



3. SOIL IS HOME TOO!

This Lesson's Goals

- » *To notice the abundance of life on Earth, especially in unlikely places*
- » *To show the wonders of the soil*
- » *To introduce the concept that the amount of life in a place can be increased, decreased, or can even be destroyed*
- » *To experience that dirt is not "unclean" or "ungodly"*

Opening [15-20 min.]

Use your familiar opening pattern to begin your class, including time for silent worship.

Songs

Teach a new song during this lesson with a familiar tune. The words reflect the musings of a Quaker, Francis Hole, who studied soils and rocks.

Darkle Darkle Little Grain
Words by Francis Hole,
Tune: Twinkle Twinkle Little Star

Darkle darkle little grain!
I wonder how you entertain
A thousand creatures microscopic.
Grains like you from pole to tropic
Support land life upon this planet!
I marvel at you, crumb of granite!

Sample Agenda

- 1. Opening:** Silent Worship, Song, Scripture, Sharing
- 2. Soil Is Also Home, Soil Illustration**
- 3. Small Group Activities:** If your total program time is less than one hour, you may want to focus on two to four activities from those listed below, allowing for the age and size of your group, season and weather, and space and materials needed.
- 4. Closing**
- 5. Sharing of Take-Home Materials**

If you can do the planting activities, try to divide this chapter into two or more related lessons a week apart, if possible.

The first week, the opening is a little longer than usual because of the planting. The second week, spend a short time comparing growth and then do modeling clay and gardening.





Scripture

Psalms 65: 9-13

Thou dost visit the earth and give it abundance,
as often as thou dost enrich it with the waters of heaven,
brimming in their channels, providing rain for men.
For this is thy provision for it,
watering its furrows, leveling its ridges,
softening it with showers
and blessing its growth.
Thou dost crown the year with thy good gifts
and the palm-trees drip with sweet juice;
the pastures in the wild are rich with blessing
and the hills wreathed in happiness,
the meadows are clothed with sheep
and the valleys mantled in corn, so that they shout,
they break into song.

Soil is also home! But for whom? [5-10]

Materials: A tray, gardening soil, magnifying glass

On a tray, make a pile of one pound of good garden soil. Ask what it is made of. (It has rocks and minerals in the form of clay, silt and sand along with decomposed plant matter). Does anyone live here? (Tiny microbes work hard to process the dead plant and animal material in our soil. Some of these keep us healthy and happy). Half of our pound is made of this organic matter (the microbes and the decomposing plant matter). Anyone want to guess how many microbes live in this pound of soil? We would need a good microscope to see any of the more than 500,000,000,000 microbes in just this pound. But not all the living things in soil are invisible to our eyes. What else might we find? (Worms, spiders, centipedes, beetles, ants, etc.). Use magnifying glasses to invite children to observe what is in the soil.

Organic Material: approx. 50% (microbes and decaying plant matter)

Water: approx. 40%

Dry Matter: approx. 10% (Contains the sand and minerals that are in the soil.)

Soil Illustration [15] [a multi-week activity]

Materials: Various planting materials (such as organic garden soil, aged manure, compost, forest floor humus, playground dirt, highway shoulder, lake or pond mud, and sand), four pots, healthy plants (pansies, strawberries, or other favorites), gloves, tape and markers

Identify each soil and talk about the balance necessary for healthy plant growth.



Then, with the help of several children, wearing exam or food-handling gloves, fill four or more pots, numbering and labeling each. The list below is a sample. Use what you have readily available.

Transplant the plants that are as similar as possible, one into each pot. Keep a list of which pots have which soil combination. The plants will be observed weekly to see how they have fared. Ask the children which pots they think will do the best or worst and why. Keep notes of their predictions.

A teacher takes the pots home and carefully gives each plant the same amount of water and sunlight. When the plants are brought back, have the children help identify and record changes in them. Compare these changes with their earlier predictions. Usually the combinations of soil and compost or manure show the greatest growth.

Small Group Activities

Select three or four activities from those listed, giving consideration to the age and size of your group, season and weather, and space and materials needed. Some of these activities are best done out of doors to minimize clean up.

1. Soil type and plant discussion [5-10]

Why might it be important for just one person to take the plants home and care for them during the week?

Subsequent week[s] discussion:

- » Which plants grew best?
- » Why?
- » What kind of soil seems to be best for these plants?
- » Do you know of places where plants do not grow?
- » Is it because of climate or soil or other conditions?
- » Based on our experiment, what will increase the ability of the soil to support growing plants?
- » What happens to plants when soil is damaged or destroyed?

2. Trembling Earth [5-10]

Materials: Good soil, worms

Take the pound of good soil in a box or tray and ask the children what would make that soil move. Put a live worm in your soil. Does it move? How much would the soil move for the following things?

Earthquakes or trucks driving past, elephants or cats walking, wind blowing through trees and gently lifting the roots, not-so-gentle winds, plants growing, burrowing



animals, the tidal pull of the sun and moon

What happens when soil is exposed and it rains? Share about the importance of protecting soil from erosion from wind and rain. Suggest the importance of using mulch and cover crops to protect soil from being lost.

3. Clay in our soil [10-15]

Materials: Clay Soil and/or terra-cotta ceramic clay. There are self-hardening clays that are available online or at the local art/school supply stores.

Ask children to test soil to determine how much clay is present. Collect a handful of soil and add enough water to make a ball. If you can make a ball, try to roll the ball into a snake shape. If you can, you'll know your soil contains clay because fine clay particles adhere when they are moistened.

Clay is earth in a very real sense. Playing with this could be a whole class time. Find some clay soil and perhaps mix it with some terra-cotta ceramic clay and spend time making animals and people. Set figures aside for a Sculpture Show closing.

Discussion: The Bible tells how God made us and all creatures from the dust of the Earth. In a way we really are made of dirt, because soil is what plants grow in, and we have to eat plants (or eat plant eaters) to survive. How does life depend on the soil?

Snack Ideas

Choose things that grow under the ground: carrots, potatoes, radishes, or peanuts. [Only if no one is allergic to peanuts.] If you can eat snack outside, consider with the children, the difference between daily use of an area and occasional use. What will best protect soil?

For related activities, learn more about vermiculture at <working-worms.com> And consult *Manure, Meadows, and Milkshakes* and the Hidden Villa web-site at <www.hiddenvilla.org/OnlineCurric>

4. Spin the Globe [5-10]

Materials: 12"-18" globe

Spin the globe. Ask a child to stop the globe with one finger. Talk about the place where that finger lands.

What is the soil like there? How might we guess? [climate, elevation, rainfall, etc.] What lives there? [plants and animals] Repeat so each child gets a turn and you have made the point that there is life everywhere and that lives and grows in any given place is affected by soil conditions.



5. Special Plot [5-10]

Return to your square of land. Bring a trowel, or an old serving spoon you can dig with. First, discuss what the children think might happen if they dug up that plot and planted vegetables there.

- » Would that increase or reduce the total life in the area?
- » Would it enrich the soil?
- » Would the new growth help or harm things already living there?

Then dig up a small sample of soil.

- » How can you tell if that soil is rich? Is it easy or difficult to dig?
- » Are there worms and insects in the dirt?
- » What might we add to our soil if we wanted it to be healthier and able to grow food for us?

Having natural history reference books may be helpful, but you can probably think of animals and plants for most parts of the world.

Closing [5-10]

Worms

Do not skip this activity! It has been popular and memorable. In colder weather, plan for indoor worm farming or add the worms to compost piles that can keep them warm.

Materials: Soil, small plastic jars or sealable bags, earthworms. You can get worms in bait shops and garden shops, Worms take-home page (Page 6)

Form a circle. Tell the children you are giving them some of the number-one most important living things in the history of the Earth [as ranked by Christopher Lloyd in *What on Earth Evolved*] to take home to enrich the soil. Pass small plastic jars or sealable sandwich bags around to each child. Have each child half-fill his/her jar or baggie with some of the soil you have been studying. Give each an earthworm or two.

Ask each child to tell when and where the worms will be released and how they will help the soil there.

Remind everyone to wash hands after digging in the dirt, before eating. Not all the microbes in the soil are friendly to stomachs.

Share the take-home pages. Ask each child to finish the sentence "Today I learned..."

Close with silent worship.

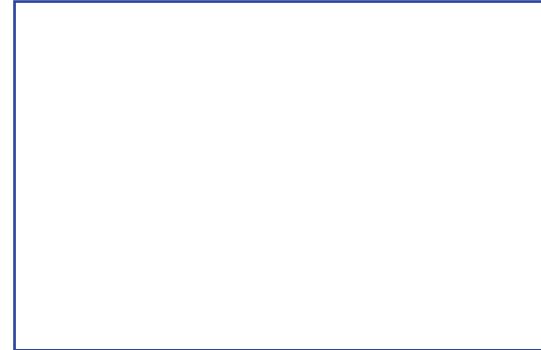
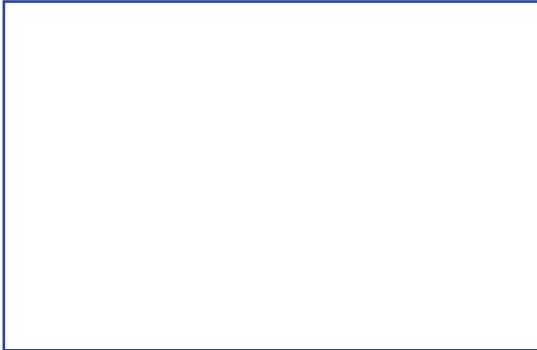


WORMS

Watch your worms and draw six pictures:

1. What do worms eat?

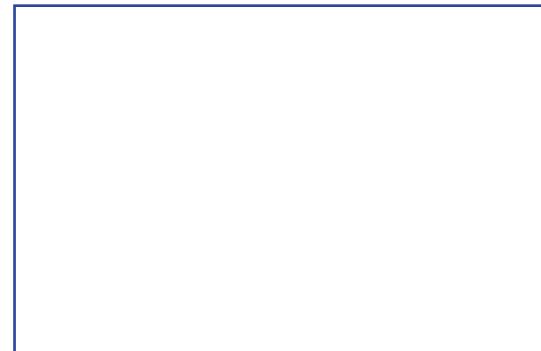
[rotting leaves, dead vegetable matter] 2. Worms also eat dead animals.
Worms also like water.



3. Well-fed worms make more worms



4. The worm defecates [poops]



5. Worm poop is fine grained, nitrogen rich soil. It is full of microbes and it helps plants grow.



6. What plants might grow in that rich soil?





In the Dirt

Circle items that:

1. Live in the dirt [have under-ground homes]
2. Grow in the dirt [have roots in the ground]

carrots	moles	kelp	robins
tornado	mistletoe		radishes
worms	books	beets	snails
seeds	hippopotamus	a	spring
stars	ants	roof	whales
potatoes	bicycles		ladybugs
foxes	wells	apples	songs
eagles	clouds	ground	squirrels
cellar	friends	subway	ducks
octopus	earthquakes		onions
sharks	bats	cats	yams
peanuts	butterflies		volcanoes

Answer Key: circled items – carrots, moles, radishes, worms, beets, snails, seeds, a spring, ants, foxes, potatoes, wells, ground squirrels, cellar, subway, earthquakes, onions, bats, yams, peanuts, volcanoes.