CHAPTER 30

NAME _____

CLASS _____ DATE _____

LAB INVESTIGATION

Hurricane Andrew

Like other Atlantic hurricanes, Hurricane Andrew, which moved across southern Florida and into south-central Lousiana in August of 1992, started as a low-pressure system in the tropics off the west coast of Africa. Warm water and moisture-laden air supplied the energy for it to strengthen into an ordinary and average tropical storm. Surface winds began to move the storm westward. Although all tropical storms form and develop in this way, only a few intensify into hurricanes. Most encounter upper air winds moving in the opposite direction from the surface winds. As a result, these storms weaken and soon die out. Tropical storm Andrew, on the other hand, encountered upper air winds moving in the same direction as the surface winds. These reinforcing winds caused Andrew to quickly strengthen into an unusually powerful hurricane. In fact, Andrew may well prove to be one of the most intense Atlantic hurricanes of the twentieth century.

Lab Skills and Objectives

- To **graph** and **interpret** weather data
- To **correlate** the track of a hurricane with weather data

Materials

- colored pencils (minimum of four different colors needed)
- ruler
- straightedge

Hurricane Data			
Date	Time (hours–24 hr clock)	Air Pressure (millibars)	Wind Speed (knots)
Aug 21	0:00	1014	45
	6:00	1010	45
	12:00	1007	50
	18:00	1004	50
Aug 22	0:00	1000	55
	6:00	994	60
	12:00	981	70
	18:00	969	80
Aug 23	0:00	961	90
	6:00	947	105
	12:00	933	120
	18:00	922	135
Aug 24	0:00	930	125
	6:00	937	120
	9:00	922	125
	12:00	951	110
	18:00	947	115

Hurricane Data			
Date	Time (hours–24 hr clock)	Air Pressure (millibars)	Wind Speed (knots)
Aug 25	0:00	943	115
	6:00	948	115
	12:00	946	115
	18:00	941	120
Aug 26	0:00	937	120
	6:00	955	115
	12:00	973	80
	18:00	991	50
Aug 27	0:00	995	35

Figure 30.1

1. Use the grid in Figure 30.2 to plot with a colored pencil the wind speed versus time from the data table in Figure 30.1. Connect the points using a straightedge and label your graph.

2. Use a different colored pencil to plot air pressure versus time. Note that air pressure is along the right vertical axis of the grid. Connect the points and label the graph.

3. Use the track of Hurricane Andrew in Figure 30.3 to determine the time of landfalls, that is, the instances when Hurricane Andrew hit land. For Andrew, there were two mainland landfalls, one in Florida and one in Louisiana. Draw vertical lines on your graph with a third colored pencil corresponding to the hour of each landfall.

4. In a fourth color, draw a vertical line to indicate when Hurricane Andrew moved off the western coast of Florida into the Gulf of Mexico.

5. Mark on the track of Hurricane Andrew in Figure 30.3, the hours of greatest strength, i.e. greatest wind speed and lowest pressure.

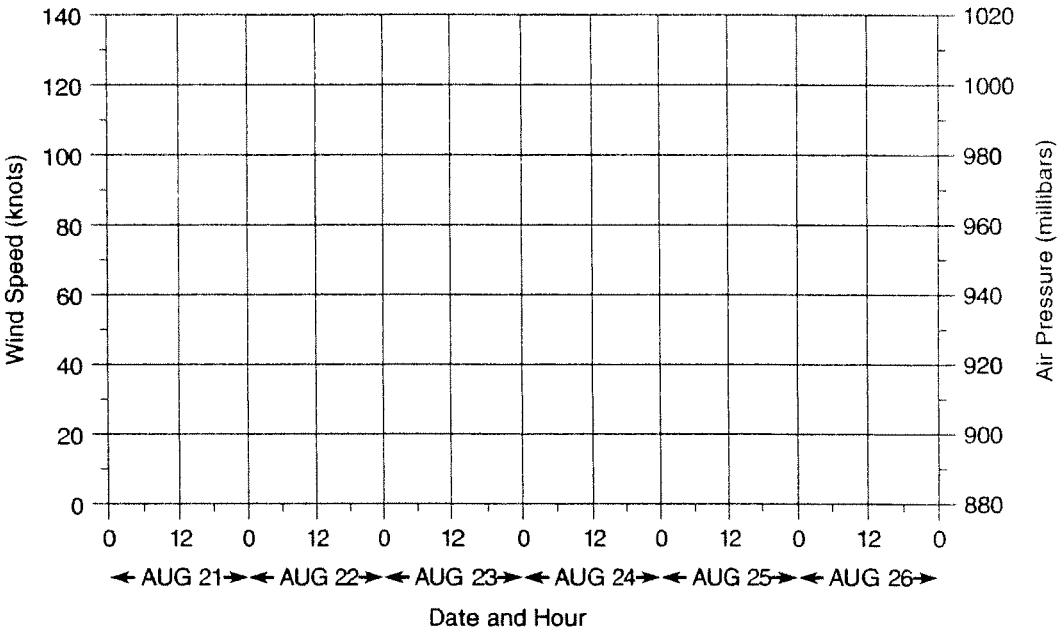

Figure 30.2

1. What does your graph show as the general relationship between air pressure and wind speed?

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_____

2. What happened to air pressure and wind speed after Hurricane Andrew's landfalls?

_____

3. What happened to air pressure and wind speed after Hurricane Andrew left Florida's west coast and once again moved over water?

_____

4. Explain why air pressure and wind speed are affected by the surface over which a hurricane moves.

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_____

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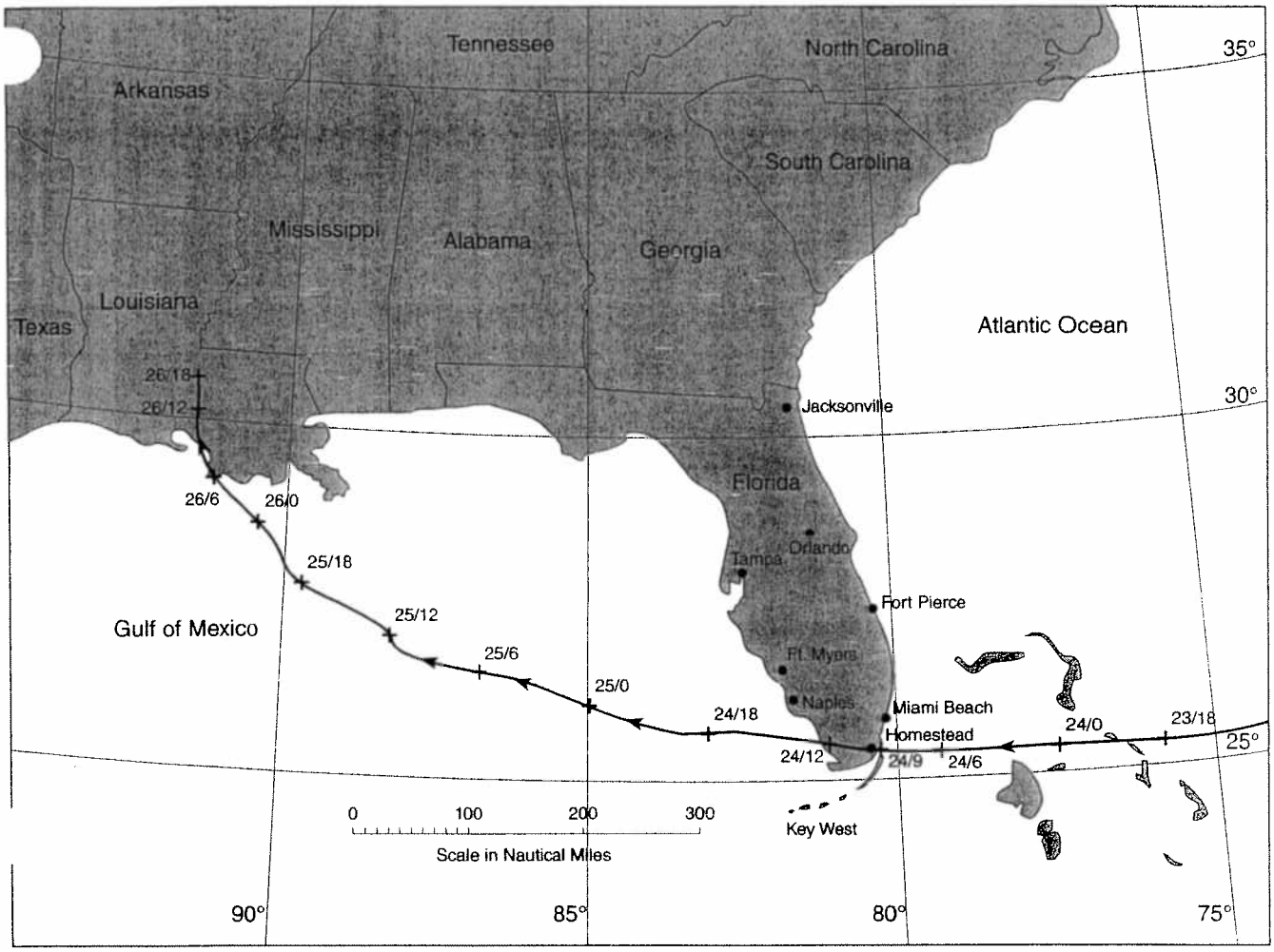

Figure 30.3

5. Of the cities shown on the map in Figure 30.3, Homestead experienced the most damage from Hurricane Andrew. Why?

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6. Use the scale on the map and a ruler to estimate the forward speed in knots (nautical miles /hour) of Andrew on August 24 between

(a) 6:00 (24/6) and 9:00 (24/9).

(b) 9:00 (24/9) and 12:00 (24/12).

7. Based on question 6, how did landfall affect the forward speed of Andrew?

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8. A tropical storm officially becomes a hurricane when it attains wind speeds greater than 64 knots. When did Andrew change from a tropical storm to a hurricane? When did it change back to a tropical storm?

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