

Life Cycles

3rd Grade

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1. References:

- “Life Cycle Observations” lesson plan from 3rd grade curriculum guide

2. Benchmarks:

GLI #LS-1: Compare the life cycles of different animals, including birth to adulthood, reproduction, and death.

GLI #LS-2: Relate animal structures to their specific survival functions.

3. Objectives:

Identify life cycle stages and be able to arrange a collection of pictures depicting the life cycle progression of an animal.

4. Materials:

- Mealworms
- Apples
- Oatmeal (other cereal types such as Cheerios, Fruit Loops, etc.)
- Bread
- Plastic cups
- Spoons
- Steak knife (for cutting apples)
- Egg [of a chicken]
- Pictures of various lifecycles (mealworm, butterfly, chicken, frog)
- *Life Cycle* booklet from the 3rd grade curriculum guide

5. Initial Demonstration:

Introduce the concept of a cycle: motorcycle, bicycle, tricycle, life cycle, water cycle, unicycle, recycle, etc... Explain that a cycle is something that goes around and around; it starts and finishing in the same place.

Show the students the egg and ask them if they know what it is, where it comes from, and what comes from it. Explain that the egg is one stage in the life cycle of the chicken. You may show the class an inanimate object such as a stapler and ask them if a stapler has a “life cycle.” Explain to them that the stapler will always be a stapler; it will not naturally undergo a change the way a living *organism* does. You may also introduce the saying, “What came first, the chicken or the egg?” – Explain this saying and the significance both in regards to life cycles and in general.

6. Target Observations:

- A chicken does not look like an egg nor does a mealworm look like what it will become (a darkling beetle). A creature can experience dramatic physical changes during its lifetime.

7. Target Model:

- Life cycles contain different stages in which the organisms can look very different. Animals can undergo changes in their appearance as they shift between different stages in their life cycles.

8. Procedure:

Give each student a copy of the Life Cycle booklet and read pages 1-6. As you read through the booklet, have the students enter and define the following terms in their science journals: *egg, larva, pupa, adult, metamorphosis, exoskeleton, embryo, life cycle*. Students can get the definitions using the information from the booklet. Review the definitions of the vocabulary words with the class to ensure their understanding.

Complete vocabulary that may be introduced: *adult, egg, embryo, emerge, invertebrate, larva, metamorphosis, nymph, pupa*. Parts of an insect: *abdomen, antenna, exoskeleton, head, thorax*.

Explain to the students that we want to observe the mealworms undergo their metamorphosis. Explain that mealworm and all living creatures have basic needs such as an adequate amount of food and moisture to survive, grow, and reproduce.

Show the students a mealworm and ask them what it is. Explain that it is a living organism (this should be obvious if it is moving and wiggling about). Tell the students that the creature is a mealworm and will undergo a change/transformation/*metamorphosis* and will become something different. Ask them to guess what the mealworm will become. You may tell them that it is an insect and have them guess why it does not look like an insect (three body parts), then explain that it is in the *larva* stage of its life cycle. You can either tell them what it will become (a darkling beetle) or this information can be withheld and discovered later.

Ask the students what the basic needs are for a creature to survive. After students identify the basic needs for development (food, environment, air, etc.) ask them to design a way to enable and watch the mealworms develop. Also, explain that a good scientist will design an experiment(s) to get multiple pieces of information. Ask the students how we might determine how temperature affects mealworms' movement and development and how we could test the beetles' food preference. The food preference can occur once the mealworms have completed their metamorphosis.

Effect of temperature on movement and development: The teacher should also take 3-4 mealworms and place them in paper/plastic cups with food like the students' mealworms. Have the students observe and record the mealworms' behavior at room temperature. Then, place the mealworms in the refrigerator for a few days. Remove the mealworms and immediately have the students record their observation. Then, after 5-10 minutes, the mealworms will begin to warm and they should start to move more rapidly. Have the students make an observation after 5-10 minutes and then have them draw conclusions regarding how temperature affects the mealworms. These mealworms will be kept in the refrigerator and they will likely become dormant. Periodic observations of these mealworms (along with observations of the students' mealworms) should show that the development (pupa and adult stages) has been slowed down for the mealworms in the refrigerator. Ask the students if you think the mealworms would ever undergo metamorphosis if they were left in the refrigerator.

Beetle food preference: Once all or most of the mealworms have become beetles, ask the students how to determine what type of food the beetles prefer. Various types of cereal, bread, vegetables, etc., may be used. Place approximately equal amounts of food in the corners of a container and place a few (3-5) beetles in the container and allow them to choose their preferred food. Have the students make a chart of food type of # of beetles preferring that type of food.

Class metamorphosis chart: The class may also keep a metamorphosis chart that will show how many of the insects are in each life cycle stage during a given week. At the completion, the students can make a multi-series bar or line graph showing this information. The graphing could also be done in front of the class with their participation.

9. Target Observations:

- A living creature has multiple stages in its life cycle and the physical appearance of the creature in each of these stages may be drastically different from one another.
- A scientific study can be performed in order to learn information that we don't already know. The study must be conducted in a "fair" manner.

10. Target Revised Model:

- In order to predict the changes that an organism will undergo during the progression of its life cycle, either experience or a "scientific" study can be used. Since they probably do not have experience with mealworms changing to darkling beetles, the class will systematically observe the mealworms undergo their metamorphosis.

11. Procedure:

Give each student the Mealworm Observation Log. Have each student take a cup, some oatmeal, and an apple slice. Have students write their names on their cups. They should make an initial observation of their mealworms (including colors, length, and a written description). The mealworms will then be placed aside a periodically checked and students will make additional observation in their Observation Log. (One or two observations per week is sufficient.)

12. Target Observations:

- Life cycles changes are not immediate. The larva, pupa, and adult will look very different. The life cycle of the beetles is relatively fast compared to a human. The time it takes to become beetles should be fairly similar for all the beetles (a Gaussian distribution of the gestation period might be obtained).

13. Target Revised Model:

- Organisms undergo various stages in their life cycles. Life is a cyclic process from egg to adult and back to egg. Time, proper nutrition, and environment are required for the organism to undergo metamorphosis.

14. Summary:

Students have compared the life cycles of different animals including birth to adulthood, reproduction, and death. (LS-1). Students conducted a scientific study, collected data, recorded their observations and displayed this information through graphs and tables. Students have learned about *form fitting function* in that various animal structures relate to their specific survival skills. (LS-2).