

Mealworm Biology

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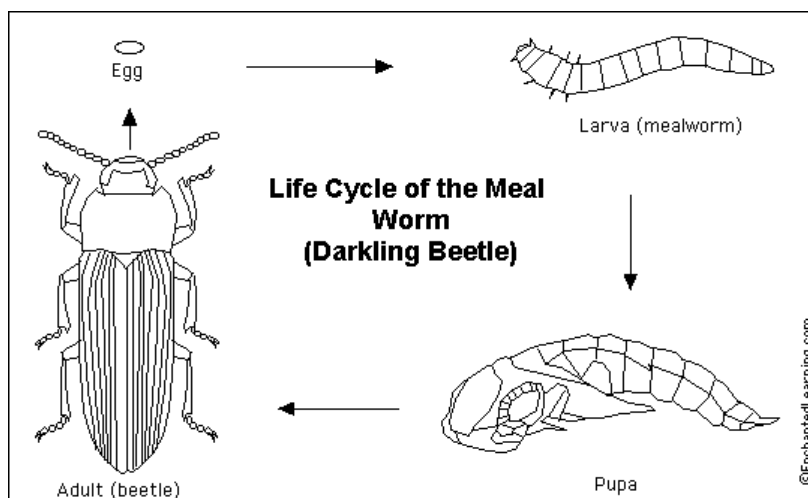
So, you feed mealworms to your anoles, but then what? Mealworms are actually also wonderful experimental subjects. You can use them to teach about life cycles and metamorphosis, and conduct experiments to determine what factors change their developmental rate. Mealworms are also decomposers, and you can use them in teaching about food webs.

Basic Information on Mealworms, copied verbatim from:

<http://www.enchantedlearning.com/subjects/insects/beetles/mealworm/mealwormlifecycle.shtml>

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. Both the larva and the beetle are nocturnal (active at night), but they are also active during the day.

Life Cycle: 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 overwinters). The pupa does not eat and seems inactive, but it is transforming itself into an adult. After pupating, a white adult darkwing beetle emerges from the pupa -- it soon turns brown and then almost black. The adult lives for a few months. The entire life cycle takes about a year.



Anatomy: The tiny, white, bean-shaped eggs are about 2 mm long by 0.9 mm wide. Larvae are dark yellow with brown bands; they are up to about 35 mm long, have a segmented body, six legs (towards the front of the body) and two antennae. The pupa is white/cream with a large head and a pointed tail (it darkens as it grows). Like all insects, this beetle has a hard exoskeleton, six jointed legs, two antennae, compound eyes, and a body divided into three parts (the head, thorax, and abdomen). The adult is from 12 to 25 mm long and is dark brown.

Diet/Enemies: Both the adults and the larvae are scavengers that eat grains (hence the name mealworm) 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.

Range: This beetle is found in temperate and other regions around the world. They usually live in dark, cool, moist places, like under rocks and logs.

Mealworm life cycle

copied from <http://lhsfoss.org/fossweb/teachers/materials/plantanimal/tenebriobeetles.html>

Mealworm Life Cycle				
Stage	How long?	Food	Moisture	Other information
Egg	7–14 days			
Larva	30–90 days	Bran	Apple	5 molts occur
Pupa	10–20 days			
Adult	5–10 days	Bran	Apple	Death: 30 days
Egg	The cycle continues.			

Mealworm experiment/activity ideas

How does temperature affect development through beetle life cycle? Place a container of mealworms in a refrigerator, and one in a warm location. Measure the length or mass of 20 mealworms every week. (Or count proportion of pupae:larvae.) In a few weeks at a warm location, larvae will become adults. In a refrigerator, the mealworms will remain in their larval state almost indefinitely.

How does food source influence mealworm growth? Raise mealworms in different types of meal (cornmeal, oatmeal, other brans). Use the nutritional information on the food packages to make predictions about mealworm growth. (More protein, fat, fiber, carbohydrates per gram cause faster growth?)

How do lizards and mealworms fit into a food web? We can see that lizards eat mealworms and crickets – but how do these fit into a more complete food web? Have students research to learn what eats lizards, and what crickets and mealworms eat.

