Life Lab Science
Preview Sampler

Kindergarten Edition

An Introduction
to the
Life Lab Science Curriculum

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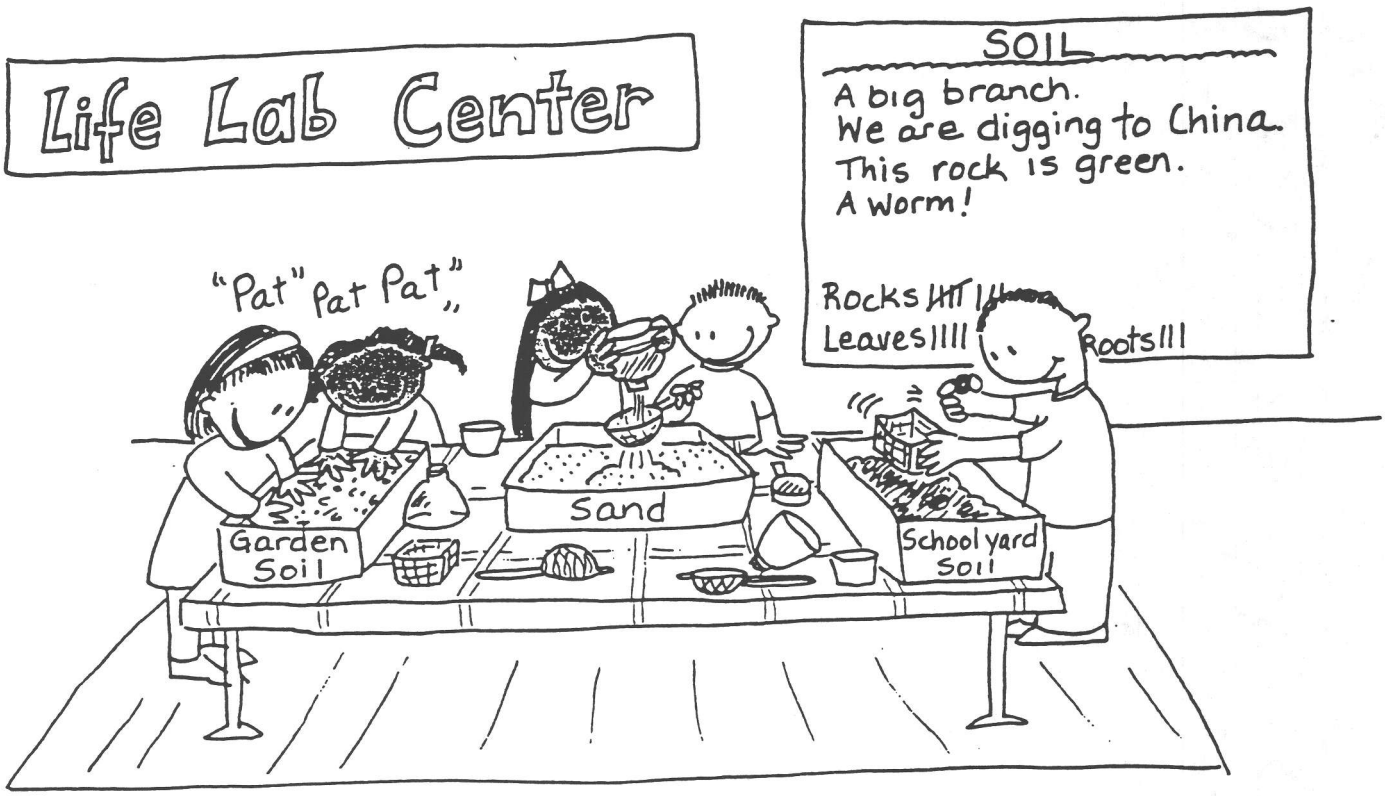
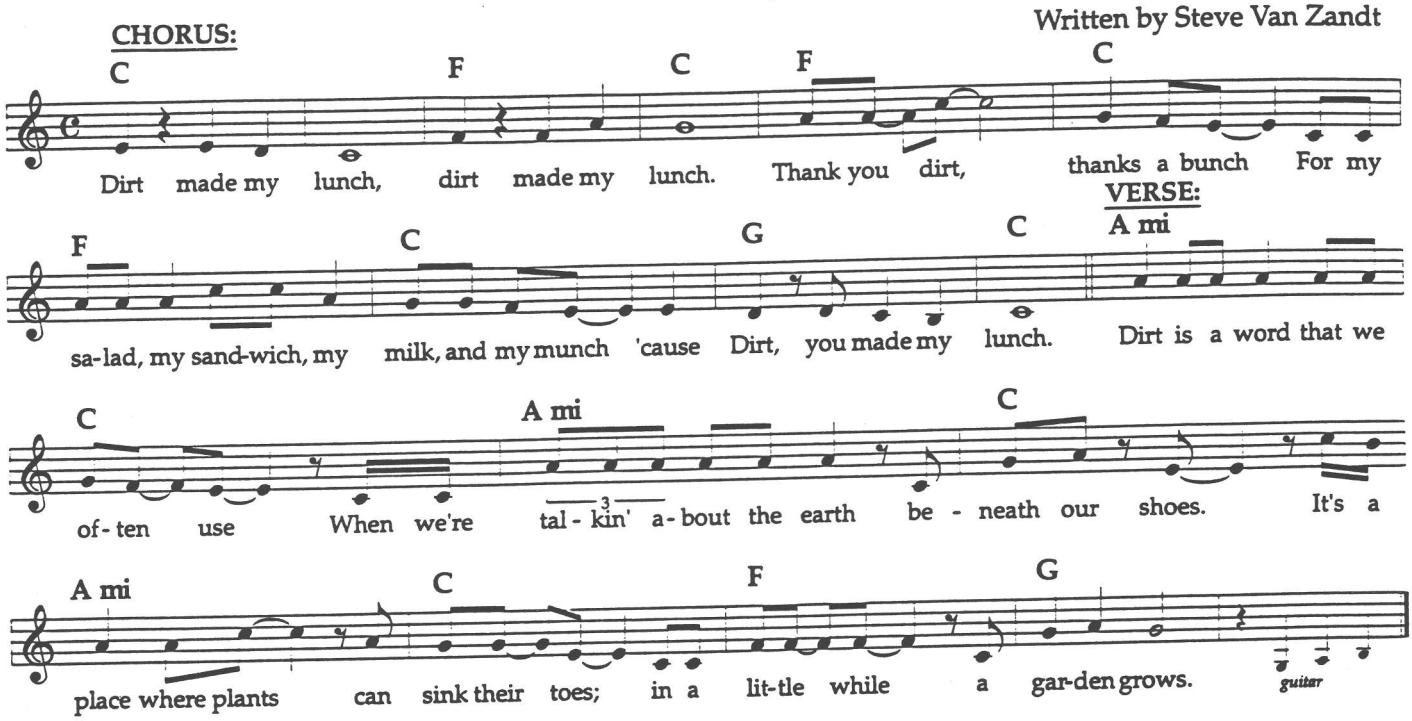


Dirt Made My Lunch

Written by Steve Van Zandt



CHORUS

A farmer's plow will tickle the ground.
You know the earth has laughed when wheat is found.
The grain is taken and flour is ground
For making a sandwich to munch on down.

CHORUS

A stubby green beard grows upon the land.
Out of the soil the grass will stand.
But under hoof it must bow
For making milk by way of a cow.

CHORUS

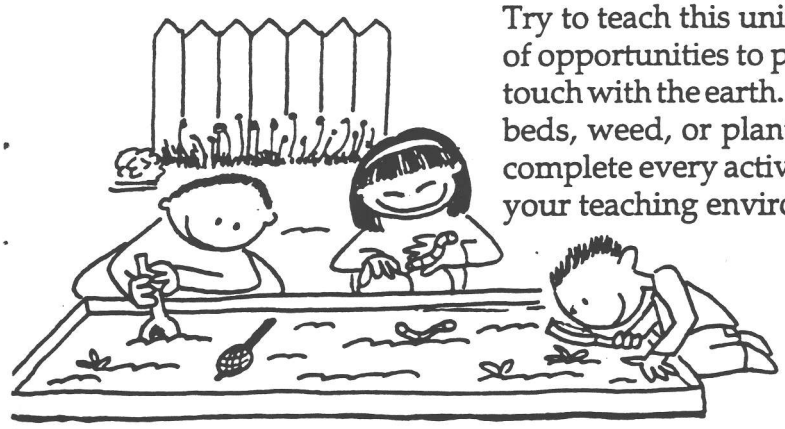
Music can be found on BSSB tape accompanying this curriculum

Exploring Soil

Go to the garden and work with the soil. Feel it between your fingers (and maybe even your toes). Breathe in the earth's aroma. Think back to when soil was something to play in. Did you throw dirt bombs? Dig to China? Jump off piles of mounded soil? Bake mud pies or build mud walls and tunnels?

Your memories will enrich your students' explorations in this unit. As students play with worms, "cook" mud pies, mix dirt soup, and collect soil, they will be using their senses to investigate the physical properties of soil. They will also use a variety of tools including trowels, spoons, unglazed tiles, and paper clips to explore soil and rocks. In the process, they will learn that soil is composed of various substances, and observe how the texture of soil changes when it becomes wet. They will discover how rocks and soil are related. In addition, they will find that some rocks can be used as tools for writing. They will explore, too, how rocks break and how worms move through soil.

Your kindergartners will use their fingers, hands, eyes, and ears to make these messy but revealing discoveries. Be prepared for them to get dirty! For many children, the best part of the garden is the soil. Most of the activities in this unit are based on games and play activities that children are likely to do on their own in the garden. They will enrich students' understanding of their previous experiences with soil. The activities and the Explorer Posts included in this unit provide many opportunities for children to share their ideas and observations. As they take part in the various investigations, they will develop skills in communicating, comparing, and observing.



Try to teach this unit at a time of year when students have plenty of opportunities to participate in garden activities that get them in touch with the earth. It may be a time when they can prepare garden beds, weed, or plant. As in previous units, do not feel you must complete every activity. Choose those that best suit your students, your teaching environment, and your teaching style.

Student Goals

Theme: Students use their senses and a variety of tools to explore soils and rocks.

Science Explorations: Students become aware of some of the physical characteristics of soil and rocks, and how soil and rocks react with water. Students observe how living creatures interact with the soil.

Process Skills: Students continue to develop observation and comparison skills as they share their observations during investigations.

Science Concepts

In this unit, students explore a variety of concepts through activities that focus on the physical properties of soil and rocks, the ways soil and rocks react to water and to various animals.

Life Science: Plants and animals are found in the soil. Their lives depend on properties of the soil.

Earth Science: Soil is composed of a variety of materials derived from living and nonliving sources. There are different kinds of soil. Rocks vary in color, shape, texture, hardness and type of streak they produce.

Physical Science: Soil and rocks are changed by water.

Science, Technology, and Society: How people treat the soil affects the lives of plants and animals. Rocks can be used for writing and drawing.

Unit Lesson	Description	Process Skills	Instructional Mode		Science Concepts				Related Subjects
			EXPLORER POST	ACTIVITY	LIFE	EARTH	PHYSICAL	STS	
A Hole Is to Dig	Students share their discoveries of objects and animals as they dig in garden soil.	Observing, Communicating		✓	✓	✓			Language Arts
Soil Sift	Students use sifters, funnels, measuring cups, and other containers to explore the properties of sand and other soils.		✓		✓	✓			
Pieces of Soil	Students discover what soil is made of by collecting and sorting soil particles and objects in the soil.	Observing, Comparing		✓	✓	✓			Math
Mud Pies	Students make mud pies to explore how soil changes as it gets wet.		✓			✓	✓		
Dirt Soup	Children add water to soil to discover how water changes soil.	Comparing, Communicating		✓		✓	✓		Math
Pet Rocks	In open play, students explore the properties of rocks with magnifying lenses, paper clips, balance scales, and water.		✓			✓	✓		Math
Getting to Know You	Students observe and feel a special rock to discover its unique properties.	Observing, Comparing		✓		✓	✓		Math
The Write Stuff	Students write with different rocks to discover which make streaks.	Observing, Comparing		✓		✓	✓	✓	Math, Language Arts
Rock Hard	Students compare the hardness of hard rocks and soft rocks while the teacher tries to break them with a hammer.	Observing, Comparing		✓		✓	✓		Language Arts, Math

Unit Lesson	Description	Process Skills	Instructional Mode		Science Concepts				Related Subjects
			EXPLORER POST	ACTIVITY	LIFE	EARTH	PHYSICAL	STS	
Worms	Students find and investigate earthworms, using magnifying lenses, soil, leaves, and moist paper towels.		✓			✓	✓	✓	
Hello, Worm	Students observe earthworms to discover their habits and how they react to stimuli.	Observing, Communicating		✓	✓	✓			Drama
Worm Race	Students compare the time earthworms take to burrow into loose and packed soil.	Observing		✓	✓	✓	✓		

Unit Planner

Activity	Time	Special Arrangements	Literature Links
A Hole is To Dig	20 min	Send home Parent Letter; prepare a place for children to dig, or bring soil to class.	Dunrea, *Deep Down Underground*
*Soil Sift	20 min	For this and the next 3 activities, have on hand quantities of soil and sand.	Peters, *The Sun, the Wind, and the Rain*
Pieces of Soil	20 min		
*Mud Pies	20 min		Lobel, *Small Pig*
Dirt Soup	20 min		
*Pet Rocks	20 min	Remind children to bring a rock from home.	Baylor, *Everyone Needs a Rock*
Getting to Know You	20 min		
The Write Stuff	20 min	Have safety goggles on hand.	
Rock Hard	20 min	Acquire unglazed tiles.	
*Worms	20 min	Collect earthworms for this and the next 2 activities.	Buchanan, *Mole Moves House*
Hello, Worm	20 min		
Worm Race	20 min		

*Explorer Post (free exploration station)

Life Lab Videodisc

Find out ways to incorporate the Life Lab Videodisc into this Unit by turning to Section K-2 Exploring Soil Unit in the *Videodisc Guide*.

Life Lab Center

Set up the Explorer Posts in the Life Lab Center. You may also wish to keep ongoing experiments and projects there as well as class lists of questions and ideas about soil. It is also a good place to display books about soil. Additional Center activities might include:

- displays of class soil and rock collections.
- a collection of rocks for children to weigh, measure, and sort.
- a bulletin board display of things made from rocks and soil (photographs of an adobe house, buildings made of granite and marble, a pencil, chalk, talcum powder, pottery, etc.). Whenever the class discovers new objects made from rock or soil, add pictures of these objects to the bulletin board.

Garden Activities

- Prepare garden beds.
- Weed.
- Water plants.
- Mulch beds and paths.
- Make signs about staying on the paths.

Recommended Literature

Story Books

Baylor, Byrd. *Everybody Needs a Rock.* New York: Scribner's, 1974. This book tells how to hunt for a rock—no, the *right* rock.

Buchanan, Elizabeth. *Mole Moves House.* New York: Doubleday, 1989. An exuberant mole refuses to believe his human neighbors, who think he is a pest.

Dunrea, Oliver. *Deep Down Underground.* New York: Macmillan, 1989. Featuring animals that live in the soil, this counting book uses repetition and fun language.

Lionni, Leo. *Pezzitino.* New York: Pantheon, 1975. A little square thinks it is the missing part of something bigger. The square never finds where it came from, but it does learn that it too is made up of little pieces.

Lobel, Arnold. *Small Pig.* New York: Harper, 1969. A pig who has had his pen cleaned goes off in search of mud, and discovers that good mud is hard to find.

Peters, Lisa. *The Sun, the Wind, and the Rain.* New York: H. Holt, 1988. This book tells two stories side-by-side. In one, the sun, wind, and rain shape a mountain, and in the other, a child tries to build a tall sand mountain at the beach, only to discover that it too is affected by sun, wind, and water.

Reference Books

Keen, Martin. *The World Beneath Our Feet, The Story of Soil.* New York: Julian Messner, 1974. This reference book for teachers introduces soil and the plants and animals found in the soil.

McLaughin, Molly. *Earthworms, Dirt, and Rotten Leaves.* New York: Atheneum, 1986. This book helps answer student questions about the soil as an ecosystem.

Some of these books may be available in Spanish-language editions. Check with your local bookstore for Spanish titles currently in print and available by special order.

Date:_____

Dear Parent or Guardian:

During the next unit, we will be exploring soil as part of our Life Lab ScienceProgram. We will be investigating what soil is, how it is made, and how it changes. We will be digging in the garden, finding out if rocks can be used for writing, and watching earthworms race into the ground. All of this adds up to a lot of hands-on fun—and more messiness than usual. You can't learn about soil without getting your hands dirty! Please do not send your child to school in dress clothes during this unit. Contact me if the possibility of clothes getting dirty presents a problem for you or your child.

For some of our Life Lab projects, we need materials you may have at home. If you have any of the following materials, please send them with your child by _____:

- 1 or more old, adult-sized shirts to use as smocks
- 1 used, clean plastic or aluminum baking pan
- 1 clean, empty 8-oz plastic food container (from yogurt or cottage cheese)

Your child will also need a special rock. Help your child find one that fits in the palm of his or her hand. Be sure your child brings the rock to school no later than _____.

Consider sharing these activities with your child during the next weeks:

- Dig in the garden or any other place where there is soil.
- Help your child collect soils from various locations and then compare them.
- Encourage your child to start a rock collection. Help to glue each rock to a cardboard square and record where it was found

If you would be interested in joining us for a lesson, please return the form below. You will enjoy it, and your assistance will help us make hands-on science activities a success.

Sincerely,

Name_____Phone_____

___Yes. I'd like to help in the classroom. Please call me.

___No. I can't help, but please keep me informed.

Pieces of Soil

Students discover what soil is made of by collecting and sorting soil particles and objects in the soil.

Outcome

Students practice sorting.

For the Teacher

Look at a boulder and you will see soil waiting to be made. Seasons of freezing and thawing, heating and cooling can eventually splinter even giant rock formations. Over time, water, wind, ice, and plant roots wear, grind, scour, and split the rock fragments into small particles. Of course, soil is not just tiny bits of rock. Soil bacteria break down dead plant and animal material, adding organic matter. Atmospheric gases also enter the soil in various ways.

In their sorting, students will discover that soil is made up of different-sized particles. Sand grains are the largest—up to 2 mm in size. The biggest grains can be picked out with the naked eye. Next smaller are silt particles, and the smallest—seen only under a higher-powered microscope—are clays. Natural soils are mixtures of these mineral particles and organic material in different proportions. Your students will see and feel the differences in soil textures. They will pick out soil clods and sand grains. But many of the treasures they will collect are soil in the making—rocks, twigs, leaves, and roots.

Indoor or Outdoor

Time
20 minutes, or until students lose interest

Related Subject
Math

Process Skills
Observing
Comparing

Materials
For the Class:
(6 or 8 students at a time)

- 3 colanders
- 3 strainers
- 3 funnels
- 3 tweezers
- 3 strawberry baskets
- 2 tubs of sand
- 2 tubs of garden soil
- 1 bottle of white glue or roll of tape
- 12" x 18" sheet of light-colored construction paper
- Soil List from A Hole Is to Dig, p. 52.

Preparation

1. Fill 4 tubs half full—2 of garden soil and 2 of sand. If possible, use different kinds of soil. Perhaps one from school and one from home.

2. Label the sheet of paper "Soil Collection." Divide it into sections labeled "Big," "Little," and "Medium-sized."

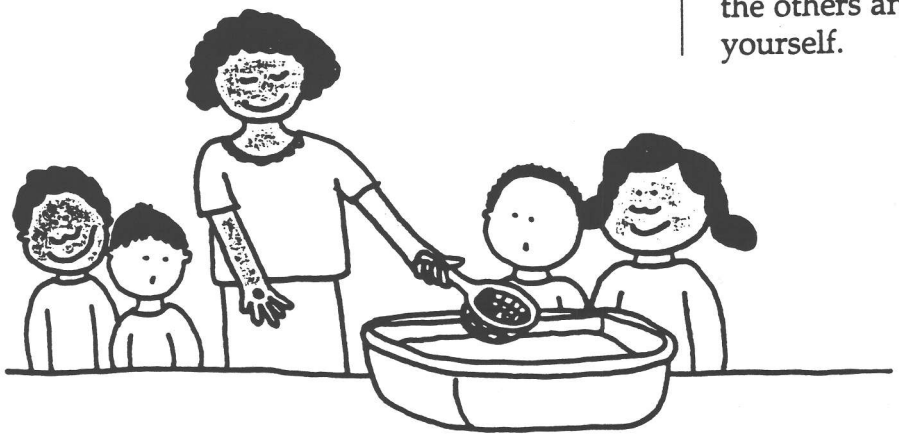
3. This is a good lesson to teach in the garden. If you are indoors, cover a table or floor area with plastic.

4. Teach in teacher-directed groups of 6 or 8 students.

Getting Started

Elicit students' ideas about what soil is made of.

Is soil made up of different things? Are they big things, little things, or both? How can we discover what soil is made of? If you did A Hole Is to Dig, bring out the Soil List. Ask students if they remember what they discovered. Do they think they will make new discoveries if they sort through soil now? If students had the opportunity to visit the Soil Sift Explorer Post, ask: **What did you discover about soil at the sifting station?**



Action

1. Tell students that you want to make a collection of the things—big and little—they find in the soil.

2. Demonstrate how to sift neatly through the soil with one of the sifting tools. Pick out a particle from the soil. Show students your discovery, and describe how it is unique. Ask them if it is big, little, or medium-sized. Glue or tape it to the proper area of the collection sheet.

3. Divide students into pairs. Give each pair a tub of soil.

4. Explain that you want a collection of different big, little, and medium-sized things. Ask students to find as many different things as they can.

5. Let each student choose a sifting tool and start sifting.

6. As students discover soil particles and objects, ask them what they found. How is it different from the other things in the collection? Does it belong in the big, little, or medium-sized section of your poster? Is it sharp or rounded? Does it glitter? Is it light or dark colored? After students describe their object, let them glue or tape the particle to the proper area of the Soil Collection Poster.

7. If students cannot identify an item, show it to the others and ask for ideas before naming it yourself.

Assessment

Encourage students to describe how they sorted objects.

What did we find in the soil and sand? If your class made a Soil List, add new discoveries to it. Or start a list now. As a group, count the number of different items in the collection. Challenge students to find the smallest and biggest objects in the collection. **Do we have more big objects than small objects?**

Digging Deeper

- Challenge students to order soil particles by size from small to large.

- Make sandpaper by coating a sheet of paper with white glue and then sprinkling sand over it. Bring in different grades of sandpaper to show students. Challenge them to make a finer or coarser grade of paper from sand you have. Bring in scrap pieces of wood for students to sand. Can they see a difference in how coarse and fine grades of sandpaper sand?

- Encourage students to write about or draw one or more of the items that they found in the soil. Let students look at the items on the sheet before they draw.

Teacher Reflections

- Could students identify and describe differences in the items they found?

- Did they try to find what other students found, or did they look for different things?

- Could they sort objects into size categories?

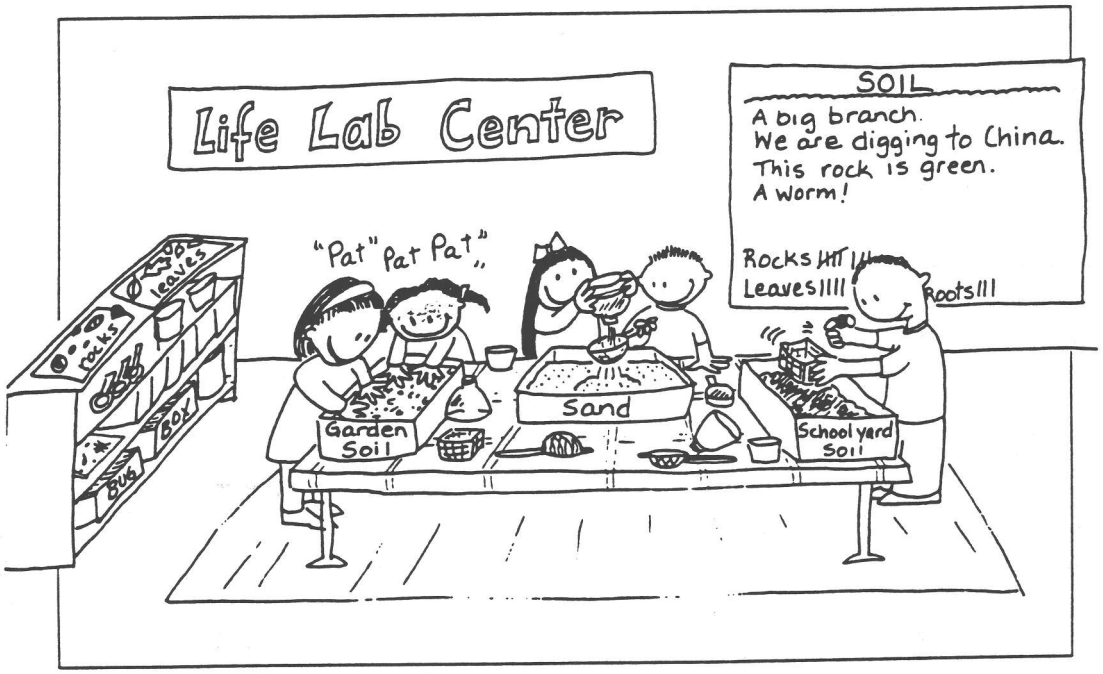
- Did they exchange sifting tools?

In the Garden

Weeding is one good way for students to both handle soil and get to know the garden. But small children need help identifying weeds. In a weedy section of the garden, model weed-pulling for the class, pointing out weeds so that students can distinguish them from other plants. Be sure they understand the importance of pulling out the roots of weeds along with the tops. See Gardening Know-How for the '90s, *pp. 63–64, for help with identifying weeds*

Soil Sift

Students use sifters, funnels, measuring cups, and other containers to explore the properties of sand and other soils.



Explorations

Given the opportunity to "mess around" on their own with soils and simple tools, your students will soon begin experimenting with the properties of soil. They will pour the soils through the funnels and discover which fall freely and which clog the funnel. Their hands and the colanders and berry baskets you provide will become sifters and tampers used to explore the different textures, consistencies, and particle sizes of the soils. As they uncover twigs and other objects in the garden soil, pack down other soil, and feel the grittiness of the sand particles, your students will gain an awareness of the rich variety in soils they once thought of only as "dirt."

Set up either indoors or outside, this free exploration station will be a hit with many young explorers. The key is to let students choose themselves whether or not to experience the station's possibilities. At an inside station set up for an extended period, students have the opportunity for truly open play at times they choose. Outdoors, where time is limited, you may have to more actively manage the rotation of groups through the station so that everyone who wants has a chance to explore the soils.

Indoor or Outdoor

Time
20 minutes, or until students lose interest

Materials
- 3 colanders
- 3 strainers
- 3 funnels
- 3 strawberry baskets—if available
- 2 measuring cups or plastic food containers
- 1 tub of garden soil
- 1 tub of coarse sand
- 1 tub of gravel-like, clay-like, or other soil unlike the two above—if available
- 3 magnifying lenses

Teacher to Teacher

Students were so excited about playing with the soil tubs! To keep the stations running smoothly, I wrote some rules on chart paper and posted them near the work area and reviewed them with each group:

- *Two students at each tub.*
- *Keep tools over the tubs.*
- *Do not mix the soils.*
- *Wash your hands when you are finished.*

I also put a small brush and dust pan near the station and let students know they should do some clean-up before they moved on.

–Lori Helman, Bayview Elementary School, Santa Cruz, CA

Preparation

1. Collect the sand and soils in shallow tubs.

2. Outside: Set up the station at a picnic table or in a garden bed.

Inside: Cover a table with a plastic tablecloth, or use an empty water table. If your classroom is carpeted, cover the floor with a plastic drop cloth.

3. Space the tubs as widely as possible to prevent students from mixing the soils.

4. If the sand is dusty when stirred up, moisten it with water.

5. Place a broom and dust pan near the Center for daily clean-up.

6. No funnels? Make your own by cutting off the top half of a plastic soda pop bottle.

Station Management

1. Recommended group size: 4–6

2. Introduce the station by showing students the tubs of soil and the tools they can use to explore them.

3. Demonstrate how to keep the tools in or over the tubs so the soils stay in the tubs.

4. Ask students why they should not mix the sand and other soils.

Teacher Reflections

- Did students take turns using the different tools?

- Did they notice differences between the sand and other soils?

- Did they share experiences and questions with each other?

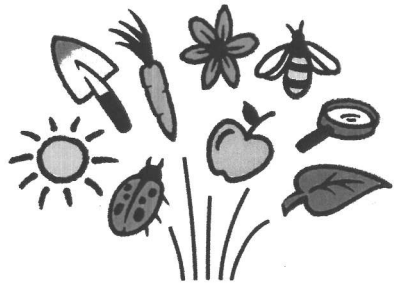
- Were they able to work at the tubs without spilling most of the sand or soil on the table?

The Life Lab Scope and Sequence—A Full Program of Life, Earth, and Physical Sciences

The **Life Lab Science** Scope and Sequence demonstrates that Life, Earth, and Physical science concepts are integrated in a systems approach to science. As the garden grows and changes throughout the seasons, it provides a natural laboratory for studying how the science disciplines are interrelated. You will also discover numerous opportunities for integrating science with math, language arts, and social studies.

Life Lab Science	Grade K	Great Explorations	Scope and Sequence	
	Theme/Connections	**Life Science**	**Earth Science**	**Physical Science**	**Process Skills**
Overview	**Exploration:** We use our senses to learn about the world around us.	Living things have characteristics that can be described and that distinguish them from nonliving things.	There are different kinds of rocks and soil. Soil is home for plants and animals. A variety of living and nonliving things can be found in soil.	All things in the physical world can be described by their properties. We can observe, describe, and record these properties.	Observing—Students observe the natural world by using their senses. Comparing—Students compare similarities and differences of objects. Communicating—Students develop descriptive language to communicate observations
Exploring Our Senses	**Exploration:** The garden is a place to explore and observe the natural world using our senses.	Plants are living things. Plants have different growth requirements.	Soil is part of the garden. Water can change the condition of the soil.	All parts of the garden, including plants, soil, and water, have physical properties we can describe.	Observe objects closely using all senses. Share tasks and communicate observations with others.
Exploring Soil	**Exploration:** We use our senses and a variety of tools to explore different types of soil and rocks.	Plants and animals live in the soil. Their lives depend on the properties of soil.	Soil is made up of many things from living and nonliving sources. There are different kinds of soil. There are different kinds of rocks.	Soil and rocks are part of the physical world. They have properties we can observe and describe. Water changes soil and rocks.	Observe closely and notice details. Compare based on similarities and differences. Draw observations and communicate observations with others.

Life Lab Science	Grade K	Great Explorations	Scope and Sequence		
	Theme/Connections	**Life Science**	**Earth Science**	**Physical Science**	**Process Skills**
Exploring Water	**Exploration:** Water has properties that we can explore and describe using tools and materials.	All living things need water. Liquid water affects living and nonliving things.	Water is all around us.	Water has properties that we can observe. Water is a liquid. Some objects float in water. Other objects sink in water.	Observe characteristics of objects. Compare the similarities and differences of objects. Communicate observations with others.
Exploring Plants	**Exploration:** All things in the physical world are made up of smaller parts. We can explore these parts using tools.	Plants are made up of parts, including roots, stems, and leaves.	Plants grow in the soil.	Plant parts have different properties that we can describe.	Observe changes over time. Compare and sort by similarities and differences. Describe changes over time.
Exploring Garden Animals	**Exploration:** There are many different kinds of animals. We can use our senses to explore how they look and what they do.	Animals have specific structures, behaviors, and survival needs. Many animals depend on plants for food and shelter.	Soil and rocks provide shelter for some animals.	We can identify animals by their unique physical properties. Animals move in different ways.	Observe characteristics of living things. Compare observations of different living things. Record information in books and graphs.
Garden Celebration	**Exploration:** We use our senses and a variety of tools to explore and learn about the world.	Plants and animals have specific growth and habitat requirements.	Soil is composed of many different things. Soil provides shelter for some animals.	Living and nonliving things have physical properties that we can observe and describe.	Demonstrate skills in observing, using senses, comparing similarities and differences, and communicating observations to others.



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