

Name Key

Date _____

Atmosphere Notes Packet One

Chapter 3 Lesson 1: The Air Around You (Composition of the Atmosphere)

Directions: Read and do textbook p. 72, then read pages 74 - 77 in your Water and the Atmosphere textbook, and use it to complete as much as you can in the spaces below.

1. **Weather-** is the condition of Earth's Atmosphere at a particular time + Place
2. **Atmosphere-** the layer of gases that surround the planet

Which gases make up most of Earth's atmosphere? Oxygen + nitrogen

3. Why is the atmosphere important? (Think about it! List at least 4 reasons)
① makes conditions on Earth suitable for living
② Contains oxygen for us to breathe
③ Traps in solar energy to keep Earth warm enough for liquid water
4. What is the most **abundant** gas in the Earth's atmosphere? nitrogen

Earth's atmosphere is 78 % Nitrogen (a little more than $\frac{3}{4}$)

(Abundant- a lot of)

Why does Earth need so much Nitrogen? Because *Nitrogen is a major component of proteins, the building blocks of living things!*

5. What is the second most abundant gas in the Earth's atmosphere? oxygen
Earth's atmosphere is 21 % Oxygen

Why is Oxygen important? (Give two reasons other than breathing!)

- ① Air to breathe
- ② Release energy for food
- ③ Things to burn
- ④ Creates ozone layer

6. Why is Carbon Dioxide (CO₂) important to plants? photosynthesis

How does Carbon Dioxide affect Earth's temperature? *Carbon dioxide traps heat keeping earth's temperature warmer, even overnight. This is the greenhouse effect.*

Where does Carbon Dioxide come from? *Give at least two different sources*

- 1 cars
- 2 animals
- 3 factories

7. What other gases are in earth's atmosphere? Argon and other trace gases make up 1% of Earth's atmosphere

8. What is water vapor? water in the form of a gas

Is the amount of water vapor in the air the same all over Earth? (See apply it! p. 76)

Explain: Not the same

Rainforest and deserts

9. What particles are found in the air? dust, smoke, salt, chemicals

Conclusion Questions for Chapter 3.1

1. What are the four most abundant gases in dry air?

2. What other substances besides the above gases are found in the atmosphere?

3. How is the atmosphere a system? (p. 77)

4. How does a hurricane get its energy from the Sun? (p.77) What strengthens hurricanes?

Air Quality

Directions: Use the blue, hard-covered Weather and Climate textbook (or Air Quality packet),

p. 20-23, to complete the items below.

1. Air Pollution

- a. **Pollutant-** harmful substance in air, water or soil
- b. Can be natural or man-made
- c. What causes most air pollution? Burning fossil fuels (coal, oil, natural gas) driving cars
- d. What are some examples of **fossil fuels**? coal, oil, natural gas and wood
Natural gas is also a fossil fuel

2. Particles in the Air

- a. What are seven natural sources of particles that pollute the air?

Ocean salt, forest fires, mold, dust storms, pollen, blowing soil, volcanoes

- b. What are some human sources of particles that pollute the air?

Burning coal, oil, + natural gas
Construction + farming

3. What is **smog**? smoke mixed with fog

4. What is **photochemical smog**? brown haze that forms over cities when sunlight makes certain chemicals react

5. How does photochemical smog form?

Nitrogen oxides, hydrocarbons + other pollutant mix with each other in presence of sunlight to make ozone

6. What is **acid rain**? rain that is more acidic than normal because of certain chemicals

7. How does acid rain form? When nitrogen oxides + sulfur oxides combine with water in the air

8. What types of damage does acid rain cause? (List 5 things)

Damages buildings, statues, trees, lakes, oceans, ponds

Kills plants, amphibians, fish, + insects

9. How has the US government tried to reduce pollution?

Passed laws

new cars

10. What can you do to reduce air pollution?

- Walk

- Ride a bike

- Use cars that are cleaner

- Conserve energy

Chapter 3 Lesson 2: Air Pressure

Directions: Read pages 78 - 83 in your *Water and the Atmosphere* textbook, and use it to complete as much of this section as you can in the spaces below.

Properties of air: Air has mass, volume, density and pressure. **Complete this chart:**

PROPERTY	DEFINITION	UNIT
Mass	Amount of matter <u>in</u> an object (or space)	Grams(g)
Volume	Amount of space an object <u>takes up</u>	mL cm ³
Density	Amount of mass in a given volume; how tightly matter is packed (p.79)	g/mL or g/cm ³
Pressure	Force pressing on an area (p.79)	millibars inches of Mercury

Altitude - elevation - hight above sea level

Air pressure - force of a column of are pressing on an area

- Measured using a barometer (p.80)
- Measured in the units of millibars or inches of mercury (p.81)
- Falling pressure means STORMY weather is coming
- Rising pressure means Clear weather is coming
- As air pressure increases, density increases (think about it) causing air to sink
- As altitude increases, pressure decreases (p.82)
- Air is less dense at high altitude so it is harder to breathe (there is less oxygen in each breath). (p.83)

Check your Understanding:

1. What's an air column. Describe and draw. (p. 79)

The column of air around you from the ground to space

2. How does increasing the pressure on a gas affect its density?

As pressure increases, density increases

3. Describe how a mercury barometer measures air pressure. Complete the Figure 2 Interactive Art activity on p. 80 of your textbook, then summarize your answer here.

When air pressure increases,
mercury is forced up the tube

4. How does air pressure and density change with altitude? Complete the Figure 4 Virtual Lab activity on p. 82-83 of your textbook, then summarize your answer here.

As altitude increases, air pressure + density
decrease

5. Why is the air at the top of a mountain hard to breathe?

As you go up, there is less pressure in the air so the air is less dense, this means the air is thinner, less oxygen to breathe

6. What changes in air pressure would you expect to see if you carried a barometer down into a deep cave? Explain.

The pressure would increase as you go deeper because there would be more + more air above you.

Chapter 3 Lesson 3: Layers of the Atmosphere

Directions: Read pages 84-89 in your *Water and the Atmosphere* textbook, and use it to complete as much of this section as you can in the spaces below.

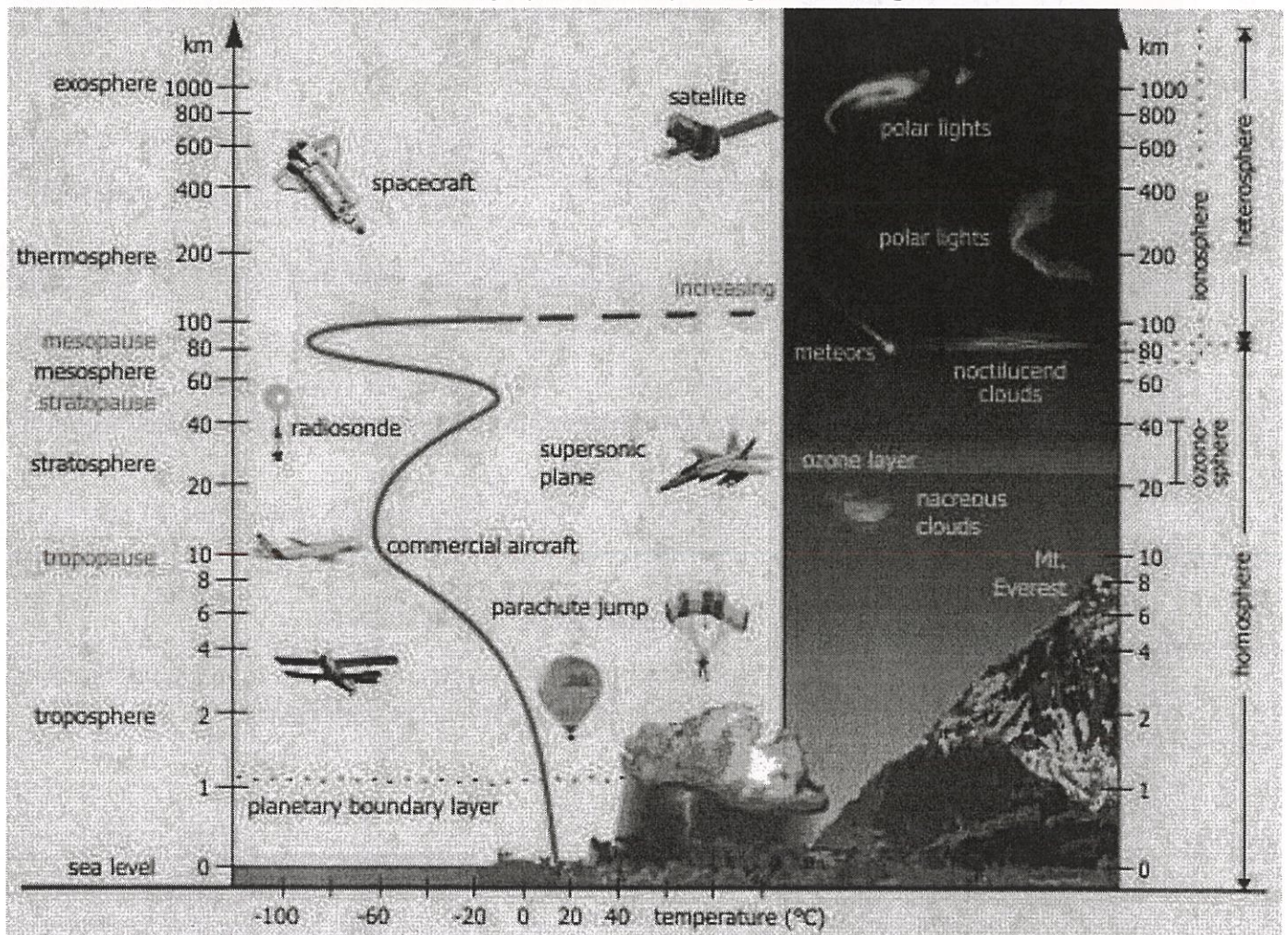
What are the Four Main Layers of the Atmosphere?

Scientists divide Earth's atmosphere into four main layers classified according to changes in temperature. (p.85)

The atmosphere has 4 main layers: troposphere, stratosphere, mesosphere, and thermosphere. (p.85)

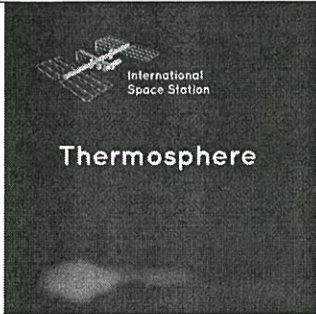
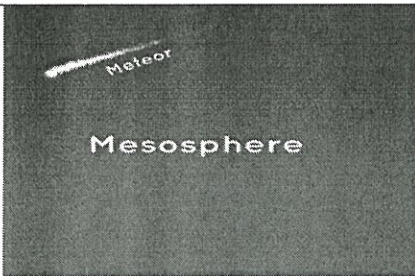
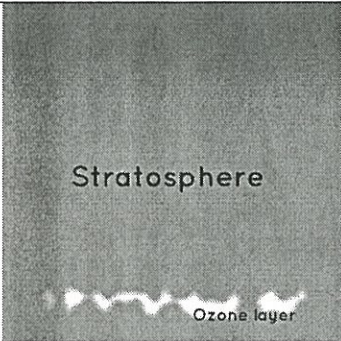

The tropopause marks the top of the **troposphere**, the stratopause marks the top of the **stratosphere**, the mesopause marks the top of the **mesosphere**, the **thermosphere** doesn't really have a top, but flows directly into the **exosphere** (space).

Note how the temperature (red line in graphic below!) changes with height.



What are the Characteristics of the Atmosphere's Layers?

The data table below shows the layers of the atmosphere stacked on top of each other. The layers closest to the surface is the Troposphere. *Fill in the chart as you read text p. 86-89*

Layers of the Atmosphere	Characteristics/Functions of Layer
 <p>Thermosphere</p>	<p>Warmest, top layer, contains the Ionosphere, and stretches to the Exosphere.</p> <p>Exosphere- where <u>satellites</u> are located.</p> <p>Ionosphere- reflects <u>radio</u> waves back to earth and produces the beautiful lights called <u>aurora borealis</u>.</p>
 <p>Mesosphere</p>	<p><u>Meteors</u> burn up here</p>
 <p>Stratosphere</p>	<p>Has the <u>ozone</u> layer that protects us from <u>uv</u> rays from the Sun</p> <p>Remember: Ultraviolet (UV) rays cause sunburn, skin cancer, and damage to plants. How else can you protect yourself from UV rays?</p>
 <p>Troposphere</p>	<p><u>Weather</u> occurs here.</p> <p>Water vapor in this layer helps the Earth to maintain moderate temperatures, and sustains the water cycle.</p>

You can learn more about the atmosphere here: <https://spaceplace.nasa.gov/troposphere/en/>

So why do we need an atmosphere? Give 4 reasons. Provides oxygen, Keeps temp safe,

Protects from UV rays, supports the water cycle + burns up meteors

Complete the do the math! activity on the bottom of p. 87 in your textbook.