

Name: _____ Laboratory Section: _____
 Date: _____ Score/Grade: _____

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 Exercise 14
 Pre-Lab Video



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LAB EXERCISE

Weather Maps

Lab Exercise and Activities

SECTION 1

Weather Map Symbols

1. Select one day from your Prologue Lab “Weather Calendar” or use the current conditions outside, and record the information here, in the appropriate format (shown with the model at the beginning of Section 1). Make notations in the proper form *only* for the following atmospheric conditions:

The answers for Question 1 will vary based upon local weather conditions.

Describe the weather conditions depicted for this day:

2. Record the proper symbols for each of the following listed in Figure 14.2.

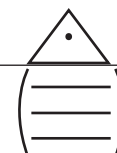
a) Visibility reduced by smoke: _____



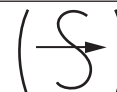
b) Intermittent drizzle (not freezing), heavy at time of observation: _____



c) Ice pellets (sleet—U. S. definition): _____



d) Fog or ice fog at a distance: _____



e) Dust storm within sight: _____



f) 40% sky coverage: _____



g) Double-layered altocumulus: _____



h) 55–60 mph (88–96 kph) winds: _____



This system of data recording is used in the preparation of the synoptic weather map such as the one you work with in Section 2.

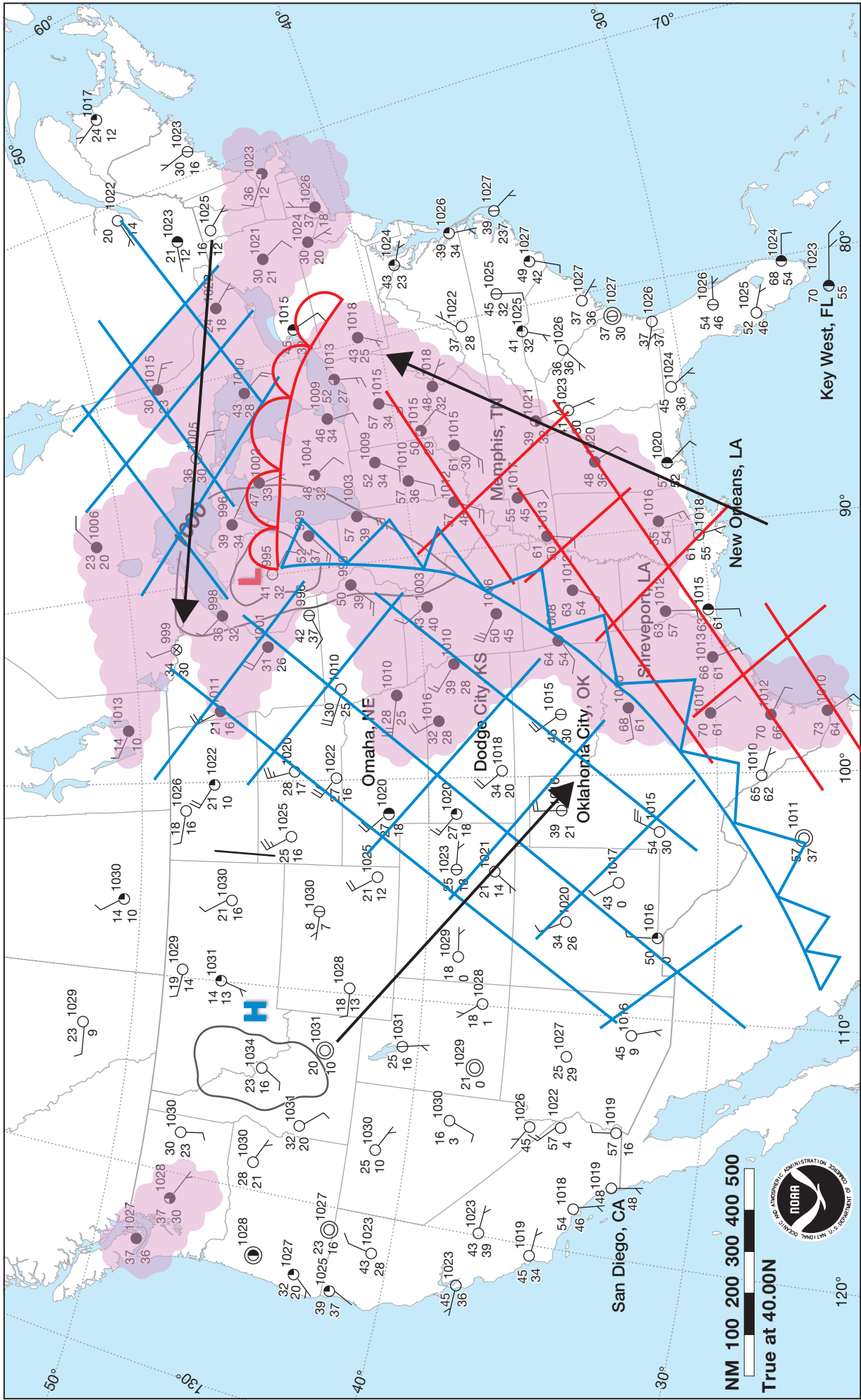
SECTION 2

Daily Weather Map—Typical April Pattern

Daily weather maps are known as **synoptic maps**, meaning that they show atmospheric conditions at a specific time and place. The daily weather map is a key analytical tool for meteorologists. **Figure 14.3** presents an adapted version of the synoptic map for a typical April morning, 7:00 A.M. EST. On April 1, 1971, the center of low pressure was near Wausau, Wisconsin (see the L on the map), with a pressure of 994.7 mb (995 on the map). Note the wind flags around this center of low pressure. The

high-pressure center is located near Salmon, Idaho (see the H on the map), with a pressure of 1033.6 mb (1034 on the map). Note the pattern of air temperatures and even lower dew-point temperatures associated with a cold-air mass centered in the region of high pressure. This exercise involves adding appropriate isobars, fronts, and air mass designations to the map. The following discussion takes you step-by-step through the completion of this map. Follow this sequence:

1. Draw and label the current conditions for the cities of San Diego, California, and Key West, Florida, on their weather stations on Figure 14.3. The conditions in San Diego, California, are: 1019 mb, wind 5 kts from the south; state of the sky is no clouds; temperature is 48°F, dew-point temperature is 48°F. The conditions in Key West, Florida, are: 1023 mb, wind 15 kts from the east; state of the sky is 4/8ths sky-cover; temperature is 70°F, dew-point temperature is 55°F.
2. On the weather map, draw in the isobars connecting points of equal barometric pressure, at 4-mb intervals. Each circle on the map represents a weather station. The number to the upper right of the station is the barometric pressure, rounded to the nearest whole millibar.
 - a) The **996-mb** and **1000-mb** isobars around the low-pressure center are drawn for you (pressures lower than 996 go inside the isobar, higher than 996 go outside this closed isobar; pressures between 996 mb and 1000 mb fall between the two isobars).
 - b) Now draw in order of increasing pressure the rest of the isobars at *4-mb intervals*: **1004, 1008, 1012, 1016, 1020, 1024, and 1028**. The highest-value isobar of **1032 millibars** is drawn for you. Note that the 1032-mb isobar is a closed isobar that surrounds Salmon, Idaho, which is the area of highest pressure.
3. Use a purple colored pencil or pen to draw an outline of the region with more than 75% sky coverage. The pattern of cloudiness is indicated by the state-of-the-sky (sky coverage) status recorded within each station symbol. The areas of frontal lifting are clearly identified by these patterns of clouds.
4. After completion of the isobars, determine the pattern of low-pressure and high-pressure systems on the map and related air masses to determine the position of the weather fronts. The southeastern portion of the country is influenced by a mild maritime tropical (mT) air mass. The high-pressure area around Idaho is under the influence of a continental polar (cP) air mass.
 - a) Use a red colored pencil or pen and cross hatch the region that is within 600 km of the warm front or cold front and is under the mT air mass. Consider those stations with dew-point temperatures above 45° F as being under the mT air mass. Use a blue colored pencil and crosshatch the region within 600 km of the warm front or cold front and is under the cP air mass. Consider those stations with dew-point temperatures below 45° F as being under the cP air mass.
 - b) Use a pencil or black marker and draw big arrows indicating the general direction of the winds with: the cP air mass that is driving the cold front; the mT air mass that is driving the warm front; and the cP air mass that is in front of the warm front.
 - c) Locate the warm front line. The warm front has a mT air mass with winds blowing from the south on one side of it, and a cP air mass with winds blowing from the east on the other side of it. The line is drawn for you, but it lacks the red semi-circles that are the warm front symbol on maps. Use a red colored pencil or pen and draw in the red semi-circles on the side with the cP air mass.



▲ Figure 14.3 Daily weather map

- d) Locate the cold front line. The cold front has a cP air mass with winds blowing from the north-west on one side, and a mT air mass with winds blowing from the south on the other side. The line is drawn for you, but it lacks the blue triangles of the cold front symbol on maps. Use a blue colored pencil or pen and draw in blue triangles on the side with the mT air mass.
5. On this weather map, note *air temperatures* in comparison with *dew-point temperatures*. The air temperatures and dew-point temperatures are noted to the left of each station symbol on the map.
- a) List the *air temperatures* and *dew-point temperatures* for Omaha, Nebraska; Dodge City, Kansas; and Oklahoma City, Oklahoma.
- Omaha: air 28°F dew 25°F, Dodge City: air 34°F dew 20°F, Oklahoma: air 46°F dew 30°F***
- b) List the *air temperature* and *dew-point temperatures* in Memphis, Tennessee; Shreveport, Louisiana; and New Orleans, Louisiana.
- Memphis: air 61°F dew 50°F, Shreveport: air 63°F dew 57°F, New Orleans: air 61°F dew 55°F***