

MINISTRY OF EDUCATION
SECONDARY ENGAGEMENT PROGRAMME
INTEGRATED SCIENCE
GRADE 9

WEEK 11

LESSON 1

Topic: Terrestrial Environment

Sub-topic Soil Organisms

Objectives: After readings and observing pictures students will accurately:

- Define soil organisms in at least one sentence.
- List at least five soil organisms in point form.
- Describe at least two advantages and two disadvantages of soil organisms in at least one paragraph.

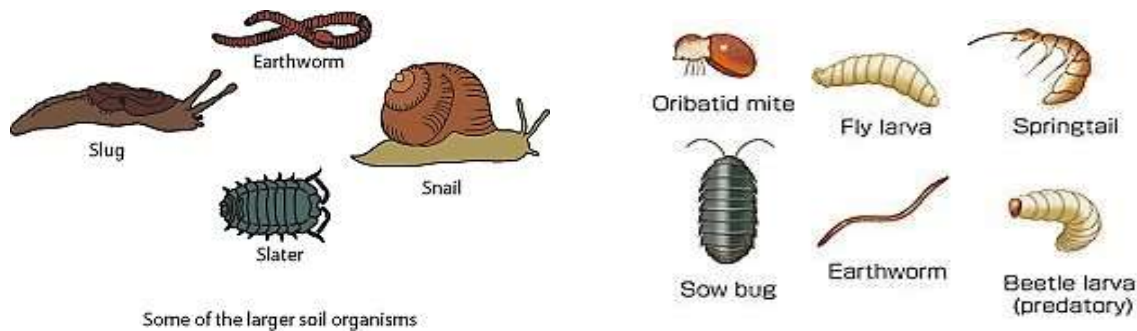
Content:

Definition

Soil contains many living organisms. Soil organisms- are those organisms that live in the soil. These are of two types:- very tiny organisms called microorganisms and larger ones called macro-organisms. Soil micro-organisms include fungi and soil bacteria. Fungi and bacteria cause the decomposition of plant and animal remains in the topsoil. Their bodies provide a source of nitrogen. After death, certain parts of their bodies decompose to form nitrates.

Macro-organisms found in the soil include underground parts of plants such as roots, rhizomes, corms, and tubers as well as earthworms and other forms of small animals such as centipedes, spiders, and nematodes.

Examples of Soil Organism



Advantages of Soil Organism

Benefits of soil organisms...

- Organic material decomposition.
- Breakdown of toxic compounds
- Inorganic transformations
- Nitrogen fixation
- Plant protection



1. Decomposition of organic matter: Most bacteria feed by breaking down organic matter. This process helps plants to obtain nutrients.
2. Inorganic Transformations/Mineralization: This is the release of mineral nutrients into the soil by micro-organisms as their digestive juices act on the organic matter and rock particles.
3. Plant Protection: Materials such as bacterial gum, fungal hyphae (threads) and termite saliva all help to fix soil particles together to make good soil structure. Actinomycetes and some other species of bacteria that produce substances that are harmful to other organisms are small do. These substances help to check the growth of pathogens in the soil.

4. Nitrogen Fixation:

(a) The blue-green algae, the photosynthetic bacteria of the genus **Azobacter**, a few soil fungi and other microbes have been associated with improved plant growth by fixing atmospheric nitrogen in the soil.

(b) The **Rhizobium** species of bacteria inhabit the root nodules of legumes and fix nitrogen in them. The nitrate produced is used by the plants and released into the soil when the plants die.

5. Breakdown of Toxic compounds: the residual effects of poisonous agrochemicals such as pesticides, fungicides, and herbicides that would have accumulated in the soils, are gradually broken down rendered harmless by soil microorganisms.

Functions of Soil Micro organisms

S.no	Function	Microorganism Involved
1	Maintenance of soil structure	Bioturbating invertebrates and plant roots, mycorrhizae and some other micro-organisms
2	Regulation of soil hydrological processes	Most bioturbating invertebrates and plant roots
3	Gas exchange and carbon sequestration (accumulation in soil)	Mostly micro-organisms and plant roots, some C protected in large compact biogenic invertebrate aggregates

Disadvantages of soil organisms

□ **Disadvantages**

1. Destroys the soil cover and its structure
2. Enhances soil erosion
3. High moisture loss
4. Disrupts the lifecycle of beneficial soil organisms
5. Needs more labor cost for the soil preparation

Homework

List three other soil organisms and their location.

Outline the functions of various soil organisms.

References

- Bernard, Myrna et.al (2003) Science in Daily Life Book 3 (Unit 5) Ministry of Education
- <https://www.soils4teachers.org/biology-life-soil#:~:text=Living%20organisms%20present%20in%20soil,organisms%20such%20as%20burrowing%20rodents.>