

Chapter Resources

Atmosphere

Includes:

Reproducible Student Pages

ASSESSMENT

- ✓ Chapter Tests
- ✓ Chapter Review

HANDS-ON ACTIVITIES

- ✓ Lab Worksheets for each Student Edition Activity
- ✓ Laboratory Activities
- ✓ Foldables—Reading and Study Skills activity sheet

MEETING INDIVIDUAL NEEDS

- ✓ Directed Reading for Content Mastery
- ✓ Directed Reading for Content Mastery in Spanish
- ✓ Reinforcement
- ✓ Enrichment
- ✓ Note-taking Worksheets

TRANSPARENCY ACTIVITIES

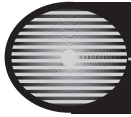
- ✓ Section Focus Transparency Activities
- ✓ Teaching Transparency Activity
- ✓ Assessment Transparency Activity

Teacher Support and Planning

- ✓ Content Outline for Teaching
- ✓ Spanish Resources
- ✓ Teacher Guide and Answers



Glencoe



Directions: Complete the concept map using the terms in the list below.

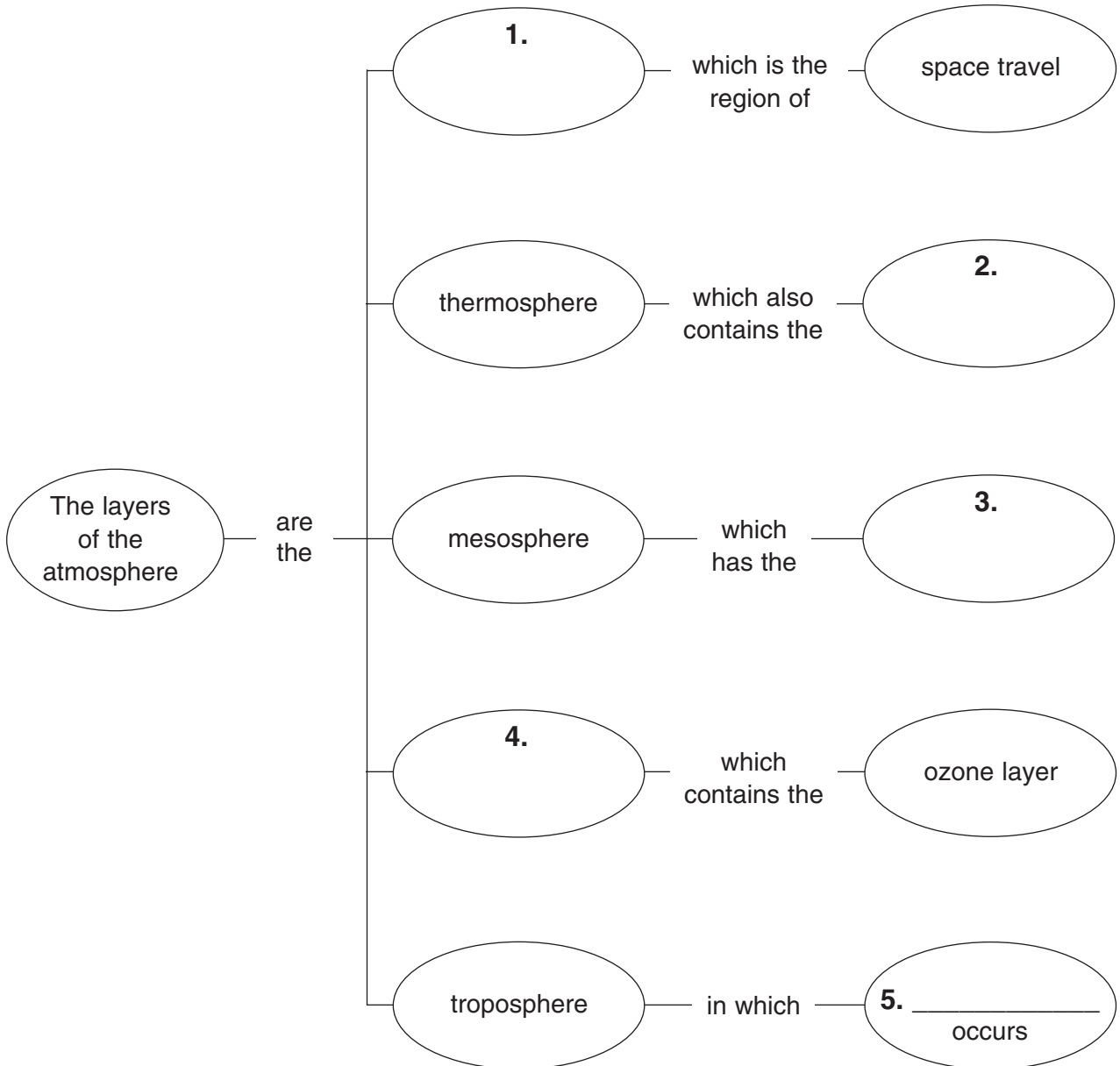
weather

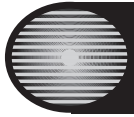
exosphere

coldest air temperature

ionosphere

stratosphere





Directed Reading for
Content Mastery

**Section 1 ■ Earth's
Atmosphere**
**Section 2 ■ Energy
Transfer in
the Atmosphere**

Directions: *Unscramble the terms in italics to complete the sentences below. Write the terms on the lines provided.*

1. The layer of atmosphere that we live in is the *oreeshroppt*.

2. The most common gas in our atmosphere is *gnoetrin*.

3. The layer of atmosphere that contains the ozone layer is the *rattsoreephs*.

4. Harmful energy that comes from the sun is *travelutoil triadiona*.

5. Chemical compounds that pollute the atmosphere are *frochrabonlorolucos*.

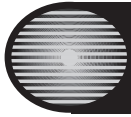
6. Energy is transferred when molecules bump into one another in *notonducci*.

7. A cycle in which air is warmed, warm air rises, air is cooled, and cooled air sinks is a *nocitecnov centurr*.

8. All the water on Earth's surface is called the *dropshyere*.

9. The process of water vapor changing to a liquid is called *cannedsitnoo*.

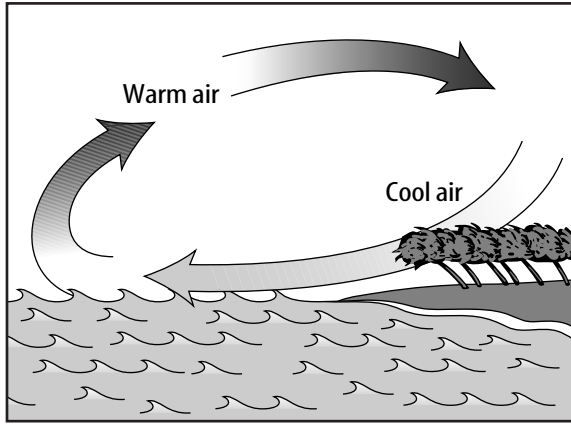
10. When water changes from a liquid to a gas, it *asprotavee*.



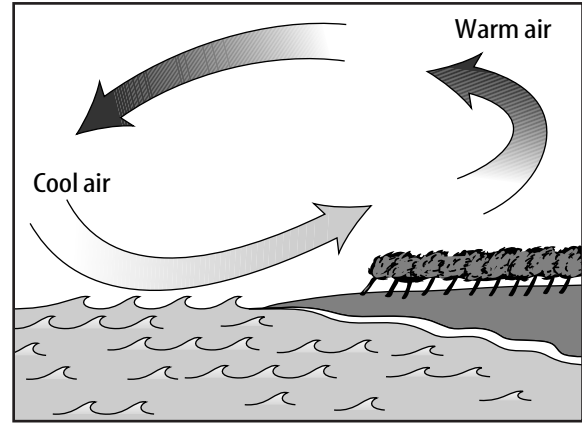
Directed Reading for
Content Mastery

Section 3 ■ Air Movement

Directions: Identify the illustrations below as showing a sea breeze or land breeze.



1. _____



2. _____

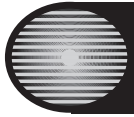
Directions: Match each cause with the correct effect. Write the letter of the effect in the blank before the cause.

Cause

- _____ 3. The equator receives more of the Sun's energy.
- _____ 4. Warm air is less dense than cold air.
- _____ 5. The poles receive less of the Sun's energy.
- _____ 6. Cold air is more dense than warm air.
- _____ 7. Warm air molecules are farther apart.
- _____ 8. Earth rotates.

Effect

- a. Cold air sinks.
- b. Air near the equator is warmer.
- c. The Coriolis effect exists.
- d. Warm air rises.
- e. Warm air is less dense.
- f. Air near the poles is colder.



Directed Reading for
Content Mastery

Key Terms
Atmosphere

Directions: Use the terms to complete the puzzle below. The letters in the dark, vertical box will spell a familiar term.

Coriolis effect troposphere sea breeze
ionosphere ozone layer jet stream radiation
land breeze condensation hydrosphere

The crossword puzzle grid consists of 10 numbered starting points for words:

- 1: 5-letter word starting at row 1, column 1.
- 2: 10-letter word starting at row 2, column 1.
- 3: 3-letter word starting at row 3, column 1.
- 4: 12-letter word starting at row 4, column 4.
- 5: 10-letter word starting at row 5, column 1.
- 6: 9-letter word starting at row 6, column 1.
- 7: 8-letter word starting at row 7, column 1.
- 8: 5-letter word starting at row 8, column 4.
- 9: 10-letter word starting at row 9, column 4.
- 10: 3-letter word starting at row 10, column 1.

A dark vertical bar is located in the center of the grid, spanning from row 1 to row 10, covering columns 4 and 5.

1. Part of atmosphere that protects Earth from harmful radiation
2. The transfer of energy that occurs when molecules bump into one another
3. Narrow belt of strong wind at high altitude
4. All the water on Earth's surface
5. The process of water vapor changing to a liquid
6. Layer of atmosphere closest to Earth's surface
7. A layer of charged particles above Earth
8. Constant movement of water between the atmosphere and Earth's surface.
9. Shifts the direction of free moving fluids such as air and water
10. A local wind system created during the day

SECTION
1

Reinforcement

Earth's Atmosphere

Directions: Answer the following questions on the lines provided.

1. Which atmosphere layer contains electrically charged particles that reflect radio waves?

2. In which atmosphere layer(s) does the temperature increase as altitude increases?

3. In which atmosphere layer(s) does the temperature decrease as altitude increases?

Directions: Use the chart to answer questions 4–7.

Gas	Percent by volume	Gas	Percent by volume
A	78.09	Helium	trace
B	20.95	Methane	trace
Argon	0.93	Krypton	trace
Carbon dioxide	0.03	Xeron	trace
C	0.0 to 4.0	Hydrogen	trace
Neon	trace	Ozone	trace

4. What information does the chart show? _____

5. A, B, and C represent three different gases. What is A? _____

How do you know? _____

6. What is B? _____

How do you know? _____

7. What is C? _____

How do you know? _____

SECTION 2

Reinforcement

Energy Transfer in the Atmosphere

Directions: Answer the following questions on the lines provided using information from the graph.

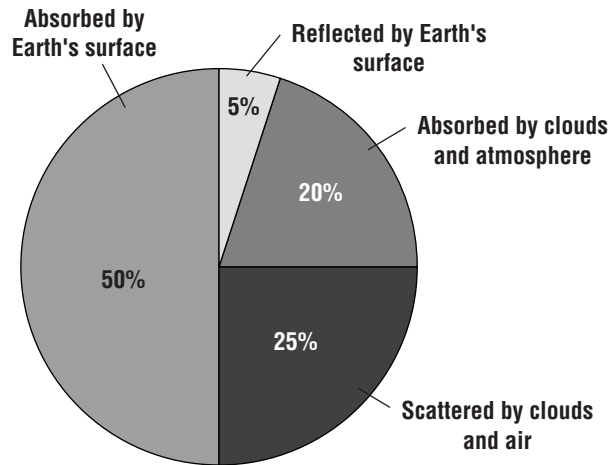
1. Why doesn't all radiation directed at Earth reach the surface?

2. What percent of radiation is lost before reaching Earth's surface?

3. What percent of radiation is lost after reaching Earth's surface?

4. What factors in the atmosphere seem to have the greatest effect on the amount of radiation received from the Sun?

What happens to radiation coming to Earth from the sun?



Directions: Complete the chart using the correct terms and phrases from the chapter. Then answer the following questions on the lines provided.

Types of heat transfer	How they are produced
5. Radiation	produced by _____
6. Conduction	produced by _____
7. Convection	produced by _____

8. If you put a frying pan on a burner on a stove and turn the burner on, the bottom of the frying pan gets hot. What type of heat transfer has occurred?

9. When you get in a closed car on a sunny day and the temperature inside is much warmer than outside, what type of heat transfer has taken place?

10. In some home heating systems, warm air is blown by a furnace fan into one side of a room. On the other side of the room cold air sinks to the floor. What type of heat transfer is this?

SECTION 3

Reinforcement

Air Movement

Directions: Write the term that matches each description below in the spaces provided. Unscramble the letters in the boxes to write a phrase related to the lesson. Use your textbook as a reference.

1. Caused by the uneven heating of Earth and its atmosphere

____ ____

2. Imaginary line around the middle of Earth

3. Windless zone at the equator which sailing vessels try to avoid

_____ _____

4. Winds generally responsible for the movement of weather across the United States and Canada

_____ _____

5. Winds that provide a dependable route for trade

____ _____

6. Cool breezes during the day caused by differences in heating and cooling rates of land and water

____ _____

7. Narrow belts of strong winds at high altitudes which blow near the top of the troposphere

_____ _____

8. Cool breezes at night caused by differences in heating and cooling rates of land and water

_____ _____

9. Heat from the Sun

_____ _____

10. The deflection of air masses resulting from Earth's eastward rotation

_____ _____

11. Winds that blow from the North and South Poles

____ _____

12. The phrase is: _____

SECTION**1****Enrichment****Observing the Effects of Air Pressure**

Temperature affects the density of air. The following experiment demonstrates the power of air pressure.

Materials    

glass bottle

sheet of paper

long match or paper drinking straw and match

hard-boiled egg, peeled

Procedure

1. Be sure that the opening at the top of the glass bottle is slightly smaller than the diameter of the egg.
2. Crumple the sheet of paper into a ball and drop it into the bottle.
3. Light the end of the paper drinking straw or the long match. Use to ignite the paper in the bottle. Be careful!
4. Immediately after the paper burns out, set the peeled hard-boiled egg over the opening at the top of the bottle with the pointed end of the egg down.

Analyze

1. What happened to the egg?

2. What caused the egg to do this?

Conclude and Apply

3. How can you get the egg out?

SECTION 2

Enrichment

Determining Temperature Change

Materials



small, dark-colored block of wood
 thermometer
 water
 electric teapot or teapot and hot plate

coffee mug
 ice cubes
 room heater or register
 clock or watch

Procedure

1. Place the wooden block in direct sunlight and record its surface temperature.
2. Measure and record the temperature of the block after two hours in the sun.
3. Heat water in the teapot and pour it into the mug. Record the temperature of the water.
4. Place two ice cubes in the water. After 10 minutes, measure and record the temperature of the water.
5. Record the temperature of the air as shown on the thermostat.
6. Ask an adult to turn up the thermostat.
7. Stand near the room heater or register, then stand near the cold-air return. Record your observations.
8. After 20 minutes, again record the temperature shown on the thermostat.

Analyze and Conclude

1. What happened to the wood block?

2. What type of heat transfer caused what you noticed?

3. What happened to the temperature of the water when ice cubes were added?

4. Explain the method of heat transfer demonstrated by the ice in the water.

5. Explain what happened in the room when the thermostat was turned up.

6. Which method of heat transfer is demonstrated by the heating of the room?

SECTION
3

Enrichment

Thermals

Convection is responsible not only for major wind systems that affect the entire Earth but also for small-scale air movements that affect only a small part of Earth's surface. Land and sea breezes are an example of small-scale air movements, or local winds. These small-scale movements are the result of differences in temperature over land and sea.

Small Scale Movement

Thermals are another type of small-scale movement. Thermals develop over only a few hundred square meters of land and last less than an hour. The formation of thermals is illustrated in the pictures below.

Figure 1 shows the thermal beginning as a rising column of air at Earth's surface. In Figure 2, a cap develops at the top. Eventually, the cap breaks off and increases in size as it continues to be forced upward (Figures 3 and 4). At higher altitudes, the thermal develops a "donut shape" before it dissipates in the cooler air (Figure 5).

Thermals may develop where Earth's surface is warm and the overlying air is cool. This may occur anywhere on Earth. The amount of heating at the surface varies, depending upon the amount of solar radiation absorbed by that part of Earth's surface.

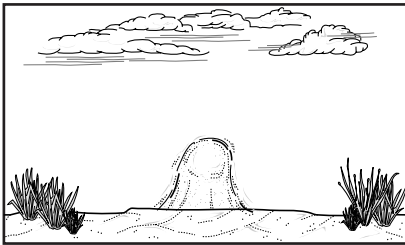


Figure 1

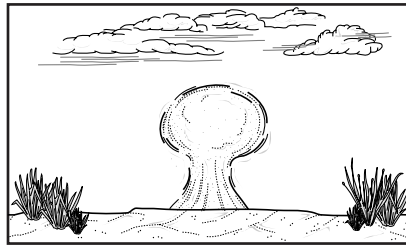


Figure 2

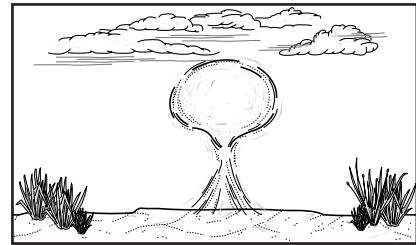


Figure 3

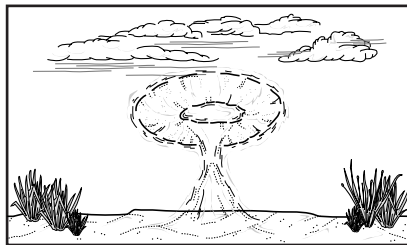


Figure 4

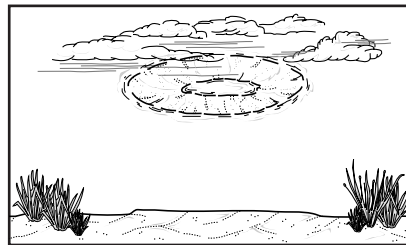
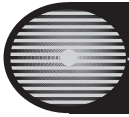


Figure 5

1. Thermals occur as a result of hot and cold air movements: _____ air rises and _____ air sinks.
2. What eventually causes a thermal to dissipate? _____

3. Vultures and hawks sometimes "glide the thermals." What do you think this means? Why do you think they do it? _____

**Note-taking
Worksheet**

Atmosphere

Section 1 Earth's Atmosphere

- A. _____—thin layer of air that protects the Earth's surface from extreme temperatures and harmful Sun rays
- B. Atmospheric makeup—mixture of gases, _____, and liquids
1. Early atmosphere was much different than today.
 - a. Volcanoes produced nitrogen and carbon dioxide, but little _____.
 - b. More than 2 billion years ago _____ began producing oxygen.
 - c. Eventually oxygen formed an _____ layer that protected Earth from harmful rays.
 - d. _____ plants and diverse life forms developed.
 2. Atmospheric _____ include nitrogen (78%), oxygen (21%), carbon dioxide, water vapor, and argon.
 - a. Atmosphere is changing with the introduction of pollutants: increasing human energy use is increasing the amount of _____.
 - b. Pollutants mix with oxygen and other chemicals to form _____.
 3. _____ include dust, salt, and pollen.
 4. _____ include water droplets and droplets from volcanoes.
- C. _____ main layers of the atmosphere
1. _____ layers
 - a. Lowest layer, where humans live, is the _____, which extends about 10 km up, and contains most of the water vapor and gases.
 - b. Extending from 10 km to 50 km above Earth, the _____ contains ozone.
 2. _____ layers
 - a. _____ extends from 50 km to 85 km and is the layer in which meteors are visible.
 - b. Thickest part of atmosphere is from 85 km to 500 km and is called the _____ for its high temperatures.
 - c. Within the mesosphere and thermosphere is a layer of charged particles called the _____ that can help carry radio waves.
 - d. _____—outer layer of atmosphere in which the space shuttle flies; has very few molecules
- D. _____—molecules closer to the surface are more densely packed (at higher pressure) than those higher in the atmosphere because of the mass of gases pressing down from higher in the atmosphere.

Note-taking Worksheet (continued)

- E. _____ in atmospheric layers
1. The troposphere is warmed primarily by the Earth's surface; temperature _____ as altitude increases in this layer.
 2. Temperatures _____ as altitude increases in the stratosphere, particularly the upper portion because ozone absorbs energy from the Sun.
 3. Temperatures _____ with altitude in the mesosphere.
 4. Thermosphere and exosphere are the first to receive the Sun's rays, so they are very _____
- F. _____—about 19 km to 48 km above Earth in the stratosphere, this layer of 3-atom oxygen molecules (O_3) protects the Earth from the Sun's harmful **ultraviolet radiation**
1. Life on Earth, as we know it, _____ on it.
 2. Pollutants called _____ (CFCs) are destroying the ozone layer.
 - a. CFCs are used in _____, air conditioners, aerosol sprays, and foam packaging.
 - b. If these products develop a leak, CFCs can enter the _____.
 3. The ozone layer has a large hole over _____.

Section 2 Energy Transfer in the Atmosphere

- A. Some energy from the Sun is reflected back into _____, some is absorbed by the _____, and some is absorbed by _____ and water on Earth's surface.
- B. _____—energy that flows from an object with a higher temperature to one with a lower temperature
1. _____—energy transferred in rays or waves
 2. _____—transfer of energy when molecules bump into each other through contact
 3. _____—transfer of heat by the flow of a material
 - a. Molecules move closer together, making the air more dense, and air _____ rises.
 - b. Cold air _____, pushing up warm air, which then cools and sinks, pushing up more warm air.
- C. The _____ cycle—water moves back and forth between Earth's atmosphere and surface
1. Energy from the Sun causes water to _____ from the **hydrosphere**, and rise as vapor.

Note-taking Worksheet (continued)

2. Water vapor in the atmosphere can cool and return to liquid form through _____.
- When water vapor condenses, clouds of tiny water _____ may form.
 - Water droplets collide to form larger _____.
3. As water drops grow, they fall back to Earth as _____.
- D. Earth's atmosphere is unique—it holds just the right amount of the Sun's _____ to support life.

Section 3 Air Movement

- A. _____ is the movement of air from an area of high pressure to an area of lower pressure.
- Different areas of Earth receive different amounts of the Sun's _____.
 - The equator's warm air, being less dense, is pushed upward by denser, _____ air.
 - The pole's cold air, being more _____, sinks and moves along Earth's surface.
 - The _____—rotation of the Earth causes moving air and water to shift to the right north of the equator and left south of the equator
- B. Global winds—wind patterns, caused by convection currents combined with the Coriolis effect, affect the world's _____.
- Near the equator, very little wind and daily rain patterns called the _____
 - Surface winds
 - Between the equator and 30° latitude (north and south) are steady _____, blowing to the west.
 - Between 30° and 60° latitude (north and south) the _____ blow to the east, in the opposite direction of the trade winds.
 - _____ blow from northeast to southwest near the north pole and from southeast to northwest near the south pole.
 - Upper troposphere—narrow belts of strong winds called _____
 - Jet stream moves _____ in the winter.
 - Moves _____ systems across the country
- C. Local wind systems—affect _____ weather
- _____—a convection current blows wind from the cooler sea toward warmer land during the day
 - _____—at night, air moves off the land toward the water as the land cools more rapidly than the water