

Mealworm Life Cycle

Summary

The mealworm is the larval stage of the darkling beetle. The darkling beetle undergoes complete metamorphosis. Students each receive a mealworm to place in a habitat and take back to their classroom. They make observations of their mealworm and watch as it progresses from the larva to the pupa and finally the beetle will emerge. Students will then release their darkling beetles outside.

Time Frame

1 class periods of 45 minutes each

Group Size

Small Groups

Materials

- one mealworm per student, may be purchased from Petco, 100 for \$3.49
- wheat bran, may be purchased from Smith's in the bulk section
- whole wheat flour
- potatoes, cut up into approximately 1 cm x 1 cm cubes
- one plastic 8 oz. cup per student
- magnifying lenses

Background for Teachers

The mealworm is NOT a worm. It is the larval stage (grub) of the yellow mealworm beetle, also called the darkling beetle (*Tenebrio molitor*). Although the grub looks a bit like a worm, the mealworm has six small, jointed legs.

The mealworm undergoes complete metamorphosis. The female darkling beetle lays hundreds of tiny, white, oval eggs, which hatch into tiny mealworms (the larval stage) - it takes from 4 to 19 days to hatch. Each mealworm eats a tremendous amount and grows a lot, molting (shedding its exoskeleton) many times as it grows. It then enters the pupal stage (this stage lasts from 2-3 weeks, up to 9 months, if the pupal stage over-winters). The pupa does not eat and seems inactive, but it is transforming itself into an adult. After pupating, a white adult darkling beetle emerges from the pupa -- it soon turns brown and then almost black. The adult lives for a few months.

Both the adults and the larvae are scavengers that eat grains and some seedlings. Because of this, it is considered a pest. They also eat decaying material, like decomposing animals and dead plants. They get all the water they need from the food they eat. Mealworms are eaten by many animals, including many birds, rodents, spiders, lizards, and some other beetles.

Intended Learning Outcomes

- Framing questions. Conducting investigations. Collecting data.
- Connecting ideas with reasons. Using multiple methods of communicating reasons/evidence.
- Communication of ideas in science is important for helping to check the reasons for ideas.

Instructional Procedures

Preparation:

Mealworms should be purchased two to four weeks before the class date. This will reduce the time the mealworms will be in the classroom because they are growing and eating before the students get them. Place the mealworms in a container with wheat bran as the bedding. Add a few teaspoons of

whole wheat flour. Cut up a potato and place the pieces into the bedding. As the potatoes dry out, add fresh potatoes. With starting 2 to 4 weeks before class you should get a pupa before class time. If you want to start the worms a month before the class you will probably have a beetle before class time.

Pre-lab discussion:

Tell the students that they are each going to take an animal back to their classroom to take care of over the next several weeks. Ask them what kind of animal they think they will receive. Tell them they are going to be taking care of a mealworm. Explain the mealworm life cycle and that they will be making a habitat for their mealworm. Explain the purpose of the wheatbran for bedding, the whole wheat flour for food, and the potato for moisture. If this is presented with excitement and fascination, these emotions are very contagious to the students. Explain to them that it is a big responsibility to take care of an animal and that they will learn how to do that safely today.

Instructional procedure:

Use magnifying lenses to study the different stages of the beetle on the desk.

mealworm -- Notice the legs on the worm. The many different sizes are due to the age and weight of the worm. The job of the mealworm is to EAT. As it grows it sheds its exoskeleton. Have students look at exoskeletons.

pupa -- Notice that it appears not to be moving but will move if touched. Notice it cannot eat during this stage. This is the stage of the biggest change.

beetle -- The beetle has all three insect parts of head, thorax and abdomen. Notice the color difference between the young and older beetles.

Describe the changes the mealworm goes through in each of its stages. These changes are slow. The changes that are fast are the hatching from the pupa and the shedding of the exoskeletons.

Make a mealworm habitat for each student to take to the classroom.

Write their name and class on the outside of a see through plastic cup.

Put about 1 inch of wheat bran in the bottom of the cup.

Place a large mealworm in the cup.

Place a small amount of wheat flour in the cup.

Add two pieces of potato.

Tell the students they will observe their mealworms over the next several weeks. They should check their mealworm every couple of days and notice when it pupates and when it becomes a beetle. It is easiest to check their mealworm if you have a supply of small desert paper plates. Then can dump the cup onto the plate, observe the mealworm, and then put everything back into the cup. When it becomes a beetle they can take it outside and let it go far from the school. About once a week, the teacher or students need to replace the potato pieces. If the mealworm dies it can be replaced with a spare mealworm if you have any left over.

Bibliography

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