



NEIGHBORHOOD DISCOVERY: **Decomposers and Composting**

To help prepare for this investigation, watch the video [Composting](#).

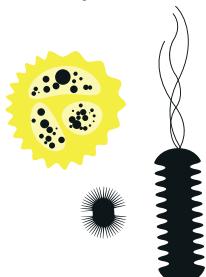
<https://www.cbf.org/news-media/multimedia/video/cbf-education-videos/composting.html>

Introduction

Have you ever wondered what happens to the leaves, grass, and twigs that fall on the ground in your backyard? Or what happens to your food scraps when you throw them out?

Decomposition

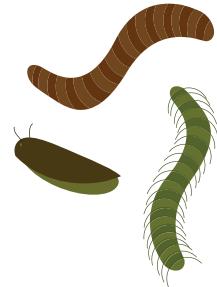
Decomposition is the natural breakdown of organic materials. People have been able to harness this natural process of decomposition for their own benefits, for centuries, and this practice has been known as composting. Composting is practiced by individuals, schools, communities, and counties—do you know anyone that composts?



Composting can't happen without decomposers! **Decomposers** are organisms that break down dead organic matter. These organisms are commonly known as the "FBIs:" Fungi, Bacteria, Insects. Insects that you'll find in your backyard investigation are also known as terrestrial macroinvertebrates.

Macroinvertebrates

Macroinvertebrates are small organisms that we can see with our "naked" eye and that do not have a backbone, unlike vertebrates, which do. Examples of terrestrial macroinvertebrates that you might find include snails, worms, ants, and spiders.



These organisms play a very important role in ecosystems: they break down organic material that then provide nutrients for the entire food web. A **food web** is a complex interaction of food chains in a biological community. A food chain is the sequence, or order, in which energy as food is transferred from one group of organisms to another.

1. Can you think of any decomposers off the top of your head? List them here.

2. Now, can you think of what role they might have in the food web? What other organisms or organic material (plant, animal, living/nonliving) do you think they eat?

Many decomposers have special features or adaptations that help them carry out their specific role, or niche, in an ecosystem. In this box draw the mouth of two different decomposers, one that breaks down woody organic material, such as a fallen tree, and one that eats leaves. Label the differences between their two mouths and why they do not look the same.

Backyard Investigation Questions

What decomposers can I find in my backyard?

What specific roles do the decomposers I find have in the food web?

Directions

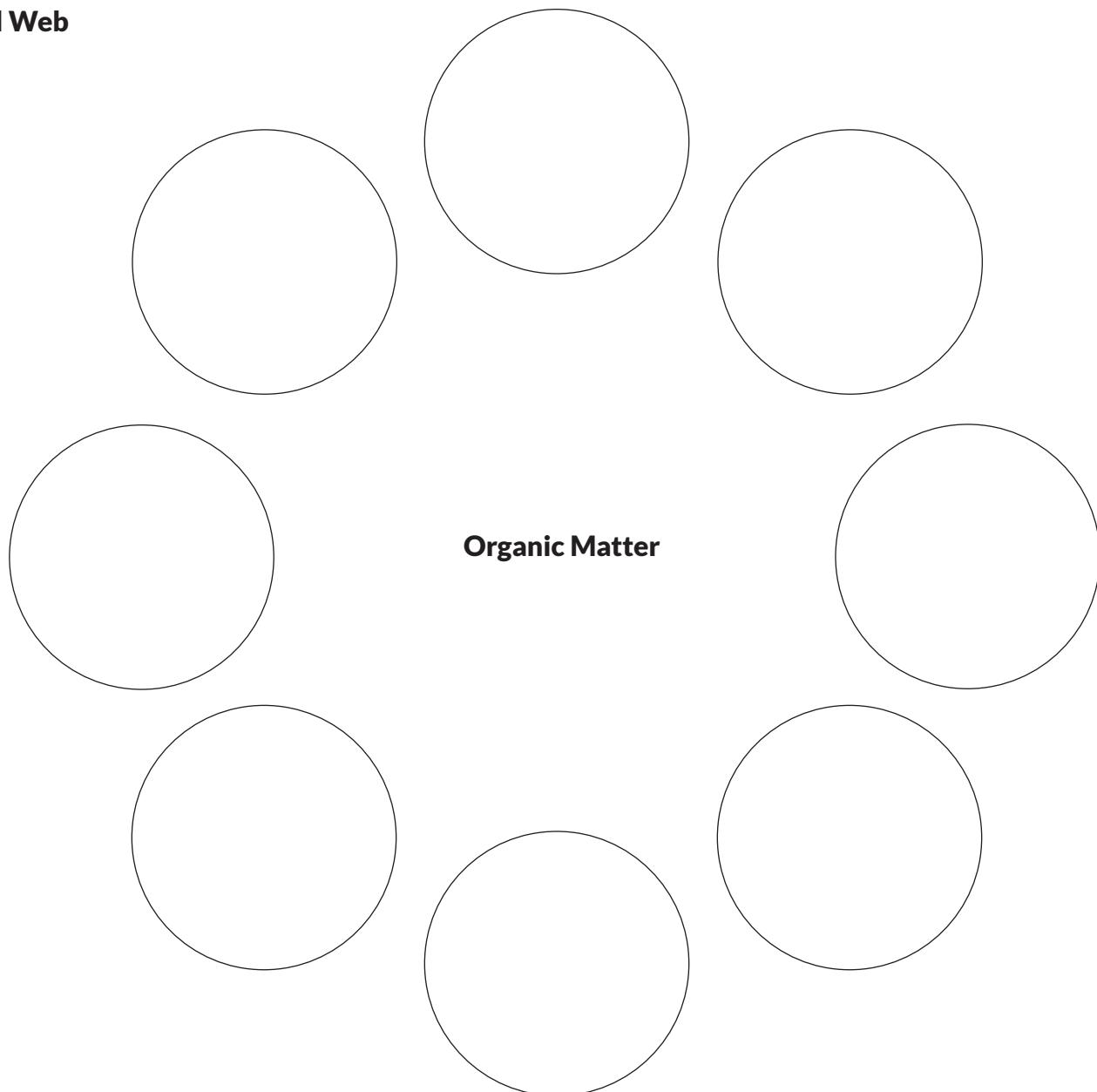
- ❑ Begin your investigation by exploring areas that have decomposing materials, such as leaf litter or leaf piles, compost piles, grassy areas, garden soil, or flower beds.
 - ❑ Use a small garden shovel to dig around. Wear gloves so you don't get your hands dirty!
 - ❑ Also try taking a peek under flowerpots, bricks, steppingstones, or patio pavers.
 - ❑ Wherever you investigate, make sure to put everything back the way you found it to avoid disturbing habitat. Insects, spiders, even amphibians such as salamanders, do not survive outside of their chosen habitat.
 - ❑ Fill out the data collection sheet below—make sure to take detailed notes when possible and use the guide to help you identify different decomposers.

Wrap Up

Using the list of decomposers that you found, create a food web below.

- In each circle write the name of one decomposer.
- Once you have a decomposer in each circle, connect circles that you think contain decomposers that might eat, or consume, the other, as well as organic material.
- Continue to build the food web as it looks in your backyard, starting with decomposers.
- Be sure to include birds, mammals, amphibians, etc.

Food Web



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INVESTIGATION

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DECOMPOSER IDENTIFICATION GUIDE

Common Name (*Scientific Name*)

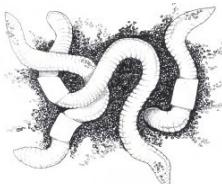
Snails (*Gastropoda*)



Description

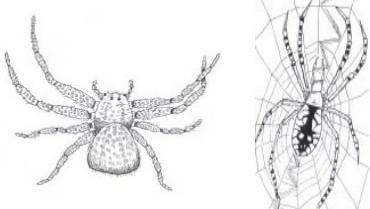
have a spiral shell (except for slugs) and a soft body without segments or exoskeleton; may have tooth-like projections over the mouth of the shell to keep out predators; a millimeter long or as long as your finger

Earthworms (*Oligochaeta*)



have no legs and lack an obvious head and tail, but note the wide fleshy band called the clitellum located near the front of the animal; obvious segments (bands); most earthworms are not native to North America

Spiders (*Araneae*)



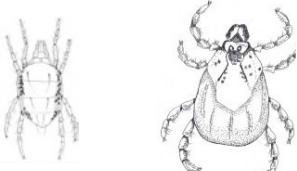
have eight legs and two body segments joined at a thin waist; abdomen does not have segments; most have eight eyes; most use silk to catch food, for shelter, or to protect their eggs; only two are dangerously venomous

Daddy-long-legs (*Opiliones*)



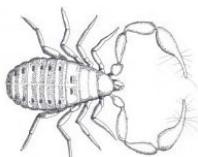
most have eight long, jointed legs and appear to have a single round or oval body part; they are NOT venomous; they do not spin webs and are not found in webs; most are found on trees, walls, the ground, or in leaf litter

Mites/Ticks (*Acarai*)



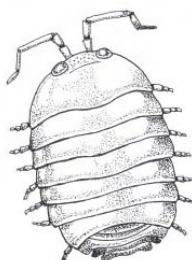
have eight rather short legs (some parasitic forms have lost some or all of their legs); heads are small but sucking mouthparts can be obvious; small to microscopic; they may be parasites or free-living; some are orange or red

Pseudoscorpions (*Pseudoscorpiones*)



look like scorpions without the stinger; 8 walking legs and large, claw-like pedipalps; small, living in the leaf litter or rotting trees; with spiders and centipedes they are the top predators in leaf litter; over-winter in silk cocoons

Pillbugs (*Isopoda*)



look like short, oblong millipedes, but only seven pairs of legs; have antennae; may have feelers at the end of the abdomen; some can roll into a ball, some cannot; live in moist places in the leaf litter or under objects

Common Name (*Scientific Name*)

Millipedes (*Diplopoda*)



Description

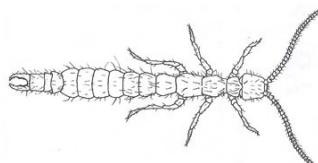
are long, worm-like animals with 15 or more body segments and two pairs of legs on most segments; none have as many as a thousand legs; the body is either flattened or sausage-shaped; most feed on dead matter

Centipedes (*Chilopoda*)



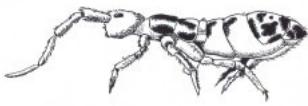
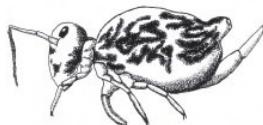
are long, worm-like animals with 15 or more body segments and only one pair of legs on each segment; usually have long antennae and venomous jaws; harmless in the US; they are major predators

Japygid (*Diplura*)



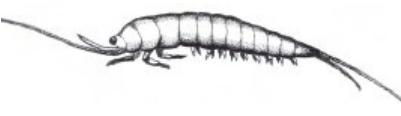
blind and colourless, subdivided into a head, a thorax with three pairs of walking legs and a long segmented body. The ten-segmented abdomen ends with pincher-like cerci to capture prey.

Springtails (*Collembola*)



are tiny, jumping creatures that live in soil, decaying logs, and leaf mold (they jump by releasing a forked structure on their abdomen); color varies from white to red to mottled; hard to see because of small size

Bristletails/Silverfish (*Thysanura*)



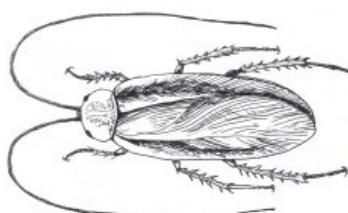
are small, but not tiny, wingless insects that live in people's homes, soil, under rocks, and in leaf mold; a few can jump and all can move quickly; they have long thin antennae and two to three thin thread-like "tails"

Grasshoppers/Crickets/Mantids (*Orthoptera*)



front wing is thin and narrow; broad hind wings fold fan-like under front wings (young have only wing buds); color varies; chewing mouthparts; large hind legs for jumping; front legs of mantids modified to grab and hold

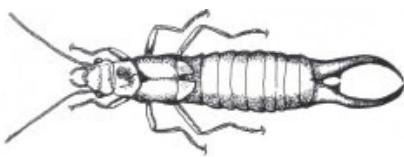
Cockroaches (*Blattodea*)



have an oval, flattened body and long, hair-like antennae; have slender front and hind legs and are often fast runners; some have wings, but others are wingless; in some species the hind wings fold under leathery front wings

Common Name (*Scientific Name*)

Earwigs (*Dermoptera*)



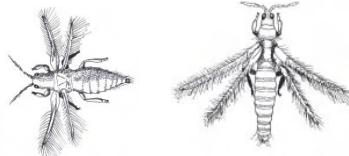
Description

have long, slender bodies with a pincer-like structure, called cerci, on their abdomen; adults usually have four wings; when at rest, the membranous hind wings fold under the short and leathery front wings

Booklice/Barklice (*Psocoptera*)



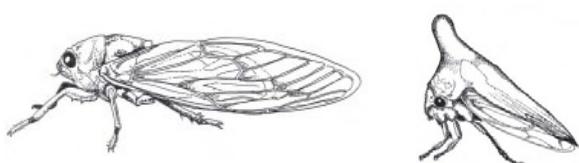
Thrips (*Thysanoptera*)



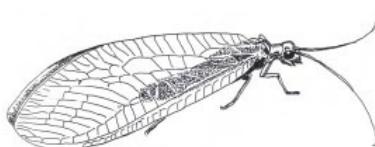
Stink/Assassin/Ambush Bugs (*Hemiptera*)



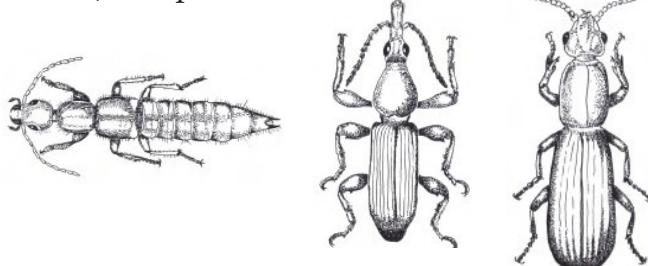
Leafhoppers/Cicadas/Aphids (*Homoptera*)



Lacewings (*Neuroptera*)



Beetles (*Coleoptera*)



body is broad or long and narrow; front wings are half leathery and half membranous and expose a triangle of back where they fold across the abdomen, forming a V, Y, or X on the back; have piercing-sucking mouthparts

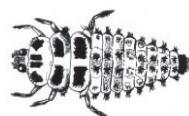
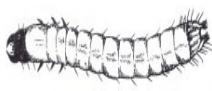
are closely related to the Hemiptera; have either four wings, or like some aphids, have no wings; at rest wings are held roof-like over body; antennae are often short and bristle-like; mouth begins at bottom of head, between legs

are soft-bodies insects with four membranous wings that have many veins; wings are held roof-like over the body when at rest; antennae are usually long and have many segments; adults are usually weak fliers

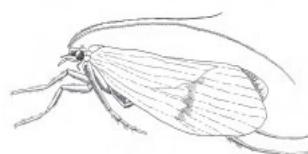
membranous hind wings fold beneath hardened front wings; front wings form the letter T on their backs when folded; have chewing mouthparts; antennae come in a variety of shapes, often like "stacked balls" or with fringe

Common Name (*Scientific Name*)

Beetle Larvae/Grubs (*Coleoptera Larvae*)



Caddisflies (*Trichoptera*)



Moths/Butterflies (*Lepidoptera*)



Caterpillars (*Lepidoptera Larvae*)



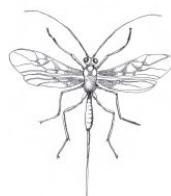
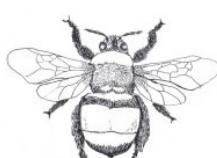
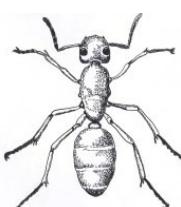
Flies/Mosquitoes/Gnats (*Diptera*)



Fly Larvae/Maggots (*Diptera Larvae*)



Ants/Bees/Wasps (*Hymenoptera*)



Description

generally have a visible and obvious head and three pair of obvious legs; some actively crawl about, others are fairly still, found under bark, in the soil, or in plant tissue.

are usually small, dull-colored, moth-like insects with four wings that are held roof-like over their backs; wings are covered with scales; antennae are very long; young live in water where many build little cases to live in

have four wings, covered with scales that form often colorful patterns and come off like dust when handled; mouthparts form a coiled tube; butterflies have club-tipped antennae; moths may have feathery antennae

usually have an obvious head and three pairs of true legs; also have up to five pairs of prolegs in the middle and/or at the end; prolegs "look like hairy suction cups"; if more than 5 pairs of prolegs, it's a sawfly, a type of wasp larvae

are usually small and soft-bodied; have two clear front wings; hind wings reduced to two tiny knobbed structures called halteres that help flies keep their balance while flying; most have very large eyes, taking up most of the head

usually have no obvious head and it may be hard to tell the front end from the back end; usually have no obvious legs, though may have small hooks; usually whitish

have four clear wings with few veins; most ants have no wings; abdomen usually is narrowly attached to thorax by a thin "waist"; often have a stinger (or egg laying tube) at the tip of the abdomen; have chewing mouthparts