South Dakota State University Extension

Level: 1st-3rd Grades

GROW GETTERS

STUPENDOUS SOILS

Overview: In this lesson, youth will answer the questions: “What are characteristics of different soil types?” “and “How can you make compost?”

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The Grow Getters Program originated as a Master Gardener project in 2020 and is now a multi-departmental effort among SDSU Extension staff and volunteers.

This material was funded by USDA’s Supplemental Nutrition Assistance Program - SNAP.

S-0022-05-02

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Activities in this Lesson:

- **Science Activity:** Water Wanderers
- **Nutrition Activity:** Nature's Energy Source
- **Physical Activity:** Earthworm Expedition

South Dakota Educational Standards:

- **Science:**
  - **2-LS4-1:** Make observations of plants and animals to compare the diversity of life in different habitats.
- **Health:**
  - **Standard 5:** Students will demonstrate the ability to use decision-making skills to enhance health
- **Physical Education:**
  - **Goal HPD-5:** S1.E2 Locomotor Runs with a mature pattern.

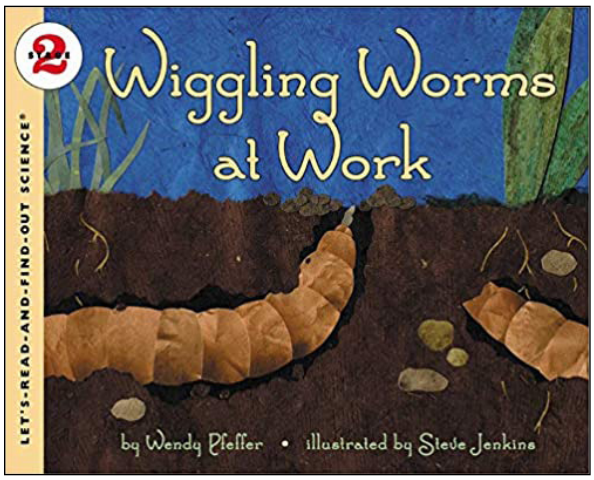
Book:

Books may be available at school or community libraries.

Wiggling Worms at Work by Wendy Pfeffer

Under the ground earthworms are on the move, Pfeffer explains how earthworms eat, move and reproduce and how they help plants to grow.

- Purchase the book: Wiggling Worms at Work by Wendy Pfeffer
- Watch: "Wiggling Worms at Work" read aloud link by STEMHAX
- Consider these follow-up questions:
  - Worms twist and turn to create tunnels what flows through those tunnels and how does that help the plant?
    - » Water and air flow down the tunnels to the root of the plant to allow the plant to grow, sometimes seeds fall in and begin to grow in the moist soil
  - What do worms help grow?
    - » Vegetables, flowers, shrubs, trees, grass



Vocabulary:

- **Soil:** Loose upper layer of the Earth's surface
- **Compost:** Plant material (leaves, stems, roots, flowers, and/or fruit) that are decayed (broken down) into a rich brown material. This material can supply lots of nutrients to growing plants.
- **Nutrients:** Substances needed for healthy growth, development, and functioning
- **Ecosystem:** A biological community of interacting organisms and their physical environment
- **Organic Matter:** Material in the soil from living or once living things

WATER WANDERERS

Science Activity
1st-3rd Grade

In this activity, students will discover how water travels through different soil textures.

Time: 30-40 minutes
Prep: 10-15 minutes

Materials

- Funnels
- Coffee filters
- Clear plastic cups
- Different soil types
  - Loam
    - » Example: Potting soil
  - Sand
    - » Example: Playground sandbox
  - Clay
    - » Example: Crayola Air-Dry Clay
- Water
- Measuring cup
- Stopwatch or clock
- Pencil
- Water Movement Experiment Worksheet

Notes:

- Clay:
  - Brown in color; has very fine particles which stick together
- Loam:
  - Mixture of sand and clay; it contains large amounts of decaying plants and animals and has a fine texture. It retains some water and lets the extra water pass through completely
- Sand:
  - Greyish brown in color, has large particles which allow air and water to pass through it

Ahead of time:

- To set up, each group will need 3 funnels, plastic cups, and coffee filters. Line the funnel with a coffee filter and place funnel in plastic cup (will need to do this for each soil type).

Instructions:

1. Divide the class into groups. Have students go through each soil feeling the texture between their fingers and observing the different colors of the soil, then writing down their findings on the activity sheet.
2. Next have the students measure out 1 cup of potting soil, 1 cup of sand, and 1 cup of clay and place in designated filters.
3. One person in each group needs to be designated as the timekeeper, another as the water pourer. Have the water pourer measure 1 cup of water (or less, depending on the size of the

funnel system). Explain to the students that when the timekeeper says go, the water pourer should carefully pour the water into the funnel. Tell the timekeeper they will keep time until it looks like all the water has gone through the soil sample and into the clear plastic cup. Repeat for all soil types.

4. Once all the water is gone through all the soils, carefully remove the funnel and dirt, measure the amount of water in each plastic cup by pouring it into a measuring cup, and record the amount of water onto the activity sheet.

Guiding Questions:

Before experiment:

- Ask: What is the difference between the particle sizes for each soil texture?
  - Answer: Sand – large particles; clay – fine particles; loam – medium particles
- Ask: Where are different locations that we could find these different soil types?
  - Answer: Sand – beaches and riverbanks; clay – near the river mouths; loam – gardens

After the experiment:

- Ask: If you were going to go plant a garden what type of soil would you use? Why?
  - Answer: Loam; Allows for moisture to be held for the roots but also proper drainage, retains nutrients, allows oxygen to flow through
- Ask: Why is it important for us to take care of the soil?
  - Answer: To provide nutrients for the plants to grow and produce food for us

Modification notes:

- **Modification:** Instead of having each group doing all three soil types, it can be split up that each group only does one soil type and then go around the room to observe the other group's soil for the activity sheet. Or do it together as one larger group.
- **Advanced:** Have students go outside and find the three different soil types to use for the experiment.

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WATER MOVEMENT EXPERIMENT

Name(s): _____ Date: _____

Clay	Loam	Sand
Size of particles	Size of particles	Size of particles

Hypothesis: I think the _____ will retain the most water.

Soil Sample	Amount of water added	Amount of water collected
Clay		
Loam		
Sand		

Conclusions:

My hypothesis was correct / incorrect

The soil that retained the most water was _____

The soil that retained the least amount of water was _____

_____

This material was funded by USDA's Supplemental Nutrition Assistance Program - SNAP.

S-0022-05-02

NATURE'S ENERGY SOURCE

Nutrition Activity
PreK-3rd Grades

In this activity, students will make a trail mix with food items representing what could be included in compost.

Time:

Prep: 10-20 minutes – including shopping
Activity: 10-15 minutes

Materials

- Plastic cup (one per student)
- Pumpkin seeds
- Chex cereal (or similar)
- Pretzel sticks
- Dried fruit (such as apples, banana chips, cranberries)
- Raisins
- Gummy worms

Steps:

Combine trail mix items in a large bowl. Once mixed together divide into individual cups.

Notes:

Food item representing compost	Compost item
Pumpkin seeds	Dried leaves
Whole wheat Chex cereal	Cardboard box
Pretzel sticks	Tree branches
Dried fruit	Fruit scraps
Raisins	Critters
Gummy worms	Worms

Instructions:

1. Hand out a cup to each student and tell them to imagine that the food items are items that can be composted.
2. Have students pull out the first food item starting with the pumpkin seeds and follow the guiding questions.
3. After each food item ask the students to raise their hands if that would be an item they would include in their own compost at home. Repeat with each food item.

Guiding Questions:

During the experiment:

- Ask: Can you think of what the pumpkin seed represents that would go in compost?
  - Answer: Dried leaves

- Ask: Can you think of what the Chex cereal represents that would go in compost?
  - Answer: Cardboard box
  - After answer, prompt with: “cardboard boxes can be added to a compost, but they need to be shredded or broken down, when you put the cereal in your mouth think of crushing or breaking down the cardboard to be utilized in the compost.”

- Ask: Can you think of what the pretzel sticks represents that would go in compost?
  - Answer: Tree branches, twigs

- Ask: Can you think of what the dried fruit represents that would go in compost?
  - Answer: Fruit scraps
  - Question to follow: Are fruit the only food item that can be added to the compost?
    - » Answer: No, vegetable scraps can also be added

- Ask: Can you think of what the raisins represent that would go in compost?
  - Answer: Critters

- Ask: What does the gummy worms represent?
  - Answer: Worms

After the experiment:

- Ask: What are the food items providing for our bodies, and how does that relate to what composting does for the soil?
  - Answer: Provide energy, fuel and nutrients just like giving nutrients to the soil so that the plants have energy to grow

- Ask: Once your composting is all done, what do you do with your compost?
  - Answer: Take it to your garden and plant some flowers or produce

Modification Notes

- **Simplification:** Brainstorm with the students different food items that could be used in the trail mix to replicate composting.

EARTHWORM EXPEDITION

Physical Activity
1st-3rd Grade

In this activity, students will attempt to find the lost earthworm and take it on an expedition back to the soil (a version of the popular game capture the flag).

Time: 15 – 30 minutes
Prep: 5-10 minutes

Photo credit: Lydia Liu, CC 2.0

Materials

- 2 – buckets (optionally filled with soil)
- 2 – brightly colored "earthworms" (this could be a paper cut out of a worm (~12" in length) or a pool noodle cut into smaller length (~12" in length)
- Rope to divide the playing filed
- Hulu-Hoop, cones, rope, or some other markers for "jail" areas
- Jerseys or stickers to identify two teams

Steps:

Ahead of time:

- Prepare the playing area that has obstacles (trees, rocks, bushes) where the earthworms can be hidden. Divide the playing area into two end-zones, separating the sides with a center line. Each side will need to have a "jail" for players who are tagged (Hulu-Hoop, cones or rope)

Instructions:

1. Ask the kids to imagine that there was a big rainstorm that came through and washed away two earthworms from the soil, the earthworms cannot survive sitting in the sun any longer and need to be put back in the soil fast.
2. Split the students into two teams. The team's will then hide their opposing team's earthworm on their side of the playing area.
3. The goal is for the students to go across the playing area to find their earthworm without getting tagged by a "crow". Some students position on the team should be defense (aka crows) to not allow the other team to find their earthworm by tagging whoever comes across the line. Some students' positions should be offense (aka a runner). They try to find their earthworm on the opponent's side. Runners can only be tagged when they are on the opponent's side. If tagged the student has to go to jail until one of their teammates comes across to release them by tagging them.
4. A team wins by capturing their earthworm and putting it in their soil bucket first.

Rules:

- The earthworm must be carried by a player and not thrown over the line.
- If a runner gets tagged while carrying the earthworm, the earthworm gets dropped when the runner was tagged and the runner goes to "jail".
- Each team gets to decide who are the runners and who are the crows. They can have 1 minute to create a strategy for the start of the game. Once the game has started, they may decide to switch roles at any time.

Guiding Questions:

Before the game:

- Ask: How do worms move through the soil?
  - Answer: Using circular and longitudinal muscles
- Ask: Can worms survive sitting in the sun?
  - Answer: No, the sun will dry up their skin and not they will not be able to breathe

After the experiment:

- Ask: What are the benefits of having so many worms underground?
  - Answer: improve nutrient availability, allow water to drain, improve soil structure

Additional Resources

If you liked this lesson, you may also like these other educational materials from SDSU Extension.

Nutrition and Physical Activity

- Pick it! Try it! Like it! Preserve it! materials are filled with tips for selecting, preparing, and preserving a wide variety of fruits and vegetables. Colorful fact sheets, recipe cards, and educational videos provide educators and families with fun, engaging tools to enhance any dietary curriculum!
- Growing Active Readers is a series of book-based lessons to help young children understand the benefits of making healthy decisions involving nutrition and physical activity.
- South Dakota Farm to School Resource Guide walks through the basics of starting farm to school programs in South Dakota, including local food selling/purchasing, school gardens, and in-class education.
- Preservation this page provides a suite of educational materials and programs offered by SDSU Extension related to food preservation.
- Physical Activity View all SDSU Extension physical activity content.

Horticulture

- Garden and Yard this page provides easy access to all the educational materials and programs related to garden and yard by SDSU Extension. This frequently updated landing page includes sections for fruits, vegetables, problems and solutions, master gardener volunteer program, garden hour, and more.
- Vegetable Gardening in South Dakota this booklet will help you with basic vegetable gardening information and tips to get started.
- Fertilizing Gardens in South Dakota this booklet by SDSU Extension provides information on soil testing, types of fertilizers, and methods of application.
- An Identification Guide to Native Pollinator Plants of South Dakota for Managed Landscapes In this guide, learn about the perennial plants native to South Dakota that attract pollinators and can be incorporated in to gardens.
- Tree Pest Alert stay updated and informed with this weekly resource for selecting, planting, and caring for trees and shrubs all year round.