

**Background:** The purpose of this activity is to teach children about the different roles insects (and other organisms) play in the environment. Children may already know that some insects fit into the environment as plant eaters, while other insects are predators, but most children are not aware of the importance of decomposers, which turn dead organic material into soil for plant growth. In this activity, children will get to know a wide range of animals that function as decomposers and watch these creatures doing their business.

**Grade level:** 1-3

**Academic Standards**:

*Next Gen Science*

*Standards:* Biodiversity

(LS4.D)

*Common Core:* Recall

information from

experiences to answer a

question (W.2.8)

**Time:** 60 minutes or an ongoing semester project

**Logistics**: Individual or small group project

**Materials**:

- Flashcards

- Box of compost

- Decomposer arthropods

- Tupperware boxes (large and small)

**Preparation:** *Create a demonstration project to model for the students.* You will need a large plastic tupperware with a lid. Fill with one inch of pet bedding (ex. shredded coconut) and garden soil. Add compostable material to the box like decaying fruits, vegetables (nothing in the cabbage family – stinky!), flowers, etc. Now, you have two options: A.) Fill the box with decomposer arthropods from your garden such as earthworms, roly-polies, millipedes, mealworms or B.) Send your students outside to collect decomposers from the soil surrounding the school. Be careful not to add potentially predatory insects to your decomposer box. The box will maintain itself with occasional supplements of compostable material.

Downloadable flashcards: <https://natureinspiredlearning.com/insect-flashcards/#free-printable-bug-flashcards>

**DO - Activity**:

**1.)** Take the students outside, preferably to a garden. Ask them to observe what insects they see and what those insects are doing. Allow the students to share their observations. Lead them to a discussion of what the insects are eating.

**2.)** Tell the students there are many different ways for insects to eat. Ask them to name several feeding guilds (e.g., predators, herbivores…). Provide the students with flashcards and ask them to work as a group to categorize the cards into feeding types. Supplementary flashcards can be downloaded from the free site listed above. The feeding guilds for the cards are:

* Ant – many possible guilds (some ants are herbivores – plant eaters, some are predators, some are decomposers.
* Aphid – herbivore
* Bee – pollinator (feeds on nectar and pollen)
* Beetle – many possible guilds
* Butterfly – pollinator
* Caterpillar (butterfly child or larva) – herbivore
* Cricket – usually decomposer
* Dragonfly – predator
* Earwig – decomposer
* Fly – decomposer
* Grasshopper – herbivore
* Grub (beetle child or larva) – decomposer
* Mosquito – bloodfeeder (parasite)
* Moth – pollinator
* Praying Mantis – predator
* Tick (not an insect!) – parasite
* Walking stick – herbivore
* Yellow jacket wasp - predator

**3.)** Show the students the decomposer box prepared for this activity. Ask the children to identify the compost in the box and ask them if they know how all the stuff in the box eventually becomes soil. Encourage a wide range of responses. Explain to the children that insects and other animals eat this stuff and turn it into soil. Write out the word *decomposer*, read the word with the children and explain that insects that eat dead stuff are known as decomposers and discuss why that’s a good thing.

**4.)** Explain that we are going to meet a bunch of different insects and other animals that are also decomposers. In the decomposer box, sift through the soil to gently search around for the different animals and show the students the different creatures inside.

**5.)** Provide individual students or small groups with the materials to create their own, smaller decomposer boxes. Allow them to find decomposers from outside or bring some from your personal garden alternatively provide them with arthropods from your demonstration box.

**6.)** Over the semester the students can watch the compostable material in their boxes become soil and observe the lifecycles of their decomposer arthropods.

**REFLECT**

Have students draw their own invented decomposer and provide information on what it decomposes and where it lives.

**APPLY**

Lead a discussion on how long you think humans could survive without decomposers to break down their trash and plant material. Discuss the importance of composting and make a compost heap together.

**Common Backyard Decomposers**

**Sowbugs** (wood lice) are small land arthropods. They are related to insects, but are actually crustaceans like shrimp. They have fourteen legs and breathe through gills. Because of the gills, woodlice need water in the air around them. They are decomposers and feed on dead plant material. They do not roll up when startled.

**Pillbugs or roly-polies** are also wood lice. The only difference between pillbugs and sowbugs is pillbugs can roll up into a ball when in danger. In such position, their hard shell faces out, protecting the softer parts of the body. This is a nice adaptation to point out. Both kinds of wood lice are very common in urban areas (although not native) and can be found under any moist object, like a potted plant.

**Mealworms** are larvae of darkling beetles. Like many beetle larvae, they live underground, feeding on dead plants and animals. They have six legs and two antennae and will molt anywhere from 9-20 times as it grows. It then enters the pupa stage lasting from 2-3 weeks up to 9 months. The pupa does not eat and seems inactive but it is transforming itself into an adult. The pupa is white initially then darkens just before the beetle emerges. The darkling beetles are one of the most common members of the beetle community. Darkling beetles feed on dead plants but also will eat fresh plant material. They prefer walking to flying. Many darkling beetles have a very interesting defense mechanism. If disturbed, they assume a head down and tail up position, and if handled roughly, they emit a dark-colored, foul-smelling liquid. The children may already know about mealworms from raising them in the classroom. The ones we have here in Tucson are a different and much larger species.

**Millipedes** are not insects, but arthropods in the group Diplopoda. Millipede means 1000 legs, although most don’t have that many. They have 2 pairs of legs (total of 4 per body segment). They grow additional segments will each molt, but most have several hundred legs when full grown. Millipedes generally live in the leaf litter zone or burrow into the top soil but some specialize in living under the bark on dead trees or else in rotten wood. They are important decomposers in many habitats, in fact in some tropical areas they are of more importance than earthworms. They cannot bite or sting, but if you really frighten it, it can release a defensive liquid that can stain or irritate the skin.