Unit Title: Tracking Temperature & Snowfall Data in Regions of the United States

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Grade Level/Subject: 4th grade science, mathematics & geography

Date of lesson: Not yet taught, will do in the new year

Length of unit: 2 months (beginning of January through the end of February)

Number of teaching periods: 1 period for introductory lesson
1 period for presentation prep lesson
1 period at end for group presentations
On-going independent/group work for students on a daily basis through the project period from January to the end of February

SOL Objectives:

- Science 4.1: The student will plan and conduct investigations in which:
  e) appropriate metric measures are used to collect, record, and report data;
  f) data are displayed using bar and basic line graphs;
  h) predictions are made based on data from picture graphs, bar graphs, and basic line graphs.
- Science 4.6: The student will investigate and understand how weather conditions and phenomena occur and can be predicted. Key concepts include:
  a) Weather measurements and meteorological tools; and
  b) Weather phenomena
- Math 4.20: The student will collect, organize, and display data in line and bar graphs with scale increments of one or greater than one and use the display to interpret the results, draw conclusions, and make predictions.
- Geography USII.2: The student will use maps, globes, photographs, pictures and tables for:
  c) Locating the 50 states and the cities most significant to the historical development of the United States.

By the end of the unit the students will have:

- Chosen a region within the US to focus on with their group.
- Individually collected and recorded temperature and snowfall data for at least one town/city within their group's region, and displayed this data in appropriate charts or graphs.
- Posted weekly region summaries within a class blog on FCPS 24-7/Blackboard.
- Created a PowerPoint slideshow or photo story of pictures from their chosen region.
- Presented the results of their data collection to the entire class.

NETS-S Standards:

- 1b: Create original works as a means of personal or group expression.
- 2a: Interact, collaborate, and publish with peers, experts or others employing a variety of digital environments and media.
- 2b: Communicate information and ideas effectively to multiple audiences using a variety of media and formats.
- 2d: Contribute to project teams to produce original works or solve problems.
- 3b: Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.
- 3d: Process data and report results.
- 4c: Collect and analyze data to identify solutions and/or make informed decisions.
- 6a: Understand and use technology systems.
- 6b: Select and use applications effectively and productively.

Materials:

- Software: Microsoft Excel
  Microsoft PowerPoint -or- Microsoft Photo Story
  MapMaker's Toolkit -or- Pixie
  Firefox -or- Internet Explorer web browser
- Web Resources: FCPS 24-7 Learning/Blackboard (fcps.blackboard.com)
  WeatherBug Achieve (achieve.weatherbug.com)
  Weather.com (www.weather.com)
  National Weather Service (www.nws.noaa.gov)
  Other weather-related websites
- Personnel: Classroom teachers, SBTS

Required skills or pre-knowledge students should have:
Ideally before the first tech lesson, students will have been divided into small groups of 3-4, selected a region within the United States (ie. New England, Mid-Atlantic, etc.) and chosen at least one city or town per student for which to collect data. Students will already be familiar with how to access their folders on the school server, as well as log in to FCPS 24-7/Blackboard. Students will also be familiar with the MapMaker's Toolkit and Pixie applications.

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Teaching Plan 1 – Introductory Lesson:

- *Hook/Opening/Anticipatory Set* – At the beginning of the introductory lesson, the teacher and SBTS would lead a whole class discussion asking students about the regions they have selected, and the cities or towns within those regions that they will focus on in their research. Elicit predictions about which regions/cities/towns will get the least or most about of snowfall and the highest or lowest temperatures during the 2-month data collection period (January-February).

- *Guided Practice* – Using an LCD projector, the teacher and SBTS will demonstrate the following to the whole class:
  - How to create an Excel spreadsheet for compiling temperature and snowfall data
  - How to find temperature and snowfall data online using specified websites
  - How to access and post into the class weather blog (which the teacher will have set up ahead of time within the class' Blackboard course)
  - How to find and save digital photographs of their regions from WeatherBug Achieve

- *Independent Practice* – After the whole-class demonstrations, students will work for the remainder of the period within their groups to:
  - Create their weather data spreadsheets and save them onto the school server
  - Post an initial entry within the class weather blog that tells what region they will be studying, and which towns or citites each individual group member will track
  - Record initial temperature and snowfall data for each of their towns or cities

- *Accommodations/Differentiation/Extensions* – Differentiation for this introductory lesson will come from students having to work both individually and together to complete the tasks mentioned above. For each group, one student will set up the data spreadsheet, another will compose the initial blog entry, and remaining members will locate temperature and snowfall data online, as well as digital photos for their regions. They will need to share and rotate among computers within their groups. Extensions might include finding data for additional towns or cities within their regions, expanding their spreadsheets to include other types of precipitation, or searching for other online sources of photographs of their regions.

- *Unit Vocabulary* – Students will have studied key weather-related vocabulary during their regular science lessons prior to this first class.

- *Homework* – Homework will mostly take the form of on-going individual and group work throughout the course of the project. Students must individually record daily temperature and snowfall data for their focus cities/towns, and compile this data within each region group's Excel spreadsheet. Groups will also be responsible for posting weekly summaries of their region within the class weather blog within FCPS 24-7/Blackboard.

- *Assessments* (formative and/or summative) – Assessment after this first introductory lesson will involve checking that each group has created and saved a weather data spreadsheet on the server, and also posted an initial entry within the class weather blog.

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Teaching Plan 2 – Presentation Prep Lesson:

- *Hook/Opening/Anticipatory Set* – This lesson will come at least halfway through the project period, most likely within 1-2 weeks of the final presentation date. By this point, students should have already collected over a month's worth of temperature and snowfall data, made at least 4 class weather blog entries, and saved at least 4 photos per city or town being observed.

- *Guided Practice* – Using an LCD projector, the teacher and SBTS will demonstrate the following to the whole class:
    - How to create charts and graphs of data using Excel
    - How to create a map with either MapMaker's Toolkit or Pixie
    - How to create a presentation with either PowerPoint or Photo Story

- *Independent Practice* – Once again, after the initial demonstration, students would use the remaining time to work within their groups to begin creating their data charts and graphs, presentations and region maps.

- *Accommodations/Differentiation/Extensions* – Completing the group's tasks will again involve individual work by the students: one student can work on creating the charts and graphs from the Excel spreadsheet data, another can create a map of the group's regions featuring each of the cities or towns observed, and another can begin to consolidate all of their digital photos and blog summaries into their presentation. Extensions at this point in the project might include having students compare forecasts and predictions made about their regions with what actually happened, or enhancing their presentations beyond the essentials with video, narration or music. Groups would also need to divide up the duties for their final class presentations.

- *Homework* – Obviously the main homework will be to have everything ready for the group presentations at the end of the project period. As this presentation prep lesson might come several weeks before the actual presentations will be made to the class, continued data collection and blog posting could conceivably go on as well.

- *Assessments* – The final assessment would evaluate each of the elements of the whole project:
    - Daily entries within the group's weather data spreadsheet
    - Weekly postings in the class weather blog
    - A 5-minute final presentation to the whole class that includes:
        - A map showing the group's region and each city/town observed
        - Charts and graphs illustrating temperature and snowfall data collected
        - A slide show or photo story of images collected from their region

Student Reflections: none (not yet taught)

Teacher Reflection: none (not yet taught)

Temperature & Snowfall Data Tracking Project Assessment Rubric

Category	4 points	3 points	2 points	1 point
Data entries in group weather data spreadsheet	Daily entries for each city/town observed	Entries for at least 4 days per week	Entries for only 2-3 days per week	Entries for less than 2 days per week
Postings in class weather blog	Weekly postings summarizing the region's weather	One weekly posting missing	2-3 weekly postings missing	More than 3 weekly postings missing
Final Group Presentation				
Map showing group's region	Map of region clearly showing each town/city, names of group members and who observed each town/city included within presentation	Map of region showing each town/city, group member names and who observed each town/city, but not included in presentation	Map of region showing each town/city, but missing names of group members and not included in presentation	Incomplete or missing map of region -- missing names of each city/town and/or also no group member names
Charts and graphs for data collected	Appropriate type of chart/graph used to clearly illustrate data collected for each town/city observed as well as whole region	Appropriate type of chart/graph used to illustrate data collected for each town/city, but none for entire region	Questionable choice in type of chart/graph which makes difficult to visualize data	Incomplete or missing chart/graph
Slide show/photo story of images collected	Slide show/photo story containing multiple images for each town/city observed during entire project timeframe	Slide show/photo story containing 2-3 images for each town/city observed during project timeframe	Slide show/photo story containing only 1 image for each town/city observed	Incomplete or missing slide show/photo story, missing photos for some towns/cities observed

Bonus Points for:

- Data collected for 2 or more cities or towns within region
- Data collected for other forms of precipitation
- Video included in presentation
- Narration included in presentation
- Music included in presentation
- Comparison of forecasts/predictions with actual weather observed in region