

“Insect Unit”
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2007 President’s Prize winner for Outstanding Achievement in Primary Education

These lessons are designed for and have been taught to fifth grade students.

Introduction to Taxonomy- Science Class

This lesson familiarizes the students with the scientific organization of the animal and plant world. Students begin by ordering the known world from universe to their street address, with more and more detailed information. Next, they are introduced to the way it is done in science, and we take examples of familiar organisms to practice, classifying each animal until we are able to identify genus and species for each. Students spend part of these lessons becoming familiar with scientific names and then we focus specifically on insects. We also look at eight familiar orders, Lepidoptera, Odonata, Orthoptera, Hemiptera, Homoptera, Coleoptera, Diptera and Hymenoptera learning about the derivation of the order name and representative insects from each.

Introduction to Research Report on a Particular Insect- Language Arts

Using field guides, students explore the variety of insect life and choose one insect form one of the eight orders we looked at in science on which to focus their research. They must write a detailed report which includes common and scientific name, identification, range and habitat, life cycle information, relationship with humans, and any other interesting facts they find. The research report must be accompanied by a biologically correct portrait drawn on a 9 x 12 sheet of paper and colored accurately. Reports and portrait completion usually takes about a week or two. This work continues as we study insects in science class.

When all students have completed the research and portraits, we begin building giant sized paper- mache models of each insect. Models must be biologically accurate as well (body parts, legs, antennae, wings, etc). The models are painted, wings, legs, antennae are added and then they are hung in the hall with the research report and models. This part takes about three to four weeks and continues as we study insects in science.

Insect Unit Lessons

Following the introduction, we begin the unit by looking at characteristics of insects. Anatomy diagrams are labeled and insect collections are passed among students who identify the various parts on real insects using their diagrams. Students are also asked to identify the order of each insect as an introductory exercise (we repeat this at the end of the study and compare our results). Metamorphosis is introduced at this time and we talk about complete and incomplete metamorphosis. The unit continues with a focus on each of the orders, beginning with Lepidoptera. Using larva from the University of Minnesota Monarch program, each student is given a

caterpillar to rear and study. Observations, feeding, and cleaning of container must be done every day. Journals are kept with detailed entries which include measurements of the larva and how much it eats at various instar intervals. This continues for about a month, going from tiny caterpillar to chrysalis to adult butterfly. Because this unit is taught in the fall, by the time the adults emerge it is usually late October. For that reason we do not release the butterflies but instead use them to teach the students how to pin insects for a collection. Each student creates a collection label and learns how to pin the butterfly. The insects are then mounted in clear plastic boxes and each student gets to keep his or her butterfly.

Concurrent with the butterfly development activities, we continue our general study of insects. One day is spent on each of these topics: getting food, reproduction and life cycle, habitats, locomotion, defenses and predation, and the relationship of humans and insects. We focus on each of the orders named above, studying in detail the characteristics of each order. We build paper models of grasshopper mouth parts and also a paper thorax with wings to demonstrate locomotion. Working in groups, the students make a poster of one of the orders, listing characteristics and illustrating insect from the order they have chosen. The posters are presented to the rest of the class and then hung in the hallway with our models and research report. After all the orders have been studied, the students learn about insect keys. We spend one or two class sessions keying out insects using color photos. Students working in groups are given a selection of laminated insect photos and use keys to identify each one. Each student must also make an illustrated booklet of Lepidoptera development using the monarch as the example and another booklet showing life cycle for each of the eight orders we study (whether complete or incomplete metamorphosis).

Insect Trapping Experiment

After the students have demonstrated proficiency at identifying insects in photos, we set insect traps around the school yard with detailed descriptions of each habitat. The students are instructed in the steps of the scientific method prior to setting the traps. Following placement of the traps the students write a hypothesis stating which of the habitats will yield the greatest variety of insects. We usually set about 7 traps with four students working together on a location. After a week, we collect the traps and each group must sort the insects in their traps, identifying them by order and counting how many are in each. Insect keys are used to sort them by order. We come together as a group to share our data and then look at it to make conclusions as a group.

Several days are spent looking at the life cycle of honey bees. A local beekeeper brings an observation hive to class and the students learn about beekeeping, try out the equipment, and extract honey with the help of the beekeeper. Each student designs a label for their honey jar, prepares the jar ahead of time and is able to take a small jar home to share with family. I also try to schedule a visit from the Bell Museum of Natural History curator of education who brings in hissing cockroaches and other invertebrates.

In addition to the research paper and portrait, monarch journal, metamorphosis booklets, paper mouth parts and flight models, and the trapping data, the unit concludes with a unit test. Most of the students are pretty surprised at how much they have learned about insects and take pride in how much they know.