

## Governor's Conservation Classroom Challenge

### Challenge # ES-11

**Title:** Move, Eat and See Like a Bug: a swarm of insect activities and investigations

**Grade Level:** 3-5

**Subjects:** Science, Language Arts

#### **Abstract:**

Insects play a critical role in nature, and entomologists, scientists who study this amazing class of organisms, may help protect crops, prevent disease or solve crimes. Through a series of hands-on activities and an outdoor investigation, students will be introduced to the intricacies of insect anatomy, locomotion and behavior. The learning activities can be completed as a unit of study or set up as stations during a field day event.

#### **Objectives:**

Students will: demonstrate four ways that insects move; identify three types of insect mouth parts and food sources; distinguish between a compound and simple eye; locate an insect's respiratory system; and use observation and recording skills to observe and collect data during an insect survey.

#### **Materials:**

- Pictures of various insect legs and mouth parts, mouth part implements with matching food source (one each of four different combinations per group) including drinking straw & cup of liquid, sponge cut in 1" cubes & tray of liquid, pliers & sunflower seeds, and plastic syringe & cup of liquid covered with plastic
- Pictures of compound and simple eyes, compound eye scopes
- Diagram of insect body parts and respiratory system
- Hula hoops (about 5) and data sheets
- Blank paper and crayons or colored pencils

#### **Safety:**

Advise students not to play with the materials used during the investigation. Insects found during the survey should not be handled. Review student allergy information in advance of outing, and keep in mind that insects can be a source of fear and dramatic reactions.

#### **Background:**

Insects have an exoskeleton, 3 body segments, antennae, and 6 legs. Instead of bones, insects have exoskeletons to give support, protect internal organs, and prevent them from drying out. There are two layers to the exoskeleton: an outer waxy layer (waterproof raincoat) and an inner armor (tough) layer. Most insects are small in size compared to birds, mammals, reptiles, and fish. Because of their diminutive size, they can live in places many other animals can't. Insects are covered with thousands of sensory hairs that stick out of their exoskeleton and are connected to their central nervous system. They have a very simple circulatory system and a simple heart that pumps blood through open body cavities. The blood is almost colorless and does not carry oxygen (Hemoglobin, an iron compound that carries oxygen to cells, is what makes vertebrate blood red). Many insects produce pheromones that communicate messages to other insects. For example, ants that find a good food source may produce a "pheromone trail" when they return to their ant hill with some of the food.

## **Procedure:**

### Preparation

Gather materials and review weather forecasts. Prior to taking students outside, walk the area (to be used) and check for hazards such as ant hills, bees' nests, etc.

### Introduction

Gather students in teaching area. Discuss the topic and order of activities for the day.

Ask students for suggestions on behavior rules for the outing, such as be polite, only one person speaks at a time, listen for instructions and handle materials carefully.

### Activities/Stations

**Locomotion:** Discuss how insects move and provide examples of specific insects and their type of movement. Pass around pictures of different insect legs to show adaptations specific to movement styles. Split class into groups of 4 for an insect relay race. Each member of the group has to perform a different type of insect locomotion (running, crawling, flying (flap arm "wings") or jumping for the set distance. Each person will pick a bug to represent that corresponds to how they will be moving (ex. Jumping person could choose a grasshopper). Conduct the relay race.

**Feeding Mechanism:** Discuss the different types of mouths that insects have and the corresponding food sources. Have students discuss why they think each insect developed the way that it did. Split class back into groups of 4 and distribute materials. Each student will pick a different "mouth" and then together as a group they will decide which food source fits which mouth. Drinking Straw = cup of liquid (butterflies); Sponge = tray of liquid (flies); Pliers = sunflower seeds (grasshopper); Syringe = cup of liquid covered with plastic (mosquito)

**Vision:** Discuss the differences between compound and simple eyes. Pass around an illustration of both types of eyes and have the students describe the differences and similarities. Discuss what the advantages and disadvantages to both types of eyes. Split class back into small groups. Pass around compound eye scopes to let students experience what sight out of a compound eye is like. Give each group of students a set of pictures and have them decide if the eyes are compound or simple. Gather the groups and have them compare answers and explain how they came to their conclusions.

**Respiration:** Discuss with students how an insects respiratory system works and where it is located. Show illustrations of spiracles and have them decide what human body part is comparable.

**Survey:** Conduct an insect survey by placing hula hoops on the ground in several locations. The hula hoops serve as survey boundaries, setting limits for the data collection. Have students, work in small groups and rotate from plot to plot to calculate the number of insects in the plots and record observations.

**Create an Insect:** Pass out paper and coloring utensils to each student. Have the students design their own insect. The insect should be fictional but with realistic body parts. As the students finish drawing, have a few volunteers come up in front of the class and tell their peers about their insect, including its (species) name, what environment it lives in, any special features, and why it has each specific body part (eyes, legs, mouth, spiracles).

### **Stewardship:**

Students may attract beneficial insects to their schoolyard or home landscape by planting specific native trees, shrubs and forbs, as well as flowers. Actions that prevent the need for pesticides inside the school building and home are helpful also. Ideas include keeping the classroom and waste basket clean, so insects are not attracted to discarded food items, and using non-toxic cleaners for desk tops. Students may enjoy researching and making their own.

### **Additional Resources:**

Ranger Rick's Nature Scope *Incredible Insects*, National Wildlife Federation, 1998

Challenge ES-1 Investigate Grasshopper Life Cycle in Your Schoolyard