

Who Am I? A Game of Clue!

Essential Question:

How do certain insects help or harm ecosystems and people?

At a Glance:

Clue cards describing insect adaptations and other insect characteristics are given to each student. Next, learners try to find the other learners whose clues describe the same insect. Finally, they state which insect they think they are. The answers will be displayed using the GEN Eco-Service cards.

Background Information:

See Background Information for Garden Earth –Pest and Disease Control and “Who Wants to be Eaten? Invertebrate Defenses” Background Information.

An adaptation is something about an organism that helps it survive in its environment. Some of these adaptations include camouflage, mimicking, armor and spikes, toxic chemicals, and running, jumping, or flying away. Invasive pest species that are introduced from other areas have adaptations that allow them to spread more rapidly and often out-compete native species.

With increased international transport of both humans and goods, exotic species have become more prevalent in the U.S. and around the world. Exotic insects may arrive in dry ship ballast, on produce or other goods, or may be brought in intentionally by humans, such as with the Gypsy moth caterpillar. The Gypsy moth was introduced from Europe to Massachusetts in 1868 by a French scientist who was hoping to breed the caterpillar with a silk worm. It is not know if the release was intentional or accident, but the damage from its occurrence has been devastating to oaks and other trees where Gypsy moth outbreaks have taken place.

A major reason invasive species do so well in their exotic home is that they have no native predators. In their native habitat, there are predators that keep their populations from growing out of control. In other instances, habitat destruction may remove any natural predators that existed and could have controlled the pest. A monoculture of plant species also allows exotic insects to become invasive more rapidly. With a lack of biodiversity, there is an abundance of food and the invasive pest’s population is able to expand rapidly.

Procedure:

1. Review the concept of adaptations with learners. Provide examples of insect adaptations that help them to function better as both predators and prey. Discuss how adaptations of an introduced insect can help it to become established and invasive.
2. Show the GEN Eco-Service cards of several insects, pointing out their special adaptations. These cards will include the answers to the activity (caterpillar, fire ant, dragonfly, mosquito,

Location: Indoors

Objectives: *Learners will*

- 1) identify insects according to their adaptations and characteristics.
- 2) understand how exotic species are established and how they become invasive.

Skills: communication, teamwork, analysis

Supplies:

- Who Am I? clue cards
- GEN Eco-Service Cards
 - Caterpillar
 - Fire ant
 - Dragonfly
 - Mosquito
 - Ladybug
 - Walking stick

Subjects: science

Time: 25 min

ladybug, and walking stick). Display these at the front of the classroom where the learners can see them during the activity.

3. Tell learners that they will each receive a 'Who Am I?' clue card that will help them identify an insect. Three or four other learners will have clues that match the same insect, while others will be working to figure out a different insect.
4. Learners will try to find the other learners whose clues go with their insect, then decide as a group which insect matches their clues.
5. Once all the learners have found their groups and decided on their insect, have them present their insect and its adaptations to the class.

Variation:

If the activity seems too difficult for your age-group, you may put learners into groups according to their insect. This will eliminate the task of finding the other learners whose clues match their insect. They will only need to decide on what insect they are as a group, matching it with the Eco-service card.

Answer Key:



Caterpillar

- **Clue 1:** Like many other insects, my larval or infant, stage looks very different than when I am an adult. Many would say that I am much more beautiful as an adult.
- **Clue 2:** I sometimes eat plants that have poisons and taste bad. I store these in my body so that certain predators will think I taste bad and won't eat me.
- **Clue 3:** I sometimes have sharp spines all over me in my infant state. This deters certain predators from wanting to eat me. These spines can also sting. Ouch!
- **Clue 4:** Some of my relatives build camouflaged tubes or webs to hide in and protect themselves from predators.
- **Clue 5:** I often use camouflage to blend in with the leaves I feed on or to look like something yucky (such as bird poop!)



Fire Ant

- **Clue 1:** I use my antennae to smell the pheromones (chemical odors) emitted from my pals. These scents can say hello, warn of danger, leave a trail to a food source, or inspire the others to work harder.
- **Clue 2:** I have a nasty sting! (Though most people call them bites). I grab my prey with my mandibles (or jaws), double over my abdomen, and inject my stinger, which contains a toxic alkaloid venom. I sting just about anything that disturbs me, including you humans!
- **Clue 3:** I am an invasive pest species that came into a Mobile, Alabama port from Brazil by way of solid ship ballast around 1930. I am not as much of a problem in South America because I have natural enemies there.
- **Clue 4:** I am quite the omnivore, eating most anything. Some of my favorite meals include other insects, ground-nesting animals, mice, turtles, snakes, and other vertebrates, young trees, seedlings, plant bulbs, fruit and grass. I've even been known to chew through electrical wires and attack baby cattle!

- **Clue 5:** My 'family' and I live in colonies and will attack as a group if anyone disturbs our home. We live in underground nests, but you can often see the dome-shaped mounds above ground in open areas.



Dragonfly

- **Clue 1:** As an adult, I am a very fast flyer (up to 60 miles/hr). My streamlined body and large wings help me to fly and change directions quickly. When I spy my prey (mainly flying insects), I shape my spiny legs into basket nets and snare them in mid flight.
- **Clue 2:** Though I don't have a sense of smell or hearing to speak of, I have amazing eyesight. I have the largest compound eyes of any insect, being able to see almost 360 degrees around me – everywhere, but directly behind me.
- **Clue 3:** Throughout my life, I am a ferocious predator. As a naiad (juvenile), I hide at the bottom of ponds and rivers, waiting for my prey. When an unsuspecting prey comes near, I snag it with my fangs and pull it into my mandibles (jaws).
- **Clue 4:** In my juvenile stage I am called a nymph or naiad. I live in the water and look completely different than my adult stage. When it is time to metamorphose into an adult, I climb out of the water, emerge from my old larval skin and dry my wings in the sun. Then I fly off as an adult, the shortest span of my life.



Mosquito

- **Clue 1:** I can carry diseases such as Malaria, West Nile virus, Yellow fever, Encephalitis, and Dengue fever. This is one of the reasons you humans hate me so much.
- **Clue 2:** I have a long mouthpart called a proboscis. Females use this to pierce the skin and suck blood. Males use it to drink nectar from flowers.
- **Clue 3:** Though I am a native species, I am still considered a pest by you humans. Females, which are the only ones that bite, are attracted to heat, light, perspiration, body odor, lactic acid and carbon dioxide. The bites leave a large red welt and itch pretty bad.
- **Clue 4:** Our lives begin in water. Eggs are laid in standing water, and then we hatch into larvae called "wigglers". We then molt into pupae, or "tumblers" right before transforming into adults. We crawl out of the water and rest while our exoskeleton hardens and wings dry out. Then we're off!
- **Clue 5:** Ways people try to control me as a pest include using nasty pesticides, removing standing water so there's nowhere to lay my eggs, and providing habitat for animals that eat me, like bats and Purple martins.



Ladybug

- **Clue 1:** There are both native and introduced species of us in the United States. One of the exotic species was introduced from Asia to help control aphids and has done a great job in controlling this agricultural pest!
- **Clue 2:** My exotic cousins can be somewhat of a nuisance in the winter. They like to over-winter inside, so often 'campout' in people's homes. They also out-compete us native species, which isn't very nice!
- **Clue 3:** I am brightly colored, which tells predators I am poisonous. As an adult, I am able to reflex-bleed a defensive chemical called hemolymph from my leg joints. This oily yellow toxin has a yucky smell and can cause stains.

- **Clue 4:** Birds are my major predator, but one way I trick them is to play dead when threatened. Most predators won't eat dead insects.



Pretty cool, huh!

- **Clue 5:** Some of my relatives can even change colors between green and brown, depending on what part of a plant they are on. Wow!

Walking stick

- **Clue 1:** I am often overlooked because I have such great camouflage. I look like a stick and blend into the leaves I feed on.
- **Clue 2:** I am not a pest to farmers or other people, or even to other insects. I am strictly vegetarian, only feeding on fruit and leaves.
- **Clue 3:** Besides my amazing camouflage, I also am able to avert predation by remaining motionless during the day and feeding at night. I also will fall off my perch and play dead if a predator happens to approach.
- **Clue 4:** When I am young and still growing (molting), I am able to regenerate limbs. This means that if I lose a leg, it will grow back.

Discussion/Assessment:

- What are some adaptations of a predator insect?
- What are some adaptations that insects use to protect themselves from predators?
- How do exotic insects become invasive when introduced to a new area?

“Who Am I?” Clue Cards

<p>Clue 1: Like many other insects, my larval or infant stage looks very different than when I am an adult. Many would say that I am much more beautiful as an adult.</p>	<p>Clue 2: I sometimes eat plants that have poisons and taste bad. I store these in my body so that certain predators will think I taste bad and won't eat me.</p>
<p>Clue 3: I sometimes have sharp spines all over me in my infant state. This deters certain predators from wanting to eat me. These spines can also sting.</p>	<p>Clue 4: Some of my relatives build camouflaged tubes or webs to hide in and protect themselves from predators.</p>
<p>Clue 5: I often use camouflage to blend in with the leaves I feed on or to look like something yucky (such as bird poop!)</p>	<p>Clue 1: I use my antennae to smell the pheromones (chemical odors) emitted from my pals. These scents can say hello, warn of danger, leave a trail to a food source, or inspire the others to work harder.</p>
<p>Clue 2: I have a nasty sting! (Though most people call them bites). I grab my prey with my mandibles (or jaws), double over my abdomen, and inject my stinger, which contains a toxic alkaloid venom. I sting just about anything that disturbs me, including you humans!</p>	<p>Clue 3: I am an invasive pest species that came into a Mobile, Alabama port from Brazil by way of solid ship ballast around 1930. I am not as much of a problem in South America because I have natural enemies there.</p>

<p>Clue 4: I am quite the omnivore, eating most anything. Some of my favorite meals include other insects, ground-nesting animals, mice, turtles, snakes, and other vertebrates, young trees, seedlings, plant bulbs, fruit and grass. I've even been known to chew through electrical wires and attach baby cattle!</p>	<p>Clue 5: My 'family' and I live in colonies and will attack as a group if anyone disturbs our home. We live in underground nests, but you can often see the dome-shaped mounds above ground in open areas.</p>
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<p>Clue 5: Ways people try to control me as a pest include using nasty pesticides, removing standing water so there’s nowhere to lay my eggs, and providing habitat for animals that eat me, like bats and Purple martins.</p>	<p>Clue 1: There are both native and introduced species of us in the United States. One of the exotic species was introduced from Asia to help control aphids and has done a great job in controlling this agricultural pest!</p>

<p>Clue 2: My exotic cousins can be somewhat of a nuisance in the winter. They like to overwinter inside, so often 'campout' in people's homes. They also out-compete us native species, which isn't very nice!</p>	<p>Clue 3: I am brightly colored, which tells predators I am poisonous. As an adult, I am able to reflex-bleed a defensive chemical called hemolymph from my leg joints. This oily yellow toxin has a yucky smell and can cause stains.</p>
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