Earth Science Final Review

Scientific Method: Put the steps in order by putting numbers 1 through 6 in the blanks.

____ Draw Conclusions
____ Perform an Experiment
____ Create a Hypothesis
____ Identify a Problem
____ Record Results
____ Create a Theory

Match the units

____ 1) Temperature
____ 2) Length
____ 3) Area
____ 4) Mass
____ 5) Volume
____ 6) Density
____ 7) Time

a) Kilogram
b) Meter
c) Seconds
d) cm^2
e) cm^3 or liters or milliliters
f) g/cm^3 or g/mL
g) Kelvin or Celsius

Match the latitudes and longitudes

____ 1) International Date Line
____ 2) Prime Meridian
____ 3) North Pole
____ 4) South Pole
____ 5) Equator

a) 0^o latitude
b) 0^o longitude
c) 180^o longitude
d) 90^o N latitude
e) 90^o S latitude

Latitude & Longitude

1) Which lines are parallel and never intersect: Latitude or Longitude?
2) Which lines converge at the poles: Latitude or Longitude?
3) Latitude lines run [east-west or north-south?].
4) Longitude lines run [east-west or north-south?].
5) The Earth is divided into how many time zones? _____
6) Which comes first when writing the coordinates of a location: latitude or longitude?

Earth's Systems: Asthenosphere, Atmosphere, Biosphere, Hydrosphere, Lithosphere

1) Water in the oceans, lakes, glaciers; water vapor in the air: _____
2) The molten portion of the Earth's mantle: _____
3) The gases that surround Earth: _____
4) The rigid outer shell of the Earth: _____
5) Organisms and their environments: _____

Elements & Compounds: silicon, oxygen, nitrogen, carbon dioxide

1) Most of Earth's atmosphere is made up of _____ and _____.
2) Most of Earth's crust is made up of _____ and _____.
3) Responsible for the greenhouse effect: _____

Earth's Layers:

Put in order from the innermost (1) to the outermost layer (4): Mantle, Crust, Inner Core, Outer Core

1. _____ 2. _____ 3. _____ 4. _____

Latitude & Longitude: Use the map to the right.

1) Multiple Choice: Choose the correct latitude and longitude for point A.
   a) 15°W, 10°N
   b) 6°N, 14°W
   c) 10°W, 15°N
   d) 15°N, 10°W

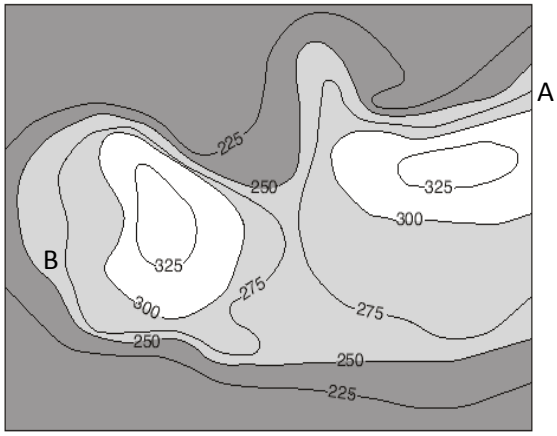
2) Multiple Choice: Choose the correct latitude and longitude for point B.
   a) 20°N, 15°E
   b) 15°E, 20°N
   c) 10°N, 23°E
   d) 23°N, 10°E

Topographic Maps

1) What's the contour interval on map?_____

2) What is the elevation of point A? _____

3) What is the elevation of point B? _____



Types of Maps

____ 1) Shows the elevation of surfaces on Earth
____ 2) Flat map that shows the correct shapes of landmasses but distorts their sizes.
____ 3) Shows the age of the ocean floor rocks
____ 4) 3-D map that does not distort the sizes and shapes of Earth's continents and oceans.

a) Isochron
b) Globe
c) Mercator
d) Topographic

Types of Measurement Instruments

____ 1) Measures atmospheric pressure
____ 2) Can give direction, distance, and location of an object on Earth using a system of satellites.
____ 3) Used to track thunderstorms.
____ 4) Measures earthquakes
____ 5) Measures wind speed

a) Anemometer
b) Barometer
c) Doppler Radar
d) Global Positioning System
e) Seismographs

Names of Subdisciplines of Earth Science

1) Study of the universe, stars, solar systems, etc.
2) Study of rocks
3) Study of earthquakes
4) Study of mapmaking
5) Study of weather and atmospheric conditions
6) Study of the composition of the Earth's saltwater bodies

a) Cartography
b) Astronomy
c) Geology
d) Seismology
e) Oceanography
f) Meteorology

The 5 Characteristics of Minerals: Circle the correct one for each number.

1) Naturally-occurring or Synthetic?
2) Organic or Inorganic?
3) Solid or Liquid or Gas?
4) Specific Chemical Composition or Varying Chemical Composition?
5) Amorphous Structure or Definite Crystalline Structure?

Mineral Characteristics: hardness, luster, color, cleavage/fracture, streak

_____ 1) Metals such as gold, silver, and copper have this.
_____ 2) This is the least reliable (but easiest) characteristic in identifying minerals.
_____ 3) This test is very reliable even when the color of the mineral varies.
_____ 4) To perform this test, use Mohs scale to see what will scratch the mineral.
_____ 5) How a mineral breaks

Types of Rock: Metamorphic, Igneous, or Sedimentary?

_____ 1) Formed when magma cools and crystallizes.
_____ 2) Forms when rock is weathered, eroded, and then cemented together.
_____ 3) Forms when rock is under high pressure and temperature, but is not melted.
_____ 4) Two types: extrusive and intrusive.

The Rock Cycle

1) Rocks are classified into metamorphic, igneous, or sedimentary categories based on how they_____.
2) What 2 forces drive the rock cycle? _____ and _____
3) Extrusive rocks cool [quickly or slowly?] [above ground or underground?], producing [large or small?] crystals and [fine or coarse?] grains.
4) Intrusive rocks cool [quickly or slowly?] [above ground or underground?], producing [large or small?] crystals and [fine or coarse?] grains.
5) Put these processes in order to show how igneous rock is changed into sedimentary rock: Cementation/Lithification, Deposition, Erosion, Weathering.
   1. _____ 2. _____ 3. _____ 4. _____

Boundaries, Faults and Stresses: Draw arrows to represent each: ←→ or →← or ↓↑

1) Boundaries: Divergent _____, Convergent _____, Transform _____
2) Faults: Normal _____, Reverse _____, Strike-Slip _____
3) Stress: Tension _____, Compression _____, Shear _____

Put in order from the fastest wave to the slowest wave: surface wave, S-wave, P-wave

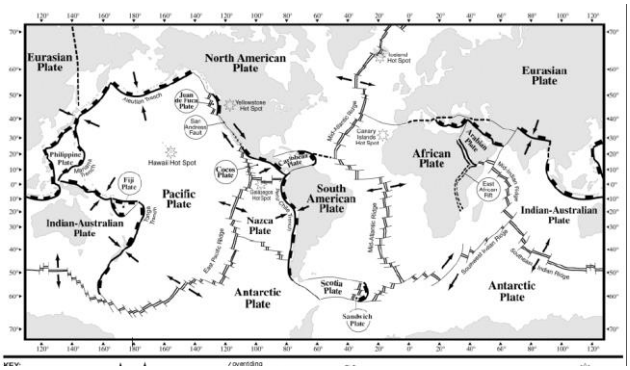
fast _____ _____ _____ slow

Identify the type of wave: surface wave, S-wave, P-wave, tsunami

a. Arrives first at seismic stations: _____
b. Travels only on the crust and causes ground to move in two directions: _____
c. Travels in the crust and the mantle, but cannot travel through the outer liquid core: _____
d. Travels through the crust, mantle, and core: _____
e. Are refracted (bent) by Earth's outer liquid core: _____
f. Wave that results from the vertical motions of the seafloor: _____

Ocean Ridges or Deep-Sea Trenches?

_____ 1) Occurs at a convergent boundary
_____ 2) Occurs at a divergent boundary
_____ 3) Youngest crust (where new crust is made)
_____ 4) Oldest crust (where crust is recycled)
_____ 5) In Atlantic Ocean
_____ 6) In Pacific Ocean



Which theory: Continental Drift or Plate Tectonics?

1) Earth's crust is broken into giant slabs: _____
2) The continents were once together in one supercontinent called Pangaea: _____
3) Supported by rock, continent shape, climate, fossil evidence: _____
4) Wegener had trouble selling the _____theory because he didn't know why or how continents moved.
5) More recently supported by sea floor spreading and paleomagnetism data: _____
6) The presence of coal beds in Antarctica (which require a warm climate to form) serves as evidence for this theory: _____

The downward pull of convection currents in the mantle help to [recycle old crust or produce new crust?] and result in plates being [pulled toward each other or pushed away from each other?].

What would occur at this boundary?	**Subduction zone?**	**Trench?**	**Rift?**	**Volcano?**	**Folded Mtn?**
1) Continent-Continent Convergent Boundary:	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No
2) Continent-Continent Divergent Boundary:	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No
3) Continent-Ocean Convergent Boundary:	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No
4) Ocean-Ocean Divergent Boundary:	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No
5) Ocean-Ocean Convergent Boundary:	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No
6) Transform Boundary:	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No

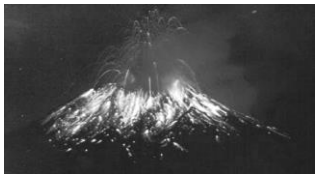
<u>At which boundary do these occur</u>? (See #1-6 above for the answer choices.)

Volcanic Island Arc (ex. Hawaii): _____

1) Great African Rift: _____
2) Folded Mountains (ex. Himalayas): _____

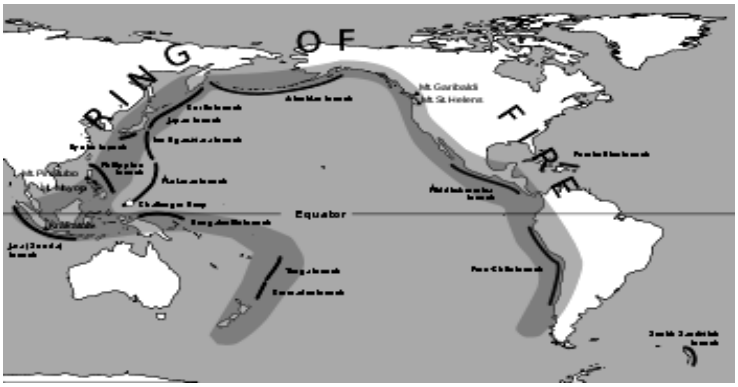
<u>Volcanoes & Earthquakes</u>

1) Identify the shape of each type of volcano (shield, composite, cinder cone):



_____ _____ _____

2) The Ring of Fire is located around the _____ Ocean.
3) Why do so many volcanoes and earthquakes occur around the Ring of Fire?
   _____
   _____
4) What scale is used to measure the magnitude of an Earthquake? _____
5) Earthquakes that occur under the ocean can cause giant waves called _____.



<u>Soil Formation</u>

____1) Water
____2) Physical (Mechanical) Weathering
____3) Chemical Weathering
____4) Important factors in soil formation
____5) Sand
____6) Clay
____7) Factors affecting rate of erosion
____8) Silt
____9) Climate that allows the fastest chemical weathering

A) When forces like wind and water break rock into smaller and smaller pieces without changing its composition.
B) The most important agent of chemical weathering
C) When rock is transformed into a new substance – ex. $CaCO_3$ (limestone) is broken down by HCl (acid) to produce H_2O, CO_2, and $CaCl_2$.
D) Largest soil particle size
E) Medium soil particle size
F) Small soil particle size
G) Wet and warm
H) Parent rock material, climate, slope, organisms, time
I) Climate, slope, type of vegetation

Freshwater & Groundwater

___ 1) A blocked-off meander
___ 2) The ability of a material to allow water to pass through it
___ 3) The shape of a stream that is being actively eroded.
___ 4) A low-lying area that is covered in water a large part of the year
___ 5) Process during which a stream resumes downcutting towards its base level (increasing its rate of flow)
___ 6) Fan-shaped deposit found on valley floors at the base of a mountain
___ 7) A triangular deposit that forms when a stream slows down as it meets the ocean.
___ 8) All of the land area whose water drains into a stream system
___ 9) A bend or curve in a stream channel
___ 10) A depression in the land that holds water
___ 11) When water spills over the sides of a stream's banks

a) Alluvial Fan
b) Delta
c) Downcutting
d) Flood
e) Lake
f) Meander
g) Oxbow Lake
h) Permeability
i) Rejuvenation
j) V-shaped
k) Watershed

Water Cycle: Condensation, Evaporation, Runoff, Precipitation, Infiltration

_____ 1) Snow, sleet, rain, or hail
_____ 2) When water changes from a liquid to a gas due to an increase in temperature
_____ 3) When water changes from a gas to a liquid due to a decrease in temperature
_____ 4) When water moves from land into the atmosphere
_____ 5) When water vapor changes to liquid water to form clouds
_____ 6) When precipitation soaks into the ground and becomes groundwater
_____ 7) When water travels along the surface of Earth to a river or ocean

Freshwater & Groundwater: acidic groundwater, bed load, limestone, solution, suspension, water table, zone of aeration, zone of saturation

1) What are the 3 ways that a stream carries its load?
   1. _____ (dissolved in the stream)
   2. _____ (small particles carried by turbulence that settle when water slows)
   3. _____ (large particles rolled along bottom)

2) Identify the layers of groundwater.
   1. _____ (highest layer; pores contain both water and air)
   2. _____ (upper boundary of the zone of saturation)
   3. _____ (lowest layer; pores are all filled with water)

3) The formation of caves requires _____ that eats away (reacts chemically with) _____, a type of rock.

Type of Heat Transfer: Conduction, Convection, Radiation

1) Energy transferred by electromagnetic waves (ex. Sun's energy traveling to Earth): _____
2) Energy transferred between two objects in contact (ex. touching a hot pan): _____
3) Energy transferred when hot air rises and cold air sinks: _____
4) Responsible for transferring energy in the atmosphere and different types of weather: _____

Global Winds: Convection Currents, Coriolis Effect, Polar Easterlies, Prevailing Westerlies, Trade Winds

1) The trade winds are created by the _____ (caused by the Earth's rotation) and _____ (hot air rising, cold air sinking) in the atmosphere.
2) Between 0° and 30°N: _____
3) Between 30°N and 60°N: _____
4) Between 60°N and 90°N: _____

Atmosphere, Ocean, & Weather

1) The layer of the atmosphere where weather occurs
2) The layer of the atmosphere that contains ozone which acts as a shield against the UV rays from the sun
3) When the temperature in the atmosphere reaches the ____ point, condensation occurs.
4) Measures the amount of water vapor dissolved in the air compared to the maximum amount of water vapor that the air could hold.
5) Particles of atmospheric dust around which clouds form.
6) Short-term variations in atmospheric conditions
7) Long-term averages of atmospheric conditions
8) The change in wave frequency of energy as it moves toward or away from an observer.

a) Climate
b) Condensation Nuclei
c) Dew
d) Doppler Effect
e) Relative Humidity
f) Stratosphere
g) Troposphere
h) Weather

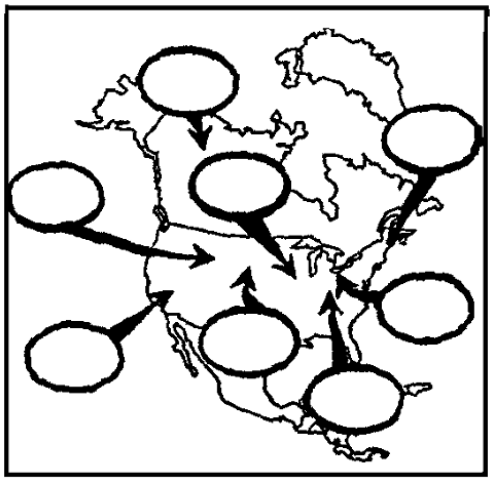
Weather (W), Climate (C) or Both (B)?

____1) An accumulation of data over 30 years or more (an average).
____2) Tracks daily temperature and precipitation.
____3) Include precipitation, temperature, humidity, sunshine, wind velocity, fog, frost, and hail storms

Types of Air masses

1) Circle the humidity and temperature for each air mass below.
    a. Marine tropical: (hot/cold, humid/dry)
    b. Continental polar: (hot/cold, humid/dry)
    c. Continental tropical: (hot/cold, humid/dry)
    d. Marine polar: (hot/cold, humid/dry)

2) Use the symbols (cP, cT, mP, mT) to fill in the map to the right.



Cyclones and Anti-Cyclones

1) Cyclones are centers of (low/high) pressure.
2) Anti-cyclones are centers of (low/high) pressure.
3) Air turns (clockwise/counterclockwise) in a cyclone.
4) Air turns (clockwise/counterclockwise) in an anti-cyclone.
5) Air (rises/falls) in a cyclone.
6) Air (rises/falls) in an anticyclone.

Predicting Weather

1) As latitude increases, the intensity of the solar energy increases/decreases.
2) The higher/lower the elevation, the colder the climate.
3) Topographic features such as mountains play an important role in the amount of _____ that falls over an area. The windward/leeward side of the mountain is typically rainier.
4) When an area is near land/water, the temperatures are more temperate.
5) Global winds are a factor that distribute_____ and _____ around the Earth.
6) Vegetation can affect both the _____ and the _____ patterns in an area.

Human Impact

a. Coal burning plants release lots of (nitrous oxides/sulfur oxides) into the air.
b. Which is NOT a greenhouse gas? (ammonia/ carbon dioxide/water vapor/methane).
c. Deforestation causes (more/less) oxygen production due to an (increase/decrease) in photosynthesis. Trees that are cut down are often burned increasing (ash and particulate matter/sulfur dioxide) to be released into the air.
d. "Heat island" refers to [urban or rural?] areas being hotter than [urban or rural?] areas.
e. The Sun's energy output is slightly (lower/higher) during periods with large numbers of sunspots.
f. CFCs introduce (chlorine/nitrogen/sulfur) into the ozone layer. The ultraviolet radiation at this altitude breaks down CFCs, freeing the _____ which breakdown ozone.
g. Ground-level _____ and airborne _____ from burning are the two pollutants that pose the greatest threat to human health in this country.

Global Climate Change

1. A layer of _____ acts as a thermal blanket for the Earth, absorbing heat and warming the surface to a life and supporting a global average of 15 degrees Celsius.
2. The greenhouse effect is a (natural / manmade) warming of Earth's (lower/upper) atmosphere and Earth's surface.
3. The (greenhouse/enhanced greenhouse) effect is the strengthening of the greenhouse effect through human activities.
4. (El Niño/La Niña) every 2-7 years heating up the eastern Pacific around the equator. Storms can be (more/less) violent and some areas have extreme drought.

Weather & Oceans

1) [High or low?] pressure systems are associated with cloudy and rainy weather.
2) [High or low?] pressure systems are associated with fair weather.
3) When an air mass rises, its water vapor [evaporates or condenses?].
4) After volcanoes spewed water vapor into the air, oceans formed when the Earth's crust [heated or cooled?] causing the water vapor to condense and fall to Earth.
5) Increasing salinity causes an [increase or decrease?] in the density of ocean water.

Abiotic and Biotic Factors in NC Biomes

____1) Abiotic factors
____2) Biotic factors
____3) Frontier ethic
____4) Sustainability

a. Living resources
b. Nonliving things
c. Resources are unlimited. Use as much as you want.
d. Resources are limited. Recycle and use sparingly so that resources will be available in the future

Biomes

_____1) Tropical Rainforest
_____2) Coniferous Forest (Boreal/Tiaga)
_____3) Deciduous Forest
_____4) Hot Desert
_____5) Tundra
_____6) Temperate Grassland/ Savannah

a. Acidic Soils
b. Soil is low in nutrient quality
c. Permafrost
d. Sandy soils
e. Thick humus layer in soils from
f. Fertile soils

Biodiversity

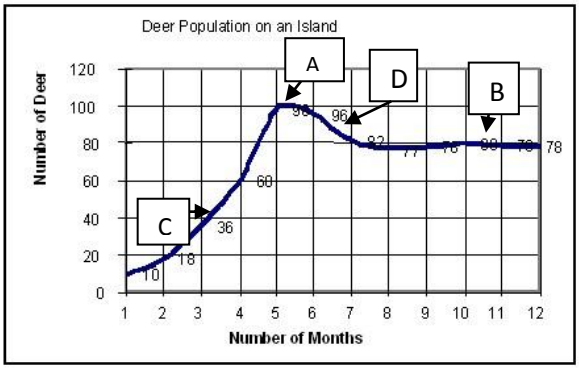
1. True or False?: a population with low genetic diversity is more likely to survive major environmental changes.
2. Put an "x" by those that will increase biodiversity.
   a. ____ Mutations in DNA
   b. ____ Natural selection pressures
   c. ____ Extinction events
   d. ____ Competition among species
   e. ____ Variations in local environments

Environmental Limits

Label the points A-D with the following terms: at carrying capacity, exponential growth, exceeded carrying capacity and declining, peak population.

A: _____ B: _____

C: _____ D: _____



Circle the statements that are describing sustainable practices:

a. mode of human development in which resource use aims to meet human needs while preserving the environment
b. the earth has an unlimited supply of resources available for use by people-- If resources run out in one area, more can be found elsewhere or alternatively human ingenuity will find substitutes
c. The earth has a limited supply of resources.
d. Humans do not need to conserve resources.
e. Humans share the earth's resources with other living things.
f. Unlimited growth is sustainable.
g. Humans are above nature.

Energy Resources: Renewable or Nonrenewable?

_____ 1) A resource that exists in a fixed amount on Earth and can only be replaced by processes that take millions of years.
_____ 2) Resources that can be used indefinitely without a reduction in supply.
_____ 3) Solar, Wind, Hydroelectric, Biomass, Geothermal
_____ 4) Coal, Oil, Natural Gas, Nuclear

Energy Resources: Solar, Geothermal, Nuclear, Biomass, Coal, Oil, Natural Gas, Wind, Hydroelectric, Fossil Fuels

_____ 1) Does not pollute, requires solar panels, renewable
_____ 2) Uses energy from radioactive material, like uranium; requires the building of a power plant; low pollution, but safety concerns
_____ 3) Burns trees, plants, and manure for energy
_____ 4) Uses heat produced by radioactive material deep in the Earth.
_____ 5) Harnesses energy from moving water.
_____ 6) Requires lots of wind and windmills
_____ 7) Cleaner than coal or oil, but a nonrenewable resource; frequently used now
_____ 8) Used for most of our electricity; high pollution; requires mining and power plants.
_____ 9) Used for gasoline; high pollution; nonrenewable; wars have been fought for control of this resource; spills cause great disturbance of ocean ecosystems.
_____ 10) A hydrocarbon deposit, such as petroleum, coal, or natural gas, derived from living matter of a previous geologic time and used for fuel

Formation of the Sun, Earth and Planets

1) Nebular theory
2) Big bang theory
3) Doppler effect
4) Solar System
5) Galaxy
6) Universe

a) Stars moving away from an observer appear red. Stars moving toward an observer appear blue
b) The Sun and planets
c) The Milky way is just one of many
d) the universe began from an initial point which has expanded over billions of years
e) The collection of all the galaxies
f) Gaseous clouds slowly rotate, gradually collapse and flatten due to gravity and form stars and planet

Motions: Draw a diagram illustrating the following

Precession Nutation Barycenter between a large & small planet

Order the following in terms of organization:

___ the Milky Way Galaxy
___ our Earth
___ our Solar System
___ the Universe

Earth, Moon, Sun, Planets

___1. Caused by the Earth's tilt and revolution around the Sun
___2. Caused by the Earth's rotation.
___3. Caused by the Moon's revolution around Earth.
___4. The reason why we see only one side of the moon.
___5. Says that planets travel around the sun in an elliptical orbit.
___6. When Earth spins on its axis this is called a _____.
___7. When the Earth moves around the Sun, this is called a _____.
___8. The center of mass of two objects
___9. The giant circle made by Earth's North Pole.
___10. The wobble that causes a change in the Earth's tilt angle.
___11. The point at which the planet is the farthest away from the sun.
___12. The point at which the planet is the closest to the sun.
___13. When the moon is closest to the Earth.
___14. When the moon is the farthest away from the Earth.

a) Day/Night
b) Kepler's Law
c) Lunar Phases
d) Seasons
e) Synchronous Rotation
f) Revolution
g) Rotation
h) Precession
i) Nutation
j) Barycenter
k) Aphelion
l) Perihelion
m) Apogee
n) Perigee

Planets: Earth, Jupiter, Mars, Mercury, Neptune, Saturn, Uranus, Venus

1) Put planets in order from closest to the sun to farthest away. Identify the row that is comprised of Terrestrial planets as well as the row comprised of Jovian planets.

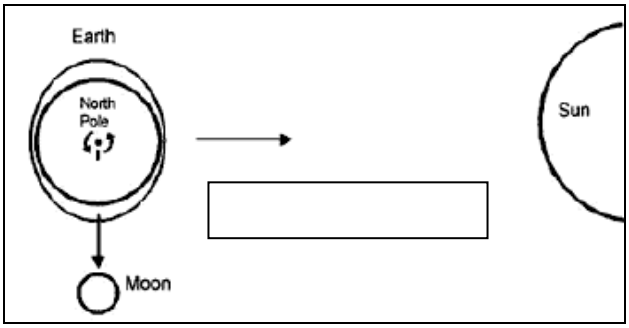
1. _____ 2. _____ 3. _____ 4. _____

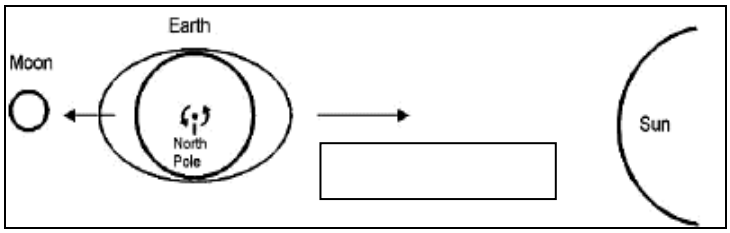
5. _____ 6. _____ 7. _____ 8. _____

Identify Earth's tides: Spring or Neap

_____1) The tide with the highest highs and the lowest lows.
_____2) The tide with the least difference between highs and lows.

Label the picture below as <u>Spring Tide</u> or <u>Neap Tide</u>.





<u>Equinox, Summer Solstice, or Winter Solstice?</u>

_____ 1) Sun is directly overhead at 23.5°N latitude.

_____ 2) Sun is directly overhead at 23.5°S latitude.

_____ 3) Days and Nights are equal.

<u>Solar Energy</u>

1) <u>True or False?</u>: Solar energy makes life on Earth possible.
2) Solar energy gets to Earth by [<u>conduction, convection, or radiation?</u>].

Free Response Questions:

<u>Answer the following on a separate sheet of paper. Anything written on here will not be scored!</u>

1. A weather map shows closely spaced isobar lines over an area.
    a. What do the isobar lines represent?
    b. What do closely spaces isobars indicate about the weather in the area?
2. Volcanoes are a major geologic feature on Earth
    a. Describe the particles and gases emitted during a volcanic eruption.
    b. Describe how a volcano can affect climate.
3. Hydroelectric resources can be used to produce electricity in some areas of the country.
    a. What is an advantage of using hydroelectric resources for power rather than using fossil fuel resources for power?
    b. What is a disadvantage of using hydroelectric resources for the production of electricity?
4. Many farmers use conventional methods of growing crops.
    a. What is one advantage of using conventional agricultural methods?
    b. How can conventional agricultural methods impact the economy?
5. To conserve natural resources, people are encouraged to 'reduce, reuse, and recycle.'
    a. Identify one example of a material that could be reused.
    b. How could reusing the object provide a lasting impact on the environment?