Stormy Weather: Problem Handouts

Stormy Weather

Part 1: National Weather

Everyone complains about the weather, but no one ever does anything about it—until now. You must forecast the weather.

Predicting the weather depends on three important factors: gathering the data, analyzing the data, and understanding how the atmosphere works. By now, you know something about how the atmosphere works, so you just need data.

In the first part of this problem, groups should predict a one-day change in weather for three US cities.

Questions:

1. What kind of data do you need to answer the questions below? (Discussion)
2. Find a city where your group predicts the weather will change from stormy (precipitation of some sort) to clear over the next 24 hours. Explain why the change occurs.
3. Find a city where your group predicts the weather will change from clear to stormy (precipitation of some sort) over the next 24 hours. Explain why the change will occur.
4. Find a city where your group predicts the weather will not change (stormy or not) over the next 24 hours. Explain why no change will occur.

Answer Sheet

City name	weather change	explanation
	Becomes Stormy	
	Storms End	
	No Change	

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Part 2: Local Weather

In this part of the problem, your group will predict the change in weather over a three-day period for the local area.

Data:

Surface Data Maps for the Local Region:

Each group has access to a series of surface data maps for the region including the local area for (Day 0), yesterday (Day -1) and the day before yesterday (Day -2).

US Enhanced Infrared Image for the Local Region:

Each group has access to the enhanced infrared image loop for the local region for the last 12 hours.

Meteogram for the Local Area:

Each group has access to meteograms covering the last 72 hours for the local area (Day -2 through Day 0).

Questions:

Predict the *first most likely* weather scenario for the next 72 hours for the local area. This involves:

Predicting values for weather elements such as temperature, dew point, pressure, precipitation, cloud cover, and wind direction for a time 24 hours from the present, 48 hours from the present, and 72 hours from the present.

Justify each element of your weather prediction.

PARAMETER	DAY 1	DAY 2	DAY 3
Temperature			
Dew point			
Pressure			
Wind Direction			
Cloud Cover			

Precipitation			

Explanation:

Predict the *second most likely* weather scenario for the next 72 hours for the local area. Give a short explanation of what would have to occur for the second scenario to take place instead of the first scenario.

PARAMETER	**DAY 1**	**DAY 2**	**DAY 3**
Temperature			
Dewpoint			
Pressure			
Wind Direction			
Cloud Cover			
Precipitation			

Explanation:

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Part 3: Evaluation

It has been at least three days since you made your predictions. In the last part of this problem, your group will evaluate your predictions.

Data:

1. **US Surface Data Maps:**

Each group has access to a series of surface data maps for the United States for the three days of their prediction (Day 1, Day 2, and Day 3).

2. **US Enhanced Infrared Image:**

Each group has access to the enhanced infrared images for the United States for Day 1, Day 2, and Day 3.

3. **US Meteograms:**

Each group has access to the meteograms for the local area for Day 1, Day 2, and Day 3.

Questions:

1. Were your predictions for Part 1 correct? Explain why or why not. Include a discussion of what 'correct' is. In other words, must the predictions be identical to the observations? Must the numbers increase or decrease in the same direction? Must the numbers be a certain percentage of the observed numbers?
2. Were your predictions for Part 2 correct? Explain why or why not.
3. What were the most common sources of error in your predictions?
4. What resources would have made your predictions easier to make?

Follow-Up:

Use your experience to improve your predictive skills. Given that you have the last three days of information for the local area:

1. Predict values for weather elements such as temperature, dew point, pressure, precipitation, cloud cover, and wind direction for a time 24 hours from the present, 48 hours from the present, and 72 hours from the present.
2. As before, justify each element of your weather prediction.
3. In three days, evaluate your second set of predictions in the same fashion that you evaluated your first predictions.