

NAME

Summer Earth Science 11 Packet, Grade 11
Meteorological Observations, Measurements, and Report

Meteorology ~ the science dealing with the atmosphere and its phenomena, including weather and climate.

Summer Activity ~ Observing and Predicting Local Weather

Background Information and Introduction

Weather is one of the most talked about subjects worldwide and one of the most puzzling. It affects the people on every continent and plays a major role in determining their activities, types of subsistence, and even aspects of their very culture. It has been a factor throughout time since the creation of the atmosphere.

Wind direction, temperature, clouds, and precipitation in a certain location are all clues to larger weather patterns. With practice, a weather observer can often accurately predict the local weather for the next day. In this activity, careful observations will be made and variables of weather over a period of time will be recorded and analyzed before identifying definite relationships that exist among them. Predictions for the days after the activity is completed will then be made.

Skills and Objectives

- To measure and record weather conditions over an extended period of time.
- To identify how weather conditions are related and analyze the results of related data.
- To predict the weather for a 24 hour period.
- To graph data associated with the times of daily sunrise and sunset (on two separate graphs) and then to compare these two graphs. Graphs may be done on the computer or if graph paper is needed it can be found at www.graphpaper.com
- To graph data associated with the daily high and low temperatures and understand the daily cycle of temperature changes.

- To recognize and describe any cycles or patterns that are observed regarding the collected data.

Procedure

1. In the traditional model, the school weather station would be used to make daily readings. Students should be familiar with the workings of the following Meteorological instruments:

Thermometer ~ to measure the number of therms in the atmosphere in °F.

Barometer ~ to determine the barometric (air) pressure in millibars (mb).

Weather (wind) vane ~ to determine wind direction.

Anemometer ~ to determine wind speed in mph.

Psychrometer ~ (wet/dry bulb thermometer) to measure relative humidity (%).

Rain gauge ~ to measure precipitation (in).

However in this activity, students should obtain this information from the daily TV or radio broadcast, from a newspaper, or from the Internet. There are many acceptable sites and a couple are:

www.weather.com/

<http://www.wcvb.com/weather/>

www.noaa.gov/

2. Construct a daily Weather Chart and a Data Table that includes data from **a continuous two week period**. Weather Chart should include: Date and either the Time of Day of the broadcast or Source of Information; Daily High and Low Temperature; Air Pressure, Wind Direction; Wind Speed; Relative Humidity, Total Precipitation, State of the Sky, Time of Sunrise; Time of Sunset; Cloud Type (check out ... http://www.crh.noaa.gov/lmk/?n=cloud_classification); and finally a statement about the day's general weather conditions on a separate paper or "diary". Below is a partial excel example.

Daily Weather Chart

	1-Jun	2-Jun	3-Jun	4-Jun	5-Jun	6-Jun	7-Jun
High Temperature	78°F						
Low Temperature	51°F						
Air Pressure	31.17						
Wind Direction	NNE						
Wind Speed	10 mph						
Humidity	84%						
Total Precip							
Sunrise							
Etc. from list							

- At the end of the two week observation time, locate a period of several days within the data where air pressure rose steadily and remained relatively high. Record the range of temperatures and relative humidities that occurred during that period of time on a data table titled Data Table A. For the same period, record the most common weather conditions and State of the Sky. Refer to example table below.

DATA TABLE A

Weather Conditions	High Air Pressure	Low Air Pressure
Range of Temperatures °F	???? High Temp	???? Low Temp
Humidity Range	???? High Humidity	???? Low Humidity
General weather conditions		
General state of sky		

- Complete the Analysis and Conclusion section.

Analysis and Conclusions ~ All answers MUST be in complete sentences with full explanations.

- Is there a wind direction that usually brings cooler weather? Explain your answer.
- Is there a wind direction that usually brings warmer weather? Explain your answer.
- How is wind speed affected when air pressure changes rapidly? How is wind speed

affected when air pressure holds steady?

4. According to the data, is high pressure associated with clear weather or stormy weather? Is low pressure associated with clear weather or stormy weather?
5. Is the state of the sky a good indicator of the next day's weather? Explain your answer.
6. Which cloud types are associated with precipitation? Cite evidence referring to data from your chart.
7. What is the relationship between relative humidity and weather? Explain your answer.
8. Do changes in relative humidity indicate changes in weather conditions? Explain the relationship referring to data from your weather chart.
9. On the basis of the data and your conclusions, what weather conditions are the most useful for making your own local forecast?
10. Forecast the weather for the next two days and explain the logic behind the predictions that were made.

Part 2: Research Mini-Paper

Choose one of the following types of storms:

1. Hurricane
2. Blizzard
3. Tornado
4. Typhoon

For the topic chosen, pick a famous one of that type of storm. Write a mini-paper on that famous storm (approximately 1- 2 pages of text) that includes but is not limited to information such as: how the storm formed, specific characteristics about the storm, where it struck, its duration, how it affected humans i.e.: travel, damage, death, destruction, dollar figure of cost, etc. Include how humans reacted to the storm, what warning they were given, how they could have prepared for it in advance, precautions put in place since the storm, etc. and any other tidbits of information that add to the quality of the paper. The mini-paper must follow all English Department guidelines and include a pictorial. The pictorial may be attached to the mini-paper and should also include a map of where the storm hit

The assignment will comprise one test grade in Term 1.