

Meet the Invertebrates Puppet Show!

Essential Question:

What are the different types of invertebrates?

Background Information:

Most of the invertebrates described in this activity are, like insects, in the phylum Arthropoda. Arthropoda have jointed appendages and a hard exoskeleton.

One important group of arthropods are the Class Arachnida. Arachnids have eight legs and lack wings and antennae. Unlike insects, most have only two distinct body parts – the cephalothorax (both head and thorax) and an abdomen. They have a pair of jaw-like or fang-bearing appendages called chelicerae in front of the mouth. These are comparable to insect jaws or mandibles. They have a pair of leg-like appendages – called pedipalps – between the chelicerae and the first pair of legs. Most arachnids are predators.

Spiders are arachnids in the Order Araneae. Their cephalothorax and abdomen are distinctly separated by a ‘waist’. The top of the cephalothorax is protected by a shield-like covering. Most – but not all – spiders have eight simple eyes. Below them, the chelicerae end in fangs. Venom is produced in glands and empties into the fangs. Spiders, generally, crush their victims by rubbing the chelicerae against each other and against the bases of the pedipalps, and then suck out their juices.

There are usually 6 finger-like glands beneath the abdomen above the anus. These are called spinnerets and spin silk for webs or burrow linings, to hold eggs, for trap or escape lines, or to ride the wind. Wind-riding or ballooning is done by some young males and dispersing young. It is thought that spiders evolved their silk-spinning capacity as insects developed their ability to fly.

Scorpions are in the Order Scorpiones. The cephalothorax of scorpions is broadly joined to a long, segmented abdomen that narrows to a ‘tail’. The tail is carried in an upcurve (like a lobster) and ends in a poisonous stinger. Scorpions are medium-sized – 1 5/8" to 5". They have two eyes in the center of the cephalothorax and 2-5 eyes on each side. Their chelicerae are small and have three segments.

Most species of **Daddy longlegs** (Order Opiliones) have long, slender legs. Their bodies are oval and the cephalothorax and abdomen are broadly joined. They have slender jaws and their pedipalps do not have pincers at the tip. They have two eyes on

Location: Indoors/outdoors

Objectives: *Learners will:*

- 1) Identify 5 non-insect invertebrates likely to be seen around the classroom site.
- 2) State at least one fact about the following invertebrates: spiders, mites and ticks, scorpions, daddy longlegs, millipedes and centipedes, earthworms, roly-polies (pill bugs), snails and slugs.

Skills: communication, observation, listening, analysis

Supplies:

- 20 insect and other invertebrate GEN Eco-service ID cards
 - Spider, orb weaver
 - Earthworm
 - Spider, jumping
 - Land Snail
 - Centipede
 - Freshwater Snail
 - Millipede
 - Slug
 - Daddy-long-legs
 - Scorpion
 - Roly-poly
 - Mite and tick
- heavy paper or paper plates, markers or crayons, scissors, glue, etc. for invertebrate puppet figures.
- wooden sticks for puppets
- copies of the Handout, ‘Say ‘Hi!’ to these Invertebrates.’

Subjects: science

low ‘turrets’ in the middle of their cephalothorax. Daddy longlegs are very sensitive to pollutants so finding strong populations is a good sign.

Mites and ticks (Order Acarina) are another group of arachnids. Their cephalothoraxes and heads are fused together and lack segments. They have one to four pairs of legs, each with 6-7 segments. The jaws and pedipalps vary among families. Mites and ticks are generally predators, parasites, or even plant feeders. Ticks are larger than mites (some 30 mm.) Mites are tiny (sometimes less than 1 mm.)

Centipedes and millipedes (in the Class Myriapoda) have long bodies and many, many pairs of jointed legs. They come in a variety of sizes and shapes and often have elongated, worm-like bodies, with many similar body segments. They have hardened head capsules with a pair of antennae and pair of mandibles, and lack true compound eyes.

Millipedes have two pairs of legs on each segment or ring, and are often dark or dull colored. They have one pair of short antennae, and simple chewing or sucking mouthparts. They may have two clusters of simple eyes or none. Millipedes feed on decaying plant matter.

In contrast to millipedes, centipedes are often brightly colored and have two long, very flexible antennae and projecting mandibular mouthparts. They have only one pair of legs per segment; their front legs have been modified into jointed, sharply pointed fangs connected to venomous glands. (As you might guess, they are predators.) Centipedes vary in size from 1 to 17 centimeters.

Roly-polies or pillbugs are in another sub-phylum of the arthropods (Crustacea), in the Order Isopoda. They are easily identified because their dark, oval, segmented body allows them to roll up into distinctive balls as a defense. They have ten legs like their relatives the crabs and lobsters. Most of their relatives are aquatic animals so it is not surprising that they have gills that must be kept moist.

Another small invertebrate you are likely to find is the **earthworm**. **Earthworms** are in a different phylum, the Annelida. The Annelids are composed of soft-bodied creatures with long, cylindrical, segmented bodies. Earthworms spend most of their time in the soil where they dig burrows. They are important in soil aeration as well as recycling the organic matter that they eat.

Snails and slugs are in the phylum Mollusca (Mollusks). They have soft, unsegmented bodies and mantles. The snails have calcareous shells. Two important groups of mollusks are gastropods and bivalves. Snails and slugs are gastropods, which move by using a muscular foot, and have a well-developed head with eyes and tentacles. Bivalves such as clams have two hinged shells.

Getting Ready:

The following puppet show, can be performed as a puppet show or used in a **dramatic reading**. If you are doing a **dramatic reading**, learners should make pictures/posters of the invertebrate assigned to them that can be held up and waved when they are introduced or as indicated.

If it is to be a **puppet show**, they should make simple puppets of their animal, using paper bags or paper plates. The puppets, also, should be held up and manipulated at appropriate points.

Procedure:

1. Hold up each of the non-insect invertebrate eco-service ID cards, and ask if the animal shown is an insect and if so, why not? Discuss what kind of animals these are. How are they alike? And how are they different from each other and insects?
2. Dramatic Reading or Puppet Show. Divide class into pairs and distribute one card (or illustration) of an invertebrate (including one insect) to each pair of children. (If a small group, each child could have a card.) Each pair should make a drawing of their animal that they can cut out and mount as a stick puppet, or provide puppet template for them to color. For the reading that follows, one child can hold the picture (or puppet) and the other read the part.
3. Have students present “Say ‘Hi!’ to These Invertebrates.” Encourage students to animate their part by demonstrating how the animal gets around or waves legs.
4. ‘DO I KNOW YOU?’ TEST: With class, review, one by one, the illustrations of invertebrates. As each is held up, ask class to identify. If necessary, use the Background Information to point out clues to identifying these animals. If students have the GEN Eco-service ID cards on hand, the cards can be distributed and, they can be asked to supply at least one fact about the animal after it is identified. As an alternative, use the clues that follow and see if class can guess which animals they describe
 - An 8-legged web-spinner (orb weaving spider or others who make webs)
 - A jumper who uses a drag line (jumping spider)
 - A shy, long-legged predator (daddy longlegs)
 - A tiny, tiny parasite (mite)
 - A predator with a stinger in its ‘tail’ (scorpion)
 - A many-legged predator with fangs (centipede)
 - A shy many-legged plant eater (millipede)
 - An isopod that curls into a ball (rolypoly or pill bug)
 - A snail without a shell (slug)
 - A creature with a shell and foot (snail, gastropod)
 - A creature with a 2 part shell that lives in fresh water (mollusk, bivalve, clam)
 - A soft, thin, legless animal that burrows in the ground (earthworm)

Discussion/Assessment:

- Encourage children to ask questions about these animals. Prompt discussion by asking:
- What do invertebrates have in common? (Lack of backbone; need for water or moisture, small size, etc.)
- Where do you find most invertebrates? (Close to or in soil, in moist places, in water)
- What defenses do invertebrates have?
- Many invertebrates are nocturnal. How would that be helpful? (Fewer predators, less loss of moisture, etc.)

SAY 'HI!' TO THESE INVERTEBRATES

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Characters:

Beetle

Orb-weaving Spider

Jumping Spider

Earthworm

Millipede

Centipede

Scorpion

Daddy Long-Legs

Tick

Mite

Roly-Poly

Land Snail

Slug

Freshwater Clam

Beetle, orb-weaving spider, and earthworm come to front of class. Others stand in place when their turns come. When each animal is introduced, its puppet or picture/poster is waved.

BEETLE: Hello, everyone. Today, we'll talk about my favorite animal--Insects. I am one, of course. A beetle. See my six legs, antennae, three body parts (well, maybe you can't see those so well). And I've got wings, too.

ORB-WEAVING SPIDER: (*interrupts*) Hey! It's not fair. People (and beetles) are always talking about insects. You can find lots of other little animals near your school or home. You might meet me. I'm a spider. And spiders like me and the jumping spider...

JUMPING SPIDER jumps up and waves

ORB-WEAVING SPIDER: ...are just as important as insects. Do you know much about spiders? We're invertebrates just like any old insect. In-ver-te-brate. That's a big word. Can you say it? (*Repeats word with children.*) It means we don't have a backbone.

EARTHWORM: Miss Spider is right! It's time for you to meet some other invertebrates. Like me. I'm an earthworm; if you went outside and looked closely in your schoolyard or garden or woods, you could find lots of us. You also might find millipedes.

MILLIPEDE IS WAVED.

EARTHWORM: Or centipedes. **CENTIPEDE IS WAVED.**

EARTHWORM: Or scorpions. **SCORPION IS WAVED.**

EARTHWORM: Don't be afraid. Scorpions are quite shy.

TICK: Don't leave out the ticks and mites. There are lots of us. **TICK AND MITE WAVE.**

DADDY LONG-LEGS: There's me, too. People always like me. I'm a daddy long-legs, you know. (*Waves.*)

ROLY-POLY: Don't forget me. I'm a roly-poly. (*Waves.*)

SNAILS: Don't forget snails.

LAND AND FRESH WATER SNAILS ARE WAVED.

SLUG: Don't forget slugs. (*Waves.*)

BEETLE: (*shakes head*) There certainly are a lot of invertebrates. (*Counts.*) More than six, I think. I can't remember numbers too well if there are over six of them. Only have six legs, you know.

ORB-WEAVING SPIDER: Too bad, you don't have eight legs like me and some of my kin, then you could count higher.

ROLY-POLY: (*stands*) If you had ten legs like me and my lobster and crab cousins you could even count by tens.

CENTIPEDE: (*stands*) My name 'centipede' means a 'hundred legs'. If you had as many legs as me, you could count lots of things.

MILLIPEDE: (*stands*) I'm a millipede and my name means 'thousand legs'. If you had that many legs, you could count hundreds and hundreds of invertebrates.

BEETLE: Yes, well. Suppose you invertebrates each tell me and the children here a little about yourself.

MILLIPEDE: (*stands*) First, let me say something about all of us invertebrates. None of us can fly so we get around with different kinds and numbers of legs. And some of us have no legs at all. Many of us have to guard against drying out, so we like dark and moist places to live. And many – but not me – like to eat at night.

ORB WEAVING SPIDER: Speaking of food, you should say, too, that many invertebrates, like me, are predators and important in getting rid of pesky insects. Others eat plants. Still others eat dead plants and animals and recycle them into soil nutrients.

MILLIPEDE: (*Stands and waves wildly*) Like me!

EARTHWORM: And me.

FRESH WATER CLAM: (*Stands.*) And don't forget I am really useful for cleaning water.

BEETLE: I can see that invertebrates do many important jobs in the environment. But, I think it's time for you to introduce yourselves. You go first, Miss Spider.

Beetle remains in front of class. Others (except Orb-weaving Spider) resume seats. Speakers, in turn, stand to introduce themselves. Poster or puppet is displayed at the same time.

ORB-WEAVING SPIDER: I am a spider and you can tell me from an insect because I have eight legs, and 2 body parts, and no antennae (just bumps) and, no wings. If you get close enough, you can see I have eight little eyes. Even so, I don't see very well. I am the kind of spider that makes webs. You may see my web before you see me. The web has sticky threads and dumb insects bump into it and, ha, ha are caught. I wrap them up and then, when hungry, I suck them dry. Yum! *(Returns to seat and sits.)*

JUMPING SPIDER: I'm a spider too. A jumping spider. Not all spiders make webs, you know. Some spiders hide by flowers, in plants, or in the ground and then snatch lunches as they walk by. Me? I hide and then I leap upon my meals when they get near. Sometimes, I have to look a bit. I can see better than most spiders. And I can jump about 6 inches.

DADDY LONG-LEGS: It's discouraging. I'm a daddy long-legs and many people think I'm a long-legged spider. Like spiders, see, I have eight legs. Long, skinny ones. Of course, I can lose one or two or so and still get around. But, I don't grow them back like walking sticks, which are insects. I like shade and moisture. I mostly catch and eat other invertebrates.

SCORPION: I'm a scorpion – and I'm no one to tangle with. Just look at my tail – well it's not really a tail but it has a stinger – a poisonous stinger at the end. And see the pincers on my feelers. I use those to grab my meals. At night, little animals need to look out for me. By day I sleep under rocks or in cracks.

TICK: Can you see me? I'm a tick and I'm about 1/4 of an inch long. But, I get much bigger when I attach to you and burrow my head into you and suck and suck until I get big and fat with blood. Then, I drop off. Some of us carry diseases – but not all. You look like nice children – my advice is stay away. Or check yourself and your clothes when you've been in woody places.

MITE: You probably can't see me at all. I'm a mite and mites are very, very, very small. But we're related to spiders and generally have oval bodies and eight legs when we're grown up. Some of us feed on plants, but most of us suck liquids from animals. Not just any animal. I, for example, just feed on birds.

CENTIPEDE: You can scarcely miss me. Like most centipedes I am brightly colored. It's a warning to other animals that I am dangerous. I have many, many pairs of legs. The first pair are really like pincer claws, and they are poisonous. At night, I creep about and look for meals. If I see a fat slug or snail, I grab it with my poison claws and that's it.

MILLIPEDE: If you're giving a prize for the most legs – it should go to a millipede like me. I have even more pairs of legs than a centipede– 2 pairs on each body segment. In fact, my name means thousand legs – not that I have that many. And I'm much nicer than any centipede– although some millipedes give off nasty chemicals if they think you want to eat them. Millipedes don't eat other animals – we eat plants, particularly rotting ones.

ROLY-POLY (PILL BUG): I'm a roly-poly or pill bug. Lots of people think we're insects, but we're not. We're isopods and related to crabs and lobsters. We have ten little legs that are just alike. And we each have a segmented body we can roll into a ball when we're in danger.

EARTHWORM: I'm quite different from these other animals, because my body is soft and because I don't have any legs at all. I dig burrows and tunnels in the ground in which to live. But at night, I come out to feed on bits of dead plants and animals. My tunnels and diet help to make good soil that is full of nutrients for plants.

LAND SNAIL: You probably know me, I'm a land snail. I'm soft-bodied like the worm, but I am protected by the shell that I make and wear on my back. When I'm in danger, I can pull inside of my shell. It's good to have some protection because I move very slowly. I don't have legs – just one foot. Land snails eat many things. Some eat dead matter and are recyclers.

SLUG: Slugs like me are really unprotected. I'm soft-bodied, too, and very like a snail. But I don't have any shell to protect me. I do wrap myself in slimy stuff though, which people, at least, don't like to touch. The slime makes it easier for me to move and protects me from enemies and from drying out.

FRESHWATER CLAM: I'm a freshwater clam. I have a two-part shell that is hinged together. I can open my shell to take in water, which is how I get my oxygen. I eat the bits of animals and plants in the water. I'm a very important water cleaner.

BEETLE: Thank you, invertebrates, for introducing yourselves to the children. You are certainly an interesting group. Perhaps sometime we can meet some of your relatives for there are many, many more kinds of invertebrates. But, it's nice to have met you. And now,

whenever any of us meet you outside, we can say “Hi!” In fact, let’s practice it now. BEETLE leads class in several, loud ‘HI! HI! INVERTEBRATES! He shouts.