



## *Western Upper Peninsula Center for Science, Mathematics and Environmental Education*

*A partnership of*

Copper Country & Gogebic-Ontonagon Intermediate School Districts and Michigan Technological University  
Serving schools and communities in Houghton, Baraga, Gogebic, Ontonagon and Keweenaw Counties

### **Terrestrial Insects**

**Duration:** 1.5-2 hours

**Age Group:** Gr. 3

**Summary:** How are aquatic and terrestrial insects different? What are the life cycles of different insects? How do insects find their mates? What are exotic species? How do scientists sample insects? Students will answer these questions as they collect and study insects from terrestrial and aquatic habitats.

#### **Objectives**

*After this lesson, students will be able to:*

1. Describe how insects are different from other living things.
2. Describe the difference between incomplete and complete metamorphosis.
3. Name an exotic insect in our area
4. Explain how scientists sample insects

#### **List of All Materials Needed** (include quantities):

- Immature & Adult “Presto Chango” Activity Cards
- Bug boxes/jars/magnifying lens (several dozen)
- Terrestrial Insect Life Stage Hunt
- Metamorphosis hand-out
- Insect Identification Chart
- Clipboards
- Pencils
- *Mason Jar Pitfall Trap (set up prior to start)*

#### **Background Information:**

- Insects are arthropods—have segmented bodies, jointed legs & exterior skeleton.
- Three main body parts (thorax, abdomen, head), 2 antennae, and 6 legs. Most have wings in the adult stage.
- Mayflies have no mouth parts as adults. They don’t eat.
- An ant can carry 50X its own weight.
- Success of insects is due to their amazing ability to adapt.  
(Adaptations: Flight, external skeleton, small size, metamorphosis, and ability to produce multiple offspring rapidly).

## **Introduction:**

What is a person who studies insects called: Entomologist.

What are insects?

The Insecta (insects) terrestrial invertebrates are just a Class from the large animal Phylum called Arthropoda (arthropods) *a name that refers to their jointed limbs.*

Other major Classes of living arthropods closely related to insects includes:

- Crustacea (crabs, lobsters, shrimps, barnacles, woodlice, etc.),
- Myriapoda (millipedes, centipedes, etc.),
- Arachnida (scorpions, king crabs, spiders, mites, ticks, etc.).

What are some major characteristics of insects:

- Most insects have wings at some point in their lifetime, though not all.
- All insects have six legs along with three unique body sections
- Tough outer body-shell, the exoskeleton,
- Flexible joints between the skeletal plates to allow the creature to move.
- All insects have six legs along with three unique body sections.
- Head
- Thorax
- Abdomen
- All insect species lay eggs

What is the difference between a vertebrate and an invertebrate?

- Invertebrates have no back bone while vertebrates have well-developed internal skeleton of cartilage and bone and highly developed brain enclosed by a skull.

What is the life cycle of an insect? Egg, Nymph, Adult

What is metamorphosis?

- Incomplete: egg-nymph-adult
  - Nymph looks like adult but smaller and has no wings
  - As it grows it sheds its exoskeleton and grows a new one
  - Examples: Dragonfly, termite, and grasshopper
- Complete: egg-larvae-pupa-adult
  - Larva looks like a worm and hatches from the egg. As it grows it sheds its skin.
  - It then grows into a pupa. The pupa doesn't move around like a larva, and during this stage it changes from an immature form to adult form.
  - Examples: butterfly, bee, ant, beetle, and fly

## **Insect trapping**

Set up a pit-fall trap at the beginning of the field trip. Check the trap at the end of the field trip to see if any insects were captured

## Part A:

### Which of these are insects?

Hold up pictures of different arthropods and have students determine whether they are insects or not. Why are they or are they not insects?

### Insect Life Cycles

Discuss with the students the life cycles of different insects. What they eat, where they live. Many insects look very different at each of the stages, unlike mammals.

#### Simple Metamorphosis & Complete Metamorphosis

- Simple- egg-nymph-adult
- Complete-egg-larvae-pupa-adult

**Find Your Kind Smelling Activity** (students are moths) – Label ½ females, ½ males. Females form a huge circle around the males. Females hold out open containers, while males look for females with matching scents. Then swap canisters (male-female).

### Exotic Species

What is an exotic species?

- Organisms that were introduced, intentionally or accidentally, into an ecosystem outside their own and managed to thrive. Exotic, invasive species can tip the balance in an ecosystem, sometimes with serious environmental and economic consequences.

How do they get there?

- Shipments of fruits and vegetables, wooden crates used for transporting cargo.

Show an emerald ash borer.

Explain how it is affecting the ash trees in Michigan.

Attacks between the wood and the bark, interrupting the flow of fluids between the roots and leaves, no transpiration can take place, basically strangling it.

- Wasn't seen in North America until the early 2000's, first seen in Detroit

How it got here:

- Most likely in ash wood used for stabilizing cargo in ships or for packing or crating consumer products.
- Moved through wood being shipped, trees bought from nursery's that were unknowingly affected, log trucks, and campers transporting firewood.
- The lifespan of the Adult EAB is about 3 weeks
- An infected tree may live 1-2 years before showing signs of distress.
  - Large healthy trees can be killed in 3-4 years.

## Part B:

### Insect Hunt

Have teachers put students into groups of 2 or 3

Explain VERY CLEARLY, that we are visitors to the insects homes (forest)—and we do not want to leave a mess. Also, looking at the insects and animals is okay.

**Rotting logs should not be “torn apart,” but gently examined.**

**Peeling back a little bark is okay, but what should you do afterwards?** Be sure to put it back.

Students should absolutely NOT put sticks in any holes.

**If you turn over a rock or a log?** Put it back!

**They can use the magnifying boxes to look at things more closely, but then?:** Be sure to return the animals to their homes when finished.

Pass out bug boxes, magnifiers, plastic containers, clipboards, pencils and data sheets to each group.

Remind students to stay within sight of an adult when they are searching for insects. Give them time to search for insects and fill out the data sheet.

Let students use a thermometer to record the temperature. They can return it to you after to avoid breaking it.

If some students finish with the data sheet right away, give them a scavenger hunt.

Make sure students return supplies. Collect the data sheets and give them to the teachers.