

Earth/Environmental Science Review Packet

Explain the Earth's role as a body in space.

1. Explain the Earth's motion through space, including precession, nutation, the barycenter, and its path about the galaxy.

A. Matching

1. ___ Rotation	A. Day and Night (24 hrs)
2. ___ Revolution	B. A Year (365 days)
3. ___ Precession	C. change in direction of the axis, but without any change in tilt—this changes the stars near (or not near) the Pole
4. ___ Nutation	D. wobbling around the axis (This occurs over an 18 year period)
5. ___ Barycenter	E. the center of mass where two or more celestial bodies orbit each other (This is the point about which the Earth and Moon orbit as they travel around the Sun.)

B. Fill in the blank

_____ is made of _____ which are made of many _____. Some stars have planetary systems similar to our _____. Earth is a _____ of one particular star.
(star, galaxy, universe, satellite planet, solar system)

- C. The universe is _____ (expanding or contracting) after the Big Bang.

True or False.

1. _____ Kepler discovered that the path of each planet around the sun is an ellipse.
2. _____ The universe is made of galaxies, galaxies contain stars, stars may have planetary systems.

Identify Kepler's Laws

_____ The line joining the planet to the Sun sweeps out equal areas in equal times as the planet travels around the ellipse.

_____ The ratio of the squares of the revolutionary periods for two planets is equal to the ratio of the cubes of their semimajor axes.

_____ The orbits of the planets are ellipses, with the Sun at one focus of the ellipse.

2. Explain how the Earth's rotation and revolution about the Sun affect its shape and is related to seasons and tides.

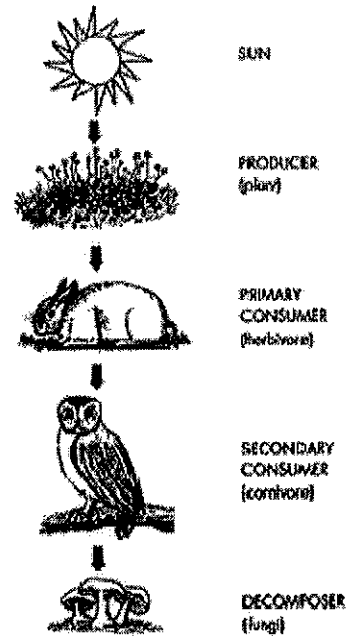
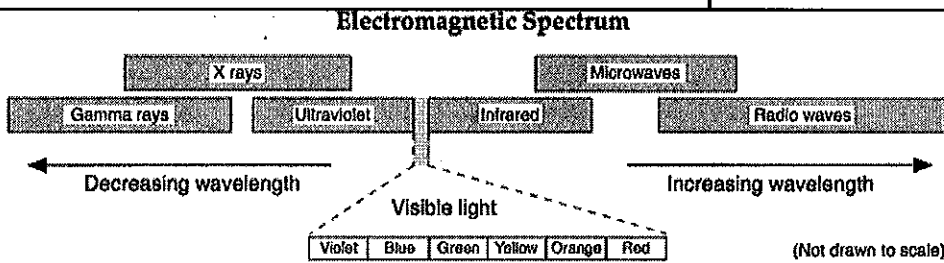
A. Fill in "tide" or "season" for the chart

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due to the approximate 23.5 degree tilt and revolution of the Earth	due to the gravitational interaction between the Earth and moon
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B. Describe Earth's shape

C. What is our main source of electromagnetic energy? _____	D. True or False. Energy produced by the Sun is transferred to earth by radiation. _____
E. Explain Nuclear Fusion. _____ _____ _____	F. Explain Nuclear Fission. _____ _____ _____



2. Explain how incoming solar energy makes life possible on Earth.

A. What is photosynthesis?

B. Explain how the sun's energy moves through the food chain

Explain how processes and forces affect the lithosphere

1. Explain how the rock cycle, plate tectonics, volcanoes, and earthquakes impact the lithosphere.

A. Match the type of rock that forms due to the following

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<p>1. ___Igneous 2. ___Metamorphic 3. ___Sedimentary</p>	<p>A. Melting and Cooling B. Heat and pressure C. Weathering/erosion and compaction</p>	
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B. Explain the theory plate tectonics

C. All of the following support the theory of continental drift except ____.

- A. The continents seemed to fit together like pieces of a puzzle.
- B. There are similar fossils on different continents.
- C. Mountain ranges on different continents lined up.
- D. The North Pole and Antarctica are covered in ice.

D. What hypothesis states that the continents were once joined to form a single supercontinent?

- a. plate tectonics
- b. seafloor spreading
- c. continental drift
- d. paleomagnetism

E. Use the word bank below to complete the sentences.

seismograph	Sea floor spreading	earthquakes	melt
P Waves			
Epicerter	Continental-continental	Metamorphic	S Waves

1. Which of the following occur at divergent boundaries? _____
2. An earthquakes _____ is occurs directly above the focus.
3. Mountains form at _____ convergent boundaries.
4. _____ rocks form due to heat a pressure.
5. Magma forms when rocks from the upper crust and mantle _____.
6. A _____ is the instrument that records earthquake waves.
7. _____ shake particles at a right angle to the direction of travel.

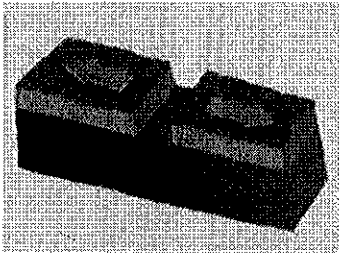
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_____ change a materials volume by expansion and compression.

8. Predictions are made on the assumption that _____ are repetitive (they occur on the same fault lines).

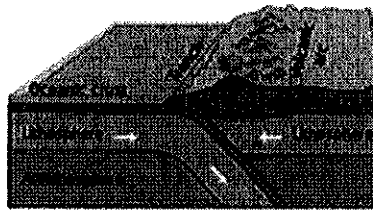
F. Match structures formed at each plate boundary

A



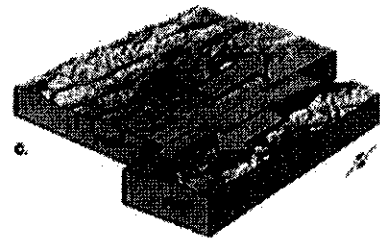
_____ 1. Convergent

B



_____ 2. Divergent

C



_____ 3. Transform

C. Explain what happens (plate motion) and what features occur at each plate boundary. Convergent (Hint: Three types)

Divergent (Hint: Two types)

Transform

G. In the chart below compare and contrast magma and lava.

<u>Magma</u>	<u>Lava</u>

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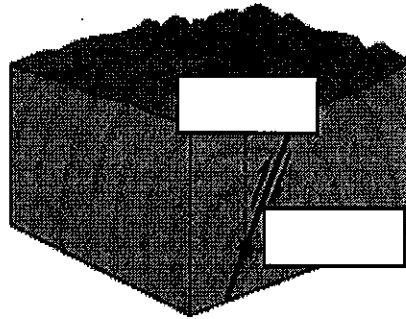
2. Locate volcanoes and relate back to plate boundaries. Explain volcanic effects on the lithosphere and relate back to plate boundaries (convergent, divergent, transform) including lahar (mud) flows and ash in the atmosphere.

A. Circle the best answer

1. Most of the active volcanoes on Earth are located in a belt known as the ____.

- a. Ring of Lava
- b. Ring of Fire
- c. East African Rift Valley
- d. circum-Atlantic belt

B. Label the epicenter and focal point.

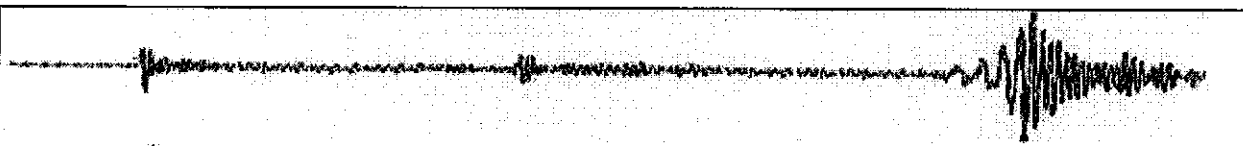
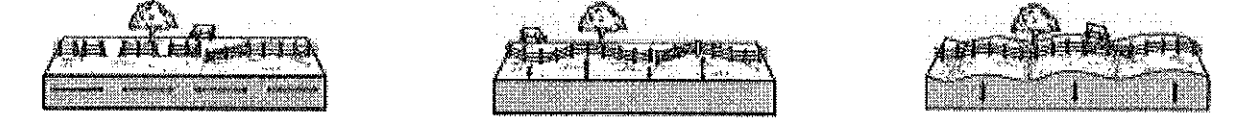


C. At which type of plate boundary do earthquakes typically occur?

D. Complete the chart below.

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Seismic Waves:

Seismic			
Waves			
Wave Letter			
Wave Name			
Order of Arrival			
Motion			
Force			

E. • Summarize the major events in the geologic history of North Carolina and the southeastern United States.

<ol style="list-style-type: none"> 1. ___ Appalachian Mountains 2. ___ Fall Zone 3. ___ Shorelines 4. ___ Barrier Islands 5. ___ River Basins 	<ol style="list-style-type: none"> a. due to uplifting of rock in the western part of NC b. line of erosion between piedmont and coastal plains c. affected by erosion due to increase in sea level d. built up by sediment from rivers, and constantly changing due to wave action e. area of land that contributes water to a river
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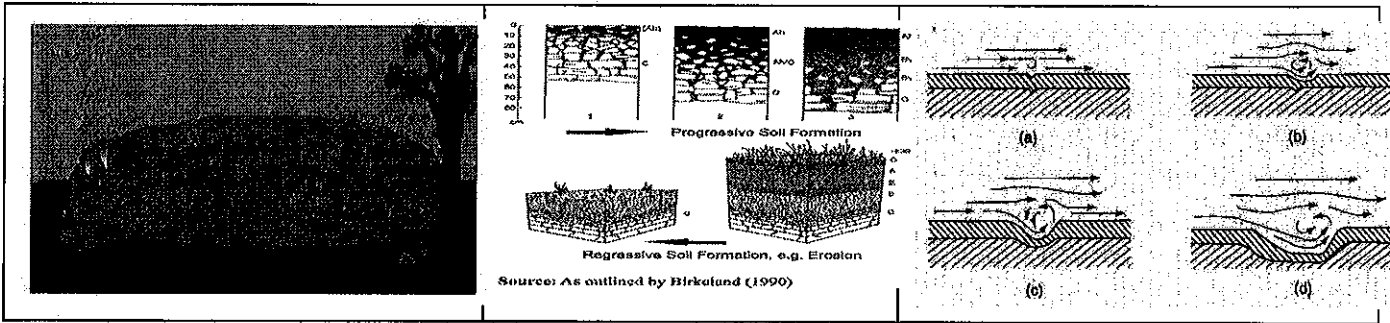
F. What is currently happening to global sea level? Why?

3. Explain how natural actions such as weathering, erosion (wind, water and gravity), and soil formation affect Earth's surface.

A. Label each diagram as "weathering", "erosion" or "soil formation"

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B. Mass Movements:

<p>___1. The downslope movement of rock, regolith, and soil under the direct influence of gravity is called a(n) _____.</p>	<p>___2. A mass movement that involves the sudden movement of a block of material long a flat, inclined surface is called a _____. a. Slide b. Slump c. Flow d. Rockfall</p>
<p>3. The downward movement of a block of material along a curved surface is called a(n) _____.</p>	<p>___4. What is the slowest type of mass movement? a. Earthflow b. Slump c. Creep d. Rockfall</p>
<p>___5. What factor(s) commonly triggers mass movement? a. Earthquakes b. Saturation of surface materials with water c. Removal of vegetation d. All of the above</p>	<p>___6. What is the force behind mass movement? a. The sun's energy b. Gravity c. Flowing water d. Moving ice</p>

C. Earthquakes:

<p>1. What are the causes of damage during or after an earthquake (5 in total)?</p> <p>1) _____ 2) _____ 3) _____ 4) _____ 5) _____</p>	<p>2. How can we predict earthquakes?</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>
<p>___3. Which of the following affects the amount of destruction caused by earthquake vibrations? a. The design of structures</p>	<p>4. What is the minimal number of seismic stations that is needed to determine the location of an Earthquake's epicenter?</p>

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<p>b. The nature of the material on which structures are built</p> <p>c. The intensity and duration of the vibrations</p> <p>d. All of the above</p>	<p>a. One</p> <p>b. Two</p> <p>c. Three</p> <p>d. Four</p>
<p>Explain the hazards to humans from an earthquake ---></p>	<hr/> <hr/> <hr/>

D. Volcanoes:

<p>___1. The particles ejected in volcanic eruptions are called ____.</p> <p>a. Calderas</p> <p>b. Volcanic stocks</p> <p>c. Laccoliths</p> <p>d. Pyroclastic material</p>	<p>2. List the types of volcanoes and explain each of them.</p>
<p>3. Most of the active volcanoes on Earth are located in a belt known as the ____.</p> <p>a. Ring of Fire</p> <p>b. Ring of Lava</p> <p>c. East African Rift Valley</p> <p>d. Mid-Pacific Rise</p>	<p>Which of the following factors helps determine whether a volcanic eruption will be violent or relatively quiet?</p> <p>a. amount of dissolved gases in the magma</p> <p>b. temperature of the magma</p> <p>c. composition of the magma</p> <p>d. all of the above</p>

<p>Explain precautions that can be made to protect life from various geohazards . Some examples include landslides, earthquakes, tsunamis, sinkholes, groundwater pollution, and flooding.</p> <hr/> <hr/> <hr/>

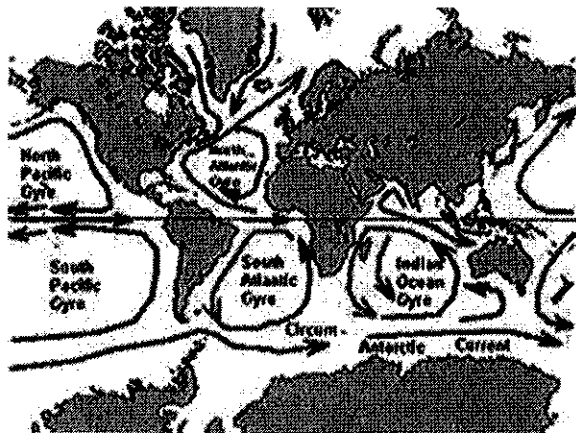
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Understand how human influences impact the lithosphere.

1. Explain the consequences of human activities on the lithosphere past and present.

A. Match each human activity to possible consequences

1. ____ mining	a. soil erosion
2. ____ deforestation	b. desertification
3. ____ agriculture	c. nutrient depletion
4. ____ overgrazing	d. global warming
5. ____ urbanization	e. heat islands



Explain the structure and processes within the hydrosphere.

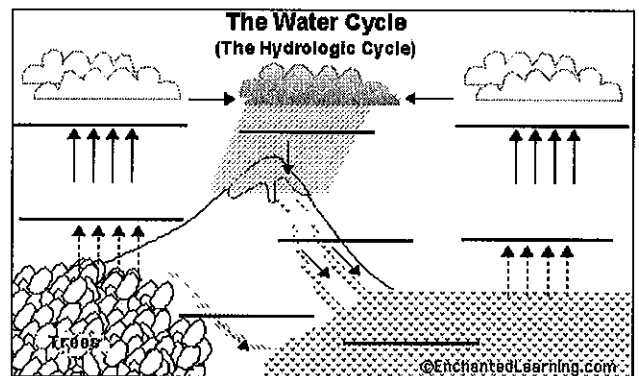
1. Explain how water is an energy agent

A. Explain how warm and cold currents cycle.

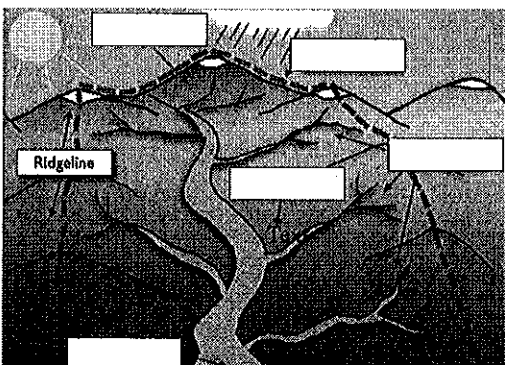
B. Why are coastal cities warmer than inland cities?

2. Explain how ground water and surface water interact.

A. Label: *evaporation, transpiration, precipitation, condensation, run off*



B. Label the watershed with: *headwaters, estuary, floodplain, tributaries, precipitation*



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Evaluate how humans use water.

1. Evaluate human influences on freshwater availability
 A. Fill in the blank: *well, aquifer, dams, agriculture, recreation, subsidence, salt water intrusion.*

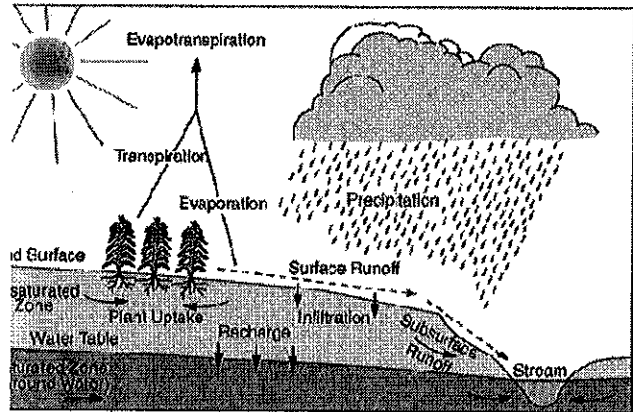
To access groundwater, _____ are dug into _____ . The primary use of groundwater by humans is for _____. Issues with aquifers include _____ (sinking of sediment) and _____ (contamination of

salt water by the coast).

B. Growing human population will _____ freshwater as a resource. (increase or decrease).

C. True or False:

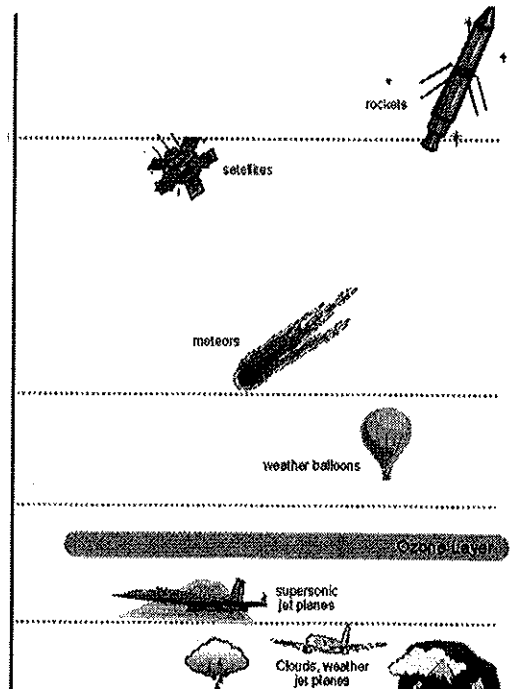
- _____ Pollution in the ground cannot affect freshwater.
- _____ Pollution at one area of a watershed cannot affect other areas of the watershed.
- _____ A biotic index of macroinvertebrates can be used to determine water quality



Understand the structure of and processes within our atmosphere.

1. Summarize the structure and composition of our atmosphere.

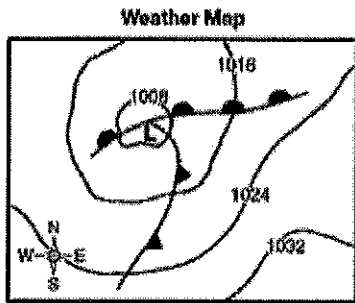
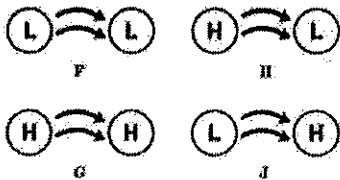
Station Model	Station Model Explanation
	<p>Present weather: Amount of cloud cover (approximately 75% covered)</p> <p>Temperature (°F) 28</p> <p>Barometric pressure (1019.6 mb) 196</p> <p>Visibility (mi) $\frac{1}{2}^*$</p> <p>Barometric trend (a steady 1.9-mb rise in past 3 hours) +19/</p> <p>Dewpoint (°F) 27</p> <p>Precipitation (0.25 inches in past 6 hours) .25</p> <p>Wind speed: whole feather = 10 knots, half feather = 5 knots</p> <p>Wind direction (from the southwest)</p>



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A. Label the layers of the atmosphere to the right: *thermosphere, troposphere, stratosphere, mesosphere*

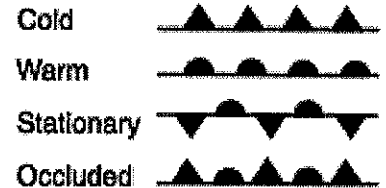
B. Which diagram above shows how air masses move in the troposphere?
(H = high pressure, L = low pressure)



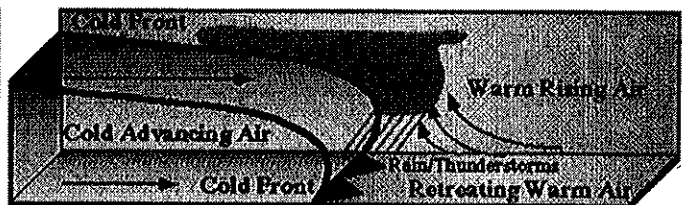
C. True or False:

- _____ warm moist air rises over cold dense air
- _____ rain occurs when warm moist air condenses at higher altitudes
- _____ higher elevations are colder than lower elevation
- _____ a cold front occurs when cold air masses push under a warm air mass. Narrow storms are produced

Fronts



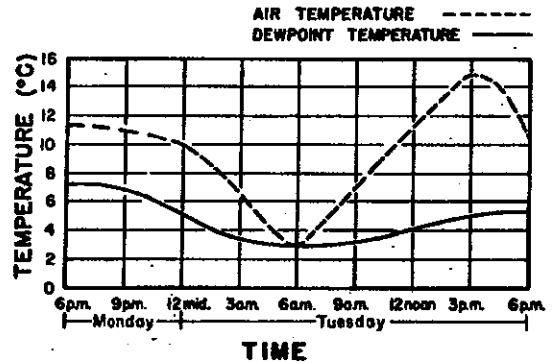
- _____ wide bands of precipitation occur at warm fronts
- _____ thunderstorms occur at warm moist air masses moving along a cold front
- _____ tornadoes are measured by the Fujita Scale
- _____ hurricanes are measured by the Saffir-Simpson Scale
- _____ isotherms show lines of temperature
- _____ isobars show lines of air pressure
- _____ psychrometers measure humidity
- _____ barometers measure air pressure
- _____ thermometers measure air temperature
- _____ anemometers measure air speed
- _____ a weather vane measure wind direction
- _____ a rain gauge shows the amount of precipitation



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2. Explain how cyclonic storms form based on the interaction of air masses

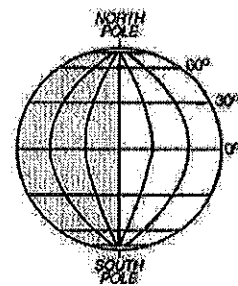
- A. Why does dew form in the morning?
- B. Explain how clouds form.



Hurricane Formation	Tornado Formation

3. Explain how human activities affect air quality

- A. Match the following to their impact on the atmosphere



<ul style="list-style-type: none"> 1. ____ Acid Rain 2. ____ chlorofluorocarbons (CFC's) 3. ____ burning of fossil fuels 	<ul style="list-style-type: none"> a. formed by sulfur dioxide and nitrogen oxides, decrease pH of precipitation b. decreases ozone c. increases the amount of greenhouse gases and sulfur dioxide and nitrogen oxides
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Analyze patterns of global climate change over time

- 1. Differentiate between weather and climate
 - A. True or False?

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- ___ Temperate climates are located closest to the equator.
- ___ Polar climates are cold year round
- ___ Temperate climates have warm and cold seasons
- ___ Polar climates have the most precipitation
- ___ Tropical climates have the most varied climate

B. Compare weather and climate.

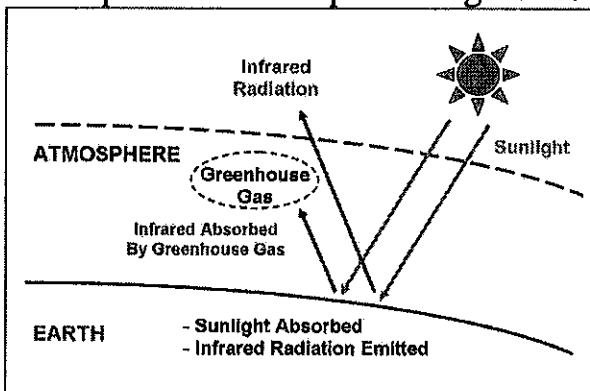
Weather	Climate

2. Explain changes in global climate due to natural processes.

A. Matching

<ol style="list-style-type: none"> 1. ___ El Nino/La Nina 2. ___ volcanic eruptions 3. ___ sunspots 4. ___ shifts in Earth's orbit 5. ___ carbon dioxide fluctuations 	<ol style="list-style-type: none"> a. unusually warm temperatures caused by a change in ocean currents b. cause cooler temperatures due to absorption of sun's energy by atmospheric particles c. decrease in climate due to magnetic field changes of the sun d. changes in climate due to the change in the tilt of Earth's axis e. increases climate when increase occurs
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B. Explain the concept of the greenhouse effect and identify 2 greenhouse gases.



3. Analyze the impacts that human activities have on global climate change (such as burning hydrocarbons, greenhouse effect, and deforestation).

A. Matching

<ol style="list-style-type: none"> 1. ___ burning hydrocarbons 2. ___ greenhouse effect 	<ol style="list-style-type: none"> a. increases greenhouse gases (CO₂) in the atmosphere b. traps heat in the atmosphere
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3. ___ deforestation 4. ___ heat island 5. ___ industrialization	c. increases CO ₂ in the air and results in less CO ₂ being removed from the air by photosynthesis d. urban areas that reflect more heat and produce more CO ₂ e. results in increased burning of fossil fuels.
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Explain how the lithosphere, hydrosphere, and atmosphere individually and collectively affect the biosphere.

1. Explain how abiotic and biotic factors interact to create the various biomes.
 - A. Identify if the following factors of biomes are biotic or abiotic: *temperature, rainfall, altitude, type of plant, latitude, type of animals.*

Biotic	Abiotic

B. Explain why biodiversity is important.

C. Complete the chart

Human Influence	Effect
Human population growth	
Habitat alteration	
Introduction of invasive species	
Pollution	
Over harvesting	

Evaluate human behaviors in terms of how likely they are to ensure the ability to live sustainably on Earth

1. Critique conventional and sustainable agriculture and aquaculture practices in terms of their environmental impacts.
 - A. Fill in the chart

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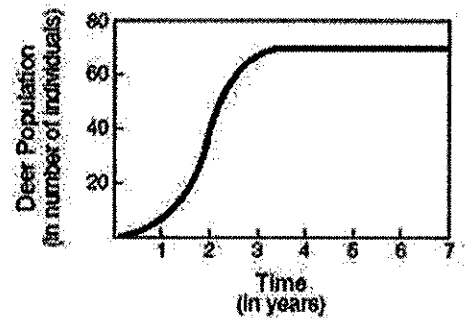
Energy	Advantages	Disadvantages
solar		
wind		
biofuels		
nuclear fission		
fuel cells		
wave power		
geothermal		
coal		
oil		
natural gas		

B. Identify if the above energy sources are renewable or nonrenewable in the chart below:

Renewable	Nonrenewable

2. Explain the effects of uncontrolled population growth on the Earth's resources.

A. What is the carrying capacity of the following graph and explain?



B. What are three limiting factors for human population?

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C. What will most likely happen if the human population continues to grow at current rates?

- a. There will be fewer natural resources available for future generations.
- b. There will be an increase in nitrogen levels in the atmosphere.
- c. There will be a decrease in the number of strong hurricanes.
- d. There will be a decrease in water pollution.

3. Evaluate the concept of “reduce, reuse, recycle” in terms of impact on natural resources.

A. What is ecological footprint?

- a. measures the amount of renewable and nonrenewable resources that are used by our activities
- b. the maximum number of individuals that the environment can support
- c. measure of how many people make up the world population

B. Identify one example of a material that could be reused. How could reusing the object provide a lasting impact on the environment?