

Teachers Guide

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“Hey, How’s the Weather?” Multidisciplinary Classroom Activities

Teachers guide for the Young Naturalist article “Hey, How’s the Weather?” by Pete Boulay. Published in the July–August 2003 *Minnesota Conservation Volunteer*, or visit www.mndnr.gov/young_naturalists/weather.

Young Naturalists teachers guides are provided free of charge to classroom teachers, parents, and students. This guide contains a brief summary of the article, suggested independent reading levels, word count, materials list, estimates of preparation and instructional time, academic standards applications, preview strategies and study questions overview, adaptations for special needs students, assessment options, extension activities, Web resources (including related Conservation Volunteer articles), copy-ready study questions with answer key, and a copy-ready vocabulary sheet. There is also a practice quiz in Minnesota Comprehensive Assessments format. Materials may be reproduced and/or modified to suit user needs. Users are encouraged to provide feedback through an online survey at www.mndnr.gov/education/teachers/activities/ynstudyguides/survey.html.



Summary Minnesotans love to talk about the weather. After reading “Hey, How’s the Weather?” you will have a better understanding of typical Minnesota meteorological events. The author explains how our geographic location and upper air currents affect our climate. He gives the reader a seasonal tour of Minnesota weather, from summer thunderstorms to spring tornadoes.

**Suggested
reading levels:**

Upper elementary through ninth grade

Total words: 2,621

“Hey, How’s the Weather?”—Teachers Guide

Materials: Poster board, graph paper, colored pencils, books, maps and other weather-related resources from your media center, local/regional newspapers, tornado-building materials (see www.ucar.edu/40th/webweather/tornado/tornadoes.htm), *Night of the Twisters* (book or video)

Preparation time: About one hour, not including extension activities

Estimated instructional time: Two 50-minute class periods

Minnesota Academic Standards applications: “How’s the Weather?” may be applied to the following Minnesota Department of Education Academic Standards:

Language arts

I. Reading and Literature

- A. Word Recognition, Analysis and Fluency
- B. Vocabulary Expansion
- C. Comprehension

II. Writing

- A. Types of Writing
- B. Elements of Composition
- C. Spelling
- D. Research
- E. Handwriting and Word Processing

III. Speaking, Listening and Viewing

- A. Speaking and Listening
- B. Media Literacy

Arts: Artistic Expression:
Visual Arts

Science

Grades 4, 8, and 9–12

III. Earth and Space Science

- B. Earth and Space Science, The Water Cycle, Weather and Climate

Mathematics

Grades 4–8

I. Mathematical reasoning

II. Number Sense

III. Patterns and Functions

IV. Data and Statistics

Social Studies:

Grades 4–8

V. B Maps and Globes

Complete Academic Standards are available at www.education.state.mn.us. Teachers who find other connections to academic standards are encouraged to contact *Minnesota Conservation Volunteer*.

“Hey, How’s the Weather?”—Teachers Guide

Preview Before you read the story ask your students to examine the illustrations. What do they learn about the sequence of events? Ask your students to pay particular attention to the illustrations and how they interact with the text. Use the KWL strategy (Ogle, 1986) to find out what your students already know (K) about our climate, what (W) they would like to learn, and eventually, what they learned (L) while reading the article and related materials, and through participating in extension activities. Display your K and W ideas on poster board or paper (see Vocabulary preview). Add to your L list as you read and discuss the article. See www.teach-nology.com/web_tools/graphic_org/kwl for a KWL generator that will produce individual organizers for your students.

KWL also gives you the opportunity to introduce interdisciplinary connections you will make during extension activities. For example, if you plan to use the article during social studies or art you may ask students to review their KWL for concepts that are specific to those disciplines.

You may also wish to create a four-seasons graphic organizer for each student or in poster form to supplement the L segment of your KWL.

Vocabulary preview Connections to vocabulary in the article may be made during the KWL activity. Ask students to highlight words on the copy-read vocab list. These are key concepts and should be discussed before reading. If students are not familiar with some of the terms, include them in the W list. Unfamiliar terms may be added to the W list as they read the article. Eventually they can be moved to the L list. You may write vocabulary on the W in green ink, while other ideas are written in black. Note: Some of the words in the vocabulary list definitions may require further explanation. Italicized words are defined in the article.

You may wish to use the study cards found at the end of this guide. Cut along the horizontal line, fold in the middle, and tape or staple. Study cards (see Strategic Tutoring, Hock, Deshler and Schumaker, 2000), can be applied to any subject area. On one side of the card, in large letters, write a key word or phrase that students are expected to know. In smaller letters frame the word or phrase in a question or statement. On the other side of the card, in large letters, write the answer to the question. Finally, in smaller letters, frame the answer in a question or statement. Blanks are provided to allow you or your students to add new words or phrases.

Study guide overview Questions in the study guide parallel the story (the answer to the first question appears first in the article, followed by the second, and so on). Preview the entire guide with your class before you read the article, explaining how the guide follows the story. You may wish to read the article aloud and complete the study guide in class or in small groups. The questions may be assigned as homework, depending on your students’ reading ability. Inclusion teachers may provide more direct support to special- needs students (see Adaptations section). Part or all of the study guide may be used as a quiz. Add information from the study guide

“Hey, How’s the Weather?”—Teachers Guide

(see items 1, 3, 4, 5, 6, 8, 9, 10, 11, 12, and 14) to the four-seasons graphic organizer (see Preview). *Please note that items 2, 3, 6, 7, and 11 and the Challenge require varying degrees of analytical/deductive reasoning.*

Adaptations Read aloud to special-needs students. Abbreviate the study guide or highlight priority items to be completed first. If time allows, remaining items may be attempted. For example, items 1, 3, 5, 8, and 12 will give students a good base of knowledge about weather. Peer helpers, paraprofessionals, or adult volunteers may lend a hand with the study guide. Cooperative groups can also offer effective support to special-needs students.

Assessment You may use all or part of the study guide, combined with vocabulary, as a quiz. Other assessment ideas: 1) Ask students to pick a weather phenomenon, such as tornadoes, and develop a portfolio of researched facts, artwork, and writing. For example, students could write a descriptive paragraph of at least five sentences with an accompanying drawing of a tornado. 2) Ask individuals or groups to make oral and/or written presentations. A group could describe attempts to control the weather, such as cloud seeding. 3) Begin a weather-monitoring project in the fall. Compare the data you collect with historical data available from the National Oceanic and Atmospheric Administration or a commercial site, such as World Climate (see Web resources).

- Extension activities**
1. Build a tornado following directions provided by Web Weather for Kids (www.windows.ucar.edu/tour/link=/teacher_resources/tornado_edu.html&edu=elem).
 2. Learn about extreme weather events around the world (see Extreme Places Weather Records at www.harcourtschool.com/activity/extreme/html_docs/Weather.html). Compare Minnesota weather events with weather from around the world by making charts or posters for rainfall (precipitation), temperature, and winds.
 3. Read the forecast in your local paper and record the actual meteorological events to see how accurate the forecasts are. This would make an excellent long-term project. *Prairie Skies: The Minnesota Weather Book* by Paul Douglas and Laurie Kruhoeffler (1992) will help students interpret weather forecasts and data.
 4. Do a class project on global warming. Are your students convinced it is a real phenomenon? What can be done about it? How do warmer temperatures affect plants and animals? Did you know that turkey vultures and opossums are now common north of the Twin Cities?
 5. Read the novel *Night of the Twisters* by Ivy Ruckman (1986), or watch it on video.
 6. Investigate lake-effect weather conditions in Duluth. Residents of Duluth receive two weather reports each day, one from downtown and one from the airport. Why?

“Hey, How’s the Weather?”—Teachers Guide

Web resources

National Oceanic and Atmospheric Administration: National Weather Service

www.nws.noaa.gov

Weather, rainfall, and temperature data

www.worldclimate.com/climate/index.htm

Weather records and averages

www.weatherbase.com

How to teach with the weather

www.microsoft.com/education/?ID=teachwithweather

Tornadoes

www.noaa.gov/tornadoes.html

www.nssl.noaa.gov/

www.weather.com/newscenter/specialreports/tornado/tracking/monitor.html

Related articles

Many related *Minnesota Conservation Volunteer* articles are available online at <http://www.mndnr.gov/volunteer/articles/index.html> including:

January–February 2001

“The Crossroads of Climate Change”

www.mndnr.gov/volunteer/janfeb01/warming.html

September–October 2004

“Flights of Fall”

www.mndnr.gov/volunteer/septoct04/flights.html

January–February 2005

“Minnesota Cold”

www.mndnr.gov/volunteer/janfeb05/mpcold.html

July–August 2005

“The Wonder of Water”

www.mndnr.gov/young_naturalists/water/index.html

November–December 2005

“Balancing Act”

www.mndnr.gov/volunteer/novdec05/balancing_act.

January–February 2007

“On Thinner Ice”

www.mndnr.gov/volunteer/janfeb07/steger.html

References

Hock, M.F., Deshler, D.D., and Schumaker, J.B. *Strategic Tutoring*. Lawrence, Kan.: Edge Enterprises, 2000.

Ogle, D.S. K-W-L Group Instructional Strategy. In A.S. Palincsar, D.S. Ogle, B.F. Jones, and E.G. Carr (Eds.), *Teaching Reading as Thinking: Teleconference Resource Guide*, pp.11–17. Alexandria, Va.: Association for Supervision and Curriculum Development, 1986.

“Hey, How’s the Weather?”—Teachers Guide

Study Questions

“Hey, How’s the Weather?” by Pete Boulay.

Minnesota Conservation Volunteer, July–August 2003

www.mndnr.gov/young_naturalists/weather.

Name _____ Period _____ Date _____

1. . How does Minnesota’s geographic position (45th latitude and far from an ocean) affect our climate? _____

2. Why do people watch weather forecasts on television? Do you?

Why or why not? _____

3. Explain how the jet stream influences our weather. _____

4. Why is the humidity higher in summer than at other times of the year? _____

5. Which weather condition does high humidity help cause? Why? _____

6. If you are planning a family reunion in Duluth, which summer month will most likely provide the best weather? Why? _____

7. How is a solstice different than an equinox? _____

“Hey, How’s the Weather?”—Teachers Guide

8. Where do Minnesotans see the earliest first frost? The latest? During which month do most places in Minnesota receive the first snowfall? _____

9. . How many people died in the 1940 blizzard? Describe three weather conditions that define a blizzard. _____

10. Minnesota is a large state, about 400 miles north to south. During January, how many degrees (F) difference in average daily low temperature is there from northern to southern Minnesota? _____

11. What is “ice out?” Why do so many Minnesotans look forward to ice out? _____

12. Describe weather conditions that may lead to tornadoes. _____

13. What percent of all the reported tornadoes from 1820 to 2002 have had an F5 severity rating? _____

14. How big were the largest hailstones ever recorded in Minnesota? _____

15. How do hailstones form and grow larger? _____

Challenge: See the weather map on pages 34 and 35. Write and present a weather forecast for the next few days based on the information the map provides.

“Hey, How’s the Weather?”—Teachers Guide

Study Questions Answer Key

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Minnesota Conservation Volunteer, July–August 2003

www.mndnr.gov/young_naturalists/weather.

1. How does Minnesota’s geographic position (45th latitude and far from an ocean) affect our climate? **We’re halfway between the equator and North Pole, so we get both warm and cold weather. Without a nearby ocean to control temperatures, we get extremes.**
2. Why do people watch weather forecasts on television? Do you? Why or why not? **Answers will vary.**
3. Explain how the jet stream influences our weather. **It moves large air masses of contrasting temperature and humidity into contact with each other. When air masses bump up against each other, the weather changes.**
4. Why is the humidity higher in summer than at other times of the year? **Warm air holds more moisture than cooler air does.**
5. Which weather condition does high humidity help cause? Why? **Heavy downpours; the higher the humidity, the greater the chance large drops will reach the ground.**
6. If you are planning a family reunion in Duluth, which summer month will most likely provide the best weather? Why? **August; hottest temperatures are past and chances of rain decrease.**
7. How is a solstice different than an equinox? **The summer and winter solstices mark the greatest differences between daylight and darkness; on the equinoxes, hours of daylight and darkness are equal.**
8. Where do Minnesotans see the earliest first frost? The latest? During which month do most places in Minnesota receive the first snowfall? **In the northeastern part of the state; in south-central and southeastern Minnesota; October.**
9. How many people died in the 1940 blizzard? Describe three weather conditions that define a blizzard. **49; heavy snow, high winds, and cold.**
10. Minnesota is a large state, about 400 miles north to south. During January, how many degrees (F) difference in average daily low temperature is there from northern to southern Minnesota? **20 degrees.**
11. What is “ice out?” Why do so many Minnesotans look forward to ice out? **When lakes are free of ice; so they can participate in activities such as swimming and boating.**
12. Describe weather conditions that may lead to tornadoes. **Strong winds twist rising hot air.**
13. What percent of all the reported tornadoes from 1820 to 2002 have had an F5 severity rating? **0.5 percent (one half of one percent).**
14. How big were the largest hailstones ever recorded in Minnesota? **12 inches in circumference—as big as a softball or grapefruit.**
15. How do hailstones form and grow larger? **Winds blow water droplets into colder air, where they freeze. The frozen droplets add more layers of ice as they continue to move between warm and freezing air.**

Challenge: See the weather map on pages 34 and 35. Write and present a weather forecast for the next few days based on the information the map provides. Answers will vary.

Minnesota Comprehensive Assessments Practice Items

“Hey, How’s the Weather?” by Pete Boulay.

Minnesota Conservation Volunteer, July–August 2003

www.mndnr.gov/young_naturalists/weather.

Name _____ Period _____ Date _____

1. On the summer solstice the North Pole tilts _____ the sun.
 - A. away from
 - B. toward
 - C. neither away from nor toward
 - D. none of the above

2. On the winter solstice the North Pole tilts _____ the sun.
 - A. away from
 - B. toward
 - C. neither away from nor toward
 - D. none of the above

3. Sudden temperature drop and rain turning to snow may mean _____ .
 - A. the winter equinox is near
 - B. a January thaw is likely
 - C. blizzard conditions are forming
 - D. all of the above

4. How does the Gulf of Mexico affect Minnesota weather?
 - A. It does not affect our weather.
 - B. It pulls our cold air south.
 - C. It sends warm, moist air north on the jet stream.
 - D. It causes earthquakes.

5. Lots of snow in the winter may mean _____ in the spring.
 - A. flooding
 - B. tornadoes
 - C. drought
 - D. cold temperatures

Minnesota Comprehensive Assessments Practice Items Answer Key

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Minnesota Conservation Volunteer, July–August 2003

www.mndnr.gov/young_naturalists/weather.

1. On the summer solstice the North Pole tilts **B. toward** the sun.
2. On the winter solstice the North Pole tilts **A. away** from the sun.
3. Sudden temperature drop and rain turning to snow may mean **C. blizzard conditions are forming** .
4. How does the Gulf of Mexico affect Minnesota weather? **C. It sends warm, moist air north on the jet stream.**
5. Lots of snow in the winter may mean **A. flooding** in the spring.

Vocabulary

“Hey, How’s the Weather?” by Pete Boulay.

Minnesota Conservation Volunteer, July–August 2003

www.mndnr.gov/young_naturalists/weather.

- climatology** scientific study of climate
- equinox** equal hours of daylight and darkness
- front** boundary between air masses of different temperatures
- herald** announce; indicate something to come
- humid** damp, moist air
- jet stream** strong wind, blowing from west to east at a high altitude
- latitude** distance north or south of the equator
- rural** out in the country
- solstice** shortest or longest daylight of the year
- straight-line winds** damaging winds that do not travel in a circular direction, as tornadoes do