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Life Science
Grade: 3rd
Life Processes/Life Cycle of Mealworms

Objective/Purpose:
The purpose of this lab series is to create an example of what all animals need so they can live and show a real example of a complete life cycle. The main objective is to allow the students to watch the changes in the mealworms’ life and reflect on how water, air, shelter, and food contribute to their changes.

OCC’s:
Topic: The Living World: Living Things
Standard: Recognizes and describes basic life processes. Identifies evidence of basic life processes in the immediate environment such as gathering and digesting food, excreting waste products, reproducing, breathing and responding to the environment

Topic: The Living World: Animals
Standard: Recognizes and describes a variety of animal and plant life cycles.

Materials/Time Required:
1. mealworms (50 mealworms for under $3.00 at a petstore)
2. containers (disposable Gladware worked great!) (SHELTER)
3. container lid (puncture with holes) (AIR)
4. moist fruit or vegetable (baby carrots worked great!) (WATER)
5. oatmeal, cornmeal, or whole wheat flour (oatmeal worked great!) (FOOD)
6. large construction paper or newspaper
7. journals (optional)
8. four notecards (optional)

Prior to this lesson, the only preparation for the teacher is buying the products. The students will enjoy constructing the habitat. The initial set-up lab will take ~30 minutes. The length of the entire series depends on the life cycle of the mealworms. Hint: Larva will turn into pupa more quickly if the temperature is warm. Each following lab took ~30 minutes, depending on how long I gave the students to observe and record their information.

Background Information:
Mealworms can be used for a perfect and inexpensive research lab of living things and animal life cycles for young students. Mealworms are not harmful, easy to take care of, and change forms rather quickly. Prior to this experiment, we read about what all living things need to live (air, water, food, and shelter). After about three weeks (depending upon your particular mealworms), we began studying life cycles, changes, and metamorphosis.

Preparation:
Before the initial lab, I poked holes in the lid of the plastic containers. Since I had to use a sharp object, it was best to prepare the habitat lids before my lesson. I divided the class into five groups and gave each group their own habitat. You will also need to cut your fruit or vegetable into
small slices. I used tiny carrots to avoid cutting them. I wrote either air, water, food, or shelter on each notecard. You may want to create journals for the students to record their observations, ideas, and research. The journals can also be used for an evaluation of their understanding of the lesson. Prior to each following lab, I needed additional carrots, another sheet of paper, and sometimes more oatmeal.

**Safety Issues:**

Ask students to wash their hands after each lab.

**Activity Outline/Teacher Procedures:**

I divided my class into groups of four. Each student chose a notecard. The students used their notecard to find what object (container, lid with holes, oatmeal, or carrots) would satisfy their necessity. This activity allowed each student to actively participate in the assembly of the habitat. Moreover, this activity was challenging for many students because they had to understand that the source of water for the mealworms is actually a food (moist fruit or vegetable). This initiated my conversation that fruits and vegetables are made of water. I explained that the carrots would rot and lose water. (Hint: Be sure to change the carrot regularly because fungus will grow in your habitats.) Therefore, we will have to change the carrots each week to ensure that the mealworms have a source of water. Next, the students worked together to assemble their habitat. Then, I added ten mealworms to each group’s habitat. During each following lab, we would dump the oatmeal out onto the large sheets of paper and sort through the oatmeal for larvae, pupas, and adult beetles. The students used their journals to record their observations. The teacher should guide each lab, yet allow the students to actively participate in creating and maintaining the mealworm habitat. Also, the teacher should initiate conversation about the students’ observations, explain the mealworm life cycle, and help the students record their observations in their journals. The mealworms will shed their exoskeleton during their larval stage. The pupas will be small, firm, and a lighter color. They will not move or eat. The beetles will be lighter in color at first, but will darken over a few hours. The teacher should show the students these many changes.

**Possible Questions:**

1. What do all living things need to live? How do the mealworms in our experiment get these things? (see materials)

2. Describe the life cycle of a mealworm? (egg, larva, pupa, adult)

**Assessment/Evaluation:**

I used journals to evaluate the students’ comprehension of each lab. The students included their observations each week, and I encouraged that they use new words that we had learned (larva, pupa, metamorphosis, habitat, etc.) The journals were a great way to informally evaluate the students, and they allowed the students to act as scientist as they recorded their observations!