

NAME \_\_\_\_\_

DATE \_\_\_\_\_

### Chapter 3 - The Atmosphere

### Unit: Water & The Atmosphere

Definitions:

#### 3.1 – The Air Around You – pages 74-77

1. Weather – \_\_\_\_\_  
\_\_\_\_\_
2. Atmosphere – \_\_\_\_\_  
\_\_\_\_\_
3. Water Vapor – \_\_\_\_\_  
\_\_\_\_\_
4. The amount of \_\_\_\_\_ in the air varies greatly from place to place and time to time.
5. Gases in air that are present in very small amounts are called \_\_\_\_\_ gases.
6. Earth is surrounded by an envelope of gases called the \_\_\_\_\_.
7. Clouds form when water vapor \_\_\_\_\_ out of the air.
8. The term used to describe the condition of Earth's atmosphere at a given place or time is \_\_\_\_\_.
9. More than three fourths of the air we breathe is \_\_\_\_\_.
10. \_\_\_\_\_ is the second most abundant gas in air. It takes up \_\_\_\_\_% of the atmosphere.
11. Plants need \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ to produce food through the process called \_\_\_\_\_.
12. Without \_\_\_\_\_ in the air, a fire will not burn.
13. When fuels such as coal and gasoline are burned they release \_\_\_\_\_ into the air.
14. Energy from the \_\_\_\_\_ drives the motions in the atmosphere.
15. Dust, smoke, salt, and chemicals are all examples of \_\_\_\_\_ in the air.

**3.2 – Air Pressure – pages 78-83**

1. Density – \_\_\_\_\_  
\_\_\_\_\_
2. Air Pressure – \_\_\_\_\_  
\_\_\_\_\_
3. Barometer – \_\_\_\_\_  
\_\_\_\_\_
4. Mercury Barometer – \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
5. Aneroid Barometer – \_\_\_\_\_  
\_\_\_\_\_
6. Altitude – \_\_\_\_\_  
\_\_\_\_\_
7. To calculate the density of a substance divide its mass by its \_\_\_\_\_.
8. The higher the altitude, the \_\_\_\_\_ the air pressure.
9. Most weather reports for the general public use \_\_\_\_\_ as units of air pressure.
10. As altitude increases, the density of the air \_\_\_\_\_.
11. Air pressure is the result of the \_\_\_\_\_ of a column of air pushing on an area.
12. Air pressure doesn't crush you because molecules in air push \_\_\_\_\_.
13. Air pressure at sea level is \_\_\_\_\_ than air pressure at the top of a mountain.
14. Two instruments used to measure air pressure are the mercury barometer and the \_\_\_\_\_.
15. When air pressure increases, the liquid in a mercury barometer \_\_\_\_\_.
16. An aneroid barometer does not use \_\_\_\_\_.
17. The amount of mass in a given volume of air is its \_\_\_\_\_.
18. Density of the air is greater/less at the bottom of a mountain than at the top.  
(circle one)

### 3.3 – Layers of the Atmosphere – pages 84-89

1. Troposphere – \_\_\_\_\_  
\_\_\_\_\_
2. Stratosphere – \_\_\_\_\_  
\_\_\_\_\_
3. Mesosphere – \_\_\_\_\_  
\_\_\_\_\_
4. Thermosphere – \_\_\_\_\_  
\_\_\_\_\_
5. Ionosphere – \_\_\_\_\_  
\_\_\_\_\_
6. Exosphere – \_\_\_\_\_  
\_\_\_\_\_
7. The troposphere is thickest over the \_\_\_\_\_.
8. Water forms thin, feathery clouds of ice at the top of the \_\_\_\_\_.
9. The upper stratosphere is warmer/cooler than the lower stratosphere. (circle one)
10. Weather occurs in the \_\_\_\_\_.
11. The \_\_\_\_\_ contains the ozone layer.
12. The \_\_\_\_\_ is the lower layer of the thermosphere.
13. Most meteoroids burn up in the \_\_\_\_\_.
14. The middle layer of Earth's atmosphere is the \_\_\_\_\_.
15. The upper region of the stratosphere is warm because energy from the sun is absorbed by the \_\_\_\_\_.
16. The exosphere is the outer layer of the \_\_\_\_\_, so the \_\_\_\_\_ has no definite outer limit.
17. The \_\_\_\_\_ contains almost all the mass of the atmosphere.
18. The \_\_\_\_\_ is thicker over the equator than over the poles.
19. The lower layer of the thermosphere is the \_\_\_\_\_.
20. The \_\_\_\_\_ has temperatures that reach 1800 degrees Celsius.

### 3.4 – Energy in Earth’s Atmosphere - pages 90-95

1. Electromagnetic waves – \_\_\_\_\_  
\_\_\_\_\_
2. Radiation – \_\_\_\_\_  
\_\_\_\_\_
3. Infrared radiation – \_\_\_\_\_  
\_\_\_\_\_
4. Ultraviolet radiation – \_\_\_\_\_  
\_\_\_\_\_
5. Scattering - \_\_\_\_\_  
\_\_\_\_\_
6. Greenhouse effect - \_\_\_\_\_  
\_\_\_\_\_
7. Sunburn can result from exposure to \_\_\_\_\_ radiation.
8. Red light has a \_\_\_\_\_ wavelength than violet light.
9. A natural process called \_\_\_\_\_ holds heat in Earth’s atmosphere.
- 10 ..\_\_\_\_\_ occurs when particles & gases in the atmosphere disperse light in all directions.
11. Energy from the sun travels to Earth in the form of \_\_\_\_\_.
12. About 50 percent of the sun’s energy that reaches Earth is \_\_\_\_\_ by land and water, which becomes heated.
13. Electromagnetic waves are classified according to \_\_\_\_\_.
14. Visible light with the shortest/longest wavelengths are red and orange light. (circle one)
15. Infrared radiation is invisible/visible to humans. (circle one)
16. During the day, the sky appears blue because of \_\_\_\_\_.
17. As it passes through the atmosphere, some \_\_\_\_\_ radiation is absorbed by the ozone layer.
18. Some ultraviolet radiation is absorbed by \_\_\_\_\_ in the upper stratosphere.
19. The direct transfer of energy by electromagnetic waves is called \_\_\_\_\_.
20. Electromagnetic waves are classified by the \_\_\_\_\_.
21. Scattered light look like the color \_\_\_\_\_ compared to ordinary sunlight.
22. List the layers of the atmosphere beginning with the one closest to earth.

Remember: “**T**wo **S**illy **M**onkeys **T**hrew **E**ggs”

### 3.5 – Heat Transfer – pages 96-99

1. Temperature – \_\_\_\_\_  
\_\_\_\_\_
2. Thermal energy – \_\_\_\_\_  
\_\_\_\_\_
3. Thermometer – \_\_\_\_\_  
\_\_\_\_\_
4. Heat – \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
5. Convection – \_\_\_\_\_  
\_\_\_\_\_
6. Conduction – \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
7. Convection currents – \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
8. The transfer of heat between two substances that are in direct contact is called \_\_\_\_\_.
9. Heat transfers well through \_\_\_\_\_, but not as well through \_\_\_\_\_ & \_\_\_\_\_.
10. \_\_\_\_\_ measures the total energy of the particles in a substance. A large item would have more/less thermal energy than a smaller item made out of the same material.
11. The transfer of heat by the movement of a fluid is called \_\_\_\_\_.
12. The average amount of energy of motion of each particle of a substance is called \_\_\_\_\_.
13. Radiation is the direct transfer of energy by \_\_\_\_\_.
14. Only the first few meters of the troposphere are heated by \_\_\_\_\_.
15. In the troposphere, heat is transferred mostly by \_\_\_\_\_.
16. Heat transferred from the sun to earth is called \_\_\_\_\_.
17. Conduction works best in some \_\_\_\_\_.
18. Air temperature is usually measured with a \_\_\_\_\_.
19. Upward movement of warm air & downward movement of cool air form a \_\_\_\_\_.
20. The \_\_\_\_\_ the molecules in a substance are, the better they conduct heat.

21. Complete the Celsius and Fahrenheit chart below.

	° Celsius	° Fahrenheit
Water Freezes		
Room Temperature		
Water Boils		

**3-6 Winds – pages 100-107**

1. Wind – \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Anemometer – \_\_\_\_\_  
\_\_\_\_\_

3. Windchill factor - \_\_\_\_\_  
\_\_\_\_\_

4. Local Winds - \_\_\_\_\_  
\_\_\_\_\_

5. Sea Breeze - \_\_\_\_\_  
\_\_\_\_\_

6. Land breeze - \_\_\_\_\_  
\_\_\_\_\_

7. Global Winds - \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

8. Coriolis effect - \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

9. Latitude - \_\_\_\_\_  
\_\_\_\_\_

10. If the Earth did not rotate, global winds would follow a(n) \_\_\_\_\_ path.

11. Trade winds blow from the horse latitudes toward the \_\_\_\_\_.

12. The two qualities used to describe winds are \_\_\_\_\_ and speed.

13. A local wind that blows during the day from an ocean toward land is a(n) \_\_\_\_\_.

14. The increase in cooling that wind can cause is called the \_\_\_\_\_.
15. Temperature differences between the equator and poles produce \_\_\_\_\_ currents.
16. How does heating air affect its density and pressure?  
\_\_\_\_\_
17. What are two types of local winds?  
\_\_\_\_\_
18. Describe the movement of air over two nearby land areas, one of which is heated more than the other.  
\_\_\_\_\_  
\_\_\_\_\_
19. What causes local winds to form?  
\_\_\_\_\_  
\_\_\_\_\_
20. Identify where the sun's rays strike Earth most directly and least directly.  
\_\_\_\_\_  
\_\_\_\_\_
21. What is a doldrum? \_\_\_\_\_

**Study Guide:**

**3.1 – The Air Around You - pages 74-77**

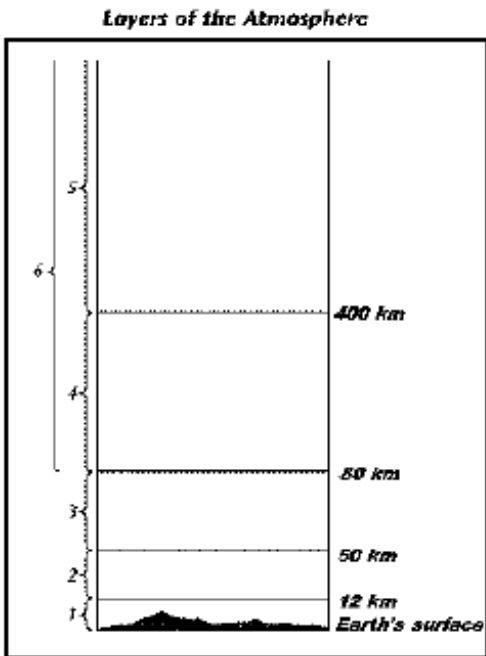
1. \_\_\_\_\_ and \_\_\_\_\_ make up 99% of dry air.  
\_\_\_\_\_ make up most of the other 1%.
2. \_\_\_\_\_ makes up less than 1% of the atmosphere, and is created when fuel such as coal and gasoline are burned.
3. Give examples of the atmosphere acting as a system.
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_
  - d. \_\_\_\_\_

**3.2 – Air Pressure – pages 78-83**

4. If a given volume of air has less mass, the less/more dense the air. (circle one)
5. \_\_\_\_\_ are instruments used to measure air pressure.
6. The higher in the atmosphere you go, \_\_\_\_\_ will decrease.
7. Dry air is 78% \_\_\_\_\_ and 21% \_\_\_\_\_.

**3.3 – Layers of the Atmosphere - pages 84-89**

8. The \_\_\_\_\_ is the layer of the atmosphere where weather occurs.
9. \_\_\_\_\_ live in the troposphere.



Identify the layers of the atmosphere on the drawing.

6. \_\_\_\_\_
5. \_\_\_\_\_
4. \_\_\_\_\_
3. \_\_\_\_\_
2. \_\_\_\_\_
1. \_\_\_\_\_

10. The ozone layer is in the \_\_\_\_\_.
11. The \_\_\_\_\_ is the third layer of the atmosphere. Its outer part is cold approximately \_\_\_\_\_ ° Celsius. It protects the earth from \_\_\_\_\_ because they burn up.

**3.4 – Energy in Earth’s Atmosphere – pages 90-95**

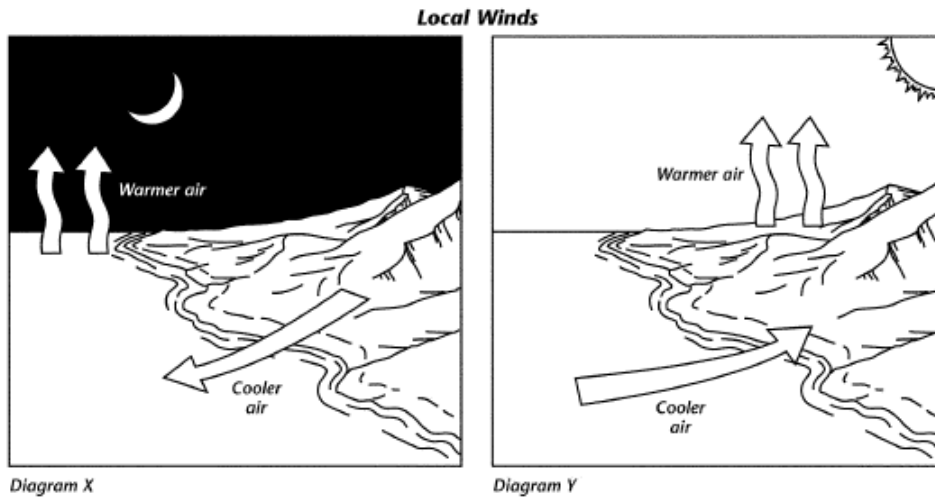
12. The process by which gases hold heat in the atmosphere is known as the \_\_\_\_\_.
13. Energy from the sun that reaches Earth is mostly in the form of \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.
14. When heated, the Earth’s surface radiates some of the energy back into the atmosphere as \_\_\_\_\_.

**3.5 – Heat Transfer – pages 96-99**

15. Tell the differences between radiation, conduction, and convection.
- a. Radiation - \_\_\_\_\_  
\_\_\_\_\_
  - b. Conduction - \_\_\_\_\_  
\_\_\_\_\_
  - c. Convection - \_\_\_\_\_  
\_\_\_\_\_
16. Give an example of conduction. \_\_\_\_\_  
\_\_\_\_\_
17. Give an example of convection. \_\_\_\_\_  
\_\_\_\_\_
18. Give an example of heat transfer by radiation. \_\_\_\_\_
19. An instrument called a \_\_\_\_\_ is used to measure how hot and cold the air is.
20. On the Celsius scale:  
Freezing is at \_\_\_\_\_  
Room temperature is at about \_\_\_\_\_  
Boiling is at \_\_\_\_\_.
21. On the Fahrenheit scale:  
Freezing is at \_\_\_\_\_  
Room temperature is at about \_\_\_\_\_  
Boiling is at \_\_\_\_\_.

**3-6 Winds – pages 100-107**

22. Cool air tends to be more \_\_\_\_\_ and flow under \_\_\_\_\_ air.
23. How are global and local winds different? \_\_\_\_\_  
\_\_\_\_\_
24. \_\_\_\_\_ is the effect of Earth’s rotation on the direction of winds and currents.
25. Winds are cause by \_\_\_\_\_ and \_\_\_\_\_.



26. Tell how the wind blows in each of the diagrams above.
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

**Possible Essays:**

Compare/Contract the three ways heat is transferred.

Why are masks required when aircraft pilots fly at extremely high altitudes?

If hiking at the top of a high mountain, where will air pressure be measured? What type of barometer is most practical to take? Explain.

How does the atmosphere help living things to survive on Earth? Give characteristics of the different layers of the atmosphere.

Explain why the region near the equator has little or no wind.