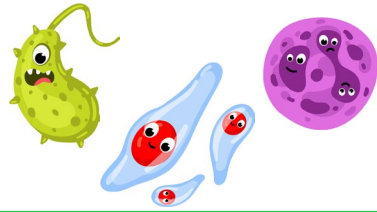


New Earth Classroom



ACTIVITY 2 LIVING SOIL



LEARNING OBJECTIVES

1. Students will watch a video called "Soil is Alive," then recall and review the information they learned.
2. Students will assess the components of soil and discuss how these components support the soil food web, which in turn feeds plants.
3. Students will cite the types of living organisms in the soil (FBI: Fungi, Bacteria, Insects)
4. Students will define microorganisms as living things that can be seen only with a microscope.
5. Students will study a visual diagram depicting the interaction between a photosynthesizing plant and microorganisms in the soil and review the symbiotic relationship between them.
6. Students will analyze methods of caring for soil to keep the soil food web alive.

KEY WORDS

soil, organic matter, biodiversity, microorganisms, bacteria, fungi, decomposers, soil food web

EQUIPMENT

- *Nutrient-rich soil (1 cup)*
- *Teaspoon*
- *8x10 sheets paper (1 sheet per 3 students)*
- *Photos of Fungi, Bacteria & Insects*
- *Visual diagram of how plants and microbes interact in soil*

SOIL IS ALIVE! 20-25 minutes

I. SOIL IS ALIVE! (20-25 mins)

A. Watch video: "Soil is Alive" (7 mins) <https://youtube/Q-J2FErZHuA>

Ask questions about some key points in the video:

- What is **soil** made of? (minerals, organic matter)
- What are some names of very small critters that live in soil? (**bacteria, tardigrades**)
- What are some examples of **organic matter**? (dead plant material, fallen leaves)
- What word describes a wide variety of living things? (**biodiversity**)
- What do plants release into the soil? (**sugars**)
How does this help the microorganisms in the soil? (the sugars **feed the microorganisms**)
- What do we call the group of living things that includes mushrooms, yeasts & molds? (**fungi**)

WATCH VIDEO "Soil Is Alive"

- How do **fungi** in the soil help plants grow?
 - They can act like extra roots that help the plants pull water and nutrients from the soil.
 - Fungi also break down organic matter and help make nutrients available to plants.
- What do we call living things in the soil that break down organic matter? (**decomposers**)
- What other interesting facts did you learn from this video?

**REVIEW &
DEEPEEN OUR
INVESTIGATION**

II. **REVIEW & DEEPEEN OUR INVESTIGATION**

A. What is **soil**?

1. Soil is a mixture of **minerals** (bits of rock created by **erosion**), water, air, **organic matter** (decaying remains of plants & animals) & billions of microorganisms.
2. The non-living components of soil (sand, silt, clay) hold nutrients and make up soil structure.
3. Soil is like the skin of the earth and supports all life on this planet.

B. How do plants depend on soil & critters that live in the soil?

1. Soil holds plants' **roots**.
2. Soil provides plants with **water**.
3. Soil contains billions of organisms: **FBI!**
 - Define **microorganisms**: very small living things that can only be seen with a **microscope**
 - Microorganisms in soil include most **bacteria**, some **fungi** & algae, protozoa, nematodes
 - Write "FBI" on the board
 - FBI stands for **Fungi, Bacteria, Insects** (write "Fungi, Bacteria & Insects" on the board)
 - These organisms **decompose** organic matter & **release nutrients** into the soil for plants.
 - **Predatory microorganisms** (like tardigrades) consume fungi and bacteria in soil, and their waste feeds plants.
 - Define **soil food web**: a complex community of living things in the soil, some of which depend on each other as food sources.
 - Living organisms in the soil are VITAL to plant health

C. How does life in the soil depend on plants?

1. Decaying **organic matter** is food for microorganisms.
2. During photosynthesis, **plants release sugars** into the soil to feed microorganisms.
3. Plants **shade** the soil, keeping it cool and moist for the critters that live in it.
4. Plants' roots break up and **aerate** the soil, providing oxygen for microorganisms, fungi and insects that live in the soil.

FBI
Fungi, Bacteria,
Insects

**ILLUSTRATE
ABUNDANCE
OF MICRO-
ORGANISMS**

- D. Illustrate the abundance of microorganisms in healthy soil:
1. Divide the class into clusters of three students per group. Pass out a piece of paper to each group.
 2. Put **2 tsp** of soil on each paper.
Explain that each group is getting 2 tsp soil as you do this.
 3. Write on the board: **8,000,000,000**
 4. Ask “what number is this?”
Answer: **8 billion**
That is how many people live on the Earth.
That is also how many living things there are in the 2 tsp of soil on your desk.
 5. What lives in the soil?
Answer: **FBI!!**
 6. Show pictures of Fungi, Bacteria & Insects
 7. Show a visual diagram of how plants and microorganisms interact in soil.
- E. How do we keep the organisms in soil alive?
1. Cover with **mulch** to keep the soil moist.
 2. **Do not** till or disturb the soil.
 3. Do not use **herbicides, pesticides or fungicides**.
 4. Do not use chemical fertilizers that can upset the **soil food web balance** and damage the microorganisms.
 5. **Grow plants!** Even “weeds” can be beneficial in shading and aerating the soil as well as feeding the microorganisms.

PLEASE NOTE: This activity works well in combination with
Activity 3: The Decomposer Game.