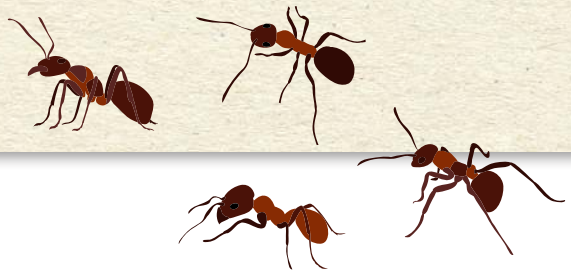
THE ACTING INSECT



THEME

- ○ Forest Health
- ☑ Ecology
- ○ Plant Conservation

TYPE OF LESSON

- ○ Instructor-Led
- ☑ Hands-On
- ○ Garden Exploration

POSSIBLE WAYS TO LEAD LESSON

- ☑ Outdoors
- ○ Virtual
- ☑ Classroom
- ○ Other:

TEACHING STRATEGY

- ○ Place-Based Learning
- ☑ Storytelling
- ○ Nature Play
- ☑ Art / Movement
- ○ Other:

STANDARDS

- NGSS, 5-LS2B: Cycles of Matter and Energy Transfer in Ecosystems. Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. (Excerpt)
- NGSS, 3-LS1-1: From Molecules to Organisms. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

GRADES 2–5

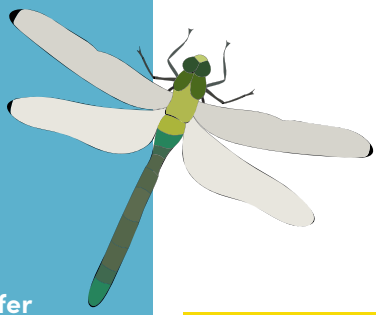
DURATION 30 minutes

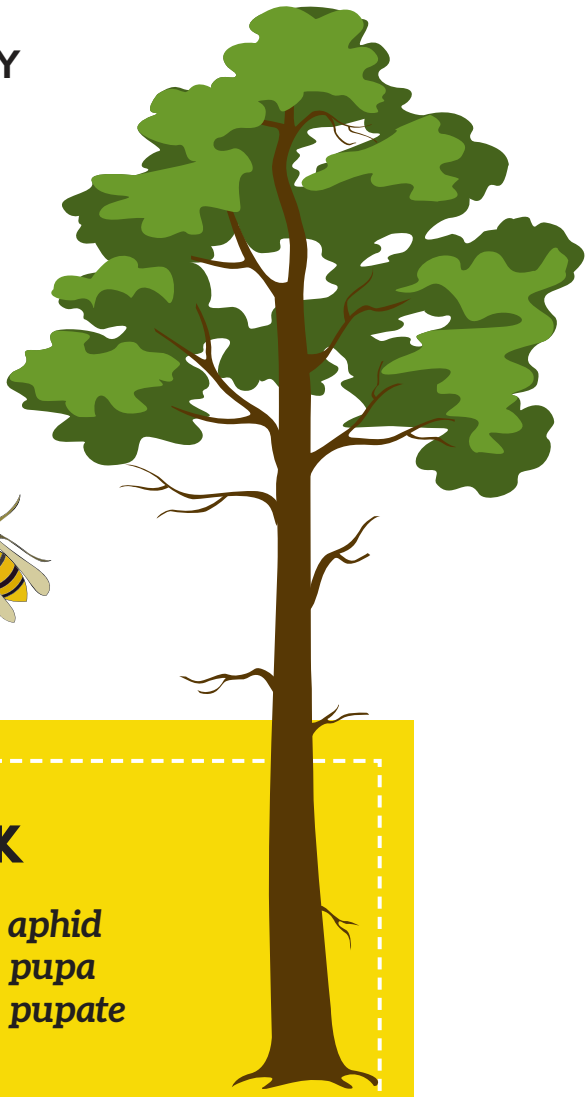
LESSON GOAL

Learners apply new information about plants and insects in a role-playing activity.

LESSON SUMMARY

Learners take turns role-playing as plants and insects in scenes from various ecosystems. Each scene requires a small number of players to act out a scenario being read aloud by a facilitator.





WORD BANK

role-play
ecosystem
larva
aphid
pupa
pupate

THE ACTING INSECT

PRINTED MATERIALS

- **Acting Cards (1 card per learner)**
  - **4 Prairie Cards**
  - **2 Forest Cards**
  - **1 Desert Card**

OTHER MATERIALS

Props:

- Whole sheets of construction paper or felt in black, orange, and white
- Pieces of felt or construction paper in yellow, brown, green, and white
- Lanyard
- Binder clips
- Flashlight
- Pieces of string or twine (at least 6 inches)
- Sheets of newspaper
- Masking tape
- Empty rolls of paper towels/toilet paper or Slinkys
- Table-tennis balls
- Pipe cleaners
- Empty water bottle labeled "Nectar Canal"
- Tissue paper (red, yellow, or orange)
- Blanket or coat
- Container to hold the props

SETUP

1. Review the **lesson procedure**.
2. Review and consider the optional **pre-** and **post-lesson explorations**.
3. Prepare the **lesson materials**.
   - Print the **Acting Cards**.
   - Set up a space for a stage.
   - Set up space for an audience.
   - Gather the props.

LESSON PROCEDURE

1. Optional: Complete one or more of the **pre-lesson explorations**.
2. Gather learners and have them sit facing a stage area.
3. Share **lesson opener**.
4. Cast roles and enact 1 to 4 scenarios as time allows. *Facilitators are encouraged to write their own scenarios to highlight local and seasonal plant and insect interactions.*
5. Ask the **lesson questions** throughout the lesson when moments present themselves.
6. Learners can narrate their own ecosystem stories, highlighting personal interactions with plants and insects.
7. Optional: Complete the **post-lesson exploration**.

LESSON OPENER

An ecosystem is made up of living and nonliving things in an environment. We are going to use our imaginations and play the roles of insects and plants to figure out the roles they play in their ecosystems.

LESSON QUESTIONS

- Did any of the new information surprise you?
- Do you have any questions about any of the information shared?
- How did plants and insects interact with each other in this scenario?
- What benefits do plants provide insects?
- What benefits do insects provide plants?

THE ACTING INSECT

PRE-LESSON EXPLORATIONS

Have learners complete any of these prompts:

- Explore together what an ecosystem is using the "Ecosystem" resource from Britannica Kids: bit.ly/PH-ecosystem.
- Explore together the three habitats you will be using for role-playing: deserts, forests, and prairies. Use the following resource from Nasa Climate Kids (or any resource of your preference): "10 Interesting Things about Ecosystems": bit.ly/PH-NASAclimate.

POST-LESSON EXPLORATIONS

Write a letter to yourself:

Have learners write letters to themselves recapping their favorite parts of the lesson. Provide a template and prompts to guide writing. For example: "Dear Myself, On MM/DD/YYYY we acted out being insects and plants. I'll never forget . . . One question I wished I asked was . . ." Collect the letters and decide whether to return them at a later time and ask learners if their answers changed.

ADDITIONAL RESOURCES

Explore these resources if there is additional time to dig deeper into the three ecosystems:

- Deserts, from National Geographic Kids: bit.ly/PH-desert
- Prairies, from MuseumLink Illinois: bit.ly/PH-prairie
- Forests, from Britannica Kids: bit.ly/PH-forest

THE ACTING INSECT

WORD BANK DEFINITIONS

role-play: **act out the part of a character**

ecosystem: **a collection of living organisms (such as plants, animals, and fungi) and the environment they live in**

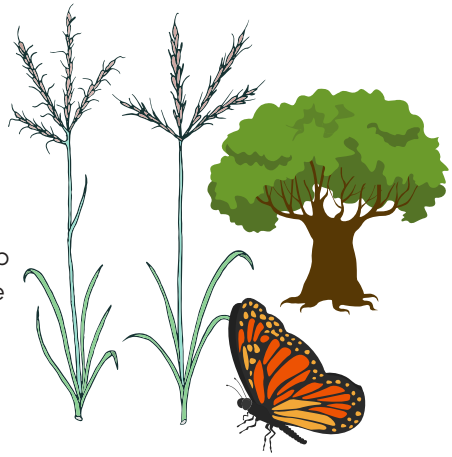
larva: **the form a young insect takes after it hatches**

aphid: **a type of insect that sucks plant sap**

pupa: **a form some insects take in between the larval and adult stages; often covered by a shell or cocoon**

pupate: **when an insect larva becomes a pupa**

THE ACTING INSECT: PRAIRIE



ACTING ROLES/# OF PARTS:

- **Big bluestem grass** (*Andropogon gerardii*) / 3
- **Small oak tree** (*Quercus* spp.) / 1

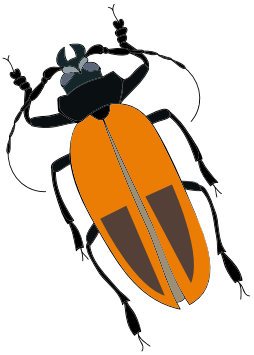
PROPS:

- ***Fire*** (red, yellow, or orange tissue paper) for an audience member to flap
- ***Fungus*** (use string to symbolize the strands of mycelium) for an audience member to spread over the ground
- ***Insects*** (pieces of felt or construction paper to represent ***butterflies, beetles, and ants***) for audience members to throw

NARRATOR:

The sky darkens in late July over the **big bluestem grass**. Lightning flashes, leaving a loud clap of thunder in its wake. On the dry prairie, the **grass** and **a small oak tree** catch ***fire***. In the blaze, the grass and oak tree burn to the ground. The **oak** cannot survive the burn; it returns to the earth as nutrients for other plants. The **grasses** appear dead, but below the surface their roots are very much alive. Each root hair is connected to a strand of ***fungus*** that helps the grass regrow. Within days and weeks, the **big bluestem grass** grows back taller and taller. As the grass returns, so do the ***butterflies, beetles, and ants*** that call the prairie home.

THE ACTING INSECT:
PRAIRIE (ADULT BEETLE)

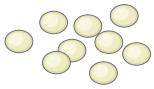


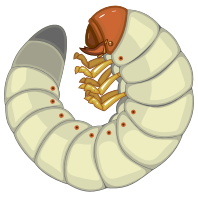
ACTING ROLES/# OF PARTS:
- **Adult goldenrod soldier beetle** (*Chauliognathus pensylvanicus*) / 1

PROPS:
- ***Nectar*** (empty bottle labeled "Nectar Canal") for the beetle to eat
- ***Wings*** (2 pieces of black or orange construction paper/felt) to flap for beetle to fly
- ***Dried leaves*** (sheets of newspaper) for the beetle to find
- ***Eggs*** (tennis-table balls, white paper cutouts) for the beetle to hatch

NARRATOR:
A **leatherwing beetle** chews on the sweet ***nectar*** of a wildflower. As it starts to feel full, it walks out on the bright pink petals of a coneflower to rest. Suddenly an urge comes over it to leave. The beetle uses its ***wings*** to fly high and low until it finds the perfect place—an opening in the tall grasses. It searches the ground below and finds some ***dried leaves***, where it lands safely. It then begins laying a cluster of ***eggs***. Once it is finished laying, the beetle flies away again looking for a nearby flower to rest on.

THE ACTING INSECT:
PRAIRIE (EGG AND LARVA)





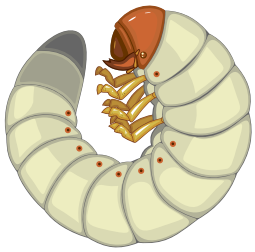
ACTING ROLES/# OF PARTS:
- **Leatherwing beetle egg** (*Chauliognathus pennsylvanicus*) / 1
- **Leatherwing beetle larva** (baby beetle) (*Chauliognathus pennsylvanicus*) / 1

PROPS:
- ***Outer shell*** (pieces of paper taped on the larva's clothing) to take off
- ***Aphids*** (a collection of small white, green, or yellow objects such as pieces of felt or tennis-table balls) for the larva to eat

NARRATOR:
At the end of summer in a small patch of shady soil under the tall meadow grasses, a **leatherwing beetle egg** begins to hatch. It shakes and dances back and forth until a creature emerges—**a larva**.

It looks like a small, white worm, and it barely moves at first. Each day it sheds its ***outer shell*** as it grows stronger. One day it grows strong enough to go explore new areas for food. The **larva** begins its search at the bottom of a tall wildflower stem. It climbs up and up until it discovers a group of ***aphids***, tiny insects that suck sap from plants. The hungry **beetle larva** begins to eat ***aphid*** after ***aphid***! What a yummy treat.

THE ACTING INSECT:
PRAIRIE (LARVA)



ACTING ROLES/# OF PARTS:
- **Leatherwing beetle larva** (baby beetle) (*Chauliognathus pennsylvanicus*) / 1

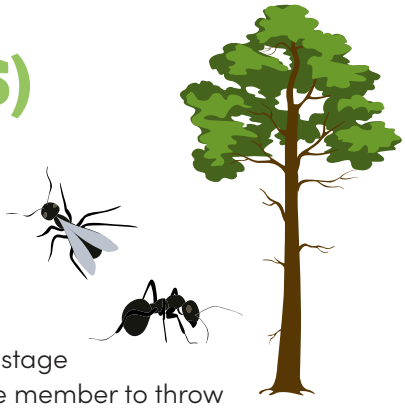
PROPS:
- ***Old leaves*** (sheets of newspaper) for the larva to hide in
- ***Slugs*** (small pieces of brown felt) for the larva to eat
- ***Shell*** (blanket or coat) to wrap around actor for the larva to transform into a pupa
- ***Wings*** (2 pieces of black or orange construction paper/felt) to flap for the adult to fly away

NARRATOR:
As summer turns to fall, the days are getting shorter and cooler. The **leatherwing beetle larva** (a baby) finds a spot in the soil with lots of ***old leaves*** to keep itself warm as winter approaches. It will stay there to preserve itself through the frost and snow of winter.

As the days finally get longer and the soil warms in the spring, the **larva** wakes up to forage for yummy ***slugs*** to eat.

The **larva** finds a patch of ***slugs*** to feast upon. When it has had enough to eat, it digs a small hole and crawls into a small ball to begin a transformation. The **beetle larva**'s body starts changing into a hard ***shell***—it is *pupating*, or becoming an adult. When it emerges from its shell, it takes time to dry its wet ***wings*** before flying away above the meadow looking for a flower to land upon.

THE ACTING INSECT:
FOREST (CARPENTER ANTS)

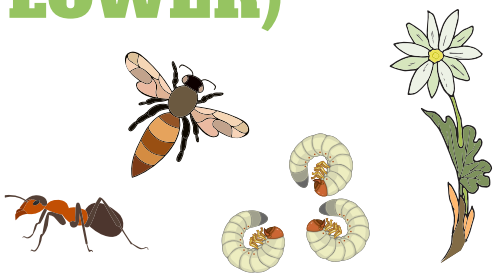


ACTING ROLES/# OF PARTS:
- **Majestic tree** / 1
- **Carpenter ants** (*Camponotus* spp.) / 1–2
- **Carpenter ant with wings** (*Camponotus* spp.) / 1–2

PROPS:
- The ***Sun*** (a flashlight with batteries) for an audience member to shine on the stage
- ***Fungus species*** (string to symbolize the strands of mycelium) for an audience member to throw
- ***Bacteria species*** (small pieces of multicolored felt to represent bacteria) for an audience member to throw
- ***Tunnels*** (empty tubes of toilet paper or paper towels, or Slinkys) for ants with no wings to represent digging
- ***Wings*** (2 pieces of black or yellow construction paper) for ants with wings to flap

NARRATOR:
A majestic tree stands tall over the forest. After many nights of rain, yet another storm travels through with large gusts of howling wind. In the morning, as the ***Sun*** rises, the light reveals that the once giant **tree** has fallen. The **tree** appears to be dead, but it is slowly coming to life as a home to other forest creatures. As the years pass, its wood softens in the freeze and thaw of the colder months. The **tree** turns soggy, inviting in species of ***bacteria*** and ***fungi*** that spread all over the fallen log. A colony of **carpenter ants** spreads through the log making themselves at home. They dig out ***tunnels*** to travel through to help raise their young and to take care of their Queen. As the colony grows in population, a new generation of **carpenter ants** with ***wings*** emerges. These **ants** fly away in search of a new fallen tree to call home.

THE ACTING INSECT:
FOREST (BLOODROOT FLOWER)



ACTING ROLES/# OF PARTS:

- **Bloodroot flower** (*Sanguinaria canadensis*) / 1
- **Miner bee** (*Anthophora abrupta*) / 1
- **Adult ant** (*Aphaenogaster fulva*) / 1
- **Ant larvae** (baby ants) (*Aphaenogaster fulva*) / 2

PROPS:

- ***Pollen*** (pieces of yellow material—felt, construction paper) for the flower to hold
- ***Seeds*** (pieces of brown material—felt, construction paper) for the flower to give to the ants
- ***White petals***: (lanyard with white pieces of felt or construction paper attached with binder clips) for the flower to wear

NARRATOR:

In the spring, after the forest soil has begun to thaw and before the trees grow new leaves, a special type of plant makes the most of the available sunlight—they are called spring ephemerals.

The **bloodroot flower** is one of these spring ephemerals. It takes advantage of a forest with lots of light by using its ***white petals*** and bright yellow ***pollen*** to attract a **hungry miner bee**. The **bee** finds the ***pollen*** patch in the center of the **flower**; it collects the ***pollen*** with its hairy legs.

The quick movement of the **bee** pollinates the **flower**. In the coming days, the **bloodroot flower** drops its ***petals*** and begins creating small, brown ***seeds*** wrapped in a fatty substance. A **hungry ant** visits the **flower** and carries the ***seeds*** back to its colony to feed the **ant larvae** (or baby ants). The **larvae** eat the fatty outsides of the ***seeds***, discarding the rest of the ***seeds*** nearby—which might grow into new **bloodroot flowers** one day.

THE ACTING INSECT:
DESERT

ACTING ROLES/# OF PARTS:

- **Hawk moth** (*Manduca sexta*) / 1
- **White datura flower** (*Datura wrightii*) / 1

PROPS:

- ***Full moon*** (flashlight with batteries to represent full moon)
- ***Antennae*** (2 pipe cleaners) for the moth to find nectar
- ***White petals*** (lanyard with white pieces of felt or construction paper attached with binder clips) for the flower to wear
- ***Long proboscis*** (tongue) (a pipe cleaner) for the moth to collect nectar
- ***Nectar canal*** (an empty water bottle labeled "Nectar Canal") for the flower to hold
- ***Pollen*** (pieces of yellow material—felt, construction paper) for the flower to pass to the moth

NARRATOR:

Under the light of a ***full moon***, a **hawk moth** flutters in the desert night, trying to locate blooming flowers with its ***antennae***. It flies forward and then backward seeking an open flower to visit. Below, a large **datura flower** with ***white petals*** emits the sweet smell of sugary nectar into the air. The **hawk moth** uses its ***antennae*** to detect the nectar from the plant below. It swoops down and lands on the **flower** petals. It uses its ***proboscis*** to drink nectar from the flower's ***nectar canal***. As it drinks its fill, it also carries ***pollen***, which it carries away to the next **datura flower** it finds.