Stewardship program educator’s guide online version

You can download this PDF educators guide from the NACD website.


The online version of this booklet will be updated as needed to bring you the most current information.


Special thanks to” Life in the Soil: Dig Deeper” reviewers

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And the many educators in the development and reviewers of the materials.

Please submit information to share with others on your successful stewardship programs or conservation education activities.

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Conservation districts are local units of government established under state law to carry out natural resource management programs at the local level.

NACD's mission is to serve conservation districts by providing national leadership and a unified voice for natural resource conservation. The association was founded on the philosophy that conservation decisions should be made at the local level with technical and funding assistance from federal, state and local governments and the private sector. As the national voice for all conservation districts, NACD supports voluntary, incentive-driven natural resource conservation programs that benefit all citizens.

NACD maintains relationships with organizations and government agencies; publishes information about districts; works with leaders in agriculture, conservation, environment, education, industry, religion and other fields; and provides services to its districts. NACD is financed primarily through the voluntary contributions of its member districts and state associations.

The association's philosophy is that conservation decisions should be made by local people with technical and funding assistance from federal, state and local governments and the private sector. The association's programs and activities aim to advance the resource conservation cause of local districts and the millions of cooperating landowners and land managers they serve.

Visit www.nacdnet.org for additional information.
To find your local district contact information, go to:

http://www.nacdnet.org/general-resources/conservation-district-directory/

STEWARDSHIP WEEK INFORMATION

NACD has sponsored Stewardship Week since 1955. 2019 marks the 64th year to celebrate NACD Stewardship Week.

Education is a critical element of the conservation effort at the local, state and national levels. Educating youth ensures that the next generation will be wise stewards of America’s natural resources. Helping today’s adults and youth understand the need for effective conservation practices builds on the conservation legacy. Through NACD’s Stewardship and Education efforts, we help districts and communities extend the reach of their education programs.

Stewardship Week, celebrated annually between the last Sunday in April and the first Sunday in May, reminds us of our individual responsibilities to care for the natural resources upon which we all depend.

NACD/Auxiliary POSTER CONTEST

2019 Poster Contest Theme
Life in the Soil: Dig Deeper

You can find a Promotional Powerpoint and all the forms and rules online and ideas for the 2019 theme at: http://www.nacdnet.org/general-resources/stewardship-and-education-materials/contests/

Each state will have their own timeline and rules.

NACD/Auxiliary PHOTOGRAPHY CONTEST

Entries are due December 1st of each year.
Youth & Adult Categories

Photo entry contest form and rules can be found online at:

http://www.nacdnet.org/general-resources/stewardship-and-education-materials/contests/
Level 1-Grades K-1
Life in the Soil: Dig Deeper

Booklet Objectives

Students will:

• Familiarize themselves with the ways they interact with soil on a daily basis.
• Differentiate between living and nonliving components of soil.
• Realize the connection between soil and items such as food, furniture, etc.
• Explain the role of parent materials in soil formation.
• Recognize that soils can be many different colors due to rock and mineral content.

Next Generation Science Standards

Disciplinary Core Ideas
PHYSICAL SCIENCES
PS3B: Conservation of Energy and Energy Transfer
LIFE SCIENCES
LS1A: Structure and Function
LS1B: Growth and Development of Organisms
LS1C: Organization for Matter and Energy Flow in Organisms
LS1D: Information Processing
LS3A: Inheritance of Traits
EARTH AND SPACE SCIENCES
ESS2D: Weather and Climate
ESS2E: Biogeology

Vocabulary Words

Filter — soil is a porous material and as water passes through it impurities can be removed.

Mineral — naturally occurring substance that is not made of animal or vegetable matter and must be ingested by animals and/or plants in order to remain healthy.

Parent materials — the geologic material from which soil horizons form.

Soil — The top layer of the earth’s surface, consisting of rock and mineral particles mixed with organic matter and living organisms such as bacteria and fungi.
Level 1 Activity

Soil, Soil Everywhere

Activity Objectives

Students will:

• Use the senses of sight, smell and touch in their observation of soil.
• Relate different soil types to parent materials.
• Discuss the correlation between their daily lives and soil.
• Name individual letters of the alphabet.

Materials

• one or more containers of soil
• bag to hold letters of alphabet
• individual alphabet letters (provided with this activity—see page 21-23 of this guide)
• small popsicle sticks
• tape

Discussion

Define “soil” for students; the top layer of the earth's surface, consisting of rock and mineral particles mixed with organic matter and living organisms such as bacteria and fungi. Discuss with students the fact that many different soil types exist due in part to soil parent materials; the geologic material from which soil horizons form. Talk about how they interact with soil on a daily basis (see examples included with activity).

Instructions

1. Place one or more containers of soil on a table in the front of the classroom.
2. Allow students to come forward in small groups to observe, touch, and smell the soil.
3. Invite student comment and discussion on soil texture, color and smell. Point out to students that there can be many types of soils and that the soil in their yards, parks and neighborhoods may look, smell, and feel different due on part to parent materials.
4. Place individual letters of the alphabet into a bag or other container. Allow each student to draw out one letter.
5. Instruct the students to name the letter they picked, and name one thing related to soil that starts with that letter (examples provided page 23 of this guide). All classroom members should be invited to help each student complete this task. Once each letter is named and related to soil student can tape the letter to a popsicle stick and insert it into the container of soil located at the front of the classroom.
Soil, Soil Everywhere

Draw a line to connect the three pictures that go together.

bed wood tree
milk cow grass
plate food farmer

We use soil every day.

Trace the words and the sentence.
Level 2 Grades 2-3
Life in the Soil: Dig Deeper

Booklet Objectives

Students will:

• Identify the connection between the five senses and the comfort of their living environment.

• Recognize that many living organisms make their home in soil.

• Realize the connection between soil and their daily activities.

• Acknowledge that healthy soil is directly related to their own healthy lifestyles.

• Identify ways to conserve and improve soil health.

Next Generation Science Standards

Disciplinary Core Ideas

PHYSICAL SCIENCES

PS1A: Structure and Properties of Matter

LIFE SCIENCES

LS1B: Growth and Development of Organisms

LS2A: Interdependent Relationships in Ecosystems

LS2C: Ecosystems Dynamics, Functioning and Resilience

LS3A: Inheritance of Traits

LS4C: Adaptation

Vocabulary Words

Compost— decayed organic matter that can be used to enrich soil.

Decompose—to break down organic matter from a complex to a simpler form.

Mineral—an inorganic substance that occurs naturally in rocks and soil that is needed by animals and plants in order to remain healthy.

Natural Resources—resources produced by nature. Usable resources that are not manmade.

Organic Matter—decaying plant or animal material. Organic matter improves soil health.

Organism—a living thing, such as a plant, animal, or bacterium.

Photosynthesis—a process by which green plants use energy from the sun to turn carbon dioxide and water into carbohydrates and oxygen.

Soil—the top layer covering most of the Earth’s land surface, consisting of the unconsolidated products of rock erosion and organic decay, along with living organisms such as bacteria, fungi and insects.
Life in One Square Inch

Activity Objectives
Students will:
- Realize the role of observation in the scientific process.
- Use a ruler to make precise measurements.
- Closely observe a soil sample.
- Record and discuss observations.

Materials
- one index card per student
- one ruler per student
- one pair scissors per student
- one toothpick per student
- one magnifying glass per student
- one “Life in One Square Inch” activity sheet per student

Discussion
Discuss with students how important observation is in the scientific process. It is the first step used by many scientists and researchers every day. Inform students that they will be observing a small sample of soil. Discuss the day’s weather and how it may relate to soil temperature and texture, for example; hot/cold, damp/dry, etc.

Make students aware that THOUSANDS of living organisms can be found in one square inch of soil! Challenge them to find as many signs of life as possible.

Instructions
1. Instruct students to use their rulers to draw a one inch square in the center of their index card.
2. Demonstrate for students how to fold the card in half with the fold in the center of the square and cut along the line they have drawn to end up with a one inch square cut out.
3. Option 1: Take students outside and instruct them to place their index card on top of soil and observe it closely. Record observations on “Life in One Square Inch” activity sheet.
   Option 2: Provide soil samples for students to observe in the classroom. Insure that the soil is from a garden, yard, etc. Potting soil or other packaged soil will not have the quantity of observable living organisms as that obtained directly from a natural environment. Record observations on “Life in One Square Inch” activity sheet.
4. Explain to students that after they have observed the soil and recorded their findings they can use a toothpick to gently look just below the surface of the soil within their observation window.
5. Follow up with a class discussion, first in groups, then with the entire class on student observations. Generate a list of living organisms observed in the soil.
Life in One Square Inch

INSTRUCTIONS

1. Using your ruler draw a square one inch in diameter in the center of your index card.
2. Fold the card in half and cut on the line you have drawn so that you have a one inch square opening in your index card. This open square is your observation window.

Place your observation window on soil and take a close look.

What are the first three things you see?

__________________________________________________________

__________________________________________________________

__________________________________________________________

How many different colors can you see in the soil? ______________________

What is the texture of the soil like? Are the soil particles very small and fine like powder? Are they like sand? Do you see any small pieces of rock?

Describe the texture of the soil.

__________________________________________________________

__________________________________________________________

__________________________________________________________

Draw what you see in the box.

Hold a magnifying glass over your observation window.

What are three new things that you could not see without the magnifying glass?

__________________________________________________________

__________________________________________________________

__________________________________________________________

How many living organisms can you see? __________________________

Draw one of the living organisms you see in the box.

Are there any roots from grasses or other plants living in the soil?

Gently explore the soil with a toothpick.

How is the soil different below the surface?
Level 3 Grades 4-5
Life in the Soil: Dig Deeper

Booklet Objectives
Students will:
• Recognize that millions of organisms are living in the soil around them.
• Relate classifications of soil organisms to their function within the soil.
• Appreciate the benefit of soil and soil organisms to humans.
• Identify the structure and function of soil horizons.
• Investigate soil survey map to determine local soil types.
• Comprehend the factors involved in soil formation.

Next Generation Science Standards

Disciplinary Core Ideas
PHYSICAL SCIENCES
PS1A: Structure and Properties of Matter
PS2B: Types of Interactions
PS3D: Energy in Chemical Processes and Everyday Life
EARTH AND SPACE SCIENCES
ESS2A: Earth Materials and Systems ESS2E: Biogeology
ESS3A: Natural Resources
ESS3C: Human Impacts on Earth Systems
LIFE SCIENCES
LS1A: Structure and Function
LS1C: Organization for Matter and Energy Flow in Organisms
LS2A: Interdependent Relationships in Ecosystems
LS2B: Cycles of Matter and Energy Transfer in Ecosystems

Vocabulary Words
Arthropod—an invertebrate with jointed limbs, a segmented body, and an exoskeleton.
Bacteria—single celled microorganism without membrane-enclosed organs.
Fungi—organisms with nuclei that are not mobile and live as parasites.
Mineral—naturally occurring substance that is not made of animal or vegetable matter and must be ingested by animals and/or plants in order to remain healthy.
Nematode—a worm with a non-segmented body protected by a tough outer skin.
Protozoa—a single-celled organism that can move and feeds on organic compounds of nitrogen and carbon.
Topography—the mapping of the features on the surface of an area of land such as mountains, rivers, etc.
Hey Teacher! We Shrank Ourselves!

Activity Objectives

Students will:
• Describe the function of specific soil organisms.
• Analyze the relationships between living organisms within the soil environment.
• Identify the benefits to humans and each other of soil organisms.
• Evaluate a soil food web.

Materials

• one copy of “Life in the Soil: Dig Deeper” Level 3 per student or group of 3-6 students.
• “Hey Teacher! We Shrank Ourselves” worksheet for each student
• a single teaspoon of soil

Discussion

Discuss with students the multitude of living organisms in the soil beneath their feet. Review the beneficial functions of the organisms discussed in “Life in the Soil: Dig Deeper” Level 3 as well as any other interesting soil organisms your class has studied.

Make the connection between living organisms and food webs. A food web illustrates how nutrition and energy is transferred among the living organisms in an ecosystem. A food web may include several food chains that interact with each other. Draw/illustrate a soil food web as your classroom discussion unfolds.

Instructions

1. Distribute copies of the “Hey Teacher! We Shrank Ourselves” worksheet. Inform students that during this activity they will imagine themselves “shrunk” to the size of a soil organism. For the purpose of this activity they can choose to be one of the following: BACTERIA, FUNGI, PROTOZOA, NEMATODE, ARTHROPOD or EARTHWORM.

2. If students are working in groups each member of the group should choose a different soil organism to be “shrunk” to.

3. As students progress to question number “5” on the worksheet present them with the teaspoon of soil so that they will be better able to imagine how miniscule some of the organisms living in the soil are. Discuss with them the fact that up to 100 billion organisms can be living in that one teaspoon of soil!

4. As an extension activity soil organisms found in specific ecosystems, such as swamps or deserts, could be evaluated.
Hey Teacher! We Shrank Ourselves!

1. Decide which of the following you would like to be for this activity and circle it:

   **BACTERIA**  **FUNGI**  **PROTOZOA**  **NEMATODE**  **ARTHROPOD**  **EARTHWORM**

2. Draw a picture of your “new” self in the box.

3. Describe your function as a soil organism.

   ____________________________________________________
   ____________________________________________________
   ____________________________________________________

4. Where do you live within the soil? Do you move around or do you stay in one place? Do you like a location near the surface or do you prefer living a little deeper, maybe you like dwelling on a plant root? Describe your new home: ____________________________________________________

5. There is an active food web in the soil. Life in the soil can be a world of eat or be eaten! Are you a hungry parasite like fungi who has to lay traps for food since you don’t move around much or a speedy bacteria trying to outrun a protozoa? Since just ONE TEASPOON of soil can hold between **100 million** and **1 billion** bacteria and other organisms... who do you need to watch out for? What other living organism in the soil might enjoy having you for an afternoon snack?

   Fill in the blanks with words found in the puzzle above. Circle the words as you find them. Words can run forward, backward, up, down or diagonally.

   Most bacteria are __________________________________. They can convert organic matter into energy for other soil organisms to use.

   __________________________________ like to eat bacteria! They also release __________________________________ into soil for plants to use.

   Nematodes help control disease and make __________________________________ available to other organisms.

   Arthropods don’t have a __________________________________ but they still manage to aerate the soil and shred organic matter!

   __________________________________ recycle nutrients and improve the soil as they burrow through.

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Life in the Soil: Dig Deeper—National Association of Conservation Districts (NACD)  www.nacdnets.org  Stewardship & Education © 2018
Booklet Objectives
Students will:
• Explain the role of soil microbes.
• Distinguish the difference between types of soil microbes.
• Recognize the involvement of soil in most aspects of daily life.
• Comprehend the value of healthy soil.
• Identify the structure and function of soil profiles.
• Summarize the usefulness of a soil profile as a tool to determine soil fertility.
• Describe the horizons within a soil profile.

Next Generation Science Standards
Disciplinary Core Ideas
PHYSICAL SCIENCES
MS-PS1: Matter and its Interactions
EARTH AND SPACE SCIENCES
MS-ESS2 Earth’s Systems
MS-ESS3 Earth and Human Activity
LIFE SCIENCES
MS-LS1 From Molecules to Organisms: Structures and Processes
MS-LS2 Ecosystems: Interactions, Energy, and Dynamics

Vocabulary Words
Actinomycetes - a rod-shaped or filamentous bacterium belonging to a large group that includes some that cause diseases and some that are the sources of antibiotics
Aluminum - a metallic chemical element in the boron group that can be used in the manufacture of construction materials, antiperspirants and corrosion resistant materials.
Aquifer - a layer of permeable rock, sand, or gravel through which ground water flows, containing enough water to supply wells and springs.
Bacillus thuringiensis - a Gram-positive, soil-dwelling bacterium, commonly used as a biological pesticide.
Coltan—a metallic ore that is mined out of the soil and is then refined into a heat-resistant powder.
Geobacter - an anaerobic respiration bacterial species which have capabilities that make them useful in bioremediation.
Microbe - a microscopic organism.
Motherboard - the main circuit board of a computer.
Organic - derived from living things.
Soil horizon - distinct layer of soil having similar properties such as color, texture and permeability.
Soil Profile — a vertical section through the soil which reveals its layers (horizons).
Level 4 Activity

Digging Deeper and Building Better

Activity Objectives
Students will:
• Utilize a soil survey to investigate local soils.
• Identify and describe soils found in the county in which they live.
• Recognize the connection between soil types and land use.
• Choose a suitable development project based on soil type.

Materials
• Printed soil survey or access to the internet for the purpose of soil survey research.
• “Digging Deeper and Building Better” student worksheets (pg. 17)
• Poster board and misc. art supplies for each group of 3-5 students.

Discussion
◊ There are more than 70,000 types of soil on Planet Earth. The type of soil is very important when decisions are made in regards to land development.
◊ Review some of the ways we use soil in our everyday lives and discuss with students the value of making the right decisions in regards to land development.
◊ Discuss the properties of soil as it relates to land development, for example;
  • suitability for crops or other agricultural pursuits
  • presence of bedrock that could hinder excavation
  • permeability for proper septic systems and waste management
  • stability issues for structures and/or foundations
  • possible slope, erosion or flooding hazards.
◊ Describe the function of a soil survey: A soil survey is a report on the soils of an area. The soil survey has maps with soil boundaries and photos, descriptions, and tables of soil properties and features. Soil surveys are used by farmers, real estate agents, land use planners, engineers and others who desire information about the soil resource.
◊ Contact your local Soil and Water Conservation District or USDA Natural Resources Conservation Service (NRCS) office for information on the soils in your county and a possible classroom presentation and/or printed soil survey information or allow students to research soil types in their area by utilizing the Natural Resources Conservation Service website at: or http://websoilsurvey.nrcs.usda.gov/ or http://soils.usda.gov/survey/online_surveys/

Instructions
1. Do an internet search for undeveloped land located in or near the county in which your school is located for students to “develop”.
2. Divide students into groups and assign them the task of investigating the characteristics of the soils found in their assigned area through printed materials available at your county’s conservation district office http://www.nacdn.org/general-resources/conservation-district-directory/ or through a soil survey via the internet. http://websoilsurvey.nrcs.usda.gov/ or http://soils.usda.gov/survey/online_surveys/
3. Inform the students that their individual groups will be given the opportunity to develop the land for the benefit of the community and that they will present a proposal for the project they choose. Possible development projects; farm and/or ranch, theme park, sports stadium, factory, residential housing, city park and pool, or a shopping mall.
4. Each group of students should complete the “Digging Deeper & Building Better” worksheets and use poster board to prepare a “presentation” of their project proposal.
5. Each group is to present their project proposal to the class. After all proposals have been presented, invite class discussion and finish with a class vote on the project most beneficial to the community.
Life in the Soil: Dig Deeper

— National Association of Conservation Districts (NACD)

www.nacdnet.org

Stewardship & Education © 2018

A soil survey is a report on the soils of an area. The soil survey has maps with soil boundaries and photos, descriptions, and tables of soil properties and features. Soil surveys are used by farmers, real estate agents, land use planners, engineers and others who desire information about the soil resource.

Natural Resources Conservation Service (NRCS)

**Level 4 Worksheet**

**Digging Deeper and Building Better**

What is the location of the undeveloped land you are investigating?

A soil **series** is a group of soils with similar characteristics. A **series** is usually named after the town, or geographic feature, where a soil scientist first saw the soil.

According the soil map or soil survey name one soil that can be found at this location:

<table>
<thead>
<tr>
<th>Choose, as a group, one of the following development projects:</th>
</tr>
</thead>
<tbody>
<tr>
<td>farm and/or ranch theme park</td>
</tr>
<tr>
<td>sports stadium  factory</td>
</tr>
<tr>
<td>residential housing</td>
</tr>
<tr>
<td>city park and pool shopping mall</td>
</tr>
</tbody>
</table>

How was this soil formed?

________________________________________

List three characteristics of this soil:
1. _____________________________________
2. _____________________________________
3. _____________________________________

KEEPING SOIL CHARACTERISTICS IN MIND, what development project has your group chosen for the undeveloped land you are investigating?

________________________________________

List four reasons you feel this is the best development for this particular location and soil type:
1. _____________________________________
2. _____________________________________
3. _____________________________________
4. _____________________________________

How will your community benefit from this development project?

________________________________________

________________________________________

________________________________________

________________________________________

Draw a picture of what the site will look like once it has been developed.

(c) NACD
## Literature Connections

These are just a few of the wonderful books on the topic of soils. Be sure to add these to your library list at your school or local library. Ask guest readers to come into your school and read one of these books on soil and share an activity. Books about natural resources are a great addition to any personal, school or public library.

<table>
<thead>
<tr>
<th>Book Name</th>
<th>Age Range</th>
<th>ISBN</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dirt: The Scoop on Soil</td>
<td>Gr K-4</td>
<td>1404800123</td>
<td>Natalie M. Rosinsky</td>
</tr>
<tr>
<td>A Harvest of Color: Growing a Vegetable Garden</td>
<td>978-1928927319</td>
<td>Melanie Eclare</td>
<td></td>
</tr>
<tr>
<td>A Log's Life</td>
<td>4 – 7</td>
<td>978-1512412934</td>
<td>Lisa Owings</td>
</tr>
<tr>
<td>From Garbage to Compost</td>
<td>4 - 7</td>
<td>978-1480817166</td>
<td>Vikki Franklin</td>
</tr>
<tr>
<td>Dirt Don’t Hurt</td>
<td>4 and up</td>
<td>978-1602553577</td>
<td>Pamela Hall</td>
</tr>
<tr>
<td>Dig In!: Learn about Dirt</td>
<td>Age 4-8</td>
<td>978-1931969079</td>
<td>Stephanie Bloom</td>
</tr>
<tr>
<td>A Place to Grow</td>
<td>Age 4-8</td>
<td>978-0516265353</td>
<td>John Himmelman</td>
</tr>
<tr>
<td>An Earthworm's Life</td>
<td>Age 4-8</td>
<td>978-0486410579</td>
<td>Allen Silverstein, Virginia Silverstein</td>
</tr>
<tr>
<td>Life in a Bucket of Soil</td>
<td>Age 4-8</td>
<td>978-1931969079</td>
<td>Stephanie Bloom</td>
</tr>
<tr>
<td>Dirt: Jump Into Science</td>
<td>Age 4-8</td>
<td>978-0792282044</td>
<td>Steve Tomecek</td>
</tr>
<tr>
<td>How We Use Soil</td>
<td>Gr 4-8</td>
<td>978-1410906069</td>
<td>Carol Ballard</td>
</tr>
<tr>
<td>Is Soil All the Same? (Down &amp; Dirty)</td>
<td>Age 5 and up</td>
<td>978-1627248365</td>
<td>Ellen Lawrence</td>
</tr>
<tr>
<td>Earthworms Life</td>
<td>Age 5 and up</td>
<td>978-0516265353</td>
<td>John Himmelman</td>
</tr>
<tr>
<td>Curious About Worms (Smithsonian)</td>
<td>Age 6 and up</td>
<td>978-1486405001</td>
<td>Samantha Grover</td>
</tr>
<tr>
<td>Exploring Soils: A Hidden World</td>
<td>Age 6 and up</td>
<td>978-0431533692</td>
<td>Kate Waters</td>
</tr>
<tr>
<td>Life in the Soil</td>
<td>Age 7 and up</td>
<td>978-1410301246</td>
<td>John Farndon</td>
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<tr>
<td>How Groundhog's Garden Grew</td>
<td></td>
<td>978-0439560658</td>
<td>Lynne Cherry</td>
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<td>Christine Taylor-Butler</td>
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<td>Lily's Garden</td>
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<td>978-0761326533</td>
<td>Deborah Kogan Ray</td>
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<td>Wonder Waste: A Book on Composting</td>
<td>Age 9-12</td>
<td>978-8179936528</td>
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<tr>
<td>A Handful of Dirt</td>
<td>Age 9-12</td>
<td>978-0802786982</td>
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**Literature Connections**

<table>
<thead>
<tr>
<th><strong>Book Name</strong></th>
<th><strong>Age Range</strong></th>
<th><strong>ISBN</strong></th>
<th><strong>Author</strong></th>
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<td>Soil</td>
<td>Gr K-4</td>
<td>736809546</td>
<td>Adele D. Richardson</td>
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<td>Materials Soil</td>
<td>Age 4 and up</td>
<td>978-1432916329</td>
<td>Cassie Mayer</td>
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<td>Microlife that lives in Soil</td>
<td>Age 4 and up</td>
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<td>Steve Parker</td>
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<td>Jump into Science: Dirt</td>
<td>Age 4 and up</td>
<td>978-1426300899</td>
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<td>From Soil to Garden</td>
<td>Age 4 and up</td>
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<td>Mari Schuh</td>
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<td>Toil in the Soil</td>
<td>Age 4 and up</td>
<td>978-0761318071</td>
<td>Michelle Myers Lackner</td>
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<td>Soil Basics</td>
<td>Age 4 and up</td>
<td>978-1429671101</td>
<td>Mari Schuh</td>
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<td>Using Soil</td>
<td>Age 5 and up</td>
<td>978-1403493217</td>
<td>Sharon Katz Cooper</td>
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<td>The Amazing Dirt Book</td>
<td>Age 6 and up</td>
<td>978-0201550962</td>
<td>Paulette Bourgeois</td>
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<td>Soil</td>
<td>Age 7 and up</td>
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<td>Sally Walker</td>
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<td>Explore Soil: With 25 Great Projects</td>
<td>Age 7 and up</td>
<td>978-1619302925</td>
<td>Kathleen M. Reilly</td>
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<td>Soil and Water</td>
<td>Age 8 and up</td>
<td>978-0766027350</td>
<td>Robert Gardner</td>
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<td>Micro Life In Soil</td>
<td>Age 8 and up</td>
<td>978-0778754152</td>
<td>Natalie Hyde</td>
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<td>Super Cool Science Experiments: Soil</td>
<td>Age 8 and up</td>
<td>978-1602795266</td>
<td>Vickie Franchino</td>
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<td>Super Soils</td>
<td>Age 8 and up</td>
<td>978-1604537475</td>
<td>Christine Petersen</td>
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<td>Rocks and Soil</td>
<td>Age 8 and up</td>
<td>978-1499431537</td>
<td>Peter Riley</td>
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<td>You Wouldn’t Want to Live Without</td>
<td>Age 8 and up</td>
<td>978-0531224380</td>
<td>Ian Graham</td>
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<tr>
<td>Soil (True Books: Natural Resources)</td>
<td>Age 9-12</td>
<td>978-0516293684</td>
<td>Christin Ditchfield</td>
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Resources

The Soil Biology Primer an introduction to the living component of soil and how it contributes to agricultural productivity and air and water quality. The Primer includes chapters describing the soil food web and its relationship to soil health and chapters about soil bacteria, fungi, protozoa, nematodes, arthropods, and earthworms.


Nutrients for Life Foundation
https://www.nutrientsforlife.org/
For Teachers (Curriculum)
For Students (Games)
For Everyone (Information)
For Communities (Programs)

North American Envirotone
http://www.envirothon.org/
http://www.envirothon.org/the-competition/curriculum-guidelines

USDA—NRCS
Natural Resources Conservation Service
Unlock the Secrets – Soil Health

IL USDA—NRCS
Claude—Scoop on soil computer game.
Lesson plans and more
http://urbanext.illinois.edu/soil/
Dr. Dirt’s K-12 Resources & Activities
Variety of soils demonstrations and activities
http://www.doctordirt.org/

Bureau of Land Management
Soils for Kids
http://www.blm.gov/nstc/soil/Kids/
Discovery Channel
The Dirt on soil
http://school.discoveryeducation.com/schooladventures/soil/

Coloring pages
I heart Soil — Soil Science Society of America
The Adventures of Sammy Soil

For Teachers (Curriculum)
For Students (Games)
For Everyone (Information)
For Communities (Programs)
### Resources

**Soil Science Society of America**

**Lessons and Activities**
http://soils4teachers.org/lessons-and-activities

**Quotes about soil**
http://soils4teachers.org/quotes

**Soil Glossary**
http://soils4teachers.org/glossary

**Ask a Soil Scientist**
http://www.soils4teachers.org/ask

**Soil Career Poster & 12 soil order poster**
http://www.soils4teachers.org/

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**Education Outreach Programs**

*(Many of these programs have a state contact)*

**Project Learning Tree**
(require workshop for activity guide)

PLT has a variety of soils activities to use for field days, classrooms or to a soils workshop that can be duplicated across the country to complement the DIG IT soils exhibit.

http://www.plt.org

**Project WET** *(requires workshop for activity guide)*

There are a variety of soils activities that can be used for field days, classrooms and presentations.

http://www.projectwet.org

**Leopold Education Project** *(requires workshop)*

The mission of the Leopold Education Project is to create an ecologically literate citizenry so that each individual might develop a personal land ethic.

https://www.aldoleopold.org/teach-learn/leopold-education-project/

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**DIG IT—The Secrets of Soil**

**Smithsonian - National Museum of Natural History**
http://forces.si.edu/soils

**Sample of topic covered:**

- Media Library—Videos and interactives
- What is soil?
- Chip off the old block
- Soil Formation
- Maters of Life and Death
- Wise Choices
- A World of Soils
- Educators—Activity sheets and more!

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**Using Leopold in Teaching—handouts and study guides**
http://www.aldoleopold.org/teach-learn

**Ag in the Classroom**

*Grassroots program coordinated by the United States Department of Agriculture.* Its goal is to help students gain a greater awareness of the role of agriculture in the economy and society, so that they may become citizens who support wise agricultural policies.

http://www.agclassroom.org/

**GLOBE Project - Soil Section**

Learning Activities,
Field Guides for Soil Investigations, Soil Glossary and data sheets for soil investigations
http://www.globe.gov/web/elementary-globe/soils/learning-activities

**Food Land & People** *(requires workshop)*

Promotes approaches to learning to help people better understand the interrelationships among agriculture, the environment and people of the world.

http://www.foodlandpeople.org/
Soil Everywhere Activity—Cards

Alphabet to be printed and cut into individual cards for “Soil, Soil Everywhere” activity. Level 1

SAMPLE (c) NACD
Soil Everywhere Activity—Cards

M N O P
Q R S T
U V W X
Soil Everywhere Activity—Cards

Examples for “Soil, Soil Everywhere” activity.
A  APPLE  Apples grow on trees, trees grow in soil.
B  BED  Beds can be made of wood that comes from trees that grow in soil.
C  CAT  Cats like to climb trees that grow in soil.
D  DOOR  Many doors are made of wood that comes from trees that grow in soil.
E  EARTH  Earth’s outer layer is soil.
F  FINCH  A finch is a bird that eats seeds and fruit that grow in soil.
G  GRASS  Grasses grow in soil.
H  HORSE  Horses eat plants that grow in soil.
I  INSECT  Many insects, like beetles, live in soil.
J  JEANS  Many blue jeans are made from cotton, a plant that grows in soil.
K  KANGAROO  Some kangaroos live in grasslands. Grasses grow in soil.
L  LIME  A lime is a fruit that grows on trees that grow in soil.
M  MILK  Milk comes from cows that eat plants that grow in soil.
N  NOSE  We need oxygen to breathe. Oxygen is made by plants that grow in soil.
O  OATS  Oats are good for breakfast! Oats come from plants that grow in soil.
P  PAPER  Paper contains pulp that comes from trees that grow in soil.
Q  QUAIL  A quail is a bird that likes to eat flower buds. Flowers grow in soil.
R  RABBIT  Rabbits live in burrows they dig into the soil.
S  SCHOOL  School buildings are built on soil.
T  TRACTOR  Farmers use tractors to prepare soil for crops that we eat.
U  UNDERGROUND  Many animals, like chipmunks and rabbits, like to live underground.
V  VINE  Vines are plants that grow in soil.
W  WALNUT  Walnuts are a nut that grows on trees that grow in soil.
X  XIAOSAURUS  The xiaosaurus was a dinosaur that lived a long time ago. It ate plants that grow in soil.
Y  YAM  A yam is a sweet potato we can eat that grows in soil.
“Life in the Soil: Dig Deeper” Education Materials at
NACD Marketplace
www.nacdstore.org

Level 1  Level 2  Level 3  Level 4

Placemat/Activity Sheet  Bookmark  Poster

National Association of Conservation Districts (NACD)
509 Capitol Court, NE
Washington, DC 20002-4937
(202) 547-NACD (6223)

Email: stewardship@nacdnet.org; Web: www.nacdnet.org; NACD Marketplace: www.nacdstore.org