

Activity 4.3 Making a Weather and Climate Timeline

Teacher Background

In recent decades there have been major advances in the accuracy and power of our instruments, and the complexity and comprehensiveness of our ideas. But weather and climate have been so important to the life of every society that the history of how civilizations have tried to “read the sky” and understand the seasons and predict the weather reaches back into the remote past. This fascinating story involves ideas and inventions from just about every culture and era. (See Resources for books such as *Braving the Elements* by David Laskin, with a fine chapter on Native American weather lore.) Science education today includes not just the mastery of essential content and concepts, but also interweaves the *process of discovery* and *technological invention*. This Activity provides an excellent opportunity to stretch students minds and to populate the past with the real historical figures—Coriolis, Fahrenheit, Doppler, Ted Fujita (from the recent past!) and others—who have given their names to real-world phenomena or to the instruments and techniques we use to measure and record weather and climate. Via our online resources and through the commitment of researchers like NOAA’s Sim Aberson, we’re also able to point to some of the unsung heroines and heroes of meteorology. Women and minorities have not been as active in weather and climate research in the past as they are now. (See WHO/Weather and Climate Timeline, and also WHO/BIOs/Shirley Murillo and Joanne Simpson.) But those formal and informal barriers are disappearing. When we talk about temperatures, or the strength of tornadoes, we honor the humans whose minds and imaginations led to today’s understanding. Perhaps 200 years from now one of the students in your class will be remembered in this way for *their* breakthrough thinking! (See Expand, below.)

Objectives

Students will research how people of different cultures and times have contributed to our knowledge of weather and climate, and explore the impact of major weather events on history. Students will develop a text and image timeline of weather discoveries and events.

Materials

Student Worksheet 4.3.1 Sample timeline for teacher reference

Student Worksheet 4.3.2 Suggested URLs

Student Worksheet 4.3.3 Rubric for scoring student timelines

reference materials (“The Timetables of Science”, textbooks, almanacs, CD-ROMs, Internet)

markers, pens, crayons, etc.

paper or adding machine tape, and other materials for poster presentations

Engage

Discuss some of the weather events students remember from their own experiences. What impact did these events have on them and what they were able to do that day or for the next several days? (See also Activity 4.1, “Writing Up a Storm.”) Do they recall parents or other adults talking about weather and climate events which happened in *their* lives and which made an impression? (Did grandparents move west during the Dustbowl years of the Great Depression?)

Ask what historical events they've heard about which had an impact on what we know about weather? (For example, Ben Franklin flying his kite into a thunderstorm—behavior we do *not* want to encourage today's students to emulate.) What instruments do weather reporters use to explain today's weather? (Thermometers, barometers, anemometers.) Who invented these, when and where? What new instruments have helped them make more accurate weather predictions? (Computers, Doppler radar [see Activity 3.5], weather satellites.) How recently have these new tools become available?

Explore/Explain

Explain to the class that they are to research 50 important weather and climate events (major hurricanes like Camille or Andrew, or the unnamed storm which hit Galveston, TX in 1900, or volcanic eruptions with global impact such as Mt. Pinatubo) and create a timeline that stretches far back into the past and spans several continents and cultures. At least 10 of the 50 events must involve discoveries or inventions that originated outside Europe and North America. The events must fit the following chronology: 2 events that occurred B.C.; 15 events that occurred after 1 AD and before the year 1900; 15 events from the 20th century, with the remaining events from any time period.

Suggest that they include 1 or 2 major world events into each category (e.g. Gutenberg invents the printing press, Galileo uses the telescope for astronomy, World War 2) to help set the wider context.

Explain that the timeline must be to scale and that the scale must uniformly apply to the entire timeline. Five inches per hundred years works well, but students can use whatever best fits their poster board or construction paper. A scale marker should appear on their timeline. They should map out their centuries using pencil before putting events on the timeline: a jagged line signifying a break in the scale (see above) should only be used if there is a section where there are several centuries without any dates.

Students can make their timelines in 3D, but must create these themselves. Commercial products (i.e. stickers) or timelines printed off the Internet or CD-ROMs are not acceptable.

The following questions can be used to help guide the students to find significant weather dates for their timeline:

- What new discoveries were made about the weather during this period?
- What scientific discoveries were made in other parts of the world?
- What instruments were invented to study the weather or to make predictions more accurate?
- What historical events were affected by weather?

Encourage students to find a few truly obscure dates and people by digging deeper and following links from the Suggested URLs or using reference materials in your school library. Challenge them to stump you (with real data!) and submit what they've found to STUDENT'S CORNER/CLASSROOM CONNECTION on the LFSTORM website. Students should illustrate their timelines with pictures of the scientists (with brief captions and dates) and/or a depiction of their instruments.

Expand/Adapt/Connect

Instead of having each student create their own timeline the class could be divided into teams, with each team responsible for researching and visualizing a different time period, or culture or continent, and presenting that section to the entire class.

Students could also debate and discuss the best way to divide up the timeline. This would employ math and logic skills as well as knowledge of history.

If you are undertaking this Activity towards the end of your weather and climate unit, challenge your students to write a brief imaginative essay, composed in some future time, where *their* last name is associated with a discovery or invention that answers one of the outstanding weather mysteries of today! Perhaps “*Smith Probes*” will be small rockets launched through tornadoes that unravel the mystery of why some thunderstorms result in twisters, and others just in heavy rain. Or “*Jones Radar*” may be flown simultaneously on 5 research aircraft circling a hurricane making simultaneous measurements. Or “*The Brown Theory*” may honor the Nobel-prize winning physicist (still in 7th grade in 2000) who finally figured how the Greenhouse Effect combined natural variation with human-generated changes in Earth’s atmosphere. Challenge students to read the online JOURNALS and BIOographies to find what makes today’s researchers excited about future discoveries, or frustrated about our current ignorance—and have them put *their* names on the future history of weather and climate!

Make sure the best student timelines are on display, running along a corridor wall, for the next Parents’ Night or school event: never too late for learning!

Suggested URLs

Note to teachers: 42 dates appear in the third URL alone (most about hurricanes), so having students find 50 dates in total should not be a problem. They should dig deep to find examples from before 1945. Challenge them to ensure dates, discoveries and inventions are well distributed across the world.

<http://www.ncdc.noaa.gov/ol/reports/weather-events.html#1999>

Worldwide Weather Events of 1991-1999: fascinating facts and stories from NOAA/NESDIS.

<http://www.ncdc.noaa.gov/ol/climate/globalextremes.html>

World Temperature Extremes from the authoritative National Climatic Data Center

<http://www.sun-sentinel.com/storm/history/>

Major weather events from 1495 to 1995, with an emphasis on Florida and hurricanes

<http://www.wrgb.com/directweather/history/index.html>

A Quick History of Meteorology: not comprehensive but a good place to start your search!

http://www.islandnet.com/~see/weather/general/site_map.htm#d

Weather Almanac—use the “Weather Diary” links for more dates, and biographies of Franklin, Beaufort and Luke Howard, “The Man Who Named The Clouds.”