

How Do We Forecast Weather?

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Summary

Students investigate ways that scientists collect weather data and forecast weather.

Grade level

Third

Time required

3 hours, plus a fieldtrip

Materials

Science journals
Resources on weather forecasting and technology
Art supplies for making teaching posters
Current weather forecast

Goals

By completing this lesson, students will

- 1) investigate ways that scientists collect data to develop weather forecasts,
- 2) learn about how Colville people forecasted the weather in times past and
- 3) develop science inquiry process skills.

Science standards addressed

National Science Standards

- Abilities necessary to do scientific inquiry
- Science as a human endeavor
- Changes in Earth and sky
- Understanding about science and technology

American Indian Science Standards

- Observations and understandings of nature and ecological relationships traditionally formed an essential base of knowledge among American Indian cultures
- Objects in the sky as exemplified by historical American Indian lunar calendars, traditional stories, and knowledge of weather patterns, constellations and the habits of birds

Teacher tips

There are numerous web sites and books available that will provide kids with information for their inquiry investigation of weather data and forecasting. Suggested sites are listed in the Resources section. Bookmark the sites for students or allow time for kids to search for sites. Work with your librarian to find suitable print and video resources.

Meteorologists, such as those at the National Weather Service, local television stations or at airport based surface weather stations, will also be helpful.

Prepare a space for a bulletin board that will incorporate the five categories of weather forecasting that students will research.

Background information

The Colville people in times past used signs in the natural world to forecast the weather. Some of these signs, as shared by Elaine Emerson, Colville elder, are listed below.

- Animals and insects become agitated prior to weather change.
- Animals lay down prior to earthquakes.
- The moss will change colors when the weather changes. It is black when the weather is dry; it turns green during damp weather.
- When bad weather is coming, flies will be thicker, ants will have longer trails.

Today we can supplement these types of observations with data collected using various types of technology. Satellite imagery, Doppler radar, surface collection sites and weather balloons are examples of some of the many types of technology used in meteorology. The web sites listed in the Resource section provide background information for the teacher and student on technology used in weather forecasting.

Procedure

Engagement

- 1) Ask students how they chose what to wear or how they got to school today. Were their choices influenced by the weather? How did they know what the weather would be like?
- 2) Ask students to characterize the current weather. Show a current weather forecast. Pose this question for students: How do scientists get the information to forecast the weather? Have students generate a list of ideas.

Exploration

- 1) Introduce the four basic categories of weather data collection that are used for modern weather forecasting – satellite imagery, radar, surface observations and upper air observations (e.g., weather balloons). Show students satellite images or give them time to examine satellite images online taken from weather satellites, such as those at NASA's Global Hydrology and Climate Center.
- 2) Ask each group of students to research one type of weather technology (satellite images, radar, surface observations or balloons). Assign one group to find out about traditional means of forecasting the weather used by Colville people in times past. Ask student groups to prepare a teaching poster that will be posted as part of a

bulletin board in the classroom. Provide resources such as trade books, videos and Internet sites to aid their research.

Explanation

Ask each group to use their teaching posters and explain the forecasting method they researched. Combine the posters to make a bulletin board about weather forecasting.

Elaboration

- 1) Invite or visit a tribal elder to discuss how the Colville people predicted the weather in times past. Lead students in a comparison between past and present methods.
- 2) Visit the cooperative surface weather station or airport weather station in Omak.

Evaluation

- 1) Observe students as they work together to conduct research and prepare their teaching poster and presentation. Look for evidence of process skill proficiency.
- 2) Assess student understanding of content through their presentations and through journal responses to related questions such as those listed below
 - What are the advantages of each type of weather forecasting?
 - What are the disadvantages of each type of weather forecasting?

Follow up activities

- 1) Search the vast number of links from web sites given to gain more knowledge on forecasting weather and remote sensing.
- 2) Allow students to explore NASA's *Remote Sensing, Learning from Satellites* web site. The address is listed in the Resources section.
- 3) Allow students to explore *Winds of Change* a NASA CD about satellite imagery, weather collection data and Earth Observing Systems.
- 4) Invite or visit a meteorologist to learn more about forecasting and technology.

Resources

Web sites

[NASA's Global Hydrology and Climate Center](http://www.gohcc.msfc.nasa.gov/GOES/globalwv.html) – Has various types of satellite images all over the world

www.gohcc.msfc.nasa.gov/GOES/globalwv.html

[University Corporation for Atmospheric Research](http://www.ucar.edu/ucar/index.html) – Information and education resources on weather

www.ucar.edu/ucar/index.html

[National Oceanic and Atmospheric Administration's Photo Library of Space](http://www.photolib.noaa.gov/space/) – Good source of pictures of satellites

www.photolib.noaa.gov/space/

National Oceanic and Atmospheric Administration – Information and history of satellites, background information for teachers
www.oso.noaa.gov/history/index.htm

USA Today's Weather Technology – Information for students and teachers
www.usatoday.com/weather/wtech0.htm

Dan's Wild, Wild Weather – Weather technology information for students
www.wildwildweather.com/satellit.htm

Franklin's Forecast – Weather technology information for students, educational resources
www.fi.edu/weather/

The Tech Museum of Innovation – Information about satellites for students and teachers
www.thetech.org/exhibits_events/online/satellite/

Surfnet Kids – Links to student sites on satellites
www.surfnetkids.com/satellite.htm

Schoolnet Digital Collections program – Information on satellites for students
<http://collections.ic.gc.ca/satellites/english/>

Science for Families – Links to sites with satellite information for students
<http://scienceforfamilies.allinfo-about.com/features/satellites.html>

Kids Using Satellites – Information about satellites
www.wfu.edu/albatross/kids_sats.htm

National Oceanic and Atmospheric Administration – Information on weather balloons and other related topics
www.education.noaa.gov/cweather.html

NOAA Weather for Kids – Information on weather balloons for students
www.wrh.noaa.gov/Missoula/balloon.html

National Weather Service – Provides information and examples of the various types of weather observation technology
www.nws.noaa.gov/observations.html

NASA's Remote Sensing, Learning from Satellites
<http://octopus.gma.org/surfing/sensing/index.html>

Winds of Change CD – Contains a variety of excellent images and activities. Can be obtained free from a NASA Educational Resource Center or ordered directly by electronic mail to pcfalcon@mail1.jpl.nasa.gov
<http://winds.jpl.nasa.gov/education/index.html>