

CHAPTER 12 METEOROLOGY

Reviewing Vocabulary

Compare and contrast each pair of related terms.

1. weather, climate

2. trade winds, prevailing westerlies

3. air mass, front

4. thermometer, barometer

5. anemometer, hygrometer

6. digital forecast, analog forecast

Multiple Choice

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

- Narrow bands of fast, high-altitude westerly winds are
 - polar easterlies.
 - jet streams.
 - air masses.
 - warm fronts.
- A weather instrument that measures temperature is a(n)
 - hygrometer.
 - anemometer.
 - thermometer.
 - barometer.
- A balloon-borne package of sensors that gathers upper-level temperature, air pressure, and humidity is
 - a radiosonde.
 - a satellite.
 - a hygrometer.
 - Doppler radar.
- The change in wave frequency of energy as it moves toward or away from an observer is the
 - Coriolis effect.
 - Doppler effect.
 - convergence effect.
 - radar effect.
- Polar and tropical regions maintain fairly constant average temperatures because
 - the Sun always strikes these regions at the same angle.
 - air masses remain stationary near the poles and equator.
 - Earth radiates extra energy back into space.
 - the continual motion of air and water reallocates heat energy throughout Earth.
- Differences in thermal energy can be detected with
 - ultraviolet imagery.
 - visible light.
 - infrared imagery.
 - sonar imagery.
- A record of weather data for a particular site at a particular time is a(n)
 - station model.
 - topographic map.
 - isopleth model.
 - climate map.
- Lines on a map that connect points of equal pressure are
 - boundaries.
 - isobars.
 - fronts.
 - station models.
- The exchange of heat or moisture with the surface over which an air mass travels is known as
 - intertropical convergence.
 - air mass modification.
 - occlusion.
 - air mass exchange.

Short Answer

Thoroughly answer the following questions.

1. Explain how air masses help redistribute energy on Earth's surface.

2. Describe how jet streams affect the weather and give the two different locations jet streams are typically found.

3. Identify the four types of fronts and the weather conditions associated with each one.

1. _____
2. _____
3. _____
4. _____

4. Compare and contrast a continental polar air mass and a maritime tropical air mass.

continental polar air mass _____

maritime tropical air mass _____

5. What problems are associated with long-term weather forecasts?

Thinking Critically

Thoroughly answer the following questions.

1. You examine two weather maps of your area for two different days. One map shows isobars that are closely spaced; the other shows isobars that are far apart. Predict the difference in weather conditions for those days.

Day 1: isobars that are closely spaced _____

Day 2: isobars that are far apart _____

2. How would Earth's wind systems be different if the whole planet were heated equally?

3. Your town is experiencing a short drought in which the weather has been hot and dry for weeks. Infer which type of pressure system is stalled over the area. Explain your answer. Hint: High or Low

4. There are five weather instruments collecting weather data in a city you are about to visit: an anemometer, a barometer, a hygrometer, a radiosonde, and a thermometer. You need information that will allow you to dress properly when you arrive. You can have the data from just three of the instruments. Which ones would you pick and why?

Instrument1: _____

Instrument2: _____

Instrument3: _____

Applying Scientific Methods

A meteorology class has set up a small weather station outside of school. It has a few simple instruments: a thermometer, a barometer, a rain gauge to measure rainfall, and a hygrometer. The students took measurements with the instruments once a day for a week. They then filled in the chart below. The barometer broke, so they were not able to finish collecting air-pressure data.

Use the chart and what you know about weather systems and weather forecasting to answer the following questions.

	Mon	Tue	Wed	Thurs	Fri	Sat	Sun
Average temperature (°C)	23.3	22.2	22.2	15.6	16.7	16.7	17.8
Rainfall (cm)	0	0	3.31	0	0	0	0
Relative humidity	40%	60%	100%	80%	60%	50%	40%
Air pressure (mb)	1000	998	—	—	—	—	—

1. A cold front passed through the students' city during the week. Showers occur at fronts. On which day did the front pass through?

2. What evidence does the data provide of the arrival of the front? Give two examples.

3. The students did not record cloud cover data. If they had, what would their observations have been as the front arrived?

4. Low-pressure systems are associated with clouds and precipitation. If the students' barometer had continued to work, would the air pressure reading for Wednesday have been higher or lower than the one for Tuesday, when the weather was clearer?

5. Given the relative humidity on Thursday, would you expect clear or cloudy skies?

6. Use the data in the chart to make an analog forecast of the weather for the Monday following the last day in the chart. Explain your answer.

Temperature: _____

Rainfall: _____

Relative humidity: _____

Air pressure: _____