

# Best Practices of Technology Integration

**TITLE:** Hands-On Weather Data Collecting

**Submitted by:**

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**Subject Area:** Science

**Intended Grade Level:** 5<sup>th</sup> grade

**Description:**

These activities provide a combination of high-tech and low-tech experiences for the students to learn about weather in their community, in the United States, and around the globe.

**Narrative:**

I struggled for some time trying to find a way to make our fifth grade study of the weather and atmosphere more authentic. In an age where we can flip on the Weather Channel to find the weather anywhere on Earth at any given moment, it seemed to me that the time spent on the weather unit might be better spent elsewhere.

One day while surfing the Web, I came upon a sight that gave up-to-the-minute information about the weather in cities throughout the world. This sight led me to create the following activities that bring the weather to students in a way that appeals to them. All of the activities involve the students either finding weather data using weather instruments or using technology to acquire this information.

The first activity provides the students with an opportunity to use thermometers, the Beaufort wind scale, and simple weather symbols to measure and record the weather outside of their school.

The second activity provides the students with an opportunity to compare weather information from around the United States to the weather at their school via the Internet.

The third activity provides the students with an opportunity to compare weather information from around the world to the weather at their school via the Internet.

Rather than looking at pictures of the different cloud types, the students were given the opportunity to try and identify the clouds outside each day. Instead of just looking at weather maps in the newspaper, they were able to create their own weather maps each day. Students were always highly engaged due to the hands-on nature of the activities.

The information gathered during these activities leads to a variety of cross-curriculum tie-ins and lead-ins to other areas of weather and science. For example, the collection of weather data throughout the world could lead to a collection of climate data from around the world in order to compare the different seasons happening in the different hemispheres, and it could lead to a variety of geography lessons. The data can be used in a real-world context during math units on charts and graphs. Each student can choose cities in the United States and compare the weather in different regions of the United States, providing coverage of the social studies curriculum on U.S. regions.

### **Curriculum Benchmarks:**

**MI.SCI.V.3.E.2** Describe weather conditions and climates. (Key concepts: Temperature—cold, hot, warm, cool. Cloud cover—cloudy, fog, partly cloudy. Precipitation—rain, snow, hail. Wind—breezy, windy, calm. Severe weather—thunderstorms, lightning, tornadoes, high winds, blizzards. Climates—desert (hot and dry), continental (seasonal changes), tropical (hot and humid), polar. Tools: Thermometer, windsock. Real-world contexts: Daily changes in weather; examples of severe weather; examples of climates, including desert, mountain, polar, temper-ate.)

**MI.SCI.V.3.MS.2** Describe patterns of changing weather and how they are measured. (Key concepts: Weather patterns—cold front, warm front, air mass. Tools: Thermometer, rain gauge, wind direction indicator, weather maps, satellite weather images. Real-world contexts: Sudden temperature and cloud formation changes; records, charts, and graphs of weather changes over periods of days.)

**MI.SCI.I.1.E.6** Construct charts and graphs and prepare summaries of observations. (Key concepts: Increase, decrease, steady. Tools: Graph paper, rulers, crayons. Real-world contexts: Examples of simple charts and graphs like those found in a newspaper.)

### **Total Amount of Time for Lesson:**

School Weather Data

About 5 – 10 minutes per day

United States Weather Data

About 3 minutes of computer time per student per day

## World Weather Data

About 3 minutes of computer time per student per day

The length of the activities will obviously depend on the intended uses of the information that is gathered. I would recommend a minimum of 2 weeks to provide the students with adequate time to familiarize themselves with the weather instruments and the Internet capabilities.

### **Materials / Hardware / Software:**

Thermometers

Beaufort wind scales [[beaufort.doc](#)]

Weather symbols [[symbols.doc](#)]

Tables (these can be done by hand or directly on the computer spreadsheets) [these tables and the assessments are contained on [weather2.xls](#)]

Clipboards (these are helpful for writing on outside, but can be replaced by textbooks or binders)

<http://www.rainorshine.com>

Map of the United States

Map of the world

Magnetized weather symbols for maps

Atlases

### **Teacher Preparation:**

I would recommend familiarizing yourself with the Internet site and the Beaufort wind scale. They are both very simple to use.

I would also laminate the weather symbols list and the Beaufort wind scales so that they can be used outside (I glued them to construction paper and then laminated them. They went through 5 weeks and 2 classes of abuse and are ready to be used next year!).

### **Prerequisite Student Skills:**

It would be helpful, but not essential, if the students were familiar with using the Internet. I bookmark the weather site, and they simply input their city and country information to retrieve the data.

### **Student Activities / Procedures:**

Collecting Local Weather Data

1. Break the class into groups of 4 students.
2. Assign each student one of the following responsibilities—recorder, temperature, wind speed / direction, and cloud / precipitation. The recorder records the weather data. The temperature person is responsible for taking out the thermometer and gathering the temperature data in both Celsius and Fahrenheit. The wind person is responsible for judging the wind direction (I suggest letting grass fall from your hand) and wind speed (using the Beaufort wind scale). The cloud person is responsible for determining the type of clouds (I limit this to cumulus, cirrus, and stratus) and

providing the precipitation data. Although students have a specific responsibility, I encourage them to ask each other for help if they have a question or problem.

3. I give the students a limited amount of time to complete their data acquisition and record it on the Weather Observation Journal, reducing the time each day until we can complete the task in about 3 minutes.
4. Each student should perform each responsibility on a rotating basis so that they can do all four.
5. I have the students tell what data they collected the first few days to make sure that everyone in the class is doing each step correctly and using the tools correctly. I also provide guidance and help them answer questions during the data collection.

#### Collecting United States Weather Data:

1. Break the students into groups of two.
2. Each set of partners selects a city from somewhere in the United States (insure that choices cover different regions from across the country including different elevations).
3. Have each set of partners record the city, state, region, and elevation (from an atlas, encyclopedia, or globe) on the U.S. Weather Data Table.
4. Have the students collect the following information each day—date, high and low temperatures (°F and °C), wind speed (mph), wind direction, humidity, and air pressure—from the Internet website.
5. Have each set of partners assemble the data in the U.S. Weather Data Table.

#### Collecting International Weather Data:

1. Break the students into groups of two (I use the same partners as in the United States weather data and let them gather the data for both the U.S. and international at the same time).
2. Each group selects a city from somewhere in the world (insure that choices cover different regions from all continents including different elevations). Globes are very useful for finding different elevations as well as major cities within each foreign country.
3. Have each group record the continent, country, city, northern or southern hemisphere, and elevation on the International Weather Data Table.
4. Have the groups collect the date and the high and low temperatures (°F and °C) each day.
5. Have each group assemble the data in the International Weather Data Table.

#### **Assessment / Evaluation:**

##### Collecting Local Weather Data

I provide students with their own recording sheet. I break the students into four groups. One group does the temperature, one does the wind, one does the weather symbols / clouds / precipitation, and the other provides detailed instructions on using the Beaufort wind scale. Students must work on their data collection independently during the assessment. I have the groups rotate to the different stations (the temperature station has the thermometers, the wind station has the Beaufort wind scales, and the symbols / clouds / precipitation station has the weather symbols).

#### Collecting United States Weather Data

I select 6 cities in the United States. I have the students randomly select a recording sheet with one of the 6 cities as they get to the computer. They must find the weather information for that city independently.

#### Collecting International Weather Data

I select 6 international cities. I have the students randomly select a recording sheet with one of the 6 cities as they get to the computer. They must find the weather information for that city independently.

I do not grade the daily weather data that is collected because I feel that it should be used solely to identify areas that need further instruction and provide hands-on practice. I also encourage the students to work together if they have a question or problem. I do tell them that they will have to complete every task independently on their assessments, so this helps to encourage everyone to do their share.

#### **Follow-up Activities:**

There are a variety of activities that the class can do using the daily weather information. The students can create weather maps for the U.S. or the world. A daily weather report can be announced as part of the morning school announcements. Students can keep a graph of the weather information for any of the activities.

The information gathered during these activities leads to a variety of cross-curriculum tie-ins and lead-ins to other areas of weather and science. For example, the collection of weather data throughout the world could lead to a collection of climate data from around the world in order to compare the different seasons happening in the different hemispheres. The study of different areas of the United States could lead into a social studies unit on regions of the United States. The study of different areas of the world could lead to a variety of geography lessons. The data can also be used in a real-world context during math units on charts and graphs.

[Click here to view or print student worksheets](#)

[Click here to view or print the Beaufort Scale](#)

[Click here to view or print weather symbols](#)