Using the Scientific Method, Outdoors!
An Educational Program of the Environmental Interpretive Center
at the University of Michigan - Dearborn

Teacher Information

Program Length, Season and Appropriate Grade Levels

- This program lasts 8-9 hours, spread out over two complete school days. (Consecutive
day sessions are best, but visits can be separated by as much as a week.)
- Time for on-site lunch each day is included.
- The program is offered year-round.
- Appropriate for Grade Levels 4-8.

Program Description and Activities

Participants in this inquiry-based program put the scientific process into practice by becoming field scientists. In a naturalist-facilitated team effort, students develop, direct, and do their own outdoor science investigation of a local plant or animal in its natural habitat. The site for their research is the campus Environmental Study Area, a 300+ acre nature sanctuary.

We begin the experience with an exploration of various habitats. Participants are encouraged to be curious and to observe the activities of plants and animals around them. Excitement builds as discoveries are made using various senses that are opened to the world of nature. Thinking minds develop a sense of wonder.

After the walk, participants are given a questionnaire that asks them to name three plants or animals they saw on their walk that they would like to find out more about. They are also asked to write a question they might try to answer by doing a study of one of the plants or animals they chose. Their responses are used to determine what sorts of animal and plant investigations the participants will do, based on common interests they express. For example, if 10 participants were especially interested in green frogs they observed during their walk, they will become the “green frog study team.”

Each team will use all the elements of the Activity Model of Scientific Inquiry for their investigations. Applying the model often means moving back and forth through the following activities:

- Asking questions
- Defining the problem
- Forming the question
- Articulating the expectation (hypothesis)
- Carrying out the study
- Examining the results
- Reflecting on the findings
- Communicating with others
- Making observations
Before going outdoors, each team will use the worldwide web, books, and other resources to investigate what is known about that species. The team members will use the information they find to develop a hypothesis, which they will test in the field.

As your students come up with ideas about what sort of a hypothesis they would like to test, they will find that practical considerations come into play. Various challenges include local weather conditions and geography, habitat types available for study on site, amount of time available to do the necessary observations and data recording, and the unpredictability of observing the behavior of freely roaming animals.

Each team will make careful observations of their plant or animal, and gather and record data that will be used to reach conclusions about their hypotheses. Later, the data they collect will be assembled into a data table that will help them to interpret and present on their data in an organized way.

After completing the field component of their study, each group will begin putting together their poster. Information on the poster will be organized as follows:

- Plant or animal studied
- Questions the group had about their plant or animal before they developed their hypothesis.
- “What was known” i.e. what the group found out about their plant or animal by investigating various resources such as books, the Internet, etc.
- Hypothesis
- Methods
- Data gathered
- Findings (results)
- Surprises and challenges in doing the study
- Ideas for further research that extend from the group’s findings

Study teams will then give a 10-minute oral poster presentation to the rest of their class. Constructive input from their classmates will be encouraged.

The posters made by the students can be taken back to your classroom.

**A note about pre-visit curriculum preparation for teachers:**

Classroom activities that connect to inquiry, constructing local knowledge, observing and recording data about living plants and animals, the scientific method, constructing data sets, graphing, and journal keeping are all suitable in preparing your class for their program experience.