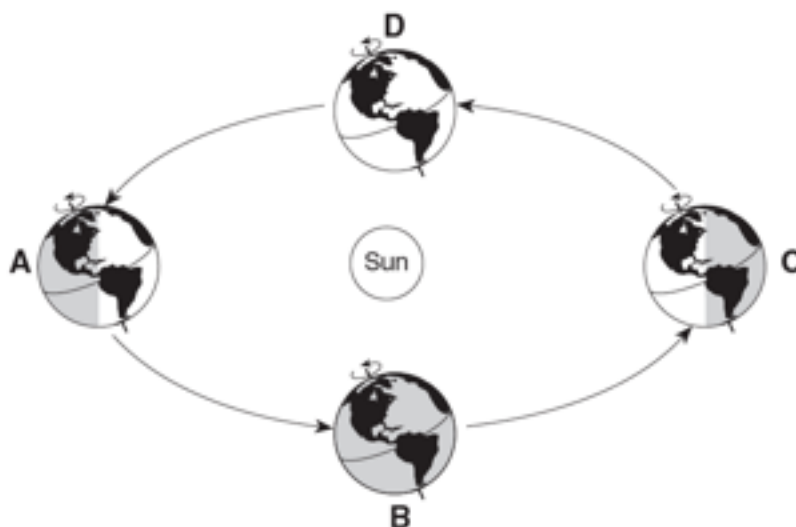
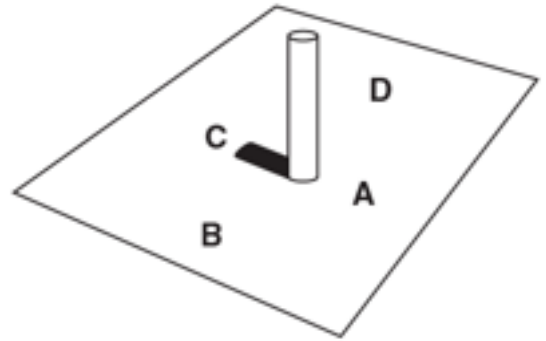
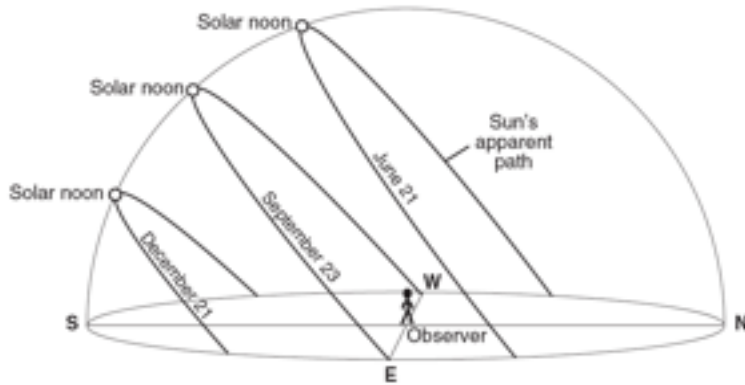
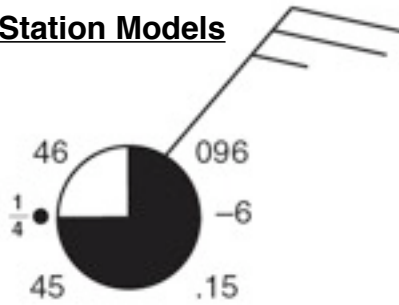


The Seasons

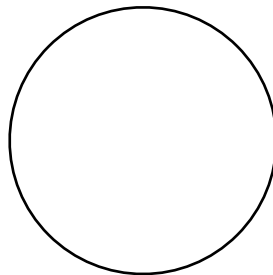
Description	Position	Description	Position
March 21st		South Pole-24 Hrs of Dark	
June 21st		High Kinetic Energy	
December 21st		Low Kinetic Energy	
September 23rd		Earth Close to Sun	
Northern Hemisphere Winter		Earth Far from Sun	
Northern Hemisphere Spring		Southern Hemisphere Spring	
North Hemisphere Summer		Southern Hemisphere Fall	
Northern Hemisphere Fall		Southern Hemisphere Winter	
Greatest Orbital Velocity		South Hemisphere Summer	
Least Orbital Velocity		9 Hrs of Day in NYS	
23 1/2 N-Zenith		12 Hrs of Day in NYS	
0 (Equator)-Zenith		15 Hrs of Day in NYS	
23 1/2 S-Zenith		Winter Solstice	
North Pole-24 Hrs Day		Vernal Equinox	
South Pole-24 Hrs Day		Autumnal Equinox	
North Pole-24 Hrs Dark		Summer Solstice	

Sun's Path in NYS

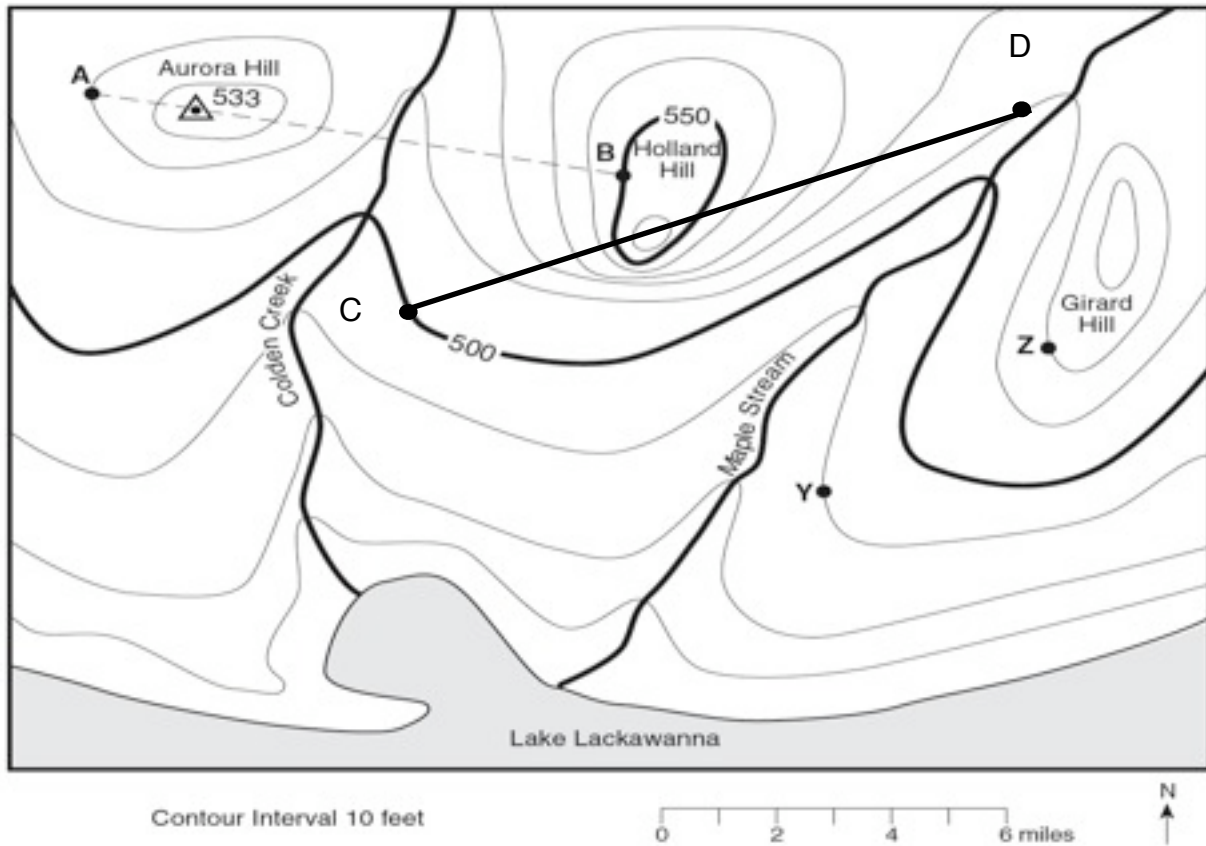
1. What direction does the sun rise in summer? _____
 2. What direction does the sun rise in winter? _____
 3. What direction does the sun rise in fall/spring? _____
 4. How long is the sun out in fall/spring? _____
 5. How long is the sun out in winter? _____
 6. How long is the sun out in summer? _____
 7. What direction do you look to see the noon time sun? _____
 8. What direction do you look to see polaris? _____
 9. From sunrise to noon, what happens to the length of a shadow? _____
 10. From noon to sunset, what happens to the length of a shadow? _____
 11. From sunrise to noon, what happens to the angle of insolation and intensity of insolation? _____
 12. From noon to sunset, what happens to the angle of insolation and intensity of insolation? _____
 13. What season does the sun have the greatest insolation? _____
 14. What season does the sun have the least insolation? _____
 15. Does the sun ever reach the zenith in NYS? _____
 16. What direction does the sun set during winter? _____
 17. What direction does the sun set during fall/spring? _____
 18. What direction does the sun set during summer? _____
 19. Does the sun physically move across the sky? _____ Explain!
-
20. From season to season, how many degrees does the noon time sun shift in the sky? _____
 21. Why is it so cold in NY during winter? _____
 22. Why is it so hot in NY during summer? _____
 23. Why does the sun shift its position along the horizon with the changing seasons? _____
-
24. On the shadow diagram, what letter represents South? _____

Station Models

Variable	Variable
Temperature:	Dew Point:
Visibility:	Wind Speed:
Wind Direction:	Cloud Cover:
Barometric Pressure:	Barometric Trend:
Precipitation:	Current Weather:



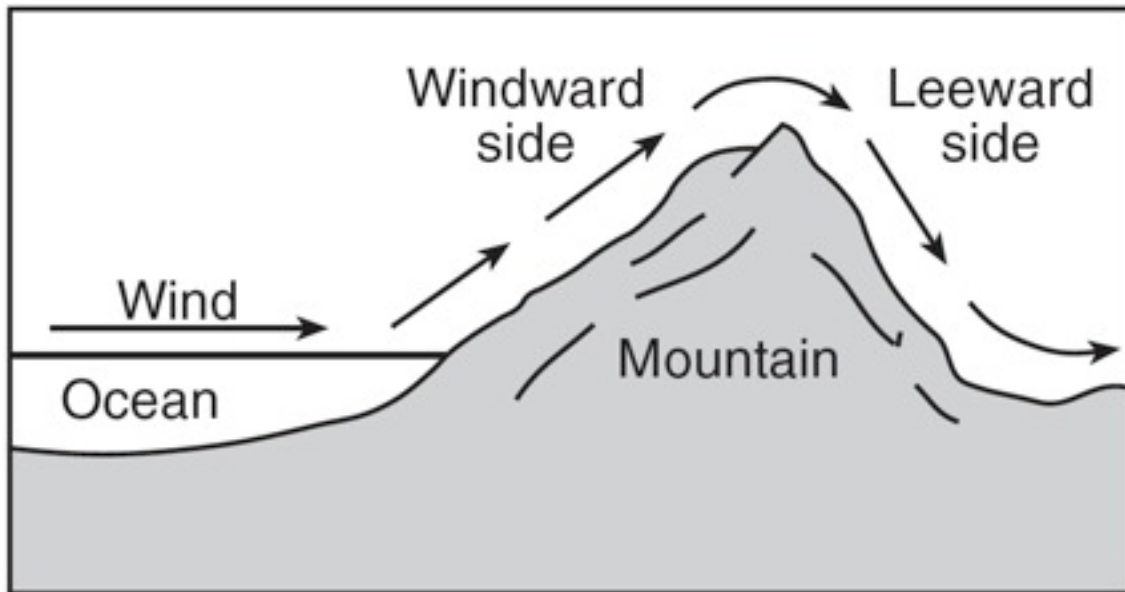
Variable	Variable
Temperature-71 F	Dew Point-68 F
Visibility-1/2 Mile	Wind Speed-45 Knots
Wind Direction-W	Current Weather-T-Storms
Cloud Cover-100%	Barometric Pressure-987.6 mb
Barometric Trend: -33\	Precipitation- 0.11 Inches

Topographic Maps

1. What is the direction of stream flow for Maple Stream? _____
2. Provide an evidence that supports your answer.

3. What is the highest possible elevation of Girard Hill? _____
4. Determine the gradient between points A and B. _____
5. Create a profile between points C and D



Orographic Lifting

1. What side of the mountain will get the majority of the precipitation? _____
2. Tell me what the temperature and humidity will be like on the Windward side?

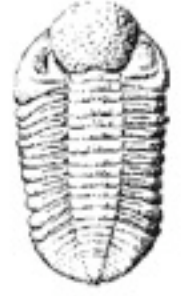
3. What happens to the air mass as it begins to rise over the mountain? _____
4. What temperature does the air mass cool to? _____
5. As air rises, it cools and (expands or contracts)? _____
6. What phase change occurs as a cloud forms? _____
7. When the air mass goes over the mountain, is the humidity high or low? _____
8. The Leeward side of the mountain has a phenomenon called "The _____
Shadow Effect"
9. Tell me what the temperature and humidity will be like on the Leeward side?

10. As air sinks on the Leeward side it will warm due to (expansion or contraction?)

11. What is orographic lifting?

12. What is adiabatic temperature change?

Index Fossils

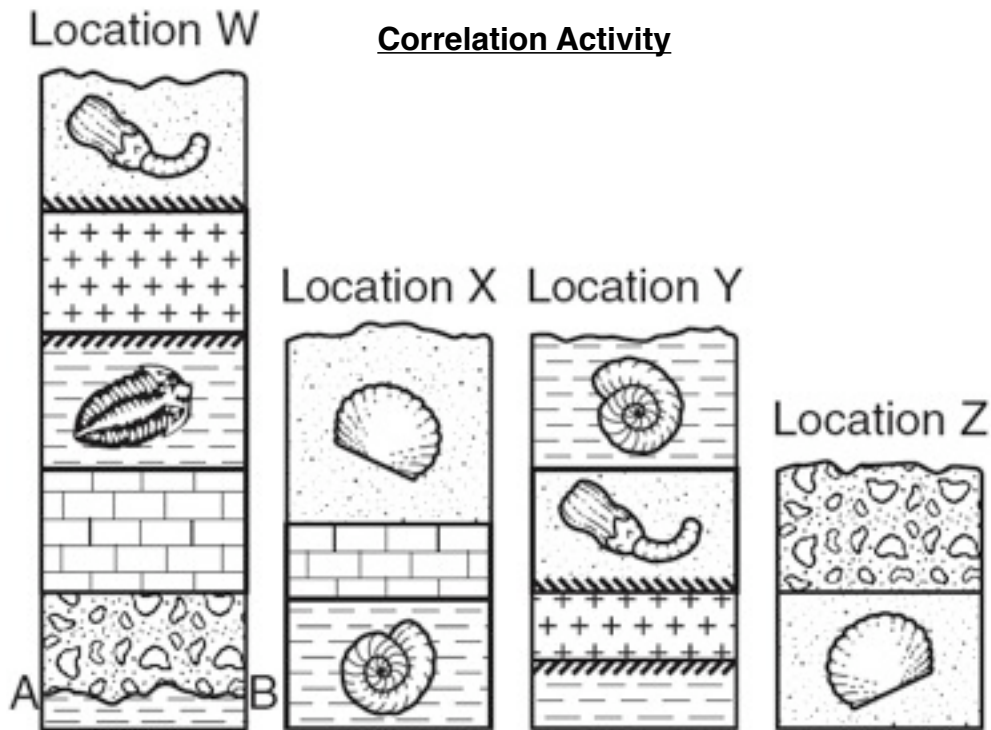
Table of Index Fossils		
		
Eospirifer	Manticoceras	Phacops

Identification	Eospirifer	Manticoceras	Phacops
Identification Letter			
Eon			
Era			
Period			
Epoch			
Important Geo Event			
Landscape Where They Lived			

1. Why are index fossils important in determining age of rocks?

2. What are the 2 criteria that is special to an index fossil?

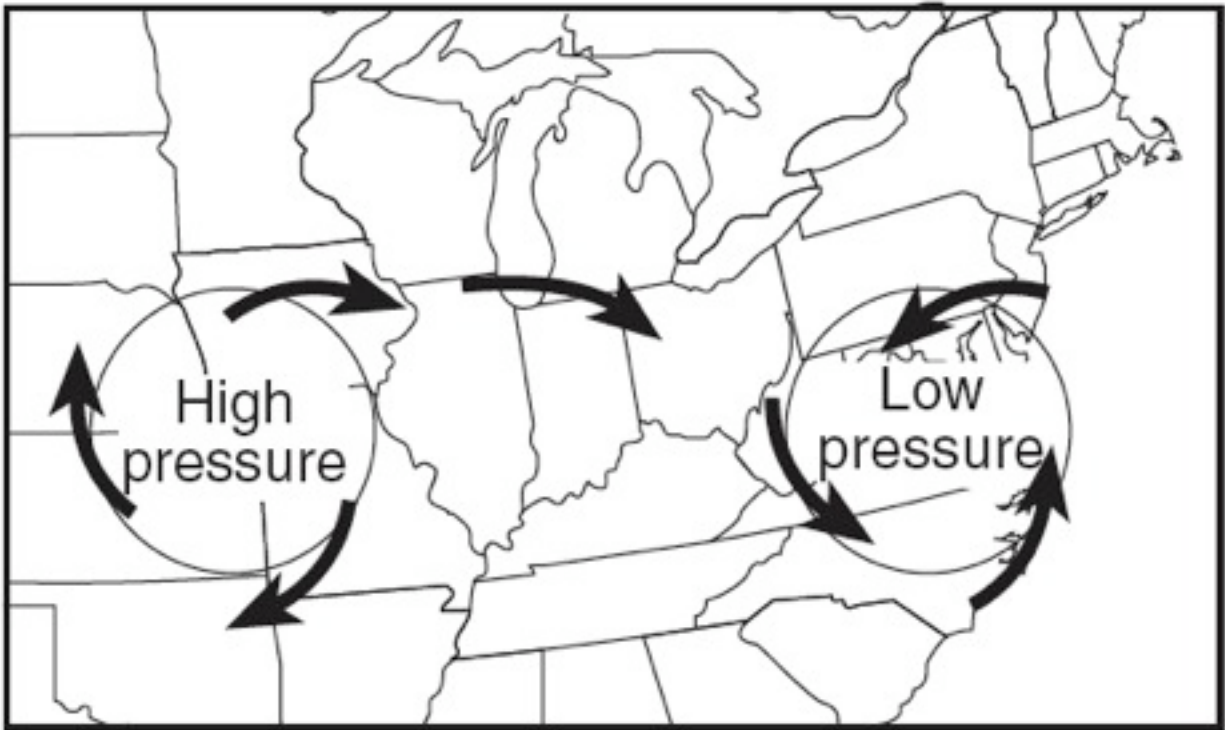
3. What was another method discussed in class (very similar to index fossils) that helps geologists determine age of rocks? _____



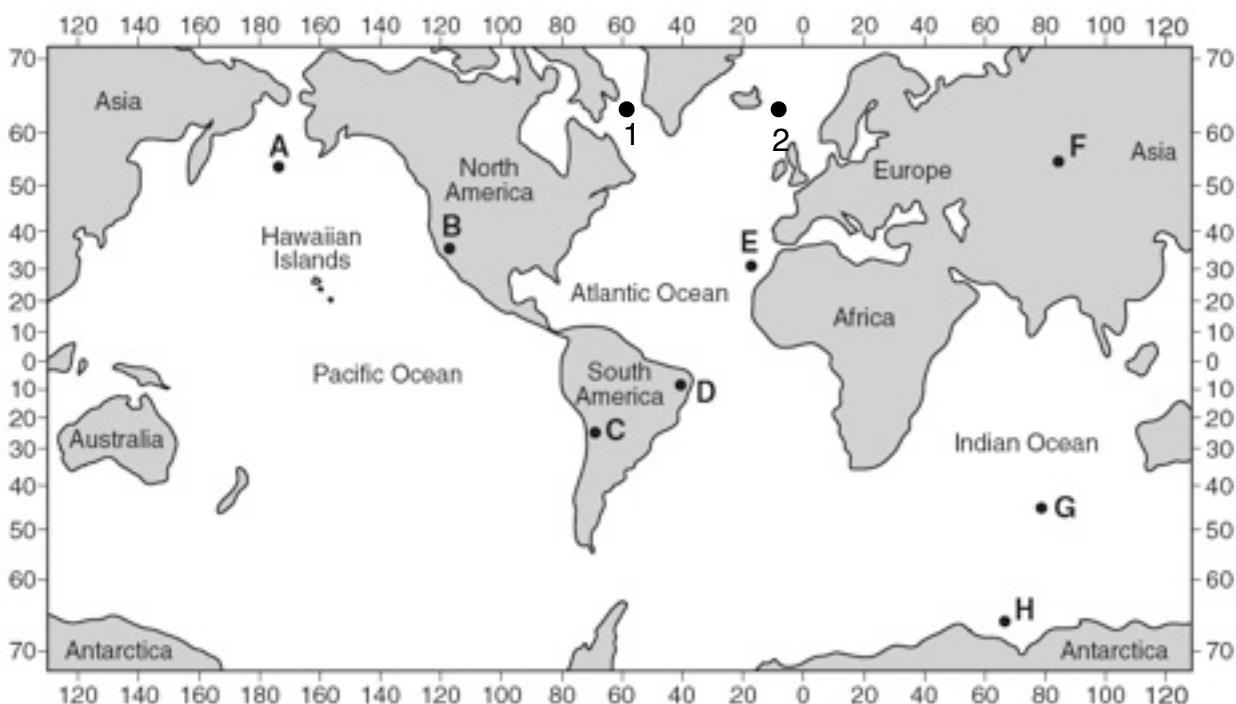
1. What rock layer is the oldest? _____
2. What rock layer is the youngest? _____
3. What are the steps in determining unconformity AB?

4. Describe which of the fossils above is the best index fossil (describe what it looks like) _____
5. What do the little lines coming off of the rock layers in locations W and Y represent?

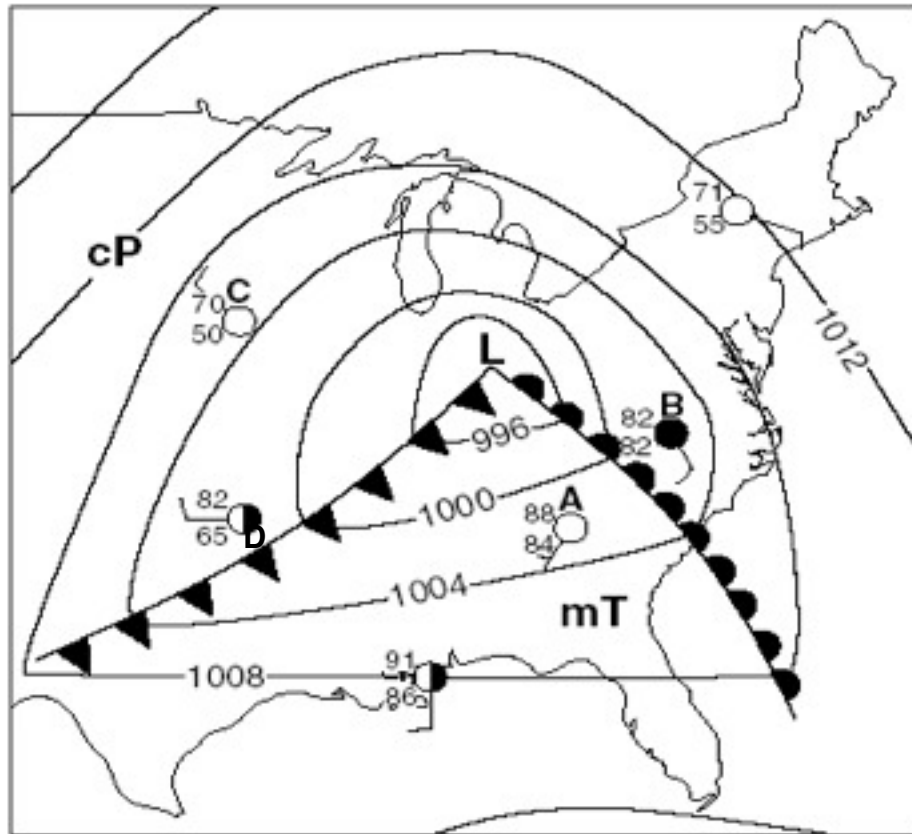
6. What is younger in location W: Intrusion or shale? _____
7. What is older in location X: Limestone or sandstone? _____
8. What happened most recent: Intrusion or bottom layer of shale? _____
9. What happened first: Breccia or Sandstone? _____
10. In location Y, what rock would form at the contact point between the intrusion and the sandstone? _____

High and Low Pressure Characteristics

High Pressure Characteristics	Low Pressure Characteristics

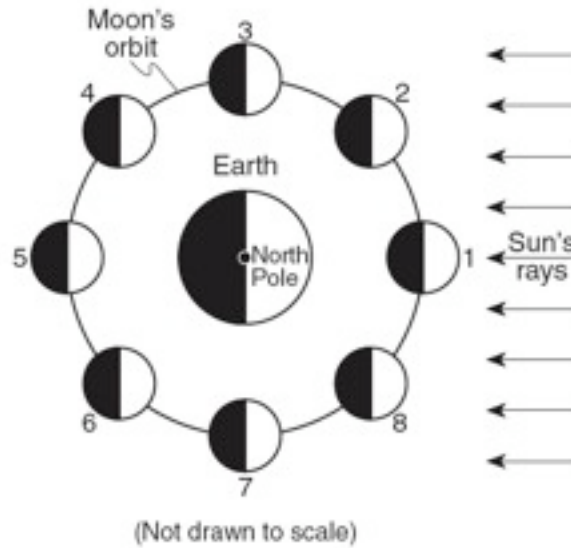
Latitude and Longitude

1. What is the latitude and longitude of point B? _____
2. What is the latitude and longitude of point C? _____
3. What is the latitude and longitude of point G? _____
4. How many degrees separates each time zone? _____
5. How many degrees of longitude are in each time zone? _____
6. As you go east, the time does _____
7. As you go west, the time gets _____
8. If its 6:00am at point 1, what time is it at point 2? _____
9. If the altitude of polaris is 42 degrees, what is your latitude? _____
10. If your latitude is 61 degrees North, what is your altitude of polaris? _____
11. What is the altitude of polaris if you latitude is 41 degrees south? _____
12. What latitude gets the most direct sun on June 21st? _____
13. What latitude gets the most direct sun on December 21st? _____
14. What latitude gets the most direct sun on March 21st? _____
15. What latitude gets the most direct sun on September 23rd? _____

Weather Practice

1. What is the name of the storm pictured above? _____
2. Is Low pressure dry weather or wet weather? _____
3. Draw in where the precipitation will be found for both the warm front and the cold front
4. Where does the mT airmass come from? _____
5. Where does the cP airmass come from? _____
6. In station model B, what does it mean when both the air temp and dew point temp are both 82° F?

7. What direction are the winds blowing around the low pressure? _____
8. What station model just experienced torrential rains and a tornado warning? _____
9. What station model has the driest air? _____
10. What station model is experiencing slow steady precipitation? _____
11. What station model has a slowly falling barometer? _____
12. What 2 station models have a flood warning with very dangerous lightning? _____
13. What happened the pressure of station model D over the past hour? _____
14. What direction will this low pressure center move over the next 24 hours? _____

Moon Phases**Draw the Phase**

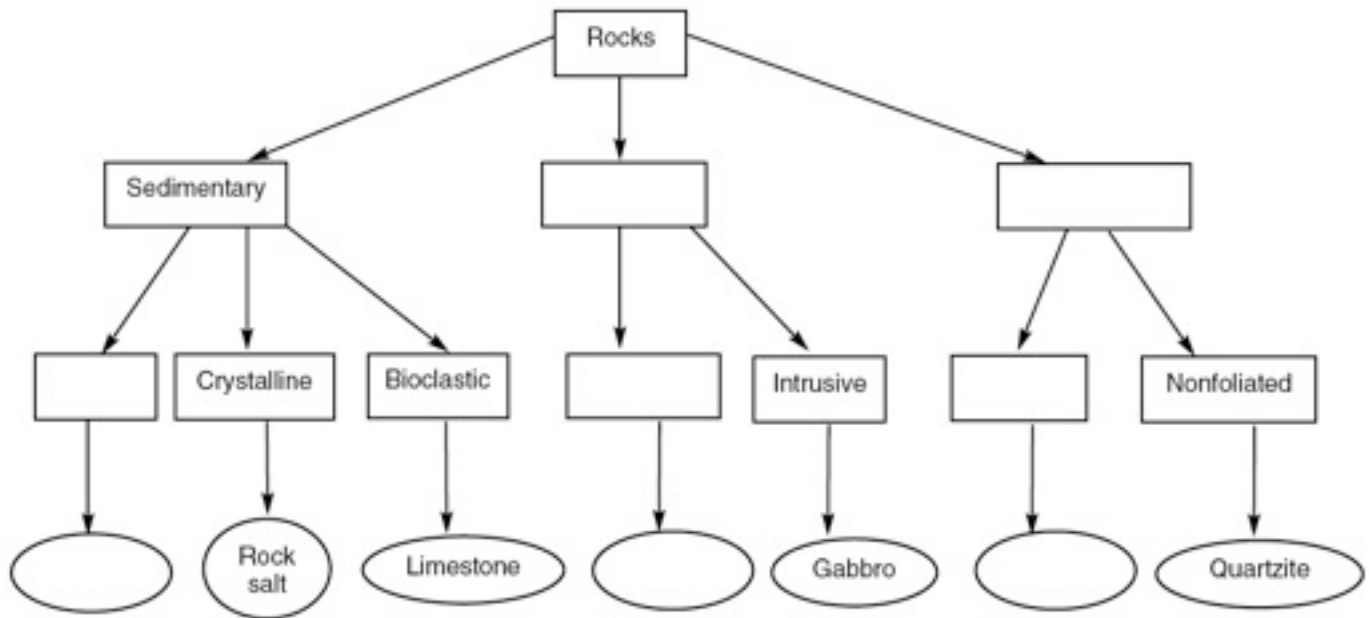
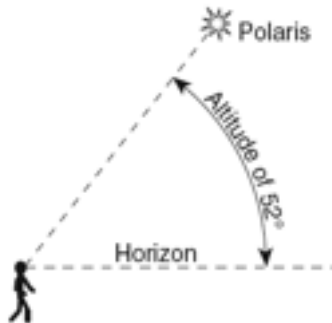
Moon Phase #	Name of the Phase
1	
2	
3	
4	
5	
6	
7	
8	

1	2	3
4	5	6
7	8	

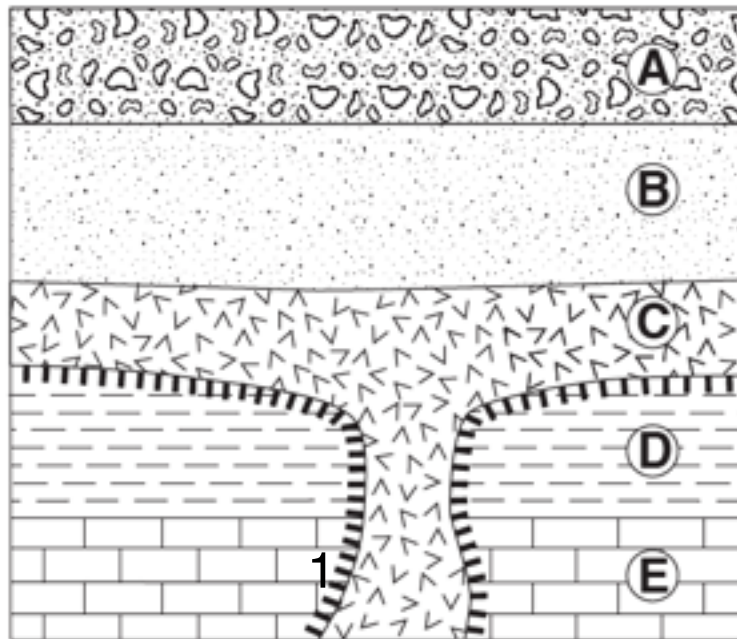
- What 2 phases (name and number) provide a spring tide? _____
- What 2 phases (name and number) provide a neap tide? _____
- What phase (name and number) creates a solar eclipse? _____
- What phase (name and number) creates a lunar eclipse? _____
- Why do we see the same side of the moon every day?

- What motion causes the phases of the moon? _____

Fill in the blanks from the flowcharts below.

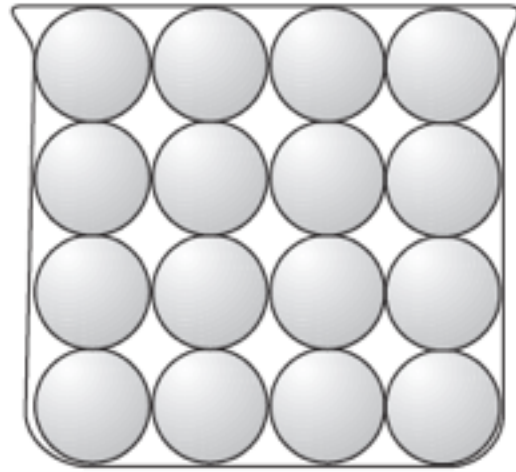
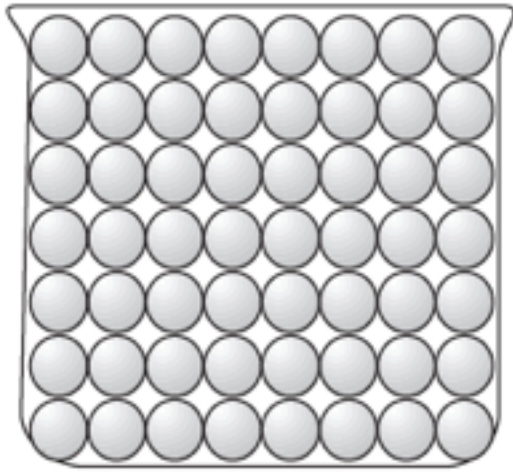
Rock Classification Flowchart**Altitude of Polaris**

1. What is the latitude of the observer? _____
2. Can you see Polaris in the southern hemisphere? _____
3. What is the point directly above the observer called? _____
4. As your latitude increases, what happens to your altitude of Polaris? _____
5. What type of relationship is that called? _____
6. If one travels from NY to Chicago, what happens to their altitude of Polaris? _____

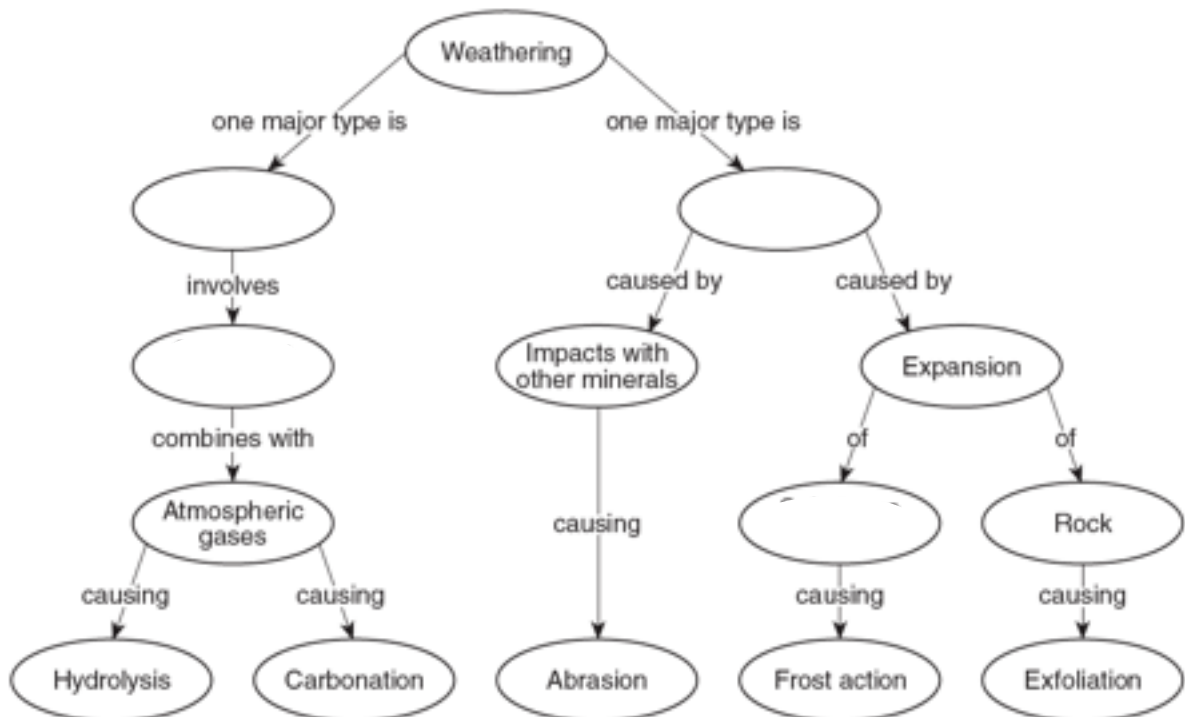
Sequence of Events

Key	
	Contact metamorphism
	Igneous rock

1. What layer of rock is the youngest? _____
2. What layer of rock happened most recently? _____
3. What layer of rock is the oldest? _____
4. Which is older...Shale or the Intrusion? _____
5. Name the rock found at point 1? _____
6. Put the above sequence in order from oldest to youngest
 - a. _____
 - b. _____
 - c. _____
 - d. _____
 - e. _____
 - f. _____

Porosity, Permeability, Capillarity

1. Which sample has the greatest porosity? _____
2. Which sample has the greatest permeability? _____
3. Which sample has the greatest capillarity? _____
4. Which sample will have the lowest permeability rate? _____
5. Which sample will have the greatest infiltration time? _____
6. Which sample has the greatest surface area? _____

Weathering Flow Chart

Earthquake Practice

A seismic station located at point A is 5400 kilometers away from the epicenter of the earthquake. If the arrival time for the *P*-wave at point A was 2:00 p.m., the arrival time for the *S*-wave at point A was approximately

- (1) 1:53 p.m.
- (2) 2:07 p.m.
- (3) 2:09 p.m.
- (4) 2:16 p.m.

A seismograph station recorded the arrival of the first *P*-wave at 7:32 p.m. from an earthquake that occurred 4000 kilometers away. What time was it at the station when the earthquake occurred?

- (1) 7:20 p.m.
- (2) 7:25 p.m.
- (3) 7:32 p.m.
- (4) 7:39 p.m.

A seismic station 4000 kilometers from the epicenter of an earthquake records the arrival time of the first *P*-wave at 10:00:00. At what time did the first *S*-wave arrive at this station?

- (1) 9:55:00
- (2) 10:05:40
- (3) 10:07:05
- (4) 10:12:40

The first *S*-wave arrived at a seismograph station 11 minutes after an earthquake occurred. How long after the arrival of the first *P*-wave did this first *S*-wave arrive?

- (1) 3 min 15 s
- (2) 4 min 55 s
- (3) 6 min 05 s
- (4) 9 min 00 s

A seismic station is recording the seismic waves produced by an earthquake that occurred 4200 kilometers away. Approximately how long after the arrival of the first *P*-wave will the first *S*-wave arrive?

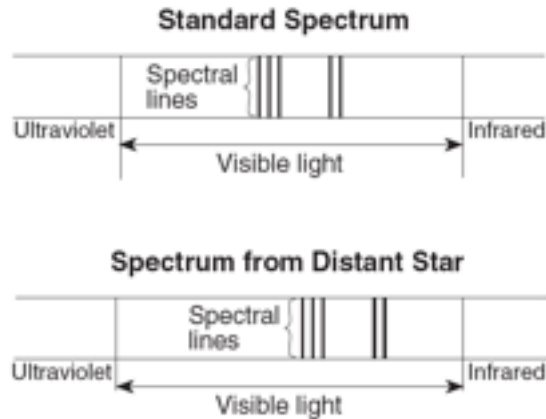
- (1) 1 min 05 sec
- (2) 5 min 50 sec
- (3) 7 min 20 sec
- (4) 13 min 10 sec

An earthquake's first *P*-wave arrives at a seismic station at 12:00:00. This *P*-wave has traveled 6000 kilometers from the epicenter. At what time will the first *S*-wave from the same earthquake arrive at the seismic station?

- (1) 11:52:20
- (2) 12:07:40
- (3) 12:09:20
- (4) 12:17:00

The distance from Albany, New York, to the epicenter of this earthquake is 5600 km. Approximately how much longer did it take for the *S*-wave to arrive at Albany than the *P*-wave?

- (1) 4 minutes and 20 seconds
- (2) 7 minutes and 10 seconds
- (3) 9 minutes and 0 seconds
- (4) 16 minutes and 10 seconds

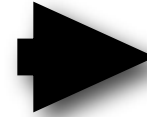
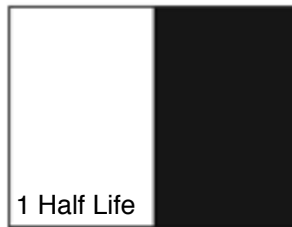
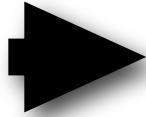
Doppler Effect-Red Shift/Blue Shift

1. The doppler effect supports the idea that the universe is _____
2. Red shifts support the idea that objects are moving _____
3. Blue shifts support the idea that objects are moving _____
4. How long ago did the Big Bang occur? _____
5. Infrared Radiation is on what side of the spectrum? _____
6. Ultraviolet Radiation is on what side of the spectrum? _____
7. The Red end of the spectrum is (long or short) wavelength? _____
8. The Blue end of the spectrum is (long or short) wavelength? _____
9. What is the name of the galaxy that we live in? _____
10. What type of galaxy do we live in? _____
11. The farther an object is red-shifted, what do we know about it's distance?

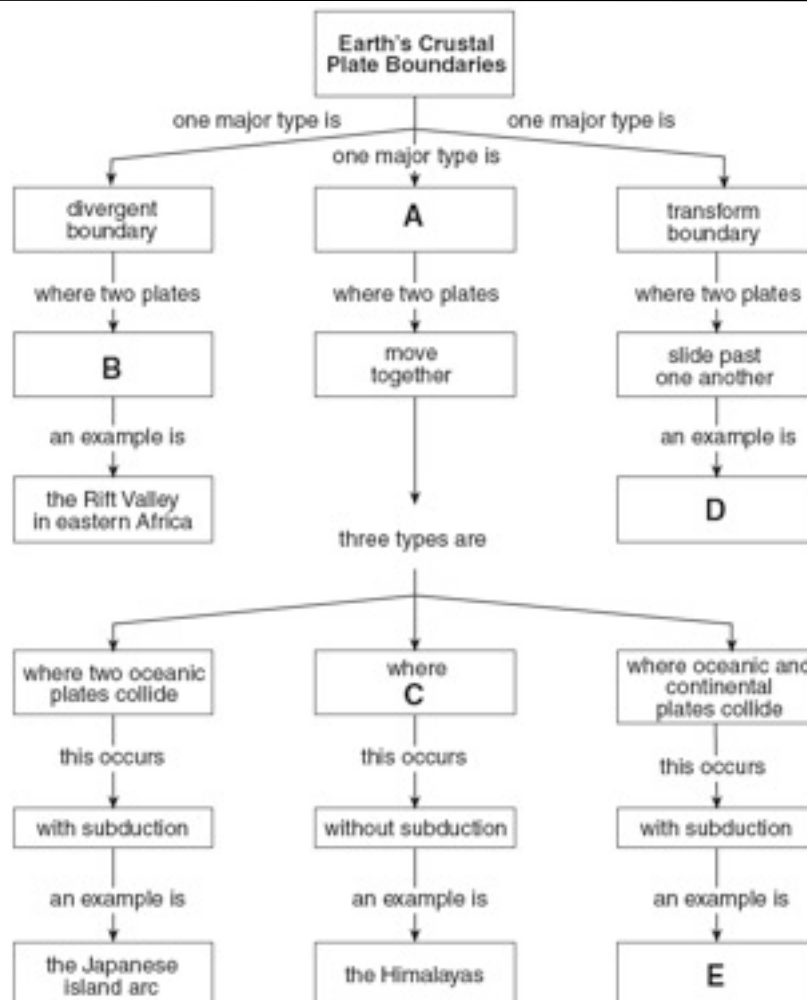
12. The farther an object is red-shifted, what do we know about it's speed?

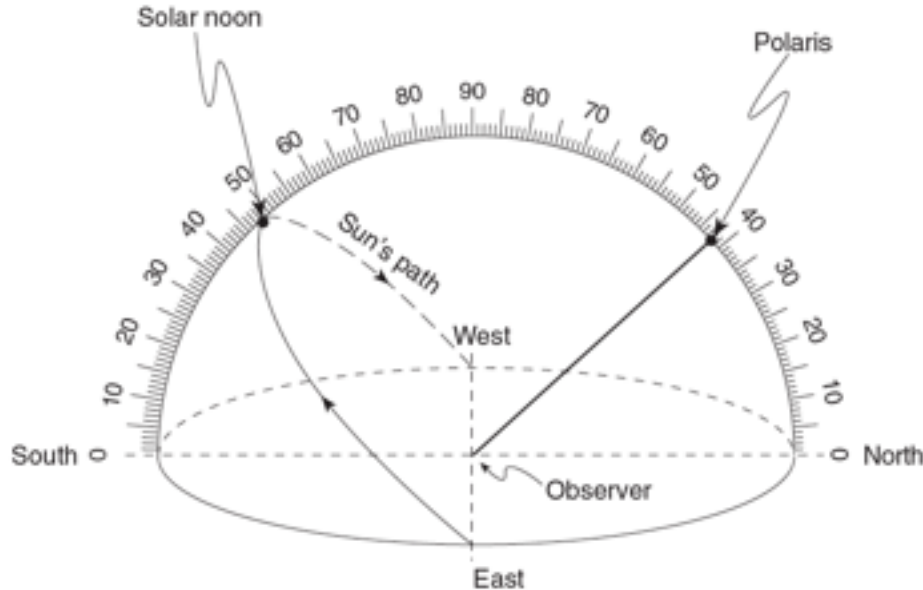
Radioactive Decay

Sample before decay



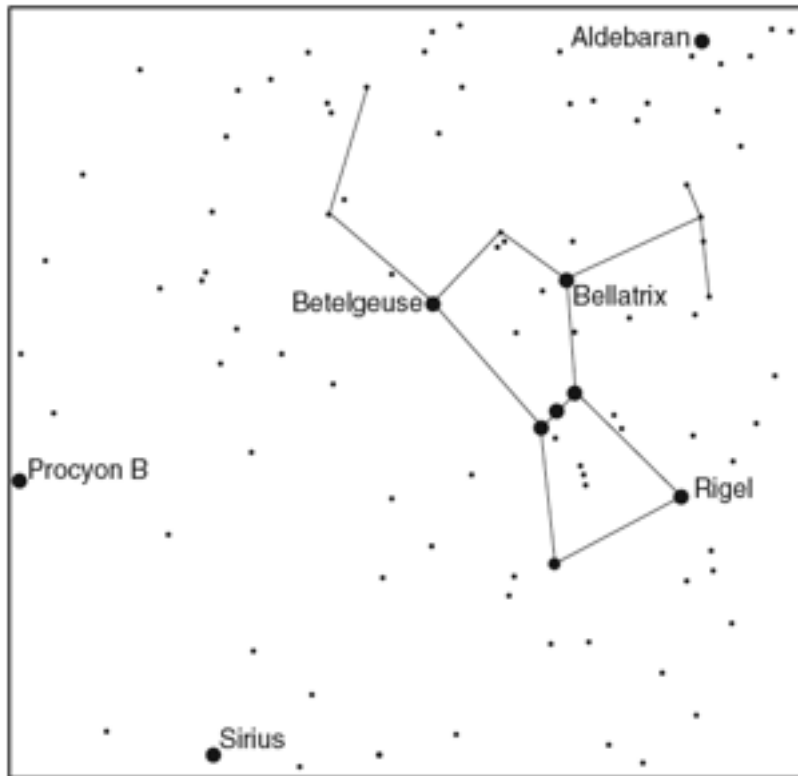
1. If the half life above is 5700 years, how many years have gone by? _____
2. In the example above, what percentage of original sample is left? _____
3. What isotope is used to date young, organic material? _____
4. Name an isotope used to date a trilobite fossil? _____
5. In the above example, if you start out with 1000 g of K40, how much Ar40 is left after 2 half lives? _____
6. In the previous example, how many years have passed over 2 half lives? _____



Sun's Path and Altitude of Polaris

1. What season is shown in the diagram above? _____
2. What is the altitude of the noon sun? _____
3. What direction would the noon shadow of the observer point? _____
4. What is the altitude of Polaris? _____
5. Name a city in NYS that would see Polaris at this altitude? _____
6. What would the altitude of the noon sun be in Summer? _____
7. What is the zenith? _____
8. Does the noon sun ever reach the zenith in NYS? _____
9. Explain why the zenith is never reached in NYS.

10. What happens to the length of the shadow from sunrise to noon? _____
11. What happens to the length of the shadow from noon to sunset? _____
12. What season has the longest noon shadow? _____
13. What season has the greatest angle of insolation? _____
14. What season has the shortest noon shadow? _____
15. What season has the lowest angle of insolation? _____

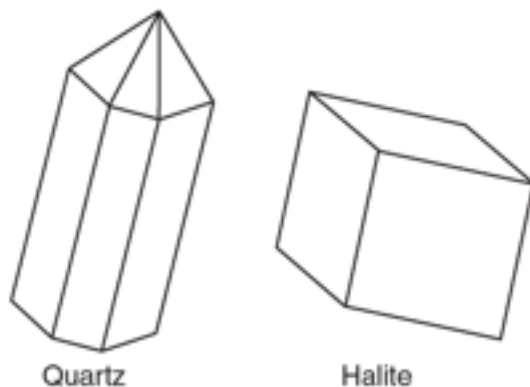
Stars

1. What is the luminosity and temperature of Betelgeuse?

2. What is the temperature and luminosity of Rigel?

3. What is the name of the reaction that produces light within a star? _____
4. What is the “fuel” of the sun? _____
5. The majority of stars fit into what category? _____
6. Our own sun is considered a (what group of star?) _____
7. In 5 billion years, our sun is going to turn into a _____
8. We can see Orion in December...why can't we see Orion in June?

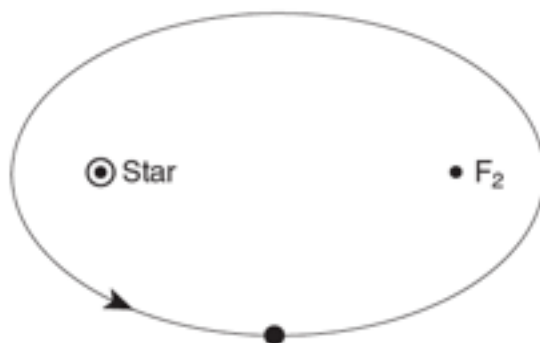
9. What color star is Sirius? _____
10. What group of stars does Aldebaran belong to? _____

Minerals

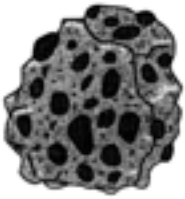
1. What is the hardness and composition of quartz? _____
2. What is the luster and form of breakage of halite? _____
3. What makes quartz different from halite? _____
4. What mineral has a metallic luster, hardness of 6.5 and is a brassy yellow color?

5. What mineral has a non-metallic luster, has cleavage and bubbles with acid?

6. What mineral has a greasy feel and is used in ceramics? _____

Eccentricity

1. What is the eccentricity of this ellipse? _____
2. When the planet gets close to the star, what happens to the velocity? _____
3. The more elliptical this ellipse gets...what happens to eccentricity? _____
4. Low eccentricity is what shape orbit....round or oval? _____

Sedimentary Rocks

A
Conglomerate



B
Breccia



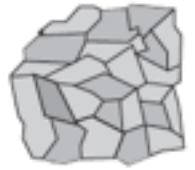
C
Sandstone



D
Shale



E
Limestone



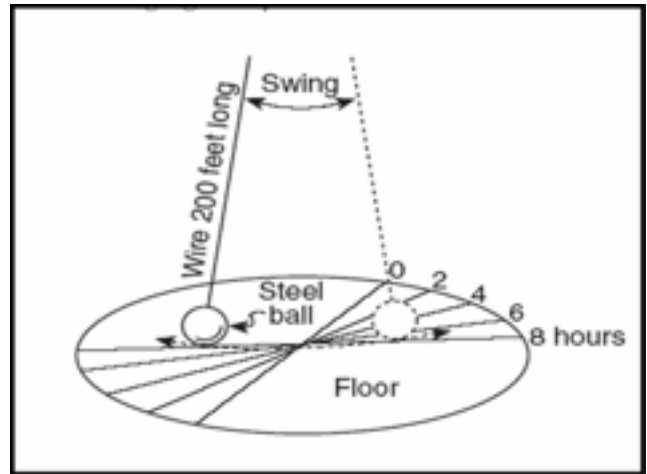
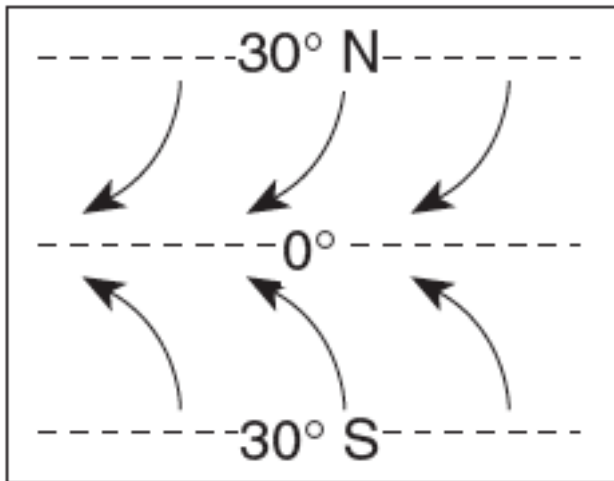
F
Rock salt

1. Which rocks above are clastic? _____
2. Which rock is organic? _____
3. Which rock is a chemical rock? _____
4. What are the 2 ways a chemical rock can form? _____
5. Describe the process for the formation of a clastic rock?

6. What is the particle size for a sandstone rock? _____
7. What is the difference between a conglomerate and breccia rock?

8. Which rock had particles that traveled further....conglomerate or breccia?

9. Which rock is made of particles with a diameter of 0.006-0.2cm? _____
10. Which bioclastic rock is made from dead plants? _____
11. What is the composition of rock gypsum? _____
12. How are clastic sedimentary rocks classified? _____
13. How are chemical rocks classified? _____

Earth Rotation

1. The Earth rotates in what direction? _____
2. What direction do wind and water currents deflect towards in the northern hemisphere? _____
3. What direction do wind and water currents deflect towards in the southern hemisphere? _____
4. The coriolis effect is caused by what? _____
5. The Foucault Pendulum supports the idea that the Earth does what? _____
6. The Earth rotates how many degrees per hour? _____
7. What does rotation give us on the planet? _____
8. What does revolution give us on the planet? _____

Metamorphic Rocks**Metamorphic**

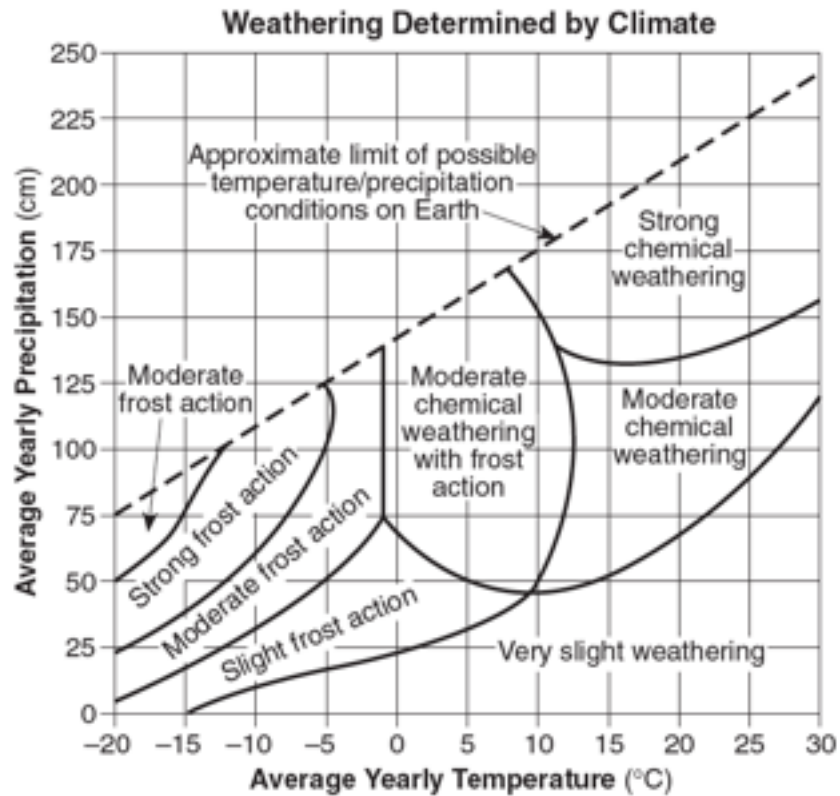
1. What rock is shown in the picture above? _____
2. What 2 processes produce a metamorphic rock? _____
3. What does foliation mean? _____
4. What type of foliation does Gneiss show? _____
5. What are the 2 types of metamorphism? _____
6. What sedimentary rock forms into Anthracite Coal? _____
7. What sedimentary rock forms into Quartzite? _____
8. What sedimentary rock forms into Marble? _____
9. What metamorphic rock shows the lowest grade of metamorphism? _____
10. What metamorphic rock shows the highest grade of metamorphism? _____
11. How are nonfoliated rocks classified? _____
12. What metamorphic rock is made of platy mica crystals? _____
13. What metamorphic rock can be made from various other rocks through the contact of magma? _____
14. What metamorphic rock is made from shale? _____

Igneous Rocks**Igneous**

1. What 2 processes produce an igneous rock? _____
2. Rocks that form inside the earth are....intrusive or extrusive? _____
3. Rocks that form at or near the surface are...intrusive or extrusive? _____
4. Igneous rocks are classified how? _____
5. Very coarse rocks are created where? _____
6. What is the color, density and composition of Granite?

7. What is the color, density and composition of Basalt?

8. Name a coarse grained rock that contains the mineral pyroxene? _____
9. Name a vesicular rock that is glassy and floats in water? _____
10. Name an igneous rock that contains a lot of quartz? _____
11. Rocks that have large crystals formed....quickly or slowly? _____
12. Rocks that have very small crystals formed...quickly or slowly? _____
13. How are the crystals described with igneous rocks? _____

Weathering Conditions

1. Describe the climate needed for chemical weathering to be dominant.

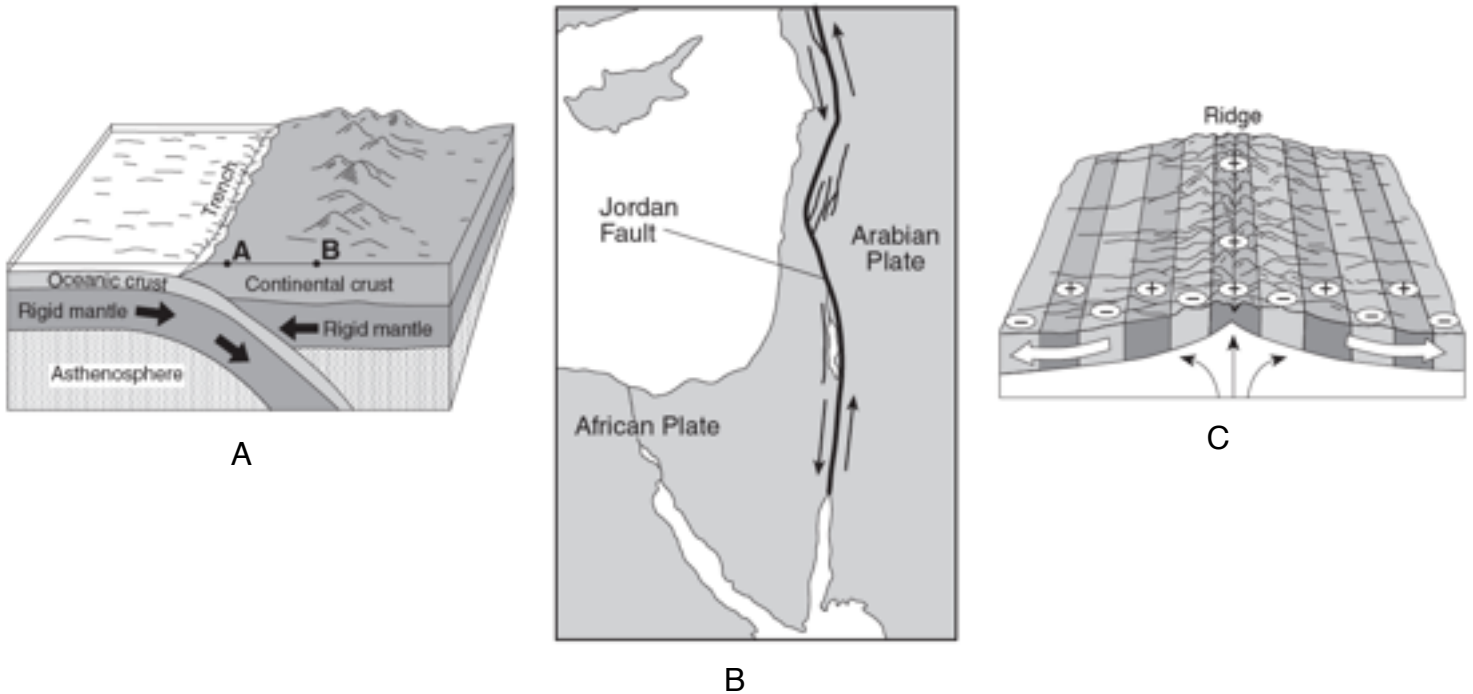
2. Describe the climate needed for physical weathering to be dominant.

3. Provide a few examples of physical weathering. _____

4. Provide a few examples of chemical weathering. _____

5. Describe what a chemical weathering landscape would look like.

6. Describe what a physical weathering landscape would look like.

Plate Boundary Diagrams

1. Name the type of plate boundary for diagram A _____
2. Name the type of plate boundary for diagram B _____
3. Name the type of plate boundary for diagram C _____
4. Provide an example from your reference table where you would find diagram A.

5. Provide an example from your reference table where you would find diagram B.

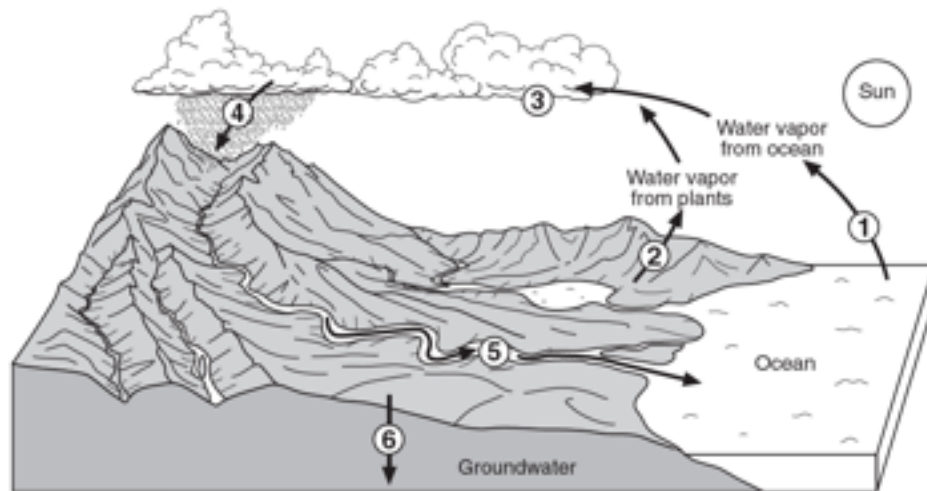
6. Provide an example from your reference table where you would find diagram C.

7. What is convection and what layer of Earth would you find it?

8. Describe the geologic features that you would get with diagram A.

9. Describe what the + and - signs mean with diagram C.

The Water Cycle



1. Label the processes from the diagram above....

- i. _____
- ii. _____
- iii. _____
- iv. _____
- v. _____
- vi. _____

2. Provide the necessary ground conditions for runoff.

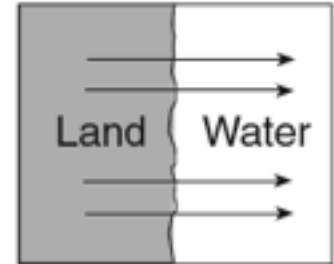
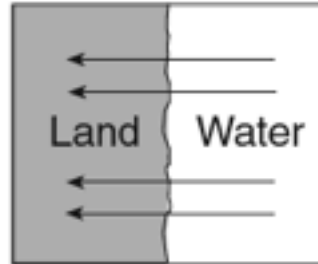
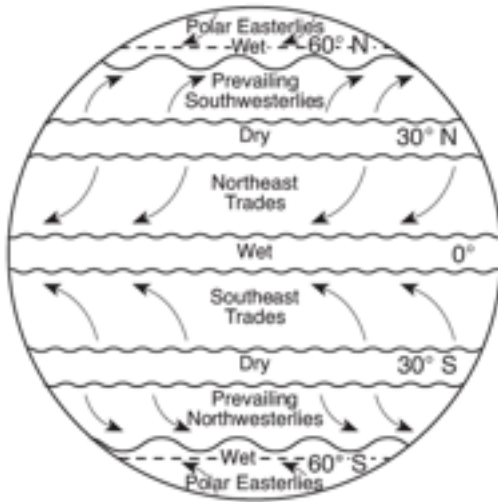
3. What does the term “saturated”? _____

4. Provide the necessary ground conditions for infiltration.

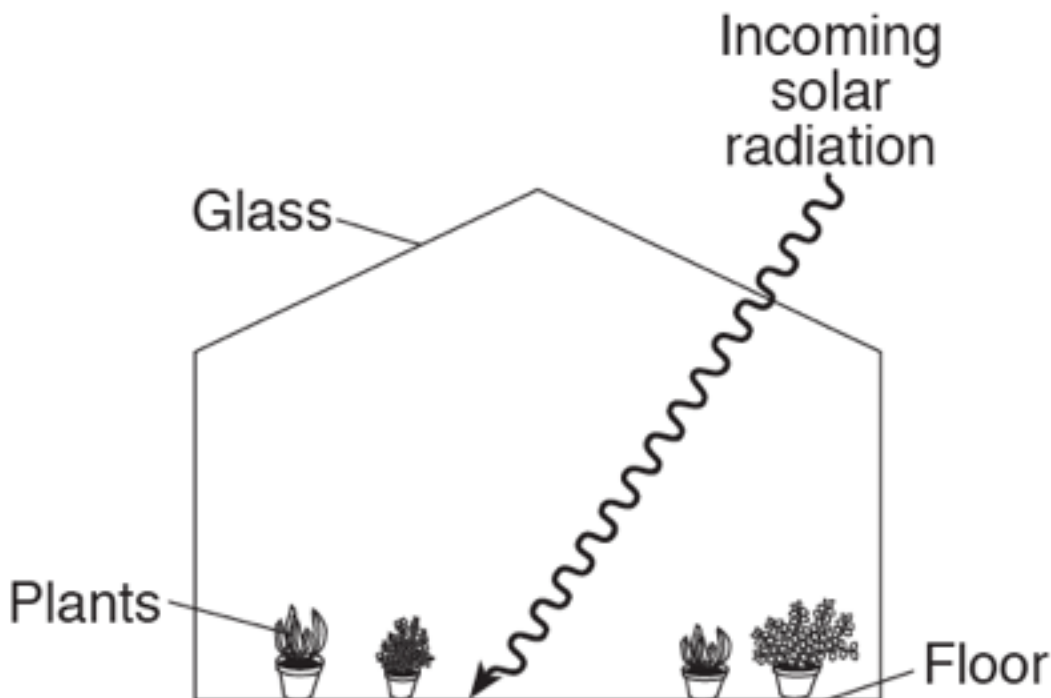
5. Clouds form from what process? _____

6. Water enters the atmosphere through 2 processes...what are the?

7. What are the 2 groundwater zones? _____

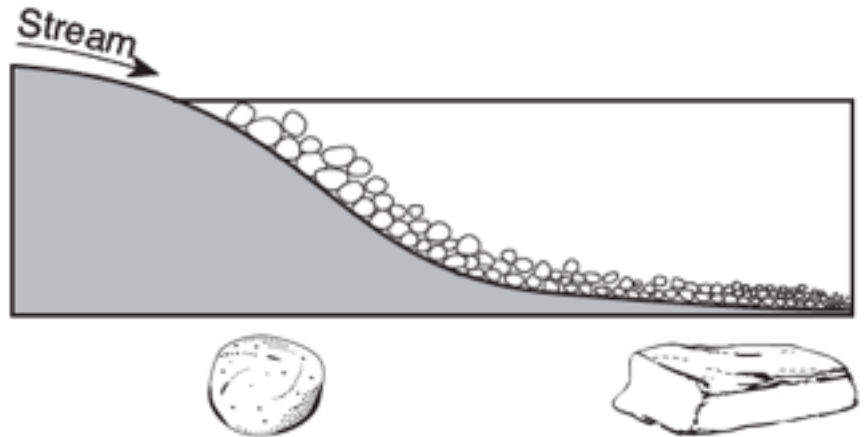
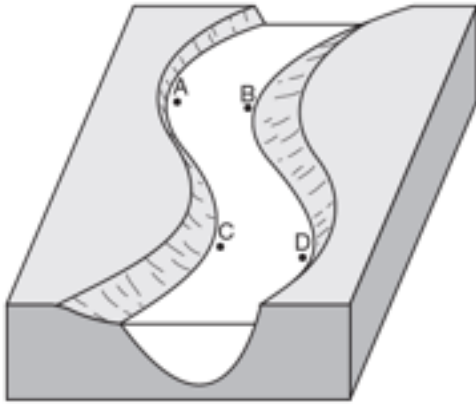
Winds

1. Winds in the northern hemisphere travel in what direction? _____
2. Winds in the southern hemisphere travel in what direction? _____
3. Winds that converge at the surface do what? _____
4. Winds that diverge at the surface do what? _____
5. Which diagram shows a land breeze? _____
6. What time of day does a land breeze occur? _____
7. Which diagram shows a sea breeze? _____
8. What time of day does a sea breeze occur? _____
9. Winds are caused by differences in what? _____
10. What are lines of equal pressure called? _____
11. How do you determine where the strongest winds are on a weather map?

The Greenhouse Effect

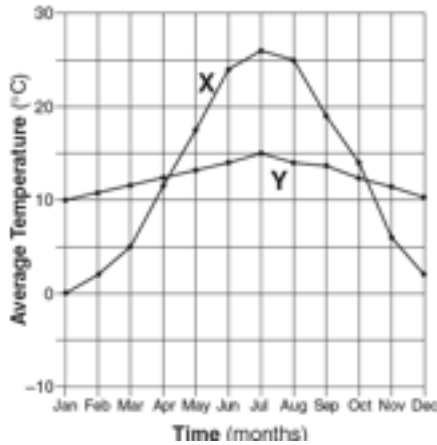
1. What type of radiation enters the greenhouse (provide wavelength and names of waves) _____
2. What type of radiation tries to escape the greenhouse (provide wavelength and names of waves) _____
3. Provide a few examples of greenhouse gases. _____
4. The glass in the greenhouse is equivalent to which greenhouse gas? _____
5. What are some possible reasons for the increased amount of carbon dioxide in the atmosphere?

6. Dark colors are good at doing what? _____
7. The electromagnetic spectrum is organized by what? _____

Deposition

1. What is deposition? _____
2. What is erosion? _____
3. The diagram at the left, which positions will show erosion? _____
4. The diagram at the left, which positions will show deposition? _____
5. What is carrying power? _____
6. What is discharge? _____
7. What is velocity? _____
8. What are meanders? _____
9. The diagram on the right shows horizontal sorting...what are some of the factors that effect deposition? _____
10. What is the relationship between velocity and slope?

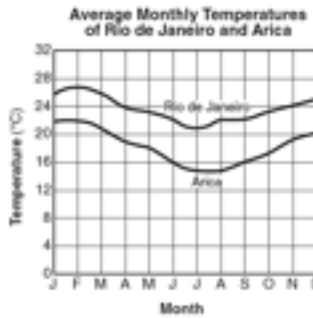
11. In a straight channel stream, where does water travel the fastest? _____
12. Why does water erode more on the outside of a meander? _____
13. Why does water deposit more on the inside of a meander? _____

Climatic Conditions

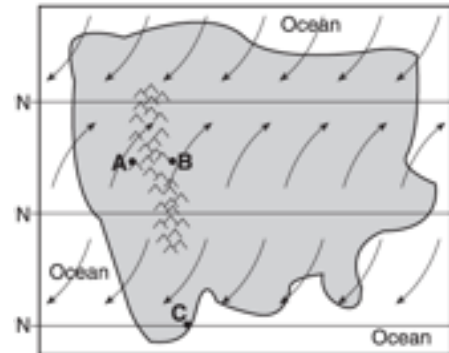
A



B



C



D

1. In diagram A, explain why the 2 cities have very different temperature curves?

2. Explain the summers and winters of an inland region.

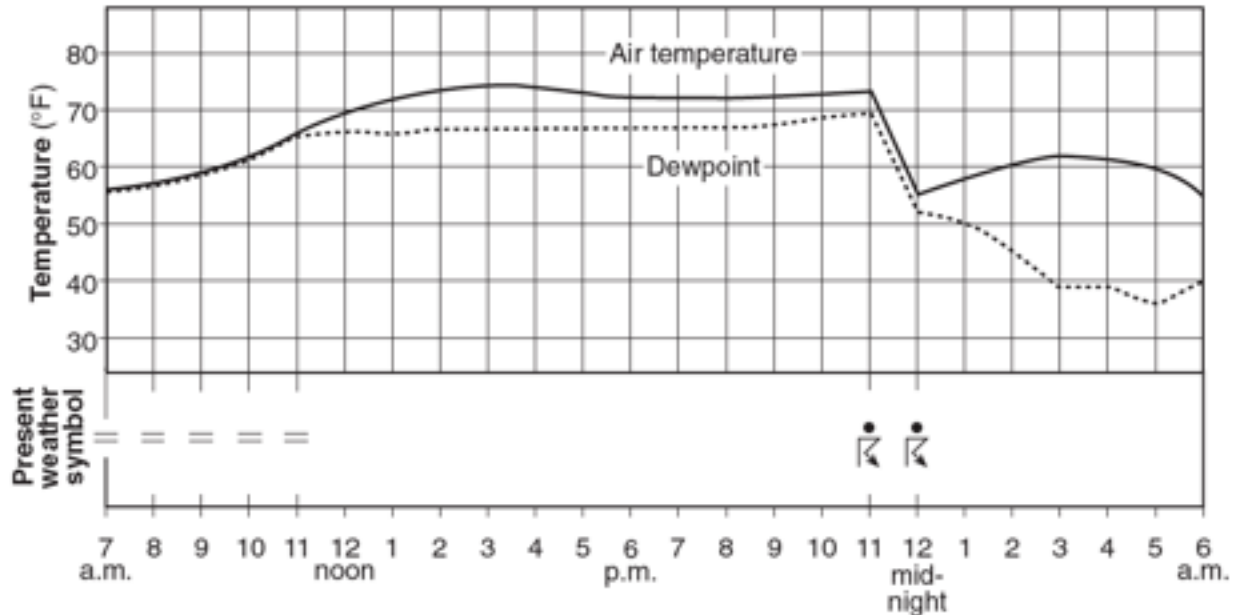
3. Explain the summers and winters of a coastal region.

4. What substance has the highest specific heat on the planet? _____

5. Describe the differences in heating/cooling for substances that have high or low specific heats.

6. In diagrams B and C, explain the difference in temperature curves for Arica and Rio de Janeiro. Both cities are at the same latitude.

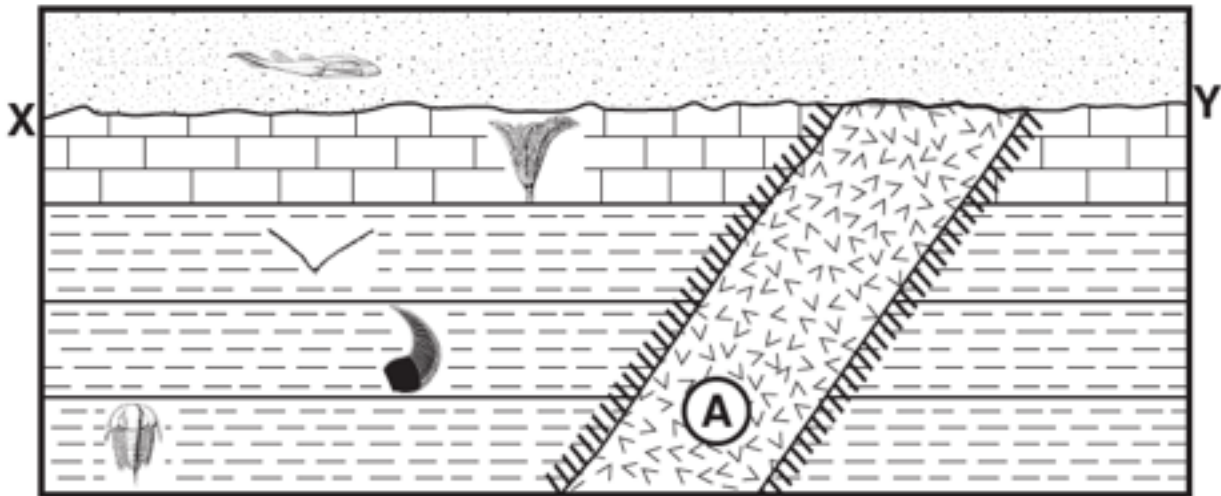
7. In diagram D, explain the difference in climate for positions A and B.

Temperature and Dew Point

1. Low pressure is going to bring in what type of weather? _____
2. High pressure is going to bring in what type of weather? _____
3. As the air temperature approaches the dew point, what happens outside?

4. As the air temperature and dew point get farther apart, what happens to the weather outside? _____
5. Clouds form when warm air rises, expands, cools to the _____
6. In the diagram above, what 2 time blocks represent the best chance for precipitation? _____
7. As air temperature approaches the dew point, what happens to the relative humidity?

8. Air that is saturated is said to have what type of humidity? _____

Index Fossils and Correlation

1. What are the 2 criteria for a fossil to be considered an “index fossil”?

2. What is line XY called? _____

3. What does line XY represent? _____

4. Provide the steps needed to create line XY

5. What is rock layer A? _____

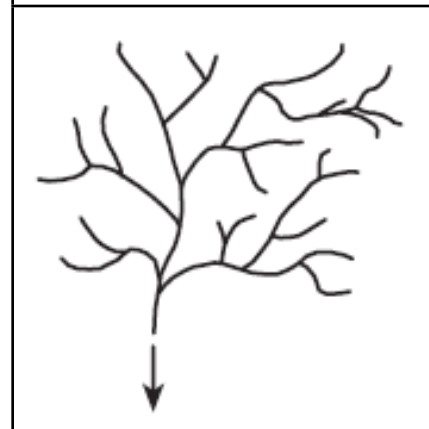
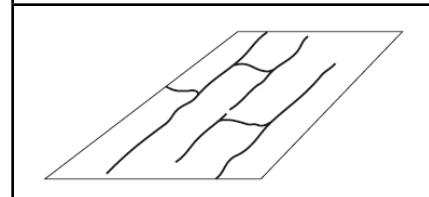
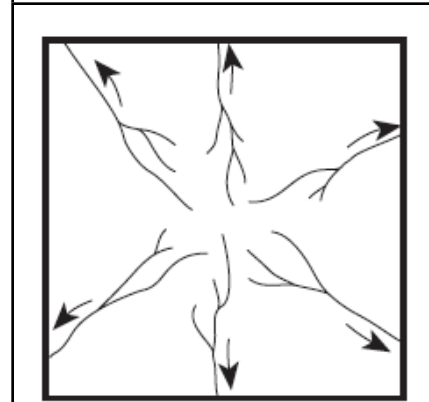
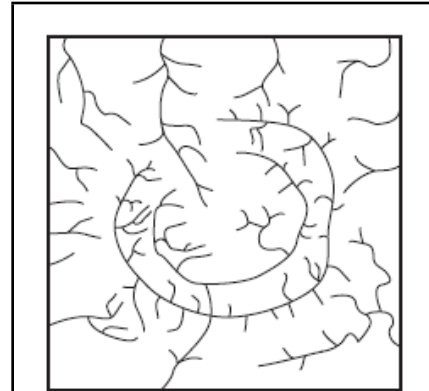
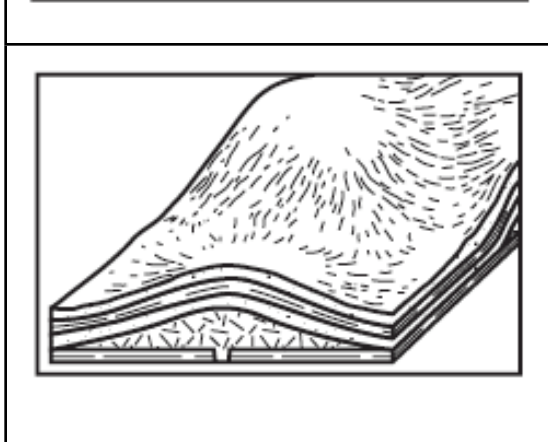
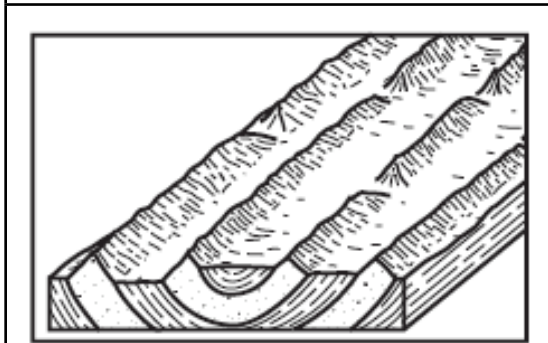
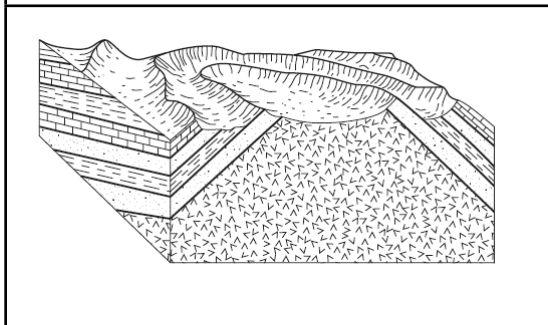
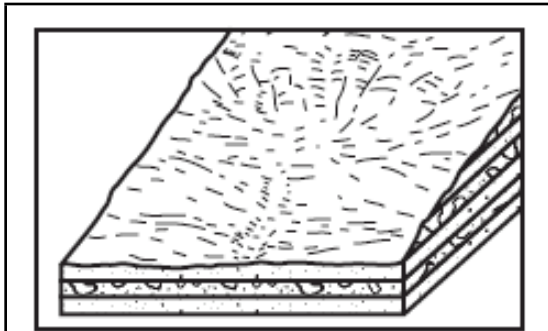
6. Why are these fossils useful in determining the relative age of these rocks?

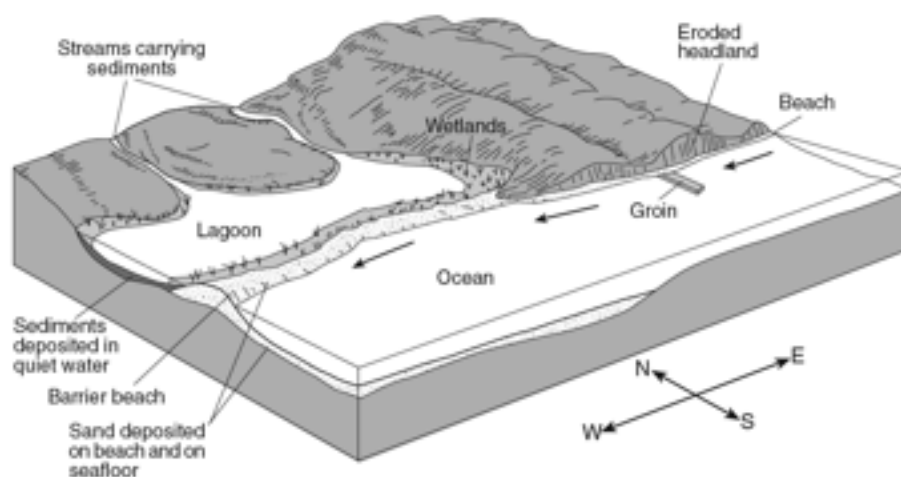
7. Put the sequence in order....

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____
- f. _____
- g. _____
- h. _____
- i. _____

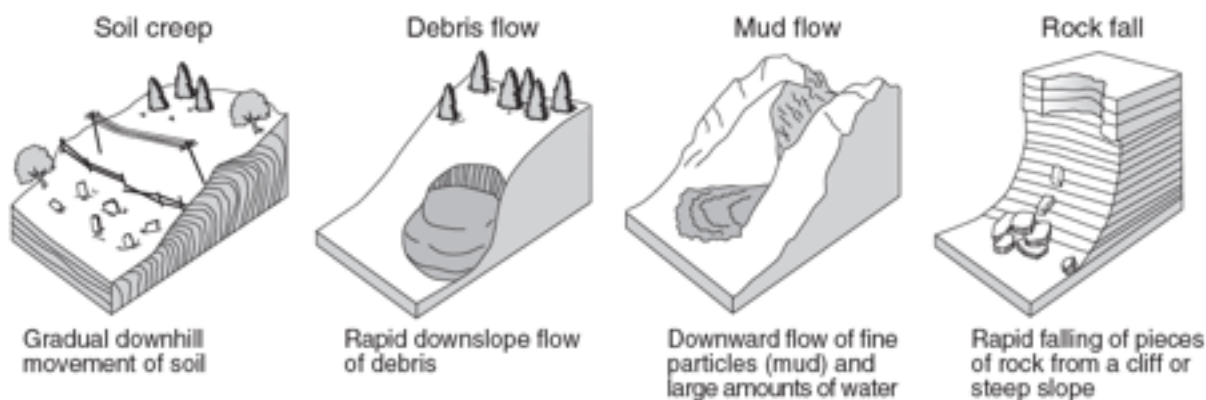
Landscapes

Match the landscapes on the left with the drainage patterns to the right



Oceans

1. When looking at the groin, what compass direction will the largest beach? _____
2. Sediment is carried parallel to the shoreline by _____
3. Ocean currents follow the same path as _____
4. What direction is the current flowing? _____

Mass Wasting

1. What is the major force behind all 4 types of erosion shown above? _____
2. Mass wasting produces what type of sediment? _____
3. Glaciers and gravity produce unsorted sediment, wind and water produce _____
4. Which one of the 4 diagrams above has the greatest velocity? _____