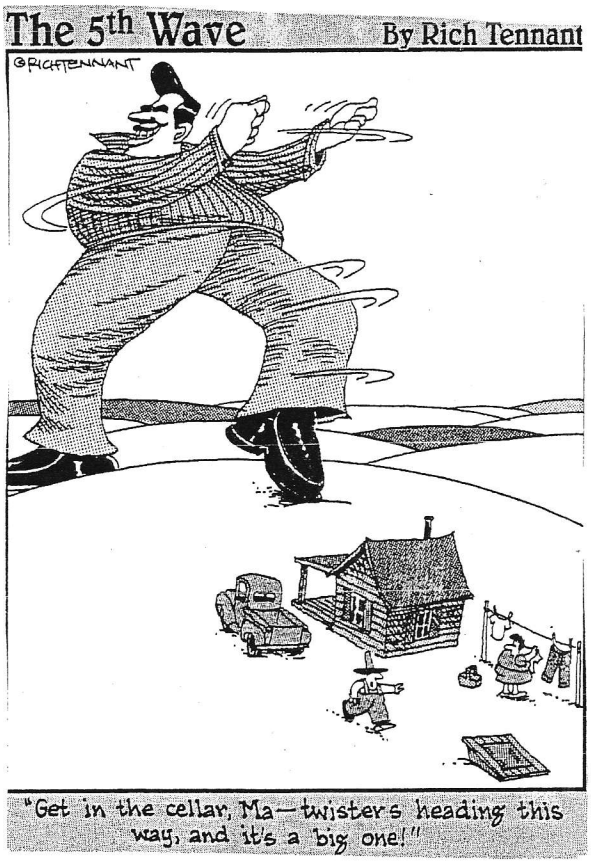
Weather Packet

Chapter 2

Review and Reinforce



Name

Homeroom

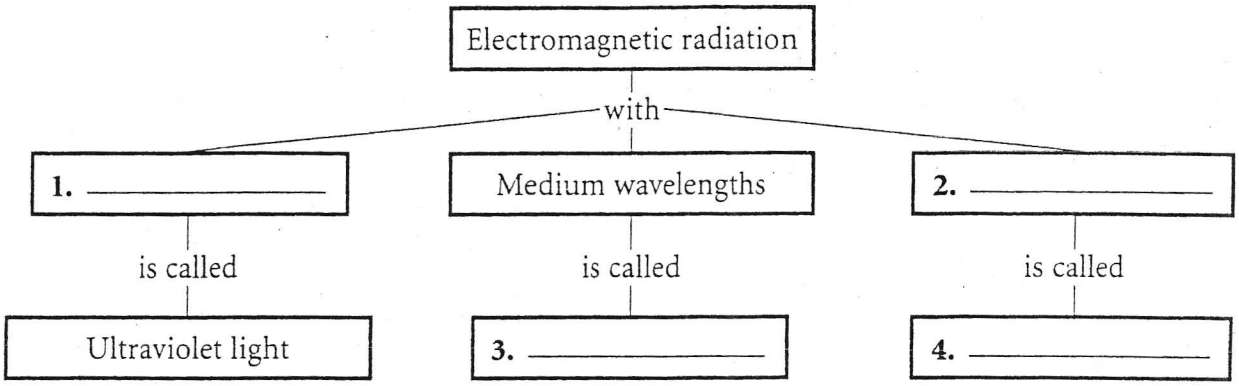
Name _____ Date _____ Class _____

SECTION 2-1 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

_____ **11.** radiation

_____ **12.** infrared radiation

_____ **13.** ultraviolet radiation

_____ **14.** scattering

_____ **15.** greenhouse effect

a. a form of energy with wavelengths that are longer than red light

b. the direct transfer of energy by electromagnetic waves

c. reflection of light in all directions

d. a form of energy that can travel through space

e. the holding of heat by gases in the air

f. a form of energy with wavelengths that are shorter than violet light

1

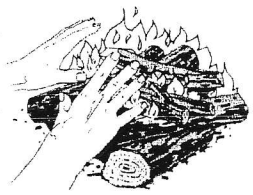
Name _____ Date _____ Class _____

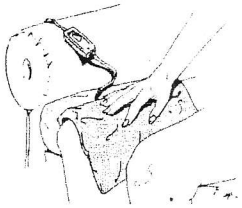
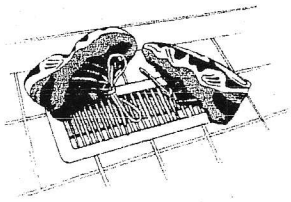
SECTION 2-2 REVIEW AND REINFORCE

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 _____.

3

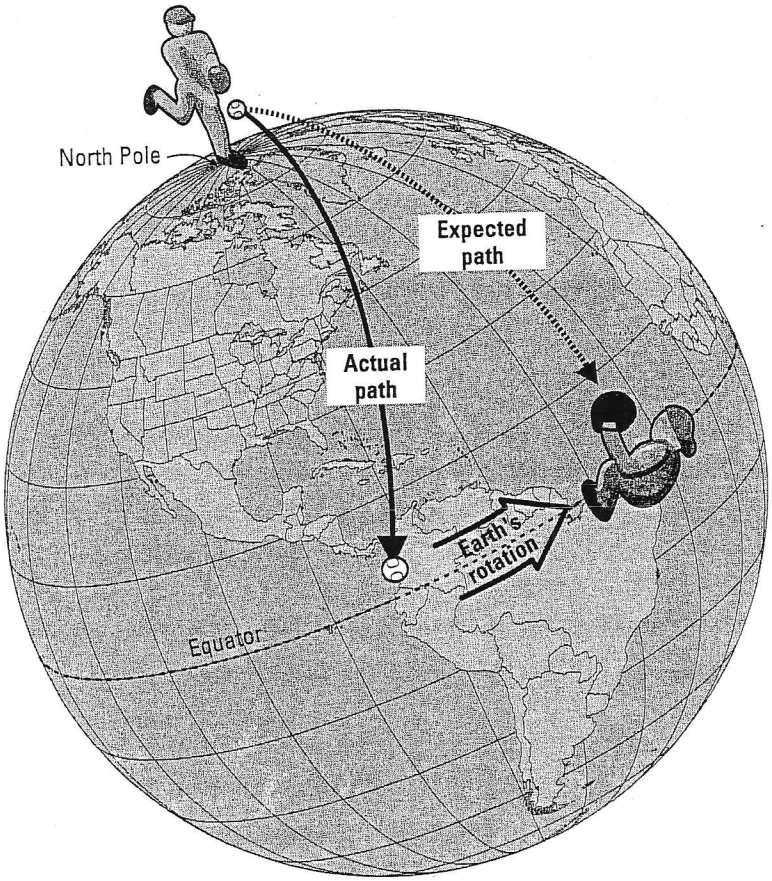


Figure 4-6: The effect of Earth's rotation on a fast-traveling object.

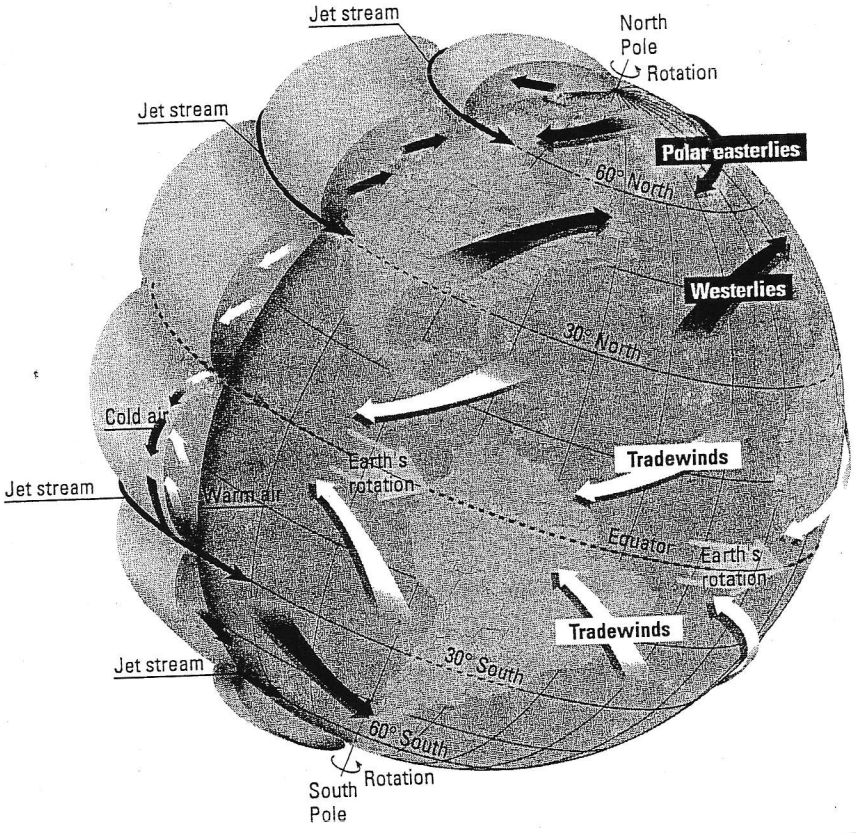


Figure 4-1: The general circulation of the atmosphere.

(3a)

Name _____ Date _____ Class _____

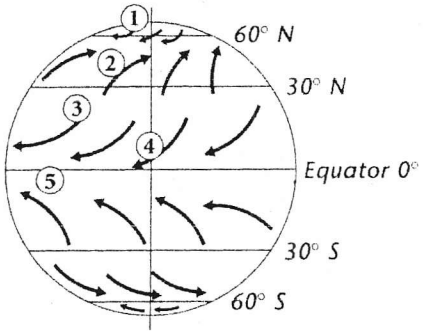
SECTION 2-3 REVIEW AND REINFORCE

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.

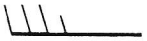
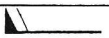
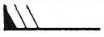
_____ **15.** Bands of high-speed winds about 10 kilometers above Earth's surface are called polar easterlies.

4

NAME _____

HOW WINDY IS IT?

You can estimate the speed of the wind by watching how it affects things outside, like trees, flags, and chimney smoke. Below is the **Beaufort Wind Scale**, which you can use to match the effects of the wind to its speed. Observe the wind's effects at the same time of day for a week or at various predetermined times, and record your observations and your estimate of the wind speed in the chart at the bottom of the page.

Observation	Name of Wind	Miles per Hour	Symbol
Smoke goes straight up	Calm	Less than 1	
Smoke moves, but wind vane does not	Light air	1-3	
Leaves rustle, wind vane moves, wind felt on face	Light breeze	4-7	
Leaves and small twigs move constantly, wind extends light flag	Gentle breeze	8-12	
Dust raised, dead leaves and loose paper blows about, small branches move	Moderate breeze	13-18	
Small trees sway, small waves crest on lakes or streams	Fresh breeze	19-24	
Large branches move constantly, wind howls around eaves, wires on telephone poles hum	Strong breeze	25-31	
Large trees sway, walking against wind is inconvenient	Moderate gale	28-32	
Twigs break off trees, walking against wind is difficult	Fresh gale	39-46	
Branches break off trees, loose bricks blown off chimneys, shingles blown off	Strong gale	47-54	
Trees snap or are uprooted, considerable damage to buildings is possible	Whole gale	55-63	
Widespread damage to buildings	Storm	64-75	
General destruction	Hurricane	Over 75	

	Observations	Name of Wind	Miles per Hour	Symbol
Monday				
Tuesday				
Wednesday				
Thursday				
Friday				

Name _____

The Wind-Chill Factor

Directions: Answer the questions.

1. How cold does it feel when the wind speed is 30 mph and the temperature is 30°?

   _____

2. How cold does it feel when the wind speed is 40 mph and the temperature is 50°?

   _____

3. How cold does it feel when the wind speed is 5 mph and the temperature is 40°?

   _____

4. What are the actual temperature and the wind speed when it feels like -116°?

   _____

5. What is the actual temperature right now? _____

   What is the wind speed right now? _____

   How cold does it feel? _____

WIND CHILL FACTOR

Wind Speed (mph)	Thermometer Readings (° F)									
	50	40	30	20	10	0	–10	–20	–30	–40
	Equivalent Temperatures (° F)									
Calm	50	40	30	20	10	0	-10	-20	-30	-40
5	48	37	27	16	6	-5	-15	-26	-36	-47
10	40	28	16	4	-9	-21	-33	-46	-58	-70
15	36	22	9	-5	-18	-36	-45	-58	-72	-85
20	32	18	4	-10	-25	-39	-53	-67	-82	-96
25	30	16	0	-15	-29	-44	-59	-74	-88	-104
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109
35	27	11	-4	-20	-35	-49	-67	-82	-98	-113
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116
	little danger				increasing danger			great danger		

4b

Name _____ Date _____ Class _____

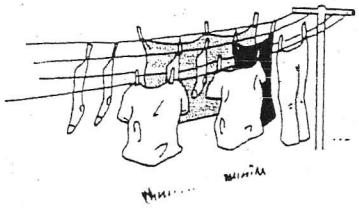
SECTION 2-4 REVIEW AND REINFORCE

Water in the Atmosphere

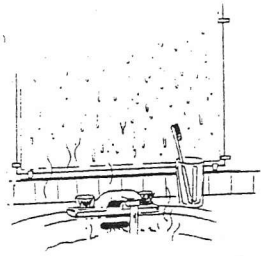
◆ Understanding Main Ideas

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 in the right column on the line beside the term in the left column.

_____ **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

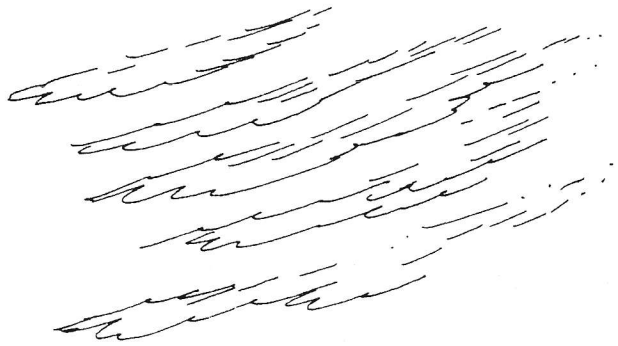
i. the process by which water molecules in liquid water escape into the air as water vapor

5

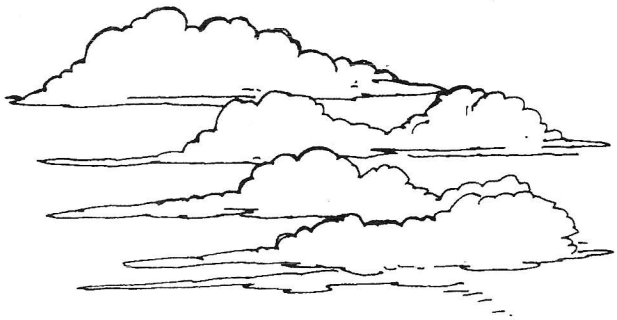
What Are Those Clouds?

Types of Clouds

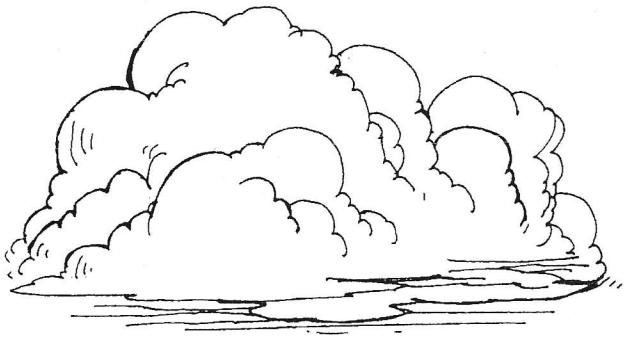
The following illustrations show the three basic types of clouds and the cumulonimbus clouds. Below the illustrations, descriptions are given, along with explanations of how the clouds were named.



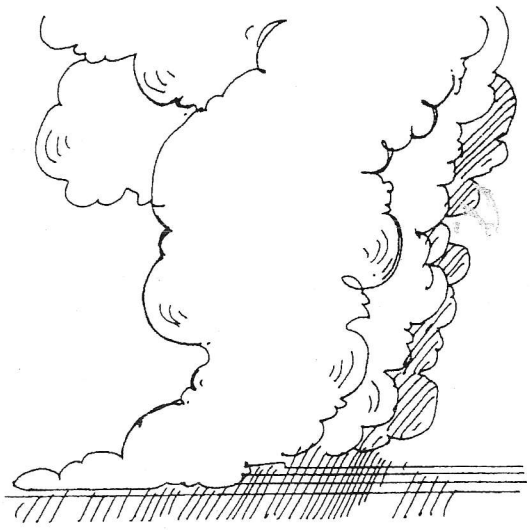
Cirrus clouds are high, thin, white clouds that are made of tiny ice pieces. *Cirrus* is a Latin word meaning curl.



Stratus clouds are low, flat gray clouds which are layered. When stratus clouds lie close to the ground, they are called fog. *Stratus* is a Latin word which means layer.



Cumulus clouds are white, puffy clouds which form in warm air on sunny days. They can quickly develop into thunder clouds or cumulonimbus clouds. *Cumulus* is Latin for heap.



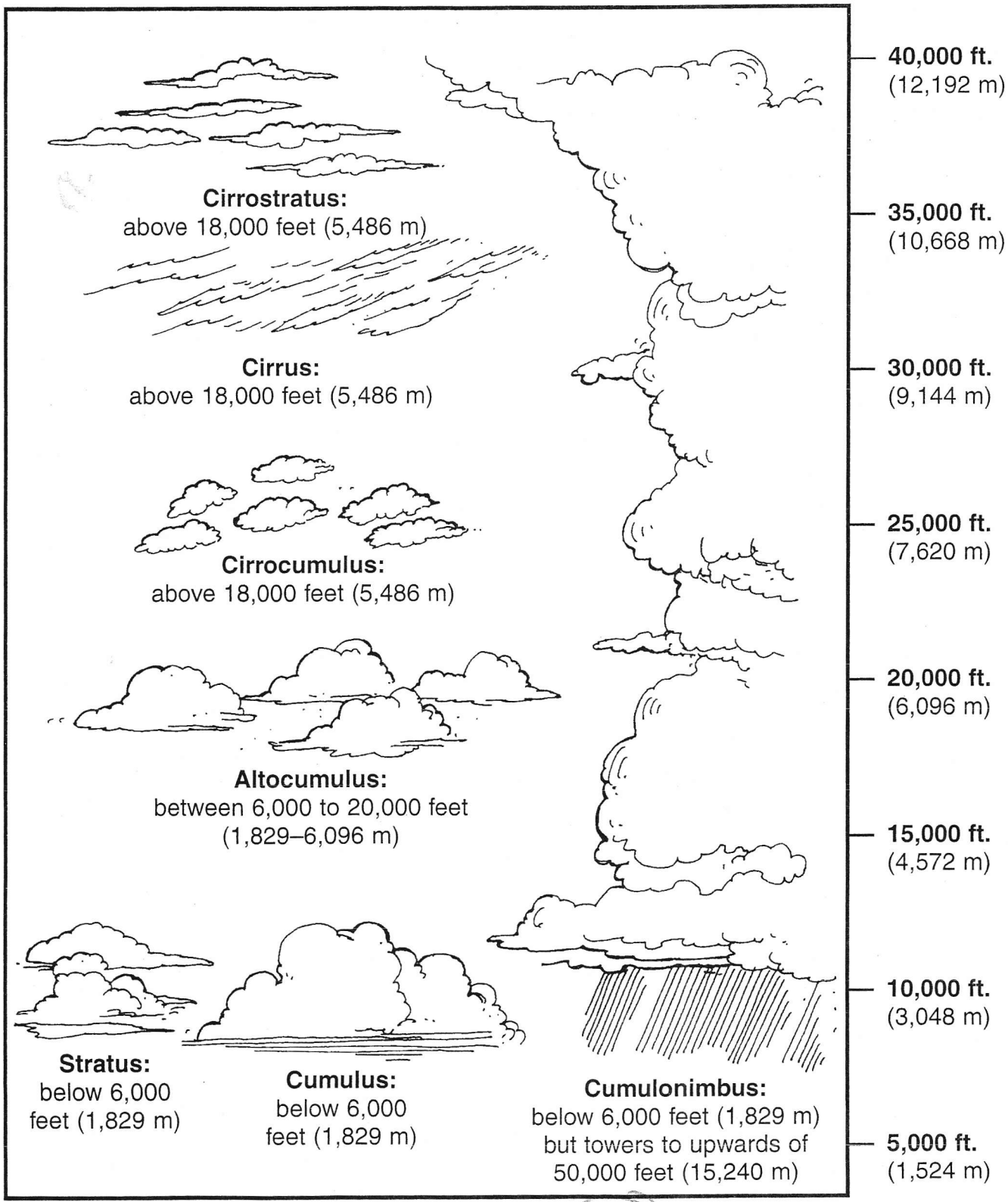
Cumulonimbus clouds or thunderheads are huge, puffy, dark clouds, which are a type of cumulus cloud. *Nimbus* is Latin for rain.

5a

What Are Those Clouds *(cont.)*

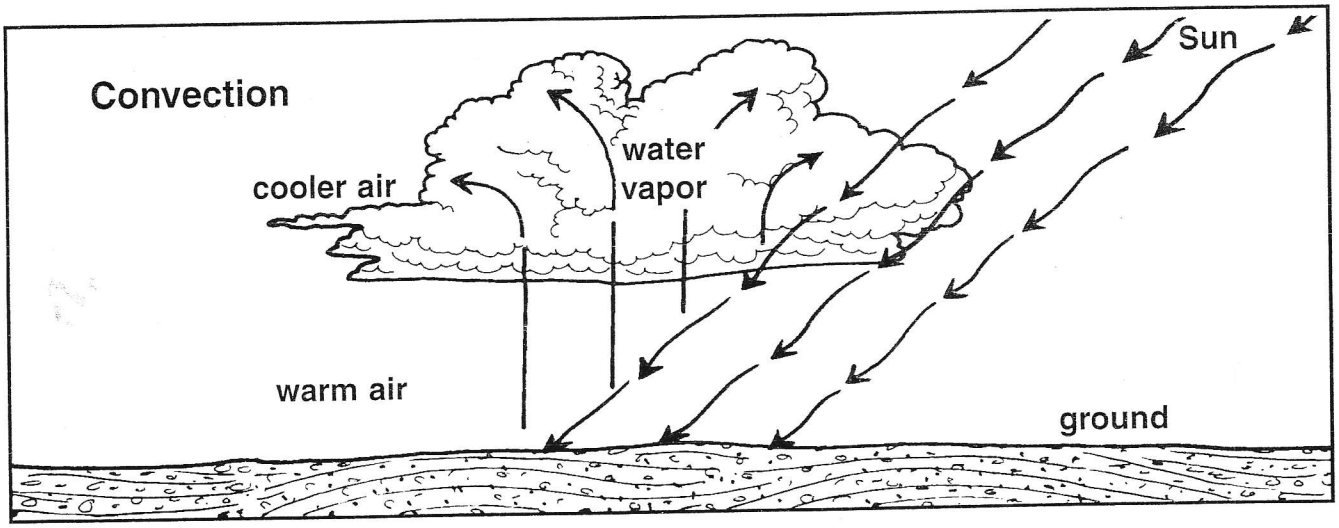
Clouds in the Atmosphere

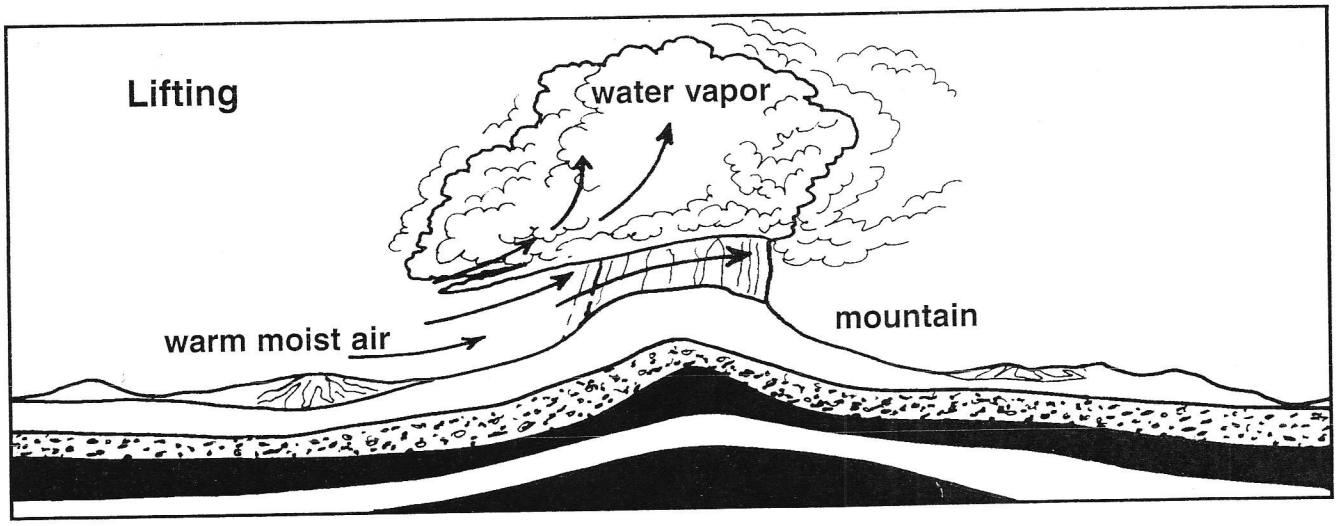
This table illustrates several types of clouds and the heights they can reach in the atmosphere.

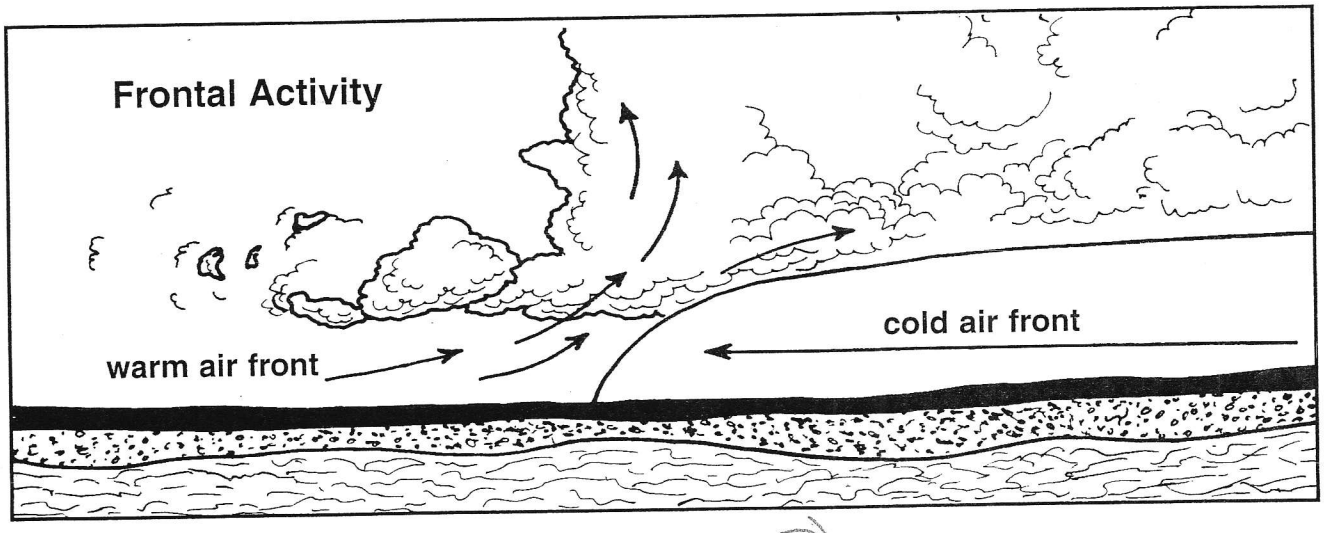


How Are Clouds Formed?

Cloud Formation







5c

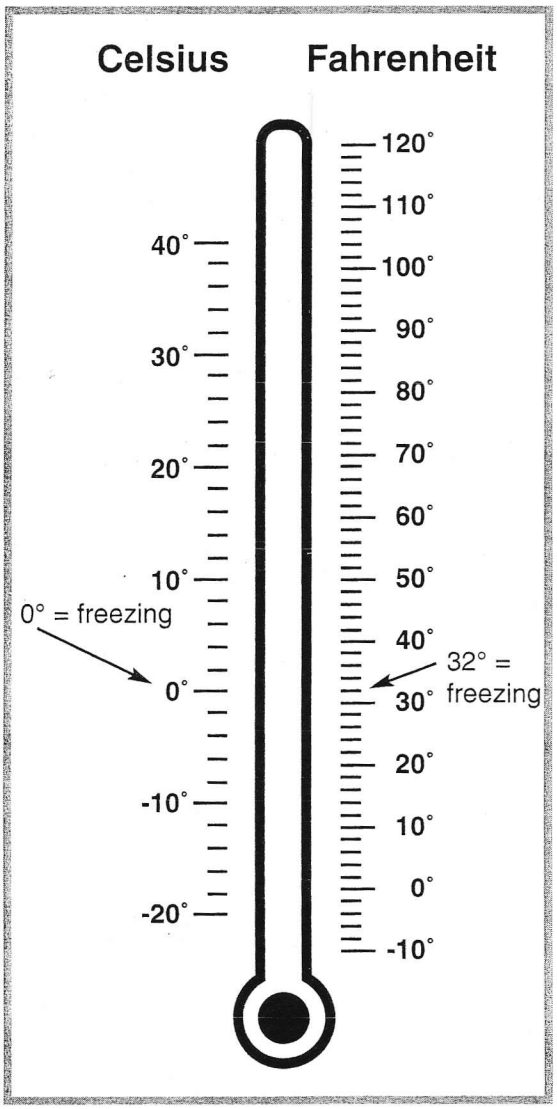
How Do Thermometers Work? *(cont.)*

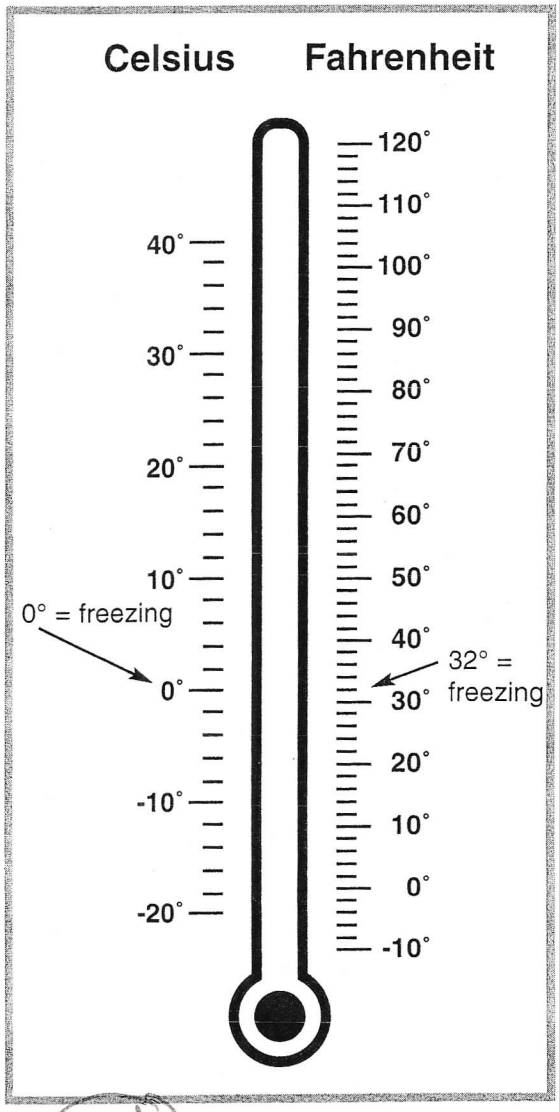
Reading a Thermometer

The temperature on a thermometer is determined by finding the level of the red mercury in the tube and the number on the temperature scale across from it. The temperature is written in numbers with the ° sign. For example, 80° F is read: 80 degrees Fahrenheit.

The **Fahrenheit** scale records the freezing point of pure water at 32° F and the boiling point of water at 212° F (at sea level). The temperature is usually reported in degrees Fahrenheit in newspapers, on the radio, and on television. The normal mouth temperature of the human body is 98.6° F on this scale.

The **Celsius** thermometer records temperatures based on the freezing point of pure water at 0° C and a boiling point of water at 100° C (at sea level). The Celsius thermometer is used in most countries other than the United States because it is part a of a metric system. The Celsius thermometer is usually used by scientists because it is based on a decimal system using multiples of ten. The normal mouth temperature of the human body is 37° C on this scale.





Name _____ Date _____ Class _____

SECTION 2-5 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.

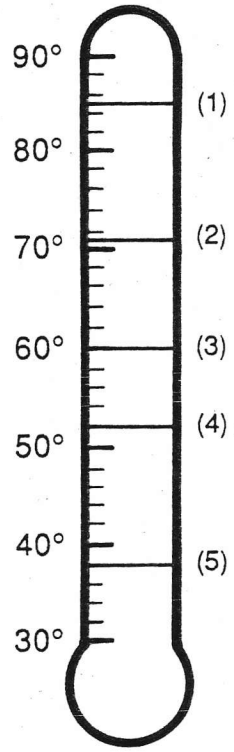
8. _____ is any form of water that falls from clouds and reaches Earth's surface.

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

10. Long periods of low precipitation are called _____.

NAME _____

HOW HOT? HOW COLD?



A. What is the temperature shown by each line?

(1)

(2)

(3)

(4)

(5)

B. Draw a line across the thermometer to show each of the following temperatures. Number each temperature line.

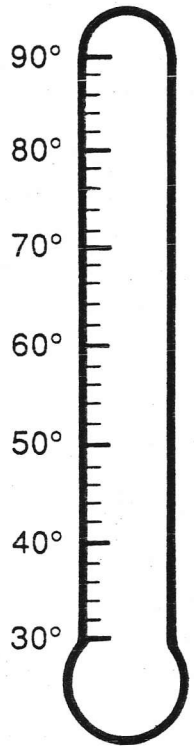
(1) 39°

(2) 44°

(3) 56°

(4) 68°

(5) 80°



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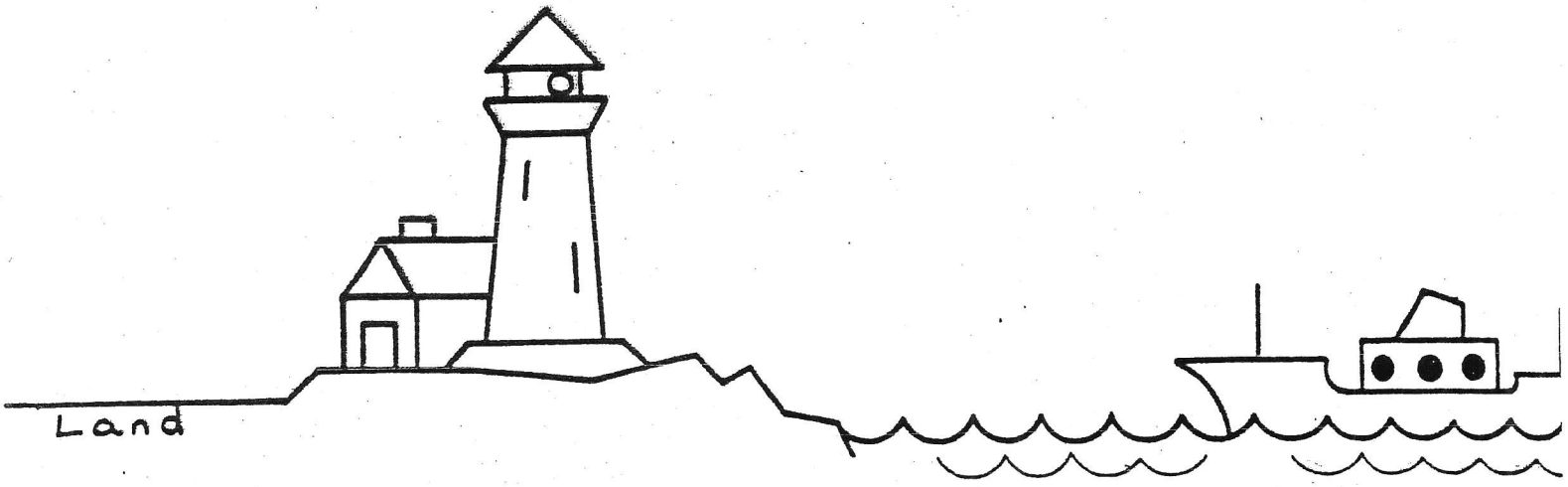
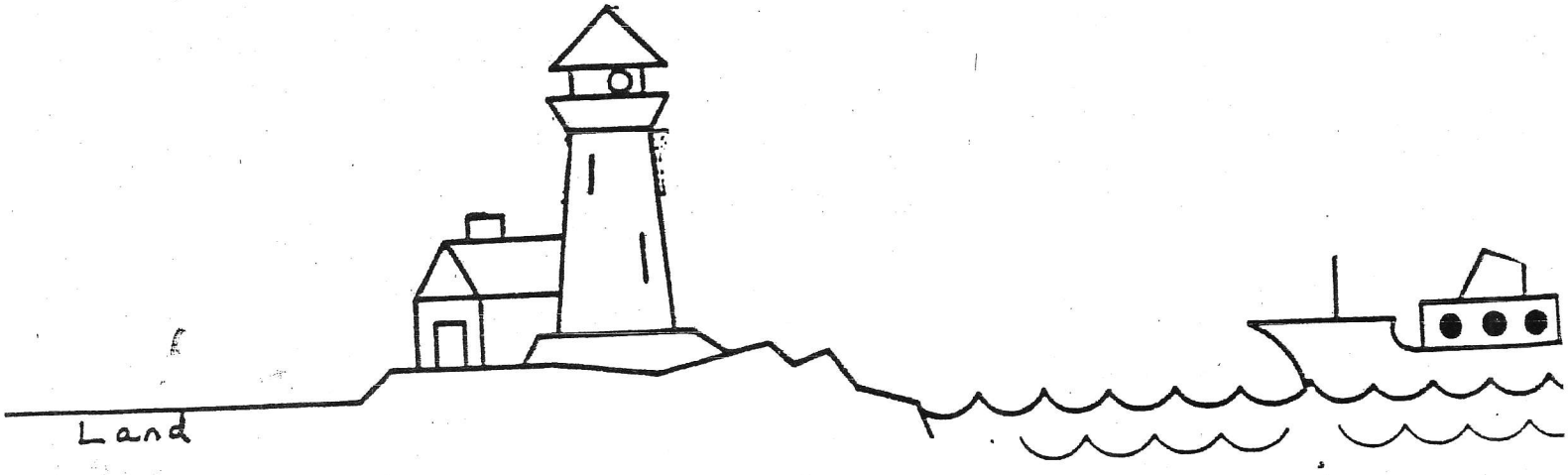
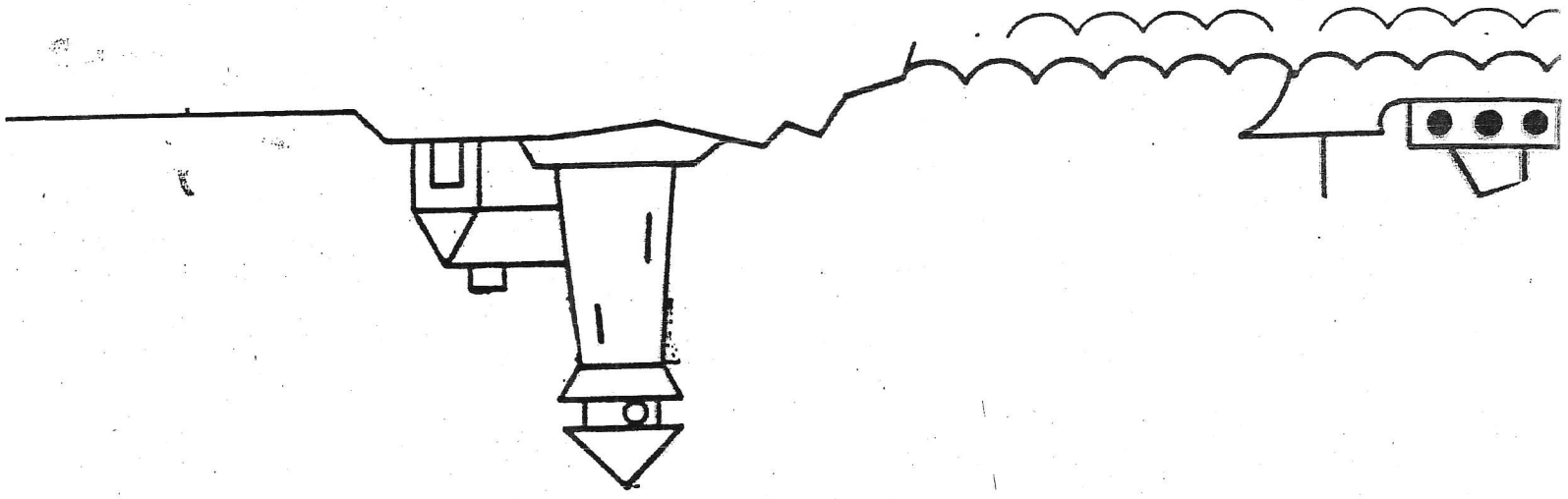
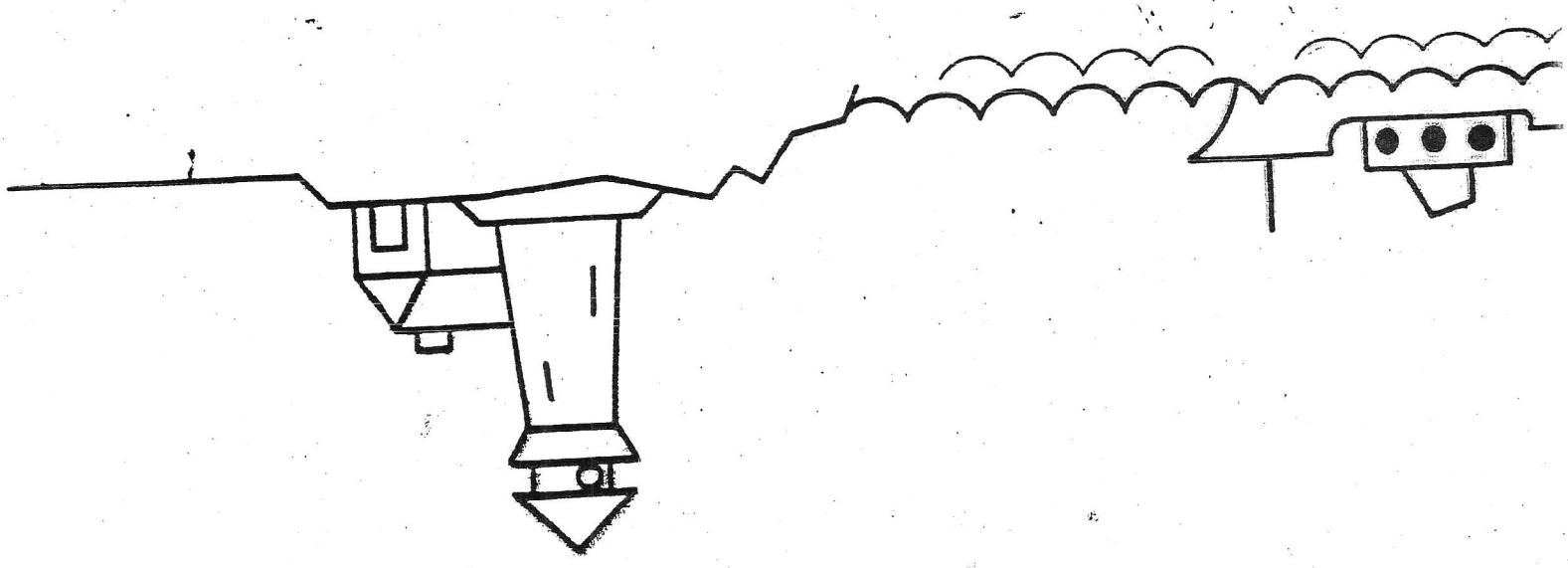

Land


Land

(b)





Hot air over land rises. Cool sea air flows in to take its place.

Warm air over sea rises. Cool land air flows out over the sea.

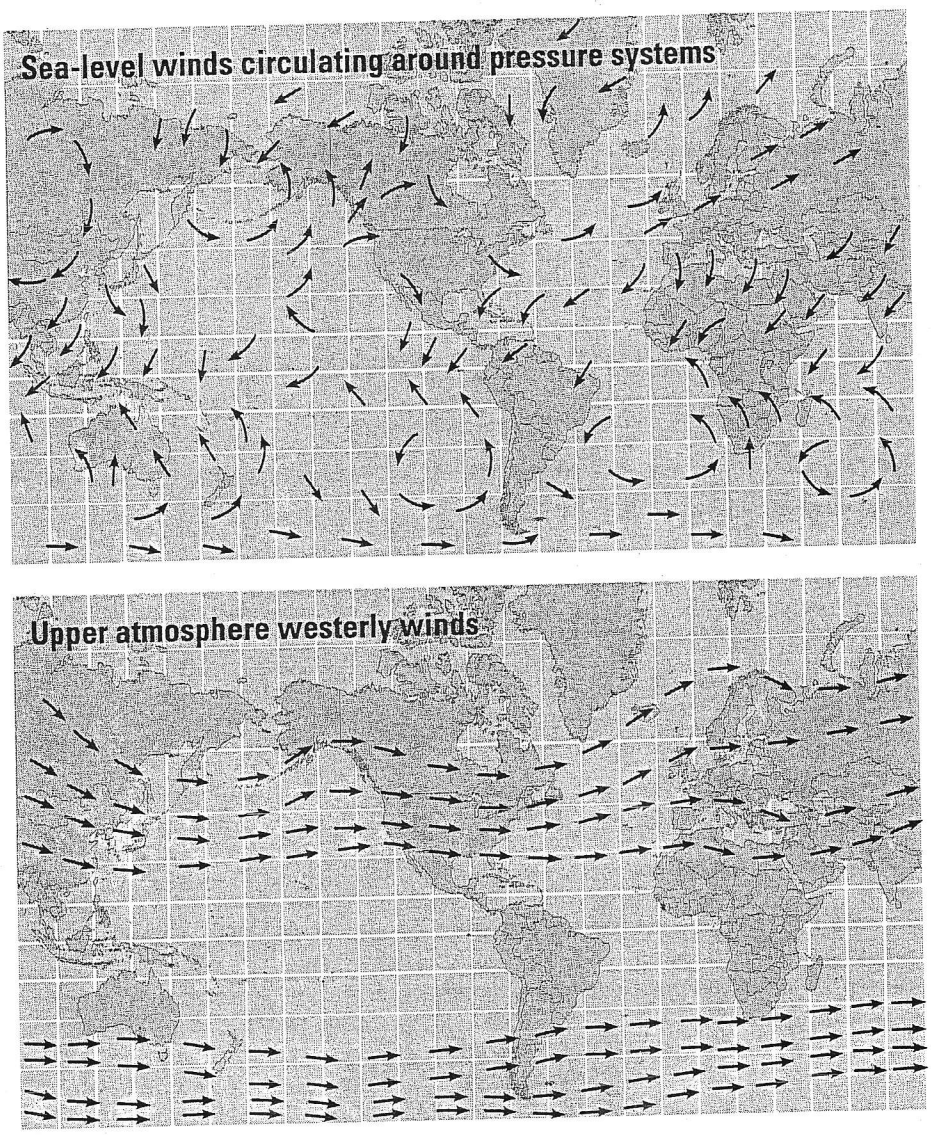
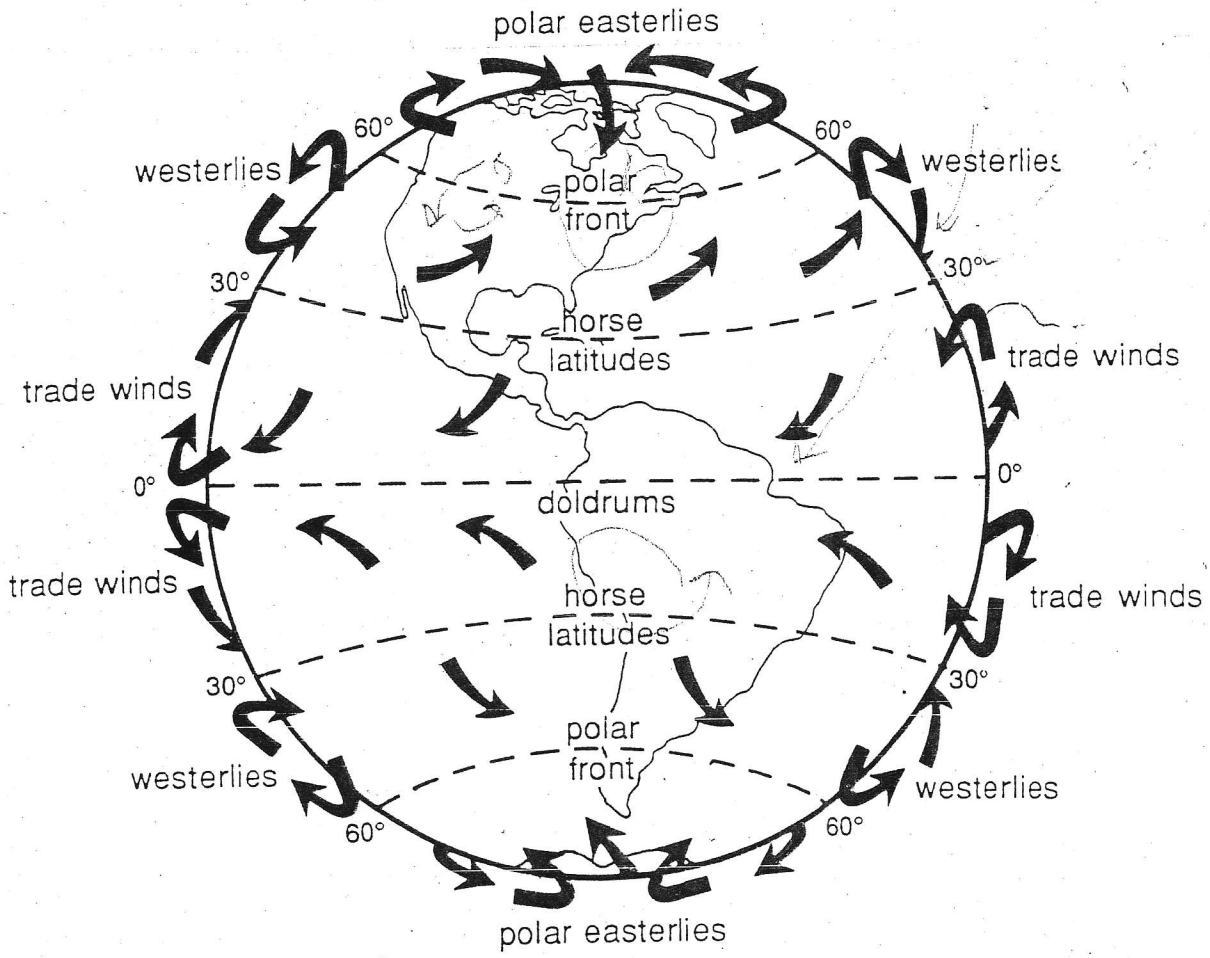


Figure 4-7: Typical patterns of wind and pressure at the surface and aloft.

GLOBAL WIND PATTERNS



The doldrums are near the equator. The air is calm here because there is little change in temperature.

Above the equator the trade winds are steady northeast winds. Below the equator, the trade winds are steady southeast winds.

The horse latitudes are another area of calm. The air is cooling and sinking here.

The westerlies are the prevailing wind over much of the middle and higher latitudes.

The polar front is where the warm air of the westerlies meets the cold air of the polar easterlies. This causes unstable weather in the region where the westerlies prevail.

7. jet streams: global winds

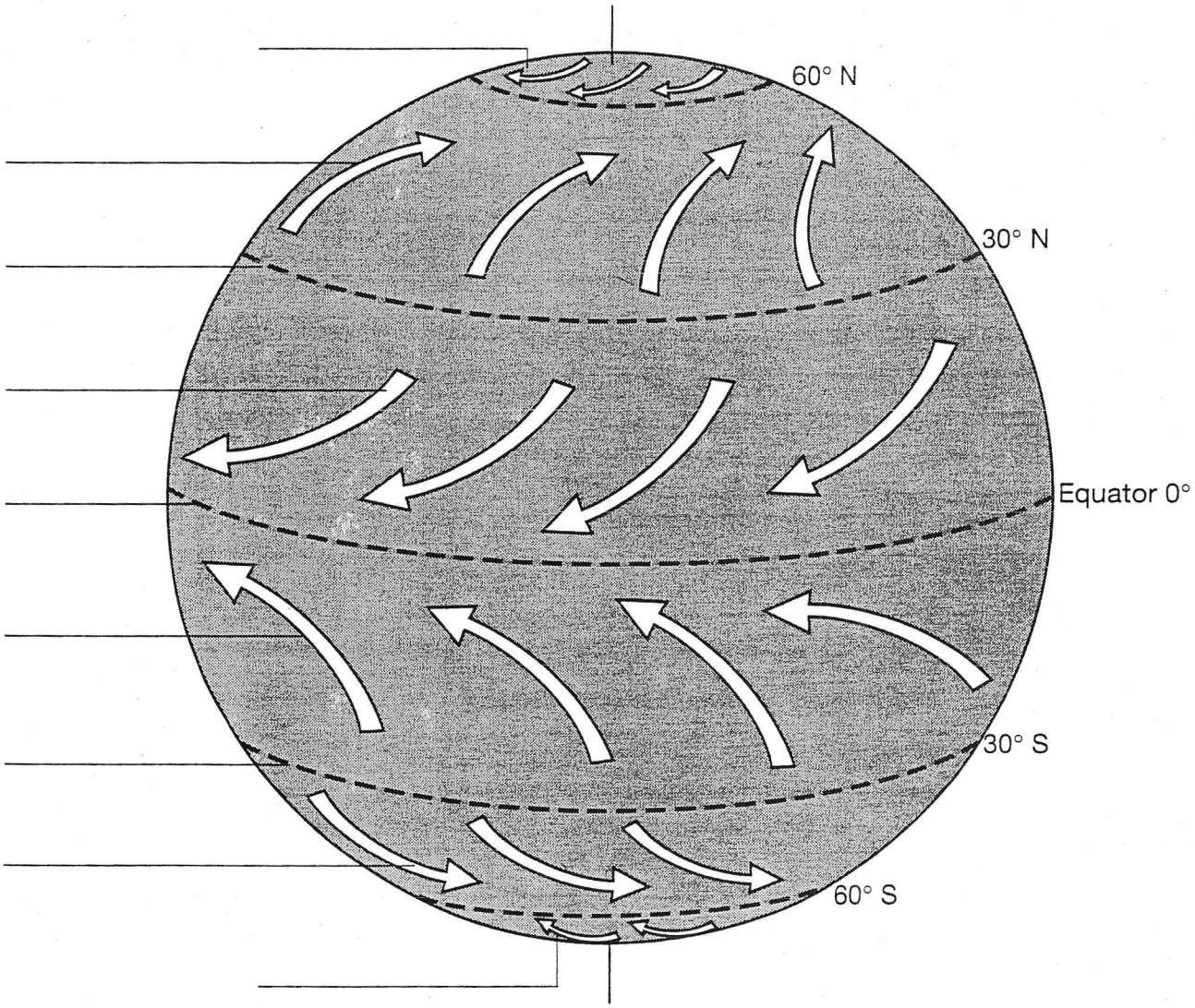
8. wind: air pressure

Global Winds: Understanding the Main Ideas

On the diagram below, label the following:

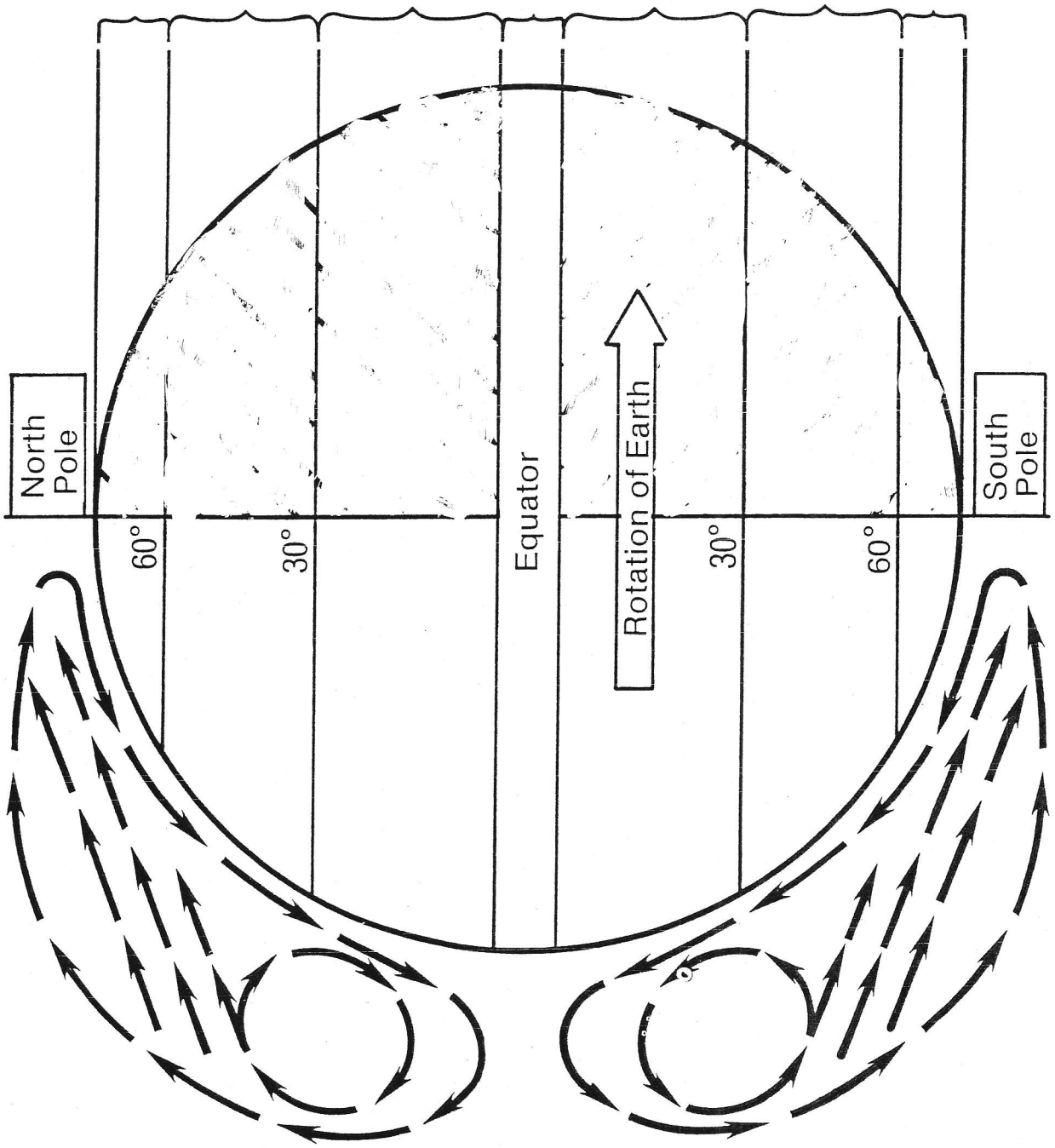
doldrums horse latitudes polar easterlies

prevailing westerlies trade winds



12

How Air Circulates



Air enclosing our planet is set in motion by heat from the sun. As air above the equator becomes heated, it rises and flows off toward the poles. The spinning of the Earth causes wind belts.

Air Currents

Name _____

Name the three air current phenomena pictured below using words from the Word Bank. Then fill in each explanation.

This picture shows: _____

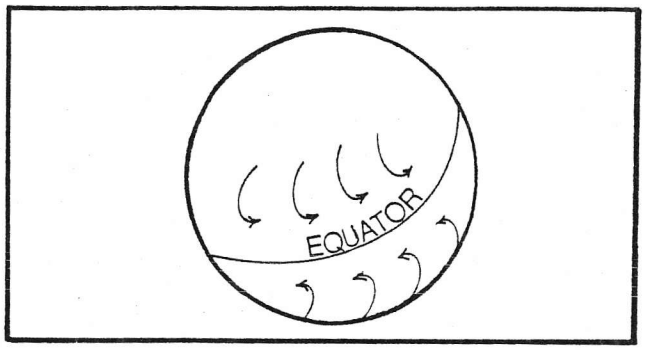
Explanation: _____

_____

_____

_____

_____



This picture shows: _____

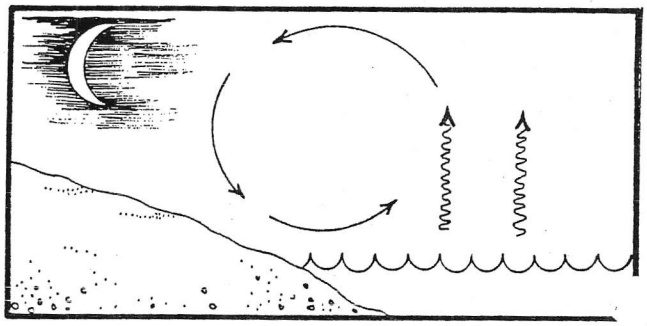
Explanation: _____

_____

_____

_____

_____



This picture shows: _____

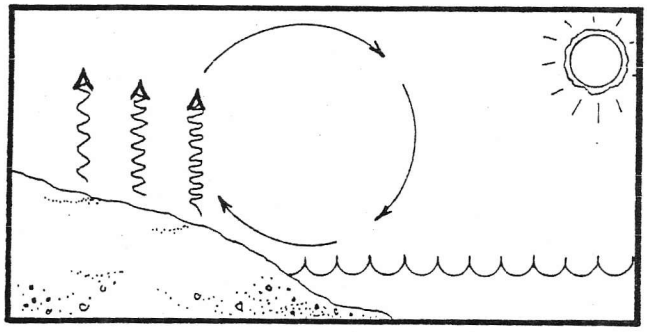
Explanation: _____

_____

_____

_____

_____



WORD BANK

a land breeze
a sea breeze
the Coriolis effect

EXPLANATIONS

The earth's rotation affects the paths of winds.

During day, cooler air from sea replaces warm air over shore.

At night, cool air over shore replaces warm air over sea.

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6 CAUSES OF EVAPORATION AND CONDENSATION

Label each picture as an example of either evaporation or condensation.

1. _____

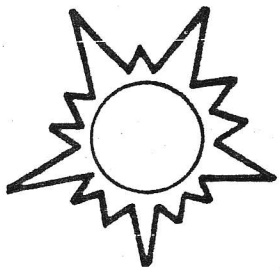
2. _____

3. _____

4. _____

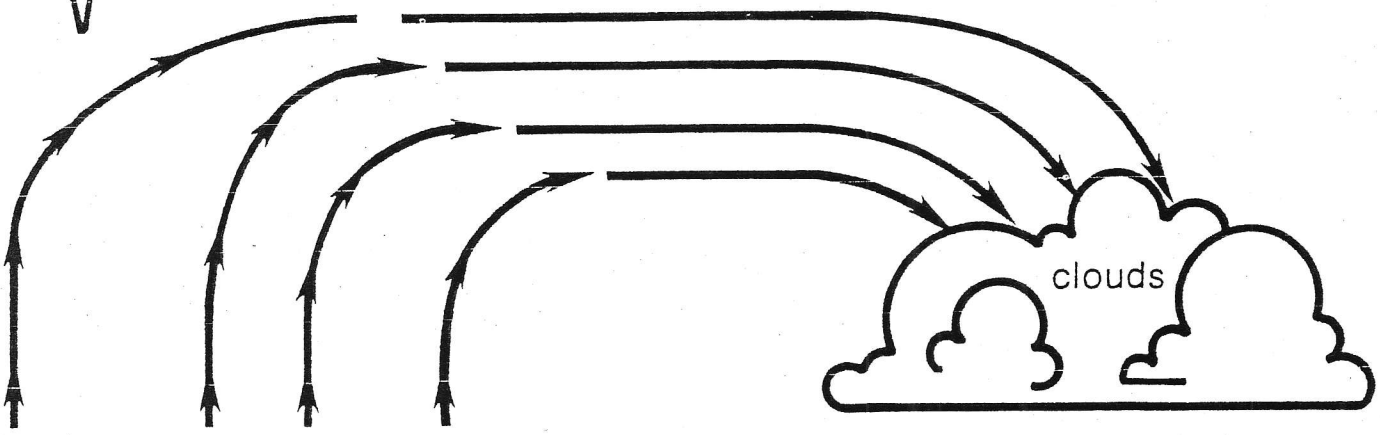
THE WATER CYCLE

WAYS WATER ENTERS AND LEAVES THE ATMOSPHERE



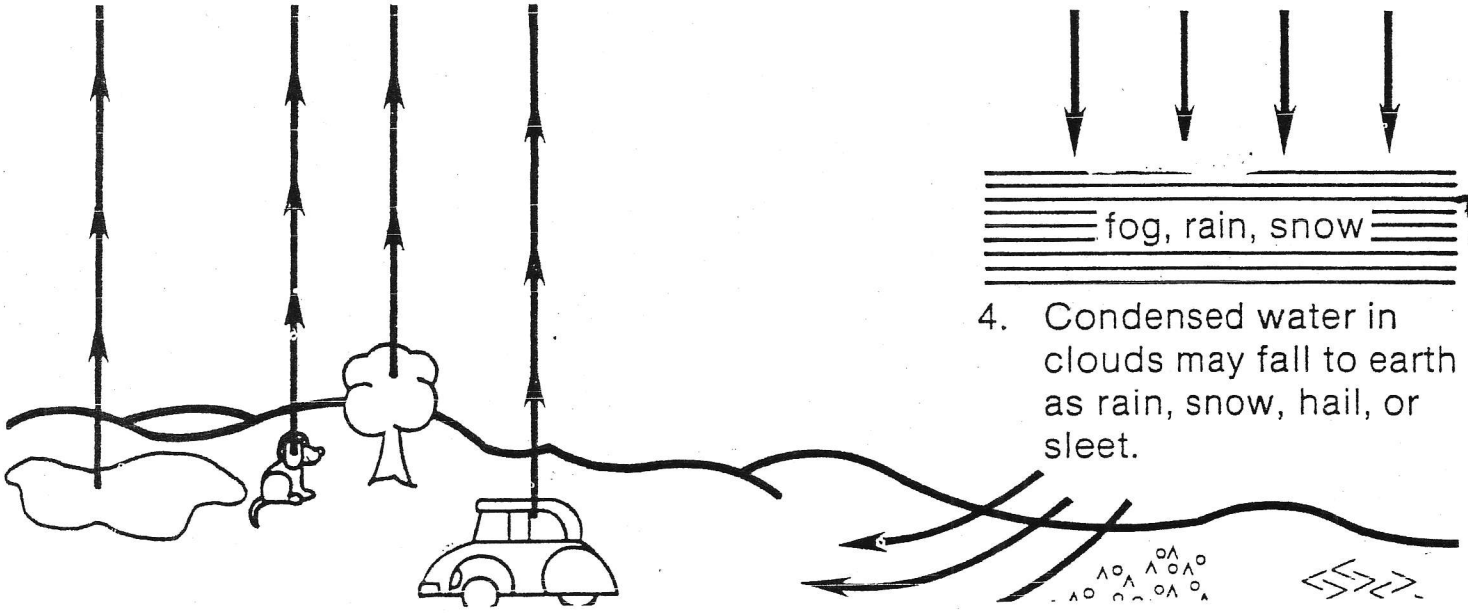
EVAPORATION

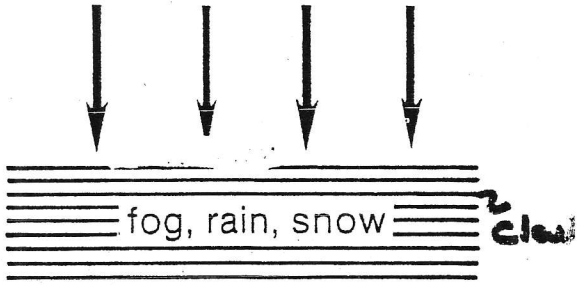
CONDENSATION



2. Vapor is carried up by ascending currents.

3. Vapor condenses in these forms.





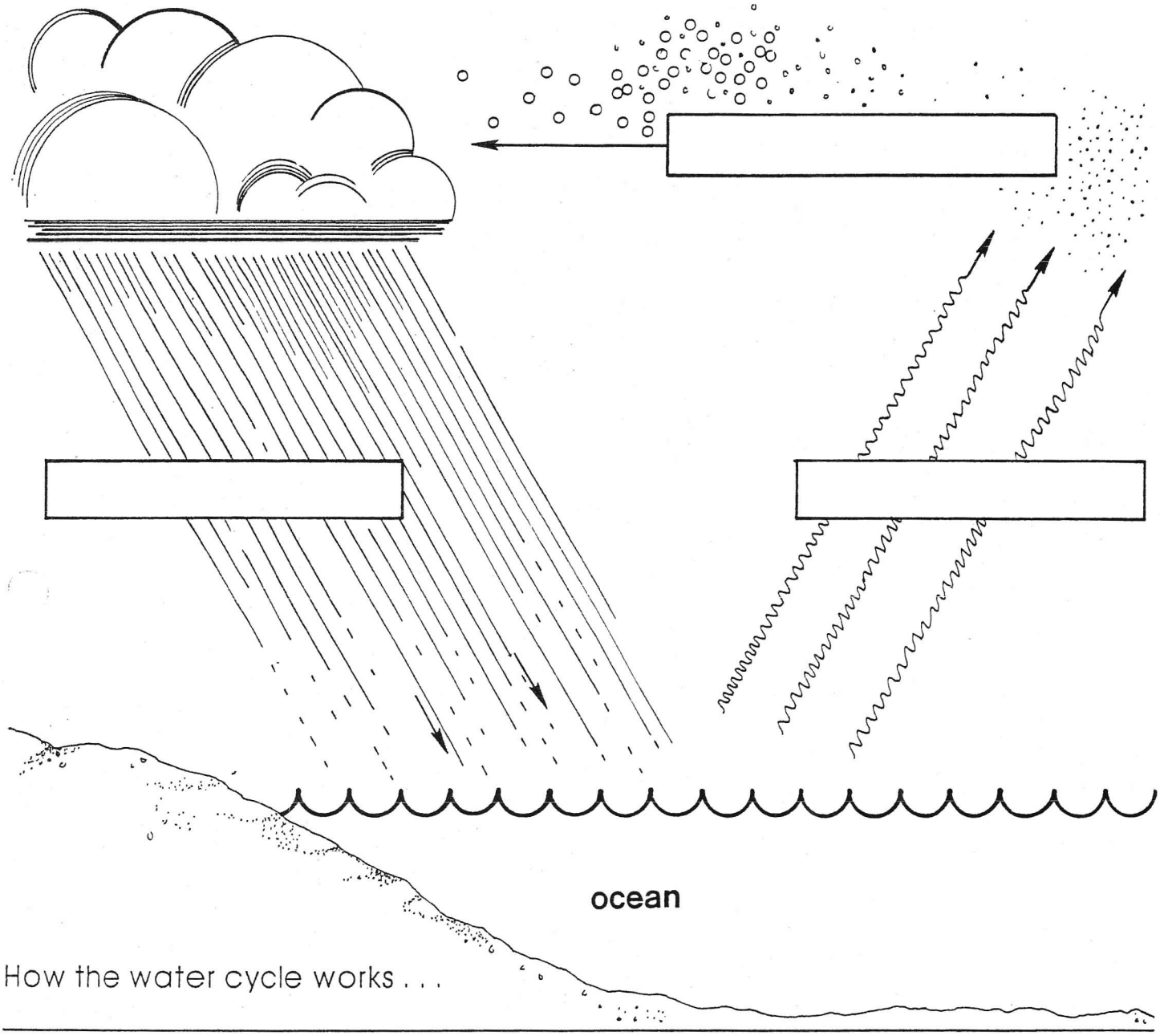
4. Condensed water in clouds may fall to earth as rain, snow, hail, or sleet.

1. Water e
ocear
moi
thi

The Water Cycle

Name _____

The never-ending circulation of the waters of the earth from the oceans, to the air and to the land is called the water cycle. Label the three major steps in the water cycle. Then explain how the water cycle works in your own words.

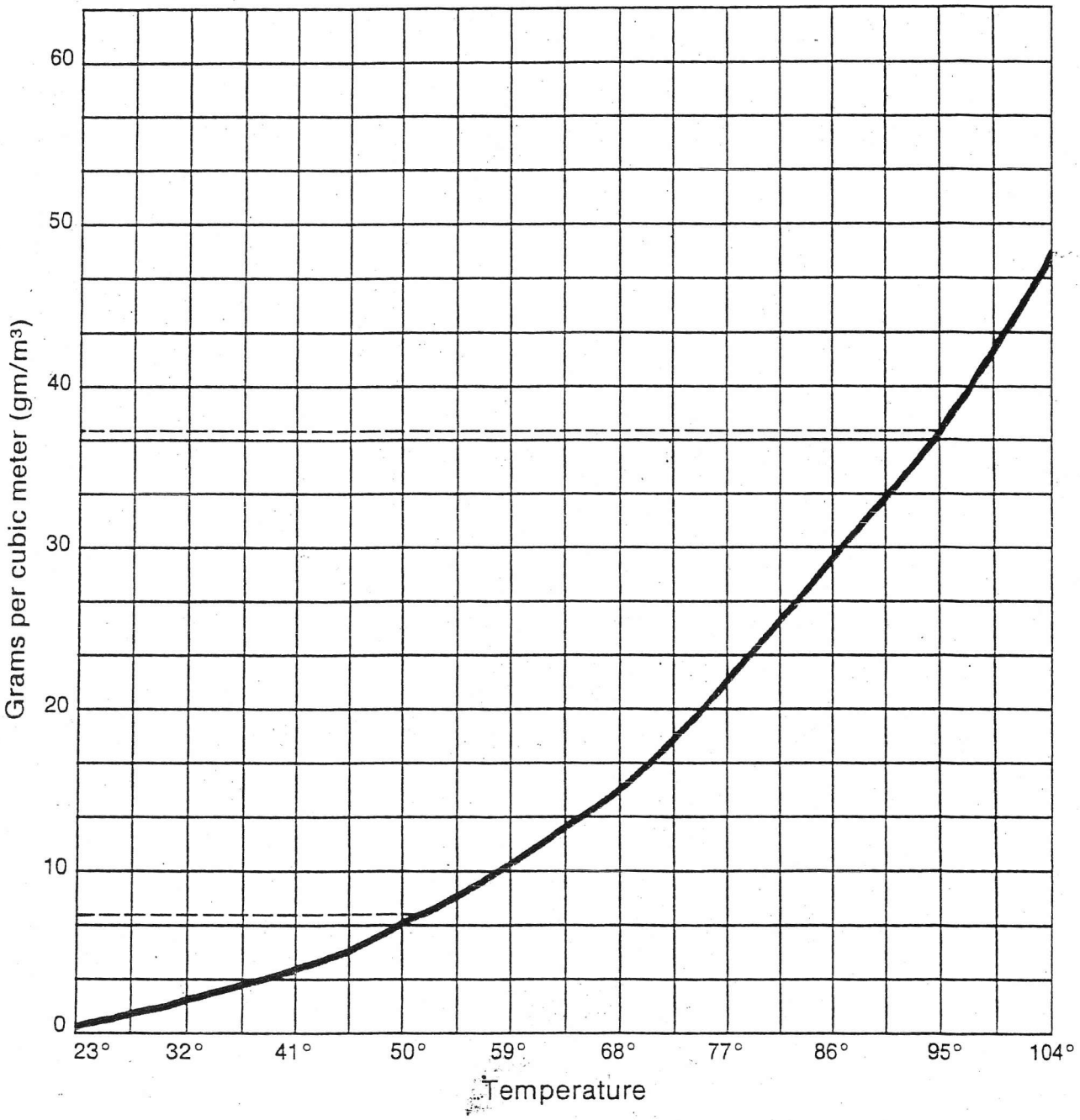


How the water cycle works . . .

WORD BANK

condensation precipitation evaporation

AIR TEMPERATURE AND WATER VAPOR CAPACITY



NAME _____

RELATIVE HUMIDITY

Dry-Bulb Temperatures (° F)

Wet-Bulb Temperatures (° F)	56	58	60	62	64	66	68	70	71	72	73	74	75	76	77	78	79	80	82	84	86	88
38	7	2																				
40	15	11	7																			
42	25	19	14	9	7																	
44	34	29	22	17	13	8	4															
46	45	38	30	24	18	14	10	6	4	3	1											
48	55	47	40	33	26	21	16	12	10	9	7	5	4	3	1							
50	66	56	48	41	34	29	23	19	17	15	13	11	9	8	6	5	4	3				
52	77	67	57	50	43	36	31	25	23	21	19	17	15	13	12	10	9	7	5	3	1	
54	88	78	68	59	51	44	38	33	30	28	25	23	21	19	17	16	14	12	10	7	5	3
56		89	79	68	60	53	46	40	37	34	32	29	27	25	23	21	19	18	14	12	9	7
58			89	79	70	61	54	48	45	42	39	36	34	31	29	27	25	23	20	16	14	11
60				90	79	71	62	55	52	49	46	43	40	38	35	33	31	29	25	21	18	15
62					90	80	71	64	60	57	53	50	47	44	42	39	37	35	30	26	23	20
64						90	80	72	68	65	61	58	54	51	48	46	43	41	36	32	28	25
66							90	81	77	73	69	65	62	59	56	53	50	47	42	37	33	30
68								90	86	82	78	74	70	66	63	60	57	54	48	43	39	35
70									95	91	86	82	78	74	71	67	64	61	55	49	44	40
72											95	91	86	82	79	75	71	68	61	56	50	46
74													96	91	87	83	79	75	69	62	57	51
76															96	91	87	83	76	69	63	57
78																	96	91	84	76	70	64
80																			92	84	77	70
82																				92	84	77
84																					92	85
86																						92

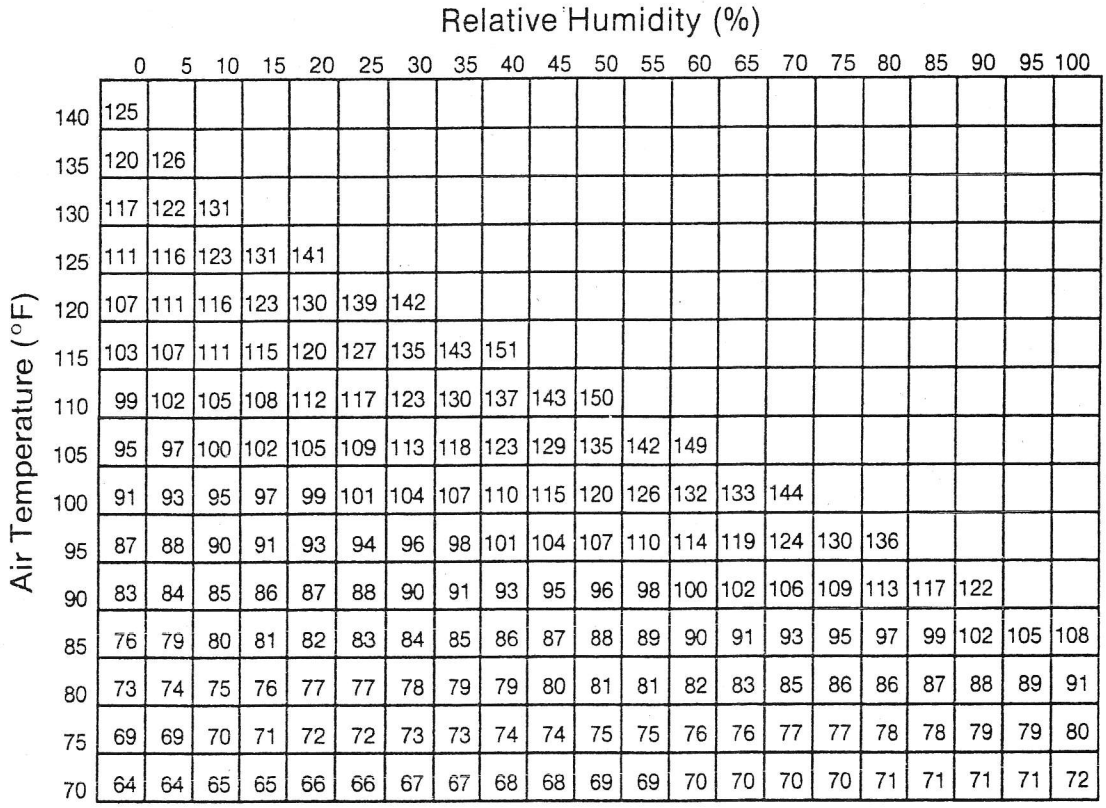
Use the table above to fill in the relative humidity for these readings.

	Wet-Bulb Reading	Dry-Bulb Reading	Relative Humidity
1.	60°	70°	____ %
2.	46°	70°	____ %
3.	70°	82°	____ %
4.	80°	82°	____ %

5. At which humidity reading of the four above would it be driest? _____

6. At which reading of the four above would you expect rain soon? _____

HEAT INDEX



Heat Index	Possible Heat Disorders for People in Higher-Risk Groups
130° or higher	Heatstroke or sunstroke highly likely with continued exposure
105°–130°	Sunstroke, heat cramps, or heat exhaustion likely, and heat-stroke possible with prolonged exposure or physical activity
90°–105°	Sunstroke, heat cramps, and heat exhaustion possible with prolonged exposure or physical activity
80°–90°	Fatigue possible with prolonged exposure or physical activity

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