# 15.1 Notes The Earths Atmosphere

The layer of gases surrounding the earth is called the ATMOSPHERE. The atmosphere is made up of a combination of elements and compounds

- 78% Nitrogen
- 21% Oxygen
- 1% Argon, Carbon Dioxide, water vapor, etc....
    - Oxygen and nitrogen are the two most important elements to all life on earth.

<u>The Oxygen Carbon Dioxide Cycle</u>- is the process of oxygen and carbon dioxide circulating between living things maintaining life.

- When animals and people breathe in air, our bodies absorb the oxygen to create energy and carbon dioxide is released from our lungs. Plants will absorb carbon dioxide and release oxygen into the atmosphere

<u>The Nitrogen Cycle</u>- Nitrogen cycles from the atmosphere to living things and into the soil.

- Nitrogen is absorbed by plants, those plants are eaten by animals. When an animal dies the body decomposes and nitrogen is absorbed into the soil. Bacteria in the soil breaks down waste, releasing nitrogen back into the air.

<u>Layers of the Atmosphere-</u>The atmosphere consists 0f 5 layers

1. **Troposphere**- the layer we live in. The bottom layer of the atmosphere, extending from the ground level up to about 16 km above the earth. This layer contains 75% of the air particles in the entire atmosphere.
    a. Air gets cooler and thinner as you go higher in the troposphere
    b. Also characterized by the up and down and side to side movements of air (wind).

**Stratosphere**- the layer above the stratosphere. Extends 16-50 km above the earth's surface. This layer is clear and dry. NO WEATHER OCCURS HERE

. Temperature increases as you go higher in the stratosphere

a. The OZONE LAYER is found in the lower half of the stratosphere.

i. This is important because the ozone layer absorbs and protects us from the harmful rays of the sun (UVA, UVB, UVC rays).

**Mesosphere**-the middle layer of the atmosphere. Here temperature decreases with height. Located 50-80 km from the earth's surface

. The coldest layer of the atmosphere

**Thermosphere-** 4th layer of the atmosphere. The air is thinnest here. 60-300 km from the earth's surface

. Temperature increases with height. Can reach up to 2000 degrees Celsius.

a. This layer also includes the IONOSPHERE

. The ionosphere is the layer of the atmosphere containing ions. These are important in radio communication. Radio waves will travel from stations, bounce off the ionosphere and travel back to earth.

**Exosphere**-the outermost layer of the atmosphere. This is where the atmosphere ultimately things out and merges with space

# 15.2 Notes- Clouds

How do clouds form? → Most of the earth's surface is covered in water. The sun's heat causes the liquid to EVAPORATE (goes from a liquid to a gas). This gas is called WATER VAPOR. As the air becomes more heated it becomes less dense and begins to rise. As it rises it cools down and CONDENSES (turns from a gas to a liquid) creating tiny water droplets that stay afloat. These tiny droplets gather together to form a cloud.

Types of Clouds

- Clouds are categorized according to their SHAPE and ALTITUDE (the height above the earth's surface).
- From clouds we get this thing called PRECIPITATION. This is moisture that falls to the earth from the atmosphere.
    - Precipitation falls when the water droplets in the cloud become too heavy to stay suspended.
    - Types of precipitation include rain, snow, sleet, and hail.

- 4 types of clouds
    1. **Stratus clouds**- low, flat clouds that form in layers.Their altitude is less than 2,000 meters. These clouds are wider than they are tall, often covering the whole sky like a blanket. Stratus clouds can produce precipitation
    2. **Fog**- a stratus cloud that forms extremely close to the ground. This happens when the air close to the ground is cool enough for air to condense close to the earth.
    3. **Cumulus clouds**- puffy, white clouds occurring anywhere between 2,000-7,000 meters above the earth's surface. These clouds usually indicate fair weather.
    4. **Cirrus clouds**- thin, wispy streaks high in the sky. These are made of ice crystals. They occur at 7,000-13,000 meters high. These clouds occur during fair weather but usually indicate that rain or snow is on the way.

## 15.3 Notes- Wind Patterns

- The earth's atmosphere is constantly in motion. Air is moving, forming what we call wind.
- The motion of the air is caused by unequal heating of the earth's surface by the sun.
    - When air is heated it becomes lighter and less dense. This causes the hot air ro rise.
    - Cold air will then fill in the space the warm are left behind. And if that air is warmed it will rise and the process repeats itself.
    - This cycle of air flow is called a WIND CELL
    - On earth, the warmest air is found near the equator. When that air rises, it moves towards the North and South Poles. As it moves it gets colder and begins to descend in altitude. As it gets closer to the earth, it moves back towards the equator.

GLOBAL WINDS

- Winds move around the earth in patterns called WIND BELTS. The two most known and understood belts are located north and south of the equator. These are called TRADE WINDS
    - Trade winds are strong reliable winds that blow from the east. These winds were called trade winds because sailors on trading ships would use them to power their sails.

- Most of the USA and southern Canada are affected by the northern wind belt of the PREVAILING EASTERLIES. These winds blow from the east to the west. Generally between 30N and 60N degrees latitude.
    - These blow opposite the trade winds
    - Also are less reliable than trade winds.

- Wind belts also blow from the poles towards warmer latitudes. Wind in these belts are named POLAR EASTERLIES.
    - These winds also blow east to west like trade winds
    - These bring cold stormy weather
    - Most of Alaska lies within this belt.

Name_____ General Science
15.1 Worksheet

1. What is the atmosphere? _____
2. What is the chemical composition of the air (list elements and percentages)

   _____

   _____

   __

3. Explain the Nitrogen Cycle.

   _____

   _____

   __

4. Explain the Oxygen and Carbon Dioxide Cycle.

_____

_____

_____

__

5. The _____ is the layer of the atmosphere in which we live.
6. True or false: no weather occurs in the troposphere.
7. What is the ozone layer and why is it important? _____

_____

_____

__

8. Which layer is the coldest layer in the atmosphere? _____
9. Which layer is characterized by its high temperatures and contains the ionosphere?

_____

10. What is the ionosphere important for? _____
11. What is the exosphere? _____

Name_____ General Science
15.2 Worksheet

1. What two criteria categorize clouds? _____
2. What is precipitation and what causes it to fall to the ground? _____

_____

3. How do clouds form?

_____

_____

_____

_____

4. Name 2 kinds of precipitation

_____

5. What kind of cloud is characterized by its puffy cotton ball appearance?

_____

6. What kind of weather does (answer to #5)

indicate?_____

7. Describe a stratus cloud.

_____

_____

8. Why are cirrus clouds made of ice crystals instead of water vapor?

_____

_____

9. What is fog and why does it create issues for travel?

_____

_____

10. Which kind of cloud indicates the stormy weather is coming?

_____

Name _____ General Science
15.3 Worksheet

1. What causes wind? _____

_____

2. The movement of hot air rises and cold air filling its place is known as _____

3. Where is the warmest air on earth located?

_____

4. Explain the movement of winds from the equator to the poles _____

_____

_____

5. What is the name of the winds located directly north and south of the equator?

_____

6. Who named (answer to #5) and why?

_____

7. What are wind belts?

_____

8. Over what geological area do Prevailing Easterlies cover?

_____

9. What state lies within the Polar Easterlies Belt?

_____

10. What kind of wind was the most reliable?

_____

11. True or false- Polar Easterlies travel west to east (the opposite direction as trade winds).

12. What kind of wind is known to bring stormy weather?

_____

Name _____ General Science

Ch. 15 Practice Test
DEFINE

1. Condense

2. Evaporate

3. Stratosphere

4. Trade winds

5. Ionosphere

6. Altitude

7. Polar Easterlies

8. Troposphere

9. Exosphere

10. Wind Belt

11. Wind Cell

12. Cirrus Cloud

13. Fog

14. Ozone Layer

15. Precipitation

SHORT ANSWER

11. What is precipitation and what causes it to fall to the ground? _____

_____

12. How do clouds form? _____

_____

_____

_____

13. Name 2 kinds of precipitation _____

14. What kind of cloud is characterized by its puffy cotton ball appearance? _____

15. What kind of weather does (answer to #5) indicate? _____

16. Describe a cirrus cloud. _____

_____

17. Why are cirrus clouds made of ice crystals instead of water vapor? _____

_____

18. What is fog and why does it create issues for travel? _____

_____

19. Which kind of cloud indicates the stormy weather is coming?

_____

20. What causes wind? _____

_____

21. The movement of hot air rises and cold air filling its place is known as _____

22. Where is the warmest air on earth located? _____

23. Explain the movement of winds from the equator to the poles _____

_____

_____

24. What is the name of the winds located directly north and south of the equator?

_____

25. Who named (answer to #24) and why? _____

26. What are wind belts? _____

27. Over what geological area do Prevailing Easterlies cover? _____

28. What state lies within the Polar Easterlies Belt? _____

29. What kind of wind was the most reliable? _____

30. True or false- Polar Easterlies travel west to east (the opposite direction as trade winds).

31. What kind of weather do Polar Easterlies bring? _____

32. What is the atmosphere? _____

33. What is the chemical composition of the air (list elements and percentages)

_____

_____

34. Explain the Oxygen and Carbon Dioxide Cycle. _____

_____

_____

35. In which layer of the atmosphere do we live? _____.

36. True or false: no weather occurs in the stratosphere.

37. What is the ozone layer and why is it important? _____

_____

_____

38. Which layer is the coldest layer in the atmosphere? _____

39. Which layer is characterized by its high temperatures and contains the ionosphere?

_____

40. What is the ionosphere important for? _____

41. What is the exosphere? _____