

Best Practices of Technology Integration

Title: Student Meteorologists

Submitted by:

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Format: Windows 98

Subject Area: Science

Intended Grade Level(s): 7-8

Description:

This unit is on weather and has four main components. First, students will understand and use basic weather equipment and concepts. Second, students create a weather forecast. Third, students will incorporate technology effectively into their forecast. Finally, the students will use a children's trade book as a substitute for the textbook. The four components outlined will be accomplished in a unique fashion. In order to bring meaning and significance to the presentation, recent real life events will be used, such as the derecho winds of last spring (1998), the severe storms this fall (1998), or the blizzard of 1999. Each of these events impacted all of our students in different ways. Understanding and being able to explain weather events is necessary for all students. Additionally, each student in the 8th grade was partnered with one or more 3rd grade student throughout all of the activities. This can be optional, if proximity to an elementary classroom does not permit partnering.

Narrative:

I found this lesson to be one of the most exciting and satisfying lessons I have ever taught. The components of this lesson that made it successful were: video taping forecasts which allowed for expressing creativity, mentoring younger students, and for the 8th graders "teaching" skills and concepts to another student, as well as being role models. At the conclusion of this project, the students in both classes (8th and 3rd) were ready to embark on another project and more than willing to continue the partnership. For my students the addition of technology was critical to the success of the project. Each student partnership created an original forecast, which reflected their individuality. The opportunity to integrate technology is difficult in my classroom and content area because we currently do not have televisions, VCR's, or computers in our classrooms. Unlike many other districts, Coopersville has not had the opportunity to equip its classrooms with these technological tools.

Curriculum Benchmarks:

ML.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.)

ML.SCI.V.3.EL.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, wind sock. Real-world contexts: Daily changes in weather; examples of severe weather; examples of climates, including desert, mountain, polar, temperate.)

ML.SCI.V.3.MS.1 Describe the composition and characteristics of the atmosphere. (Key concepts: Atmosphere—air, molecules, gas, water vapor, humidity, dust particles, air pressure. Temperature changes with altitude. Also see Hydro-sphere benchmarks. Real-world contexts: Examples of characteristics of the atmosphere, including steam, pressurized cabins in airplanes, demonstrations of air pressure; examples of air-borne particulates, such as smoke, dust, pollen, bacteria.)

Total amount of time for lesson:

6-7 lessons each 50 minutes

Materials/Hardware/Software:

Each of the materials listed should be provided to each group (except for the TV, VCR, Video Camera, and Video Tapes).

15 COPIES (1 PER PARTNERSHIP) of The Big Storm by Bruce Hiscock. ISBN# 0-689-31770-0. I purchased mine for \$8.97 (a 40 % discount) through Partners Book Distributing Inc. (1-800-336-3137).

Sling Psychrometers

Thermometers

Rain Gauges

Wind Meters

Barometers

Cloud Types Booklet (i.e. Golden Books: Weather by Burnett and Zim)

Approximately 30 sheets of white posterboard to use as cue cards

Free standing overhead screen

15 thick black markers

Teacher Preparation:

Pre-read The Big Storm and outline the major weather events in the story. Focus the students on forecasting only the event they are assigned. They should be directed to apply what they have learned to develop a forecast which is accurate for the event in the story. The 8th grade students

should be instructed to help guide and explain each part of the forecast to the 3rd grade student(s). It is important to make resources available for the students to use after they have been placed in groups and assigned a weather event. For example, I use *The Weather Book*, by Jack Williams to support students when they are forecasting. Any weather reference material, including a textbook, is useful. If your school has Internet access a list of web sites for students to access would be an added resource. Our classrooms do not have computers so this is not useful for Coopersville. Another option is to outline the important information for each weather event then provide the students with a guide to follow. I spent 30 minutes re-reading the book and outlining the important weather events, which I will assign to each group. I also spend approximately 60 minutes with the school media specialist gathering weather related reference materials, and I reserve an extra freestanding overhead screen for the backdrop for the forecasts. I spend 15 minutes gathering markers and poster board for the students to use as cue cards. It will also take 30 minutes to meet with the 3rd grade teacher and assign partnerships.

Prerequisite Student Skills:

8th grade students must have learned how to use each weather instrument, and understand its function. Students must have had practice identifying major cloud types, and be able to explain each type to the younger students. Students must have had practice forecasting prior to this activity. I usually do this activity (forecasting) at the conclusion of the weather unit. The technical skills they should have are operation of a TV and VCR and video camera. If your school were linked to the Internet it would be useful for students to be able to use search engines to find weather-related sites. They could search for information regarding the weather event they were assigned.

Student Activities/Procedures:

In order to accomplish the goal of the project, I used the children's trade book *The Big Storm*, by Bruce Hiscock. The trade book offers an insightful and friendly format for students who are intimidated by a textbook. Before reading the book, my 8th grade science class was partnered with a 3rd grade class. The partnerships were established to engage both the younger students and older students in different types of "student-teacher" relationships. (Keep in mind student ability and personalities when assigning partnerships. I met with the other teacher to establish the groups in advance.) This allowed my 8th grade students to take ownership for their instruction and demonstrate effective use of concepts and equipment.

On the first day of the project the students read the book together and discussed the weather events that occurred. This section takes approximately 30 minutes. The last 20 minutes is used for discussion of the weather events. The students may do this on their own, or it may be guided. I guided the discussion by using the timeline in the front of the book. We discussed what happened on each day in the story and how it was similar to events they had experienced.

The second day, we viewed video of weather forecasts from the local TV station. These can be forecasts from current weather. I used old weather forecasts from the storms in the spring of 1998, fall 1998, and winter 1998-99. If your classroom is cable ready you could substitute "The Weather Channel." We view these for approximately 15 minutes. The follow-up to the video is a discussion on the importance of forecasting, particularly for severe weather. I encourage students to share their own experiences with severe weather. Following the discussion, which last for about 15 minutes, each student partnership is assigned a specific section of the story to prepare a simulated forecast for. This is accomplished by researching the

type of severe weather assigned to them and understanding the use of tools in predicting future weather. The goal of each forecast is to simulate what people in the story might have heard before the actual weather event occurred. The students spend the last 20 minutes of this day beginning to brainstorm ideas for their forecast.

However, in order to prepare a forecast the 8th grade students had to prepare the 3rd grade students to predict weather. This was accomplished during the next lesson. Each 8th grade student had previously learned how to use all of the basic weather equipment, as well as how to identify cloud cover. Each group of students taught their 3rd grade partners how to use the equipment, measure, and record the data. Once each group had an opportunity, my students were prepared to use these skills and demonstrate accurate predictions. Therefore, this activity was used as a performance-based assessment to evaluate the 8th grade students. Upon conclusion of this activity, each partnership prepares a forecast, which will be video taped for broadcast. (It is possible to alter or modify this portion of the lesson if equipment is in limited supply. For example, the group may go outside in small groups and the teacher could demonstrate each weather tool and what it is used for.)

On the fourth day of the project each partnership will prepare their forecast. The teacher can facilitate this in two ways. First, by providing a list of possible conditions for each weather event or second, by suggesting resources to students that may provide a list of possible conditions for each weather event. All forecasts should be factually correct, but students can and should use their creativity to present the forecast. The forecasts should be approximately 3 minutes in length. The students should be given 45 minutes to work on their forecasts.

The fifth day is a continuation of the fourth day. Students are continuing work on their forecasts. Their scripts should be placed on cue cards, and they should have time to practice at least once before their presentation is recorded. The teacher should proof read all of the scripts, which is not difficult if you move about the room while they are being written. This day is quite busy; it helps to schedule the students for a time to record their broadcast. I usually help the students with the recording in the hallway, while the other teacher remains in the classroom. Recording presentations takes 30 minutes.

The final day of the project all presentations are viewed and the 8th grade students are evaluated. They are evaluated on their presentations and given a quiz on the book *The Big Storm*. They also fill out a self-evaluation.

Assessment/Evaluation:

Students will be assessed by the forecast they produce. The student-produced forecasts provide an opportunity for using performance-based assessment. Students in 8th grade will also be given a quiz based on the book *The Big Storm*. The teacher whose class participated also provided feedback for improvement. Students were extremely excited to see themselves on video and then view it in conjunction with the story. The impact of technology was measured by the self evaluations and recommendations for improvement the students prepared after having had the opportunity to watch their forecasts on TV.

The Big Storm Quiz

Directions: Please circle true or false for each statement.

1. True or False – The prevailing winds in the United States blow from east to west.
2. True or False – Cold fronts bring sunny weather.
3. True or False – Warm air rises from the tropics and cold air flows down from the poles.
4. True or False – A barometer measures precipitation.
5. True or False – Low pressure brings storms.
6. True or False – A narrow band of high-speed wind that snakes across the continent is called the jet stream.
7. True or False – The United States has the fewest tornadoes in the world.
8. True or False – Tornadoes usually form behind a warm front.
9. True or False – The weather instrument that measures humidity is a thermometer.
10. True or False – Warm fronts bring fair weather.

Teacher Evaluation of Forecasts

1. 10 points – Clear Voice
2. 10 points – Good Posture and Eye Contact
3. 50 points – Facts Correct and Quality of Presentation
4. 10 points – Correct Time
5. 10 points - Creativity

Self Evaluation - is the same format as the Teacher evaluation except each category is meant for students to write about not score themselves. I ask each student to comment with at least one paragraph on each topic. I consider the evaluations when I issue their final grade for the project.