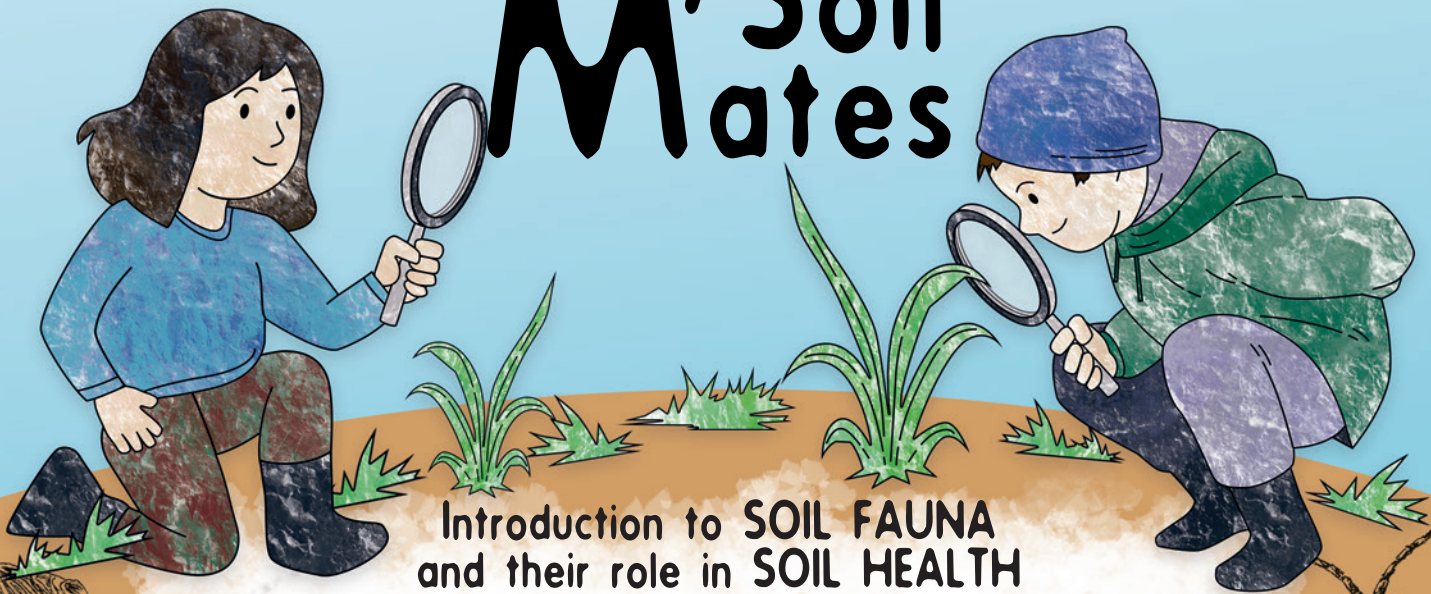


My Soil Mates



Introduction to SOIL FAUNA and their role in SOIL HEALTH

Have you ever wondered what happens to fallen leaves, dead plants, and other natural debris that ends up on the ground? Why doesn't our earth get piled up with layers and layers of this stuff? The answer lies beneath our feet — in the **soil**!

What's happening under our feet?

Beneath the ground we walk on, there's a bustling world of tiny creatures known as **soil fauna**. These include numerous invertebrates such as springtails, mites, chilopods and many microscopic buddies. They might be tiny, but they have a super important job: breaking down dead plants and other organic materials. This process is called **decomposition**. But that's not all! Did you know that the soil is home to about 60% of all species on Earth? That's right! It's a massive hub of diversity with countless organisms, most of which we can't even see.

Why is decomposition important?

Imagine you have a recyclable bottle. Instead of throwing it away, you put it in a recycling bin, and later, it is turned into something new and useful. Similarly, soil fauna help **recycle** dead organic materials. The bigger soil animals, like earthworms and isopodes, chew on dead materials, breaking them into smaller bits that are further eaten by even tinier animals. They eat them up, and as they digest, they transform these materials into simpler substances. The soil decomposition process is essential as it releases nutrients that plants use to grow. Think of it as nature's way of recycling!

This whole process of decomposition by soil fauna is a vital part of what we call **ecosystem process**. Different parts of nature work together to keep our environment balanced and healthy. Soil fauna and decomposition play a central role in this by ensuring the soil remains fertile and plants get the nutrients they need.

Don't forget!

Next time you're out in a park, a forest, a garden, etc., remember that beneath you, there's a world of tiny creatures working day and night. They're nature's recyclers, ensuring that the Earth remains a thriving and balanced home for all of living beings. And remember, the soil isn't just dirt — it's a living, breathing world filled with more diversity than we can imagine!

Decomposers
Predators

* Furca: appendix that comes out of the abdomen that is used to jump

SOIL FAUNA

Mesofauna



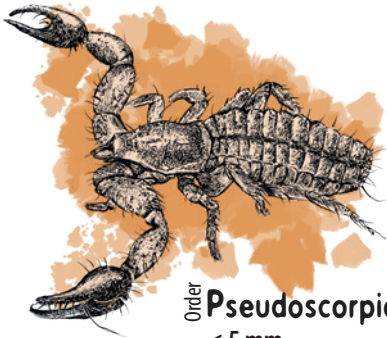
Order **Oribatid mites**
60 μ m – 5 mm
Dark, marked anal area



Suborder **Prostigmatid mites**
0.1 – 2 mm
Beaked head



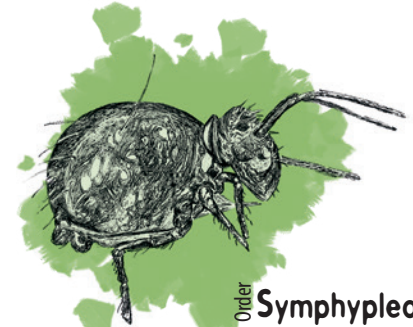
Order **Mesostigmatid mites**
0.2 – 5 mm
Strongly marked insertion of the legs (coxae)



Order **Pseudoscorpions**
< 5 mm
Scorpion shape without tail



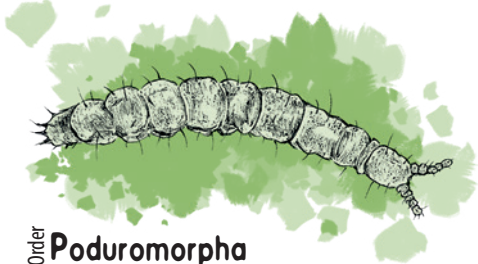
Order **Isopoda**
5 – 15 mm
Mealybugs



Order **Symphyleona**
0.12 – 4 mm
* Globular shape, bunny shaped



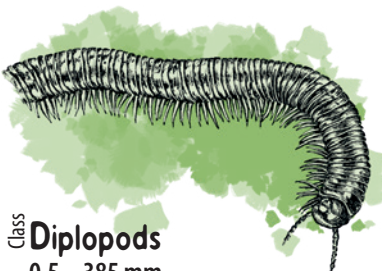
Order **Neelipleona**
< 0.5 mm
* No antennae, no colour



Order **Poduomorpha**
0.5 – 2 mm
* Highly marked segments, Michelin dummy shaped



Order **Entomobryomorpha**
1 – 3 mm
* Elongate shape, long antennae, furca clearly visible



Class **Diplopods**
0.5 – 385 mm
Millipede, 2 pairs of legs per segment



Class **Chilopods**
0.5 – 385 mm
Centipede, 1 pair of legs per segment



Order **Thysanoptera**
1 – 3 mm
Marked eyes, small head, usually winged



Order **Psocoptera**
0.5 – 385 mm
Rounded or convex body and head, usually winged



Order **Protura**
0.5 – 2.5 mm
Transparent body, no antennae, 2 first legs forward



Order **Diplura**
0.3 – 1 cm
Very long antennae and double tail

Macrofauna



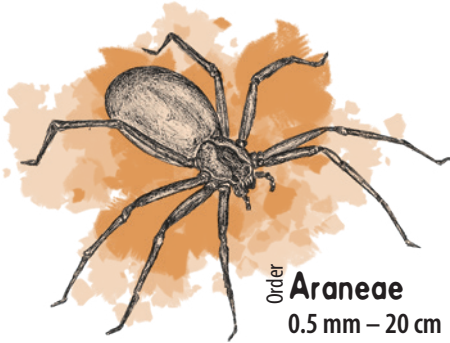
Class Gastropoda
5 mm – 30 cm
Snails



Infraorder Isoptera
4 – 11 mm
Termites, pale body, *ant shaped*



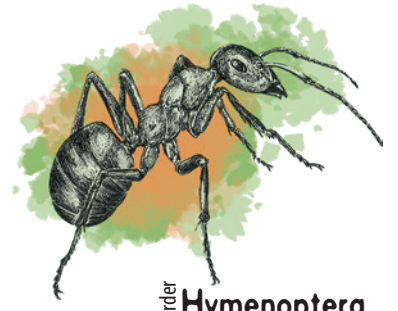
Order Coleoptera
0.3 – 20 cm
Beetles



Order Araneae
0.5 mm – 20 cm
Spiders

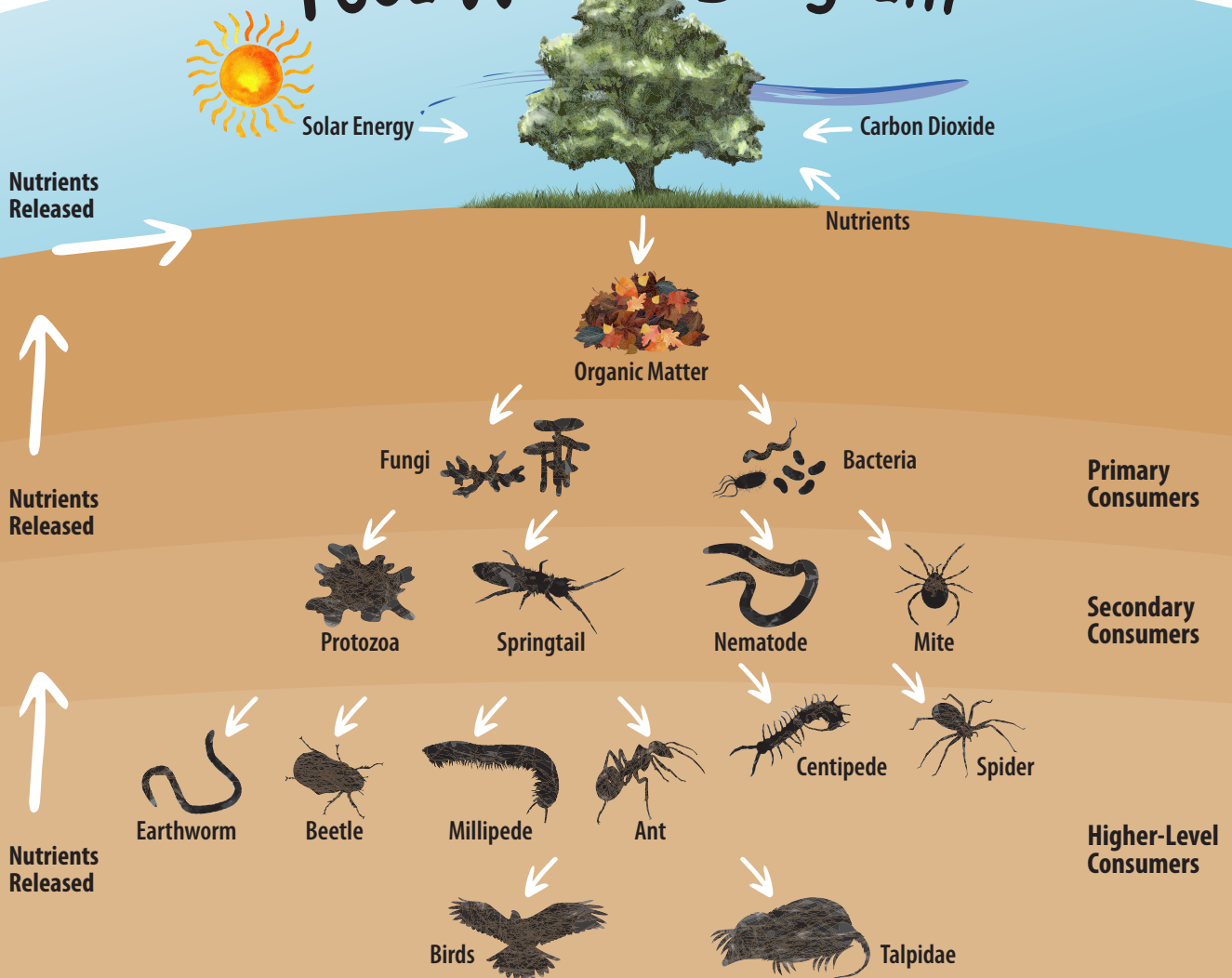


Suborder Lumbricina
3 cm – 1 m
Earthworms



Order Hymenoptera
3 cm – 5 cm
Ants, bees and wasps

Food Web Diagram

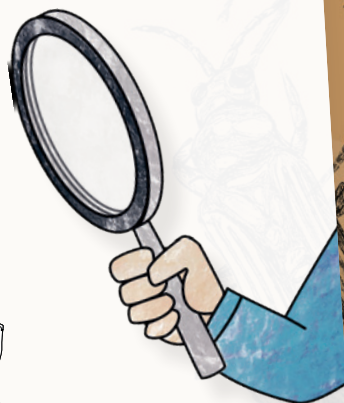


Experiment 1

MATERIALS DECOMPOSITION

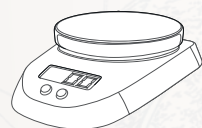
Materials you will need:

- Underwear 100% cotton
- Banana peel
- Tea bags with nylon mesh bags
- Shovel or garden trowel
- Scale
- Labels and markers



Procedure:

- 1 Select a suitable location:**
Find a small area in your school/house/public garden for your experiment. Make sure it is easily accessible for you to check periodically, but away from perturbations.
- 2 Weigh and prepare your organic materials:**
Weigh your underwear, banana peel, and tea bag and record this data as accurately as possible in your scale (0.01 grams). These are all made of organic materials that can decompose.
- 3 Bury the items:**
Dig three small holes in your chosen area using a shovel or garden trowel. Place one item in each hole and bury them at 10 cm depth.
- 4 Label your experiment:**
Place a label next to each buried item indicating what it is (e.g., "Underwear", "Banana Peel", "Tea Bag"). This will help you remember where each item is.
- 5 Cover and start the timer:**
Carefully cover each item with soil, making sure they are completely buried. This will mimic how things decompose underground in nature. Note the date you started the experiment on a calendar or timer. You will leave the items buried for at least 3 months.
- 6 Unbury, weigh and record:**
After 3 months, carefully dig up each item. Remove the excess soil around them. Leave the underwear and tea bag in a dry place and let it dry for few days. Weigh the banana peel just after unburying it. Weigh the underwear and tea bag a few days. Record this data as accurately as possible with your scale (0.01 grams).
- 7 Observations and conclusion:**
Based on your observations, discuss your findings. Which item decomposed the most, and which one the least? What might have caused these differences?
Think about the biodiversity of soil fauna in your area and how it may have influenced the decomposition process.
- 8 Reflect and share:**
Share your experiment and findings with your classmates. Discuss what you have learned about decomposition and its connection to soil life.

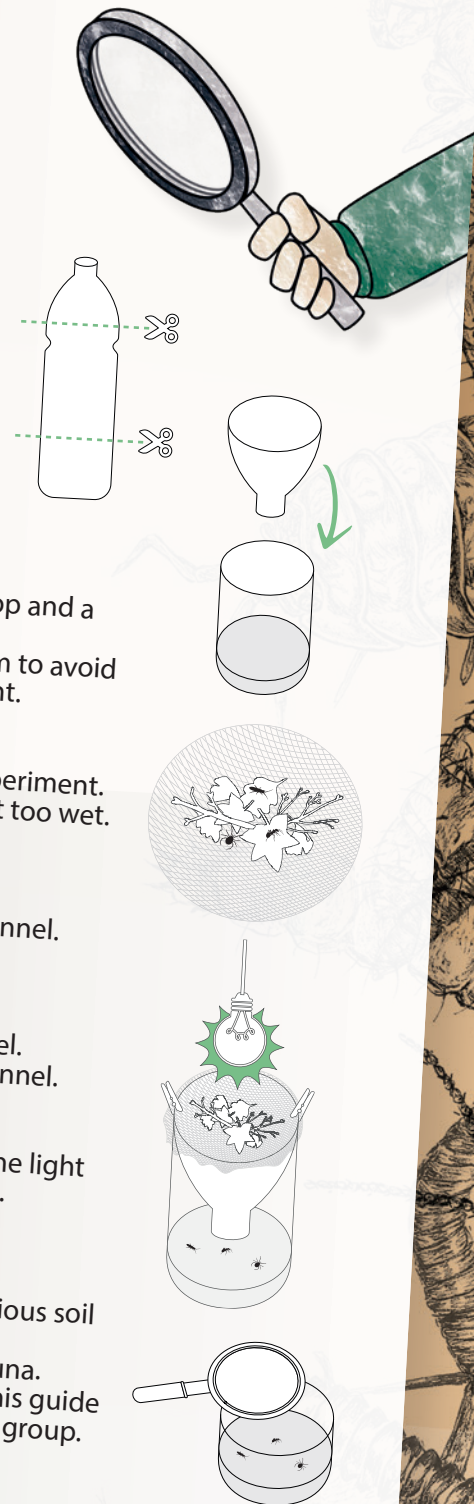


Experiment 2

IDENTIFY EDAPHIC FAUNA IN SOIL SAMPLE

Materials you will need:

- Berlese funnel (reusing a 2 litre plastic bottle)
- Soil sample from the garden
- A piece of fine mesh or cloth (approx. 3 mm)
- Clothespins, rubber bands or tape
- A lamp or light bulb
- A tray or shallow dish
- A magnifying glass



Procedure:

1 Prepare the Berlese funnel:
Cut the 2 litre plastic bottle leaving the wide opening at the top and a narrow tube at the bottom.
Set up your Berlese funnel by adding alcohol 70° at the bottom to avoid fauna decomposing when falling, as they try to escape the light.

2 Prepare the soil sample:
Select an area in your school/house/public garden for your experiment.
Take a small sample of soil (5 grams). It should be moist but not too wet.
Place it in the centre of the fine mesh.

3 Place soil sample:
Put the net with the soil into the wide opening of the Berlese funnel.
Use clothespins, rubber bands or tape to secure it tightly.

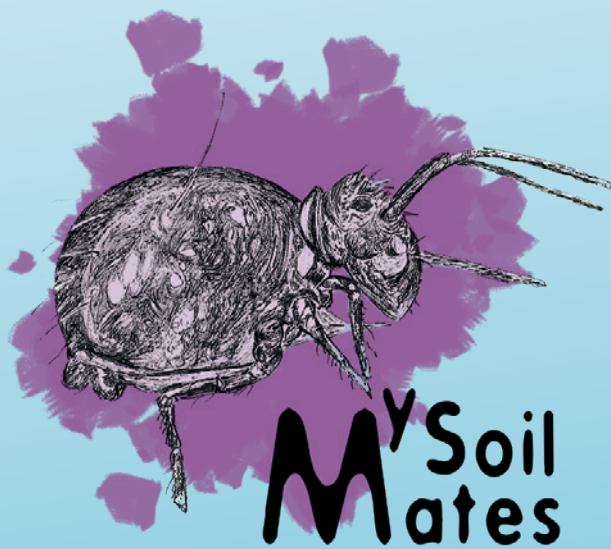
4 Attach the light source:
Secure a lamp or light bulb above the wide opening of the funnel.
Make sure it's positioned in a way that light can shine into the funnel.

5 Apply heat and wait patiently:
Turn on the lamp or light bulb above the funnel. The heat from the light will encourage the soil fauna to move away from the light source.
Leave your Berlese funnel set up for 3 days.

6 Collect and identify the soil fauna:
Collect soil fauna at the bottom of the funnel. You should find various soil fauna creatures inside. Move them to a tray or shallow dish.
Use a magnifying glass to get a closer look at the collected soil fauna.
Try to identify different taxonomic groups of soil fauna by using this guide and note their sizes and colours, as well as the abundance of each group.

7 Clean up:
Turn off the lamp and carefully remove the soil sample from the funnel.

8 Share your findings:
If you have made interesting discoveries, share them with your classmates.
Discuss the importance of soil fauna in the ecosystem.



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