

MAISA and the REMC Association of Michigan Best Practices in Technology Integration Plan

Title: Weather Across the Regions

Subject(s): Social Studies, Science, Math, Language Arts

Intended Grade Level(s): Grades 4-6

Description:

Weather Across the Regions is an inquiry in which students work cooperatively with on-line data collection, organization of data, reporting and sharing conclusions. The inquiry seeks to answer the question: “How do the landforms of a region affect the climate?” The students discover that technology is a tool that can be used to help them solve problems and communicate effectively. Students will learn to log-on and log-off the internet, the use of a browser and search engines, how to bookmark sites, enter data onto a spreadsheet and then convert that data to a bar graph and double bar graph; and, as an option, how to use communications software and email etiquette. They will gather weather data over a ten-day period using NOAA Web sites from six cities located in different physical regions of the U.S., but at the same line of latitude. Students will gain practice working cooperatively and collaboratively with groups, and will use the scientific process to complete their inquiry.

The lesson will also give the students hands-on experience with using the technology available, challenge them to use higher level thinking skills, engage in substantive conversation, and connect them to the world outside their classroom.

Curriculum Benchmarks:

MI.SOC.II.4.LE.6. Describe the geography of major United States regions, and compare the regions.

MI.SOC.V.2.LE.2. Gather and analyze information using appropriate information technologies to answer the question posed.

MI.SOC.V.2.LE.3. Construct an answer to the question posed and support their answer with evidence.

MI.SCI.I.1.E.1. Generate reasonable questions about the world based on observation.

MI.SCI.I.1.E.2. Develop solutions to unfamiliar problems through reasoning, observation, and/or experiment.

MI.SCI.I.1.E.5. Develop strategies and skills for information gathering and problem solving.

MI.SCI.I.1.E.6. Construct charts and graphs and prepare summaries of observations.

MI.SCI.V.1.E.1. Describe major features of the earth's surface (mountains, rivers, deserts, plains, valleys, and oceans).

MI.SCI.V.3.E.1-2 Describe atmosphere, weather, and climate.

MI.MAT.III.1.LE.1-2 Collect and explore data through observation and organize data using tables, graphs, and databases.

MI.MAT.III.3.LE.3. Formulate and communicate arguments and conclusions based on data and evaluate their arguments and those of others.

MI.ELA.2.LE.1. Write fluently for multiple purposes to produce an explanation of processes.

MI.ELA.3.LE.3. Read and write fluently, speak confidently, listen and interact appropriately, view knowledgeably, and represent creatively.

MI.ELA.3.LE.8. Express their responses to oral, visual, written, and electronic texts, and compare their responses to those of others.

Materials/Hardware/Software:

To complete this inquiry, students should have access to the following:

- Access to the Internet and the World Wide Web.
- Spreadsheet software such as Microsoft Works for Windows.
- A journal or journal sheets for recording data and observations (a sample is included).
- A copy of the included "My Investigation Report" sheet.

Activities/Procedures:

Pre-activities:

The students learn in a previous lesson about the five physical regions that make up the United States of America. These regions are commonly named the Eastern Coastal Plains, the Appalachian Highlands, the Central Plains, the Mountains West, and the Pacific Region (however, your text may give these regions different names). The students should also have prior knowledge about the variety of landforms that occur in these regions (coastal plains, hills, interior plains, mountains, and plateaus). In a study of atmosphere and weather, students learn about the conditions that create weather including temperature, moisture, wind, and air pressure.

One factor that is not currently addressed in the social studies or science curriculum is the affect landforms have on local climate and weather conditions. For example, Boston, MA; Syracuse, NY; Lansing, MI; Rochester, MN; Casper, WY; and Medford, OR all lie on about the same line of latitude (between 42° N and 44° N). In other words, these cities are all roughly the same distance north of the Equator; yet, they have widely different weather conditions. Why? This question is at the heart of this three-week investigation.

Teacher Activities:

Students first review the five physical regions of the United States. Converse with the students about cities located in the five regions that are on about the same line of latitude. What would they expect to be true about the temperatures in these cities since they are all about the same distance north of the Equator? What would they expect to be true about other weather conditions? Following this conversation, the question to be investigated is then introduced: **“How do the landforms of a region affect the climate?”**

To conduct the investigation, one city located in each of the five physical regions is selected. The cities chosen must be located on approximately the same line of latitude. To increase student interest at our school, cities located on about the same latitude of our own city were selected. We also chose to add a sixth city as a control. This could be your location if the weather information is available. The cities selected were Boston, MA (Atlantic Coastal Plain); Syracuse, NY (Appalachian Highlands); Lansing, MI (Control City); Rochester, MN (Central Plains); Casper, WY (Mountains West); and Medford, OR (Pacific Region).

The students are divided into six cooperative groups (one for each city). The groups work cooperatively to come to consensus on their hypothesis, collect and organize the data, and collaboratively to reach a conclusion based on the data. Each group is responsible for making observations, recording data, and analyzing weather data from one of the six cities. At this point, technology becomes the tool.

Student Activities:

1. The students go on-line to retrieve current weather data from their city for ten consecutive school days. They will access National Oceanographic and Atmospheric Administration (NOAA) sites on the World Wide Web

<http://weather.noaa.gov/weather/ccus.html>. This URL will allow the group to select their state. The state screen has a selection of reporting cities from which to choose. This site was selected because there is access to 24 hour-reported conditions, as opposed to sites that give forecasts.

2. Once the students reach their city, they should bookmark their site to make the data gathering more efficient.
3. The students now record the sky conditions (clear, partly cloudy, etc.), minimum and maximum temperatures, and precipitation collected from these sites into a weather journal (see “Data Collection Page”) and onto a classroom chart. Each student also records her/his own observations concerning the weather in their city.
4. Once the data has been collected, each group enters their temperature data onto a spreadsheet on a daily basis.
5. After each group’s data is entered, the students will use the spreadsheet software to generate a double-bar graph each day that illustrates the range of temperatures (high and low) for the six cities.
6. At the end of the ten days, the students will also make a bar graph showing the total precipitation recorded for each of the cities.

NOTE: The various tasks of this investigation are rotated among the four or five students in each group so each student gains experience with each task.

7. Following the ten days of data collection and organization, new groups will be formed. One student from each of the collection groups will join for collaboration. The new groups will analyze the data collected to answer the question posed. They will then compare their conclusion to their original hypothesis to complete the scientific process. The students will put their conclusions and a summary of the investigation into written form.

Possible conclusions reached may include the climate altering factors of nearness to the ocean or other large bodies of water, or elevation as the cause of the climate differences observed. These are valid conclusions. The desired conclusion is that the landforms of the region affect the current weather and climate of that region.

8. The conclusions reached by each group can then be reported to the class.

Assessment/Evaluation:

Assessment of this lesson is a continuous process as students collect data accurately, organize it in a useful manner, reach conclusions supported by the

data, and report their findings to others. At the conclusion of this lesson, each student will have produced a collection of weather data on a spreadsheet, a set of graphs, and their weather journals as evidence of the completed task. The data must be accurately recorded. The graphs will be constructed properly to illustrate temperature range and total precipitation in an accurate and easy-to-read manner. Journals must be completed. (See the attached scoring rubric for one way to assess). A simple checklist may also suffice.

A final piece of the assessment will be a reflective journal entry from each student describing their participation in the process, their feelings about how things went for themselves and for their group, what they enjoyed the most and why, what they did not enjoy and why, and what they would like to learn more about.

Follow-up Activities:

- Select another group of cities located in a different part of the United States (i.e. the Southern tier of states) to see if the same conclusion would be reached.
- Contact a school in the cities selected to learn more about your site.
- Seek Web Pals from the five regions to share weather information.
- Explore other weather-related Web Sites.

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SEE BELOW

Scientist _____ Date _____

MY INVESTIGATION REPORT

The **question** to be investigated: _____

What I/we predicted: _____

The materials my group used: _____

What I/we did to collect our data: _____

What I/we observed: _____

What I learned about the **question** from our investigation: _____

A new question about this investigation I would like to explore: _____

Data Collection Page

Date: _____

Time: _____

Recorded by: _____

Temperatures

High

Low

Sky Conditions

Precipitation

(trace=.001)



NOTES:

Scoring Rubric

Weather Across the Regions

Recording Data	Possible Points
Journal each day (10 days x 1 pt/day)	_____ 10 pts.
Classroom chart (2 times x 1 pt)	_____ 2 pts.
Organizing and Graphing Data	
Enter onto spreadsheet High/Low temperatures and Precipitation on at least two occasions (2 x 3 pts for each entry)	_____ 6 pts.
Graph same information	_____ 6 pts.
Technology -- On-line	
Successful log on and web connection	_____ 5 pts.
Successful e-mail transmission	_____ 5 pts.
Completed Inquiry Form	
Completes all five steps in process	_____ 5 pts.
Summary	
Reflects steps in process plus conclusion	_____ 5 pts.
Reflective Journal	_____ 6 pts.
TOTAL	_____ 50 pts.

_____ /50 = _____ % = _____ GRADE