CLASSROOM ACTIVITY

NAO: Driving Climate Across the Atlantic

For centuries, a massive atmospheric system has regularly altered weather patterns, fishery production and animal migrations across the North Atlantic Ocean. At last, Earth scientists and climate modelers are beginning to understand how—and when—the North Atlantic Oscillation (NAO) happens.

CLASS DISCUSSION

Establish Prior Knowledge
Ask students to explain the difference between weather and climate. Explain that this feature is about the NAO, a complex climate system, that influences local weather in various regions.

Exploration
Have students watch the video and read the synopsis. Ask them to take notes while they are watching the video. Use the following questions to guide discussion.

- What is a positive NAO phase? What are some examples of weather conditions caused by a positive phase?
- What is a negative NAO phase? What are some examples of weather conditions caused by a negative phase?
- Studying the NAO requires enormous amounts of data on numerous weather and climate phenomena. What are some of the challenges in collecting this data?
- What instruments do scientists use to collect data?
- Why is having data from so many NAO's of the past so important?
- How far back can scientists go to gather data on the NAO? Can they determine what the NAO pattern was like a million years ago?

Wrap-Up
Use these questions to wrap up your discussion.

- What has caused renewed interest in the NAO?
- What are the challenges involved in predicting a NAO trend?

The Scientific Method

Research scientists use the Scientific Method (see page three) to investigate the natural world. You can use *NAO* to illustrate how scientists formulate and test hypotheses.

CLASSROOM ACTIVITY

NAO (continued)

Extend
Students who want to learn more can visit these related links from NASA:

Searching for Atlantic Rhythms: Winter Weather and the North Atlantic Oscillation
http://earthobservatory.nasa.gov/Study/NAO/
This detailed article contains lots of interesting facts and visuals about the North Atlantic Oscillation.

AIRS: NASA's New Satellite Takes On Global Climate Change
http://airs.jpl.nasa.gov/features/climate_change/intro.html
Read about how the atmospheric infrared sounder satellite, AIRS, can be used to detect large-scale global climate change.

Athena Curriculum: Weather
http://vathena.arc.nasa.gov/curric/weather/hsweathr/
Is weather prediction an exact science? Find out the answer to this question and many more by exploring this fascinating site, which also has links to activities.

JPL: Weather
http://www.jpl.nasa.gov/earth/weather_climate/weather_climate_index.cfm
Learn how trying to predict the weather helps scientists deepen their understanding of Earth's dynamic nature.

Scientific Process

The Scientific Method is a dynamic and open-ended process that scientists use when they investigate a question they have. It is not a series of prescribed steps that scientists follow to prove a hypothesis. Rather, it's a general plan that helps guide their investigation. And while all scientists use the Scientific Method, they might not use all the steps, or they may complete the steps in a different order. For example, a scientist might make observations and collect data about a subject that interests him or her for years before formulating a hypothesis.

DEFINING A QUESTION TO INVESTIGATE

As scientists conduct their research, they make observations and collect data. The observations and data often lead them to ask why something is the way it is. Scientists pursue answers to these questions in order to continue with their research. Once scientists have a good question to investigate, they begin to think of ways to answer it.

FORMING A HYPOTHESIS

A hypothesis is a possible answer to a question. It is based on: observations scientists make, existing theories, and information they gather from other sources. Once they have a hypothesis, scientists can begin to think about how to test it.

TESTING A HYPOTHESIS

Evidence is needed to support or disprove the hypothesis. There are several strategies for collecting evidence. Scientists can gather their data by observing the natural world, performing an experiment in a laboratory, or by running a model. Scientists decide what strategy to use, often combining strategies. Then they plan a procedure and gather their data. They make sure the procedure can be repeated, so that other scientists can evaluate their findings.

ANALYZING THE DATA

Scientists organize their data in tables, graphs, diagrams, and even photographs. If possible, they check the data by comparing it to data from other sources. They are looking for patterns that show connections between important variables in the hypothesis they are testing.

DRAWING CONCLUSIONS

Scientists must decide whether the data clearly support or do not support the hypothesis. If the results are not clear, they must rethink their procedure. If the results are clear, scientists write up their findings and results to share with others. The conclusions they draw usually present new questions for them to pursue.