

Name:

		Data at Surface Station	
Temp (F) → 45	045 ←	Pressure (mb)	Temp 45° F, dewpoint 29° F, overcast, wind <b>from SE</b> at 15 knots, weather light rain, pressure 1004.5 mb
Weather → ●●●	←	Sky Cover	
Dewpoint (F) → 29	←	Wind (kts)	

**MAP A shows weather stations reporting wind, sky conditions, temperature, and pressure (no dew point).**

1. How many weather stations are reporting completely overcast skies? 3
2. How many weather stations are reporting completely clear skies? 2
3. Describe the wind direction on the eastern side of the map: southern
4. One of the weather stations is outlined by a box. What is the sea level air pressure? 1004.9 mb [include units]
5. One of the weather stations is circled. What is the sea level air pressure? 995.5 mb [include units]
6. Somewhere on the map there is a center of low pressure and a cold front. Use the wind directions and pressure numbers to determine where the L should go and draw it. Then, draw in where the cold front would be using the correct symbol. The cold front will start at the Low and extend out in some direction that you need to determine. To figure out the path for the cold front, look for where the temperature gradient is the greatest (in other words, where do you notice a significant drop in temperatures?). Cold fronts are usually fairly straight but may have a slight arc to them.
7. Where would you expect cumulonimbus clouds to be occurring on this map? Label it on the map. see map

**MAP B shows weather stations across the US during a midlatitude cyclone.**


8. This map includes a center of low pressure, a cold front, and a warm front. You will need to determine where these features are located and draw them in. To do this, use the following hints:
  - a. Use the wind direction and sea level pressure to determine where the L is located.
  - b. The cold front and warm front will both start at the L and then extend out in two different directions.
  - c. To determine the location for the fronts, look for large gradients in temperature and/or dew point. Remember that air behind a warm front is usually relatively humid (higher dew points) while the air behind the cold front is relatively dry (lower dew points). Both fronts are relatively straight with a slight arc.
- 9A. What type of clouds would you expect to be present at the circled weather station? stratus or nimbostratus
- 9B. What type of clouds would you expect at the weather station in the rectangle? cirrus
10. Draw a square over the weather station reporting the driest air.
11. Draw a triangle over the weather station reporting the most humid air.

**MAP C shows five reporting weather stations, contoured sea level pressure, a cold front, and a warm front. The long arrow shows the direction of the moving midlatitude cyclone. The center of the midlatitude cyclone is moving about 600 miles per day. For these questions, assume that the entire system moves in the direction of the dashed arrow.**

12. Which weather station(s) would likely report a drop in sea level pressure in the next 12 hours? A B C D E

13. 24 hours from now, which weather station(s) would you expect to report a higher pressure than currently reported? (a ruler may help for this one) A B C D E **maybe E also but hard to tell for sure**
14. Which weather station is most likely to experience warmer temperatures in the next 12 hours? A B C **D** E
15. Which weather station is most likely to experience colder temperatures in the next 12 hours? A **B** C D E
16. What types of clouds would you expect at station D? **probably altostratus/cirrostratus**

**MAP D shows a well-developed midlatitude cyclone.**

17. Identify the cold fronts in blue, the warm fronts in red, the stationary fronts in green, and the occluded fronts in purple. Exact shade of the colors isn't important.
18. Suppose this storm is moving in the direction of line Z at a speed of 400 miles per day.
- How would the temperature at station F change in the next 12 hours? **will get warmer**
  - How would the air pressure at station C change in the next 12 hours? **will decrease**
  - How would the barometer at station L change in the next 12 hours? **will rise**
19. Using thin pencil lines, draw in where cirrus clouds are probably forming. **(red)**
20. Using a cross-hatch pattern, draw in where stratoform clouds are probably forming.  **(green)**
21. Draw in some pea-shaped circles to show where you would expect cumulonimbus clouds to be forming. **(purple)**

**The following weather maps are 'real' maps published by the National Weather Service and contain all of the elements we have learned so far. There is a lot of information packed onto these maps and therefore they are a bit messy and difficult to read.**

**For the weather map of the Pacific Northwest:**

- Identify the cold fronts in blue, the warm fronts in red, the stationary fronts in green, and the occluded fronts in purple.
- Using one of your colored pencils, circle the center of the midlatitude cyclone (center of rotation). **(orange)**
- Write "RIDGE" along the axis of a major ridge of high pressure (sea level pressure is not written on the contours on these maps, but highs and lows are indicated by H and L symbols).
- Describe the general wind conditions in eastern Oregon: **calm**
- There is a weather station on the border between eastern Oregon and western Idaho.
  - What is the temperature? **19F**
  - What is the dew point temperature? **12F**
  - What are the sky conditions? **clear**
  - What are the wind conditions? **calm**
- Which direction is the wind blowing off the western coast of Canada? **from the south to the north**
- There appears to be a weather station on a ship just east of the center of low pressure. How has the pressure changed (in millibars) there in the past few hours? **has dropped 4.9 millibars**
- What is the wind speed there at the ship (in mph)? **38-43 mph**
- Using your pencil, draw some **thin** lines where you would expect cirrus clouds to be forming. **(red)**

- j. Using your pencil, **lightly** shade in where you would expect stratoform clouds (of all types) to be forming. (green)
- k. Draw some small circles (pea-sized) where you would expect cumulonimbus clouds to be forming. (purple)
- l. 24 hours from now, roughly where would you expect the center of low pressure to be located? Over Canada
- m. There is a circled weather station in Canada. How would you expect the barometer there to behave in the next 24 hours? it will fall

### For the weather map of the southwestern US:

- a. Identify the cold fronts in blue, the warm fronts in red, the stationary fronts in green, and the occluded fronts in purple. Exact shade of the colors isn't important.
- b. There is a weather station in Texas highlighted with a box.
  1. Describe the cloud cover: clear
  2. How fast is the wind blowing (in miles per hour)? 15-20 mph
  3. Describe the wind direction: southeast
  4. What is the temperature? 66F
  5. What is the dew point? 49F
  6. How has the pressure changed in the past 3 hours? has dropped 1.0 millibar
- c. Describe how the weather in the northeastern portion of New Mexico is different than that in the southwestern portion of New Mexico. Include as many things as you can deduce from the map.

Northeast: Overcast, strong winds from the northeast.

Southwest: Clear skies, light winds that vary between north and west.

Although a cold front separates these two regions, there is not an obvious difference in temperature or dew point.

- d. Describe the general wind direction in eastern Texas: southeast
- e. Describe the general wind conditions in Indiana: calm
- f. How will the weather along the Gulf Coast (TX) probably change in the next 12 hours?

A warm front is approaching, so we would expect temperatures to increase, dew points to increase, and stratoform clouds.

- g. Describe how the humidity of the air in Arizona compares to that in Texas:

The dewpoints in AZ are in the teens or single digits. By comparison, the dewpoints in TX range from the 40's to the 60's. Therefore the air in Texas is much more humid.

- h. Describe what everyone's barometers in Arizona have been doing in the past few hours:

Rising.

- i. Based on what you see occurring on this map, where would you expect some very unstable air to be forming? Explain your answer:

Probably over Texas as the warm humid air from the warm front collides with the cold dry air from the cold front. This will create very unstable air as we talked about in class during the convective storms lecture ("tornado alley").

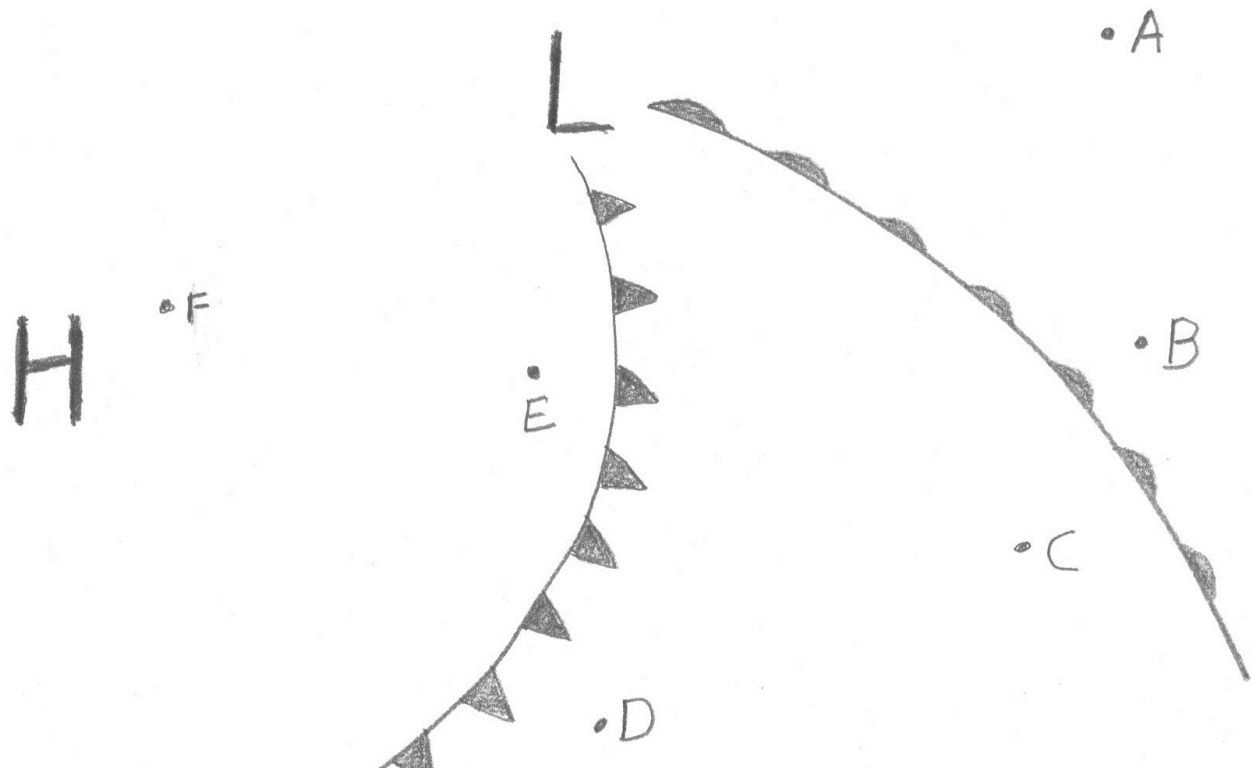
1. You are a farmer that lives in Montana in the 1800's . You are out plowing your fields one spring morning and you notice long wispy stringy clouds in the sky. At lunchtime, you notice that there is a ring around the sun. By sunset, you notice that the sun is a fuzzy ball. What is the most likely weather for tomorrow?

- a. Clear skies but normal temperatures.
- b. Unusually cold weather.
- c. Unusually warm weather and lots of sun.
- d. Rain all day long.
- e. Scattered thunderstorms.

2. You're still a farmer in the 1800's and you wake up one late fall morning to find it raining. It rains all day and all night. The next day, the rain is starting to break up and you can even see some bits of sun. What weather do you expect tomorrow?

- a. Clear skies but normal temperatures.
- b. Another day of steady rain.
- c. Unusually warm weather and lots of sun.
- d. Cold air but completely clear skies.
- e. Cold air and scattered showers or maybe even some snow flurries.

3. If you have to teach weather to kids, you will likely give them a simplified weather map. For example, imagine we give them the map below:



- A. Shade the areas on this map you expect it to be raining.
- B. Each letter is a city. Which city should expect warmer temperatures in the next 24 hours?   B
- C. Which city should expect colder temperatures in the next 24 hours?   D
- D. Which city is probably experiencing scattered showers right now?   E
- E. Which city probably has clear skies with very cold temperatures?   F
- F. Which city is probably seeing lots of cirrus clouds today?   A