



What's the Weather?

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Is it sunny or cloudy, raining or snowing, hot or cold outside? Each and every day, we want to know what the weather is like to help us plan our day. Weather is the heat we feel on a summer day. It's the rain that delays our ball game. It's the wind that blows leaves off trees. It's all these things and more. Weather is the condition of the air around us.



In this universally designed iBook unit for grades 3-5, students with and without sensory disabilities, specifically those who are deaf or hard of hearing (Figure 1) and blind or have low vision, consider weather as the condition of the air at a particular place and time. To do this, they conduct hands-on and online investigations about moisture, temperature, air pressure, and wind. They use displays of their data and publically available weather data to find out what the weather is like in their location and in other locations of interest.

2: drop
2: dust
2: evaporation
2: float
2: fog
2: freeze
2: gas
2: ground
2: hail
2: heavy
2: invisible
2: join
2: particle
2: precipitation
2: rain
2: sleet

2: fog

Fog is a cloud near the ground.



Originally developed by TERC with funding from the National Science Foundation, the *What's the Weather?* unit belonged to the Kids Network series published by the National Geographic Society. Like all of the units in the series, it includes activities and readings and encourages students to build ideas of science content and processes through the investigation of a phenomenon in their local area. As technology advanced, the units were revised several times, but retained the initial structure and focus. Most recently, encouraged by the increasing use of iBooks in classrooms, TERC revised and redesigned the units as iBooks. The

Figure 1. Sign language support for deaf or hard of hearing students.

What's the Weather? iBook is the result of this effort.

A Teacher's Guide and Student Packet that run on computers, iPads, and mobile devices with iOS operating systems are available free from <https://wtw-ibook.terc.edu>. The Teacher's Guide includes an overview of the unit contents, implementation tips about features, such as navigation and accessibility options, and six chapters that correspond to the original unit's lessons. Chapters can be done individually or grouped together with one or more other chapters. This flexibility allows teachers to fit the unit into their core science curriculum, however and whenever they would like. Highlights of the chapters are as follows:

- 1) **What Is Weather?** – Students go to the National Oceanic and Atmospheric Administration’s (NOAA’s) National Weather Service (www.weather.gov) to select location(s) and find out about the weather there. They use their data to define weather as the sum of moisture, air temperature, air pressure, and wind.
- 2) **What Is the Moisture of the Air?** – Students use resources and a demonstration of the water cycle to explain how water moves between Earth’s surface and the atmosphere by the processes of evaporation, condensation, and precipitation. The National Weather Service site shows and explains the amount of moisture in the air in students’ location on that day.
- 3) **What Is the Temperature of the Air?** – Students consider temperature as how hot or cold the air is. They measure the outside air temperature, collect moisture data, and create displays. Using their displays and comparisons with NOAA data, they summarize the current weather.
- 4) **What Is the Pressure of the Air?** – Students consider air pressure as the weight of the air above a spot on Earth as measured with a barometer. They use the National Weather Service site to see if the air pressure in their location is changing. Then they use displays of the data to predict changes in the weather that might be on the way.
- 5) **What Is the Speed of the Wind?** – Students consider wind as the movement of air and an anemometer as the instrument used to measure it. They estimate wind speed (how fast the air is moving), use the National Weather Service site to collect actual wind speed data, and create displays to describe what the weather is like.
- 6) **Collect and Display Weather Data** – Students select location(s) to use for collecting weather data and decide on the number of data-collection days, what data they will collect, and how they will record the data. They create displays of their weather data and use them to describe the weather in the locations they have selected and how (or if) it might be about to change.

What’s the Weather? supports the Framework for the Next Generation Science Standards (Figure 2).¹

The Student Packet contains copies of the activity sheets and readings and hyperlinks to all of the interactive features that have been incorporated into the Teacher’s Guide. These features support the three principles of Universal Design for Learning.²

Principle 1. Learners can acquire information in different ways.

Principle 2. Learners are provided with opportunities for demonstrating what they know.

Principle 3. Learners are offered opportunities that make sense and are interesting.

SEP: Obtaining, Evaluating, and Communicating Information
Obtain and combine information from books and other reliable media to explain phenomena. (3-ESS2-2)
DCI: ESS2.D: Weather and Climate
Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. (3-ESS2-1)
CCC: Patterns
Patterns of change can be used to make predictions. (3-ESS2-1),(3-ESS2-2)

Figure 2. Grade 3 Science and Engineering Practice (SEP), Disciplinary Core Idea (DCI), and Crosscutting concept (CCC) supported by *What’s the Weather?*

In support of principles 1 and 3: students conduct online research; read English text using an appropriate text size; listen to English text presented as audio; view illustrations; listen to audio descriptions of graphic elements; look up the meaning of terms; collect, display and/or analyze data; and work individually and/or in groups. In support of principle 2: students offer oral explanations and/or engage in conversations; write paragraphs and/or research reports; answer questions; set up and do experiments; and collect, record, and/or analyze experimental and/or online data.

A preliminary evaluation of the unit for usability has been conducted with six teachers. They downloaded and reviewed the iBook and PDF versions using the computer or device of their choice and completed an online survey. Findings show that the unit is a resource these teachers envision implementing in their classroom. The unit, or parts of it, fit into their existing curriculum and address concepts that they normally teach. The flexibility of the unit and format allows teachers who teach in very different situations to take advantage of the many ways it can be implemented. For information about formative evaluation of the unit and how to participate in field-testing, contact the authors.

References

- ¹ NGSS Lead States. 2013. *Next Generation Science Standards: For states, by states*. Washington, DC: The National Academies Press.
- ² Rose, D.H., & Meyer, A. 2006. *A practical reader in universal design for learning*. Cambridge, MA: Harvard Education Press.

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