Name _____ Class _____ Date _____ 66 points total

Chapter 18 Moisture, Clouds, and Precipitation

Section 18.1 Water in the Atmosphere

21 points

Obtain a psychrometer in order to measure the relative humidity.

Use the table at the right to calculate the relative humidity in the classroom.
Record here: _____

2pts

Measure the relative humidity outside.
Record here: _____

RELATIVE HUMIDITY TABLE

Dry bulb	Difference between wet and dry bulb readings in Celsius degrees									
C	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
3	84	69	54	40	26	12				
4	85	70	56	42	29	16	3			
5	86	72	58	45	32	19	7			
6	86	73	60	47	35	23	11			
7	87	74	61	49	37	26	14	3		
8	87	75	63	51	39	28	18	7		
9	88	76	64	53	42	31	21	11	1	
10	88	77	66	55	44	34	24	15	6	
11	89	78	67	56	46	36	27	18	9	
12	89	78	68	58	48	39	29	21	12	
13	89	79	69	59	50	41	32	22	15	7
14	90	79	70	60	51	42	24	25	18	10
15	90	80	71	61	53	44	26	27	20	13
16	90	81	71	63	54	46	28	30	23	15
17	90	81	72	64	55	47	40	32	25	18
18	91	82	73	65	57	49	41	34	27	20
19	91	82	74	65	58	50	43	36	29	22
20	91	83	74	67	59	53	46	39	32	26
21	91	83	75	67	60	53	46	39	32	26

1. Circle the letter of the most important gas in atmospheric processes.

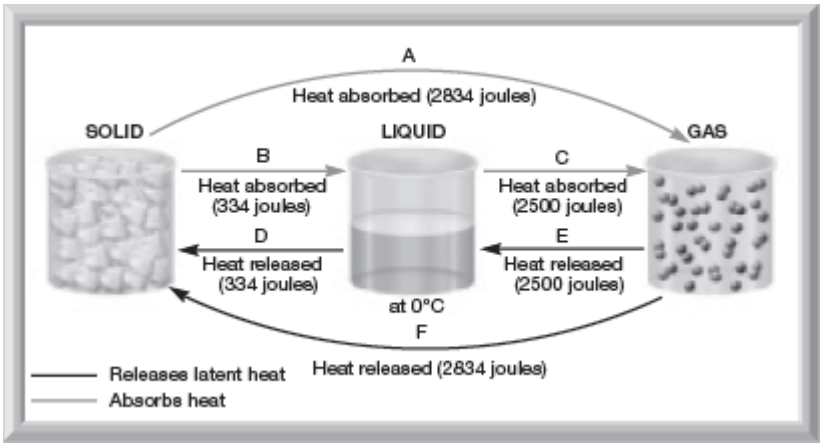
a. oxygen
b. nitrogen
c. water vapor
d. carbon dioxide

Water's Changes of State

2. Select the appropriate letter in the figure that identifies each of the following changes of state.

6pts

_____ sublimation
_____ deposition
_____ condensation
_____ freezing
_____ evaporation
_____ melting



3. For each change of state, write the opposite change of state.

3pts

a. condensation: _____

b. freezing: _____

c. deposition: _____

4. The heat absorbed or released during a change of state is called _____

Humidity

5. Is the following sentence true or false? Saturated warm air contains more water vapor than saturated cold air.

_____

6. What is the difference between humidity and relative humidity?

_____

_____

_____

_____

Match each situation to its change in relative humidity.

Situation	Change in Relative Humidity
_____ **7.** Water vapor is added.	a. increases
_____ **8.** Air temperature decreases.	b. no change
_____ **9.** Water vapor is removed.	c. decreases
_____ **10.** Air temperature increases.	

11. When a parcel of air is cooled to the temperature at which it is saturated, it has reached its _____

12. Circle the letter of the factor that a hygrometer is used to measure.

a. humidity

b. relative humidity

c. temperature

d. latent heat

13. A sling psychrometer works because the amount of cooling that occurs in the wet bulb is directly proportional to the _____ of the air.

14. What happens when air that has reached its dew point is cooled further? _____

_____

_____

Name _____ Class _____ Date _____

Section 18.2 Cloud Formation

27 points

This section explains what happens when air is compressed and expanded. It also describes processes that lift air, how stable and unstable air behaves, and how condensation occurs.

Reading Strategy

As you read, write the main idea for each topic in the table below. For more information on this Reading Strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.

2pts

Topic	Main idea
Adiabatic temperature changes	a.
Stability measurements	b.
Degrees of stability	c.

3pts

Air Compression and Expansion

1. When a parcel of air is allowed to expand, it _____.

2. Why does a parcel of air expand as it rises upward through the atmosphere?

_____

_____

3. Is the following sentence true or false? The rate of heating or cooling of saturated air is the dry adiabatic rate.

_____

4. When a parcel of air reaches it dew point, the process of _____ begins.

5. After a parcel of air rises past the condensation level, the rate of cooling decreases because of the release of latent _____.

Processes That Lift Air

6. List four mechanisms that can cause air to rise.

4pts

_____

_____

7. Complete the table below.

Processes That Lift Air		
Process	**Cause of Lifting**	**Typical Resulting Weather Pattern**
Orographic lifting	mountains block airflow	
Frontal wedging		clouds and rain
Convergence		
Localized convective lifting		

6pts

8. What causes a rain shadow desert? _____

_____

_____

_____

9. A(n) _____ is produced when two air masses collide.

10. Is the following sentence true or false? Localized convective lifting produces thermals that lift birds to great heights.

_____

Stability

11. A parcel of air that is less dense than the surrounding air is _____ and will tend to rise.

12. Is the following sentence true or false? Unstable air tends to remain in its original position. _____

13. Circle the letter of the sentence that best describes a temperature inversion.

a. Air temperature increases with height.
b. Air temperature decreases with height.
c. Low-altitude air is unstable.
d. High-altitude air is unstable.

14. Clouds associated with lifting of _____ air often produce thunderstorms.

Condensation

15. For condensation to occur, air must be _____.

16. Is the following sentence true or false? Above the ground, tiny particles called condensation nuclei serve as surfaces for water-vapor condensation. _____

Name _____ Class _____ Date _____

Section 18.3 Cloud Types and Precipitation

18 points

This section describes different types of clouds, including fog. It also explains how precipitation forms and describes different types of precipitation.

Reading Strategy

As you read, add definitions for the vocabulary terms. For more information on this Reading Strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.

4pts

Vocabulary Term	Definition
Cirrus	a.
Cumulus	b.
Stratus	c.
Coalescence	d.

Types of Clouds

1. Is the following sentence true or false? Clouds are classified based on form and height. _____
2. The three types of _____ clouds are cirrus, cirrostratus, and cirrocumulus.
3. Which photograph shows cumulus clouds? _____
4. Which photograph shows cirrus clouds? _____

A.

B.

5. How can you tell from the name of a cloud if it is a middle-range cloud?

_____

_____

_____

6. Circle the letter of each cloud type that is a low cloud.

a. stratus
b. altostratus
c. stratocumulus
d. nimbostratus

Fog

7. Define *fog*. _____

_____

_____

8. Is the following sentence true or false? Fogs can be formed by cooling or by evaporation. _____

How Precipitation Forms

9. What must happen for precipitation to form? _____

_____

10. Formation of precipitation in cold clouds is called the _____ process.

11. Is the following sentence true or false? In warm clouds, raindrops form by the Bergeron process. _____

12. Circle the letter of the word that describes water in the liquid state below 0ºC.

a. supersaturated
b. coalesced
c. saturated
d. supercooled

Forms of Precipitation

Match each description with its form of precipitation.

	Description	Form of Precipitation
_____	**13.** small particles of ice	a. hail
_____	**14.** drops of water that fall from a cloud and have a diameter of at least 0.5 mm	b. sleet c. rain
_____	**15.** ice pellets with multiple layers	