

Meteorology

SECTION 12.1 *The Causes of Weather*

In your textbook, read about weather and climate.

In the space at the left, write *true* if the statement is true; if the statement is false, change the italicized word to make it true.

- _____ 1. *Meteorology* is the study of atmospheric phenomena.
- _____ 2. Weather is the current state of the *lithosphere*.
- _____ 3. Long-term variations in weather for a particular area make up the *climate* of the area.
- _____ 4. The tropics are hotter than the poles because the sun strikes this area of Earth more *indirectly*.

In your textbook, read about air masses and source regions.

Circle the letter of the choice that best completes the statement.

5. A large parcel of air that takes on the characteristics of the area over which it forms is a(n)
- | | |
|--------------|-------------------|
| a. cloud. | c. source region. |
| b. air mass. | d. wind. |
6. An air mass takes on its source region's
- | | |
|------------------------------|---------------------|
| a. temperature and humidity. | c. clouds and wind. |
| b. landforms. | d. elevation. |
7. Maritime air masses originate over
- | | |
|------------|---------------|
| a. clouds. | c. glaciers. |
| b. oceans. | d. mountains. |
8. When an air mass travels over land or water that has different characteristics than those of its source region, it undergoes
- | | |
|---------------------------|-------------------------------|
| a. air source change. | c. air pressure modification. |
| b. air mass modification. | d. temperature inversion. |

SECTION 12.2 *Weather Systems*

In your textbook, read about global winds and how Earth's rotation affects their movement.

Use each of the terms below just once to complete the passage.

intertropical convergence zone rotation North America jet streams
 trade winds southwest polar jet streams Coriolis effect
 low pressure prevailing westerlies polar easterlies northeast

The **(1)** _____ deflects moving air to the right in the northern hemisphere and to the left in the southern hemisphere. The cause of this is Earth's **(2)** _____.

Each hemisphere has three basic wind systems. The first, at 30° latitude north and south, is known as the **(3)** _____. There, air sinks, warms, and moves toward the equator from northeast to southwest in the northern hemisphere and from southeast to northwest in the southern hemisphere. When the air reaches the equator, it rises, then moves back toward 30° to start the cycle again. These winds from both hemispheres converge at the equator. They are forced upward, creating an area of **(4)** _____. This area near the equator is called the **(5)** _____.

The second wind system, called the **(6)** _____, flows between 30° and 60° latitude north and south of the equator. Its circulation pattern is opposite that of the wind system discussed above. These winds are responsible for the movement of many weather systems across much of **(7)** _____.

The third wind system, the **(8)** _____, lies between the poles and 60° latitude. In the northern hemisphere, these winds flow from the **(9)** _____ to the **(10)** _____. They flow in the opposite direction in the southern hemisphere.

Narrow bands of fast, high-altitude, westerly winds called **(11)** _____ flow at the boundaries between wind zones in the middle latitudes. These bands of wind steer weather systems in the middle latitudes. The most important one, the **(12)** _____, separates the polar easterlies from the prevailing westerlies.

SECTION 12.2 *Weather Systems, continued*

In your textbook, read about fronts and wave cyclones.

Complete the table by filling in the type of weather system described. Use the following terms: *front, cold front, occluded front, stationary front, warm front, wave cyclone.*

Description	Weather System
13. Cold, dense air that displaces warm air, forcing the warm air up	
14. Narrow region separating two air masses of different densities	
15. Advancing warm air that displaces cold air	
16. Low-pressure system that heavily influences weather in the middle latitudes	
17. Cold air mass that moves rapidly and overtakes a warm front	
18. Two air masses that meet and do not advance	

In your textbook, read about pressure systems.

Complete the table by checking the correct column for each statement.

Statement	High-Pressure System	Low-Pressure System
19. Characterized by sinking air		
20. Characterized by rising air		
21. Air flows toward center		
22. Air flows away from center		
23. Air moves clockwise in the northern hemisphere		
24. Air moves counterclockwise in the northern hemisphere		
25. Associated with fair weather		
26. Associated with clouds and precipitation		

SECTION 12.3 Gathering Weather Data*In your textbook, read about weather instruments.*

For each item in Column A, write the letter of the matching item in Column B.

Column A	Column B
_____ 1. An instrument that measures the height of cloud layers and estimates cloud cover	a. thermometer
_____ 2. An instrument that measures wind speed and direction	b. barometer
_____ 3. An instrument that measures temperature	c. anemometer
_____ 4. An instrument that measures air pressure	d. hygrometer
_____ 5. A balloon-borne package of sensors that gathers upper-level weather data	e. ceilometer
_____ 6. An instrument that measures relative humidity	f. radiosonde

In your textbook, read about radar and weather satellites.

Answer the following questions.

7. What is the Doppler effect? How do meteorologists use it to predict weather?

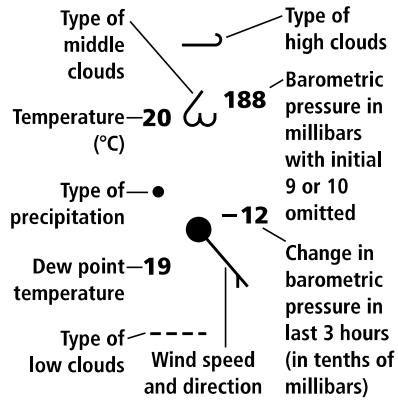
8. How do meteorologists combine data from weather radar and weather satellites to gather information about the atmosphere?

9. What is infrared imagery? How is it used?

SECTION 12.4 *Weather Analysis*

In your textbook, read about station models.

Study the station model. Then answer the questions that follow.



1. What is a station model?

2. What are the advantages of using station models?

3. List three types of information shown on a station model.

4. For the station shown, what is the temperature?

5. For the station shown, how has the barometric pressure changed in the last 3 hours?

SECTION 12.4 *Weather Analysis, continued*

In your textbook, read about isopleths.

For each statement below, write *true* or *false*.

- _____ 6. An isopleth is a line that connects points of equal or constant values.
- _____ 7. Lines of equal pressure are called isobars.
- _____ 8. Isobars that are far apart indicate a small difference in pressure and light winds.
- _____ 9. Contour lines are lines of equal temperature.
- _____ 10. Isotherms are used to identify temperature gradients and, consequently, frontal systems.

In your textbook, read about weather forecasting.

Use each of the terms below just once to complete the passage.

digital forecast**short term****long-term****analog forecast**

There are two major types of weather forecasts. A(n) **(11)** _____ relies on numerical data. It is the main method used in modern weather forecasting. Another type of forecast, the **(12)** _____, involves comparing current weather patterns to patterns that took place in the past.

Regardless of the forecasting method, all forecasts are more reliable in the **(13)** _____. Forecasts become less reliable as they attempt to predict **(14)** _____ weather changes.