

How Do Scientist Forecast the Weather?

Background

In the United States, weather generally moves from west to east in bands called fronts. Temperature and moisture conditions are usually very different on opposite sides of the front. Cold fronts move on the average of 32 km/hour, and warm fronts average 24 km/hr. Stationary, or static fronts generally do not move much at all. Warm air generally forms a low-pressure area, and cool air usually forms a high-pressure area. Scientists observe and study the movement of these fronts, air pressure areas, and their characteristics in an effort to predict weather conditions. In this investigation, you will interpret weather maps and identify weather patterns.

Objectives

After completing this investigation, you will be able to

- *Interpret* a weather map
- *Identify* weather patterns
- *Forecast* movement of weather fronts.

Skills Checklist

Process Skills:

- Interpreting diagrams
- Generalizing
- Predicting
- Inferring

Materials

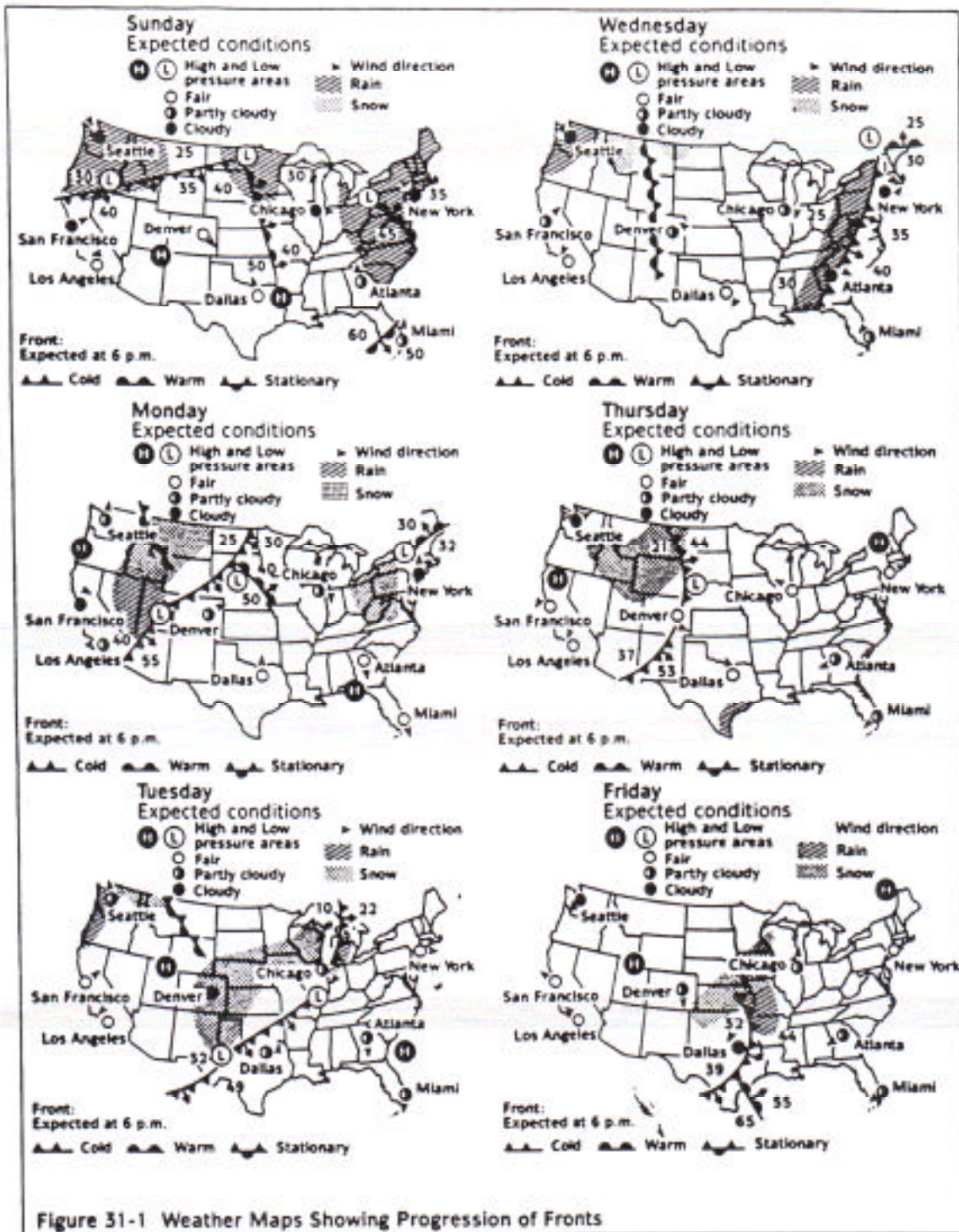
Local newspaper weather map

Procedure

A. Examine the maps in Figure 31-1.

1. Draw the symbols for each of the following according to the keys on the map.

a. rain	b. cold front	c. cloudy sky
d. warm front	e. snow	f. partly cloudy sky
g. fair sky	h. stationary front	i. high pressure area



B. Examine the weather map from your local newspaper. Compare the symbols used in your newspaper weather map with the symbols used on the weather maps in Figure 31-1.

2. Note any differences in symbols. _____

3. Why is it important to understand the meaning of the symbols before trying to interpret the map? _____

C. Study all the maps in Figure 31-1. Answer these questions.

4. Note the cold front in the northwestern section of the United States on Sunday. In

what section of the United States is that front on Tuesday? _____

5. Where is the same front on Thursday? _____

6. From the observation, what generalized statement can you make about the movement

of this cold front? _____

7. Does precipitation follow or precede a cold front? _____

8. On which days do the maps indicate warm fronts? _____

9. Describe the activity of the stationary front between Monday and Wednesday.

10. Is it likely that the people who live in Dallas will see snow during the week? ____

11. Denver is situated right on the edge of a front on what day? _____

12. What type of front is it? _____

D. Note the temperatures on Figure 31-2. Using the same symbols used on the maps in Figure 31-1, indicate where the following weather conditions are likely to occur.

a. a cold front. Use arrows to indicate the direction the front is moving.

b. a warm front. Use arrows to indicate the direction the front is moving.

c. general area of high pressure

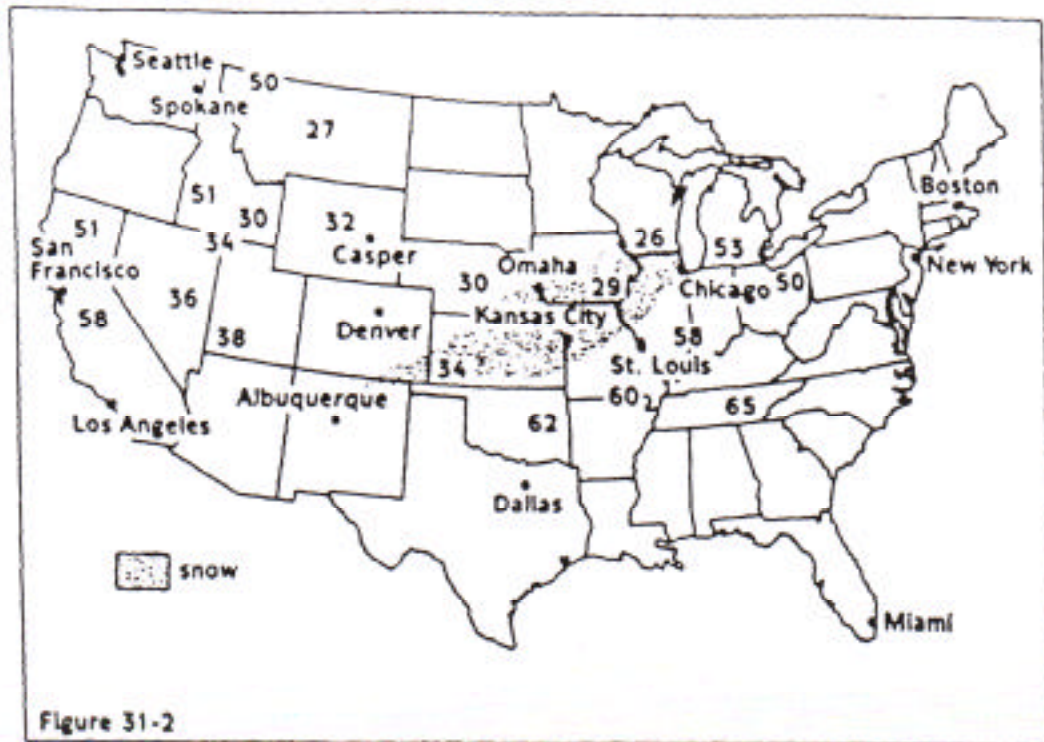
d. general area of low pressure

13. What weather would you predict during the next 24 hours for Casper, Wyoming?

_____ For Dallas? _____

14. Omaha is 2,189 km from Spokane. If the warm front continues to move eastward at an average of 24 km/hr, how long will it take for warmer temperatures to reach

Omaha? _____



E. One problem with weather maps is they are very abstract. Thus they are hard to understand. For example, it is difficult to infer from the maps how reliable they forecast or how much cloud cover and/or precipitation one should expect from the passage of a particular front. Weather satellite images are helpful for this. A set of recent satellite images are provided along with the related weather maps. Study the matching patterns they represent; then answer the questions for the dates and cities given by your teacher.

Physical Science 111
Semester:

Name : _____

Physical Science Laboratory: Satellite Images and Weather Maps

Objectives: After completing this investigation, you will be able to:

- Interpret symbols used to indicate fronts, clouds, and precipitation
- Recognize cloud features depicted in satellite photographs
- Associate fronts with weather conditions
- Correlate information from general regional and national weather maps with satellite images

Equipment: current satellite images and weather reports

Procedure: use the images and reports supplied to answer the following questions

1. What is the range of dates for the maps and images given? _____
2. What two satellites are used to obtain these images? _____
3. Each date has two images, how are they different? _____
4. Using the temperature given on the Regional Outlooks for highs and lows calculate an average high and low for Chicago over the time period given. Average high = _____ Average low = _____
5. What type of front runs through the southwest of the USA on August 1? _____
6. In the August 3 National Outlook, what four states have a large coverage of the highest clouds over them as indicated by their bright whiteness? _____

7. Circle the area on the August 1 Regional Forecast where rain is predicted to occur according to the report. Where was it likely to be actually raining that afternoon according to the Regional Satellite image?

8. What direction has the front moved on the National Outlook from August 1 to August 2? _____
What happens on August 3? _____

9. Place a circle around an example of cumulus clouds on the August 2 regional satellite picture?
10. Find the hurricane Guillermo and place an X on it on all the Goes images.
11. What symbols are used to indicate sunny, partly cloudy, and cloudy on the weather maps?
12. Describe today's weather. (Go outside and look up) Include a discussion of cloud types over Chicago (if any).

