What Is Weather?

Weather is the state of the atmosphere at a given time in a particular place. The atmosphere is the air that surrounds Earth. Some of the things that make up weather are temperature, precipitation, wind speed, humidity, and cloud cover. These elements may change from day to day and cause the differences in weather we see and feel when we go outside.

If you watch a weather report on television, you might see drawings that represent the weather that is predicted. Look at the drawings below. They represent some types of weather that occur in Texas.

Meteorologists

Meteorologists are scientists who predict and report the weather. Many of the television personalities who report the weather are trained meteorologists. They use computers to help them predict the weather, but computer systems are not always accurate. Sometimes they need humans to guide them and interpret the data.

Weather Maps

As with most subjects, weather has its own language of symbols and codes. Someone who understands these symbols is able to look at a map like the one above and know what kind of weather is happening anywhere in the country. Given the current weather and wind movements, meteorologists can predict what the weather patterns will be tomorrow and later in the week. Forecasters are fairly accurate with their predictions of trends and major events. The farther away in time the prediction is, the less accurate it is likely to be.
Map Symbols

In order to understand a weather map, it is helpful to understand the common map symbols. Each city in the map above has two numbers next to it. The number before the slash is the high temperature for the day. The number after the slash is the low temperature. Some maps use colors to show temperatures. The shades of gray on this map show areas that will have similar high temperatures. For example, places in the dark gray area will have high temperatures in the 80s.

The letters $H$ and $L$ represent high pressure and low pressure. A **low-pressure area** is where the atmospheric pressure is lower than the surrounding area. Low pressure usually brings warmer air and cloudy or rainy conditions. A **high-pressure area** is where the atmospheric pressure is higher than the surrounding area. High pressure usually brings sunny and cooler conditions.

A **warm front** is the place where a warm air mass is replacing a cool air mass. The air behind the warm front is warmer than the air ahead of it. The circles on the front tell you which way the front is moving. A **cold front** is the leading edge of a cooler air mass. Cold fronts move more quickly than warm fronts. Storms may occur along a cold front, but high pressure and clear weather usually follows the front. On some maps, you may see a **stationary front**. It is not moving in either direction.

A stationary front may cause rainy weather in an area for several days.

Precipitation may be shown on a weather map. A good weather map includes a key. Look at the key for the map above. Find locations where it is raining and snowing.
Weather Stations

The information used to make a current weather map is gathered from weather stations. A weather station has several weather tools that measure the weather. Most weather stations have a thermometer for measuring temperature, a barometer for measuring air pressure, an anemometer for measuring wind speed, and a wind vane for measuring wind direction. The data from a weather station is reported using a series of international symbols. The image below shows how the information in a symbol is arranged. The tables that follow show the options that can be used in a weather station report.

![Weather Station Diagram]

Current temperature [35]

Present weather

Wind speed

Symbols for Present Weather:

- drizzle
- rain
- snow
- shower
- thunderstorm

- hail
- sleet
- fog
- smoke
- haze

Symbols for Wind Speed (measured in knots):

- calm 1–2
- 3–7
- 8–12
- 13–17
- 18–22
- 23–27
- 48–52
- 73–77
- 103–107

Symbols for Sky Cover:

- clear 1/8
- scattered 3/8
- broken 7/8
- overcast obscured

Forecasting Weather

Meteorologists use weather-station data, along with information from weather satellites and other instruments, to make forecasts. A forecast is a prediction of upcoming weather. There are many variables to consider when making a forecast. Forecasting is not an exact science; sometimes predictions are incorrect.

When you read a weather map and try to predict upcoming weather, two things to consider are which direction fronts are moving and which way the wind is blowing in a certain area. If a front is moving toward your area, the weather will likely change as the front passes over. If the wind is blowing from the north, your area will likely soon have the weather that’s just north of you now.
Hands-On Activity

Modeling Changes

You can use the symbols you just learned to read a weather map from the newspaper or to understand a weather report on television.

Procedure:

1. With your group, examine the weather maps.
2. The members of your group should take turns explaining what information you can gather from the map and what the map’s symbols mean.
3. Gather maps that cover 4 or 5 days, and put the maps in time order.
4. Select one group member to explain to the class why you selected the order you did.
5. Use colored pencils to draw your prediction of tomorrow’s weather on a blank map. Be sure to use the symbols and colors that are used in the other maps.
6. Select a different group member to explain your group’s forecast.

Discussion Questions:

1. How can you use the maps from several days in a row to predict the next day’s weather?
2. How did your prediction compare to the actual weather on the next day?

Materials
• weather maps from different areas of the country
• blank maps
• colored pencils
Patterns of Change on Earth

1. Look at the weather map below that was drawn by a student.

How would you improve the map?

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

2. Describe what you can tell about each of the symbols below.

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

3. Use weather instruments to measure today’s weather where you live. Then use the symbols you learned about to draw a weather station report in the space on the right.

4. How do meteorologists develop weather forecasts?

______________________________________________________________________________

______________________________________________________________________________

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______________________________________________________________________________
TEKS Assessment 4.8A

Fill in the letter of the best choice.

1. Which symbol represents a cold front?
   - A.
   - B.
   - C.
   - D.

2. Which weather conditions are likely after a cold front passes?
   - A. sunny and windy
   - B. sunny and cold
   - C. cloudy and rainy
   - D. cloudy and hot

3. Look at the image below.

Which direction is the wind blowing from?
   - A. northeast
   - B. southwest
   - C. southeast
   - D. northwest

4. The image below was taken from a weather map.

What can you tell from this information?
   - A. the average climate of each city
   - B. the number of lightning strikes per hour
   - C. the amount of precipitation received
   - D. the high and low temperatures for the day

5. Which tool is not used by a meteorologist to predict weather?
   - A. anemometer
   - B. thermometer
   - C. computer model
   - D. triple-beam balance
Answer Key

Hands-On Activity (p. 4)

1. Sample answer: I can look for weather patterns that are moving from west to east across the United States. If a weather feature is moving toward my location, it will most likely affect my area at some point in the future.

2. Answers will vary but should be based on observations and collected data.

Student Response Activity (p. 5)

1. Sample answer: I would include more detailed information, such as high and low temperatures, wind speed, wind direction, and weather features in surrounding areas.

2. The image on the left is a cold front. It will bring cool, dry air after it passes through an area. The image on the right is a high pressure area. It is associated with clear skies and nice weather.

3. Check students’ drawings. Help them accurately collect data and use the weather station symbols.

4. Meteorologists look at weather patterns and weather features in the surrounding area. They examine data from a variety of sources, including weather stations and satellites. They look at historical trends and use computer models to assist with their predictions.

TEKS Assessment (p. 6)

1. D

2. B

3. B

4. D

5. D