

Earthworms

Ms. F. is planning and teaching a unit that provides students with the opportunity to understand the science in the K-4 Life Science Content Standard. She plans to do this through inquiry. Of the many organisms she might choose to use, she selects an organism that is familiar to the students, one that they have observed in the schoolyard. As a life-long learner, Ms. F. uses the resources in the community, a local museum, to increase her knowledge and help with her planning. She also uses the resources of the school—materials available for science and media in the school library. She models the habits and values of science by the care provided to the animals. Students write and draw their observations. Developing communication skills in science and in language arts reinforce one another.

[This example highlights some elements of Teaching Standards A, B, D, and E; Professional Development Standard C; K-4 Content Standards A and C; Program Standards B and D; and System Standard D.]

While studying a vacant lot near school, several of Ms. F.'s third-grade students became fascinated with earthworms. Although she had never used earthworms in the science classroom before, and she knew she could use any of a number of small animals to meet her goals, Ms. F. felt she could draw from her experience and knowledge working with other small animals in the classroom. She called the local museum of natural history to talk with personnel to be sure she knew enough about earthworms to care for them and to guide the children's explorations. She learned that it was relatively easy to house earthworms over long periods. She was told that if she ordered the

earthworms from a biological supply house, they would come with egg cases and baby earthworms and the children would be able to observe the adult earthworms, the egg cases, the young earthworms, and some of the animal's habits.

Before preparing a habitat for the earthworms, students spent time outdoors closely examining the environment where the worms had been found. This fieldtrip was followed by a discussion about important aspects of keeping earthworms in the classroom: How would students create a place for the earthworms that closely resembled the natural setting? An earthworm from outside was settled into a large terrarium away from direct sun; black paper was secured over the sides of the terrarium into which the children had put soil, leaves, and grass. A week later the earthworms arrived from the supply company and were added to the habitat.

Ms. F. had been thinking about what she wanted the children to achieve and the guidance she needed to give. She wanted the students to become familiar with the basic needs of the earthworms and how to care for them. It was important that the children develop a sense of responsibility toward living things as well as enhance their skills of observation and recording. She also felt that this third grade class would be able to design simple experiments that would help the students learn about some of the behaviors of the earthworms.

In the first 2 weeks, the students began closely observing the earthworms and recording their habits. The students recorded what the earthworms looked like, how they moved, and what the students thought

the earthworms were doing. The students described color and shape; they weighed and measured the earthworms and kept a large chart of the class data, which provoked a discussion about variation. They observed and described how the earthworms moved on a surface and in the soil. Questions and ideas about the earthworms came up continually. Ms. F. recorded these thoughts on a chart, but she kept the students focused on their descriptive work. Then Ms. F. turned to what else the children might want to find out about earthworms and how they might go about doing so. Among the many questions on the chart were: How do the earthworms have babies? Do they like to live in some kinds of soil better than others? What are those funny things on the top of the soil? Do they really like the dark? How do they go through the dirt? How big can an earthworm get?

Ms. F. let all the questions flow in a discussion, and then she asked the students to divide into groups and to see if they could come up with a question or topic that they would like to explore. When the class reconvened, each group shared what they were going to explore and how they might investigate the topic. The students engaged in lively discussion as they shared their proposed explorations. Ms. F. then told the students that they should think about how they might conduct their investigations and that they would share these ideas in the next class.

A week later, the investigations were well under way. One group had chosen to investigate the life cycle of earthworms and had found egg cases in the soil. While waiting for baby earthworms to hatch, they had checked books about earthworms out of the

library. They had also removed several very young (very small) earthworms from the terrarium and were trying to decide how they might keep track of the growth.

Two groups were investigating what kind of environment the earthworms liked best. Both were struggling with several variables at once—moisture, light, and temperature. Ms. F. planned to let groups struggle before suggesting that students focus on one variable at a time. She hoped they might come to this idea on their own.

A fourth group was trying to decide what the earthworms liked to eat. The students had been to the library twice and now were ready to test some foods.

The last two groups were working on setting up an old ant farm with transparent sides to house earthworms, because they were interested in observing what the earthworms actually did in the soil and what happened in different kinds of soil.

In their study of earthworms, Mrs. F.'s students learned about the basic needs of animals, about some of the structures and functions of one animal, some features of animal behavior, and about life cycles. They also asked and answered questions and communicated their understandings to one another. They observed the outdoors and used the library and a classroom well equipped to teach science.