Glencoe Science

Chapter Resources

Weather

Includes:

Reproducible Student Pages

ASSESSMENT

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- ✔ Chapter Review

HANDS-ON ACTIVITIES

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

MEETING INDIVIDUAL NEEDS

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- ✔ Directed Reading for Content Mastery in Spanish
- ✔ Reinforcement
- ✔ Enrichment
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- ✔ Teaching Transparency Activity
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- ✔ Spanish Resources
- ✔ Teacher Guide and Answers

Glencoe

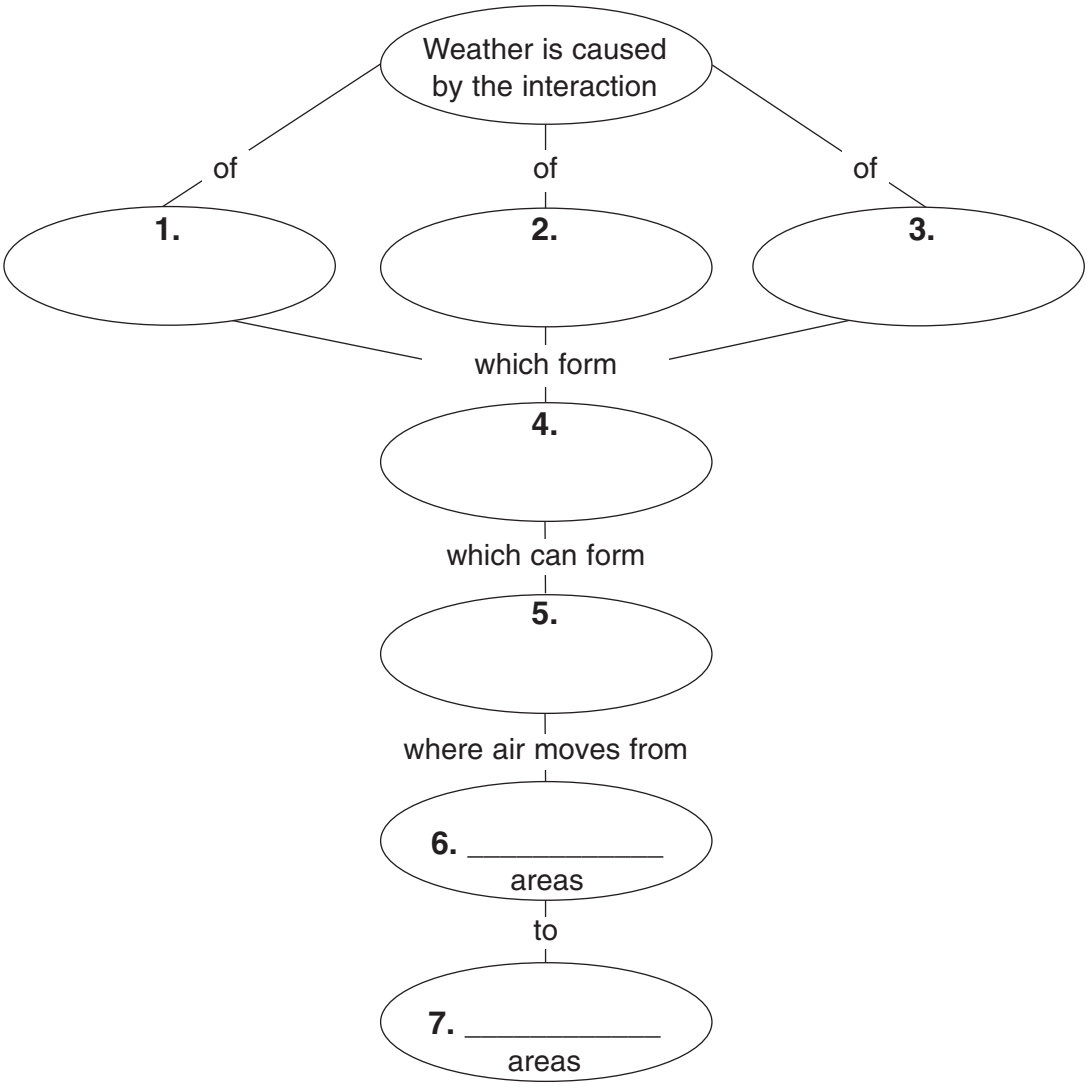
New York, New York Columbus, Ohio Chicago, Illinois Peoria, Illinois Woodland Hills, California

Directed Reading for Content Mastery

Overview Weather

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

Sun **fronts** **water** **air masses**
low pressure **high pressure** **air**



Directions: *Complete the following sentences using the correct terms.*

8. Clouds form as moist air rises and _____.

9. When dense, cold air meets less dense warmer air, the warm air is pushed _____.

10. Winds form because air moves from an area of high pressure to an area of _____ pressure.

Directed Reading for Content Mastery

Section 1 ▪ What is weather?

Directions: *Write the letter of the correct question next to its answer below.*

Questions

a. What is the dew point?

b. What is sleet?

c. What is fog?

d. What is humidity?

e. What is wind?

f. What is relative humidity?

g. What is weather?

h. What is temperature?

i. What are clouds?

j. What are types of precipitation?

k. What is caused by the interaction of air, water, and Sun?

Answers

_____ **1.** a description of the current state of the atmosphere

_____ **2.** the amount of water vapor in the air

_____ **3.** objects that form as warm air rises, expands, and then cools

_____ **4.** the temperature at which condensation forms from saturated air

_____ **5.** the measurement of the amount of water vapor in the air compared to the amount needed for saturation at a specific temperature

_____ **6.** rain, snow, sleet, and hail

_____ **7.** a stratus cloud that forms near the ground

_____ **8.** the weather

_____ **9.** air moving in a specific direction

_____ **10.** a measure of the average amount of motion of molecules

_____ **11.** rain drops that pass through a layer of freezing air near Earth's surface forming pellets

Name Date Class

Directed Reading for Content Mastery

Section 2 ▪ Weather Patterns
Section 3 ▪ Weather Forecasts

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

_____ **1.** A boundary between two different air masses is called a *norft.*

_____ **2.** Atmospheric *serpuser* is determined by the temperature and density of the air and the amount of water vapor in it.

_____ **3.** Storms and *ipitrpitconea* occur at fronts.

_____ **4.** Fronts usually bring a change in *etertermaup.*

_____ **5.** Fronts alweays bring a change in wind *iridotnec.*

_____ **6.** A(n) *ria sams* is a large body of air with the same properties as Earth's surface under it.

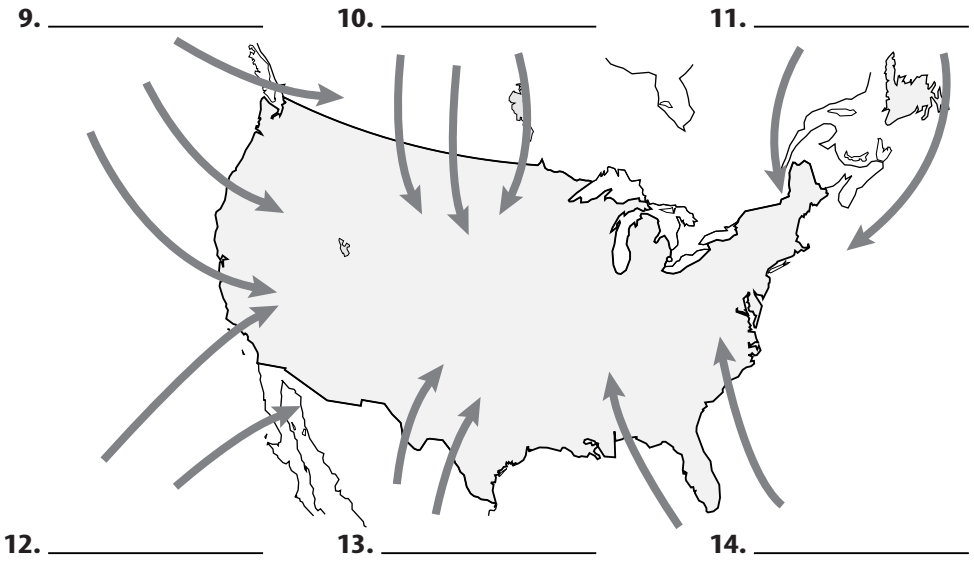
_____ **7.** A line connecting points of equal temperature is a(n) *timsrohe.*

_____ **8.** A(n) *tiostan emdol* shows the weather conditions at one specific location.

Directions: *Write the descriptive terms for air masses in their proper places on the map. Note that cool/moist and warm/moist appear twice.*

hot/dry **cool/moist** **warm/moist** **cold/dry**

cool/moist **warm/moist**



Meeting Individual Needs

Name Date Class

Directed Reading for Content Mastery

Key Terms
Weather

Directions: *Complete the following sentences using the correct terms. Then circle the terms in the word search puzzle.*

1. _____ is the amount of water vapor in the air compared to the amount of water vapor needed for saturation at a certain temperature.
2. The temperature at which air is saturated and condensation begins is the _____.
3. When air is cooled to the dew point near the ground, it forms a stratus cloud called _____.
4. When you observe a change in the weather from one day to the next, it is due to the movement of _____.
5. A _____ is a large swirling low-pressure system that forms over tropical waters.
6. A _____ studies weather.
7. An _____ connects locations of equal temperature.
8. An _____ connects locations of equal pressure.
9. A _____ is a violent whirling wind that moves over land.
10. The boundary between cold and warm air masses is a _____.

J M E T E O R O L O G I S T A S B
V I S O B A R Q U E X S L O I T F
A Z F R O N T J U S I S O F R H D
R R T N E D N U H T S N A W M T V
R W A A T H I R N U O M N Y A M P
M S O D E W P O I N T T Y P S M G
M W F O G H T A W M H A I L S D S
S N H U R R I C A N E C A U E I U
S W E A T H F O G E R A I N S T K
R E L A T I V E H U M I D I T Y X

Meeting Individual Needs

Name Date Class

SECTION 1 Reinforcement

What is weather?

Directions: *Answer the following questions on the lines provided.*

1. How does temperature affect humidity?

2. Why can't cold air hold much water vapor?

3. How do clouds form?

4. Complete the chart below about the types of clouds in Figures 1 through 4.

Figure 1

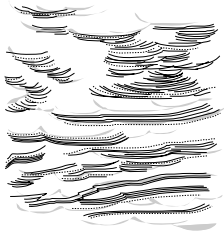


Figure 2

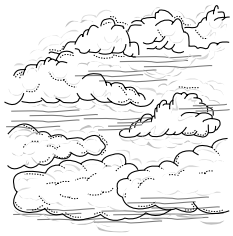


Figure 3

Figure 4

	Figure 1	Figure 2	Figure 3	Figure 4
Type				
Description				
Weather				

Directions: *Match the terms in Column I with their descriptions in Column II. Write the letter of the correct description in the blank at the left.*

Column I

_____ **5.** snow

_____ **6.** rain

_____ **7.** sleet

_____ **8.** hail

Column II

a. water drops that fall when the temperature is above freezing

b. water drops that fall and become solid when the temperature is below freezing

c. water drops that freeze in layers around small nuclei of ice during thunderstorms

d. water drops that pass through a layer of freezing air near the surface, forming ice pellets

Meeting Individual Needs

Name Date Class

SECTION 2 Reinforcement

Weather Patterns

Figure 1

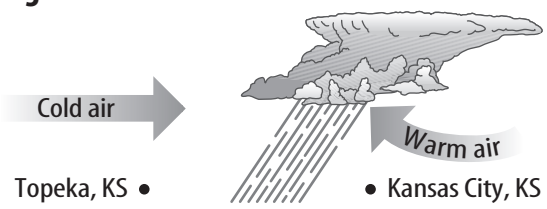
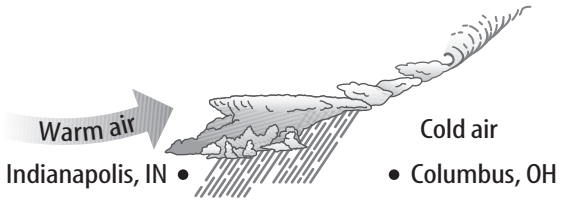


Figure 2



Directions: *Use the diagrams to answer the following questions.*

1. What kinds of clouds form along the front in Figure 1? _____

2. What kind of precipitation might come from these clouds? _____

3. What kind of clouds form along the front in Figure 2? _____

4. What kind of precipitation might come from these clouds? _____

5. Figure 1 represents a _____.

6. Figure 2 represents a _____.

7. What will happen to the temperature in Columbus, Ohio, when the front passes?

_____

8. Compare the temperatures in Topeka and Kansas City, Kansas. _____

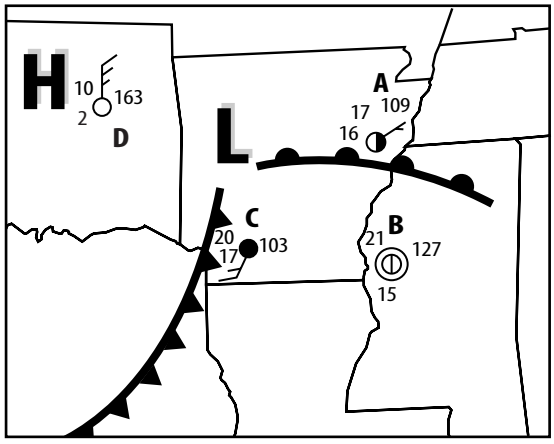
9. Fill in the chart about the elements of thunderstorms.

Element of Thunderstorms	Caused by
a. heavy rain	
b. strong winds	
c. lightning	
d. thunder	
e. tornado	

Meeting Individual Needs

SECTION 3 Reinforcement

Weather Forecasts



Directions: *Use the weather map and Weather Map Symbols Reference Handbook to answer the following questions.*

1. Which station has the lowest pressure?

2. How would you describe the wind at Station B?

3. Which station is recording the highest wind speed?

4. Which station has the highest pressure?

5. What kind of front is south of Station A?

6. Which station has the most cloud cover?

7. How might the temperature change at station C over the next few hours? Why?

Directions: *Answer the following questions on the lines provided.*

8. What is the difference between an isobar and an isotherm?

9. On a weather map for county A, the isobars are far apart. On a map for county B, about 100 miles away, the isobars are close together. Which map shows high winds? How can you tell?

SECTION 1 Enrichment

Relating Clouds to Weather

Clouds are one indicator of weather. How well can you predict weather by observing the sky?

Materials

camera
roll of film
poster board
markers

WARNING: *Do not aim the camera directly at the Sun. Damage could occur to the eyes if direct sunlight is observed.*
(Hint: Catch the same tree or top of a building in the beginning photo each day so you know when each day begins in your information.)

Procedure

1. Take photographs of the sky during the day for seven days. Photograph from west to east each day. Record the weather conditions, time of day when each photograph is taken, and number of photos taken each day.
2. Watch or listen to a nightly weather report and briefly record what weather conditions existed that day.
3. Use your textbook and cloud charts to identify the type or types of clouds in each photograph.
4. Look up the weather conditions normally associated with each cloud type in your photographs. Compare this information with your observations.

Data and Observations

Make a poster organizing your observations and information. Attach your photographs and include which type of cloud each photograph contains, the type of weather associated with that cloud type, and the weather you actually observed with that cloud type.

Conclude and Apply

1. Do you notice any pattern to the clouds observed and the weather experienced? Explain.

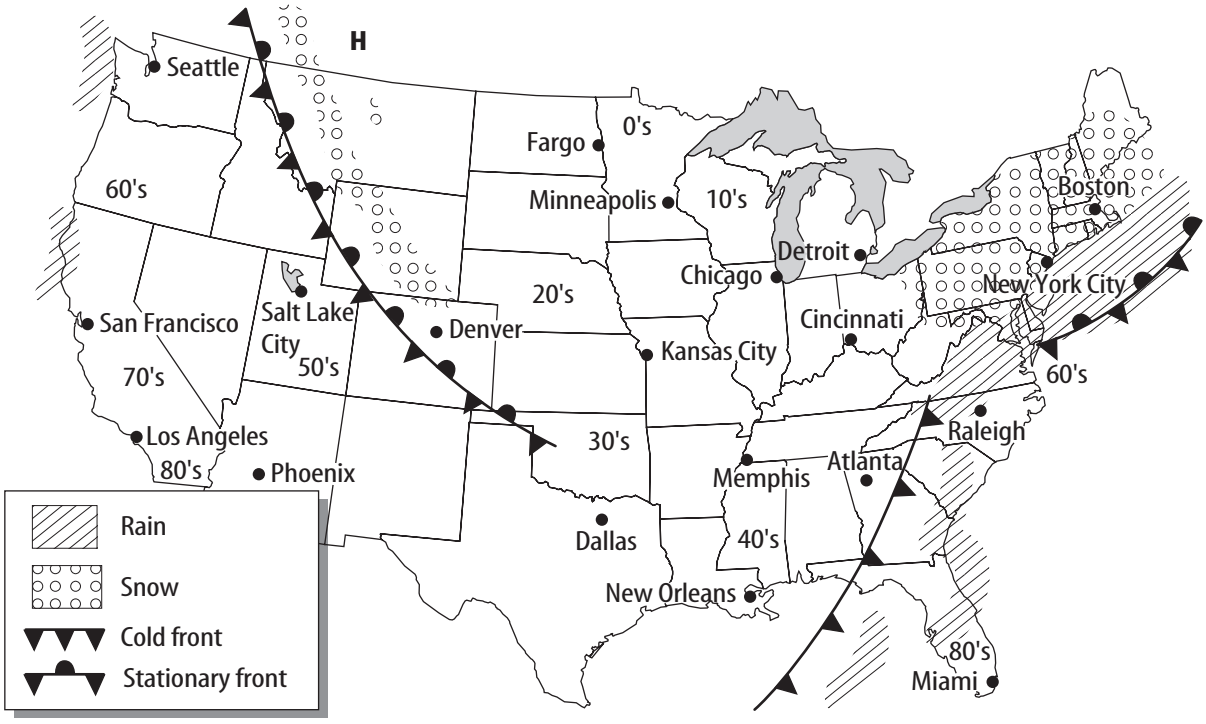
2. What do you conclude about using clouds to predict weather?

Name Date Class

SECTION 2 Enrichment

Reading Weather Maps

The symbols on the weather map below show the locations of fronts, high- and low-pressure areas, and different kinds of precipitation across the United States in the afternoon on a particular day in March. The key below the map tells what the symbols mean.



Directions: *Answer the questions below based on information in the weather map.*

1. Would you expect to find clear weather or clouds near Fargo, North Dakota?

2. Where would you expect to find a storm?

3. How is the weather in Salt Lake City, west of the stationary front, different from the weather in Denver, east of the front?

4. What is happening to the air masses at the cold front?

Meeting Individual Needs

SECTION 3 Enrichment

Making Forecasts

Materials

Celsius thermometer
aneroid barometer
magnetic compass

Procedure

1. Make a chart like the one shown below to record your weather observations each day for 7 days. Be sure to make observations at the same time and place each day.
2. Determine the temperature by placing the thermometer in a shaded location.
3. Determine the air pressure using the aneroid barometer.
4. Estimate the amount of sky covered by clouds as clear, overcast, or somewhere in between.
5. Determine the types of clouds using the Cloud Field Guide in the back of your textbook.
6. Use a magnetic compass to determine the direction from which the wind is blowing.
7. Describe the precipitation. Use the terms *rain, snow, sleet, hail, fog,* or *clear.*
8. Use the data you collect each day to forecast weather conditions for the following day. Note any trends you see in your observations, such as high cirrus clouds preceding rainy weather.

Date	Temp. (°C)	Atmospheric Pressure	% Cloud Cover	Cloud Types	Wind Direction	Precipitation	Forecast

Conclude and Apply

1. Was there a relationship between low barometric pressure and the presence of clouds and precipitation? Explain.

2. How accurate were your forecasts for the next day? Give an explanation for any errors that may have occurred in your forecasting.

3. What weather observations can you make yourself?

Name Date Class

Note-taking Worksheet

Weather

Section 1 What is weather?

A. Weather is the state of the _____ at a specific time and place.

1. Includes such conditions as air pressure, wind, _____, and moisture in the air.
   - **a.** The _____ evaporates water into the atmosphere forming clouds; water returns to Earth as rain or snow; the Sun also _____ air.
2. Temperature is a measure of _____ movement.
   - **a.** The Sun's energy causes air molecules to move rapidly; temperatures are _____ and it feels _____.
   - **b.** When less of the Sun's energy reaches air molecules, they move less rapidly and it feels _____.
3. Wind—air moving in a _____
   - **a.** As the Sun heats air, it expands, becomes less _____, rises, and has _____ atmospheric pressure.
   - **b.** Cooler air is _____ and sinks, causing _____ atmospheric pressure.
   - **c.** Air moves from _____ pressure areas to _____ pressure areas, causing wind.
4. **Humidity**—the amount of _____ in the air
   - **a.** Warmer air can hold _____ water vapor, tending to make it more humid.
5. **Relative humidity**—the amount of water vapor in the air compared to what it can hold at a _____ temperature
   - **a.** When air cools, it can't hold as much water vapor, so the water vapor _____ to a liquid or forms ice crystals.

B. _____—the temperature at which air is saturated and condensation forms

C. Clouds form as _____ air is forced upward and cools. Then the water vapor condenses in tiny droplets that remain suspended in the air.

Meeting Individual Needs

Note-taking Worksheet (continued)

D. The shape and height of clouds vary with temperature, pressure and the _____ in the atmosphere.

1. Shape

a. _____—smooth, even sheets or layers at low altitudes

b. _____—puffy, white clouds, often with flat bases

c. _____—high, thin, white, feathery clouds made of ice crystals

2. Height

a. _____—high clouds

b. _____—middle-elevation clouds

c. _____—low clouds

3. _____ clouds are dark and so full of water that sunlight can't penetrate them.

E. Precipitation—_____ falling from clouds

1. When _____ in clouds combine and grow large enough, precipitation falls to Earth.

2. Air _____ determines whether the droplets form rain, snow, sleet, or hail.

Section 2 Weather Patterns

A. Because _____ and _____ move in the atmosphere, weather constantly changes.

1. Air mass—a large body of air with properties like the part of _____ over which it formed

2. Highs and lows

a. Stormy weather is associated with _____ pressure areas.

b. Fair weather is associated with _____ pressure areas.

c. Air pressure is measured by a _____.

B. Front—a _____ between two different air masses

1. Clouds, precipitation, and _____ occur at frontal boundaries.

a. Cold front—where _____ air advances under _____ air

b. Warm front—where _____ air advances over _____ air

2. _____ front—involves three air masses of different temperatures

3. _____ front—air masses and their boundaries stop advancing

Note-taking Worksheet (continued)

C. Severe weather

1. Thunderstorms occur along warm, moist air masses and at _____.
   - **a.** Warm, moist air is forced rapidly upward, where it cools and _____.
   - **b.** Strong updrafts of warm air and sinking, rain-cooled air cause strong _____.
2. Lightning
   - **a.** Movement of air inside a storm cloud causes parts of the cloud to become _____.
   - **b.** Current flows between the regions of opposite electrical charge, forming a _____.
3. Thunder—lightning _____ the air, causing it to expand rapidly and then contract, forming sound waves
4. _____—a violent, whirling wind that moves in a narrow path over land
5. _____—a large, swirling, low-pressure system that forms over tropical oceans
6. **Blizzard**—a winter storm with strong winds, cold temperatures, and low visibility, that lasts more than _____ hours.
7. Severe weather safety
   - **a.** A National Weather Service _____ means conditions are favorable for severe weather to develop.
   - **b.** A _____ means that severe weather conditions already exist.

Section 3 Weather Forecasts

A. _____ study and predict the weather.

B. The National Weather Service makes _____.

1. _____ show weather conditions at a specific location.
2. Temperature and pressure
   - **a.** **Isotherms** are lines on a weather map connecting points of equal _____.
   - **b.** **Isobars** are lines on a weather map that connect points of equal atmospheric _____.
3. Weather fronts move from _____ to _____.