# Meteorology Lab Report

#### Introduction

Meteorologists draw conclusions based on all known weather data. Since weather data is constantly changing, their forecast can change from day to day or from hour to hour. Now, it is your turn to predict the weather. In this lab activity, you will analyze data collected from a weather station to create a weather forecast.

**Problem:**

How can we use the relationships among weather data to produce a forecast?

**Hypothesis/Prediction:**

Based on the weather data you in **Table 1** below, make a prediction about the weather from the data by completing the sentences below.. Make sure your prediction is made ***before*** you create graphs of your weather data.

1. If temperature \_\_\_\_\_\_\_\_\_\_\_\_\_ increases/decreases, then the dew point will \_\_\_\_\_\_\_\_\_\_\_\_\_increase/decrease.
2. If temperature \_\_\_\_\_\_\_\_\_\_\_\_\_\_ increases/decreases, then air pressure will \_\_\_\_\_\_\_\_\_\_\_\_\_ increase/decrease.

**Materials:**

* Weather data in **Table 1**
* [Weather Maps Symbols Key](https://www.wpc.ncep.noaa.gov/html/stationplot_printer.html) (see lesson)
* Graphing software or application
* [Graphing tutorial](https://cdn.flvs.net/cdn/lo/graphing/) (optional)

#### Procedures:

1. Using the Weather Data from **Table 1**, construct a line graph using Time on the X axis and Temperature for the Y axis. Make sure to plot both the temperature and dew point on your graph. Be sure to include units and add titles to the graphs. *Refer to the graph example and graphing tutorial in the lesson if needed.*
2. Using the Weather Data from **Table 1**, construct a second line graph using Time on the X axis and Air Pressure for the Y axis. Be sure to include units and add titles to the graphs.
3. Select two different times (one day and one night) from **Table 1** and create a weather station model for each. Use the example diagram in the data sections and the **Weather Map Symbol Key** in the lesson to guide your weather station models.
4. Complete the **Questions and Conclusion** section of the lab report.

**Graph 1**

1. You may plot the data by hand on the template below or follow the steps below to create your graph.
2. Double click on the graph, then select the tab labeled “**Time vs Dew Point**”.
3. Open the Graph in Google Sheets and make a copy.
4. Add your values to **column B** and the graph should update as you add values.
5. Once you have input all corresponding data, right click the graph and paste it into this document.

**Graph 2**

1. You may plot the data by hand on the template below or follow the steps below to create your graph.
2. Double click on the graph, then select the tab labeled “**Time vs Air Pressure**”.
3. Open the Graph in Google Sheets and make a copy.
4. Add your values to **column B** and the graph should update as you add values.
5. Once you have input all corresponding data, right click the graph and paste it into this document.

**Data and Observations:**

**Table 1: Weather Data from Station 1, Cape Canaveral, Florida**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Time of Day** | **Temperature(F°)** | **Air Pressure(sea level, mb)** | **Relative Humidity** | **Cloud Cover(sky condition)** | **Wind Speedand Direction(wind, mph)** | **Dew Point (F°)** |
|  12:00 am |  76 | 1013.3 |  97% |  A few clouds |  Calm |  75 |
|  1:00 am |  75 | 1013.0 | 100% | A few clouds | S 3 | 75 |
|  2:00 am |  75 | 1012.8 | 100% | A few clouds | Calm | 75 |
|  3:00 am |  74 | 1012.5 | 100% | Fair | Calm | 74 |
|  4:00 am |  74 | 1012.3 | 100% | A few clouds | Calm | 74 |
|  5:00 am |  73 | 1012.5 | 100% | Fair | Calm | 73 |
|  6:00 am |  73 | 1013.0 | 100% | Shallow Fog | Calm | 73 |
|  7:00 am |  76 | 1013.4 | 100% | A few clouds | Calm | 76 |
|  8:00 am |  79 |  1013.6 |  90% | A few clouds |  NW5 |  76 |
|  9:00 am |  82 |  1013.9 |  79% | A few clouds |  NW3 |  75 |
|  10:00 am |  85 |  1014.1 |  68% | Partly Cloudy |  Calm |  73 |
|  11:00 am  |  85 |  1014.2 |  70% | Mostly Cloudy |  E6 |  74 |
|  12:00 pm |  87 |  1013.7 |  65% | Mostly Cloudy |  NE9 |  74 |
|  1:00 pm |  87 |  1013.1 |  65% | Partly Cloudy | E9 |  74 |
|  2:00 pm |  87 |  1012.5 |  65% | Mostly Cloudy | E12 |  74 |
|  3:00 pm |  87 |  1011.8 |  67% | Mostly Cloudy |  E12; G17 |  75 |
|  4:00 pm  |  86 | 1011.3 |  70% | Partly Cloudy |  Variable 7 |  75 |
|  5:00 pm |  85 | 1011.5 | 72% | Partly Cloudy | SE7 |  75 |
|  6:00 pm |  82 | 1011.7 | 77% | Mostly Cloudy | E5 |  74 |
|  7:00 pm | 81 | 1012.1 | 82% | Mostly Cloudy | SE3 |  75 |
|  8:00 pm | 79 | 1012.9 | 88% | Mostly Cloudy | SW6 |  75 |
|  9:00 pm | 78 |  1013.8 | 90% |  Overcast | SW3 |  75 |
|  10:00 pm |  77 | 1014.4 | 94% | Overcast | SW7 |  75 |
|  11:00 pm |  76 | 1014.3 | 100% | Overcast | Calm |  75 |

Select two different times (one day and one night) from **Table 1** and create a weather station model for each. Use the[**Weather Map Symbols Key**](https://www.wpc.ncep.noaa.gov/html/stationplot_printer.html) from the lesson to guide your weather station models. An example is shown below. Place your weather station models under the data for each time. [**Weather station creator tool**](https://courseware.e-education.psu.edu/courses/meteo101/javascript/Lesson1/stationmodel_tool.html)



**DAY: \_\_\_\_\_\_\_ (Time)**

1. Temperature: \_\_\_\_\_\_\_

2. Dew Point: \_\_\_\_\_\_

3. Air Pressure: \_\_\_\_\_\_\_ mb

4. Wind Direction—Choose One: N, NE, E, SE, S, SW, NW W

5. Wind Speed: \_\_\_\_\_\_\_

6. Cloud Cover—Choose One: CLR 0%, FEW 25%, SCT 50%, BKN 75%, OVC 100%

***Place Weather Station Model here.***

**NIGHT: \_\_\_\_\_\_\_ (Time)**

1. Temperature: \_\_\_\_\_\_\_

2. Dew Point: \_\_\_\_\_\_

3. Air Pressure: \_\_\_\_\_mb

4. Wind Direction—Choose One: N, NE, E, SE, S, SW, NW W

5. Wind Speed: \_\_\_\_\_\_\_

6. Cloud Cover—Choose One: CLR 0%, FEW 25%, SCT 50%, BKN 75%, OVC 100%

***Place Weather Station Model here.***

#### Questions and Conclusion

1. Write a summary of the weather that occurred during the 24 hours in **Table 1.**
2. What are the possible sources of error in the weather data?
3. What relationships do you notice between temperature, dew point, humidity, cloud cover, and air pressure? Provide evidence for these relationships from data in **Table 1**.
4. In conclusion, how did your graphs support or contradict your 12-hour forecast for the following day?
5. Describe additional data you could collect to make your forecast more reliable.
6. What did you learn about weather forecasting by completing the activity?