

Scientific Models in Adaptive Management Lesson Plan



Note: This lesson plan can be used with any *Natural Inquirer* or *Investi-gator* article.

Time Needed

One and one-half to two class periods.

Materials

(needed for each student group)

- Copy of the article
- Graphic organizers (in the following section)
- Four pieces of blank paper
- Pencils
- Glue or tape
- Felt-tip markers
- Scissors
- Large piece of blank paper, about 24" square; or if not available, a piece 12" square (one for each group of students)

In this lesson, students will read and summarize four of the article's sections. After the class reads the article and summarizes the sections, students should work in groups to create a model of the scientific process.

Before getting started, review "Welcome to the Scientific Models in Adaptive Management Edition!" on page 4. You may have students read this section for homework the night before, read it in class, or you may summarize the information for your students. It is important for students to understand what a model is and the variety of models that are created and used by scientists.

You may reinforce the model introduction with the following:

Models are simple representations or descriptions of things. Models can represent objects you can see, processes, or ideas. Models are often visual. Examples of visual models are model cars, maps, and illustrations. Models can be built with numbers or symbols, as in $E=mc^2$. Models may also be made with words, as in "Earth revolves around the Sun." Models can be made out of materials, such as metal, wood, cardboard, or plastic. The most important thing to remember about models is that they are simple representations of more complex things.

Introduce the *Natural Inquirer* article and the sections of a scientific paper. (See "Note to Educators" at <http://www.naturalinquirer.org>.) Explain to students that they will summarize each section of the article. Have students read the article. They may read silently or in small groups. Use the Reflection Sections to check comprehension and to stimulate critical thinking about informational texts. The Reflection Sections can be used in a class discussion if time permits.

After the article has been read, have the students use the graphic organizer to help them construct a visual model of the research process. Review the concept of

models and explain to students that they will use the combination of their summaries and the graphic organizer to create an illustrated model of the research process about which they just read.

Divide the class into eight groups.

For each group, information from the graphic organizer will be used to write a summary of each article section, plus identify and write the research question. Each group should summarize all sections. Have students identify the main idea of each paragraph to help them with their summaries. Each article section should be summarized in pencil, using the space in the graphic organizer.

The sections are the following:

- Introduction
- Methods
- Findings
- Discussion

When all sections have been summarized, ask the students to cut out their summaries by section. Collect all summaries and organize by section. Redistribute these summaries back to the groups by section. If you have eight groups, two groups will have the same section. You may randomly divide the summaries into two groups so that each group has a unique set of summaries.

In groups, have the students analyze their summaries and turn each set of summaries into an action statement. This action statement will describe what scientists did during this phase of the research process. For example, for the

“Introduction” section, students may conclude that scientists identified and read about the problem to be solved and they stated the research purpose as a question or questions.

Instruct each group to write its action statement in the second graphic organizer. Optionally, have each group also write its action statement on the board. (You will have two action statements for each section because two groups will be working on the same section.) Include the section label (for example, “Methods”). Have the students write all of the summary action statements on a piece of plain paper, labeled by section. Have each group create a general model of the research process using these statements as a guide. Students should use the 24 inch sheet of paper, the glue or tape, scissors, and markers to create an illustrated model of the research process. Students may add arrows, illustrations, pictures, or anything they feel helps to describe the research process. The class will have constructed eight models of the research process based on the research methods used in the article—one model for each group.

Have a spokesperson for each group describe its model. Post the models on the wall. Hold a class discussion about the research process. Critically examine the constructed models. How do the models compare and contrast? Identify the advantages of constructing a model to show a process. Discuss what students have learned about the actions that are taken in each step of the research process.

Graphic Organizer for Model Construction

(to be cut out by section following completion)

Introduction Summary Statement

Methods Summary Statement

Findings Summary Statement

Discussion Summary Statement

Graphic Organizer for Model Construction FACTivity

Introduction Action Statement

Methods Action Statement

Findings Action Statement

Discussion Action Statement