

Chapter 16 Weather Factors

Study Guide

1. Energy in the Atmosphere
 - a. Energy from the Sun
 - i. **Electromagnetic Waves**
 - ii. **Radiation**
 - iii. **Infrared Radiation**
 - iv. **Ultraviolet Radiation**
 - b. Energy in the Atmosphere
 - i. **Scattering**
 - c. Energy at Earth's Surface
 - i. **Greenhouse Effect**
2. Heat Transfer
 - a. Energy and **Temperature**
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 - b. Measuring Temperature
 - i. **Thermometer**
 - c. How **Heat** is Transferred
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 - i. **Sea Breeze**
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 - d. **Monsoons**
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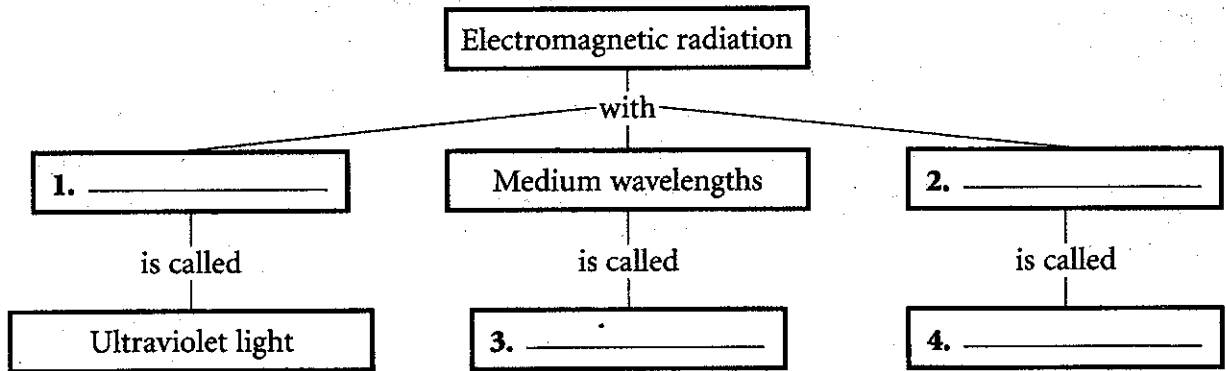
- i. Global Convection Currents
 - ii. **The Coriolis Effect**
 - f. Global Wind Belts
 - i. Doldrums
 - ii. Horse **Latitudes**
 - iii. Trade Winds
 - iv. Prevailing Westerlies
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- 4. Water in the Atmosphere
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 - a. Measuring **Relative Humidity**
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 - b. How Clouds Form
 - i. **Condensation**
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- 5. **Precipitation**
 - a. Types of Precipitation
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 - b. Measuring Precipitation
 - i. **Rain Gauge**
 - c. Controlling Precipitation
 - i. **Droughts**

SECTION 16-1 REVIEW AND REINFORCE

Energy in the Atmosphere

◆ Understanding Main Ideas

Fill in the blanks in the concept map with the correct word or words.



If the statement is true, write true. If it is false, change the underlined word or words to make the statement true.

- _____ 5. Sunburns are caused by infrared radiation.
- _____ 6. Ultraviolet radiation can be felt as heat.
- _____ 7. Scattering is a natural process that keeps Earth's atmosphere warm.
- _____ 8. Electromagnetic waves are classified according to wavelength.
- _____ 9. Visible light with the shortest wavelength is red light.

◆ Building Vocabulary

Match each term with its definition by writing the letter of the correct definition on the line beside the term.

- | | |
|---------------------------------|-------------------------------------------------------------------------|
| _____ 10. electromagnetic waves | a. a form of energy with wavelengths that are longer than red light |
| _____ 11. radiation | b. the direct transfer of energy by electromagnetic waves |
| _____ 12. infrared radiation | c. reflection of light in all directions |
| _____ 13. ultraviolet radiation | d. a form of energy that can travel through space |
| _____ 14. scattering | e. the holding of heat by gases in the air |
| _____ 15. greenhouse effect | f. a form of energy with wavelengths that are shorter than violet light |

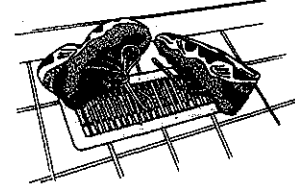
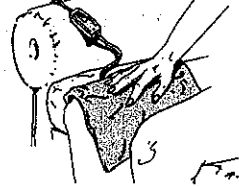
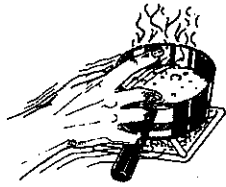
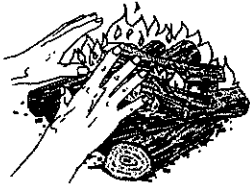
SECTION 16-2

REVIEW AND REINFORCE

Heat Transfer

◆ Understanding Main Ideas

Label each picture with the type of heat transfer that it shows.



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

Answer the following questions in the spaces provided.

5. How is air temperature usually measured? _____
6. At what temperature on the Celsius scale does pure water freeze? At what temperature does it boil? _____
7. Name the three ways that heat is transferred. _____
8. How is heat transferred from the sun to Earth? _____
9. What causes most of the heating of the troposphere? _____

◆ Building Vocabulary

Fill in the blank to complete each statement.

10. The total energy of motion in the molecules of a substance is called _____.
11. _____ is the average amount of energy of motion in the molecules of a substance.
12. A(n) _____ is a thin glass tube with a bulb on one end that contains a liquid, usually mercury or colored alcohol.
13. The energy transferred from a hotter object to a cooler one is referred to as _____.
14. The direct transfer of heat from one substance to another substance that it is touching is called _____.
15. The transfer of heat by the movement of a fluid is called _____.

SECTION 16-3

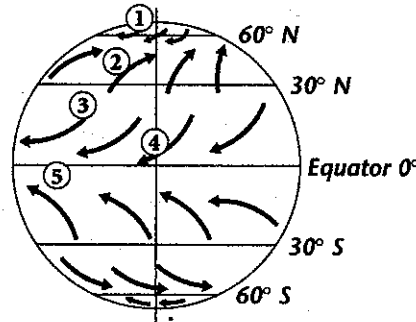
REVIEW AND REINFORCE

Winds

◆ Understanding Main Ideas

Identify the global wind belts and calm areas in the figure below.

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



◆ Building Vocabulary

If the statement is true, write true. If it is false, change the underlined word or words to make the statement true.

- _____ 6. A wind is a horizontal movement of air from an area of high pressure to an area of lower pressure.
- _____ 7. Wind speed is measured with a(n) wind vane.
- _____ 8. The increased cooling that a wind can cause is called the Coriolis effect.
- _____ 9. Local winds are winds that blow over short distances.
- _____ 10. The flow of air from an ocean or lake to the land is called a land breeze.
- _____ 11. The flow of air from land to a body of water is called a sea breeze.
- _____ 12. Sea and land breezes over a large region that change direction with the seasons are called global winds.
- _____ 13. Winds that blow steadily from specific directions over long distances are called doldrums.
- _____ 14. The way Earth's rotation makes winds curve is called the prevailing westerlies.
- _____ 15. Bands of high-speed winds about 10 kilometers above Earth's surface are called polar easterlies.

SECTION 16-4 REVIEW AND REINFORCE

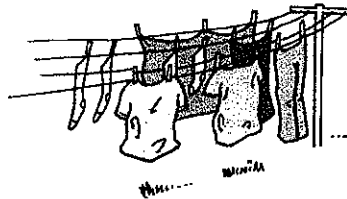
Water in the Atmosphere

◆ Understanding Main Ideas

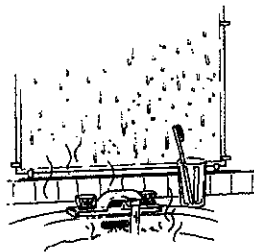
Label each of the pictures below with the name of the process it shows—either evaporation or condensation.



1. _____



2. _____



3. _____



4. _____

◆ Building Vocabulary

Match each term with its definition by writing the letter of the correct definition on the line beside the term.

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_____ 5. evaporation

_____ 6. humidity

_____ 7. relative humidity

_____ 8. psychrometer

_____ 9. condensation

_____ 10. dew point

_____ 11. cumulus

_____ 12. stratus

_____ 13. cirrus

a. the process by which molecules of water vapor in the air become liquid water

b. the temperature at which condensation begins

c. instrument with two thermometers, a wet-bulb thermometer and a dry-bulb thermometer

d. clouds that look like fluffy, rounded piles of cotton

e. the percentage of water vapor in the air compared to the maximum amount the air could hold

f. clouds that form in flat layers

g. a measure of the amount of water vapor in the air

h. wispy, feathery clouds

i. the process by which water molecules in liquid water escape into the air as water vapor

SECTION 16-5

REVIEW AND REINFORCE

Precipitation

◆ Understanding Main Ideas

Fill in the blanks in the table below.

Type of Precipitation	Description
1.	water droplets at least 0.5 millimeters in diameter
sleet	2.
3.	rain that freezes on a cold surface
hail	4.
5.	ice crystals

Answer the following questions in the spaces provided.

6. What is needed for precipitation to occur? _____

7. How is snowfall measured? _____

◆ Building Vocabulary

Fill in the blanks with the correct word or words.

8. _____ is any form of water that falls from clouds and reaches Earth's surface.

9. A(n) _____ is an open-ended can or tube that collects rainfall.

10. Long periods of low precipitation are called _____.

Name: _____

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Ch.16 Review

Choose the letter of the correct answer.

1. The horse latitudes are located
[A] at about 60° north and south latitudes. [B] at about 30° north and south latitudes.
[C] at the equator. [D] at the north and south poles.
2. Clouds form when water vapor in the air
[A] becomes liquid water or ice crystals. [B] is deposited as ice onto a solid surface.
[C] falls to the ground. [D] condenses onto a solid surface.
3. Cool air masses tend to
[A] be less dense and flow over warm air masses.
[B] be more dense and flow under warm air masses.
[C] be lifted up by denser warm air masses. [D] mix easily with warm air masses.
4. Most of Earth's incoming ultraviolet radiation is absorbed by
[A] ozone. [B] water vapor. [C] clouds. [D] dust.
5. The freezing point of pure water on the Celsius scale is
[A] 0°C. [B] 32°C. [C] 100°C. [D] 212°C.
6. The difference between sleet and hail is
[A] the size of the ice pellets. [B] the temperature of the ice pellets.
[C] where the ice pellets formed. [D] both B and C.
7. Global winds generally
[A] are not influenced by the heating of Earth's surface.
[B] change directions from day to day.
[C] are unpredictable.
[D] blow from specific directions over long distances.

Choose the letter of the correct answer.

8. Convection takes place because

- [A] warm and cold air have the same density. [B] cold air is less dense than warm air.
[C] warm air is denser than light air.
[D] cold air is denser than warm air.

9. Most of the heating of the troposphere comes from

- [A] radiation. [B] induction. [C] convection. [D] conduction.

10. Wind speed is measured by a(n)

- [A] hygrometer. [B] barometer. [C] thermometer. [D] anemometer.

Fill in the word or phrase that best completes the statement(s).

11. If 4 grams of water vapor are present in a cubic meter of air that can hold a maximum of 10 grams, the _____ is 40 percent.

12. Gases in the air hold energy that is radiated from Earth's surface in a process called the _____.

13. Mist and drizzle are made of small _____.

14. In the atmosphere, some of the sun's rays get _____, or reflected in all directions.

15. Clouds that form near the ground and look like fluffy heaps of cotton are called _____.

16. Scientists use cloud seeding to produce rain during _____, or unusually long, dry periods.

17. Winds in the mid-latitudes that blow from west to east are called _____.

18. Most of the heating of the troposphere occurs by _____, which is the transfer of heat by fluid movement.

If the statement is true, write true. If it is false, change the underlined word or words to make the statement true.

19. Most of the world receives more rain than snow.

If the statement is true, write true. If it is false, change the underlined word or words to make the statement true.

20. The three main types of clouds are cumulus, stratus, and altos.
21. Earth's major wind belts are the trade winds, the prevailing westerlies, and the polar latitudes.
22. On the Celsius scale, the freezing point of pure water is 0° .

Use the diagram to answer the question(s).

Local Winds

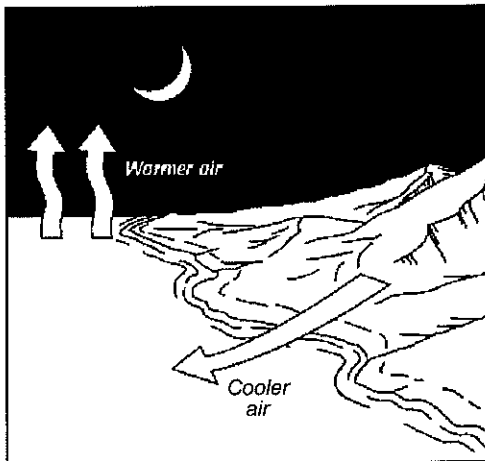


Diagram X

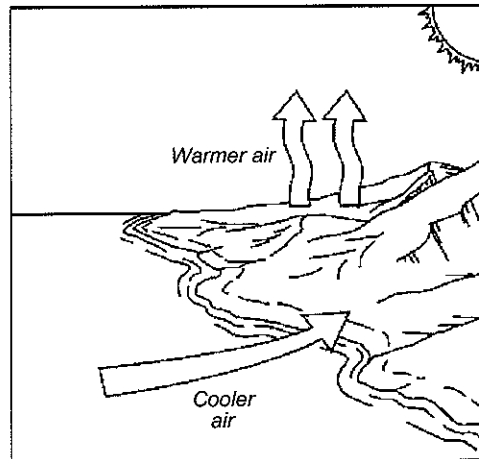
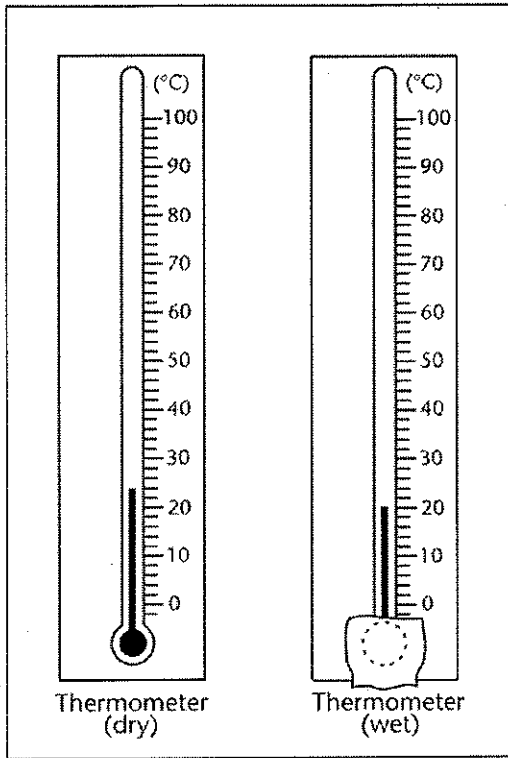


Diagram Y

23. Which diagram shows the formation of a sea breeze?
24. In diagram Y, which warms up more slowly, the land or the water?
25. In diagram Y, which way does the wind blow? Why?

Use the diagram and table to answer the question(s).

Relative Humidity



Dry-Bulb Reading (°C)	Difference Between Wet- and Dry-Bulb Readings (°C)				
	1	2	3	4	5
10	88	76	65	54	43
12	88	78	67	57	48
14	89	79	69	60	50
16	90	80	71	62	54
18	91	81	72	64	56
20	91	82	74	66	58
22	92	83	75	68	60
24	92	84	76	69	62
26	92	85	77	70	64
28	93	86	78	71	65
30	93	86	79	72	66

26. Suppose the relative humidity of the air is 54 percent and the temperature of the dry-bulb thermometer is 16°C. What is the temperature of the wet-bulb thermometer?
27. How do the temperatures of the wet-bulb and dry-bulb thermometers compare?
28. What is the temperature of the dry-bulb thermometer?

Write an answer to the following question(s).

29. Explain why the region near the equator has little or no wind.
30. Suppose gases in the atmosphere did not trap the energy that is radiated from Earth's surface. What would happen to living things on Earth? Explain your answer.

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