



*Forest Floor Terrarium  
Background Information*



## *The Forest Floor*

The forest floor at first glance may seem like a calm and quiet environment, but take a few minutes to peer beneath the surface and you will observe some of the hundreds of energy and matter interactions occurring in this active habitat. Decomposers such as bacteria and fungi are busily working to break down fallen leaves and other dead plant matter. Worms, mites, pillbugs, slugs and other small consumers in turn feed on the bacteria, fungi, and partially decayed plant matter. Still larger consumers such as centipedes and beetles feed upon these smaller consumers. Over time, plant matter is cycled to the soil, air, and/or water in basic elements such as phosphorus, nitrogen, or other nutrients. These nutrients are then taken in by plants which use them as building blocks through the process of photosynthesis. In time, plants lose their leaves or die and the process begins again. So the next time you're walking through a forest, think about the world at work beneath your feet.



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# *Decomposition*

## *What is it?*

Decomposition is the process by which matter is broken down into nitrogen and other basic elements by bacteria, fungi, and other consumers.

## *How does it relate to this activity?*

The forest floor, with its layer of leaf litter, is the perfect environment for holding in moisture. This moisture, along with air and the energy of the plant matter, provides an excellent place for the growth of bacteria and fungi. The bacteria and fungi soften plant matter and eventually use the energy stored inside. Over time, bacteria, fungi, and other small consumers will convert the forest's plant matter into nitrogen and other matter produced through their waste products.

## *Did you know?*

All organic matter (plants, animals, plant and animal products, etc.) will eventually decompose. As a result, nitrogen, water, and other matter will be cycled back to the Earth.



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# *The Water Cycle*

## *What is it?*

*Water cycle* is a phrase that describes the flow of water on the Earth, which is driven by heat energy.

Usually we think of this as water *evaporating* into the air via the energy of the sun, *condensing* into clouds, *precipitating* downward, and *collecting* on the Earth--and then the process starts all over again. While this is true, there are many more aspects of the water cycle to consider. The human role in the water cycle, *percolation* of water in the soil, and *transpiration* of water through plants are some of the other ways water cycles on the Earth.

## *How does it relate to this activity?*

The forest floor *collects* moisture beneath the leaf litter and in rotting logs. Heat, generated during decomposition, causes moisture to *evaporate* into the air and *condense* onto the sides and top of the terrarium. In addition, plants also *transpire* moisture into the air through their leaves. Over time, more moisture *condenses* and moisture on the top and sides begins to *precipitate* back to the soil where it *collects*, *percolates*, and begins the cycle again.



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# *Needs of Living Things*

Living things need the following to grow and reproduce:

**space**  
**water**  
**energy**  
**air**

Combine these four with **time** and you have a great acronym--SWEAT.

## *How does it relate to this activity?*

The moist forest floor provides an environment that allows living things to grow and reproduce. The *energy* and *water* stored in decaying matter combined with the *air* and *space* in the terrarium allow for the growth of fungi, bacteria, and small consumers over *time*.

## *Did you know?*

Air satisfies different needs for different living things. While animals use oxygen from the air, plants use carbon dioxide from the air. Some bacteria even use nitrogen from the air!



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# *Bacteria*

## *What is it?*

Bacteria is a common name which represents a group of one-celled microscopic organisms.

These organisms are neither plants nor animals, but are classified as monerans. There are literally thousands of different types of bacteria.

## *How does it relate to this activity?*

The forest floor provides the right conditions for bacteria to grow. These bacteria help to decompose decaying matter, such as logs and leaves, by feeding on their stored energy.

## *Did you know?*

People cannot live without bacteria. Bacteria help to decompose plant and animal matter back to nutrients that sustain ecosystems. Bacteria present in your stomach aid in digestion. Bacteria are used by people to make foods such as yogurt and cheese. There are bacteria that can harm humans, such as the bacteria in untreated water that can spread cholera or the bacteria in meat that can cause botulism (food poisoning), but these bacteria are far outnumbered by bacteria that are beneficial to us.



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# *Fungi*

### *What is it?*

Fungi are organisms that are neither plants nor animals. They usually feed on dead and decaying matter to get their energy.

### *How does it relate to this activity?*

Moist nutrient-rich soil provides the right conditions for fungi to grow. Fungal spores sprout root hairs called *mycellium* that spread into the soil and forest floor. These root hairs give off enzymes that break down food before it enters the fungi. Then the fungi takes in the food energy through the mycellium, much like you would drink milk through a straw.

### *Did you know?*

When you find a mushroom, you've actually found the reproductive part of a fungi. The main body of the fungi is in the soil. So picking a mushroom is like picking an apple off of a tree. It doesn't kill the fungi, and it may actually help spread spores to grow new fungi.





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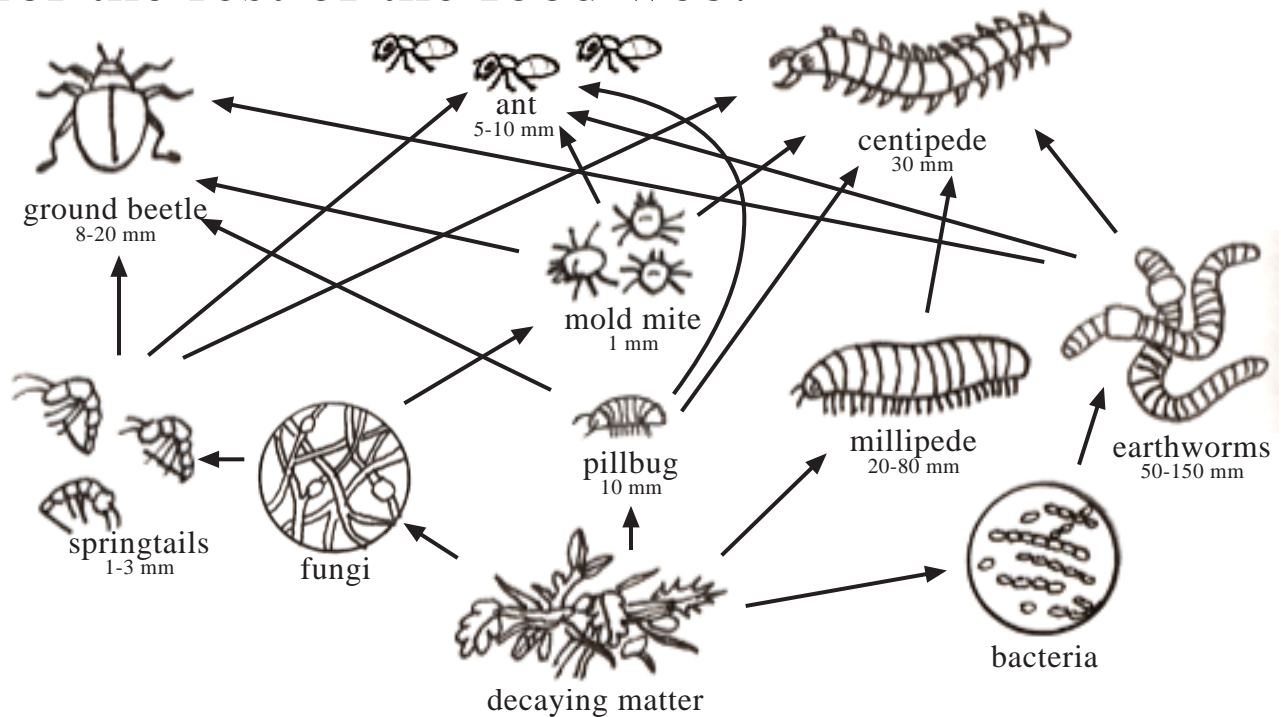
# Food Chains/Webs

### *What is it?*

A food chain shows the energy connections between living things. Leaf >>> millipede is a food chain that illustrates a millipede getting energy from a leaf. A food web shows multiple food chain connections among living things within an ecosystem. A food web for the forest floor is shown below.

### *How does it relate to this activity?*

The forest floor environment provides the right conditions for bacteria and mold to decompose fallen organic matter. This matter provides energy for the rest of the food web.





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# Physical vs. Chemical Change

### What is it?

#### Physical Change

- The physical properties (the way it looks, smells, feels, etc.) may or may not change.
- The change may be reversible.
- A new substance *is not* produced.

#### Examples:

- cutting logs to make firewood
- falling leaves from a tree
- mining bauxite from the ground

#### Chemical Change

- The physical properties change.
- The change is not reversible.
- A new substance *is* produced.

#### Examples:

- burning firewood to make carbon and heat
- composting leaves into soil
- making aluminum from bauxite

### *How does it relate to this activity?*

The leaf matter and rotting log are chemically changing as they decompose into phosphorus, nitrogen, and other matter that will become nutrients in the air, water, and soil.