NAME: _____ PERIOD: _____ DATE: _____

LAB PARTNERS: _____ LAB #29

WEATHER MAP ANALYSIS

INTRODUCTION

Weather maps give the current weather conditions for an entire region. This enables the meteorologist to see how weather conditions are interacting with each other for a large area. This interaction can then be used to help forecast weather for any location on the map. Weather maps can be found in local newspapers, magazines, and of course seen on television during news broadcasts or the weather channel.

MATERIALS Weather Map Attached
Colored Pencils

APPROXIMATE TIME 2-3 Periods

OBJECTIVES

During this lab activity you will:

1. Use past experiences with plotting and interpreting weather station models and their symbols in order to analyze the weather conditions at a particular locality on the map of North America.
2. Be able to draw warm and cold fronts on a weather map and determine the type of weather associated with the passage of the front.

PROCEDURES

1. The weather observations chart, on the next page, gives information of weather variables as measured at different stations in the United States and Canada. This information must be plotted on the map, using the correct placement of numbers and symbols as shown in your Reference Tables.
    a. Wind directions are given from which the wind is blowing. Place a line indicating the correct direction of the wind around the station model circle for each city given. Draw each of the wind arrow shafts in **black pencil**.

    b. Wind speed must be represented by placing "feathers" on the shaft of the wind arrow. Refer to the sample weather map or your notes for the correct symbol to use and draw the "feathers" for your wind speed in **black pencil**.

    c. Air pressures are recorded in millibars. **Remember to convert the pressures to short form.** In the pressure begins with "10", drop the "10" and the decimal point. If the pressure begins with "9", drop the "9" and the decimal point. Write all air pressures on the station model in **red pencil**.

    d. Temperatures are given in degrees Fahrenheit. Write the temperature in its correct position around the station model circle in **blue pencil**.

    e. Present weather is given for some cities. Using page 13 in your Reference Tables, draw in the appropriate present weather symbol in **green pencil**.

    f. The amount of cloud cover at each station is to be drawn in **black pencil**.

2. Draw isobars at 4 millibar intervals, starting with an air pressure of 1004.0. Continue with isobars for pressures of 1008.0, 1012.0, 1016.0, 1020.0, and 1024.0, in **black pencil**.
3. Find the observation station that has the lowest atmospheric pressure and put a large "**L**" just above it in **black pencil**. This represents the center of the low pressure system.

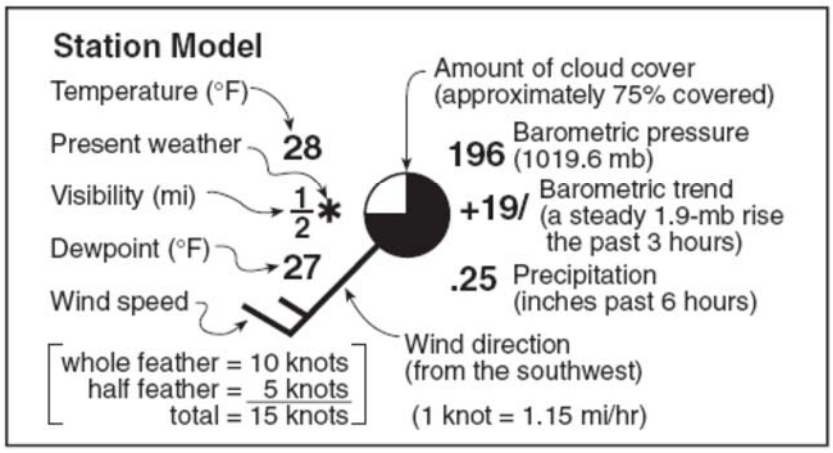
4. Find the observation station that has the highest atmospheric pressure and put a large "**H**" just above it in **black pencil**. This represents the center of the high pressure system.

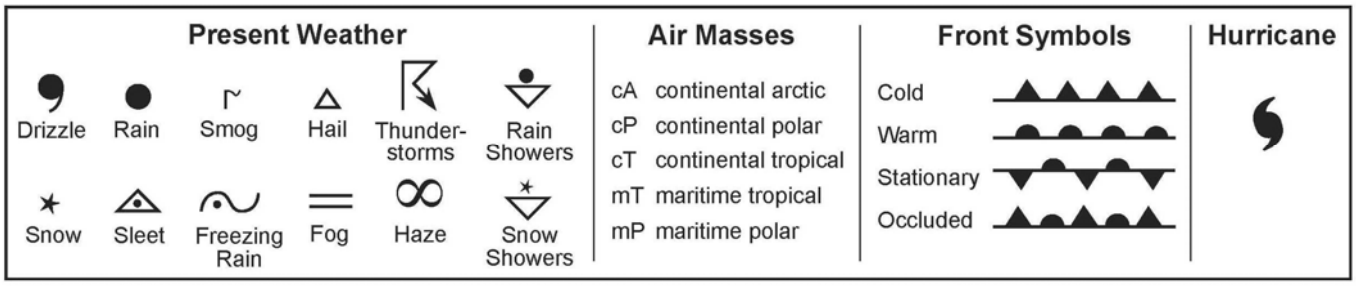
5. Draw the warm and cold fronts on the map in **black pencil**, using the station models as guides. Look up the symbols for the appropriate fronts in the Reference Tables of page 13.
   Hint:
   a. **The cold front** extends southwestward from the low pressure center (**L**). The front will be located between stations where winds change from southwest to northwest and temperatures decrease suddenly.
   b. **The warm front** extends eastward of the low pressure center (**L**). This front will be located between stations where winds change from east to southwest and temperatures rise suddenly.

6. Find and label the continental polar air mass with a large "**cP**", with a **black pencil**.

7. Find and label the maritime tropical air mass with a large "**mT**", with a **black pencil**.

Weather Map Symbols





WEATHER OBSEVATIONS

Weather Station	Wind Direction	Wind Speed (kts)	Air Pressure (mb)	Temp. (°F)	Present Weather	Cloud Cover (%)
Seattle	W	5	1020.8	42		0
Bend	SSW	10	1023.5	40		0
San Francisco	SE	10	1020.0	48	Fog	100
Los Angeles	N/A	0	1021.1	41	Fog	100
Phoenix	NE	10	1021.1	45		0
Ely	N/A	0	1025.1	37		0
Dubois	SW	20	1024.0	38		0
Helena	NW	15	1020.0	41		0
Medicine Hat	NNW	20	1020.1	40		0
Bismarck	N	20	1014.3	48		0
Casper	N	10	1016.0	50		0
Pueblo	NW	10	1015.3	47		0
Roswell	N	20	1016.0	48		0
Del Rio	NW	40	1012.0	50	T-storms	100
Galveston	SW	5	1016.0	71		25
Dallas	NW	30	1007.9	60	Hail	100
Oklahoma City	NW	45	1007.9	57	T-storms	100
Burwell	NNW	20	1009.3	52	Rain	100
Kansas City	N/A	0	1002.3	58	Rain	100
Minneapolis	NE	15	1008.2	51	Drizzle	100
Sioux Lookout	NE	20	1016.8	46		25
Chicago	NE	10	1005.2	58	Drizzle	100
Little Rock	SW	10	1009.3	67		25
New Orleans	SW	5	1017.9	73		0
Nashville	SW	5	1011.1	68	Rain	100
Cincinnati	E	5	1009.8	57	Rain	100
Detroit	ENE	10	1011.9	54	Drizzle	100
Sault Ste. Marie	NE	15	1013.1	50	Drizzle	100
Ert	E	5	1017.2	48		0
Quebec	N/A	0	1017.0	50		25
Boston	E	10	1018.1	52	Fog	100
Buffalo	ENE	5	1016.0	52	Drizzle	100
New York	ENE	10	1017.6	56	Fog	100
Hatteras	N	15	1019.1	60	Rain	100
Charleston	SW	15	1017.8	70		25
Atlanta	SW	5	1014.6	70		0
Jacksonville	SSW	5	1018.1	73		0
Tampa	SW	5	1018.0	74		25
Miami	N/A	0	1019.8	78		0

LABORATORY QUESTIONS

1. What kind of air pressure/mass system is presently affecting the:

   Northwest coast of the U.S. _____

   Southern Gulf States area of the U.S._____

2. According to your map, which type of pressure system is the precipitation associated with?

   _____

3. According to your map, what type of precipitation is associated with the cold front?

   _____

4. According to your map, what type of precipitation is associated with the warm front?

   _____

5. When the isobars on a weather map are spaced far apart, what does this indicate about the pressure gradients and wind speeds?

   _____

6. According to your map and your knowledge of weather, how do the winds around a low pressure center circulate?

   _____

7. According to your map and your knowledge of weather, how do the winds around a high pressure center circulate?

   _____

8. What kind of front will soon pass over Little Rock? _____

   In what direction is it moving? _____

   What changes can be expected in temperature, air pressure, and wind direction Little Rock?

   _____

9. What kind of front will soon pass over Cincinnati? _____

   In what direction is it moving? _____

   What changes can be expected in temperature, air pressure, and wind direction in Cincinnati?

   _____

10. Why are there little to no clouds present over the western portion of the United States?

_____

11. Calculate the air pressure gradient between Cincinnati and Atlanta.
Measure the distance between the two cities, using a distance scale of 1 cm = 100 miles

Distance between cities: _____ in miles

Convert the air pressures back to the long form to calculate gradient.

Pressure at Cincinnati = _____ Pressure at Atlanta = _____

Look up the gradient formula on page 1 ESRT and **show all work** below:

Gradient =_____ _____

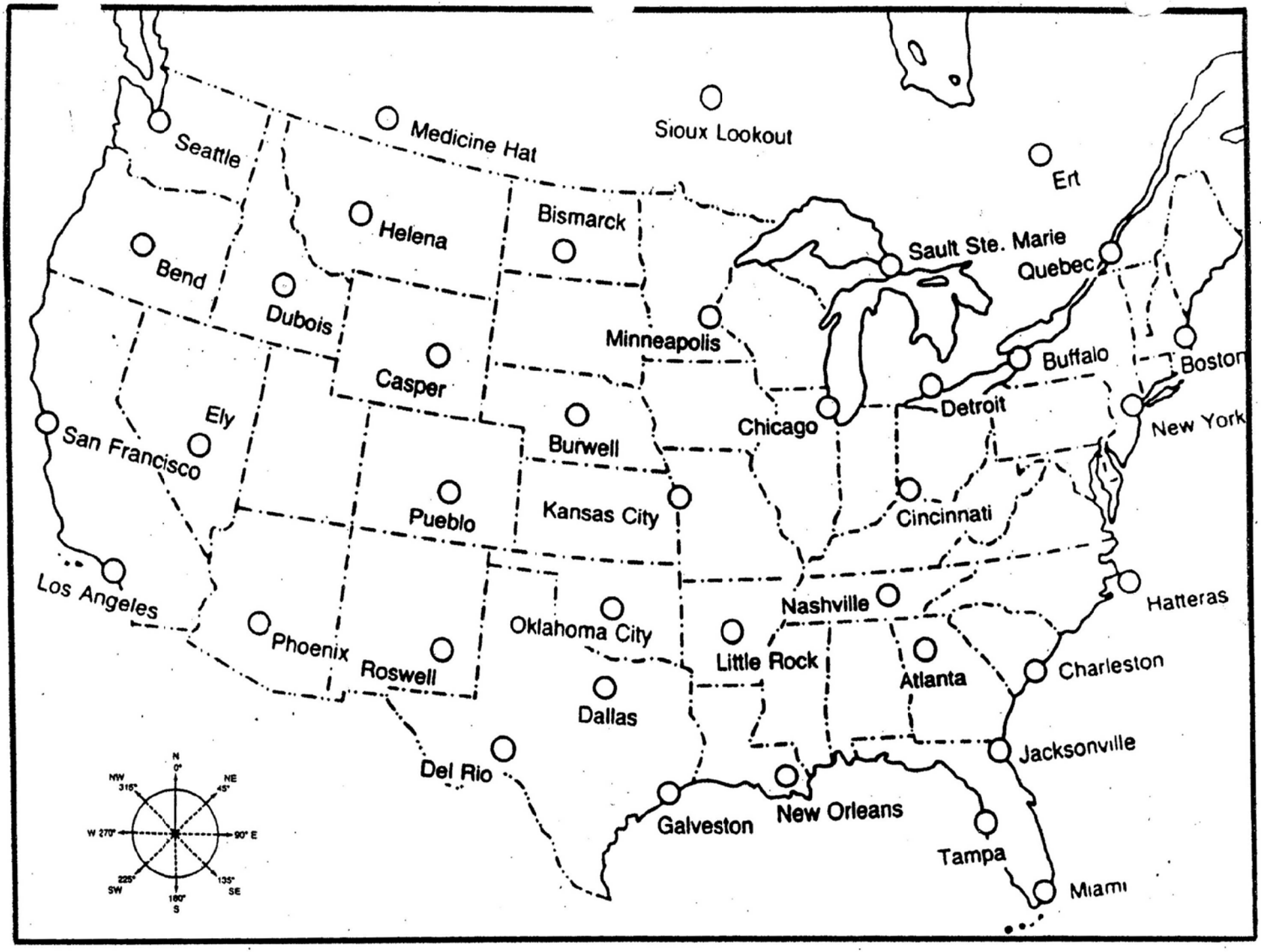
12. Calculate the temperature gradient between Helena and Galveston.
Measure the distance between the two cities, using a distance scale of 1 cm = 100 miles

Distance between cities: _____ in miles

Temperature at Helena = _____ Temperature at Galveston = _____

Look up the gradient formula on page 1 ESRT and **show all work** below:

Gradient =_____ _____


Seattle
Medicine Hat
Sioux Lookout
Ert
Helena
Bismarck
Bend
Sault Ste. Marie
Quebec
Dubois
Minneapolis
Buffalo
Boston
Casper
Detroit
Ely
Chicago
New York
San Francisco
Burwell
Pueblo
Kansas City
Cincinnati
Los Angeles
Nashville
Hatteras
Oklahoma City
Phoenix
Roswell
Little Rock
Atlanta
Charleston
Dallas
Jacksonville
Del Rio
Galveston
New Orleans
Tampa
Miami
N
0°
NE
45°
90° E
135°
SE
180°
S
225°
SW
270°
W
315°
NW