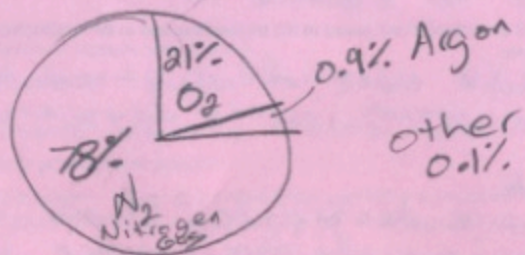


The Atmosphere Review

Please answer each question completely. Remember that these questions are to help you go back to your notes and assignments to study. Having a couple words or an answer is not going to prepare you for the FFLA.

1. Draw a pie chart showing the relative amount of the top gases in our atmosphere.



2. What is the source of energy in the atmosphere?

Sun / Solar Energy

3. How is Earth's atmosphere heated?

As sunlight is absorbed by Earth's surface, the energy is then spread through the atmosphere by conduction, radiation, and convection.

4. What is albedo?

How much light a surface reflects.
White = high albedo
Black = low albedo

5. What is the difference between water and land in the way they interact with the sun's energy?

Both absorb energy but land changes temperature more.

6. How does the energy from the sun move throughout the Earth's atmosphere?

Conduction - Direct contact
Convection - heat transferred by a moving fluid.
Radiation - electromagnetic waves.

7. What is short-wave radiation?

Radiation with a shorter wavelength and more energy

- a. What are some examples?

shortest

Gamma → X-Ray → UV → Visible

8. What is long-wave radiation?

waves that have a longer wavelength + usually less energy

- a. What are some examples?

Longest

Infrared → Microwaves → Radio

9. Describe the role that each of the following words plays in heating the Earth's atmosphere.

- a. Reflection

Reflection has little to no effect on our temperature because it just sends the radiation back out.

- b. Absorption

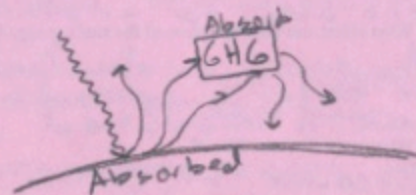
Molecules take the energy in and then spread it through the atmosphere by conduction, convection, and radiation.

10. What are the possible results of the Earth's energy budget changing?

- If more energy comes in than goes out, Earth's temperature will increase.
- Opposite if more goes out than comes in.

11. How does the greenhouse effect work in the atmosphere?

Certain gases are transparent + allow shorter-wave radiation in. As longer-wave radiation tries to leave, those gases absorb some of it and send it back to Earth.



12. Name 3 major greenhouse gases?

a. H₂O - Water Vapor
b. CO₂ - Carbon Dioxide
c. CH₄ - Methane

13. Why is the greenhouse effect so important on Earth?

Keeps Earth's atmosphere about 60° F warmer than it would be without it.

Fall

14. Draw a diagram showing how the Earth and Sun are configured during *our* winter, spring, summer, and fall.

Summer

Sun

Winter

Spring

15. How does energy from the sun differ from season to season?

• During summer, the sunlight is more direct in our hemisphere. During winter it's less direct.

16. Why are the seasons different in the northern vs. the southern hemisphere?

• The tilt of the Earth means that during certain times of year, the sun is more direct in the northern hem., & other times in the south.

17. What causes wind?

• Air flowing from high pressure to low.
• Convection in the atmosphere moving heat from one area to another

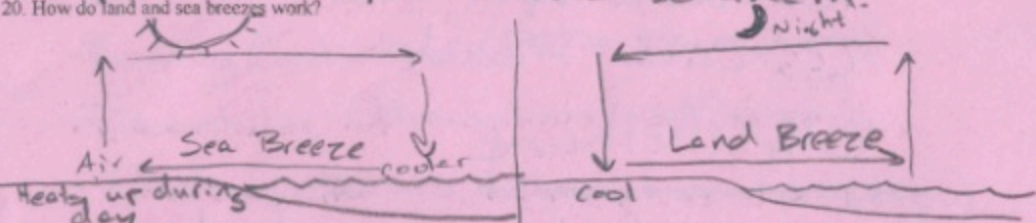
18. What effect can the absorption of the sun's energy have on the motion of the air in the atmosphere?

• As energy is absorbed, molecules in Earth and Air move faster + spread out. The air becomes less dense + is pushed upward.

19. What is the Coriolis Effect?

• Because of Earth's rotation, wind and ocean currents bend to the right in the northern hemisphere and left in the southern.

20. How do land and sea breezes work?



21. What is ozone?

Gas in the atmosphere made out of 3 Oxygen atoms. O_3

22. How can ozone be both good and bad?

a. Good

• In the stratosphere, we won't breathe it in and it protects us from harmful UV radiation.

b. Bad

• If it is found, produced, where we live, it is toxic to breathe in.

23. Why are scientists concerned about ozone in the troposphere and in the stratosphere?

a. Troposphere

• We make more of it as we burn fossil fuels on warm sunny days and it is toxic

b. Stratosphere

• We are destroying it w/ ozone depleting substances, allowing more UV light in.

24. If you have an enclosed sample of air, what are three ways you can change its pressure?

a. Change temperature. Higher temp = higher pressure

b. Change volume

c. Add/remove air

25. What were the features of weather we talked about and what tools are used to measure them?

a. Temperature = amount of heat in air.

↳ use a thermometer

b. Air Pressure we use a Barometer.

↳ weight/force of the air molecules around you.

c. Relative Humidity

• Amount of water in the air compared to the amount of water that air can hold. Use a psychrometer

d. Wind Speed

↳ use an anemometer

26. What's the relationship between temperature and relative humidity?

Increase the temperature, decreases Z.H.
Decrease the temperature, increase R.H.

27. What's the connection between air pressure and weather?

- Higher pressure usually means nicer weather.
- Lower pressure usually means stormy weather

28. How do we use air pressure to predict future weather?

- Slow increase in air pressure usually means good weather is on the way. A slow, steady decrease usually means storms are on the way.

29. How do you recognize high and low pressure systems on a satellite map?

Northern hemisphere

- Low pressure systems rotate counter clockwise and high pressure rotate clockwise.

a. What's the difference between high and low pressure systems in the southern and the northern hemispheres?

Spin opposite directions in the different hemispheres.

30. Describe the following different types of fronts. Include a description of weather that is associated with each and how the air masses interact with each other.

a. Warm

- Warm air replaces cooler air. The warm air rises up over the cooler air and slowly pushes it out of the way. Showers ahead of the front.

b. Cold

- Cold air pushes the warm air in front of it up + out of the way. Clouds ahead of the front + storms as the front passes. Wind will switch from south to north + pressure will rapidly increase as the front passes.

c. Stationary

- Two air masses against each other that aren't moving. Have several days of rainy weather.

d. Occluded

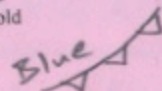
- Cold front out runs + takes over a warm front.

31. How do you recognize a warm, cold, stationary, and occluded front on a weather map?

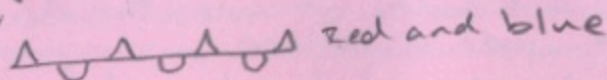
a. Warm



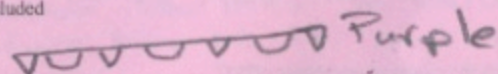
b. Cold



c. Stationary



d. Occluded



32. Compare and contrast weather and climate.

- Both describe conditions of the atmosphere.
- Weather is current or instant.
- Climate is average or long-term.

33. Describe the 6 climate factors that can impact a city's temperature.

a. Latitude - Colder - farther from equator

b. Proximity to center of large landmass: Center = wider range in high/low temperatures.

c. Proximity to large bodies of water: More narrow range between high/low temperatures

d. Windward sides of mountain ranges are usually colder

e. Higher elevation usually means colder temperatures.

f. Ocean currents usually warm the eastern sides of a continent and cool the western.

34. Describe the 5 climate factors that could control the amount of precipitation a city receives.

a. Latitude: $0^\circ + 60^\circ N + S = \text{More precipitation}$
 $30^\circ N + S = \text{Less precipitation.}$

b. Near the center of a large landmass usually means less precipitation.

c. Near a large body of water usually means more precipitation.

d. Windward sides of mountains usually get more precipitation.

e. Prevailing wind direction determines windward + leeward.

35. What concern do scientists have with the changing greenhouse effect?

Adding more CO_2 + other greenhouse gases will lead to a stronger greenhouse effect and climate change.

36. What are the primary reservoirs of carbon in the carbon cycle?

a. Atmosphere

b. Ocean

c. Rocks + Soil

d. Living Things

e. Fossil Fuels.

37. What processes are involved in moving carbon from one reservoir to another in the carbon cycle?

• Cellular Respiration (Living things \rightarrow Atmosphere)

• Burning/Combustion (FF \rightarrow Atmosphere)

• Dissolving (Atmosphere \rightarrow Ocean)

• Photosynthesis (Atmosphere \rightarrow Living things)

• Death + Decomposition

38. How has the carbon cycle changed dramatically over the past 150-200 years?

Increasing combustion has moved lots of carbon from F.F. to Atmosphere

39. Describe the air pollution problems of Utah.

a. Summer

• Ozone is produced by burning F.F. on warm, sunny days.

b. Winter

Particulate matter is trapped in the valley during inversions.

40. What evidence is there that the Earth's temperature has increased since the beginning of the industrial revolution?

• Temperature data.

• Glaciers Melting

• Sea-level rising

• Ecosystems Shifting

41. What connection do scientists think there is between the warming of Earth's climate and the carbon cycle?

Warming is being caused by the increase of greenhouse gases from combustion.

42. Name the possible ways that Earth's climate has changed over time.

• Change in amount of energy

• Milankovitch Cycles

• Solar Cycles

• Greenhouse Effect

• Topography + Plate tectonics

• Change in spin

• Change in energy absorbed + reflected

a. How have scientists been able to decide which one is primarily responsible for modern climate change?

• They looked at how long each one would take + concluded that it was changes in the greenhouse effect.