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Bug Zoo

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BUG ZOO

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Parent: What did you learn in school today?
Child: Nothing special.
Parent: Did you have science today?
Child: Yeah.
Parent: Well, what did you learn in science?
Child: Our book said that fish and stuff live in water and woods have lots of trees. Birds live in trees, and lots of other stuff live in the woods, too.

We envisioned a conversation something like this taking place at the dinner table of one of our students who had read a chapter on animal habitats that day in school. This imaginary conversation was the impetus for the idea of a classroom "bug zoo." Our goal was to supplement the school district's curriculum with activities that emphasized science process skills and promoted the enjoyment of science and scientific activity. Because we felt that the skills necessary for reading nonfiction are a critical aspect of science instruction, we were committed to using our district's text. We hoped our project would help to compensate for its weaknesses.

Obviously, the student identified earlier had not experienced the intellectual stimulation and pleasure many adults find in studying our planet's great variety of animal and plant life, as well as the myriad ways different species adapt to their environments. We wanted our students both to experience that challenge and enjoyment, and at the same time have an opportunity to practice critical science process skills. The text and its suggested activities fell short of our goals. The pictures are beautiful, but the prose is oversimplified, and the science concepts (which are sometimes difficult) are buried in an avalanche of rhetorical questions. The suggested activities are usually easy to do, but too often they emphasize verification rather than experimentation. They frequently require minimum use of science process skills and do not address the major concepts of the chapter.

After considering field work, terraria and a variety of classroom pets, the ideal project literally jumped out at us (in the form of grasshoppers and crickets) from our own Iowa habitat. A project which would make use of our own environmental resources (abundant in bugs in the fall) and capitalize on the students' natural interest in creepy-crawly things seemed perfect. It had the immediate practical advantages of being simple to execute (no field trip logistics, no special equipment, no hassles over weekend animal care) and beginning with the children's own environment rather than far away deserts and oceans (although we did later study and make murals about such environments).

We began by asking the children to collect bugs. We sent home simple directions with several options for making nonbreakable "cages" out of everyday household items. Children were directed to observe the bug's environment carefully when they collected the bug and to try to put in the right kind of leaves and other things the bug might need to live. For some species such as grasshoppers and crickets, we borrowed aquaria, covered them with wire mesh and housed all of the bugs of a kind in that one cage. Once we had as many of a certain species as we could handle, we stopped collecting any more of that kind.

From the first day, the project taught the children important principles about the relationships between living organisms and their habitats. The project caused them to raise, on their own, questions about the very concepts we wanted to teach. The children quickly learned that a habitat must have food, water in the appropriate form and often particular physical features. They were at first inclined to think that any type of vegetation would do as food for a bug, even though they knew that stores sell different foods for cats, dogs and birds. They soon found that caterpillars are very particular about what they eat and lady bugs and crickets don't eat vegetation at all. The issue of space came up very quickly in the case of grasshoppers. Did they need a lot of room so they could jump? Were the crickets fighting and did that mean they needed more space?

When observation failed to provide answers, research was needed. We checked out almost every book in the school and town libraries. Parents and an entomologist at Grinnell College were also used as resources. It was a parent at open house who recognized that one of our grasshoppers was laying eggs in the sand we had provided. The children discovered they could feed lettuce to the grasshoppers, were amazed at how much the grasshoppers ate and loved being able to see the grasshoppers' mouth parts as they bit and chewed. We read that crickets could live on dog food, so a child brought some from home. How to provide necessary water and humidity was another problem that required research. Since neither of us knew any more about insects than many of the children, we all learned together.

Environmental issues come up naturally when you operate a zoo, so the children considered the purpose of having a zoo, whether it would be detrimental to the natural environment if we removed too many bugs, whether it was "nice" to cage our bugs and what to do with the bugs when the zoo closed. This last question led to others about survival and life cycles, because we planned to release our bugs outdoors when it was much colder than it had been when we started the project.

In addition, the children posed other kinds of questions common to scientific research. Why wasn't one of our spiders eating the bugs we had provided based on our research? Why did a cocoon, which was supposed to over-winter, hatch a moth when our room wasn't cold at all? These kinds of "problem" questions are an important aspect of science that we sometimes try to eliminate from classrooms because we want everything to "work," but this is what science is really like, and these may be the most challenging and thought-provoking questions. We teachers often didn't have any better answers than the children. We tried to generate hypotheses together and do more book research, but many of these questions remained unanswered.

Science spilled out into other parts of the day as children arrived in the morning with new specimens or as an especially interesting observation was made. For example, one day regular classwork was punctuated by periodic checks on the progress of one of our spiders which was building a web on the wooden frame made by a parent volunteer. Going to the bug zoo (a counter at the side of the room) and reading "bug books" became popular free time activities. During the science period, we discussed what we had learned, read our text, read trade books about a particular bug to the class, used some of the worksheets and activities provided by our text or planned an activity related to the bug zoo. For example, one day we set up stations around the room and transferred one of each kind of bug to a petri dish for observation. The children had charts on which they recorded the length of each bug, the number of legs and wings it had and whether they could see its mouth and eyes. These observations provided data for discussion, and for older students lead into consideration of the characteristics of insects versus other "bugs," or to scientific classification.

Bugs readily lend themselves to experimentation. This first year, most of our "experiments" were informal and dealt with trying to keep our bugs alive. Now that we are a little more knowledgeable, we would like to try other experiments. With a variety of bugs, experiments to determine food preferences and responses to environmental factors such as light and temperature could easily be performed.

Our first science project of the school year was a huge success from the point of view of children and teacher, and the children were very disappointed when we announced the zoo would be closing.

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