stained sleeves to the heart."**
>
> Richard Louv, Last Child in the Woods

3. Emotionally Resonant Experiences

Louv argues that emotional memory is key to long-term environmental stewardship. He suggests:

- Children are more likely to protect what they have come to love through experience
- Joy, wonder, and curiosity are more effective motivators than fear-based messaging (such as focusing only on pollution or climate anxiety)
- Educators should emphasize relationship-building with nature, not just facts about it

This philosophy supports using soil as a story—how it nurtures life, holds memory, and connects all living things. Conservation educators can create emotional resonance by introducing students to soil as a home, a helper, or even a living character.

Introduction - Soil. Where It All Begins

Soil is more than the ground beneath our feet—it's the foundation for all terrestrial life. Every plant, tree, garden, and ecosystem relies (or rely) on soil to grow, thrive, and connect with the web of life. In recognition of its importance, this guide celebrates soil as a living, dynamic system that deserves our care, attention, and curiosity.

Soil. Where It All Begins is a flexible, engaging, and hands-on education guide designed for use by informal educators, such as those in conservation districts, outdoor learning centers, afterschool programs, nature camps, museums, and environmental outreach programs. It includes interactive modules and creative projects that invite learners in Grades K–8 to explore soil with their senses, imagination, and scientific inquiry.

This guide was developed in collaboration with the **National Association of Conservation Districts (NACD)** and inspired by the science-based outreach efforts of the **Natural Resources Conservation Service (NRCS)**. The lessons aim to make soil science accessible, exciting, and deeply relevant to learners across all environments - from urban neighborhoods to rural gardens and forest trails.

Pedagogical Overview

The Soil. Where It All Begins. education modules use hands-on, observation-based learning to introduce students to soil as the foundation of life. Each lesson is built to promote active discovery, environmental awareness, and curiosity through direct interaction with real soil materials.

Approaches to Learning in the Guide

Observation and Classification
Students begin by looking closely at what makes up soil using basic tools like magnifying glasses, droppers, and spoons. They practice classification skills by sorting soil components and comparing texture, moisture, and physical properties. Activities such as Soil Sample Sorting and the Water Drop Test give students meaningful practice in making observations and drawing conclusions.

Investigation and Inquiry
Students explore essential questions such as "What is soil made of?" and "Why is soil important for plants?" These questions guide them through experiments and model-building activities where they evaluate soil samples, construct soil layers, and test how soil holds water. This investigative process mirrors real scientific methods and encourages students to think critically.

Reflection and Communication
Each module includes structured opportunities for students to reflect on their findings. Prompts like "What did you find in your soil sample?" and "Draw a picture of plants growing in and above the soil" give students a chance to summarize their learning and express understanding through writing or drawing. Reflection is a key component of each lesson's conclusion.

Adaptable Learning Experiences
Modifications are suggested to ensure that younger learners (K–2) can fully participate. These include using larger magnifying glasses, pre-filled trays, picture-based sorting mats, and sentence starters such as "I saw __ in my soil." These adaptations support accessibility and success across a wide range of early learners.
Making the Most of This Teaching Resource

- Use the activity sequence as a flexible learning path. You can implement each activity independently or in combination based on your group's schedule and setting.
- Encourage the use of journals or clipboards for recording observations. These can be used for assessment and as personal soil science notebooks.
- Extend learning outdoors. The materials list is designed for classroom or outdoor settings, allowing students to explore soil in their own environment.
- Reinforce the idea that "soil is more than dirt—it's life beneath our feet." This phrase, repeated throughout the modules, can be used as a guiding theme or class motto.

Referenced Standards in the Modules

- NGSS 3-LS4-3
- NGSS 4-ESS2-1
- CCSS.ELA.W.4.2
- C3.D2.Geo.5.3–5

These standards support learning in life science, earth science, writing, and geography and are intentionally integrated into the objectives of each lesson.

Why Soil?

Soil is often overlooked, yet it plays a vital role in climate stability, food production, clean water, and biodiversity. Teaching students about soil builds not only science literacy but also a deeper appreciation for nature, stewardship, and sustainability.

Through these activities, students will:

- **Learn what soil is made of**
- **Discover who lives in the soil**
- **Observe how soil supports plant life**
- **Explore ways to protect and care for soil in their own communities**

Whether you're facilitating a single activity or designing a full soil-themed program, Soil. Where It All Begins provides the tools, guidance, and inspiration to connect youth with one of Earth's most essential—and magical—resources.

How to Use This Guide

This guide is divided into three grade bands:

- Grades K–2: Sensory exploration, imaginative play, and creative arts
- Grades 3–5: Hands-on experimentation, systems thinking, and community awareness
- Grades 6–8: Inquiry-driven projects, civic engagement, and career connections

Each grade band includes four modular lessons that can be taught in order or independently. Every lesson is written in a consistent format featuring:

- Objectives tied to national standards
- Background Information to support facilitator knowledge
- Materials lists with common and low-cost supplies
- Step-by-step Procedures for clear and confident delivery
- Discussion Questions to prompt curiosity and reflection
- Assessment suggestions focused on observation and expression
- Extensions and Modifications for flexible implementation

Conservation District Educators:

Bringing Soil Education to Schools

GETTING STARTED

Create a Plan. Coordinate with school staff to identify grade-level science goals, STEM opportunities, and natural tie-ins to state standards. Use this guide to select activities that fit your community's soil types and conservation goals.

Funding Support. Many districts use local, state, or national grants—like NACD's Outreach & Education grants—to support materials, transportation, or events. Partnering with your NRCS office, FFA chapters, or Master Gardeners can provide supplies or volunteers.

Brainstorm & Collaborate. Meet with teachers or curriculum teams to build a shared vision.Start with soil basics for younger students, then scaffold up to conservation practices and career connections for older grades.

Get Approval. Districts may need approval from school boards, principals, or county STEM supervisors. Provide sample lesson plans and links to standards included in this guide to streamline approval. Schedule Activities. Begin planning 4–6 weeks in advance. Whether it's a one-day soil field station or a classroom series, align visits with science units or Earth Day events for the greatest impact.

Supplemental soil health education from a conservation district connects students to the living world beneath their feet. It gives them hands-on science, builds stewardship values, and shows how local conservation professionals are protecting natural resources right in their own community.

When teachers bring in supplemental soil health education, students get more than a science lesson—they discover the foundation of life itself. These hands-on experiences create real-world connections, deepen understanding, and inspire a new generation of conservation-minded learners.

Teachers: Partnering for Soil Education Success

Create a Plan. Review your science, social studies, and ELA standards. This guide offers adaptable lessons for grades K–8 that can reinforce topics like life cycles, ecosystems, and weathering. Choose activities that complement your curriculum.

Funding Support. Talk to your conservation district about available classroom support. They often have free materials, guest speakers, or small grant opportunities. Parent-teacher groups or community sponsors may also help fund supplies or field days.

Brainstorm & Customize. Collaborate with conservation staff or other teachers to plan what works best for your students. Decide if you want in-class lessons, a field day, a soil station at a science night, or all three.

Get Approval. Share your plan with your principal, grade-level team, or science coordinator. Let them know these lessons are tied to national and state standards and support conservation literacy.

Schedule Activities. Aim to plan 4–6 weeks ahead. Align soil activities with Earth Day, science fair season, or local agriculture weeks for meaningful connections and easier integration.

Bringing Soil Education to Life:

A Guide for Educators and Conservation Partners

Create a Plan. Conservation district educators can coordinate with teachers to identify local curriculum goals, soil types, and community conservation priorities. Teachers can select lessons that fit science, social studies, and ELA standards from this guide. Together, you can design learning that's hands-on, standards-aligned, and place-based.

Funding Support. Districts often have access to local or national funding, including NACD grants, that support education efforts. Teachers may also find support through PTOs, STEM funds, or community sponsors. Partnering early can help maximize resources and minimize classroom expenses.

Brainstorm & Collaborate. Whether you're designing a soil station for a field day, hosting a guest speaker, or integrating a full classroom series, collaboration is key. Discuss student needs, scheduling preferences, and available materials. Adapt lessons from this guide to your audience and setting.

Get Approval. District educators may need school or county-level approval to participate. Teachers may need administrator sign-off for special projects. Sharing sample lessons and standards—already included in this guide—can streamline the process and ensure buy-in.

Schedule Activities. Plan at least 4–6 weeks ahead. Align lessons or events with Earth Day, National Stewardship Week, agriculture events, or science units to increase engagement and ease implementation.

Advisory Committee:

Building a Team to Put Conservation Education on the Ground

Successful soil education programs don't happen in isolation—they thrive when communities come together. An advisory committee brings people with passion, knowledge, and local ties to the table to support the conservation district's education goals. This group doesn't just advise—they roll up their sleeves and make it happen.

Who Should Be Involved?

- Conservation district supervisors and staff
- NRCS and FSA representatives
- Teachers, principals, and STEM or curriculum coordinators
- FFA advisors and 4-H leaders
- Master Gardeners or local extension agents
- Local farmers and foresters
- Tribal leaders or cultural resource educators
- Natural resource professionals (state/federal agencies)
- Parents, PTO representatives, and youth mentors
- Community volunteers and retired educators
- Sponsors, donors, and business partners

What Do They Do?

This isn't a sit-and-watch committee. These members support the educator (or become the educator if one doesn't exist). Their roles may include:

Facilitators and Coordinators – Help organize logistics, volunteers, and student activities

In-Person Support – Step in on activity days or lead stations

Fundraisers and Sponsors – Seek grants, donations, or local business partnerships

Resource Leads – Help procure or create hands-on materials

Liaisons – Build trust and communication between the district, schools, and community

Outreach Champions – Spread the word, recruit volunteers, and promote events

Choose Your Setting

Indoor Options:

- Classroom stations using clear cups or soil sample trays
- Cafeteria or gym setups for soil investigations or mini-labs
- Library corners with soil books and sorting tools

Outdoor Options:

- School gardens or raised beds
- Community gardens or nearby green spaces
- Temporary "Soil Learning Zones" with buckets, shovels, or trays on tarps

No Green Space?

Use windowsills, buckets, or even temporary outdoor tents. Soil is flexible—and mobile.

No Educator? No Problem.

If your district doesn't have a dedicated education staff member, this committee is the team. Volunteers and local experts can bring programming to life one station, one class, one field day at a time.

A well-built advisory committee doesn't just support the work—it becomes the foundation for sustainable, high-impact conservation education. When people from across the community lend their time and skills, students benefit, schools gain resources, and the district strengthens its mission.

SOIL MODULES

Grades K-5

MODULE 1 – Soil Explorers: What Is Soil?

Activity A: Soil Rainbow Jars

Focus Concept: Soil is made of many visible parts with different textures, colors, and natural materials. Exploring these layers helps students recognize that soil is a mixture of living and nonliving things.

Let kids build a "soil rainbow" by layering different natural materials in clear containers.

- Have a scoop station for each material.
- Encourage them to feel each texture.
- Ask: "Why are these colors different?"
- Tip: Create a display table if space allows.

Learning Objectives

- Identify and sort soil components (sand, pebbles, leaves, dirt)
- Compare textures, colors, and layering
- Observe and describe the natural diversity in local soil materials

Procedure

1. Set up several scoop stations, each with a different soil material. Include labels and picture cards to support non-readers.
2. Give each child a clear cup or jar. Ask them to build their own "soil rainbow" by layering the natural materials in any order.
3. Encourage students to feel each material before adding it. Prompt: "What do you notice when you touch the sand? The leaves?"
4. As they build their jars, circulate and ask open-ended questions. Help children compare differences between their layers and their peers'.
5. When finished, have students place their jars on a display table or share them with a partner or small group.
6. Use guiding questions to spark discussion. Allow time for students to record their observations or draw a quick diagram of their soil rainbow.

Discussion Questions

- Why do these materials look or feel different?
- What might each layer do in real soil?
- Which materials are lightest? Heaviest?

Extensions

- Label layers with cards or stickers showing names and simple facts
- Display finished jars with student-drawn signs or soil facts
- Use magnifying glasses to look closely at the particles in each layer

Assessment

Observe student participation and descriptive language. Collect drawings or notes that show understanding of soil diversity.

Modifications

- For younger children: Pre-fill jars with two base layers, and allow students to add top layers only.
- For older students: Introduce vocabulary like "organic matter," "decomposed," and "sediment."
- Use sentence frames like "The softest layer is ___" or "I felt ___ in my soil."

QUICK LOOK

Time Needed: 30–60 minutes

Setting: Indoors or outdoors

Ideal Group Size: 4–20 children

Recommended Grades: K–5

Supplies:

- Clear cups or jars (1 per child)
- Spoons/scoops
- Local soil, sand, crushed leaves, pebbles
- Water
- Plastic containers or film canisters with lids
- Scrap paper
- Bowls
- Natural brush materials (pine needles, twigs, feathers, etc.)
- Clay or play dough
- Shoeboxes or cardboard box lids

Activity B: Soil Sound Shakers

Focus Concept: *Soil materials make different sounds based on their composition. Listening to soil helps students identify differences in size, shape, and moisture.*

Fill jars with soil materials (sand, gravel, dry leaves). Let kids shake and listen.
- Have them guess the contents by sound.
- Compare loud vs. soft containers.
- Invite discussion: "What do these sounds tell us?"

Learning Objectives
- Use sound to identify soil components
- Practice observation and reasoning skills
- Explore how texture and density relate to sound

Preparation
- Fill each container with one type of soil material. Prepare a variety (at least 4 types).
- Label each container with a number or symbol. Keep the contents secret for the guessing portion.

Procedure
1. Distribute one shaker per child or small group. Instruct them to shake it gently next to their ear and describe the sound.
2. Encourage them to guess what might be inside based on what they hear. Prompts: "Does it sound soft or scratchy?" "Is it loud or quiet?"
3. Create a group chart listing each shaker's number, guesses, and final answers.
4. After each group shares their guess, open the containers one at a time and confirm the contents. Let students touch and examine each material.
5. Compare the sounds across materials. Ask what features might cause a shaker to sound louder or softer.

Discussion Questions
- Which shaker was loudest? Why?
- What kind of material made the softest sound?
- How does sound help scientists understand the soil?

Extensions
- Have students create their own soil shaker with a mix of materials and let others guess
- Use a Venn diagram to compare materials that sounded alike
- Connect to erosion by discussing how wind or rain might "move" loud vs. soft materials

Assessment
Check student reasoning and verbal participation during the guessing game. Review recorded guesses or drawings for accuracy and detail.

Modifications
- For younger learners: Use fewer shaker types and add color-coded lids for matching games
- For older students: Add mystery materials like crushed eggshells or damp soil and include texture comparisons
- Include simplified charts with symbols or emojis to help categorize loud vs. soft

QUICK LOOK

Time Needed: 15-20 minutes

Setting: Indoors or outdoors

Ideal Group Size: 4–20 children

Recommended Grades: K–5

Materials:
- Plastic containers or jars with lids (film canisters work well)
- Soil materials: sand, gravel, dry leaves, small sticks, clay pellets
- Paper for notes and guesses
- Sound chart or picture labels (optional)

Activity C: Mud Paint & Nature Brushes

Focus Concept: *Soil is more than just ground beneath us—it can be used for art, storytelling, and scientific discovery. Mixing soil with water to make paint helps students observe soil color and texture while using natural materials creatively.*

Mix different soils with water to make mud paint. Use bundled pine needles or feathers tied to sticks as brushes.

- Paint "life under the soil" on paper or cardboard.
- Encourage creativity with worms, roots, and rocks.

Learning Objectives

- Mix soil and water to observe changes in color and texture
- Explore soil's use in cultural and artistic practices
- Create artwork inspired by underground life

Preparation

- Pre-collect soil types and lay out nature brush materials in baskets or trays
- Cover surfaces with newspaper or tarps if working indoors
- Test the soil and water ratios ahead of time to show how some soils make smoother paints

Procedure

1. Begin with a short discussion about how people have used soil for painting across history and cultures.
2. Let students explore soil types by hand, noting color and feel. Prompt: "Which soil feels sticky? Which one feels gritty?"
3. Help students create their own nature brushes by tying natural items to sticks or pencils.
4. Mix soil and water in small bowls to create earthy paints. Demonstrate different ratios for thicker or thinner paint.
5. Ask students to paint a scene titled "Life Under the Soil." Encourage them to include worms, roots, tunnels, rocks, and hidden animals.
6. Once paintings are complete, invite students to share their artwork and describe one element they learned about soil.

QUICK LOOK

Time Needed: 20-30 minutes

Setting: Indoors or outdoors

Ideal Group Size: 4–20 children

Recommended Grades: K–5

Materials:

- Soil samples from different locations (clay-rich, sandy, loamy)
- Water in cups or squeeze bottles
- Scrap paper or cardboard
- Natural brush materials (bundled pine needles, twigs, feathers, leaves)
- String, rubber bands, or tape for attaching brush heads
- Paint trays or shallow bowls for mixing

Discussion Questions

- What did you notice when mixing soil with water?
- How are the paints different based on the soil you used?
- What do you think lives under the soil in real life?

Extensions

- Display the artwork as a classroom "Soil Gallery"
- Introduce the idea of soil horizons and have students use layers in their art
- Incorporate writing by having students label parts of their painting or write a sentence describing it

Assessment

Observe student use of materials and their ability to describe the painting process. Review artwork for representation of soil layers or underground life.

Modifications

- For younger students: Pre-assemble simple brushes and provide only one soil type
- For older students: Add plant-based dyes or natural pigments to experiment with color blending
- Provide laminated "mud paint mixing" recipe cards with step-by-step visuals

Activity D: Burrow Builders

Focus Concept: *Soil provides shelter for many living organisms. Creating soil habitats helps students understand soil's role in supporting underground life and ecosystems.*

Let kids sculpt a soil creature (worm, mole, beetle) with clay and place it in a mini soil habitat built in a shoebox or tray.

- Add layers using natural items.
- Label tunnels or rooms with words or symbols.

Learning Objectives

- Model a soil habitat using natural materials
- Identify animals that live underground
- Understand how burrows provide safety, air, and food access

Preparation

- Pre-cut or prepare shoeboxes if needed
- Organize natural items in sorting trays or baskets
- Provide reference cards with soil-dwelling animals (worms, moles, beetles, ants)

Procedure

1. Introduce the idea that many animals build homes in the soil. Ask students: "Have you ever seen holes or tunnels in the ground?"
2. Pass out clay or dough and let students shape a soil creature such as a worm, beetle, mole, or ant.
3. Using a box or tray, students build a miniature soil habitat or burrow. They may sculpt tunnels, create root systems, and use natural materials to show food sources or walls.
4. Allow time for labeling features using flags or small signs. Encourage use of symbols or words depending on age.
5. Invite students to share their burrows in small groups, describing the creature's needs and how their habitat provides shelter, food, or air.

Discussion Questions

- What does your creature eat? Where does it sleep?
- How do roots and soil help protect animals?
- Why is it important to leave soil undisturbed in some places?

Extensions

- Create a soil ecosystem mural combining all student burrows
- Add a mapping component where students diagram their habitat from above
- Write a short story or comic strip from the perspective of a soil creature

Assessment

Observe how students connect structure to function in their burrow design. Check for labeled features and verbal explanations linking soil to the survival of the animal.

Modifications

- For younger learners: Offer premade clay creatures or limit to simple burrow shapes
- For older learners: Introduce predator-prey dynamics in soil ecosystems or add structural engineering challenges (e.g., test if tunnels can hold up under weight)
- Pair students to create cooperative or interconnected burrow systems

Facilitator Tips:

- Use a discovery table with labeled bins.
- Allow students to explain their creations to the group.
- Group ages flexibly and guide younger learners with modeling.

QUICK LOOK

Time Needed: 20-30 minutes

Setting: Indoors or outdoors

Ideal Group Size: 4–20 children

Recommended Grades: K–5

Materials:

- Clay or play dough
- Shoeboxes, cardboard box lids, or small trays
- Natural items: twigs, dry leaves, small rocks, moss, dried grass
- Labels, toothpicks, or flags for marking features
- Drawing paper and pencils (optional for planning)

MODULE 2 – Who lives in Soil?

Activity A: Underground Puppet Parade

Focus Concept: *Soil is alive—it's a habitat full of important creatures.*

Have each child make a finger puppet or soil stick puppet of an underground critter.
- Suggested creatures: worm, fungus, beetle, tardigrade
- Invite them to introduce their puppet to the group

Learning Objectives
- Identify creatures that live in soil and their roles
- Express understanding through puppet design and presentation
- Practice communication and creative thinking

Preparation
- Prepare table space with all materials sorted in small trays or containers
- Create a sample puppet and simple fact sheet for each soil creature to offer examples
- Display photos or illustrations of soil life for inspiration

Procedure
1. Begin with a short group discussion: "What kinds of living things might live under our feet?" List ideas together.
2. Show reference images or read fun facts about a few underground creatures. Suggested examples:
   - Earthworm: soil tunnel maker
   - Beetle larva: decomposer
   - Fungus: helps plants grow
   - Tardigrade: microscopic survivor
3. Invite students to choose a creature and create a puppet. Puppets can be made from paper cutouts on sticks or more sculptural with extra materials.
4. Once puppets are finished, gather the group in a circle or at the front of the class. Allow each child to "introduce" their puppet to the group using a simple sentence or movement. Prompt: "This is my worm. It helps plants by making tunnels in the soil."
5. If time allows, parade around the classroom or mural area and let puppets explore the "underground."

Discussion Questions
- What does your creature do in the soil?
- Why do we need healthy soil creatures?
- Did you learn about a new soil animal today?

Extensions
- Add puppet characters to a storytelling circle or short group skit
- Create a "Soil Superhero" poster that shows what your puppet helps with
- Place puppets on sticks into a small container of soil to create a puppet display garden

Assessment
Listen for use of key vocabulary and reasoning when students introduce their puppets. Check puppet designs for recognizable features and connection to real creatures.

Modifications
- For younger children: Pre-cut shapes or provide creature templates to trace
- For older children: Ask students to add speech bubbles with interesting facts
- Pair students to create "critter buddies" who share a soil task, like decomposition or burrowing

QUICK LOOK

Time Needed: 30-45 minutes

Setting: Indoors or outdoors

Ideal Group Size: 4–16 children

Recommended Grades: K–5

Materials:
- Puppet-making supplies (paper, popsicle sticks, markers)
- Mystery box (shoebox with hand holes and flap)
- Items to hide: rubber worms, dried roots, leaves, pebbles
- Clear jars, soil, sand
- Black paper or cloth (for worm jar cover)
- Large mural paper or bulletin board
- Glue, crayons, scissors

Activity B: Dig-a-Critter Mystery Box

Focus Concept: *Soil is full of hidden organisms and materials. Using their sense of touch, students will explore the mystery of what's beneath the surface and practice describing and identifying soil life and parts.*

Kids reach into a box and feel hidden soil-related objects.
- Encourage description: "It feels soft… It's stringy…"
- Reveal and identify each item.

Learning Objectives
- Use descriptive language to explore unknown objects
- Identify natural materials found in soil
- Practice inference and observation through sensory play

Preparation
- Cut hand-sized holes in a shoebox and cover with cloth or paper to conceal contents
- Place several mystery objects inside each box, ideally 3–5 different items per round
- Prepare multiple boxes or rotate items between groups
- Make sure students cannot see the contents before guessing

Procedure
1. Explain to the group that they are going to use only their hands to explore what might be living or found in soil.
2. Ask students to take turns reaching into the box and feeling the items. One at a time, they will describe what they feel without looking.
   Prompt: "Is it soft or scratchy? Smooth or bumpy? Does it feel like something alive or something from nature?"
3. Record guesses as a group or let students quietly write or draw what they think is inside.
4. After each student has a turn, open the box and reveal the items. Discuss each object and its connection to soil.
5. Repeat with different combinations or let students help refill the box with their own found items.

QUICK LOOK

Time Needed: 10-15 minutes

Setting: Indoors or outdoors

Ideal Group Size: 4–16 children

Recommended Grades: K–5

Materials:
- Shoebox with hand holes and a liftable top flap (or fabric-covered bin)
- Rubber worms or toy bugs
- Dried roots, dry leaves, pebbles, bark, nutshells
- Optional: magnifying glasses for later inspection
- Labels or answer key for the educator

Discussion Questions
- Was it easier or harder to guess with just your hands?
- Which objects felt natural? Which surprised you?
- Why are these materials important in the soil?

Extensions
- Create a chart of real vs. artificial soil items
- Match mystery box items to puppet characters or mural creatures
- Use magnifiers to examine each object after the reveal and record textures or colors

Assessment
Listen for accurate use of sensory vocabulary and the ability to relate the item to the soil environment. Participation and reasoning during the reveal discussion can serve as formative assessment.

Modifications
- For younger children: Use only two or three large, familiar items per round and guide with simpler prompts
- For older students: Include less familiar items like bark, nutshells, or moss, and ask them to describe the ecosystem function of each
- Use textured word cards or emoji icons to help students describe the feel of an item

Activity C: Worm View Window (optional)

Focus Concept: *Soil is a living environment, and earthworms play a vital role in keeping it healthy. A worm jar allows students to observe how worms move through soil, mix layers, and interact with organic matter.*

Layer soil and sand in a clear jar. Add compost scraps and (if allowed) earthworms.
- Cover the jar and peek in daily.
- Note tunnels or changes over time.

Learning Objectives
- Build a model to observe underground soil life
- Identify how worms contribute to soil structure and decomposition
- Record changes over time using observation and documentation

Preparation
- Gather clean clear jars and prepare enough materials for layering soil and sand
- Moisten soil slightly (not soggy)
- Ensure local rules allow the use of live worms and plan for their care afterward or release into a garden

Procedure
1. Begin by showing a photo or video of worms moving through soil. Explain their role in breaking down matter and improving soil health.
2. Have students add alternating layers of sand and soil to their jars (3–5 layers). Add a few small compost scraps on top.
3. Gently place 1–2 worms into each jar and spray lightly with water.
4. Cover the jar with black paper or fabric to simulate darkness. Place the jars in a cool, indirect light space.
5. Each day, remove the cover briefly and observe. Encourage drawing what they see: tunnels, movement, changes in layers, food disappearing.
6. At the end of the observation period, have students share what they discovered and reflect on what worms need to live.

Discussion Questions
- What changes did you see in the jar?
- Where do worms seem to spend the most time?
- Why are worms called “nature’s tillers”?

Extensions
- Graph changes in food disappearance or tunnel depth
- Compare jars with and without worms (control vs. experimental)
- Add vocabulary words: “decompose,” “moisture,” “oxygen,” “casting”

Assessment
Use observation journals or drawings to assess attention to detail and understanding of worm behavior and soil structure. Discussion participation also reflects engagement.

Modifications
- For younger students: Provide a class jar instead of individual ones, and use large paper to record shared daily observations
- For older students: Include daily measurement of tunnel locations and discussion on soil porosity and plant growth
- If worms are not allowed: Use a time-lapse video to explore the same concepts or build a paper version of a worm habitat model

QUICK LOOK

Time Needed: 20-30 minutes for setup, with daily observation for 1–2 weeks

Setting: Indoors (near light but not direct sun)

Ideal Group Size: 4–16 children (can work in small groups)

Recommended Grades: K–5

Materials:
- Clear jars or large clear plastic bottles (one per group)
- Soil and sand (to create visible layers)
- Compost scraps (vegetable peels, eggshells, paper shreds)
- Earthworms (red wigglers work well if allowed)
- Water spray bottles
- Black construction paper or cloth to cover jars
- *Optional:* magnifying glasses, observation journals

Activity D: Living Soil Mural

Focus Concept: *Soil is not just dirt—it's a vibrant, interconnected habitat full of creatures that help keep ecosystems healthy. A collaborative mural helps children visualize this underground world and reinforces concepts from the module.*

Invite kids to add drawings or glued pictures of soil creatures to a large mural showing the underground world.
- Build the mural together, labeling who lives where.

Learning Objectives
- Represent organisms that live in soil and their roles
- Collaborate to build a large visual model of an underground habitat
- Label and categorize soil life by location and function

Preparation
- Tape mural paper to a wall or spread it out on tables or the floor
- Lightly sketch a cross-section with "above ground" and "underground" areas
- Set up creation stations with pre-drawn critters, blank paper, or materials to draw from scratch
- Display visuals or real-life examples of soil organisms for inspiration

Procedure
1. Introduce the mural space. Ask: "What do you think is happening under our feet?"
2. Invite children to pick a soil organism to represent—either by drawing it, coloring a printed version, or building a layered piece with craft supplies.
3. Once their creature is complete, have them glue it onto the mural in the appropriate underground location. Add tunnels, roots, burrows, or moisture layers as desired.
4. Encourage labeling with names or short facts. Older students can write a phrase like "Decomposer" or "Mixes soil."
5. Once everyone has contributed, gather as a group to review the mural and talk about the full picture of soil life.

Discussion Questions
- What types of animals live deepest underground?
- How do different organisms help each other in soil?
- Why do we need to protect soil and its habitats?

Extensions
- Add a compost pile or decaying leaf layer to show organic matter feeding the system
- Build a 3D version of the mural using shoeboxes or cardboard tunnels
- Include above-ground connections: grass roots, plant stems, rainfall paths

Assessment
Check for variety and accuracy of soil life represented. Listen during group discussion for understanding of how different organisms contribute to soil health.

Modifications
- For younger learners: Use large printed templates to color and glue
- For older learners: Add a key, classification chart, or legend with organism roles
- Turn the mural into a bulletin board or traveling display for others to learn from

Facilitator Tips:
- Allow puppet-making and mural as rotating stations
- Use magnifying glasses if real soil critters are available
- For multi-age groups, let older kids be mural "guides"

QUICK LOOK

Time Needed: 20-30 minutes for setup, with daily observation for 1–2 weeks

Setting: Indoors and outdoors

Ideal Group Size: 4–16 children

Recommended Grades: K–5

Materials:
- Large mural paper (butcher paper, bulletin board paper)
- Crayons, markers, colored pencils
- Scissors and glue
- Printed clip art or drawings of soil creatures (worms, fungi, ants, beetles, roots, tardigrades)
- *Optional:* magnifying glasses, soil life reference sheets, stickers, tissue paper for layering

MODULE 3 – How Plants Use Soil

Activity A: Root Races

Focus Concept: *Plants send out roots to find water and nutrients in the soil. This interactive game models how roots grow, explore, and soak up moisture.*

Pretend to be roots searching for water.
- Create “soil bins” with hidden pipe cleaners (roots).
- Kids dig gently with their hands or tongs.
- Dropper “rain” is added after roots are found.

Learning Objectives
- Understand that roots grow through soil to find water
- Explore how different types of soil impact root growth
- Model the behavior of plant roots in a playful setting

Preparation
- Fill several soil bins with a mix of textures and bury pipe cleaners of varying colors and lengths to simulate roots
- Set up enough bins so children can rotate through or work in small groups
- Prepare a “rain” station with droppers or squeeze bottles

Procedure
1. Begin by asking students: “What do you think roots do for a plant?” List responses and briefly explain root functions—anchoring, absorbing water, and storing nutrients.
2. Introduce the Root Races: Students will be “roots” trying to grow through the soil to find other roots.
3. Instruct children to gently dig through the soil bins using hands or tongs. When they find a pipe cleaner, they set it aside.
4. Once a few “roots” are found, add a few drops of water to the bin and say, “It’s raining!” Ask them to observe what happens to the soil.
5. Wrap up by comparing how different bins felt and how hard or easy it was to find the roots.

Discussion Questions
- Was it easier to grow through certain types of soil?
- What do you think happens to real roots in clay or sand?
- Why is water important for roots?

Extensions
- Use pipe cleaner colors to represent nutrient-rich vs. dry roots
- Add math: count the number of roots each team finds or measure them
- Create a mini relay game with kids racing to “plant” their root in a labeled soil bin

Assessment
Watch for understanding during the digging phase and group discussion. Can students explain how roots search for water and interact with soil?

Modifications
- For younger learners: Use larger items to “find,” such as soft fabric roots or plastic carrots
- For older learners: Add vocabulary cards (“taproot,” “fibrous,” “soil structure”) and assign roles such as root hairs or soil particles
- If indoors, use tubs with dry shredded paper as a clean soil substitute

QUICK LOOK

Time Needed: 30-60 minutes

Setting: Indoors or garden

Ideal Group Size: 6-20 children

Recommended Grades: K–5

Materials:

- Large bins or tubs filled with dry soil materials (gravel, sand, shredded paper, wood mulch, or potting mix)
- Pipe cleaners or yarn pieces to represent “roots” (hide these inside the bins)
- Plastic tongs or small hand tools
- Small containers of water with droppers or syringes
- Optional: small flags or cards to label root finds

Activity B: Grow a Soil Sprout Pet

Focus Concept: *Soil provides a growing home for seeds. With sunlight and water, plants sprout roots and shoots from the soil to grow strong and healthy.*

Decorate a cup with a face. Fill with soil and plant seeds.
- Water daily and observe growth.
- Hair = plant leaves!

Learning Objectives
- Observe how seeds grow in soil
- Identify the parts of a plant that emerge first
- Understand how soil supports plant growth

Preparation
- Set up a planting station with cups, soil, seeds, and decorations
- Pre-moisten the potting soil slightly if very dry
- Place a tray near a windowsill or sunny area for storing finished pets

Procedure
1. Introduce the concept: “Today we’re going to grow our own plant friend using soil!”
2. Invite children to decorate their plastic cup with a face or design to make a sprout pet. This can include silly eyes, drawn-on mouths, or colorful clothing using stickers or scraps.
3. Fill each cup about two-thirds full with potting soil. Let children plant 4–6 seeds near the surface and gently press them in.
4. Lightly water using droppers or a spray bottle until moist but not soggy.
5. Label each cup with the student’s name and place in the designated “Soil Pet Garden” area.
6. Over the next 1–2 weeks, have students check their pet daily and record observations in a journal or drawing notebook. They can measure sprout height, notice leaf shapes, and track changes.

Discussion Questions
- What part of your plant pet came up first?
- Why do we use soil instead of just water?
- What does your sprout need each day to stay healthy?

Extensions
- Create a growth chart to track whose pet sprouts first or tallest
- Compare pets grown in different soil types (sand, clay, potting mix)
- Make seed ID cards that show different leaf types as they emerge

Assessment
Assess student understanding through observation journals, discussion, and their ability to care for their plant pet consistently. Look for accurate identification of parts like root, shoot, and leaf.

Modifications
- For younger learners: Pre-fill cups and limit seed choices to simplify decisions
- For older learners: Introduce vocabulary such as “germination,” “photosynthesis,” and “root system”
- For group learning: Assign teams to tend shared sprout pets and take turns recording data

QUICK LOOK

Time Needed: 20-30 minutes (plus daily observation over 1-2 weeks)

Setting: Indoors, classroom, or sunny windowsill

Ideal Group Size: 6-20 children

Recommended Grades: K–5

Materials:

- Large bins or tubs filled with dry soil materials (gravel, sand, shredded paper, wood mulch, or potting mix)
- Pipe cleaners or yarn pieces to represent “roots” (hide these inside the bins)
- Plastic tongs or small hand tools
- Small containers of water with droppers or syringes
- Optional: small flags or cards to label root finds

Activity C: Sip, Slurp, Soak!

Focus Concept: *Different types of soil hold water in different ways. Plants need soil that can soak up and store enough water to keep roots hydrated.*

Test how much water each soil type can hold.
- Pour drops into gravel, sand, and clay.
- Ask: "Which one held the most water?"

Learning Objectives
- Compare how different soil types absorb water
- Observe and describe soil texture and structure
- Understand why water retention matters for plant growth

Preparation
- Fill cups or trays with equal amounts of each soil type
- Provide labeled stations or a testing tray per group
- Prepare a chart or poster to track predictions and results

Procedure
1. Begin with a question: "Do all soils hold water the same way?" Invite predictions.
2. Introduce the three soil samples: gravel (large particles), sand (medium), clay (small). Let students feel each and describe its texture.
3. At each station or in small groups, let students use droppers to add water to each soil sample—one drop at a time.
4. Observe and record what happens:
   - Does the water pool or disappear?
   - How long does it take to soak in?
   - How much water can it hold before it overflows?
5. Once all soil types are tested, discuss which one soaked up the most and what that might mean for a plant trying to drink.

Discussion Questions
- Which soil held the most water?
- Why do you think gravel didn't soak up much?
- Which soil would you choose to help your plant grow?

Extensions
- Try mixing soil types to create loam and test it
- Use sponges as a visual for "soil holding capacity"
- Connect results to the "Soil Pet" activity by planting in different tested soils

Assessment
Review student observations and conclusions. Can they describe which soil works best and explain why? Look for vocabulary use such as "absorb," "soak," and "texture."

Modifications
- For younger learners: Use visual chart stickers (raindrops) to track water drops used in each soil
- For older learners: Measure exact water volume and calculate retention rates
- If materials are limited: Demonstrate one test as a class and have students draw results

QUICK LOOK

Time Needed: 20-30 minutes (plus daily observation over 1-2 weeks)

Setting: Indoors, classroom, or sunny windowsill

Ideal Group Size: 6-20 children

Recommended Grades: K–5

Materials:
- Large bins or tubs filled with dry soil materials (gravel, sand, shredded paper, wood mulch, or potting mix)
- Pipe cleaners or yarn pieces to represent "roots" (hide these inside the bins)
- Plastic tongs or small hand tools
- Small containers of water with droppers or syringes
- Optional: small flags or cards to label root finds

Activity D: "Thank You, Soil" Leaf Letters

Focus Concept: *Soil plays a vital role in helping plants grow. Writing or drawing a thank-you letter from the perspective of a plant helps students reflect on soil's value and practice empathy for the natural world.*

Children write or draw thank-you notes to soil from a plant's perspective on large leaves.
- Display them in a "garden of gratitude."

Learning Objectives
- Reflect on the importance of soil from a plant's point of view
- Express understanding through art, writing, or oral storytelling
- Reinforce the idea that soil provides water, nutrients, and stability

Preparation
- Collect or cut out leaf shapes large enough for writing or drawing
- Display a few sample "thank-you" messages to guide younger learners
- Optional: use sentence starters like "Thank you for helping me..." or "Dear Soil, I love it when you..."

Procedure
1. Review what students have learned about how soil supports plants—through roots, nutrients, and water.
2. Tell students they will pretend to be a plant writing a thank-you note to the soil. Ask: "If you were a sprout or flower, what would you say to the soil that helped you grow?"
3. Pass out one leaf per child and invite them to write or draw their message. Younger children may illustrate the roots, water, and soil and dictate their letter to an adult.
4. Once completed, invite volunteers to share their letters aloud in a "garden of gratitude" circle.
5. Display all letters on a wall, windowsill, or bulletin board using tape or a string "vine" to create a class garden scene.

QUICK LOOK

Time Needed: 15-25 minutes

Setting: Indoors or outdoors

Ideal Group Size: 6-20 children

Recommended Grades: K–5

Materials:
- Large leaves (fresh or pressed), or paper cutouts shaped like leaves
- Markers, crayons, or colored pencils
- Tape or glue
- *Optional:* bulletin board, string line, or wall space for a mural garden display

Discussion Questions
- What did your plant thank the soil for?
- What would happen if the soil dried up or was washed away?
- How can we help keep soil healthy for plants?

Extensions
- Turn the mural into a rotating display of plant-themed reflections
- Add characters from earlier activities (like Soil Pets or puppets) into the scene
- Record an audio version where each student voices their plant's thank-you message

Assessment
Assess for thoughtful reflection, correct references to soil's benefits, and creativity in expression. Look for accurate drawing or vocabulary that connects the activity to the lesson.

Modifications
- For younger learners: Offer pre-written thank-you messages to trace or complete
- For older learners: Ask them to write a longer note or poem from a tree's or vegetable's perspective
- Turn the activity into an oral storytelling circle for students who prefer speaking over writing

Outdoor Sign Activity: "We Love Soil Because..."

Purpose: *Create weatherproof outdoor signs that share student voices and highlight why soil is important—without creating waste.*

Instructions:

1. Give each child one 8.5 x 11 sheet with the sentence starter:
"We love soil because..."
(Child writes or draws their answer below.)
2. Ask them to write a short sentence or draw a picture showing why they appreciate soil. Examples:
   - "It helps my plants grow."
   - "Worms live in it!"
   - "It holds water for roots."
3. Once completed, laminate each sign for durability. (Matte finish reduces glare outdoors.)
4. Use staples, zip ties, or tape to attach signs to garden stakes.

Stake Ideas (Reusable and Low-Waste):

- Wooden paint stirrers or survey stakes from hardware stores
- Plastic or bamboo garden stakes
- Old yard sign wires (metal H-frames)
- Tree branches or trimmed limbs (for a natural look)

Add a note on the back of each sign:

"Please do not remove. Part of our soil learning trail."
or
"Camp learning sign – please return to staff at the end of the week."

Facilitator Tips:

- Start a "Soil Pet Garden" on a windowsill
- Use dry-erase names on cups to reuse next event
- Adapt leaf letter writing into oral storytelling for younger ages

QUICK LOOK

Time Needed: 15-25 minutes

Setting: Indoors or outdoors

Ideal Group Size: 6-20 children

Recommended Grades: K–5

Materials:

- 8.5 x 11 white cardstock (1 per child)
- Markers, crayons, or colored pencils
- Laminator and laminating sheets
- Stapler, zip ties, or strong tape
- Garden stakes (see ideas below)

MODULE 4 - Soil Detectives: Protecting and Helping Soil

Activity A: Dirty Jobs Detective Game

Focus Concept: *People can either help or harm the soil. By exploring like detectives, children learn to identify which actions are good for soil and which are not.*

Learning Objectives

- Recognize actions and items that are good or not good for soil
- Build awareness of how people impact soil health
- Strengthen observation and critical thinking skills

Preparation

- Hide clue cards or signs outdoors in designated spaces—under mulch, near trees, in garden beds
- If indoors, place them around the classroom or in bins of soil and natural items
- Prepare a simple observation chart or space to sort cards after the activity

Procedure

1. Introduce the mission: "You are Soil Detectives today. You'll search for clues that show how people are helping or hurting the soil."
2. Give each child a detective badge or magnifying glass and a clipboard.
3. Distribute clue cards that prompt a search:
   - "Find something that is good for soil."
   - "Can you spot something that is not good for soil?"
4. Send students out to search and observe. When they find a match, they draw or describe it.
5. Regroup and share findings. Create a group chart by sorting discoveries into "Good for Soil" and "Not Good for Soil."
6. Reinforce with discussion and possible follow-up actions like "What could we do to fix this?"

Discussion Questions

- Which actions help soil the most?
- Why is bare soil not good for soil?
- What can you do to be a soil helper at home or school?

Extensions

- Turn sorted clues into a poster or "Soil Safety Pledge Wall"
- Add roles like compost checker, mulch mover, or erosion expert
- Ask local NRCS or conservation district staff to join as "Senior Detectives"

Assessment

Review student observations and how accurately they classified clues. Look for thoughtful reasoning in group discussion and drawings.

Modifications

- For younger students: Use pictures only and guide discussion as a group
- For older students: Add "why" explanations to clue sorting and include vocabulary like erosion, nutrients, and organic matter
- Use paired searching for mixed-age groups to support peer learning

QUICK LOOK

Time Needed: 15-20 minutes

Setting: Outdoors or adaptable for classroom use

Ideal Group Size: 6-18 children

Recommended Grades: K–5

Materials:

- Detective badges, paper vests, or magnifying glasses
- "Good for Soil" and "Not Good for Soil" clue cards or picture signs

(Examples: compost pile, mulch, cover crops, bare soil, tire ruts, pollution)

- Optional: printed images of outdoor examples if working indoors
- Clipboards or flat surfaces for drawing or writing
- Pencils, crayons, or markers

Activity B: Erosion in a Pan

Focus Concept: *Soil erosion happens when rain or wind removes unprotected soil. Mulch and plants help prevent erosion and keep soil where it belongs.*

Learning Objectives

- Observe how soil behaves with and without ground cover
- Understand the concept of erosion and how it affects soil health
- Recognize ways to protect soil using natural coverings

Preparation

- Fill both trays with soil. Leave one tray bare and cover the other with natural material like mulch or leaves.
- Label trays “No Cover” and “Covered Soil.”
- Set up the demonstration space and have clean-up supplies nearby.

Procedure

1. Begin with a question: “What happens when it rains on bare soil?” Let students share ideas.
2. Show the two trays. Ask which one they think will hold the soil in place better. Record predictions.
3. Slowly pour water over each tray or spray water to simulate rain. Observe what happens to the soil in each.
4. Compare runoff: Did the bare soil move? Did the covered soil stay in place?
5. Repeat the process if desired and observe changes. Invite children to touch and describe the soil after water is added.
6. Discuss how mulch, plants, and cover crops protect soil from washing away.

Discussion Questions

- What did you notice when the water hit the bare soil?
- Why did the soil with cover stay in place better?
- How can we help soil stay where it belongs?

Extensions

- Add a third tray with grass or small plants growing in it and compare erosion control
- Turn this into a guessing game: Which tray is better for soil health and why?
- Create a class erosion pledge: “I will help protect soil by...”

Assessment

Look for student understanding in their predictions and explanations. Use drawings or group charts to show what they learned about erosion.

Modifications

- For younger children: Use clear trays so they can see water movement from the side
- For older students: Add a data chart to measure how much soil washed away from each tray
- Conduct the demo on a slanted board or ramp for a more dramatic effect

QUICK LOOK

Time Needed: 15-20 minutes

Setting: Outdoors or classroom with tray and water access

Ideal Group Size: 6-18 children (small groups or stations)

Recommended Grades: K–5

Materials:

- Two shallow trays or baking pans
- Soil (same amount in each tray)
- Mulch, leaves, or straw to cover one tray
- Cups of water or spray bottles
- Paper towels or rags for clean-up
- *Optional:* plastic sheet or tray underneath for spills
- Observation sheet or discussion chart

Activity C: Compost Critter Sorting

Focus Concept: *Healthy soil is built from decomposed organic matter. Composting turns food scraps and natural materials into nutrient-rich soil. Knowing what belongs in compost helps protect soil.*

Learning Objectives

- Identify items that are good for compost and soil
- Practice sorting by categories (compostable vs. not)
- Understand how compost supports healthy soil and plants

Preparation

- Print and cut out sorting cards ahead of time
- Place "Good for Soil" and "Not Good for Soil" mats or bins in a central area
- Prepare guiding visuals or a compost reference poster

Procedure

1. Start with a quick explanation: "Some things break down and feed the soil—others don't. Let's become compost critters and sort them out."
2. Show or read a few examples aloud, asking students to vote thumbs up (compost) or thumbs down (not compost).
3. Hand out cards or objects to individuals or pairs.
4. Invite students to come up one at a time to place their item on the correct mat or in the bin.
5. As each child sorts, ask: "Why did you put it there?" or "How do you think that helps or hurts the soil?"
6. Review together and correct any misplacements. Focus on gray areas (paper towels = compostable, plastic-coated paper = not).

Discussion Questions

- What happens to food scraps in a compost pile?
- What helps soil get more nutrients?
- Why don't we compost things like plastic or meat?

Extensions

- Visit or create a compost bin at school, camp, or home
- Have students draw a "compost critter" character that helps break down food
- Make a chart of local compost rules and items allowed in your area

Assessment

Observe sorting accuracy and explanation reasoning. Look for growing vocabulary around compost, decompose, and organic matter.

Modifications

- For younger learners: Use images only, with color-coded cards (green for compost, red for trash)
- For older learners: Include why certain items can't compost (sanitation, chemical coatings)
- Allow group debate on trickier items and vote as a class

QUICK LOOK

Time Needed: 15-20 minutes

Setting: Indoors or outdoors

Ideal Group Size: 6-18 children

Recommended Grades: K–5

Materials:

- Printed cards with pictures or names of items (food scraps, leaves, paper, plastic, metal, meat, bones, napkins)
- Bins, boxes, or labeled sorting mats: "Good for Soil" and "Not Good for Soil"
- Optional: real objects for tactile learners (banana peel, wrapper, twig, rubber band)
- Magnifying glasses for soil critter discussion (if available)
- Optional: a sample of compost or vermicompost to examine

Activity D: Build-a-Soil Saver Kit

Focus Concept: *Everyone can take action to protect and improve soil. Building a simple kit helps children think about real tools and practices that support soil health.*

Learning Objectives
- Identify tools and practices that are good for soil
- Create a take-home kit to encourage continued conservation habits
- Take pride in helping soil through small but meaningful actions

Preparation
- Set up a table or station with all kit items arranged in bins or trays
- Label each item with its purpose (e.g., "Mulch = Protects soil from erosion")
- Create a sample kit as a visual guide

Procedure
1. Explain that students will build their own Soil Saver Kit—a collection of items that help soil stay healthy and strong.
2. Walk through each item and its role in protecting soil. Keep explanations short and interactive:
   - o "This mulch keeps soil from washing away."
   - o "Seed balls grow plants that hold the soil in place."
3. Let each child collect 3–5 items and place them in their box or bag.
4. Encourage children to decorate their kit and write their name on it.
5. Optional: Invite them to write or sign a simple pledge, such as:
   - o "I promise to take care of soil by planting, covering, and respecting it!"
6. Share or present kits with a partner or the group. Ask students how they might use their kit at home or in the community.

Discussion Questions
- Which item in your kit do you think is most helpful to soil?
- What is one thing you can do to protect soil today?
- Why is it important for people to care about soil?

Extensions
- Turn kits into a classroom display or giveaway at a school event
- Use the pledge as a classroom banner with student names or drawings
- Pair with a "mini garden" planting station if time and space allow

Assessment
Look for thoughtful item selection and understanding of each item's purpose. Use group discussion and pledges as informal reflection.

Modifications
- For younger learners: Use fewer items and include picture labels for non-readers
- For older learners: Add QR codes to each item that link to more information or videos
- Allow students to brainstorm and suggest new items to include based on what they learned

Facilitator Tips:
- Use clipboards or flat rocks for outdoor writing
- Turn the erosion demo into a guessing game
- Offer family take-home tip cards

QUICK LOOK

Time Needed: 20-30 minutes

Setting: Classroom or outdoors

Ideal Group Size: 6-18 children

Recommended Grades: K–5

Materials:

- Small boxes, paper bags, or recycled containers
- Natural or symbolic soil-saving items (choose any of the following):
  - Seed balls or small native seed packets
  - Bits of mulch or straw in a baggie
  - Mini compost info cards
  - Stickers with soil-saving slogans
  - Pieces of sponge (to represent water retention)
  - Printed "Good for Soil" tip cards
  - Small flags or signs for home garden labeling
  - *Optional:* "Soil Saver" badge or sticker
- Markers and labels for decorating boxes
- *Optional:* blank pledge sheets

Need More?

Encourage connections with your local NACD or NRCS office. Many have tools, posters, or demo models available for public educators. Ask about soil tunnels, soil-themed giveaways, and local conservation efforts!

SOIL MODULES

Grades 5-8

MODULE 1 – Explore Soil Foundations

Lesson 1: Soil Foundations and Properties

Focus Question: What is soil made of, and how do we measure its properties?

Learning Objectives

By the end of this lesson, students will be able to:

- Identify the components of soil (minerals, organic matter, air, water, organisms)
- Describe and compare soil texture and structure using simple tests
- Explain how soil properties affect plant growth and land use

Background for Educators

Soil is not just "dirt." It is a complex mixture of minerals, organic matter, water, air, and living organisms. This lesson introduces soil as a dynamic and varied natural resource with physical properties (such as texture and structure) that can be tested through observation and basic experiments. Soil properties influence its ability to retain water, support root systems, and function in agriculture, construction, and conservation.

Instructional Sequence

Engage (10 min)

Ask: *"What's in a handful of soil?"*
Write student ideas on a board or chart. Show a real clump of soil and let students examine it with magnifiers.

Ask:

- *"Does it all look the same?"*
- *"What do you think is alive in here?"*

Transition into today's goal: testing what makes up different types of soil.

Explore (25–30 min)

Activity A: Settling Jar Test

1. In groups, students add soil and water to a jar, shake vigorously, and let it settle.
2. As layers form (sand, silt, clay), students measure each and calculate percentage.
3. Record on the worksheet and compare across samples.

Activity B: Texture by Touch

1. Students moisten a small sample and use a texture chart to identify as sandy, silty, or clayey.
2. They roll the soil between fingers and form ribbons, using touch to determine texture class.
3. Record observations and complete a Venn diagram comparing two samples.

Explain (10 min)

Discuss findings as a class.
Ask:

- *"Which soils held their shape best?"*
- *"Which had the most clay?"*
- *"How might this affect water or root growth?"*

Link back to real-world uses: farming, construction, gardening, erosion control.

Elaborate (Optional Extension)

Test water infiltration rates with funnels and timers
Research USDA soil texture triangle
Connect to local soil maps or NRCS Web Soil Survey

Evaluate (5–10 min)

- Observation logs
- Completed texture comparisons
- Exit question: "Which soil would you use to grow vegetables and why?"

Modifications

- Younger or struggling learners: Pre-label texture samples for matching
- Advanced students: Calculate particle percentages and compare to texture triangle
- Outdoor setting: Encourage collection of unique schoolyard or trail soil samples

QUICK LOOK

Time Needed: 45-600 minutes

Setting: Classroom or outdoor learning space

Ideal Group Size: 6-18 children

Recommended Grades: 5-8

Materials:

- Soil samples (from at least 3 different sources)
- Clear jars with lids (for settling tests)
- Water
- Rulers
- Magnifying lenses
- Spoons or small trowels
- Texture-by-feel chart (printable or projected)
- Dry erase board or chart paper
- Student worksheets (observation log + Venn diagram)

Lesson 2: Soil Systems and Scientific Inquiry

Focus Question: *How can we use observation and experimentation to understand soil as a system?*

Learning Objectives

By the end of this lesson, students will be able to:

- Describe soil as a system with interacting parts (abiotic and biotic)
- Design and conduct a simple scientific investigation using soil as a model system
- Collect and interpret data related to a soil-related question

Background for Educators

Soil is not an isolated material—it functions as a system involving energy flow, biological interactions, and chemical and physical processes. In this lesson, students will explore soil as a living system through guided inquiry and hands-on observation. Using experimental design, they will develop their scientific reasoning and systems thinking skills.

Instructional Sequence

Engage (10 min)

Display an image or diagram of soil layers teeming with roots, fungi, worms, and plant material.

Ask:

- *"What's happening here?"*
- *"If we changed one thing in the soil, what else might change?"*

Explain that students will investigate how different parts of the soil system interact and respond to change.

Explore (30–40 min)

Activity A: Soil System Mapping

1. In small groups, students observe their soil samples and draw a "soil system map" identifying visible components: roots, insects, organic matter, rock fragments, moisture, etc.
2. They categorize elements as living, once-living, or non-living, and discuss how they interact.

Activity B: Mini Investigation

Give groups a question to explore, or allow them to generate their own. Sample questions:

- "Does adding leaves change the moisture level of the soil?"
- "Does covered soil stay cooler than uncovered soil?"
- "How fast does water soak into different soil types?"

Students write a hypothesis, run the test using tools provided, record data, and summarize their findings.

Explain (10 min)

Groups share their question, hypothesis, method, and one key result. Guide a class discussion:

- "What worked well in your investigation?"
- "What did you learn about how soil parts affect one another?"
- "Why is it important to understand soil as a system?"

Elaborate (Optional Extension)

- Connect to systems in other fields: ecosystems, the human body, or climate systems
- Extend inquiry into a multi-day experiment such as decomposition rates, seed sprouting, or erosion impact

Evaluate (10–15 min)

- Review student soil system maps
- Use reflection questions or a quick "What if?" scenario (e.g., "What if we removed all the roots?")
- Group presentations or gallery walk to explain their experiments

Modifications

- For limited time: Pre-set the experiment and focus on observation and discussion
- For advanced learners: Ask students to graph results or compare multiple trials
- Outdoor version: Use a school garden or forest edge to observe soil systems in place

QUICK LOOK

Time Needed: 60-75 minutes

Setting: Classroom, schoolyard, or science lab

Recommended Grades: 5-8

Materials:

- Soil samples (moist, varied textures)
- Soil trays or plastic containers
- Rulers and digital thermometers (optional: moisture meters)
- Magnifying lenses
- Plant materials (leaves, seeds, small stems, food scraps for decomposition)
- Stopwatch or timer
- Worksheets (hypothesis sheet, soil system map, and observation log)
- *Optional:* soil pH strips, compost jar, poster paper

MODULE 2 – Soil Life and Ecosystem Services

Lesson 1: Soil Biodiversity and Decomposition

Focus Question: *What lives in soil, and how do soil organisms contribute to decomposition?*

Learning Objectives

By the end of this lesson, students will be able to:

- Identify living organisms that contribute to decomposition in soil
- Describe how decomposers break down organic matter and return nutrients to the soil
- Observe and model the biodiversity of soil life

Background for Educators

Healthy soil teems with biodiversity. Microorganisms and macroinvertebrates break down dead matter and recycle nutrients, supporting plants and stabilizing the ecosystem. Decomposition is a critical process that connects soil health to global carbon and nitrogen cycles. This lesson allows students to investigate who lives in the soil and how they keep the ecosystem running.

Instructional Sequence

Engage (10 min)

Begin with a guessing game: "Who's hiding in the soil?" Show close-up images of worms, fungi, and other decomposers. Ask:

- "What do these organisms have in common?"
- "What would happen if no one broke down the dead leaves or old food?"

Explore (30 min)

Activity A: Soil Life Survey

1. In small groups, students examine a soil or compost sample using magnifiers.
2. They fill out a Critter Checklist, identifying signs of living organisms (worms, mites, fungi threads, etc.).
3. Discuss conditions that support decomposer life—moisture, warmth, food sources.

Activity B: What Breaks Down, What Stays?

1. Present a mix of real or picture-based food and waste items.
2. Students sort items into "Will Decompose" and "Will Not Decompose" piles.
3. Use guiding questions: "How long will it take?" "Who will eat this?"
4. Compare with real-world compost rules (e.g., what goes in vs. what contaminates).

Explain (10 min)

Discuss findings. Ask:

- "Which items break down fastest? Why?"
- "What organisms helped that happen?"
- "What would happen if these decomposers disappeared?"

Elaborate (Optional Extension)

- Build a simple compost jar to observe decomposition over time
- Research soil food webs and create a visual web connecting organisms
- Use digital microscopes to view bacteria, fungi spores, or protozoa (if available)

Evaluate (5–10 min)

- Review student checklists and sorting accuracy
- Ask reflection questions: "How does soil biodiversity support the whole ecosystem?"
- Exit ticket prompt: "One way decomposers help soil is…"

Modifications

- Younger students or limited settings: Use photo cards instead of live samples
- Advanced students: Estimate decomposition rates or compare different environments (e.g., forest vs. field soil)
- Remote learning option: Use compost time-lapse videos and virtual organism ID activities

QUICK LOOK

Time Needed: 45-60 minutes

Setting: Classroom, schoolyard, or compost station

Recommended Grades: 5-8

Materials:

- Real or simulated compost samples (classroom bin, jar compost, or vermicompost)
- Magnifying lenses
- Soil life reference cards or printable organism ID chart
- Gloves or small tools for safe investigation
- Food scrap samples or replica item cards (banana peel, newspaper, plastic bag, eggshell)
- Student worksheets: Soil Critter Checklist, Decomposition Chart
- Optional: printed "Decomposer Cards" (fungi, bacteria, millipedes, worms, etc.)

Lesson 2: Soil and Climate Connections

Focus Question: *How does soil interact with weather and climate, and why does that matter?*

Learning Objectives

By the end of this lesson, students will be able to:

- Explain how soil stores and filters water
- Describe how soil affects and is affected by changing weather patterns
- Conduct a hands-on test to model water retention and runoff
- Discuss the role of soil in storing carbon and protecting against erosion

Background for Educators

Soil plays a major role in climate regulation, stormwater absorption, and erosion control. Healthy soil stores carbon, helps manage floods, and protects plants during extreme conditions. In this lesson, students explore how soil interacts with water, temperature, and air, connecting soil health to resilience in the face of environmental shifts.

Instructional Sequence

Engage (10 min)

Start with a question: "What happens to the ground during a heavy rain?" Show images of runoff, flooding, cracked clay, or drought-damaged land. Ask:

- "What does soil do with all that water?"
- "What might happen in a storm or dry spell?"

Explore (25–30 min)

Activity: Soil Water Holding Test

1. Set up three funnels with filters and different soil types. Place them over labeled cups.
2. Add the same amount of water to each and time how long it takes to drain.
3. Record observations: Which soil drained fastest? Which held the most water?
4. Compare with what students felt earlier during texture testing (Module 1).
5. Optional: simulate rainfall and observe erosion by tilting the soil trays.

Explain (10 min)

Lead a discussion on how soil affects flooding, water storage, and plant survival. Introduce the concept of carbon storage:

- "Healthy soil stores more carbon and moisture—how do we keep it that way?"
- "What happens when soil is bare or compacted?"

Elaborate (Optional Extensions)

- Graph and compare results from different soil types
- Discuss how drought and intense storms affect farming and urban areas
- Connect to conservation practices: cover crops, mulch, rain gardens

Evaluate (10 min)

- Review student logs for accurate observations and reasoning
- Reflection prompt: "How does healthy soil protect us from weather extremes?"
- Class brainstorm: "Ways to help soil work with—not against—climate and water"

Modifications

- For younger or visual learners: Use large icons for soil types and visual timers
- For advanced students: Test how soil amendments (compost, sand) change water retention
- Remote option: Use video demonstrations and interactive simulations

QUICK LOOK

Time Needed: 45-60 minutes

Setting: Classroom, lab or outdoor station

Recommended Grades: 5-8

Materials:

- Three types of soil (sandy, clayey, loamy)
- Funnels, cups, and coffee filters or mesh for drainage
- Water and measuring cups
- Stopwatches or timers
- Plastic tubs or trays to catch runoff
- Weathering and erosion image cards or diagrams
- Student worksheets: Soil & Water Test Log + Reflection Prompts
- *Optional:* straws and spray bottles to simulate wind or rain

MODULE 3 – Soil and Plants - From Farm to Food

Lesson 1: Soil and Agriculture/Food Security

Focus Question: *Why is soil important for food production, and what challenges do farmers face in protecting it?*

Learning Objectives

By the end of this lesson, students will be able to:

- Explain how healthy soil supports food crops
- Identify threats to soil health in agriculture (erosion, nutrient loss, compaction)
- Connect soil conservation practices to sustainable food systems

Background for Educators

Soil provides the foundation for the global food system. Most of the world's food depends on topsoil, yet agriculture can damage it through poor practices. This lesson explores how crops rely on soil, the problems that arise when soil is depleted, and the sustainable strategies that protect it for future generations.

QUICK LOOK

Time Needed: 45-60 minutes

Setting: Classroom, outdoor garden or virtual farm tour

Recommended Grades: 5-8

Materials:

- Samples or photos of different crop-growing soils (loamy, compacted, sandy)
- Visuals or printouts of agricultural practices (tillage, irrigation, cover crops)
- Plant samples or food items (fruits, grains, vegetables)
- Student worksheets: "Soil to Spoon" chart and Farm Challenge Scenario
- *Optional:* local produce labels, seed packets, or guest speaker (farmer or NRCS staff)

Instructional Sequence

Engage (10 min)

Ask: "How many meals have you eaten today?"
Write answers on the board, then ask: "Which of those foods came from soil?"
Show common food items (bread, apples, corn, etc.) and track their path back to soil.
Introduce the idea: no soil = no food.

Explore (25–30 min)

Activity A: Soil-to-Spoon Mapping

1. Have students choose or receive a common food item.
2. Using the worksheet, they trace the food's path:
   - What crop is it from?
   - What kind of soil does it grow in?
   - How do farmers protect that soil?
3. Add any visible problems that could hurt the soil (drought, fertilizer overuse, erosion).
4. Share results and compare how different foods depend on different types of soil care.

Activity B: Farm Challenge Scenario

1. Present students with one of several challenge cards:
   - "Your farm is losing topsoil during heavy rains."
   - "Your soil is compacted from machinery."
   - "Crops are failing due to poor soil nutrients."
2. Students work in pairs or small groups to come up with 2–3 solutions (e.g., use cover crops, rotate crops, compost).
3. Groups present their problem and soil-saving plan.

Explain (10 min)

Discuss:

- "What did your solution do for the soil?"
- "Why is it important to think long-term when growing food?"
- "How do soil problems affect what we eat?"

Elaborate (Optional Extensions)

- Research how indigenous and regenerative farming practices improve soil
- Invite a local conservationist, extension agent, or farmer to discuss real-life soil management
- Compare farming in the U.S. to practices in another country or region with soil challenges

Evaluate (10 min)

- Review "Soil to Spoon" diagrams and solution presentations
- Ask: "What is one way you can help soil where your food is grown?"

Modifications

- For younger students: Focus only on one or two food items and use pictures instead of written mapping
- For advanced students: Introduce USDA soil classifications and let them map regional crops to soil types
- Virtual version: Use online videos of farms, soil testing labs, or USDA educational tools

Lesson 2: Urban Soil and Food Access

Focus Question: *How does soil support food production in cities, and what challenges and opportunities exist in urban environments?*

Learning Objectives

By the end of this lesson, students will be able to:

- Describe how soil can be used to grow food in urban areas
- Identify challenges to healthy soil in cities (contamination, compaction, lack of space)
- Propose creative solutions for growing food where soil is limited or poor

Background for Educators

Urban agriculture is becoming more important as cities seek to improve food access, reduce transportation costs, and reconnect people with nature. However, urban soils can be compacted, paved over, or contaminated. This lesson encourages students to explore how soil in cities can still support healthy food systems—with creativity and care.

QUICK LOOK

Time Needed: 45-60 minutes

Setting: Classroom, urban garden or schoolyard

Recommended Grades: 5-8

Materials:

- Images or case studies of urban gardens, green roofs, or community farms
- Urban soil sample (if available)
- Maps of your city or neighborhood (print or digital)
- Student worksheets: Urban Soil Site Planner and Problem/Solution Match
- *Optional:* large paper or poster boards for garden design plans

Instructional Sequence

Engage (10 min)

Ask: "Can you grow food in the middle of a city?"

Show photos of rooftop gardens, planter boxes, or repurposed lots. Ask:

- "Where is the soil?"
- "What might make city soil different from country soil?"

Introduce the idea: Even cities need soil—but they must protect it differently.

Explore (25–30 min)

Activity A: Urban Soil Challenge & Solution Match

1. Present students with 3–4 common urban soil problems:
   - Heavy metal contamination
   - Compacted soil
   - Concrete surfaces and limited space
   - Low nutrient levels
2. Provide solution cards: raised beds, composting, soil testing, community gardens, green roofs
3. Students match the best solution(s) to each problem and explain why.

Activity B: Urban Garden Design Plan

1. Using school grounds or a printed map of a local area, students sketch a simple plan for growing food in an urban space.
2. Their plan must:
   - Identify where and how soil (or alternatives) will be used
   - Choose 2–3 soil-friendly practices
   - Include at least one food crop
3. Encourage realistic thinking (e.g., using containers, testing soil, using mulch or compost).
4. Optional: present their design to the class or make a poster display.

Explain (10 min)

Guide discussion:

- "Why do some communities have less access to healthy soil?"
- "How can we fix poor soil or grow food without traditional garden beds?"
- "What role does soil play in food justice and community health?"

Elaborate (Optional Extensions)

- Take a walking tour to observe soil surfaces near the school
- Interview a local food grower, urban planner, or environmental justice group
- Research city-led soil health or urban ag initiatives in your region

Evaluate (5–10 min)

- Review each student's garden design plan and their solution reasoning
- Reflection prompt: "Why is soil part of the solution for cities that need more food access?"

Modifications

- For younger learners: Use simplified maps and offer fewer soil problem/solution options
- For advanced students: Include a budgeting or materials list in their design plans
- For remote learning: Use Google Maps and virtual tours of urban farms to inspire planning

MODULE 4 – People and Soil - Choices and Consequences

Lesson 1: Soil Conservation and Land Use

Focus Question: *How do land use decisions affect soil, and how can we conserve it?*

Learning Objectives

By the end of this lesson, students will be able to:

- Describe ways that human land use impacts soil health (positively and negatively)
- Identify conservation practices used to prevent erosion and soil loss
- Evaluate land use scenarios and propose soil-friendly alternatives

Background for Educators

The way land is used—whether for farming, construction, or recreation—has direct effects on the soil beneath it. Erosion, compaction, contamination, and nutrient depletion can result from poor land use. Conservation practices like cover cropping, contour plowing, and riparian buffers help keep soil in place and productive. This lesson helps students think critically about how people shape soil's future.

Instructional Sequence

Engage (10 min)

Show side-by-side photos: a healthy green hillside and a nearby slope eroding due to overgrazing or construction. Ask:

- "What's different between these two places?"
- "What might happen to the soil next?"

Define erosion and explain how conservation practices help.

Explore (30 min)

Activity: Land Use Scenario Sorting and Redesign

1. Divide students into small groups and give each group a scenario card:
   - A farm on a steep hill that has no ground cover
   - A neighborhood with lots of paved driveways and no rain garden
   - A trail system that's eroding after heavy foot traffic
   - A playground where grass has worn away
2. Groups discuss how the current land use might be affecting soil. They answer:
   - "What's happening to the soil here?"
   - "What could make this worse?"
   - "What are 2–3 things we could do to protect the soil?"
3. They sketch or list a "revised" version of the site that includes conservation strategies.
4. Groups share their redesign with the class.

Explain (10 min)

As students present, highlight key strategies:

- Ground cover
- Minimizing compaction
- Directing water properly
- Restoring vegetation
- Using best management practices (BMPs)

Elaborate (Optional Extensions)

- Watch a short NRCS or district erosion demo video
- Walk around school grounds to identify real places where soil is at risk
- Invite a conservationist or engineer to talk about erosion control or land planning

Evaluate (10 min)

- Review students' redesigned site plans and discussion reasoning
- Ask: "Which strategy could we use at school to help protect soil?"

Modifications

- For younger students: Use picture-only scenario cards and act out conservation changes
- For advanced students: Ask groups to write a short proposal or create a poster advocating for their solution
- Outdoor version: Conduct this as a schoolyard or park walk with real-time analysis

QUICK LOOK

Time Needed: 60 minutes

Setting: Classroom or outdoor study site

Recommended Grades: 5-8

Materials:

- Land use photos or illustrations (urban development, logging, farming, mining, grazing)
- Chart paper or whiteboard
- Student handouts: Land Use Scenario Cards, Soil Conservation Brainstorm Sheet
- *Optional:* soil erosion demo tools (see "Erosion in a Pan" from earlier K–5 module)
- Access to local or satellite maps of your area for discussion

Lesson 2: Community Soil Stewardship and Action Projects

Focus Question: *How can we take action in our own community to protect and improve soil?*

Learning Objectives

By the end of this lesson, students will be able to:

- Define what it means to be a soil steward
- Identify local soil issues and brainstorm real solutions
- Plan and design a small-scale soil conservation action project

Materials

- Poster paper, markers, and planning templates
- Local maps or photos of school/community outdoor spaces
- Student worksheets: Soil Stewardship Planner
- Optional: computers for research or satellite imagery
- Optional: guest speaker (conservation district, NRCS, or Extension representative)

Background for Educators

Soil stewardship means taking responsibility for the care and protection of soil resources in daily life. This can range from reducing erosion at a school trail to planting native plants at a stormwater outfall. Students in grades 5–8 are ready to take meaningful action in their communities and understand the larger impact of local decisions. This lesson serves as a launchpad for service-based learning or place-based conservation work.

Instructional Sequence

Engage (10–15 min)

Ask: "What's one place near you where the soil could be healthier?"
Facilitate a brief brainstorm. Think about sports fields, empty lots, schoolyards, roadside banks, garden beds.
Define soil stewardship as "caring for soil so it stays healthy for plants, animals, and people."

Explore (25–30 min)

Activity: Design a Soil Stewardship Project

1. In pairs or small groups, students choose a site (real or hypothetical) that would benefit from soil help.
2. They complete a Soil Stewardship Planner worksheet that includes:
   - Problem: What is happening to the soil at this site?
   - Goal: What needs to change or improve?
   - Action Plan: What 2–3 steps will help?
   - Who: Who will be involved?
   - Tools/Materials: What will you need?
3. Students sketch their proposed plan on a poster or template, using visuals to show how the site will change.

Explain (10 min)

Have each group present their stewardship project to the class. Ask questions like:

- "How realistic is this project?"
- "What might make this easy or hard to do?"
- "Who could help you take the first step?"

Elaborate (Optional Extensions)

- Carry out a small group project such as planting a cover crop bed, building compost bins, or mulching a garden
- Host a "Soil Stewardship Showcase" with families or other classes
- Connect with local conservation professionals to explore grants or student-friendly service projects

Evaluate (10 min)

- Assess each group's completed planner and presentation for clarity and relevance
- Use a reflection prompt:
  - "What's one thing I can do this year to help soil in my community?"

Modifications

- For younger or hesitant learners: Use a guided project site (e.g., a classroom garden bed)
- For advanced students: Turn this into a multi-week capstone with journal reflections and real implementation
- For clubs or informal settings: Adapt this lesson into a challenge-based activity (e.g., "Who can improve their site with the least money or time?")

QUICK LOOK

Time Needed: 60-75 minutes (plus optional ongoing project time)

Setting: Classroom or outdoor study site

Recommended Grades: 5-8

Materials:

- Land use photos or illustrations (urban development, logging, farming, mining, grazing)
- Chart paper or whiteboard
- Student handouts: Land Use Scenario Cards, Soil Conservation Brainstorm Sheet
- *Optional:* soil erosion demo tools (see "Erosion in a Pan" from earlier K–5 module)
- Access to local or satellite maps of your area for discussion

Soil.
Where it all Begins

Section Closing: Soil is a Living Legacy

Soil is more than just the ground beneath our feet—it's a living legacy that connects every generation to the land, the food we grow, and the communities we build. These middle school lessons invite students to explore soil as a system, a habitat, a resource, and a responsibility. By investigating its properties, discovering its biodiversity, examining its role in food security, and designing real-world stewardship actions, students become empowered stewards of the natural world.

Encourage learners to ask questions, challenge assumptions, and take part in protecting the soil that sustains us. Whether in a classroom, garden, urban plot, or field, these activities plant the seeds for lifelong conservation learning.

Suggested Worksheets and Tools

To support the eight lessons, the following printable tools may be useful:

Module 1:
- Soil Composition Observation Log (Settling Jar + Texture-by-Touch Chart)
- Soil Systems Map and Interaction Chart
- Experiment Planner Template (for inquiry-based investigations)

Module 2:
- Soil Critter Checklist
- Decomposer Sorting Chart
- Soil and Water Interaction Log
- Cause-and-Effect Flow Chart: Weather & Soil

Module 3:
- Soil-to-Spoon Map
- Food Crop & Soil Health Match Activity
- Urban Garden Planner
- Problem/Solution Card Sort for Urban Soil

Module 4:
- Land Use Scenario Cards (photo-based or written)
- Soil Conservation Brainstorm Sheet
- Soil Stewardship Planner (goal, site, steps, tools, outcomes)
- Reflection Prompts or Exit Slips

Soil.
Where it all Begins