

ACTIVITY: ROLY-POLYLOGY 101

The Study of Respect and Care for Nature's Small Creatures.

Overview

Even small creatures have adaptations that allow them to survive in nature. "Roly-polyology 101" allows students to study these adaptations while learning the importance of respecting little creatures and why people should care about them.

Objectives

Students will be able to

1. observe, describe, and illustrate the natural habitat of a small creature;
2. describe the important role small creatures play within their ecosystem;
3. demonstrate a caring attitude by gently and patiently handling small creatures;
4. propose ways to help eliminate and/or clean up pollution, litter, and waste;
5. demonstrate respect for a habitat by leaving the habitat as it is found.

Background

An adaptation is a structure, function, or form that improves the chance of survival for an animal or plant within a given environment. Most living things have a variety of adaptations. These are classified as either behavioral or physical. Behavioral adaptations are what an animal does or how it behaves in order to survive (plays dead, runs away, migrates, hibernates, etc.). Physical adaptations are the body structures or forms that a plant or animal has that help it survive (body coverings, colorings, leaf patterns, bark texture, characteristics of beaks, legs, wings, etc.).

"Roly-polys," also called pillbugs (*Armadillidium vulgare*), are closely related to sowbugs. Roly-polys look like insects but they are actually crustaceans in the isopod family. Roly-polys have many physical and behavioral adaptations such as a hard outer skeleton with overlapping "armored" plates,



SCIENCE: Life Processes – Adaptations, Living Systems

CHARACTER: Caring, Respect

GRADE LEVEL

1st Grade - 4th Grade

VIRGINIA STANDARDS OF LEARNING

Science: 1.1, 1.5, 2.1, 3.1, 3.4, 4.1, 4.5

English: 1.1, 1.2, 1.12, 2.2, 2.3, 2.9, 2.10, 3.1, 3.8, 4.

LENGTH/DURATION

3 one-hour sessions

MATERIALS

hard hat or helmet, cardboard, duct tape, roly-polys (or other small creatures such as worms or mealworms), magnifying glass or bug boxes, soil, shoebox, construction paper, parent volunteers, ruler, rubber gloves

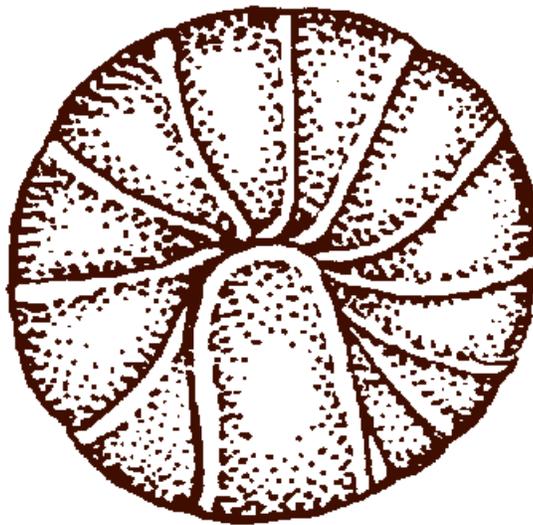
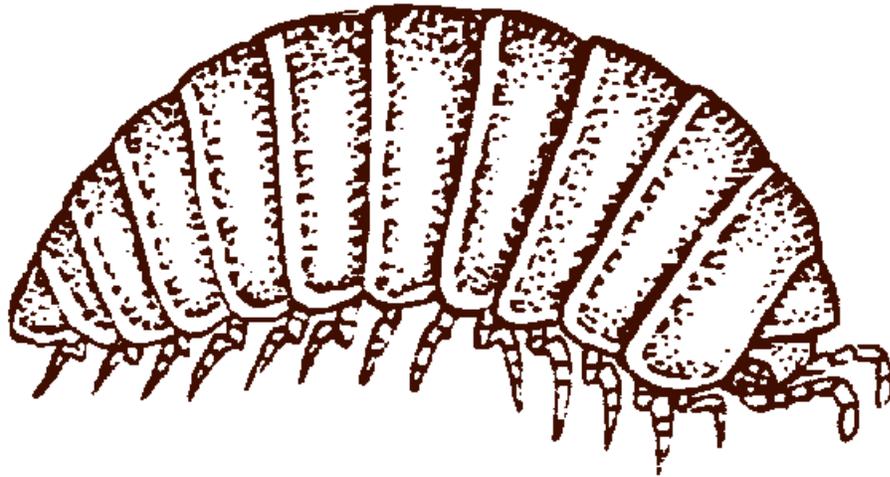
VOCABULARY

adaptation, habitat, behavioral adaptation, physical adaptation, crustacean, isopod, pillbug, roly-poly, scat, decomposer, ecosystem, caring, respect, stewardship

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jointed legs, segmented body, and two pairs of antennae. They cannot bite or sting. They are about 1/2 inch long and live in dark, moist places, under rocks, in decaying wood, or in the soil in a schoolyard. Long periods of sunlight dry them out and ultimately cause death. Roly-polys get their name from the adaptation they display when in danger -

they curl up into a ball for protection. They also can make a stinky odor like a skunk as a defense against enemies. Roly-polys are important decomposers in our ecosystem. They eat decaying matter such as leaves, mulch, and “scat” (excrement, droppings from other animals) and recycle it back into the soil.



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LESSON

Motivational Activity

Introduce or review the terms *physical adaptation* and *behavioral adaptation*.

Role-play an animal with body parts (physical adaptations) that help it survive. Wear a hard hat and “protective armor” (cardboard covered in duct tape) into class. Demonstrate how these body parts would provide protection and help the animal survive, e.g., curl up in the armor for protection, butt the hard hat against an imaginary nut to crack it open, use the hat to protect eyes from the sun to improve vision.

(Option: dress up a student and have him/her demonstrate.)

Next, exhibit and discuss possible behavioral adaptations: play dead (lie on floor), run away from danger (run around the classroom), gather food (munch on pretend plants), etc.

Students can create a name for this imaginary animal. Older students could write and illustrate in a journal, describing the imaginary animal’s life, habitat, food sources, and enemies. Students could add additional adaptations – both physical and behavioral – and include them in a story about survival.

Have students discuss, list, and role-play scenarios where real animals or plants exhibit certain behaviors or physical adaptations for protection and survival. Examples: deer raising its tail to signal danger, opossum playing dead, a very tall tree with thick bark, turtle hiding in its shell, fawn’s camouflage.

(Option: Play a game of charades to demonstrate these adaptations.)

Activities

1. Carefully collect several roly-polys (or other small creatures) and place them in a container for the classroom. Remember to provide the proper temporary environment for the creatures and return them to their habitat when finished.

Ask if anyone can identify the creatures. Discuss what the students might know about roly-polys: where they live, what they eat, what their importance is in their ecosystem, what adaptations they exhibit, etc. These hypotheses will be tested in the following steps. Have students document their scientific research in journals.

2. Divide the class into small groups of 4-5 students each. Send the groups out with magnifying lenses and bug boxes on a “roly-poly search.” Have the students test their hypotheses by looking for roly-polys in different locations. Once roly-polys are discovered, have students gather together



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to make careful observations. Remind the students to be patient and careful while observing and handling the animals. They should describe the habitat, identify probable food and water sources, and note specific behaviors.

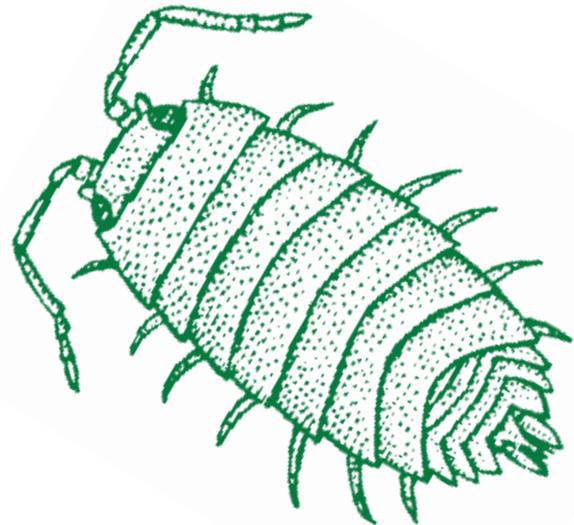
Students should use magnifying lenses to examine the physical adaptations they see and discuss their findings. Is the “hard hat” and “armor” the teacher wore similar to the outer shell of the roly-poly? What behavioral adaptations are observed? Why might the roly-poly behave that way and how does that behavior help it to survive? As a decomposer, what service does the roly-poly provide in its habitat? What might eat a roly-poly? What would happen if roly-polys disappeared from their ecosystem?

When finished observing, remind the students to return the creatures and leave the roly-poly’s habitat the way it was found. Ask, “How would you feel if someone took the roof off of your house?”

3. To learn responsibility and respect for small creatures, have the students temporarily care for a roly-poly or other small creature (ant, cricket, worm, mealworm). Discuss the importance of gently handling the creature and model this behavior. Students should create a small temporary habitat using shoeboxes, soil, leaves, mulch, and construction paper and supply adequate food and water for the creature to survive. Older students can enter day-by-day observations in their journals.

Have students share their experiences and discoveries related to their new responsibility. Discuss why demonstrating care and respect for the roly-polys is important. Journal entries might include future behaviors that the students could exhibit to protect Earth’s small creatures.

4. Relate the responsibility of caring for the roly-poly with the role of national parks in taking care of plants and animals. How do national parks protect animals both large and small? Why is it important to protect the small creatures, too? What can people do to help national parks care for plants and animals and their habitats?
5. Have students discuss, write, and illustrate facts about their discoveries and conclusions and return the roly-polys carefully to their natural habitat. Create a bulletin board display with pictures and facts that explain why it is important to respect and care for the tiny creatures of the world.



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Assessments

1. Observe and document behavior, participation, and understanding exhibited during the search for small creatures and in the classroom.
2. Written projects can be evaluated according to the number of facts and the amount of understanding the students express; the effort shown; and the use of age-appropriate language, grammar, and editing skills. These standards should be shared in advance and posted for all students to see.
3. Assess students' lists of facts and discoveries related to the roly-polys or other small creatures. A rubric scoring criteria that might be used to assess this information is 9-10 facts or discoveries = A, 7-8 = B, 5-6 = C, 3-4 = D.
4. Evaluate journals according to criteria set: e.g., labeled pictures, scientific steps and observations, clear descriptions, conclusions, stated changes in behaviors and attitudes.
5. Question and document understandings and behavioral changes a student may have achieved from this study. Is there a greater appreciation and respect for tiny creatures? Ask, "What would you do if you found a cricket behind the classroom door?" or "There are ants on the sidewalk outside the school. What should you do?"



Going Further

1. Small groups or individuals can further their understanding of roly-polys by developing scientific questions and using the scientific method to solve the questions:
 - a. How fast can a roly-poly go?
 - b. Can a roly-poly dig?
 - c. Do roly-polys like the dark or the light?
 - d. What do roly-polys like to eat?
 - e. Do roly-polys prefer a moist or dry environment?

Note: If it is very dry outside, another small creature might have to substitute for the roly-poly. Call it "Antology 101," "Wormology 101," etc. Any small creature would work for the above activities.

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2. List other animals and describe their adaptations. Have students determine if adaptations are physical or behavioral.
3. Ask students to write creative stories about their “pet” roly-poly. Use either personification to create a fictional story or facts to write a non-fiction story. They might introduce a villain or hero to their story illustrating the character traits of responsibility and caring. Adaptations used for survival should also be identified.
4. As a culminating activity, invite other classes and parents to participate in a graduation from “Roly-polyology 101.” Develop a certificate to give each student who performs satisfactorily on the above assessments.

Related Subject Activities

1. Math - Graph the types and numbers of small creatures found. Measure the length of the roly-polys found.

2. Art - Create a Habitat Box. Decorate it to look like the animal’s natural home.
3. Extensions in Science - Research other isopods and list their characteristics.
4. Language Arts - Read more about small creatures in the *Backyard Buddies* series by Michael Elsohn Ross. Assign journal writing - daily 5-minute observations documented in journal.

Resources and References

Project Wild. U.S.A.: Council for Environmental Education, 2000 Edition.

Grasshopper Gravity. 4-6.

Adaptation Artistry. 131-132.

Ross, Michael. *Rolypolyology*. Lerner Publishing Group, 2001.

Lyon, William F. *Sowbugs and Pillbugs*. The Ohio State University Extension Fact Sheet, HYG 2072-94. Ohio State University Extension, 2000.

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