

Who's Been Eating the Oatmeal?

Description

In this activity, students listen while you read “The Forgetful Pony.” Students also observe oatmeal that contains mealworms, connecting it to the oatmeal in the story, and infer what mealworms use as a food source.

Time Frame

3 lessons (45 minutes each)

Correlation to Texas Essential Knowledge and Skills

During this activity, students will be exposed to the following Texas Essential Knowledge and Skills:

Note: Some TEKS statements below end with a ; or *and* and nothing thereafter—this indicates that further TEKS statements follow but are not included here.

(1.9) Science concepts. The student knows that living organisms have basic needs. The student is expected to:

- (A) identify characteristics of living organisms that allow their basic needs to be met; and

Note: The TEKS listed here are the main content TEKS for this activity; however, this activity may also cover additional content and process skills included in other TEKS.

Materials

1 copy of “The Forgetful Pony” story (included at the end of this activity)
Old-fashioned oatmeal (*not* the quick-cooking type)
Small containers, such as plastic butter tubs, clear plastic cups, or deli containers (1 per student)
Mealworms for each student (2–3 per student)
Mealworm colony (instructions and materials described in the Materials Notes below)
What Do Different Animals Eat? chart (1 per student, and 1 class chart for the teacher)
Cotton swabs (1 per student)

SAFETY: Nothing should ever be tasted in a science investigation without teacher instruction. Also check student allergies before using food as part of a learning experience.

Materials Notes

Grain and Mealworms

Grain elevators, feed and flour mills, barns, and grain product warehouses may become home for grain-eating insects, such as darkling beetles, grain beetles, cosmopolitan beetles, and flour beetles. These beetles undergo complete metamorphosis, which means they go through four distinctive stages of development—**egg**, **larva**, **pupa**, and **adult**. The eggs are white, bean-shaped, and about 1/20 inch long. Very tiny white larvae hatch from the eggs. In the larval stage, the darkling beetle is called a **mealworm**. As the mealworms grow, they molt, or shed their hard outer skeleton, up to 14 times. The larvae of yellow mealworms (*Tenebrio molitor*) are honey-yellow in color, while the larvae of darker mealworms (*Tenebrio obscurus*) are dark brown. A mature mealworm becomes darker just before it turns into a pupa.

During the pupa stage, the larva acquires adult beetle characteristics. After the changes are complete (from one to three weeks), a light-colored adult beetle emerges. The beetle’s color darkens as it matures. Beetles are adults and do not grow; therefore, they do not molt. Adult beetles live from four to five weeks.

The mature female beetle will lay from 270 to 500 eggs. The eggs generally hatch in about two weeks. The length of time required to complete the life cycle depends on environmental conditions such as temperature and food supply. Mealworms do best in temperatures between 80–90°F. At temperatures between 40–50°F the mealworms will become dormant. Lower temperatures will kill them.

To establish a **mealworm colony**, assemble the following materials:

1 large clear, dry, glass or hard plastic container, such as a one-gallon jar, a storage box, or an aquarium

Note: Containers with a wide surface area encourage mealworm growth. Do not use cardboard or a paper or plastic bag, as the mealworms will eat through it.

Old-fashioned oatmeal (*not* the quick-cooking type)
Bran flakes (2–3 cups)
1 or 2 slices of raw potato or apple
Approximately 100 mealworm larvae (available at most pet stores)
1 colander sieve (openings should be small enough that the mealworms will not pass through)

Set up the mealworm colony at least two weeks before conducting this activity.

1. Place a two-inch-deep layer of oatmeal mixed with bran flakes in a large container. Do not fill the container to the top, or the larvae will crawl out.
2. Place a thick slice of raw potato or apple on the oatmeal mixture to supply the larvae with water.
3. Add the mealworm larvae.

4. Check the water source about once a week. Replace it with a fresh piece of potato or apple if the slice becomes hard, dry, or moldy.
5. After a few weeks a noticeable gray powder, called **frass**, will appear on the floor of the container. Dump the contents of the container into a household sieve. Mealworms, adult beetles, and uneaten oatmeal will be retained, and the frass will fall through the sieve. Frass is composed of mealworm wastes and eggs. You may want to keep the frass to raise more mealworms.
6. Clean and thoroughly dry the container.
7. Add a fresh food supply of oatmeal and bran flakes and return the mealworms, adult beetles, and uneaten oatmeal to the container. Add a fresh slice of apple or potato as a water source.

Responsible Use of Live Animals in the Science Classroom

These guidelines are part of the National Science Teachers Association’s Position Statement “Responsible Use of Live Animals and Dissection in the Science Classroom,” adopted by the NSTA Board of Directors in June 2005. The full statement is available online at www.nsta.org/positionstatement&psid=44.

NSTA supports the decision of science teachers and their school or school district to integrate live animals and dissection in the K–12 classroom. Student interaction with organisms is one of the most effective methods of achieving many of the goals outlined in the National Science Education Standards (NSES). To this end, NSTA encourages educators and school officials to make informed decisions about the integration of animals in the science curriculum. NSTA opposes regulations or legislation that would eliminate an educator's decision-making role regarding dissection or would deny students the opportunity to learn through actual animal dissection.

NSTA encourages districts to ensure that animals are properly cared for and treated humanely, responsibly, and ethically. Ultimately, decisions to incorporate organisms in the classroom should balance the ethical and responsible care of animals with their educational value.

While this position statement is primarily focused on vertebrate animals, NSTA recognizes the importance of following similar ethical practices for all living organisms.

Including Live Animals in the Classroom

NSTA supports including live animals as part of instruction in the K–12 science classroom because observing and working with animals firsthand can spark students' interest in science as well as a general respect for life while reinforcing key concepts as outlined in the NSES.

NSTA recommends that teachers

- Educate themselves about the safe and responsible use of animals in the classroom. Teachers should seek information from reputable sources and familiarize themselves with laws and regulations in their state.

- Become knowledgeable about the acquisition and care of animals appropriate to the species under study so that both students and the animals stay safe and healthy during all activities.
- Follow local, state, and national laws, policies, and regulations when live organisms, particularly native species, are included in the classroom.
- Integrate live animals into the science program based on sound curriculum and pedagogical decisions.
- Develop activities that promote observation and comparison skills that instill in students an appreciation for the value of life and the importance of caring for animals responsibly.
- Instruct students on safety precautions for handling live organisms and establish a plan for addressing such issues as allergies and fear of animals.
- Develop and implement a plan for future care or disposition of animals at the conclusion of the study as well as during school breaks and summer vacations.
- Espouse the importance of not conducting experimental procedures on animals if such procedures are likely to cause pain, induce nutritional deficiencies, or expose animals to parasites, hazardous/toxic chemicals, or radiation.
- Shelter animals when the classroom is being cleaned with chemical cleaners, sprayed with pesticides, and during other times when potentially harmful chemicals are being used.
- Refrain from releasing animals into a non-indigenous environment.

Background Information for the Teacher

Observing the life cycle of the mealworm provides students an example of the scientific principles of constancy and change. When observing mealworms, students notice the changes that occur, as well as the attributes and characteristics of the mealworm that remain constant. (For example, the basic needs of a living organism are constant, as well as its growth, reproduction, and survival.)

Advance Preparation

1. Prepare a small plastic container for each student or group of students. It should contain some fresh oatmeal and 2–3 mealworms per student or group.
2. Make one copy of the What Do Different Animals Eat? chart for each student.
3. Make one large copy of the What Do Different Animals Eat? chart, and post it on the board.

Procedures

1. Read “The Forgetful Pony” to the class.
2. Have the class brainstorm and list the kinds of food each animal in the story really eats. As a class, draw on prior knowledge to complete the What Do Different Animals Eat? class chart. Then have students copy the information onto their own charts.
3. Tell students they will observe containers of oatmeal from the Forgetful Pony’s barn. “Just like the little green lizard, you could help the Forgetful Pony.”
4. Give each student a container of oatmeal and mealworms from the Forgetful Pony’s barn. Students can use fingers or a cotton swab to move the oatmeal around. They should notice the mealworms in the oatmeal.
5. As soon as the first student notices and comments on the mealworms, get the group’s attention. Have students explain why it is important to be gentle with the animals they are observing.

Note: Do not force any students to touch the mealworms. Cotton swabs can be used to gently manipulate the mealworms. Remind students of the need to treat living creatures humanely.

SAFETY: Students should wash their hands after handling the mealworms. Ask students to explain why it is important that they wash their hands after working with animals. (They have been handling live organisms, which crawl on materials that might be unhealthful for us.)

6. Ask students to describe what they are observing in the oatmeal from the Forgetful Pony’s barn. If no student knows that these are mealworms, tell them what they are called and write the word on the What Do Different Animals Eat? chart, in the last row of the first column.

Note: Allow any student who has seen mealworms before to share that prior experience.

7. Ask students to describe what they think the little green lizard ate for a snack at the end of Chapter 3. Guide students to explain what the little green lizard found to eat in the barn. Discuss the reasons for their guesses.
8. Ask students why they think mealworms are found in the oatmeal from the barn. What do they think mealworms eat?
9. Complete the mealworm column on the What Do Different Animals Eat? class chart, and then have students complete their individual charts.
10. Return the mealworms to the colony, and keep the colony and plastic containers for use in other activities that require a mealworm colony. If none such activities are planned, discreetly place the mealworms in a plastic bag and freeze them. Once frozen, you can dispose of the bag.

Additional Resources

Following is a list of books useful for providing students informative and interesting facts about insect life.

Himmelman, John. *A Mealworm’s Life (Nature Upclose)*. Connecticut: Children’s Press, 2001.

Litowinsky, Olga. *Groovy Tube Books: Bug Blast!* Norwalk: Innovative Kids, 2000.

The Forgetful Pony

Once upon a time there was a forgetful pony. The forgetful pony wanted to make some oatmeal cookies. "I do not know anything about oat grains. Who will help me gather some grains of oats to make oatmeal cookies?" neighed the forgetful pony. "Not I," mooed the cow. "Not I," baahed the sheep. "Not I," cooed the dove. "Not I," hissed the little green lizard. "I do not like oatmeal cookies. But I will show you some oat grain." So the little green lizard went to the field and showed the pony the oat grains. Then the forgetful pony gathered the grain by himself.

"I do not know how to make oatmeal. I don't even know what oatmeal looks like," neighed the forgetful pony. "Who will help me make the oatmeal for the oatmeal cookies?" "Not I," mooed the cow. "Not I," baahed the sheep. "Not I," cooed the dove. "Not I," hissed the little green lizard. "I do not like oatmeal cookies. But I will show you how to make the oatmeal." So the little green lizard showed the forgetful pony how to roll the oat grains into oatmeal. "See, this is what oatmeal should look like," said the little green lizard. Then the forgetful pony rolled the oat grains and made the oatmeal himself.

"That was a lot of work," thought the forgetful pony. "I will put the oatmeal in the barn. I can make the oatmeal cookies tomorrow." Of course, when tomorrow came, the forgetful pony forgot where he had put the oatmeal. Many weeks went by, and the forgetful pony could not remember where he put the oatmeal.

But one day the forgetful pony neighed loudly, "I remember where the oatmeal is! I will make oatmeal cookies today. Who will help me eat the oatmeal cookies?" "I will," mooed the cow. "I will," baahed the sheep. "I will," cooed the dove. "Not I," hissed the little green lizard, "I do not like oatmeal cookies. But I will go to the barn with you to get the oatmeal." So all of the animals went to the barn to get the oatmeal for the oatmeal cookies.

"Who's been eating the oatmeal?" neighed the forgetful pony when he saw some of the oatmeal was missing. "Not I," mooed the cow. "Not I," baahed the sheep. "Not I," cooed the dove. "Well, I did not," hissed the lizard, "I do not like oatmeal. But I know who did eat it!"

And the lizard had a snack right there and then. The lizard hissed happily as he snacked, "There will be even more snacks for me to eat in a few weeks."

What Do Different Animals Eat?

Pony	
Cow	
Sheep	
Lizard	