You Guys will have 1 more week to work on your final projects. Those will be in substitution of your final test. This last section is just like a normal worksheet/test grades. Once you finish the projects work on this last chapter and that will be all for our general science class!

Final 1 Notes

-**weather**- the state of the atmosphere at a certain time and place
- **climate**- the year round weather typical of a certain place.
-**meteorology**- the study of the weather typical of a certain place.
- **meteorologist**- forecast weather conditions.

3 major factor affect of weather

1. Heat energy (insolation)
2. Uneven distribution of heat energy
3. Water vapor in the atmosphere
    a. Source of all precipitation-the water that falls to the earth.

-**water molecules**- are always in motion→ their speed depends on the amount of energy→ energy depends on the temperature. The higher the temperature, the more energy there is.

ICE

- **Freezing**-molecules lose enough energy to become locked in fixed positions
- Molecules in crystal pattern
- The low energy prevents the movements of molecules, until the temperature rises. Remember when temperature rises there is more energy.
- **Melting**- the process of going from solid to liquid

LIQUID

- Molecules move over one another freely
- Not enough energy to completely escape attraction of other molecules

GAS

- **Evaporation**- process of a liquid becoming a gas
- Molecules escape attraction due to having en0ound energy
- energy→ comes from molecules colliding at the liquids surface.

Evaporation- brings water into the Earth's atmosphere. Most of this occurs at the ocean's surface.

If water vapor loses energy → it condenses, **CONDENSATION**- the process of water vapor returning to a liquid state.

- **Atmospheric condensation**→ responsible for dew, clouds, and fog.
- **Humidity**- the amount of water vapor in the air.

Dew Point- temperature to which air must be cooled for water droplets to condense and form dew.

- Water vapor needs a surface to condense (gather) on
- **DEW**- means drops of water
- Dew forms when a surface cools below the dewpoint temperature of the surrounding air.
- On clear nights there is more dew produce than on cloudy nights. This is because clouds trap heat inside the air so the ground doesnt cool off as quickly.
- **Condensation Nuclei**- microscopic particles in the air around which water vapor condenses
    - Each particle serves as the nucleus that the water vapor condenses too.

Frost Point- the dew point of aire is below the freezing point of water (32 degrees)

- **Frost-** water vapor that crystallizes on a surface forming light, feathery deposits of ice crystals

Final 2 Notes

8.2 Clouds and Fog

clouds - many water droplets or ice crystals visible as a whole

- Formed by: 1. air drops in temperature as it expands *(adiabatic cooling)*

  2. water vapor then condenses into droplets of water (or ice crystals if dew point is below freezing)

  3. together these droplets form a cloud
- To remain suspended in air, cloud's droplets must be extremely tiny
- shape of cloud à depends on movements of air that push around its droplets
- Clouds classified into 10 categories based on shape and height
- Latin prefixes/suffixes à describe clouds characteristics
  - EX "nimbus" - cloud
- ***See cloud chart**
- Special clouds
  - lenticular cloud – a "lens-shaped" cloud
    - § Often forms above a mountain
    - § Sometimes mistaken for UFOs
  - Contrails - artificial clouds produces by airplanes
    - § Formed from jet exhaust that quickly condenses then freezes
    - § Long and narrow

Fog - water vapor that condenses in the layer of air near the ground

- Basically, a stratus cloud that develops at the earth's surface
- mist - ground-level fog who's visibility is greater than 1 km
- Types of fog:

o __radiation fog____ - forms when air near the ground cools below dewpoint causing cloud droplets to form around condensation nuclei

§ Occurs on __clear_____ nights (no __greenhouse effect_____)

§ Common during __autumn____ months (cool ground & moist air)

§ It remains in __place_____

§ Clears up as __sun___ warms air and ground

o ____advection fog__ - forms when a warm, humid breeze blows over a cold surface causing the air's temperature to drop below the dewpoint

§ Can form during _day___ or __night___

§ Moves as the _breeze____ moves

§ ___sea fog____ - advection fog that forms over the water

Ø Develops when winds __heated__ by warm ocean waters travel over __cool___ ocean waters

o ___upslope fog_____ - forms along the slopes of mountains

§ Forms when moist winds blow up a slope and __cools____

§ Can cover a large area for __several____ days

o ___steam fog_____ - forms when the water is warm but the surrounding air is cool

§ Occurs during the __fall_____

o ___frontal fog_____ - forms when warm rain falling into cool air evaporates

o ___smog_____ - mixture of smoke and fog

§ Once associated with London's __coal smoke_____ and fog problem:

Ø in 1952, a 5-day smog killed over _4,000___

§ modern-day smog's know as ___photochemical smog___ - a thick, brownish haze that results from complex molecules released into air by cars, factories, etc.

Ø sunlight breaks these molecules down into __ozone____ and other dangerous chemicals

Final 3 Notes

- **Water cycle**- movement of water from the earth's surface into the air and back to the surface.
- **Rain** - drops of liquid falling from the clouds to the earth
  - Most common form of precipitation
  - Average size- 1-2 mm
  - Drizzle- any liquid precipitation less than .5mm
    - Often called "mist" but drizzle falls and mist stays floating in the air

- **Collision Coalescence Process**- process by which rain forms in clouds above freezing
    - Large condensation nuclei→ form giant cloud droplets
    - Move downwards in the cloud→ colliding with other droplets, growing bigger
    - Too heavy to stay suspended→ so the drops fall to the earth

- **Bergeron Process**- process by which rains forms in clouds below freezing
    - Water vapor crystallizes→ around freezing nuclei
    - Ice crystals grow into snowflakes
    - Drift downwards in cloud and they keep growing
    - At the base of the cloud→ if temperature is above freezing the snowflakes melt into rain, if the temperature is below freezing, the snowflakes fall to the earth

- **Freezing Rain**- supercooled raindrops that touch a freezing surface and turn into ice. This causes dangerous road conditions and can weigh down power lines

Solid Precipitation

- **Sleet**- raindrops that freeze before they hit the ground
- **Snow**- precipitation made of snowflakes that fall to the ground
    - The shape of snowflake depends on the temperature of the cloud
    - Most familiar shape is a DENDRITE- star shape
    - "Dry snow"- below freezing temperatures, poor packing snow
    - "Wet Snow"- warmer temperatures, good packing snow
        - Snow is categorized by
            - Visibility
            - Length of snowfall
            - Accumulation
            - Strong winds

    - flurries- brief periods of snowfall; little to no accumulation

    - snow squall- brief but intense snowfall; strong winds.

    - heavy snowfall- 4 or more inches of snow in 12 hours or 6 or more inches of snow in less that 24 hours

    - blizzard- heavy snowfall and winds for more than 3 hours.

    -whiteout- falling and blowing snow reduces visibility to almost 0.

- **Hail**- layered balls of ice that forms in strong thunderstorms.
- Starts as a raindrop
    - Updraft in cloud sweeps the drop to the coldest layer
        - Here the drop freezes into a pellet.

- Pellet collides with other raindrops and grows in size.
    - Becomes too heavy and falls to earth.

- **Hailstone**- individual layered ball of ice
- Size of hailstone- depends on strength of updraft. Largest hailstone was 7 inches in diameter found in Aurora Nebraska. Heaviest hailstone was 1.67 pounds found in Coffeyville Kansas.
    - Very destructive

- **Drought**- water shortage affecting crops, people, environment due to abnormally low precipitation.
- 4 types of drought
    1. **Meteorological**- comparing an areas current precipitation with its typical precipitation
    2. **Agricultural**- precipitation cannot support areas crops
    3. **Hydrological**- an area's ground water, lakes, rivers, etc…, considered decreased due to lack of precipitation
    4. **Socioeconomic**- the supply of any product/material use by people is affected by precipitation.

Final 4 Notes

- **Air mass** is a large body of air relatively uniform in temperature, humidity, and pressure
- Density of air masses is affected by
    1. Temperature- the cooler the air, the higher the density. This is because cold air molecules are more tightly packed. They like to stay next to each other
    2. Humidity- air molecules WEIGH MORE than water molecules. So the lower the humidity, the higher the density
    3. Pressure- pressure forces molecules together. The higher the pressure the higher the density

Types of Air masses

1. Tropical- forms over tropics is characterized by warm air
2. Polar- forms over cold regions, and is characterized by cold air
3. Maritime- forms over the sea and is characterized by humid air
4. Continental- forms over land, and is characterized by dry air

Names of Air masses

1. Maritime Tropical- moist, warm climate. Forms over Gulf of Mexico and can create thunderstorms
2. Continental Tropical- dry and warm climate. Forms over deserts and can cerate hot dry air
3. Maritime Polar- cold and moist climate. Forms over the northeast of North America. This produces cold and wet air,
4. Continental Polar- cold and dry climate. Forms over Canada and Alaska. This produces cold and dry air.
5. Arctic- dry and very cold climate. Found over Arctic Circle and produces dry and frigid air.

- Meteorologists predict weather by tracing paths of air masses
- **Air mass weather-** when an air mass remains stationary over a region for a long time continuing same type of weather
- **Front**- boundary between a warm and cold air mass
    - Named for air mass advancing into territory of another air mass
    - When warm and cold air masses meet, there will be violent storms
        - They are battling for supremacy

Types of Fronts

1. Warm Front
    - Warm air mass moves into colder region and the warm air will flow over the cold air
    - This results in precipitation otherwise known as rain
2. Cold Front
    - Cold air mass moves into warm region and the cold air wedges under the warm
    - This creates cumulonimbus clouds and thunderstorms
    - These move faster than warm fronts
3. Stationary front
    - A standoff between air masses where neither on advances
    - Air travels parallel to the front
    - Could result in either clear or stormy weather
4. Occluded front
    - Y shaped front caused by three air masses
    - Results in progressive weather. That means the weather changes quickly from light rain to heavy rain to being sunny.

NAME: _____ General Science Worksheet Final- 1

1. What is meteorology? _____

_____

2. Atmospheric _____ is responsible for dew, clouds, and fog.

3. Name the 3 major factors affecting the weather.

1. _____

2. _____

3. _____

4. Define *condensation nuclei*. _____

_____

5. True or False: Water molecules are always in motion no matter what their state of matter.

6. Explain the difference between weather and climate. _____

_____

_____

7. What must the conditions be for the dewpoint to be called the frostpoint? _____

_____

8. The amount of water vapor in the air is referred to as _____.

9. Compare and contrast the water molecules in ice (solid water) to the water molecules in water vapor (gaseous water).

_____

_____

_____

_____

10. What is evaporation? _____

11. What is condensation? _____

12. What type of nights tend to produce heavier dews. Explain why. _____

_____

_____

13. Water vapor in the atmosphere is the source of all _____.

14. True or False: Most condensation occurs at the ocean's surface.

15. Describe how dew is formed. _____

_____

_____

16. A _____ forecasts weather conditions.

NAME: _____ General Science Worksheet Final- 2

1. On what two things do meteorologists base their classification of clouds?

1. _____ 2. _____

2. Compare and contrast radiation fog and advection fog. _____

_____

_____

_____

3. What type of cloud is a thunderstorm cloud? _____

4. A _____ cloud is a “lens-shaped” cloud that often forms above a mountain.

5. Explain how a sea fog develops. _____

_____

6. What name did sailors give to cirrus clouds? _____

7-8. Write the English translations of the Latin prefixes/suffixes used to name clouds.

1. stratus - _____

2. cumulo - _____

3. cirrus - _____

4. nimbus - _____

9. What is necessary for a cloud to remain suspended in the sky? _____

10. Which type of cloud generally forms on a humid day and often disappears by evening? _____

11. What is fog? _____

_____

12. How does the original smog of London differ from modern day smog? _____

_____

_____

13. Which type of cloud is the most frequently seen? _____

14. Fog who's visibility is greater than 1 km is known as _____.

15. How are contrails formed? _____

_____

16. Which type of cloud is so gray and thick that it blocks out the sun and moon? _____

17. Explain the process of cloud formation. _____

_____

_____

NAME: _____ General Science
Quiz
Final 1 & 2

1. What is the study of weather and the atmospheric conditions that produce weather? _____

2-3. Name the 2 of the 3 major factors that affect earth's weather.

1. _____

2. _____

4. Explain the difference between evaporation and condensation. _____

_____

_____

5. True or False: Water molecules in ice have more energy than water molecules in water vapor.

6. What are condensation nuclei? _____

_____

7. Water vapor in the air is the source of all _____.

8. True or False: Unlike radiation fog, advection fog can form in either the day or the night.

9. What type of cloud means "curl of hair" in Latin? _____

10. What type of cloud is a thunderstorm cloud? _____

11. Explain the process of cloud formation. _____

_____

_____

12. A _____ cloud is a "lens-shaped" cloud that often forms above a mountain.

NAME: _____ General Science
Final Study Guide

1. meteorology –

2. precipitation –

3. evaporation –

4. condensation -

5. radiation fog –

6. advection fog –

7. water cycle –

8. dew –

9. humidity –

10. blizzard –

11. contrails –

12. air mass –

13. air mass weather –

14. stationary front –

15. occluded front –

16. Explain the difference between weather and climate. _____

_____

_____

17. How do meteorologists name “fronts”? _____

_____

18. What 3 major factors affect earth’s weather?

1. _____
2. _____
3. _____

19. Do molecules have more energy at higher or lower temperatures? _____

20. Explain the difference between freezing rain and sleet. _____

_____

_____

21. What is the term for layered balls of ice that form during strong thunderstorms? _____

22. Which type of front moves faster moves faster- a cold or warm front? _____

23. Explain why condensation nuclei are important to clouds. _____

_____

_____

24. Compare and contrast glaze and rime. _____

_____

_____

25. What is the most frequent type of clouds? _____

26. When a warm air mass is approaching a cold air mass, where will the warm air mass go? _____

_____

27. What is the most familiar shape of snowflake? _____
28. Name the three states of water. In which state do the molecules stay close together in a fixed position while vibrating?

1. _____ 2. _____ 3. _____

29. On what two things do meteorologists base their classification of clouds?

1. _____ 2. _____

30. Write the English translations of the Latin prefixes/suffixes used to name clouds.

1. stratus - _____

2. cumulo - _____

3. cirrus - _____

4. nimbus - _____

31. What is the major difference between the collision-coalescence process and the Bergeron process?

_____

_____

32. Name and give a description of the four types of drought.

1. _____ - _____

_____

2. _____ - _____

_____

3. _____ - _____

_____

4. _____ - _____

_____

33. _____ is the term given to a mixture of smoke and fog.

34. A _____ cloud is a “lens-shaped” cloud that often forms above a mountain.

35. What type of cloud is a thunderstorm cloud? _____

36. The size of a hailstone depends upon what? _____

37. Which clouds did the sailors give the name “mackerel sky” because they look like fish scales?

_____

38. Fill in the missing things on the air mass chart.

AIR MASS	ABBREVIATION	DESCRIPTION
Maritime polar	_____	_____
_____	cP	_____
Arctic	_____	_____
_____	_____	Dry, warm
_____	mT	_____

39. Which type of air mass has a higher density – a cold or warm air mass? Explain why. _____

_____

40. What is a front? _____

41. What must the conditions be for the dewpoint to be called the frost point? _____

_____