**Earth Science Lesson Plan 4: Meteorology**

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| **Name: Barbara (BJ) DeJarnette** | **Date: July 12, 2011** |
| **Content Area: Earth Science** |  **Grade Level(s): 9/10** | **Topic(s): Weather Watch Activity; Graph & Analyze Data** |

**Standards (SOL)**

ES.1a) The student will plan & conduct investigations in which volume, area, mass, elapsed time, direction, temperature, pressure, distance, density, & changes in elevation/depth are calculated utilizing the most appropriate tools.

1c) scales, diagrams, maps, charts, graphs, tables, & profiles are constructed & interpreted.

1d) variables are manipulated with repeated trials;

1e) a scientific viewpoint is constructed & defended.

ES 3a; 3c

**Objectives**

Students will graph and analyze weather data.

**Materials & Resources**

Unit Organizer: Meteorology: The scientific study of weather.

Vocabulary Words: completed using Linking Strategy

Slot Outline Notes from power point presentations.

Textbook

Pencil, colored pencils

Weather report page from local newspaper: all the same (one paper per group) &/or Data from Internet with one computer per group or information projected on screen in front of room

Worksheets with assignments

**Safety Considerations**

This activity is designed to be completed by each individual student at their desks although it may be adjusted so that students work with a partner (if they have been absent & need a copy of the data).

**Engage – Time Estimate: 10 minutes**

Have the students look at & review the Unit Organizer (Meteorology) chart on the wall (Causes, Weather Systems, Weather Instruments have been completed. Lead into what season, weather, etc. your area currently has and how meteorologists record it. The following questions are to be used for the students to discuss as a class or with their lab partner.

1. Five hundred years ago, how did people know what the weather forecast was?
2. In what ways can a weather forecast help to save money?
3. When you are outside, what things can you use to observe the weather?
4. How many different weather instruments, or tools, can you name?
5. What things would help to make weather forecasts more accurate?
6. How can we know what the weather is over the oceans and up in the air?
7. What are some things you need to do before you make a weather forecast?
8. In what ways do weather forecasts make our lives better?

**Explore–Time Estimate: 10 minutes daily for 8 consecutive days, depending on how much data you want to analyze. (Start on a Monday or midweek so finish on a Thursday or Friday or carry over to following week).**

Students will find (teacher generated from computer and displayed from projector or smart board or from daily newspaper weather report) and record data on their worksheets over a period of 8 days. A large chart for the class may also be on a wall or board in the classroom for students to look at and copy if they had been absent on any of the days. They will need to determine if the wind pressure is rising or falling. Data sheets will include the following:

Date

High Temperature

Low Temperature

Air Pressure

Change in Air Pressure (rising/falling)

Average Relative Humidity

Cloud Coverage

Wind Direction

Wind Speed

Amount of Precipitation

At the end of the week, students will use the collected data and draw a station model for each of the recorded days. They will then calculate the average daily temperature (degrees F) for each day. They will construct a line graph that shows the daily high and daily low temperatures as well as the average daily temperature. They will then answer questions on wind, precipitation, air pressure, and relationships between the air pressure and wind and weather patterns.

**Explain -- Time Estimate 10 minutes**

The chart on the wall will contain all the information so students will be able to compare their information to it and change if necessary. Students complete the Graphing and Analyzing Data assignment using their textbooks, previous notes and lab partners. Papers will be turned in and graded. Afterwards, corrections may be made as the teacher goes over the information via the chart on the wall and answers on an overhead or smart board.

**Extend -- Time Estimate: 5 minutes plus homework time**

When students are finished with the lab and are back in class, ask the following: What would happen if all meteorologists stopped making weather forecasts? Do you think computers can forecast the weather better than humans can? Then, hand out the News Article: Mount Hood Disaster. Have the students read and respond to the questions on the back. The next day, they should get into groups of 4 and compare their comments.

**Evaluate -- Time Estimate: 5 minutes**

Labs should be graded according to correct responses. The Mount Hood Disaster could be graded according to whether or not they answered the questions. On unit test, students will correctly answer questions relating to interpreting weather data and forecasting charts.

**Plans for Diversity**

The method of gathering the information may be adjusted according to the type of students you have. They may find it in the newspapers themselves everyday or the teacher may decide to post it on the board from the internet or paper. If a student is absent, they may copy the information from their partner. The graphing section may need to be larger depending on the students’ ability to fit the information in the area. The teacher may need to collect papers if students are unorganized.

**Connections**

Students can compare their pictures and information with those on TV or the internet and then use them to make predictions for the future weather forecasts.

The lesson fits in with the Meteorology unit. They have learned about the layers of the atmosphere, heat transfer and the relationships between heat, density, air pressure, and humidity, as well as clouds and precipitation. Students have covered the causes of weather, weather systems, and weather instruments. After they explore the how to, why, when, where, and what to do with forecasting, they will then be using their knowledge in order to identify specific types of storms and reoccurring weather.

They can review their Unit Organizer and Use Mount Hood Disaster as a lead in for Storms for **ES.13c**: severe weather occurrences, such as tornadoes, hurricanes, and major storms.

**“The Mount Hood Disaster,” A Sudden Change in the Weather**

Weather is very changeable and can be severe at times, causing disasters. Weather can be difficult to predict at times, especially in certain areas where there are many contributing factors to consider.

First, read the newspaper article about the Mount Hood disaster. This really happened in 1986. Read it carefully, underlining or highlighting the important facts (not all the little details). Keep in mind that in a newspaper article the **reporter tries to present the facts as truthfully as possible. Write your answers on another piece of paper to turn in with the handout.**

**1. Write a brief summary telling what happened according to the newspaper article.**

Nest, read an editorial that appeared in the newspaper a few days after the original article.

**2. Use 2 different writing tools to underline or highlight reasons given as to why students should or should not be allowed to do such field trips.** Keep in mind that in an editorial someone gives his opinion about something, tells it the way he sees it.

**3. Make a list of reasons given in the editorial that support the ideas that students should not be allowed to take part in such a dangerous activity as the Mount Hood climb.**

**4. Make a list of reasons given in the editorial that support the idea that students should be allowed to take part in exciting and challenging activities such as the Mount Hood climb.**

Having read the facts (newspaper article) and someone’s opinion on the matter (editorial), please give your own opinion.

**5. Explain whether or not you think this disaster could have been avoided and how.**

**6. Explain whether or not the group of climbers could have known that a storm was likely to occur while they were on the mountain.**

**7. Do you think that students should be allowed to participate in such activities? Give a t least 3 reasons telling why you feel the way you do.**