
Harry's
Big Adventure
EDUCATOR'S
GUIDE
TERMINIX

Teaching Virtually?
Many activities and lessons can be easily adapted to work within a virtual learning environment. Advance sharing of materials and worksheets may be required.

DEAR EDUCATOR,

As an insect, the world we share looks a lot different to me. In fact, most people don't pay a lot of attention to the bugs that scurry around their feet or buzz past their heads. What these people don't realize is they're missing out on some of the most epic natural stories that nature has to tell us.

Insects aren't just pests. We play an essential role in the ecosystem. We carry the pollen to create flowers. We recycle organic material that makes the soil rich and fruitful. Throughout every stage of agriculture, there are millions of insects playing a vital role in producing food for your family table.

Sure, bugs are small. But we play a huge part in making nature as beautiful as it is. Without insects, the world would be a stagnant and lifeless place. And if you could see Mother Earth the way we do, you'd see what a horrible tragedy that would be. The small details that escape your attention, the hidden world beneath leaves or in shallow pools — these are wondrous places, teeming with hidden life and beauty.

This is the insight we're sharing in Harry's Big Adventure. We hope you will use this curriculum as a way to show your students the incredible journey of an insect's life from birth to death.

Audubon Butterfly Garden and Insectarium entomologists and educators worked closely with Terminix® to create a course that would foster a sense of wonder in young people for the natural world. Terminix is proud to do this, because Terminix loves bugs. They've devoted their business to trying to understand them better than anyone. This respect for insects' role in nature is why Terminix only steps in when bugs leave their natural environment and threaten to damage ours.

Hopefully your students will see insects like myself as they never have before. Our story is a magnificent and thrilling experience full of colorful and fascinating insects guiding the way. So, let's begin, shall we?

HARRY
the Chinese Praying Mantis

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IT'S A BUG'S LIFE

Anyone who has ever taken a hike in the woods, spent time on the water, worked in a garden or cleaned out an old attic or garage has encountered an insect. That is because insects are widely distributed across the globe. They can live in any habitat — terrestrial or aquatic (both fresh water and marine) — that can support green plants. Insects are the foundation on which our food webs are built, providing much-needed protein to larger consumers. There are more than 1 million known species of insects in the world, and up to 30 million more waiting to be discovered and identified. It really is a bug's world!

What's in a name?

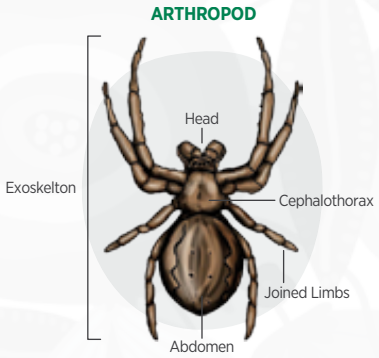
Arthropods, bugs, insects: What's the difference? A lot.

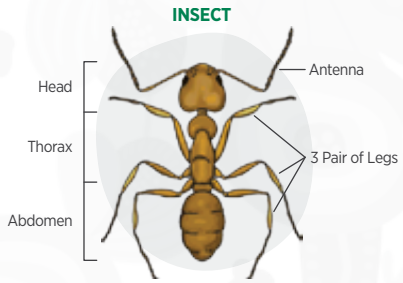
Arthropods are a group of animals that are invertebrates (no backbone) and have a segmented body, jointed limbs and a shell or exoskeleton to support muscles and protect the body. Arthropods must shed their exoskeletons in order to grow. Spiders, scorpions, crabs, lobsters, crayfish, millipedes, centipedes and insects are all arthropods.

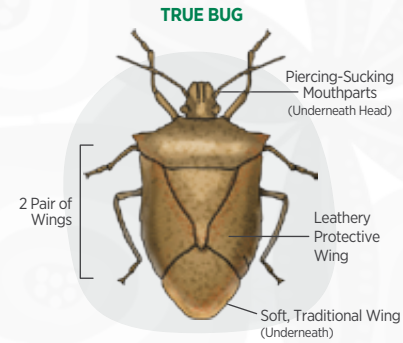
Yes, you read that right. Insects are a class of arthropods with distinct characteristics that set them apart from the others. Insects have three distinct body parts (head, thorax and abdomen), three pairs of legs (six legs total) attached to the thorax and one pair of antennae.

The head is the first segment of an insect body. It is where the eyes, mouth and antennae are located. In general, insect jaws work from side to side, not up and down like those of humans and most animals. However, some insects that eat nectar have straw-like mouths to suck up the liquid from flowers. The underside of the thorax — the middle body segment — is where the three sets of legs are attached. If an insect has wings, the wings are attached to the top of the thorax. The abdomen, the final body section of an insect, houses the reproductive organs, and its main function is to protect them.

True bugs are a group of insects (including stink bugs, water striders and bedbugs) that typically have two pairs of wings. The front wings are partly thick and protective, and partly membranous. At rest these wings cross over one another to lie flat along the insect's back. True bugs also have elongated, piercing-sucking mouthparts.







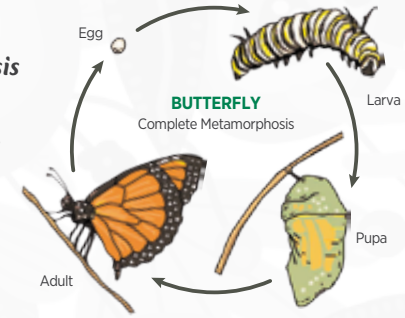
Insect Growth & Development

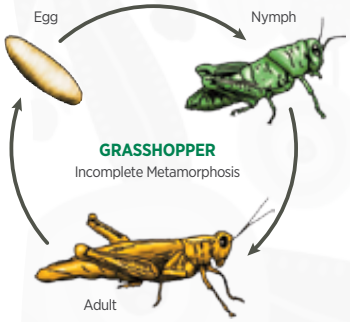
All living things, including insects, go through a life cycle of birth, growth, reproduction and death. The lifespan of an insect can be as short as a few days or as long as 17 years. For the majority of insects, life starts out as a single egg in a large egg mass. After hatching, an insect must molt, or shed its rigid exoskeleton, in order to grow.

Metamorphosis

Metamorphosis is a process most insects go through as they grow from an egg to an adult. During this time, they actually change in form, developing from an immature stage (e.g., caterpillar) to an adult stage (e.g., butterfly). There are two types of metamorphosis, complete and incomplete.

Complete metamorphosis has four stages: egg, larva, pupa and adult. It is the life cycle found in the majority of insect species.



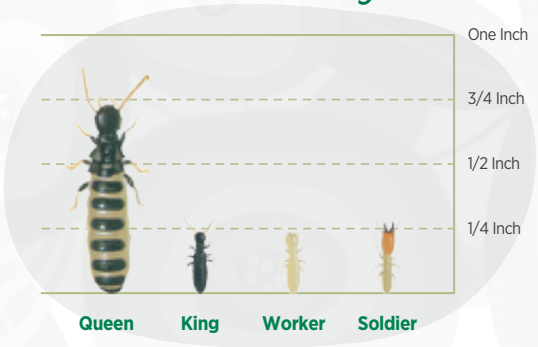


However, some insects, like grasshoppers, go through ***incomplete metamorphosis*** where the young insect usually resembles the adult. This life cycle has three stages: egg, nymph and adult.

Social Insects

Most insects are solitary; however, some insects do have complex societies. All termites and certain ants, wasps and bees are social insects characterized by cooperation among members, caring for the immature and a division of labor called a caste system.

EXAMPLE: Termite Caste System



Primary reproductives – a queen and kings

Secondary reproductives – nymph-like workers that can develop into primary reproductives if anything should happen to the queen or kings

Workers – nonreproductive members that do work such as building and maintaining the nest or caring for the young, the queen, the king and soldiers

Soldiers – nonreproductive members, usually larger, specialized to defend the colony

Beneficial Insects

Pollination

Pollination is the process by which plant pollen is transferred from the male reproductive organs to the female reproductive organs to form a seed. In flowering plants, this process is often aided by wind or insects. Many species of insects — including bees, beetles, butterflies, flies and wasps — indirectly pollinate flowering plants while traveling between flowers in search of their food source. Insects assist in the pollination of approximately 65% of all flowering plants.

Biological Controls

In addition to using chemicals to control infestations, more people are "naturally" controlling pest insects by introducing insects that prey on them. Ladybugs and praying mantises, like Harry, are successful examples of this technique. They protect the crops by eating the insects that eat the crops.


THE KEY TO
HARRY'S BIG
ADVENTURE

The Key to Harry's Big Adventure

Objective

Insects are a distinct group of arthropods that have three body parts (head, thorax and abdomen), six legs and two antennae. In this activity, students will learn to use a dichotomous key to identify Harry and his friends.

Key Words

Arthropod **Head** **Abdomen**
Insect **Thorax** **Antenna**
Dichotomous key

Procedure

Using the discussion questions, talk with students about the characteristics of arthropods and insects (see Introduction included in this guide). Review the key words for this activity (see Glossary). Look over the labeled bug parts diagram to make sure students connect the terms with the location of the body parts on an insect.

Distribute the Key to Harry's Big Adventure Worksheet. Explain to the class how to use a dichotomous key, using the picture of Harry as an example. If the students cannot read yet, read the steps aloud and allow students to answer verbally. Once you have identified one of Harry's friends, have students practice making their letters by labeling the pictures. If students are able to read, have them work individually or in pairs to identify the insects on the insect pictures page.

Materials Needed

- ☐ **Key to Harry's Big Adventure Worksheet**
- ☐ **Pencil**

Discussion Questions

- What is the difference between an arthropod and an insect?
- What is a dichotomous key?
- Who might use a dichotomous key to identify insects? Why?

Extension

- Reinforce the new insect key words by singing the following song to the tune of "London Bridge Is Falling Down."

  "Head, thor-ax, ab-do-men, ab-do-men, ab-do-men.

  Head, thor-ax, ab-do-men, six legs, two an-ten-nae."

- Have students fill out a Venn diagram comparing two different insects.

KEY TO HARRY'S BIG ADVENTURE WORKSHEET








DICHOTOMOUS KEY

1 This arthropod has six legs. It's an insect! **(Go to 3)**

This arthropod has more than six legs. **(Go to 2)**

2 This arthropod has eight legs. **Spider**

This arthropod has more than eight legs. **Millipede**

3 No, this insect does not have wings. **(Go to 4)**

Yes, this insect has wings! **(Go to 6)**

4 Body has a narrow waist, and the antennae usually have a bend in the middle. **Ant**

Body does not have a narrow waist, and the antennae do not have a bend in the middle. **(Go to 5)**

5 Yes, this insect has modified mouthparts called mandibles that look like pinchers. **Termite**

No, this insect does not have modified mouthparts. **Hissing Cockroach**

6 Yes, this insect has front legs that are used to grasp prey and are held close to the body when resting, making the insect look like it's praying. **Praying Mantis**

No, this insect does not have front legs that are used to grasp prey. **(Go to 7)**

7 Front and hind wings have a similar size and shape. **Dragonfly**

Front and hind wings do not have a similar shape. The front wings are larger. **Butterfly**

MEALWORM METAMORPHOSIS

Mealworm Metamorphosis

Objective

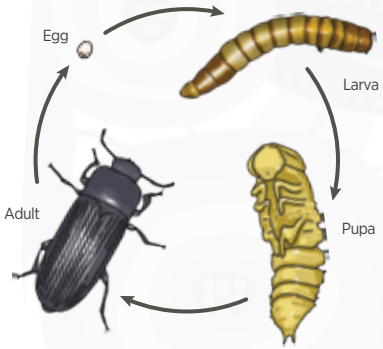
In this activity, students will reinforce key vocabulary terms and observational skills by monitoring an insect's metamorphosis from mealworm to pupa to beetle.

Procedure

Review the process of metamorphosis with your class, using the discussion questions (also see Introduction included in this guide). Explain to the class that they will be observing an insect's metamorphosis over the next few weeks and need to first prepare a habitat for the insect.

Give each student a clear glass jar or container. Fill each jar about halfway with bran — this will be the mealworms' food. Next, place a piece of potato or apple on the surface of the bran. Mealworms will get their water from this food source. Be aware that you will need to replace the potato or apple if it becomes moldy or dried-up.

Give each student two to five mealworms, placing them on a piece of paper. Allow students time to watch the mealworms and write down their observations, as pictures and descriptions, in their journal. Ask them what insect they think mealworms will change into as adults. Have them include their hypotheses in this first journal entry. When this task is completed, the mealworms can be added to the jars.



On a regular basis over the next few weeks (at least once a week), have students gently pour the mealworms out of the jar and onto a piece of paper. Students should record their observations in their journals. Once the metamorphosis is complete, have students identify the adult form as a beetle. Was anyone's hypothesis correct?

Key Words

Metamorphosis	**Pupa**
Egg	**Adult**
Larva	**Hypothesis**

Materials Needed

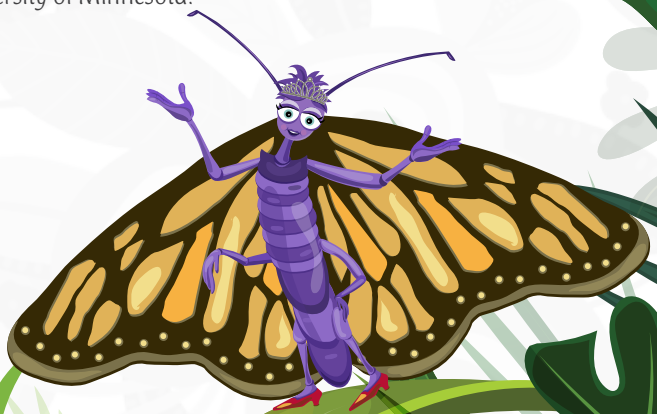
- ☐ **Clear glass jars or containers**
- ☐ **Wheat bran** (used for baking)
- ☐ **Potato or apple**
- ☐ **Mealworms**

Discussion Questions

- What is metamorphosis?
- What animals go through a metamorphosis?
- How many stages of complete metamorphosis are there?
- How many stages did they observe of the mealworm's life cycle?

MONARCHS AND MIMICS

This lesson is adapted, with permission, from ***Monarchs in the Classroom***, University of Minnesota.



MONARCHS AND MIMICS

Objective

Just as we notice the beautiful coloration of monarch butterflies in nature, predators do too. Using their taste buds, students will simulate the experience of a predator and learn about the different ways coloration can be used as a defense mechanism.

Procedure

Divide your class in half. Without an explanation, give half of your students regular popcorn, and give the other half heavily salted popcorn. Now offer the entire class a second portion, passing out a good batch only. More of the students from the first group should accept a second helping. Finally, pass around a bowl consisting of a mix of regular and heavily salted popcorn, but have the heavily salted popcorn dyed red. (Make the popcorns separately first, and dye the heavily salted popcorn with food coloring.) More students should avoid the red popcorn.

Relate this activity to a predator that eats a distasteful butterfly and then avoids a similar looking yet perfectly edible second butterfly. As in the case of the warning coloration, it involves learning on the part of the predator.

Using the discussion questions, explain to the class that the color of an insect is not a fashion statement but a defense mechanism. The colors and patterns of an insect can hide them in their environment (camouflage), can be bright in order to warn a predator they are poisonous or just taste bad (warning coloration), or can copy the coloration of another insect that is poisonous or distasteful (mimicry).

Show the students pictures of a monarch butterfly and viceroy butterfly. Tell them the viceroy is a mimic of the monarch, although recent studies have shown that viceroys actually taste bad to some predators. There are several cases in which two species of butterflies that are both toxic mimic each other. In this case, they both gain protection from having the other one around, since predators are likely to learn sooner to avoid them.

Monarch Butterfly

Viceroy Butterfly

KEY WORDS

Defense
Camouflage
Mimicry
Warning coloration

MATERIALS NEEDED

- ☐ **Normal and heavily salted popcorn** (or some other food)
- ☐ **Food coloring**
- ☐ **Pictures of monarch and viceroy butterflies**

Discussion Questions

- What would happen if there were lots of good-tasting mimics around, but only a few of the bad-tasting butterflies? (This would be similar to you giving only a small fraction of the class bad-tasting food at first and would not provide the same protection to the mimics, since it would take predators longer to learn to avoid them.)
- What are examples of other insects that use camouflage? Warning coloration? Mimicry?

Extension

- Have students complete a Venn diagram of the similarities and differences between viceroys and monarchs.


MODEL
a
MOSQUITO

MODEL A MOSQUITO

Objective

A slough is a creek in a marsh or tideflat with unique animals that call it home. Each animal has adaptations that help them in their aquatic habitat. Students will be able to name adaptations of a mosquito, an insect that lives in the slough, and describe the functions of each adaptation.

Key Words

Adaptation **Habitat**

Prepare

- Create disco ball glasses by cutting mirrored balls in half and gluing them onto the eyeglasses
- Create antennae by attaching feathers to rabbit ears and the rabbit ears to a hat or headband

Materials Needed

- ☐ **Mesh sports jersey**
- ☐ **Disco ball**
- ☐ **Eyeglasses**
- ☐ **2 radio antennae or rabbit ears**
- ☐ **2 feathers**
- ☐ **Hat or headband**
- ☐ **Syringe or turkey baster**
- ☐ **Thermometer**
- ☐ **Kazoo**
- ☐ **Ping-pong balls**
- ☐ **Large glass or bowl of water**

Procedure

Using the discussion questions, talk with students about how animals have adaptations that help them survive in their habitat. Explain to the class that they will be demonstrating the adaptations of an insect that lives in an aquatic habitat. Ask for a student to volunteer to "dress as a mosquito."

Explain to the class that the volunteer will be turned into a mosquito using common objects as props that represent the mosquito's adaptations. Some of the adaptations are physical structures that help the mosquito survive in its habitat, while other adaptations help the mosquito find prey or even a mate!

Introduce each prop individually, placing it on the volunteer and asking students for suggestions about the meaning of the prop and the function of the adaptation it represents.

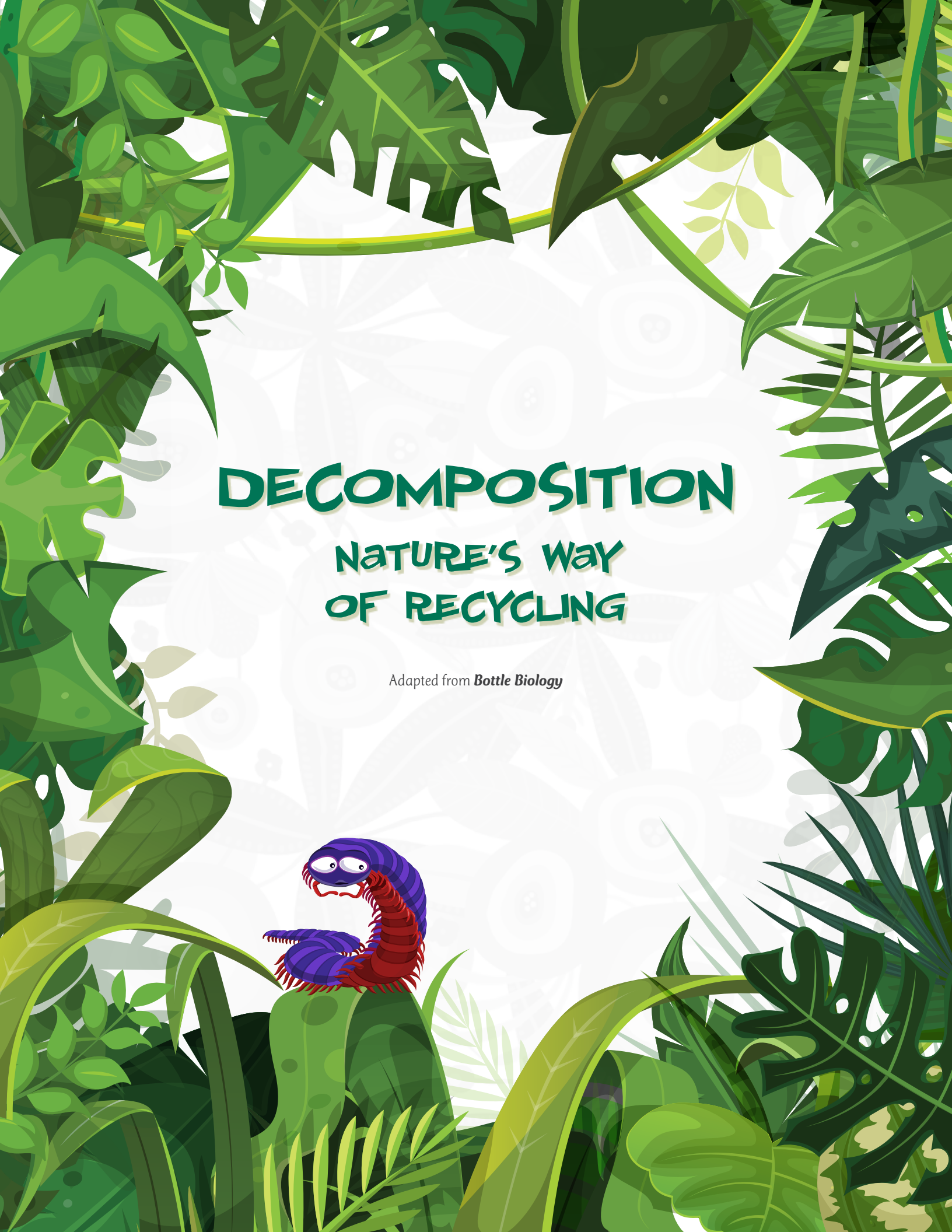
Discussion Questions

- What is a habitat?
- What is an adaptation? Give examples.
- How do adaptations help animals survive in their habitats?
- How do adaptations help animals find mates?

Extension

- Students can select another insect or other animal that lives in this marsh habitat and develop their own "Dress as an Animal" activity. Let students share their ideas with the class.

PROP	ADAPTATION	FUNCTION
	**Spiracles**	Allow air into body to breathe
	**Compound eyes**	Sharp perceptions of movement increase protection from predators and assist in finding prey
	**Mouth**	Used to obtain food sources such as nectar and plant juices or, in the case of females, blood needed for the development of eggs
	**Branching antennae**	Used as sensory organs
	**Heat sensors**	Used to detect heat from warm-blooded mammals and birds
	**Sound of flapping wings**	Helps mosquitoes find mates because female hums are a higher pitch than male hums
	**Floating eggs**	Water is needed for eggs to hatch, but adult mosquitoes cannot swim, so they lay eggs on top of the water



DECOMPOSITION

NATURE'S WAY OF RECYCLING

Adapted from ***Bottle Biology***

DECOMPOSITION
NATURE'S WAY OF RECYCLING

Objective

Speedy the Millipede and his friends in the Forest Habitat contribute to the health of the forest by breaking down organic matter into nutrient soil. They are nature's recyclers. In creating a decomposition column, students will explore the process of decomposition and the role insects play in it.

KEY WORDS

Decomposition **Organic matter**
Decomposer **Recycle**

Procedure

The key to staying on top of the garbage heap is recycling, both by people and in nature. Yes, nature recycles garbage all the time, and this recycling is essential to the availability of nutrients for living things. Nature's recyclers are tiny bacteria, fungi, insects and other arthropods that break down plant and animal waste, making nutrients available for other living things in the process. This is known as decomposition.

Decomposition involves a whole community of large and small organisms that serve as food for each other, clean up each other's debris, control each other's populations and convert materials to forms that others can use. The bacteria and fungi that initiate the recycling process, for example, become the food for other microbes, earthworms, snails, slugs, flies, beetles and mites, all of which in turn feed larger insects and birds.

MATERIALS NEEDED

- ☐ **3 two-liter soda bottles per individual or group**
- ☐ **Kitchen scraps, leaves, newspapers or any other biodegradable items**
- ☐ **Decomposition column-building directions**
- ☐ **Rainwater**
- ☐ **Clear tape**
- ☐ **Scissors**
- ☐ **Safety pin**
- ☐ **Garden soil**
- ☐ **Measuring cup**

You can think of the decomposition column as a miniature compost pile or landfill, or as leaf litter on a forest floor. Through the sides of the bottle, you can observe different substances decomposing and explore how moisture, air, temperature and light affect the process.

Build two decomposition columns per individual or group of students. Measure out equal quantities of leaves from the same tree. Fill each column loosely with half a cup of garden soil. To one of the columns, add bugs collected from a garden, decaying log or other local native habitat. Leave the other column with dirt and leaves only. When the experiment is over, make sure to return the critters to the location where you found them. Pour equal amounts of rainwater (1 or 2 cups) into each column and wait several hours for the water to soak through. Add enough, in equal amounts, so that about half a cup of water drips into the bottom reservoir. Schedule one of these "rainstorms" to occur in the column every few days, pouring the drained water back through the column. Which leaves decompose faster? Why?

Once you've decided how to fill your column, carefully observe what you put inside. In a notebook, describe the color, texture, smell and shape of every item you put in the bottle. Weigh items. Schedule column checks for at least once a week to record changes. Note changes in the column contents' height, color, shape, texture and odor. Hold a ruler next to the column to record changes in the height of the contents. Insert a thermometer into the top of the column to determine temperature changes. Decomposition columns offer good opportunities for observation and description.

Decomposition Column

MATERIALS NEEDED

- ☐ 3 two-liter soda bottles
- ☐ Scissors
- ☐ Tape

1 Remove the labels on all three bottles.

2 Cut off the top of Bottle #1 approximately 1 inch below the shoulder.

3 Cut off the top of Bottle #2 approximately 1 inch below the shoulder.

Then cut the bottom off approximately 1 inch below the hip.

This will leave the cylinder with two tapered ends.

4 Cut off the bottom of Bottle #3 approximately 1 inch above the hip, leaving the cylinder with a straight end.

5 Flip "C" upside down and stack into "D."

Stack "B" on top of "C" and tape the middle seam to secure them together.

Poke air holes in "B" and "C."

Place "A" on top and use a piece of tape to create a hinge.

Discussion Questions

- What is decomposition?
- Many landfills seal garbage in the earth, excluding air and moisture. How might this affect decomposition?
- Will a foam cup ever rot?
- What happens to a fruit pie or tea bag?
- Which do you think decomposes faster, banana peels or leaves?

Extension

- Create a Classroom Environmental Protection Agency (CEPA). Assign jobs such as Recyclables Inspector to students to make sure the trash and recyclables are sorted correctly. Ask the CEPA to make suggestions on how to improve the classroom environment.

Hop from Crop to Product

Hop from Crop to Product

Objective

In this activity, students will be able to identify both the positive and negative relationships between specific insects and crops as well as the consumer products produced from those crops. Students will also discuss the natural process of pollination and the importance of insect management in croplands.

Key Words

Crop	Producer
Pest	Consumer
Swarm	Mutualism
Pollination	Consumer product

Procedure

Begin the activity by reviewing with students the process of pollination and the different ways pollen can travel — by insects, birds and wind (see the Introduction in this guide). Show the students pictures of pollinating insects — including bees, beetles, butterflies, flies, moths and wasps — and cultivated crops that depend on those pollinating insects for reproduction, such as fruit orchards, blueberries, cucumbers, squash, melons and strawberries. Ask students what other kinds of relationships insects can have with crops. Review with students the concepts of producers, consumers and mutualism.

Using the discussion questions, engage students in a conversation about interactions between insects and plants. Have them identify relationships that are positive, like pollination and mutualism, and relationships that are negative to one of the organisms, like producer/consumer.

Distribute the Hop from Crop to Product Worksheet, pencil and colored pencils or markers to students. They can work independently or in groups. Have them first use a pencil to draw a line connecting the insect with the crop with which it has a relationship. Using the relationship identification key at the bottom of the worksheet, ask students to label (with words or symbols, depending on the age of students) the connections between the insects and the crops. Discuss with students which relationships benefit the crops and which hurt the crops. Have students mark the harmful relationships by going over the pencil line in red. Have students mark the helpful relationships by going over the pencil line in green. Next, have students draw a line connecting the crop and the product it produces.

Materials Needed

- ☐ Hop from Crop to Product Worksheet
- ☐ Pencil
- ☐ Colored pencils/markers

Extension

- Have students choose a crop and research the consumer products made from it. Students can share their reports with the class.

Discussion Questions

- Predict what would happen if bees and other insects stopped pollinating crops. Could the crops remain productive? Would consumer products made from these crops remain the same price?
- Ask students what they would do if their cropland was infested by insect pests like aphids. Would they use chemical insecticides or predator insects like ladybugs to control the pest population? Ask students to share the reasons behind their choice.

Name _____ Date _____

HOP FROM CROP TO PRODUCT WORKSHEET

INSECT	CROP	PRODUCT
		
		
		
		

RELATIONSHIP IDENTIFICATION KEY

Mutualism – cooperation, each helps the other

Pollination – the insect pollinates the crop so that it can reproduce

Producer/Consumer – the crop is a producer of food and energy, and the insect consumes (eats) the crop

PEST DETECTIVES

PEST DETECTIVES

Objective

In this activity, students will work in small groups to identify why pests are attracted to certain areas of a home or classroom. As a class, have them create a list of pests they may find in their school or home, where they would expect to find these invaders and what signs these pests might leave to indicate their presence.

Procedure

Begin the activity with the first discussion question, asking students what makes insects and other animals pests. Engage students in a debate on the subject using the other discussion questions. As a class, have them create a list of locations in their school or home where they would expect to find pests.

Distribute the Pest Detectives Worksheet. Ask the class to compare the list they compiled with the list of infestation areas on the worksheet.

Separate students into small groups and have them investigate the classroom, the school building or the schoolyard. Using the Pest Detectives Worksheet, students should check off any evidence of pest activity they find. Students should also write down their observations about the locations and the types of pests they find. Have students make suggestions about actions they can take to prevent infestations.

Discussion Questions

- Why might an insect or other animal be considered a pest?
- Where have you seen bugs in your home or school?
- What is an insect infestation area?
- What are some actions you can take to prevent an infestation in your school or home?

KEY WORDS

Insect infestation areas

MATERIALS NEEDED

- ☐ **Pest Detectives Worksheet**
- ☐ **Pencil**
- ☐ **Clipboard** (optional)
- ☐ **Magnifying glass** (optional)

Name _____ Date _____

PEST DETECTIVES WORKSHEET

Termites

Infestation Areas

- Crawl spaces
- Interior of walls
- Woodpiles

Signs of an Infestation

- ☐ Tiny wings shed by alates near doors or windows
- ☐ Mud tubes on building foundations
- ☐ Blistered wood in floors and/or doorways: this usually sounds hollow when tapped

Cockroaches

Infestation Areas

- Under sinks
- In cabinets where food is stored
- Landscaped areas that have mulch and are watered regularly

Signs of an Infestation

- ☐ Shed exoskeletons
- ☐ Tiny brown oval egg cases
- ☐ Live roaches seen foraging during the day (cockroaches are typically nocturnal)

Ants

Infestation Areas

- Pet food and water dishes
- Kitchen counters and pantries
- Bathroom sinks and bathtubs

Signs of an Infestation

- ☐ Piles of soil on concrete or soil surface
- ☐ Trails of ants
- ☐ Piles of wood shavings (carpenter ants)

Fleas

Infestation Areas

- Pets
- Pet bedding
- Carpeted floors

Signs of an Infestation

- ☐ Black, pepper-size specks on animals or within the home
- ☐ Itchy skin (not just on animals, but on humans too)
- ☐ Adult fleas seen on animals or jumping from carpets

Wasps

Infestation Areas

- Under decks, eaves or overhangs
- In a hole in the side of the building
- In underground burrows located near the home

Signs of an Infestation

- ☐ Nests found under gutters, corners of patios, sheds, etc.
- ☐ Faint buzzing noises
- ☐ Wasps found flying around your home

Bedbugs

Infestation Areas

- Mattresses
- Couches, chairs and other furniture
- Book bags, luggage or clothing

Signs of an Infestation

- ☐ Red, itchy welts on the skin, similar to mosquito bites
- ☐ Blood spots on bedsheets
- ☐ Shed exoskeletons

Spiders

Infestation Areas

- Dark basements or crawl spaces
- Piles of clothing left on the floor
- Around exterior doors where lights are left on overnight

Signs of an Infestation

- ☐ Abandoned cobwebs
- ☐ Fresh webs with spiders and egg sacs
- ☐ Live spiders foraging in the home or other building

Rats

Infestation Areas

- Garages, attics or storage areas
- Piles of firewood or debris

Signs of an Infestation

- ☐ Gnawed boxes of food in pantries
- ☐ Dark droppings one-half to three-quarters inch in length
- ☐ Oily rub marks along walls where rodents routinely travel

GLOSSARY

Abdomen
The hind portion of the three main body parts on an insect that protects the organs

Antennae
A pair of appendages located on the head above the mouthparts, used as sensory organs

Arthropod
Any of a phylum of invertebrate animals (insects, spiders and crustaceans, such as crabs) having a segmented body, jointed limbs and a shell of chitin that is shed periodically

Chrysalis
The pupa of a butterfly or moth

Cocoon
A silken case made by the larva of some insects (such as moths) in which it passes the pupa stage before emerging

Complete metamorphosis
Life cycle found in the majority of insect species with four stages: egg, larva, pupa and adult

Decomposer
An organism (such as a bacterium, fungus or insect) that feeds on and breaks down dead plant or animal matter

Decomposition
The breakdown of plant or animal matter

Dichotomous key
A series of pairs of phrases or descriptions that are used to classify a group of living things by making choices between the sets of traits and characteristics described in each pair

Exoskeleton
A hard supporting or protective structure (as of an insect, spider or crustacean) on the outside of the body

Head
The upper or front part of the body (as of a human being or an insect) that contains the brain, the chief sense organs and the mouth

Incomplete metamorphosis
Life cycle found in some insects (like grasshoppers) in which there are three stages — egg, nymph and adult — and in which the young insect usually resembles the adult

Insect
Any of a class of arthropods (such as butterflies, true bugs, two-winged flies, bees and grasshoppers) with the body clearly divided into a head, thorax and abdomen, with three pairs of jointed legs and usually with one or two pairs of wings

Larva
A young, wingless, and often wormlike form (such as a grub or caterpillar) that hatches from the egg of many insects

Metamorphosis
A change in form during development from an immature stage (e.g., a tadpole or a caterpillar) to an adult stage (e.g., a frog or a butterfly)

Pupa
A stage of an insect (such as a bee, moth or beetle) having complete metamorphosis that occurs between the larva and the adult, and usually enclosed in a cocoon or case

Thorax
The body region between the head and the abdomen that bears the legs and wings

INSECT RESOURCE LIST

Books for Children

Anansi the Spider: A Tale from the Ashanti
by Gerald McDermott

Backyard Detective: Critters Up Close
by Nic Bishop

Be Nice to Spiders
by Margaret Bloy Graham

Crickwing
by Janell Cannon

Insectlopedia
by Douglas Florian

The Very Lonely Firefly
The Very Hungry Caterpillar
The Very Noisy Click Beetle
The Grouchy Ladybug
The Very Quiet Cricket
all by Eric Carle

Waiting for Wings
by Lois Ehlert

Books for Teachers

Bottle Biology, The Bottle Biology Project, University of Wisconsin-Madison, 1993

Guide to Observing Insect Lives, Stokes, Donald W., Little Brown and Company, 1983

Monarchs in the Classroom: An inquiry-based curriculum for middle school, University of Minnesota, 1999

Places to Visit

Audubon Butterfly Garden and Insectarium
U.S. Custom House
423 Canal Street
New Orleans, LA 70130

*Audubon Insectarium is the largest museum dedicated to insects and their relatives in the U.S.

audubooninstitute.org/insectarium

Insect Links

Harry's Big Adventure
harrysbigadventure.com

The University of Florida Book of Insect Records (UFBIR)
http://entnemdept.ufl.edu/walker/ufbir/

What's that bug?
https://www.whatsthatbug.com/

Classroom Show and Tell

Teachers, book a Terminix Expert to present to your class. Go to **HarrysBigAdventure.com**

Looking for more ways to have fun with pests?
Send your students online to take a quiz about Harry and his friends. They can also download bug activity sheets to do at home!

It's all at **HarrysBigAdventure.com**