Lessons in a Backpack

United Nations Educational, Scientific and Cultural Organization

LONG POINT BIOSPHERE REGION

Healthy Soil = Healthy Plants

Description of Lesson

This lesson plan will introduce students to the idea of plant basic needs. Students will then explore soil and learn about how it is a resource that plants, animals and humans depend on. Students will also discuss how soil can be impacted by human activities and how we can protect it.

Connect with the Long Point Biosphere

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LONG POINT BIOSPHERE REGION

At a Glance

Grade Level: 3

Learning Environment:
Indoor Classroom and the Schoolyard or a garden.

Prep Time: 15 minutes

Length of Lesson: 1.5 hours

Key Vocabulary: Soil, Water, Sunlight, Seedlings

Staffing: 1 educator

Materials:
3 opaque containers
Soil
Water
Apple
Sharp knife
Trowels/spades/spoon (1 for each group or student)
Small containers for soil (1 for each group)
Potting mix or seed starter mix
Bean seeds (1 for each student)
4 inch pots (1 for each student)
Labels and pens (1 for each student)
Trowel or spoons
Water

Groupings: Whole class, and Small groups

Teaching/Learning Strategies:
Hands-on

Lesson Outline

TIME	ACTIVITY	LOCATION	MATERIALS
15 minutes	A Plant's Basic Needs	Classroom/ school yard	3 opaque containers Soil Water
20 minutes	If the Earth was an Apple…	Classroom/ school yard	Apple Sharp knife
20 minutes	Soil Samples	School yard/area with accessible soil	Trowels/spades/spoon (1 for each group or student) Small containers for soil (1 for each group)
20-30 minutes	Planting Seedlings	School yard/ Classroom	Potting mix or seed starter mix Bean seeds (1 for each student) 4 inch pots (1 for each student) Labels and pens (1 for each student) Trowel or spoons Water

Curriculum Expectations Grade 3 Science and Technology

Understanding Life Systems: Growth and Changes in Plants

Overall:
3. Demonstrate an Understanding that plants grow and change and have distinct characteristics.

Specific:
2.3 Germinate seeds and record similarities and differences as seeds develop.
3.1 Describe that basic needs of plants, including air, water, light, warmth and space.

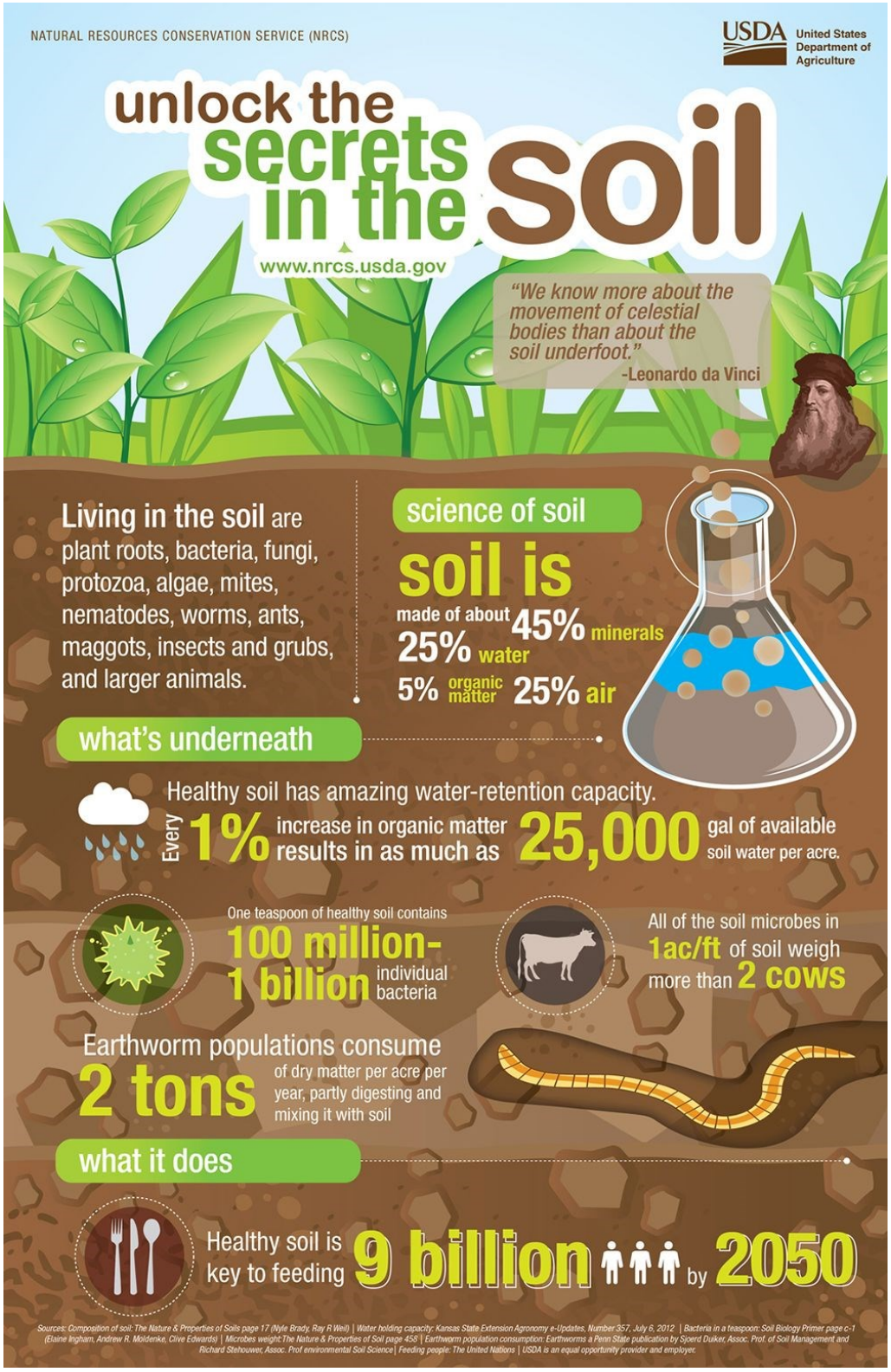
Understanding Earth and Space Systems: Soil in the Environment

Overall
1. Assess the impact of soils on society and the environment, and of society and the environment on soils
2. Investigate the composition and characteristics of different soils

Specific
1.2 Assess the impact of human action on soils, and suggest ways in which humans can affect soils positively and/or lessen or prevent harmful effects on soils

Background

Soil is a key element that plants, animals and humans depend on. Unfortunately, there are many environmental challenges associated with soil including erosion and desertification. Industrial farming, over -use of soil, deforestation, and conversion of natural areas into urban areas all contribute to loss of soil fertility. If present trends continue, 65% of rain-fed croplands in the developing world will be lost to erosion by the year 2100. These issues are also of concern in Ontario and solutions are critical. It is important that everyone be aware of the challenges



Teaching and Learning

Part A: A Plant's Basic Needs

This activity is an introduction to the things that plants need to survive and also to our reliance on plants for food.

Materials:

- 3 opaque containers
- Soil
- Water

Procedure:

Prepare your three containers before the lesson – put a small amount of water in one container, soil in the second and leave the third empty.

Arrange the students around you in a circle. Tell the students that today they will be learning about the mysteries of life. Tell them that there are four things that make life possible. Show the students the containers and tell them that the mysteries are inside the containers.

Make sure the lids are on properly and pass the containers around the circle one at a time. Have students shake the container, listen to the container, feel how heavy it is and encourage them to think about what might be inside. Ask that they keep their ideas to themselves and not say their guess out loud.

After all three containers have been passed around ask if someone would like to guess what was in the first container. You could shake the container so that some water comes out.

Have another student guess what is in container two. Then pour the soil into their hand and ask them to show it to the class.

Tell the class the third container has two things in it. Does anyone have any guesses? Pass the container to one child to open. There is nothing inside! Tell everyone to take a deep breath. Plants breathe too! Explain to the students that when we take the lid off the container, the last mystery rushes in – it is sunlight!

Re-cap with the students the four things that are needed for plants to grow – Water, Soil, Air and Light! Remind students that plants also need warmth (which they get from the sun) and space – they can't grow if they're too close together.

Encourage the students to come up with a few examples of things that we use/eat daily that need air, water, sun and soil to grow. For example, the cotton in your shirt was grown in soil and needed sun, air and water to live! Or, apples grow in orchards. Apple trees need soil, air, water and light to grow!

Part B: If the Earth was an Apple

Materials:

- Apple
- Sharp knife

Procedure:

Ask the students what they know about soil. What is it? Why do you think plants need it? How does it help humans?

Now you will be demonstrating the need for soil stewardship with an apple. Let's pretend this apple is the Earth.

Cut the apple into quarters and set three of the quarters aside.

Three quarters of this apple represent all the oceans. The remaining quarter is the land.

Cut the remaining quarter in half and set one piece aside.

One half of the land cannot be used by humans; it is either too hot, like a desert, or too cold, like the north and south poles.

Cut the remaining piece into quarters and set three of them aside.

Of the land that humans can live on, only this small piece is land that we can grow food on. The rest is too rocky, or there isn't enough sun for plants to grow.

Peel the remaining piece.

This thin peel represents the thickness of the soil in which we grow our food. It is only about one metre deep. This tiny piece of the apple is the only area in the whole earth where all the conditions are right for us to be able to grow food. We have to grow enough food on this small area to feed all of the people on earth.

With so little soil in the world, what do you think we should be doing to protect or care for it?

Brainstorm ideas to protect soil & activities that have a negative impact on soil.

Examples: Compost at home, avoid cutting down trees, give soil a break, bring zero waste lunches.

Part C: Soil Samples

With this activity you can decide how much supervision the students need and whether you'd like them to work in small groups or partners

Materials:

- Small spades/trowels or spoons
- Something to hold soil (little bag, cup, bowl)

Procedure:

Take students outside and encourage them to find a patch of soil and to use their senses to explore it. Encourage them to investigate the soil.

Provide students with little spades/trowels or spoons and something to hold the soil (a little bag, cup, bowl, etc.). Ask them to collect a small amount of soil.

Then bring the students back into one big group and ask them what they found. Ask: what is in soil? Is it just dirt or are there other things? (leaves, grass, rocks, bugs, worms) What colour is the soil? Why do you think soil has different colours?

Encourage students to compare the different containers of soil.

Finish this exercise by summarizing the discussion about soil and sharing that soil has lots of different minerals in it that the plants need to grow.

Part D: Planting Seedlings

It would be useful for this activity to have volunteers to help. Or have small groups planting seeds while the rest of the class works on something else. Spinach boxes are great mini greenhouses to start seeds in. Also a great way to help monarch butterflies would be using milk weed seeds. Then later planting them around the school Link to free seeds https://monarchwatch.org

Materials:

- Potting mix or seed starter mix
- Bean seeds (1 for each student)
- 4-inch pots (1 for each student)
- Labels and pens (1 for each student)
- Trowels or spoons
- Water
- Used salad/lettuce container

Procedure:

Begin with an introduction to the whole class. We are going to be using what we've learned about plants and soil and we are going to be planting our own seeds!

Review the basic needs of plants; what will your seedling need to grow?

Students will get a pot and a label. Ensure they label their pot with their name.

Next ask students to fill their pot ¾ full with soil.

Students will then get one bean seed which they will put into the pot and cover with soil up to the top of the pot (soil depth on top of the seed should be 2x the seed's thickness)

Add a little bit of water and place the pot somewhere safe and in the sun.

Once everyone has planted their seed bring students back together again. Remind students that they will need to look after their plants. Note: You may want to structure the watering of the plants, for example; take some time in the morning to send groups of students to water them, or have time after recess for watering.

Over the next few days and weeks, encourage students to check on their plants and monitor their growth. At appropriate times bring the class together and chat about how the plants have grown and changed.

To really emphasize the importance of healthy soils for plants, try planting some seedlings in poorer soils such as sand or playground soil. Document as a class or in small groups how they do compared to seedlings started in potting soil. Transplant the seedlings after 2-3 weeks to richer soils, and see if they improve.

Extension Ideas

The seed planting activity can also be incorporated into a math lesson. Have students measure the growth of their plants at regular intervals and chart the results.

Another alternative is to make a photo journal of the plants' growth by taking pictures of the seedlings at regular stages. These pictures could even be used to make short videos. Be sure to take note of which plants are further from the sun light. Point out the ones that are further need to spend more energy to grow toward the light and that is why they likely will be the taller ones.

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MNIDOO GAMII
Spirit of the Water