Significant Surroundings

Purpose: Students investigate and identify basic animal behaviors and hypothesize what causes them. Students will also discover the responsibilities of an animal physiologist.

Time: 2, 60 minutes sessions

Level: 3-5

Materials:

- Masking tape
- Stapler
- Shoebox
- Flashlight
- Construction paper
- Sandpaper
- Quart sized, zip lock bags
- Lightweight paper
- Mealworms (may be purchased at pet stores)
- Timer
- Scissors
- Hand lens
- ruler

Minnesota Science Standards and Benchmarks

3.1.1.2.3 Maintain a record of observations, procedures and explanations, being careful to distinguish between actual observations and ideas about what was observed.

3.1.1.2.4 Construct reasonable explanations based on evidence collected from observations or experiments.

5.1.1.2.2 Identify and collect relevant evidence, make systematic observations and accurate measurements and identify variables in a scientific investigation.

5.4.4.1.1 Give examples of beneficial and harmful human interaction with natural systems.

Background

An animal's behavior is determined by genetics as well as experiences in its social (other animals of the same species) and physical (where it was raised) environment. These experiences can cause changes in physiology, the nervous system and physical structures of the body. Animals change throughout their lives based on their experiences. However, experiences early in life often have the greatest effect on animals and can even affect gene expression.

Animal physiologists study how animals function and behave, including how animals interact with things outside their body, such as temperature, lighting, or sound, plus things inside their body such as disease, poisons, or diet. This knowledge helps animal physiologists recommend the environmental specifications needed for the animal's well-being, including housing and nutrition. In this lesson, students will explore how animal physiologists study cattle, horse, poultry and other livestock in the field, on a smaller scale by conducting experiments with mealworms in the classroom.

Mealworms are the larval form of the mealworm beetle, a species of darkling beetle. The go through four life stages: egg, pupa, and adult. Mealworms are available for purchase at pet stores and bait shops.

Procedure

1. Think about and discuss the term *animal physiologist*. The Greek word "physis" means nature or natural and "ologist" means one who studies. Animal Physiologists make observations, or study, how animals naturally interact within their environment. An animal physiologist works to make sure that an animal's environment includes the ideal temperature, air flow and shelter they need to be healthy. Animals can't explain how they feel, so it is essential that an animal physiologist have excellent observation skills. You will take on the role of an animal physiologist and experiment with different temperatures, lighting and **surface textures** and observe how mealworms respond.
2. Carefully measure the inside of the shoebox using a ruler. Cut a piece of construction paper that fits inside half of the shoebox. Cut a piece

of sandpaper that fits into the other half of the shoebox. Use making tape to tape the seam between he two types of paper.

3. Count out 10 mealworms and place them in the center of the shoebox.
4. Observe the mealworm's movement for three minutes. At the end of three minutes, record the number of mealworms in each half of the shoebox in the data chart. Express the mealworm preference as a fraction in its simplest form. For example, if eight out of 10 mealworms prefer sandpaper, write 8/10 as 4/5. Indicate which condition most mealworms prefer.
5. Think and discuss as a team:
    a. How could the result of this experiment help you develop an ideal environment for mealworms?
    b. How would an animal physiologist working with animals that give us food (cattle, sheep, pigs, chickens) conduct a similar experiment?