

Earth Science Part D- Lab Final

This part of your regent's exam is hands on and based from the information gathered in laboratories that we have completed in class. This section is worth 16 points and can help or hurt depending on how you do. Typically an 11 or better is doing good, while below that number it begins to help your overall score less and less. So this part is very important.

- 1.) Three stations:
 - a. Rocks and minerals
 - b. Earthquake Location
 - c. Ellipses
 - 2.) At these stations you will be asked to follow a set of directions given.
 - a. Be sure to read ALL directions and charts given.
 - 3.) Check your UNITS!!!!
 - 4.) You have 9 minutes per station that's all so work fast if you finish look back at your work.
 - a. Check to be sure it can be read
 - b. Check to be sure it answers the questions
 - 5.) ANY copying, damaging or altering the setups will result in a zero for your grade.
 - 6.) You will need only a pencil/pen to complete this part of your final. No reference tables or calculators all other instruments will be supplied.
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Information to know:

Rocks and minerals

- 1.) What is a mineral? How do they form?
- 2.) How to ID a mineral. The steps and material used to ID a mineral.
- 3.) What are rocks? How do they form?
- 4.) Rock ID.
 - a. How do Igneous rocks form and characteristics
 - b. How do Sedimentary rocks form and characteristics
 - c. How do Metamorphic rocks form and characteristics
- 5.) Know your ESRT charts. (pages 6/7)

Earthquakes

- 6.) What is an earthquake? How do they form? Parts of an Earthquake.
- 7.) How to read a seismograph. EQ waves?
- 8.) How to find an epicenter.

Ellipses and eccentricity

- 9.) What is an ellipse?
- 10.) How to calculate eccentricity
- 11.) Minimum and maximum values and Drawing

READ, READ, READ.... the directions, this of this test is a reading test, very little actual knowledge.

Station 1: Identify each sample in your kit

Rock _____

What features do you see in it?

What features do you see in it?

What features do you see in it?

What type of rock is it?

What mineral is it?

What type of rock is it?

How do you know?

How do you know?

Rock _____

Mineral _____

Rock _____

What features do you see in it?

What features do you see in it?

What features do you see in it?

What type of rock is it?

What mineral is it?

What type of rock is it?

How do you know?

How do you know?

Mineral _____

Rock _____

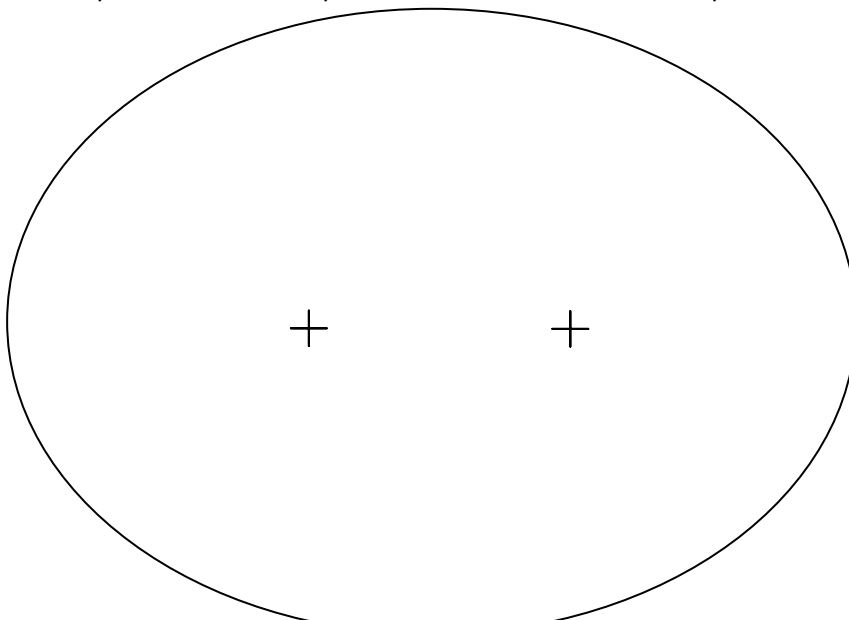
Station 2 Use attached page and fill in chart and location of earth quake epicenter.

Station 3 Find the eccentricity of the ellipse below and

Formula? _____ Solve: _____

What planet is it closest to? _____

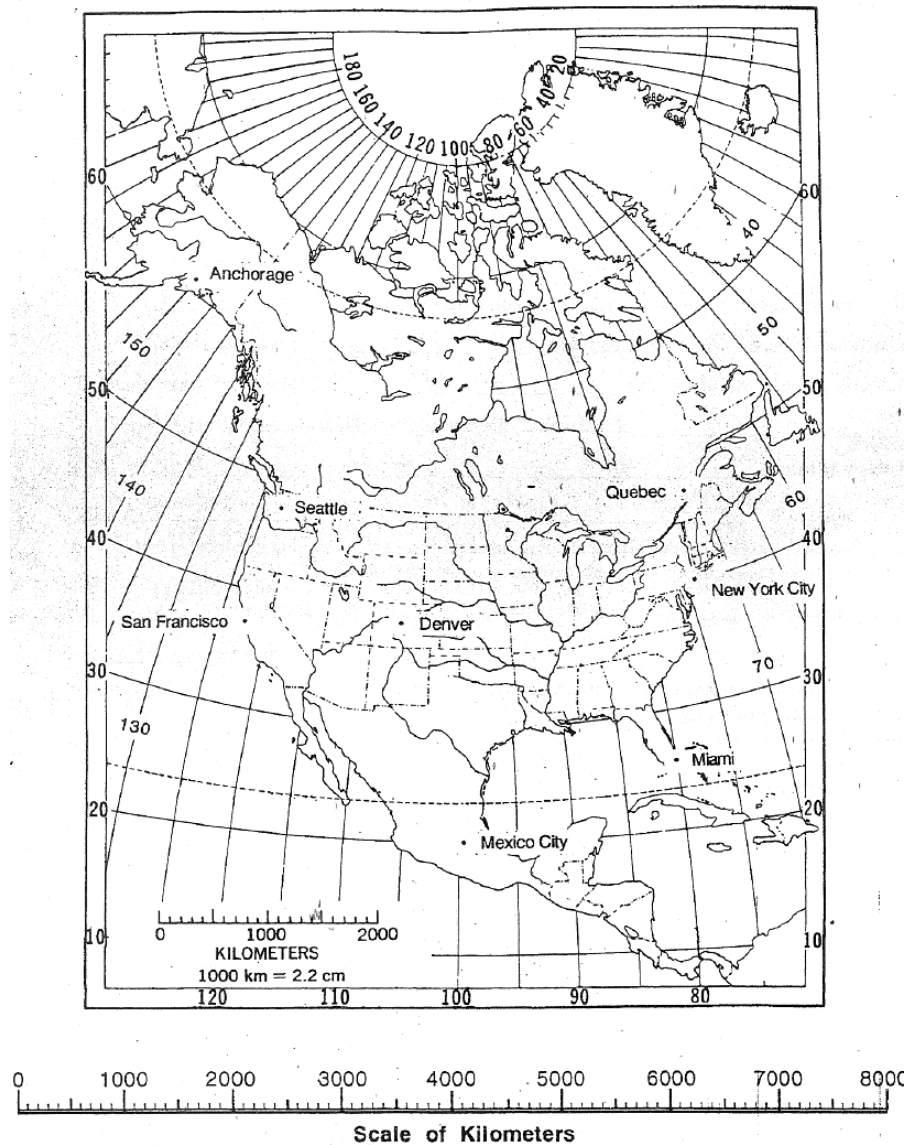
Compare it to Jupiter's eccentricity of orbit; is it more or less elliptical? _____



Station 2 **Fill in the chart and locate the earthquake epicenter on the map.**

| Station Name | P-Wave Arrival Time (00:00:00) | S-Wave Arrival Time (00:00:00) | S - P Time (00:00:00) | Distance to Epicenter (Km) | P-Wave Travel Time (00:00:00) | Origin Time (00:00:00) |
|--------------|-----------------------------------|-----------------------------------|--------------------------|-------------------------------|-------------------------------|---------------------------|
| Seattle | 13:08:10 | 13:10:50 | 00:02:40 | 1600 | 00:03:20 | 13:04:50 |
| Denver | 13:07:35 | 13:09:50 | | | | |
| Anchorage | 13:11:50 | 13:17:15 | | | | |

Put an X where the epicenter is located.



Name: _____

Date: _____

Mr Andrews

ESRT Where's Waldo®

Directions: Using your ESRT (Earth Science Reference Table), find the page(s) that the answers are found on and answer the question. This activity will allow to see how much you already know. To more you read and look the more information you will find!

Again all you need at this point is to tell me the page the answer is found on and the answer.

| | <u>Answer</u> | <u>Page</u> |
|---------------------------------------------------------------------------------------|---------------|-------------|
| 1.) What is the half life of Carbon-14? | _____ | _____ |
| 2.) What is the mean distance from the Sun (in millions of Km) of Earth? | _____ | _____ |
| 3.) What are the visible light colors from the Electromagnetic Spectrum table? | _____ | _____ |
| 4.) In order to make an igneous rock it must do what? | _____ | _____ |
| 5.) What is the formula for gradient? | _____ | _____ |
| 6.) How many tectonic plates are there? | _____ | _____ |
| 7.) How many plate boundaries are there? | _____ | _____ |
| 8.) One atmosphere is equal to how many mb? | _____ | _____ |
| 9.) What mineral can have either cleavage or fracture | _____ | _____ |
| 10.) How many types of crust are there? | _____ | _____ |

11.) What is the **present weather symbol** for fog?

12.) How much oxygen is in the **troposphere**?

13.) How many **Geologic Eras** are there in **Earth's history**?

14.) What **mineral** has a hardness of 3 and has cleavage?

15.) From the **rock cycle** how many rock types (group) are there?

16.) What are the two types of **ocean currents** on our planet?

17.) Long Island is what type of "**Generalized Landscape Region**"?

18.) What 3 states are touching **New York** on the East side?

19.) What is Earth's moon **Equatorial Diameter**?

20.) How many different **types of electromagnetic waves** are there?

21.) Between 0° and 30°N what way is the **wind traveling**?

22.) What **temperature** does ice melt at?

23.) What is the temperature in the **weather map symbol section**?

24.) What **tectonic plate** are we living on?

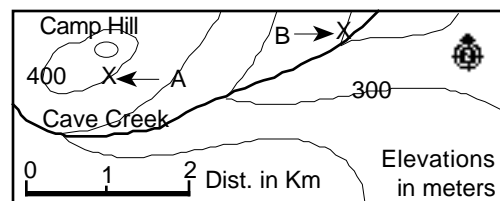
25.) What is the **density of water** at 3.98°C

The Earth Science Reference Tables is undoubtedly your most important resource for the Earth Science Regents exam. A knowledge of the information in the ESRT and how to use it will be of critical importance in your performance. Please keep in mind that completing this paper should be a learning activity. If you are unable to answer any of these items, use this an opportunity to pick up new skills.

» **Referemnce Tables; Page 1**

1. How wide is this sheet of paper, to the nearest 0.1 cm? _____ ...in meters? _____
2. Which of the radioactive substances listed on this page has the shortest half life? _____
3. Write the half life of Uranium-238 as a standard number. _____
4. If you started with 100 g of K-40, how much would remain k-40 after 3.9×10^9 years? _____
5. What common substance requires the most energy to heat up a unit mass by 10°C ? _____
6. Which uses more energy, melting a 10 g ice cube or evaporating 10 g of water? _____
7. If I estimated a rock to have a volume of 20 cm^3 , but careful measurement showed it's true volume to be 25 cm^3 , what would be the percent deviation of my estimate?
 (Please show you work for items 5 ↗ and 6 ↘.)

8. What is the average gradient from A to B?



» **Page 2**

9. In what landscape region do you live? _____
10. What is the landscape region around Old Forge, NY? _____
11. The Catskill Mountains are a part of what larger landscape area? _____

» **Page 3**

12. If you want to drive from Albany to Buffalo, what direction must you travel? _____
13. What are the approximate terrestrial coordinates of Watertown, NY? _____

14. What is the numerical age of the bedrock around Syracuse, NY? _____
15. What is the metric distance from Syracuse to Utica? _____
16. As water flows from Lake Erie into Lake Ontario, most of the change in elevation is at Niagara Falls. What is the total change in elevation? _____
17. Which kind of rocks are most common in the Catskills? Igneous, Metamorphic or Sedimentary
18. What New York landscape region has the oldest bedrock? _____

Page 4

19. What ocean current keeps Europe relatively warm? _____
20. How do local ocean currents affect the climate along the western coast of South America? _____
21. What major ocean current can be found at 50°S, 50°W? _____

Page 5

22. With respect to Africa, in what direction is South America drifting? _____
23. What kind of plate boundary is the Mid-Atlantic Ridge? Transform, Spreading or Subduction
24. What is the major active fault in the Western United States?? _____
25. What has caused the growth of the Himalayan Mountains, north of India? _____
26. Where is the nearest major mantle hot spot/plume? _____

Page 6

27. What is the final step in the formation of sediment? _____
28. What do we call sediment composed of particles 1 cm across? _____
29. How does gabbro differ from basalt? _____
30. What is the most abundant mineral in diorite? _____
31. How fast a stream current is required to transport the smallest boulders? _____
32. What five minerals are common in basalt? _____

Page 7

33. What minerals are most common in sandstone? _____
34. Which clastic (fragmental) rock is composed of the smallest particles? _____
35. What mineral is most abundant in rock salt? (The mineral is not called salt.) _____
36. What mineral family is common in slate, phyllite, schist and gneiss? _____
37. What is the texture of quartzite? _____
38. What metamorphic rock is primarily composed of calcite? _____

Pages 8 & 9

39. When did North America split apart from Africa and Europe? _____
40. How old is the Earth? _____
41. What is the first period of the Paleozoic era? _____
42. What two periods are *not* represented in the bedrock of New York? _____
43. What animal group first evolved about the same time as the dinosaurs? _____

Page 10

44. At what two depths within the Earth is the temperature above the melting point? _____
45. What is Earth's radius in kilometers? _____ What is its diameter? _____
46. What is the composition of Earth's core? _____
47. Which layer of the Earth is the least dense? _____ Most dense; _____
48. In what part of the Earth does the temperature increase fastest with depth? _____

Pages 11

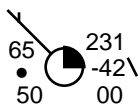
49. What is the two most common element in the oceans? _____
50. How long does it take an S-wave to travel 6000 km? _____ ...a P-wave? _____
51. How far away is the epicenter if the P-wave arrives 5 minutes before the S-wave? _____
52. What element makes up about 6% of crustal rocks by mass, but only ½% by volume? _____
53. How far can a P-wave travel in 5 minutes, 40 seconds? _____

Pages 12

54. If the wet bulb reads 4°C and the dry bulb records 12°C, what is the dewpoint? _____
55. What is the relative humidity in the conditions specified above? _____
56. What does a negative dewpoint mean? _____

Pages 13

57. What is the Kelvin temperature of 0° C? _____ What is this temperature in Fahrenheit? _____
58. What is the normal atmospheric pressure in inches of mercury? _____
59. What is the Fahrenheit temperature at this weather station? _____ Celsius? _____
60. What is the atmospheric pressure? _____ Is it rising or falling? _____
61. Wind speed? _____ Wind direction? _____ Cloud Cover? _____
62. A maritime tropical air mass is _____ and _____. (You should know this.)



Pages 14

63. How does the air temperature change as you go higher within the mesosphere? _____
64. What name has been given to the boundary at the bottom of the atmosphere? _____
65. What form of electromagnetic energy has a wavelength just too long to be visible to us? _____
66. What is the approximate wavelength of visible light? _____

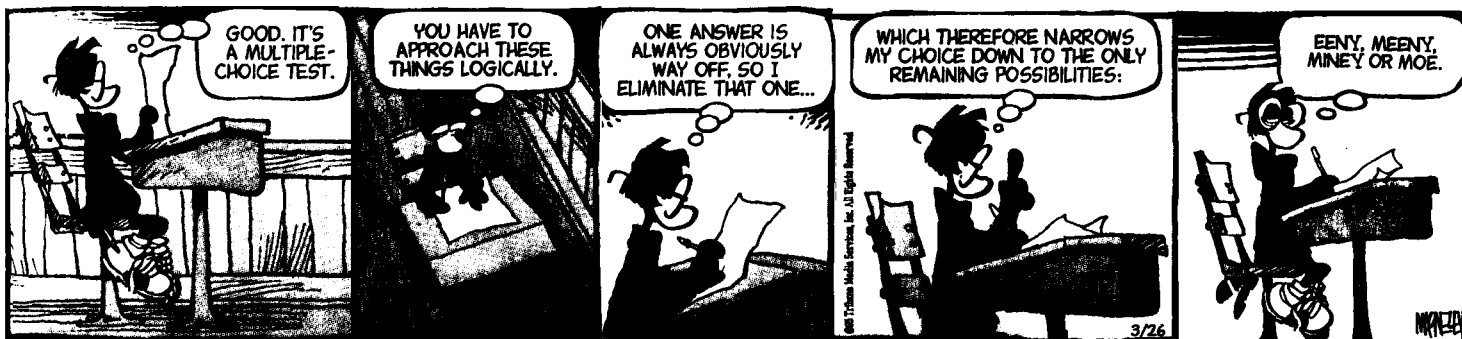
67. What is the prevailing wind direction 45° south of the equator? _____
68. Why is precipitation so abundant near the equator? _____

Pages 15

69. Although Barnard's Star is relatively close to us, it is hard to see?
Compared to the sun, how much light does Barnard's Star give off? _____
70. The North Star is similar to the sun in _____ and _____.
How is it very different? _____
71. Rigel and Betelgeuse are two of the brightest stars in the prominent winter constellation Orion.
How does Betelgeuse appear different from Rigel to us? _____
72. Of the nine planets, which one spins the fastest on its axis? _____
73. Which planet has the most out of round (flattened) orbit? _____
74. Which planet is closest to the Earth in size? _____
75. Approximately how much larger is the sun's diameter than the diameter of the Earth? _____

Pages 16

76. What mineral has a nonmetallic luster, scratches glass and is often pink? _____
77. Name two common minerals that are chemical elements _____ and _____
78. What is the most obvious difference between amphibole and pyroxene? _____
79. What other minerals form crystals similar in shape to pyrite? _____



Name: _____

Weathering, Erosion & Deposition

- 1.) _____
- 2.) _____
- 3.) _____
- 4.) _____
- 5.) _____
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- 16.) _____
- 17.) _____
- 1.) _____
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- 10.) _____
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- 12.) _____

Plate Tectonics

- 1.) _____
- 2.) _____
- 3.) _____
- 4.) _____
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- 17.) _____
- 18.) _____

Astronomy

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- 16.) _____
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- 18.) _____
- 19.) _____

Meteorology

- 1.) _____
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- 19.) _____

Rocks & Minerals

- 1.) _____
- 2.) _____
- 3.) _____
- 4.) _____
- 5.) _____
- 6.) _____
- 7.) _____
- 8.) _____
- 9.) _____
- 10.) _____
- 11.) _____
- 12.) _____
- 13.) _____
- 14.) _____
- 15.) _____

Earth Science Review Games

Directions...

- 1.) Get a partner; sit next to them at one computer.
- 2.) Log into one computer
- 3.) Type in this address
www.sciencereviewgames.com
- 4.) Click Earth Science
- 5.) Click Geology
- 6.) Pick a topic (you choose-must be related to Earth Science)
- 7.) Pick a game
 - 1-Penalty shootout (soccer)
 - 2-Hoop Shot (basketball)
 - 3-Grade or no Grade (deal or no deal)
- 8.) Click 2 players
- 9.) Pick player 1 info
- 10.) Pick player 2 info
- 11.) Play game

Unit 1 Weather

Review outlines for Units covered in Earth Science...

This is the major information you need to know before to take your test.

- I. Atmosphere
 - a. Outgassing
 - b. Structure (ESRT)
 - i. Troposphere
 - ii. Stratosphere
 - iii. Mesosphere
 - iv. Thermosphere
 - v. Pauses are the boundaries
- II. Factors
 - a. Temperature
 - i. Conversions (ESRT)
 - ii. Measures with Thermometer
 - b. Pressure
 - i. Conversions (ESRT)
 - ii. Measures with Barometer
 - c. Wind
 - i. Measures with anemometer
 - ii. Caused by pressure differences
 - iii. Land and sea breezes
 - d. Humidity
 - i. Moisture in the air
- III. Dew Point & Humidity
 - a. Measure both with Psychrometer
 - b. Dry bulb always higher than wet bulb
 - c. Dry bulb is air temperature
- IV. Coriolis effect
 - a. Rotation of the Earth causes wind and water to curve
- V. Grail: Hot air rises, cools than meets the dew point and condenses. Clouds form, gravity pulls water droplets down.
 - a. Precipitation needs a condensation nuclei to form (DUST)
- VI. Air Masses
 - a. cT, cP, cA, mT, mP
 - b. Moisture and temperature
- VII. Fronts
 - a. Cold, warm and occluded
 - b. What the incoming air is like

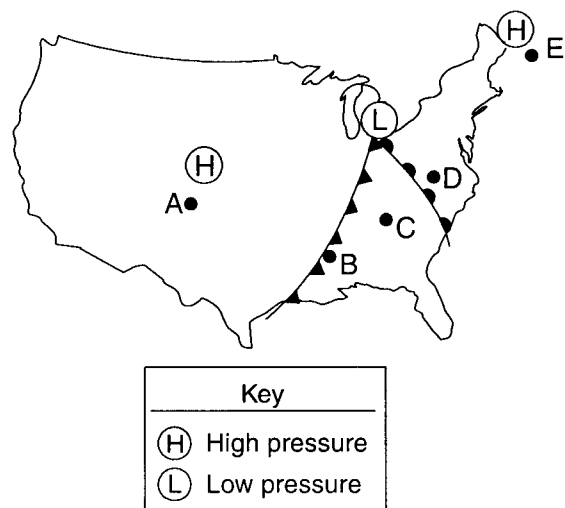
UNIT 2

Review outlines for Units covered in Earth Science...

This is the major information that you need to know before you walk into the final exam in a few weeks.

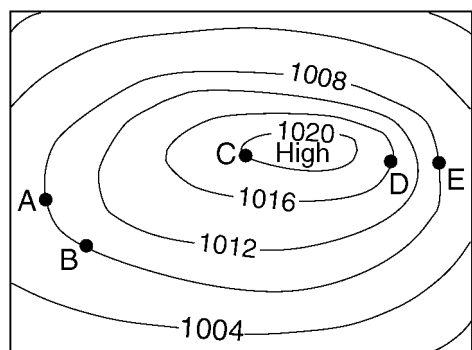
- I. Shape
 - a. Oblate Spheroid
 - i. Fattened at equator and flattened at poles
 - ii. Numbers in ESRT p 15
 - b. Polaris
 - i. The angle of Polaris in the sky is = to the observers latitude.
- II. Layers (ESRT 10)
 - a. Lithosphere (crust - solid rocky part)
 - b. Hydrosphere (crust - liquid part)
 - c. Atmosphere (above crust - Gas part)
 - d. Mantle - plastic like layer under high heat & pressure
 - e. Core - inner solid, outer liquid
- III. Positions on Earth
 - a. Latitude - parallel lines on Earth running East and West
 - i. Equator (0° Latitude)
 - ii. Tropics (23.5° Latitude)
 - b. Longitude - Lines starting at pole and ending at other pole
 - i. Prime meridian (0° Longitude)
 - ii. International Date line (180° longitude)
- IV. Mapping
 - a. Contour mapping
 - i. Closed circles mean increase in elevation
 - ii. Set scale (contour interval or distance scale)
 - b. Rivers-"V" points upstream
- V. Profiles (see review book p 23-25)
 - a. Use a straight baseline on a map
 - b. Mark off every intersecting isoline on that baseline on a scrap paper.
 - c. Use that scrap paper to transfer each mark onto appropriate elevation marked grid.
 - d. Connect dots.
- VI. Gradient (slope)
 - a. Formula
 - i. $G = \text{change in field value} / \text{Distance}$.
 - ii. Field value is the change in the elevation between two points.

1. The map below shows high-pressure and low-pressure weather systems in the United States.



Which two lettered positions on the map are most likely receiving precipitation?

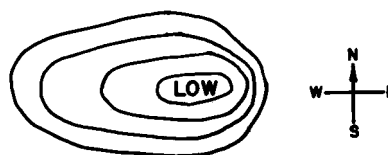
- (1) A and B (3) C and E
(2) B and D (4) A and D
2. The air-pressure field map below represents a high-pressure system over the central United States. Isobars show the air pressure, in millibars. Letters A through E represent locations on Earth's surface.



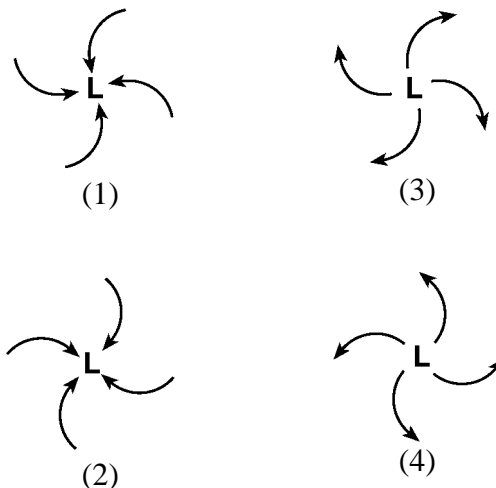
Between which two locations is the wind speed greatest?

- (1) A and B (3) C and D
(2) B and C (4) D and E

3. The diagram below shows the isolines of air pressure around a low-pressure center. On which side of the low-pressure center will the wind speed be greatest?

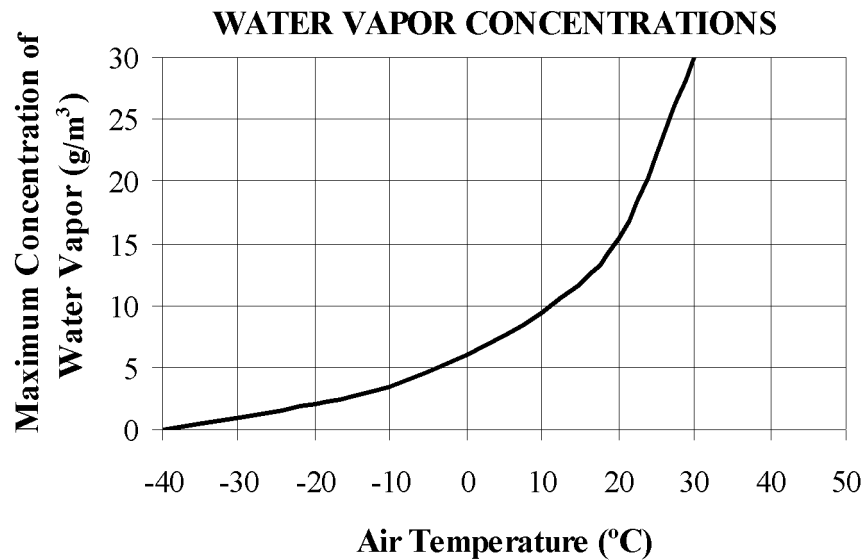


- (1) north (3) east
(2) south (4) west
4. At which of these latitudes would average annual precipitation be greatest?
- (1) 0° (3) 90° N
(2) 30° N (4) 90° S
5. Which map view best shows the movement of surface air around a low-pressure system in the Northern Hemisphere?



6. Tornadoes occur when a very cold, dry air mass meets a very warm, wet air mass. Which two air masses would most likely form a tornado when they meet?
- (1) cP and cA (3) cP and mT
(2) cT and mP (4) mP and mT
7. Which process occurs when water vapor moves out of the leaves of a tree into the atmosphere?
- (1) condensation (3) runoff
(2) infiltration (4) transpiration

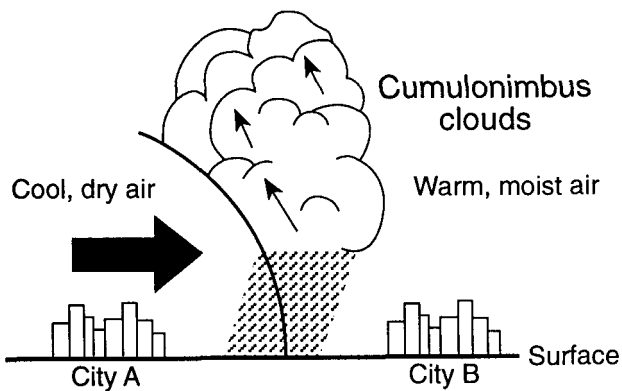
8. The graph below shows the maximum possible amounts of water vapor that air can hold at different temperatures.



What is the approximate maximum amount of water vapor that a cubic meter of air can hold at 20°C?

- (1) 15 g (2) 20 g (3) 25 g (4) 30 g

9. The cross section below shows a weather front. The large arrow shows the direction of the movement of the cool air mass.



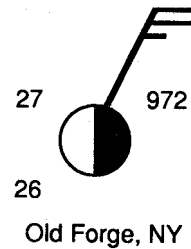
Which type of weather front is shown?

- (1) warm front (3) occluded front
(2) cold front (4) stationery front

10. An air mass that originates over the northern Pacific Ocean and moves southward over the United States would most likely be labeled on a weather map as

- (1) mP (3) cP
(2) mT (4) cT

11. The station model below provides weather data for Old Forge, New York.

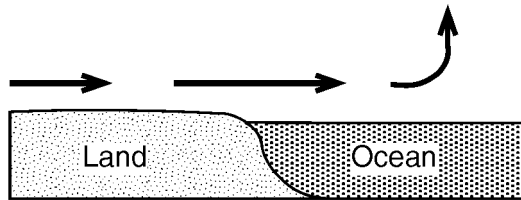


Which set of factors best describes the conditions at Old Forge?

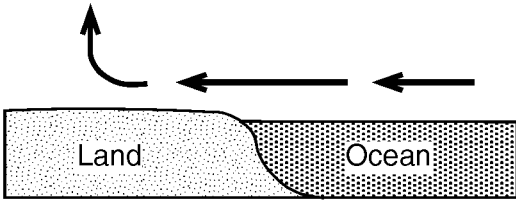
- (1) southwest wind at 25 knots, dewpoint 26°F, air pressure 997.2 mb
(2) southwest wind at 25 knots, dewpoint 27°F, air pressure 1,097.2 mb
(3) northeast wind at 25 knots, dewpoint 26°F, air pressure 997.2 mb
(4) northeast wind at 25 knots, dewpoint 27°F, air pressure 1,097.2 mb
12. What is the dewpoint temperature when the dry-bulb temperature is 12°C and the wet-bulb temperature is 7°C?
- (1) 1°C (3) , 5°C
(2) , 2°C (4) 4°C

13. Adjacent land and ocean surfaces have the same temperature at sunrise on a clear, calm, summer day. Then the land and water are heated by the Sun for several hours. Which cross section shows the most likely direction of surface winds that will develop at this ocean shore?

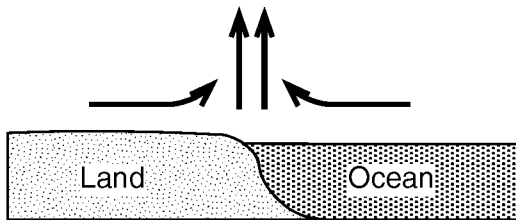
(1)



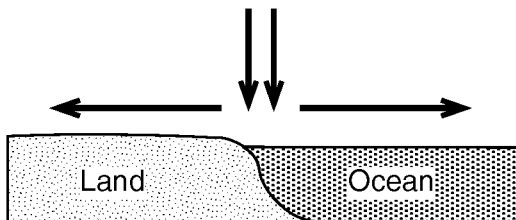
(2)



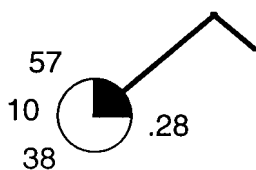
(3)



(4)



14. What is the visibility, in miles, shown on the station model below?



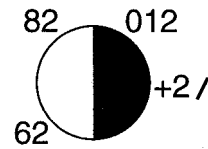
(1) 10

(3) 38

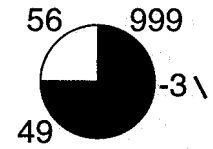
(2) 28

(4) 57

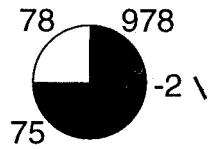
15. Which weather station model indicates the highest relative humidity?



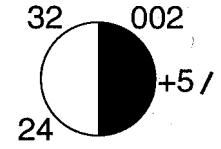
(1)



(3)

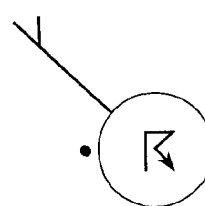


(2)

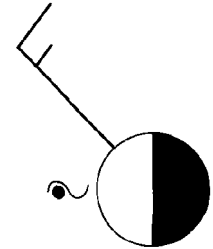


(4)

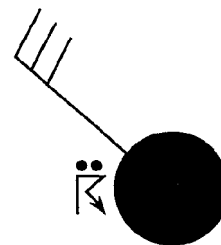
16. Which station model correctly shows the weather conditions of a thunderstorm with heavy rain?



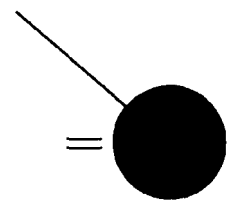
(1)



(3)



(2)



(4)

17. What is the relative humidity of a sample of air that has a dry-bulb temperature of 20°C and a wet-bulb temperature of 11°C?

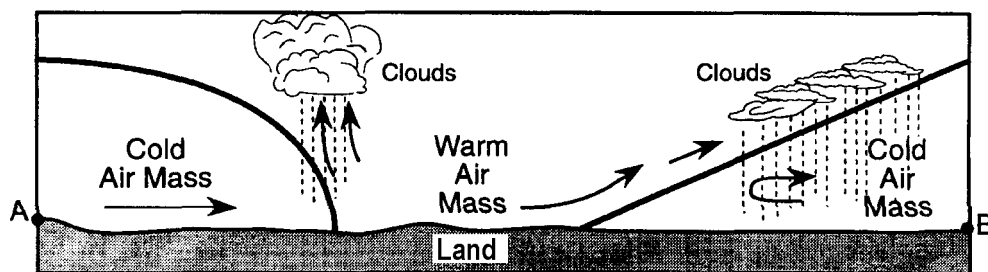
(1) 9%

(3) 17%

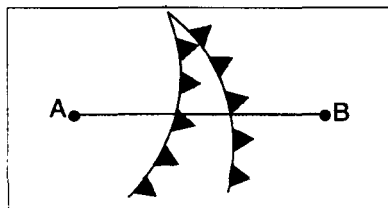
(2) 2%

(4) 30%

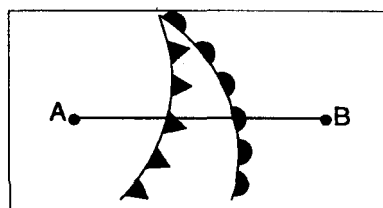
18. The diagram below represents a cross section of air masses and frontal surfaces along line AB. The dashed lines represent precipitation.



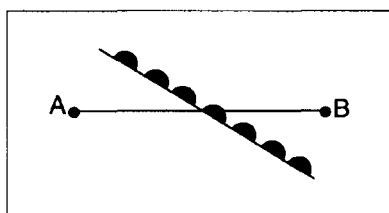
Which weather map best represents this frontal system?



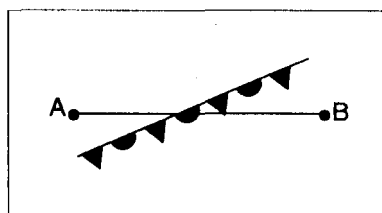
(1)



(3)



(2)



(4)

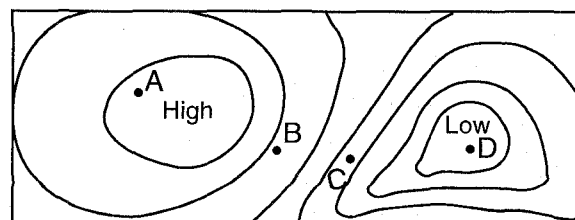
19. What is the approximate dewpoint temperature when the dry-bulb temperature is 18°C and the wet-bulb temperature is 14.5°C ?

- (1) 8.0°C (3) 11°C
(2) 10.0°C (4) 12°C

20. Which ocean current cools the climate of locations along the northeastern coastline of North America?

- (1) Florida Current (3) Canaries Current
(2) Labrador Current (4) Guinea Current

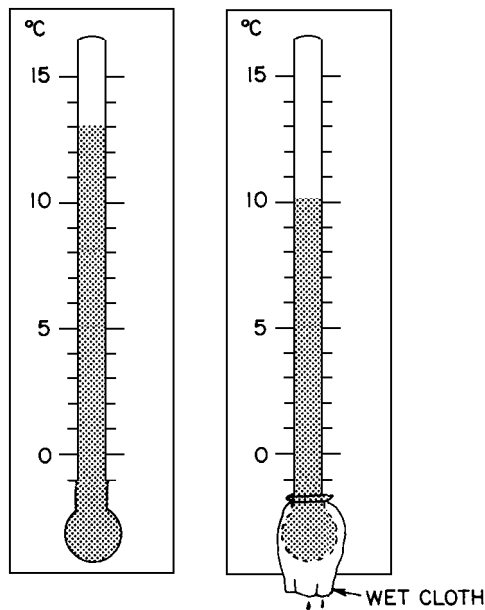
21. The diagram below represents a section of a weather map showing high- and low-pressure systems. The lines represent isobars.



At which point is the windspeed greatest?

- (1) A (3) C
(2) B (4) D

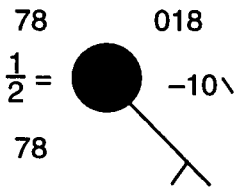
22. The two thermometers below show the dry-bulb and wet-bulb temperatures of the air.



What is the approximate dewpoint temperature of the air?

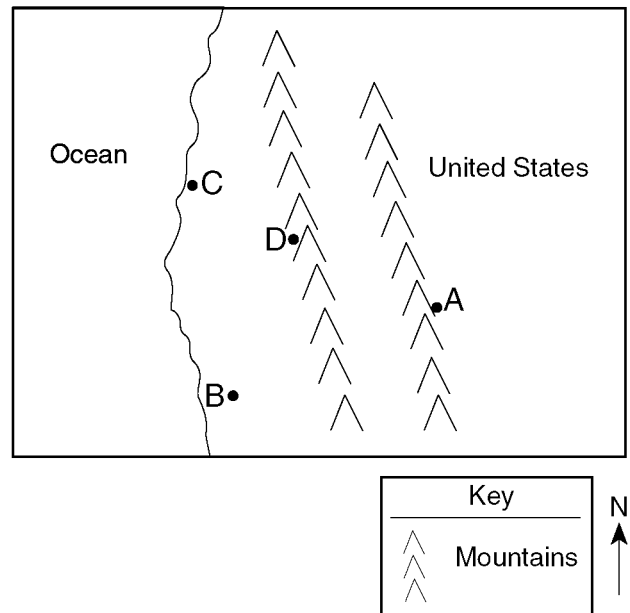
- (1) -25°C (3) 3°C
 (2) 7°C (4) 4°C

Base your answers to questions 23 and 24 on the weather station model shown below.



23. State the condition represented by the symbol for “present weather.”
24. State the relative humidity.

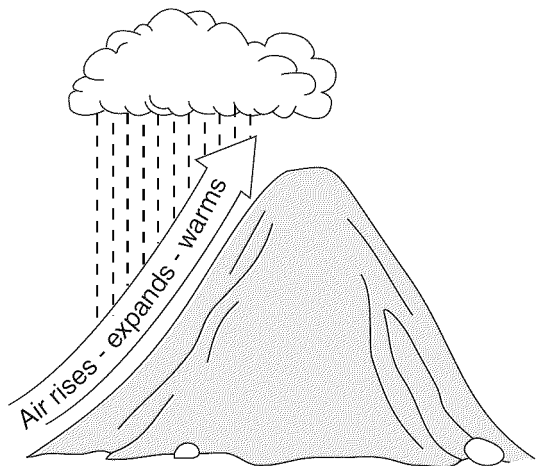
25. The map below shows the location of four cities, A, B, C, and D, in the western United States where prevailing winds are from the southwest.



Which city most likely receives the *least* amount of average yearly precipitation?

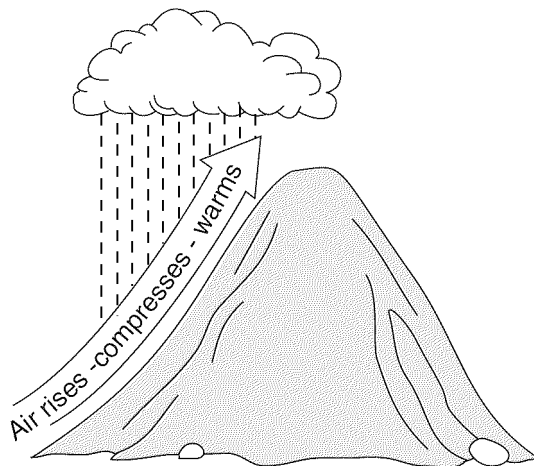
- (1) A (3) C
 (2) B (4) D

26. Which diagram best illustrates how air rising over a mountain produces precipitation?



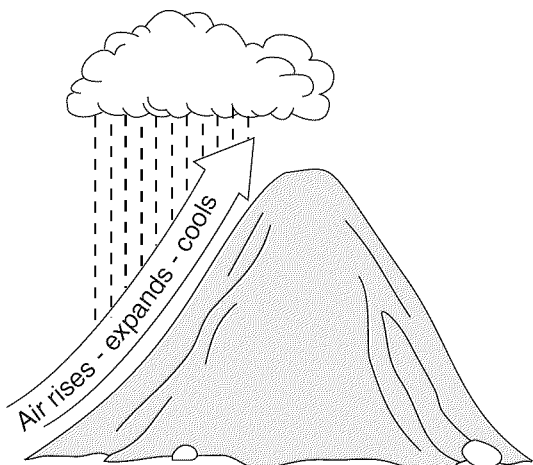
Mountain

(1)



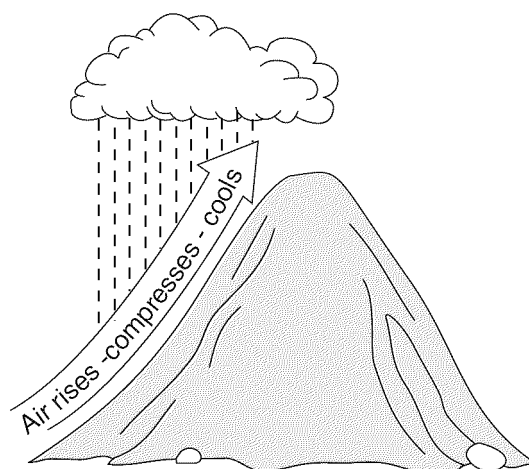
Mountain

(3)



Mountain

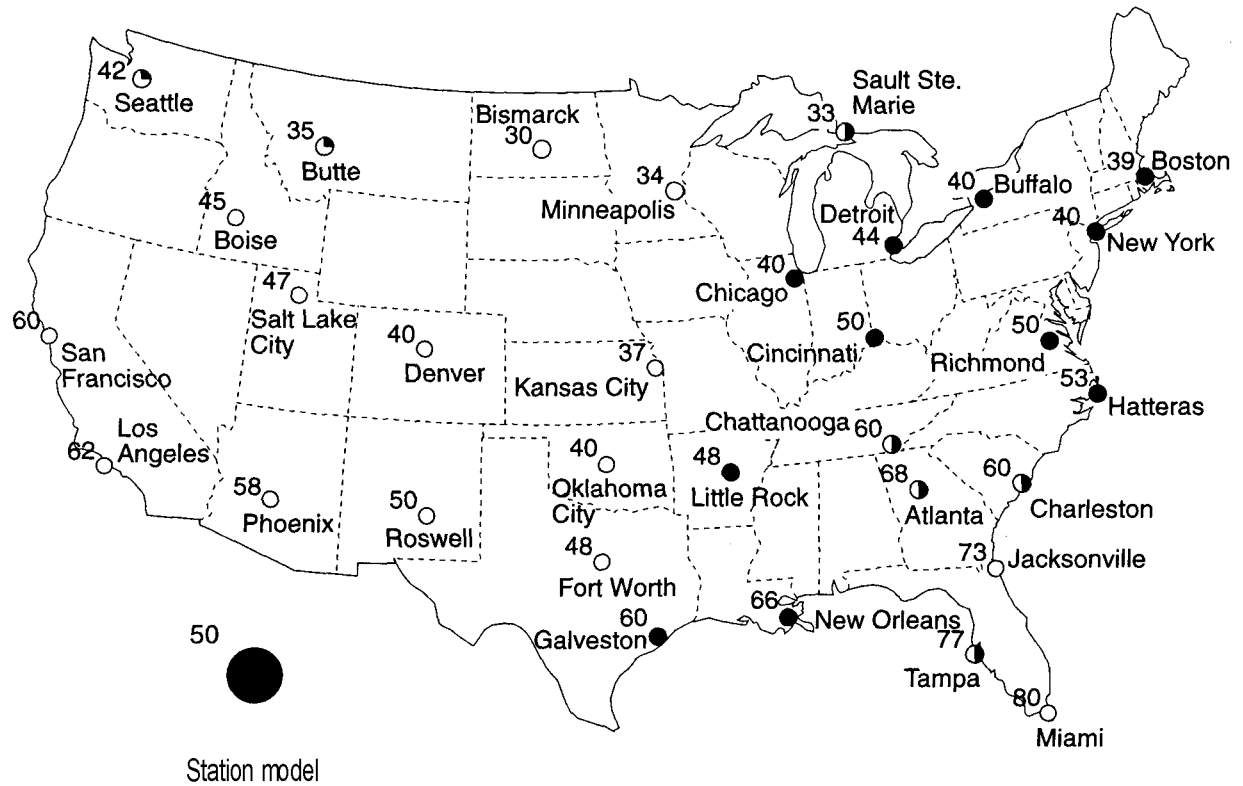
(2)



Mountain

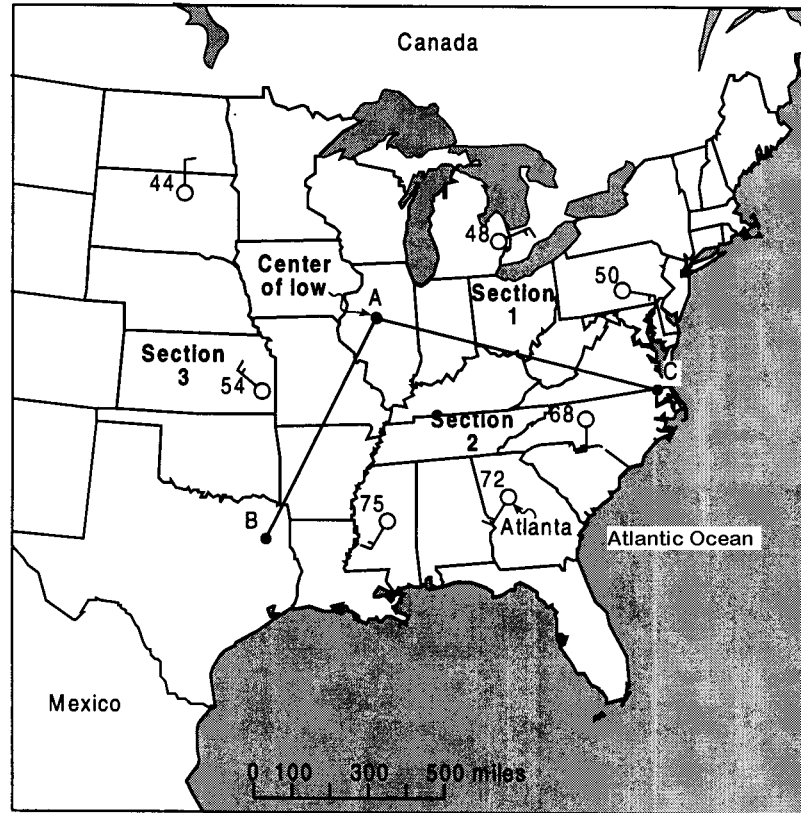
(4)

27. Base your answer to the following question on the weather map below, which shows temperature readings at weather stations in the continental United States.



On the weather map provided on your answer paper, draw three isotherms: the 40°F isotherm, the 50°F isotherm, and the 60°F isotherm.

28. Base your answer to the following question on the weather map below, which shows partial weather data for several weather stations. Point A is the center of a low-pressure system. Lines AB and AC represent the frontal boundaries between different air masses.



Draw the correct weather map symbols for the *two* different fronts located on lines AB and AC. The symbols must show the direction the fronts are moving.

Base your answers to questions 29 through 32 on the reading passage and maps below. The reading passage discusses acid rain. Map I shows the locations of some major United States producers of nitrogen oxide and sulfur dioxide that are released into Earth's atmosphere. Map II shows the pH concentration of acid rain in the United States.

Acid Rain

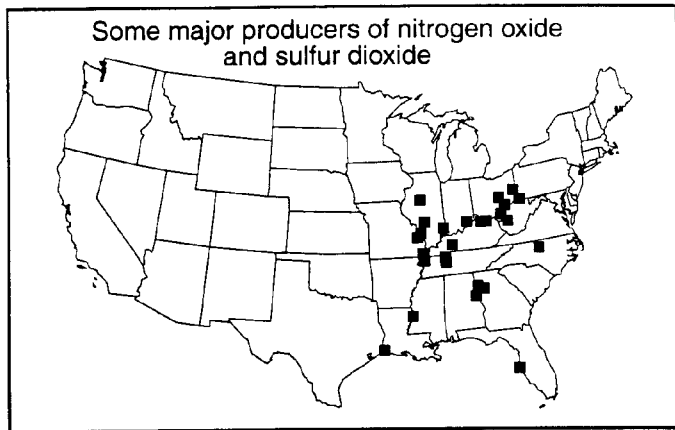
Acid deposition consists of acidic substances that fall to Earth. The most common type of acid deposition is rain containing nitric acid and sulfuric acid. Acid rain forms when nitrogen oxide and sulfur dioxide gases combine with water and oxygen in the atmosphere.

Human-generated sulfur dioxide results primarily from coal-burning electric utility plants and industrial plants. Human-generated nitrogen oxide results primarily from burning fossil fuels in motor vehicles and electric utility plants.

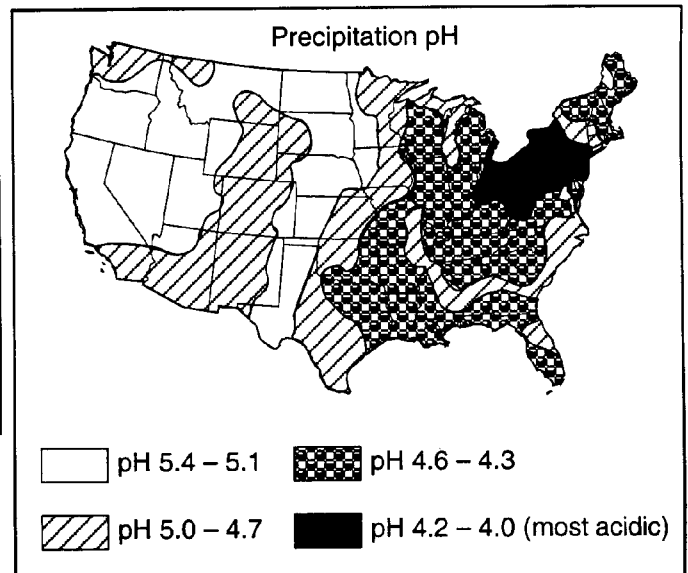
Natural events, such as volcanic eruptions, forest fires, hot springs, and geysers, also produce nitrogen oxide and sulfur dioxide.

Acid rain affects trees, human-made structures, and surface water. Acid damages tree leaves and decreases the tree's ability to carry on photosynthesis. Acid also damages tree bark and exposes trees to insects and disease. Many statues and buildings are composed of rocks containing the mineral calcite, which reacts with acid and chemically weathers more rapidly than other common minerals. Acid deposition lowers the pH of surface water. Much of the surface water of the Adirondack region has pH values too acidic for plants and animals to survive.

Map I

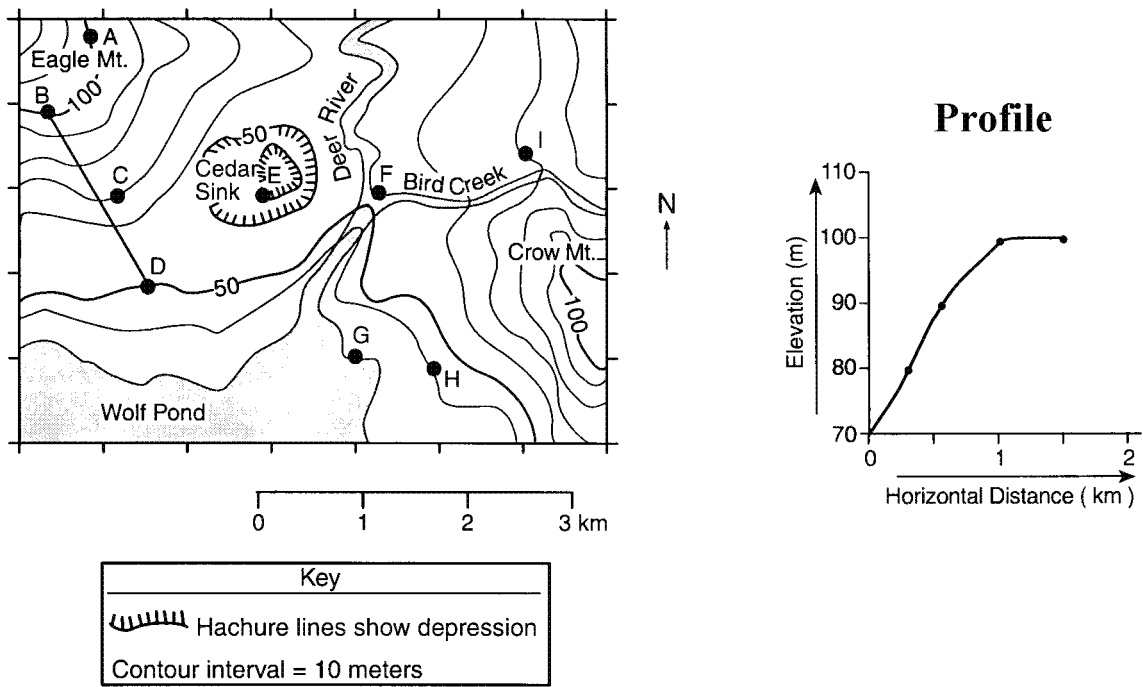


Map II



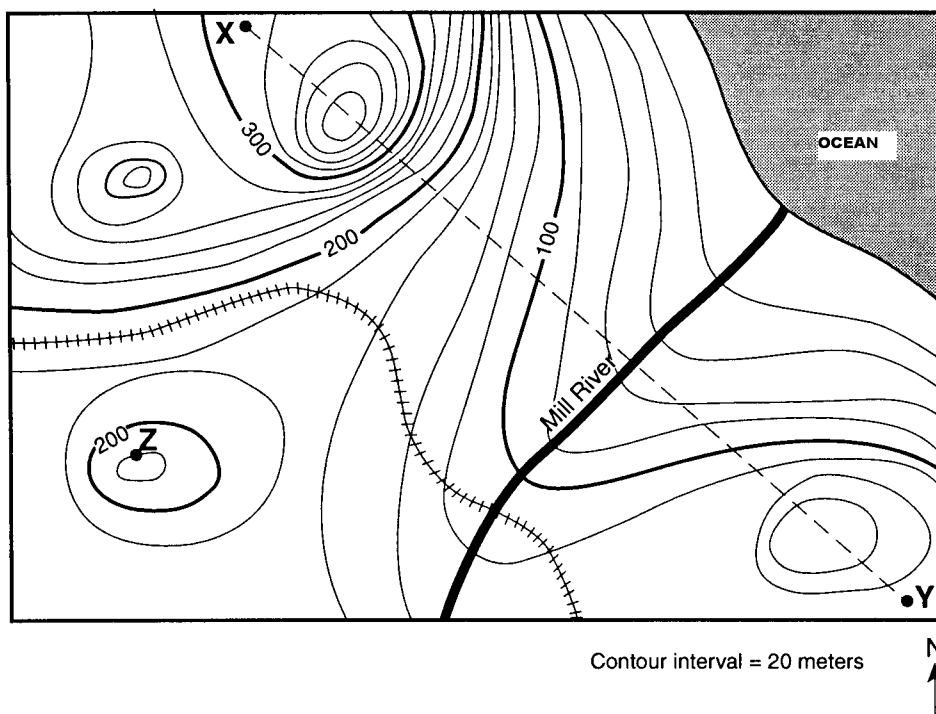
29. State *one* reason that the northeastern part of the United States has more acid deposition than other regions of the country.
30. State *one* sedimentary or *one* metamorphic rock that is most chemically weathered by acid rain.
31. Describe *one* law that could be passed by the government to prevent some of the problems of acid deposition.
32. Explain why completely eliminating human-generated nitrogen oxide and sulfur dioxide will *not* completely eliminate acid deposition.

Base your answers to questions 1 and 2 on the topographic map below. Points A through I are locations on the map. Elevations are shown in meters.



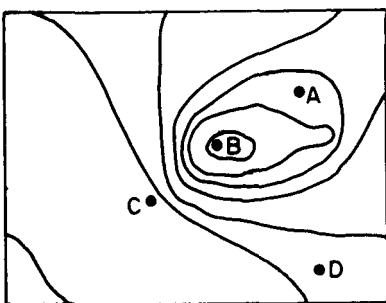
- Which locations have the same elevation?
(1) A and C (2) B and E (3) C and I (4) F and G
- In which section of the map is the highest elevation located?
(1) northeast (2) northwest (3) southeast (4) southwest

Base your answers to questions 3 and 4 on the topographic map below. Points X, Y, and Z are locations on the map. Elevations are expressed in meters.



3. Mill River generally flows toward the
 - (1) southeast
 - (2) southwest
 - (3) northeast
 - (4) northwest
4. What is the elevation of point Z?
 - (1) 190 m
 - (2) 220 m
 - (3) 240 m
 - (4) 250 m

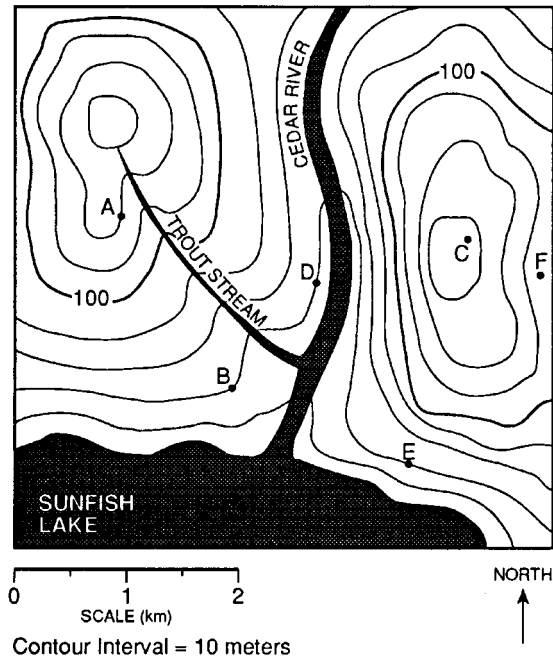
5. The diagram below is a contour map. Between which two points is the slope of the hill steepest?



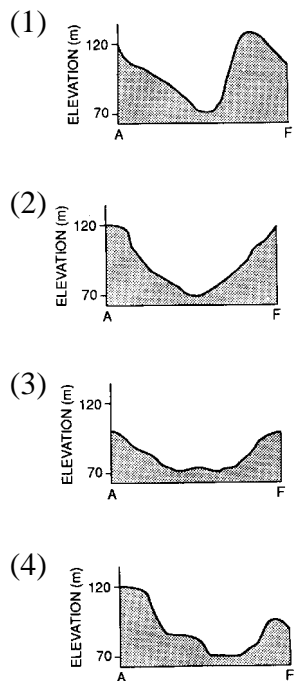
- (1) A and B
 - (2) B and C
 - (3) C and D
 - (4) A and D
6. The greatest atmospheric pressure occurs in the
 - (1) troposphere
 - (2) stratosphere
 - (3) mesosphere
 - (4) thermosphere

7. A stream has a source at an elevation of 1,000. meters. It ends in a lake that has an elevation of 300. meters. If the lake is 200. kilometers away from the source, what is the average gradient of the stream?
 - (1) 1.5 m/km
 - (2) 3.5 m/km
 - (3) 10. m/km
 - (4) 15 m/km
8. What is the approximate elevation of the stratopause?
 - (1) 10 km
 - (2) 30 km
 - (3) 50 km
 - (4) 80 km
9. Cities located on the same meridian (longitude) must have the same
 - (1) altitude
 - (2) latitude
 - (3) length of daylight
 - (4) solar time

10. Base your answer to the following question on the contour map below. Points A through F represent locations on the map.



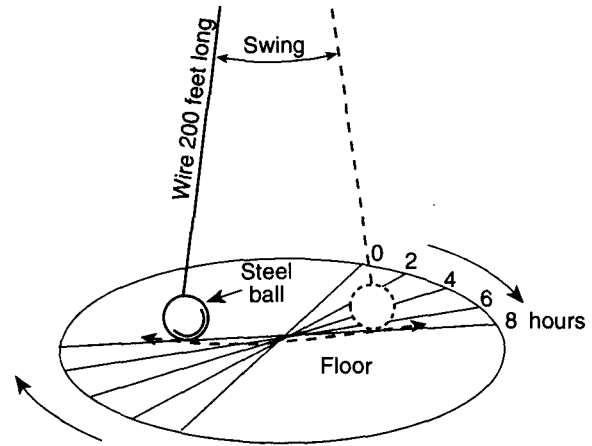
Which diagram best represents the topographic profile from location A to location F?



11. At which latitude will *Polaris* be overhead?

- (1) 0° (3) 90° S.
(2) 23 1/2°N. (4) 90° N.

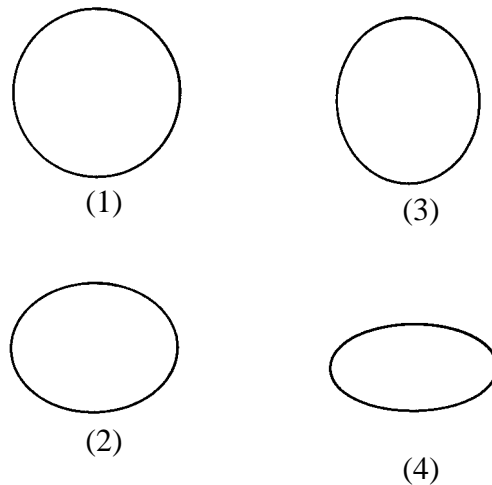
12. The diagram below represents a Foucault pendulum swinging freely for 8 hours.



The pendulum appears to change its direction of swing because of Earth's

- (1) tectonic plate movement
(2) force of gravity
(3) rotation
(4) revolution

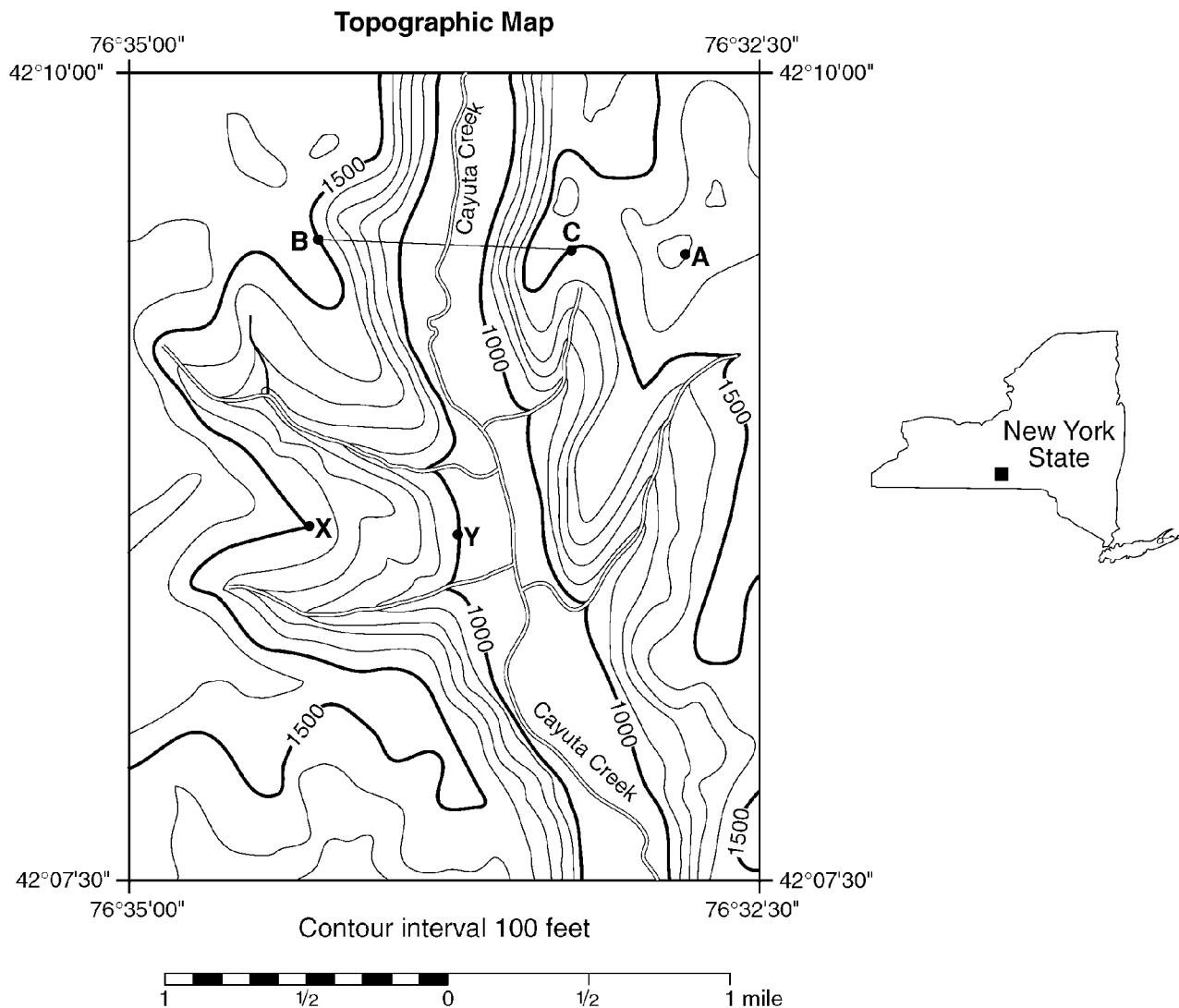
13. Which diagram most accurately shows the cross-sectional shape of the Earth drawn to scale?



14. Approximately what percent of the Earth's radius is represented by the crust?

- (1) less than 1% (3) 50%
(2) 25% (4) 75%

Base your answers to questions **15** and **16** on the maps below. Points A, B, C, X, and Y are locations on the topographic map. The small map identifies the New York State region shown in the topographic map.



15. What is the approximate gradient between point X and point Y?
 - (1) 100 ft/mi
 - (2) 250 ft/mi
 - (3) 500 ft/mi
 - (4) 1,000 ft/mi
16. What is the elevation of point A on the topographic map?
 - (1) 1,700 ft
 - (2) 1,650 ft
 - (3) 1,600 ft
 - (4) 1,550 ft
17. What could be the approximate location of an observer if he measured the altitude of Polaris to be 41 degrees above the horizon?
 - (1) Watertown
 - (2) Massena
 - (3) Buffalo
 - (4) New York City

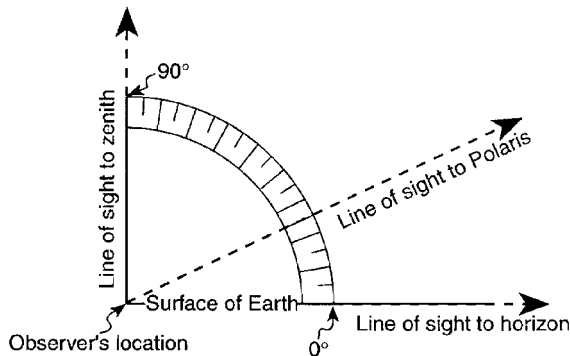
18. According to the data below, what is the exact shape of the Earth?

Actual Dimensions of the Earth

| | |
|--------------------------|-----------|
| Equatorial Radius | 6,378 km |
| Polar Radius | 6,357 km |
| Equatorial Circumference | 40,076 km |
| Polar Circumference | 40,008 km |

- (1) slightly flattened at both the Equator and the Poles
- (2) slightly bulging at both the Equator and the Poles
- (3) slightly flattened at the Equator and slightly bulging at the Poles
- (4) slightly flattened at the Poles and slightly bulging at the Equator

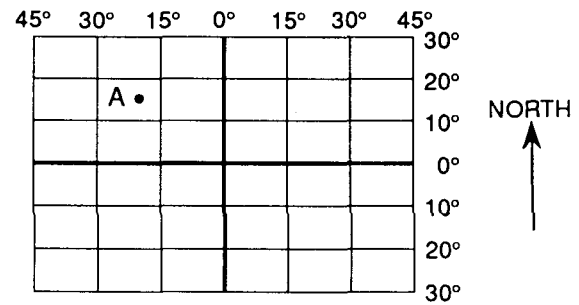
19. The diagram below shows the angular altitude of *Polaris* above the horizon at a certain location.



What is the latitude of the observer?

- (1) 15° N
- (2) 25° N
- (3) 30° N
- (4) 65° N

20. The diagram below represents a portion of the Earth's latitude and longitude system.



What are the approximate latitude and longitude of point A?

- (1) 15° S 20° W
- (2) 15° S 20° E
- (3) 15° N 20° W
- (4) 15° N 20° E

Name: _____

Review Book (Yellow book) Problems for Units 1 & 2

Page 155/156 q 1-15

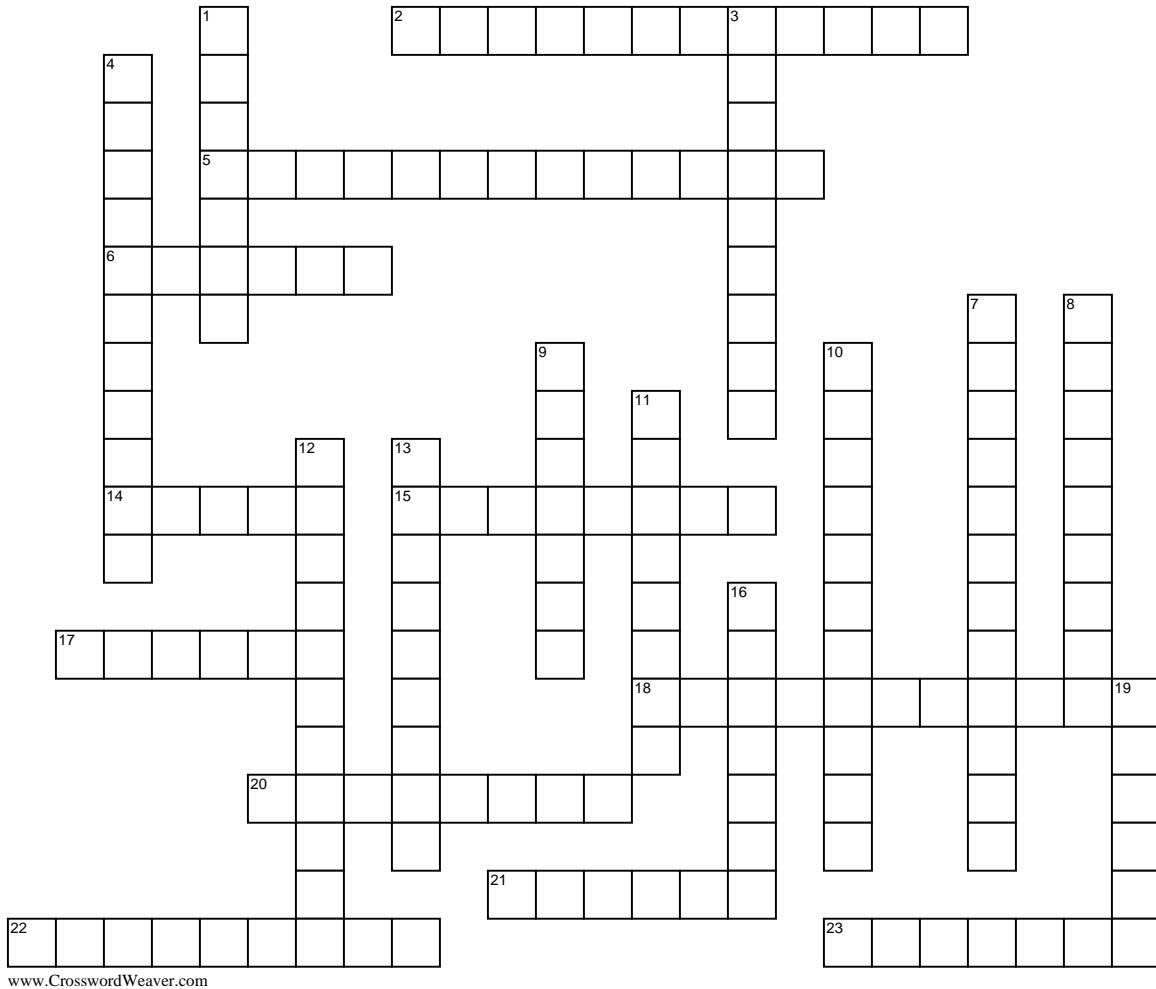
- 1.) _____
- 2.) _____
- 3.) _____
- 4.) _____
- 5.) _____
- 6.) _____
- 7.) _____
- 8.) _____
- 9.) _____
- 10.) _____
- 11.) _____
- 12.) _____
- 13.) _____
- 14.) _____
- 15.) _____

Page 27/28 q1-19

- 1.) _____
- 2.) _____
- 3.) _____
- 4.) _____
- 5.) _____
- 6.) _____
- 7.) _____
- 8.) _____
- 9.) _____
- 10.) _____
- 11.) _____
- 12.) _____
- 13.) _____
- 14.) _____
- 15.) _____
- 16.) _____
- 17.) _____
- 18.) _____
- 19.) _____

NYS Latitude & Longitude

Use your ESRT to find the locations. Name: _____



www.CrosswordWeaver.com

ACROSS

- 2 42° 30' N 78° 00' W
- 5 41° 45' N 75° 15' W
- 6 42° 15' N 76° 45' W
- 14 43° 10' N 75° 25' W
- 15 43° 45' N 74° 55' W
- 17 43° 28' N 76° 25' W
- 18 42° 00' N 75° 45' W
- 20 42° 30' N 79° 30' W
- 21 42° 25' N 76° 30' W
- 22 42° 15' N 79° 15' W
- 23 44° 10' N 74° 00' W

DOWN

- 1 42° 00' N 74° 30' W
- 3 40° 55' N 72° 45' W
- 4 41° 30' N 73° 00' W
- 7 41° 45' N 77° 00' W
- 8 44° 00' N 75° 55' W
- 9 42° 45' N 78° 55' W
- 10 44° 45' N 73° 30' W
- 11 43° 15' N 76° 15' W
- 12 43° 30' N 78° 00' W
- 13 43° 20' N 77° 40' W
- 16 44° 55' N 74° 55' W
- 19 42° 45' N 73° 50' W

WORD BANK: Albany, buffalo, connecticut, delawareriver, elmira, geneseeriver, ithaca, jamestown, lakeerie, lakeontario, massena, mtmarcy, oldforge, oswego, pennsylvania, plattsburgh, riverhead, rochester, slidemt, susquehanna, syracuse, utica, watertown.

Rocks UNIT 3

Review outlines for Units covered in Earth Science...

This is the major information that you need to know before you walk into the final exam in a few weeks.

Outline

Rocks and Minerals

- I. Minerals - Made of elements
 - a. Inorganic - not living.
 - b. Solid.
 - c. Uniform composition - made of same stuff.
- II. Characteristics (ESRT16)
 - a. Color- mineral color.
 - b. Luster- looks like metal or not.
 - c. Streak- (powdered color) rub on plate.
 - d. Hardness- compare to fingernail, glass or metal nail.
 - e. Fracture- Broken with jagged edges (like broken glass).
 - f. Cleavage- Flat smooth breaks (planes of breakage).
- III. Rocks (Made of minerals)
 - a. Igneous (ESRT 6)
 - i. Made from liquid rock must cool and solidify (crystallize).
 - ii. Intrusive- Large crystals cooled slowly inside volcano.
 - iii. Extrusive- Small crystal cooled fast outside volcano.
 - iv. Felsic- Light in color and in density.
 - v. Mafic- Dark in color and very dense.
 - vi. Vesicular- gas pockets (little air bubbles).
 - b. Sedimentary (ESRT 7)
 - i. Made from sediments (broken up other rock).
 - ii. Must compact & cement.
 - iii. Clastic (fragmental)- parts of other rocks based on grain size.
 - iv. Crystalline- chemicals precipitate from water to form rock.
 - v. Bioclastic- has living or once living things in it.
 - c. Metamorphic (ESRT 7)
 - i. Heat & Pressure.
 - ii. Foliation- minerals aligned into bands.
 - iii. Regional metamorphism- large bodies of hot rock under surface.
 - iv. Contact metamorphism- Hot rock (igneous) touching cooler sedimentary rock.

Dynamic Earth UNIT 4

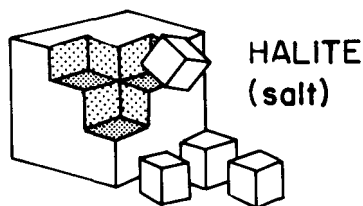
Review outlines for Units covered in Earth Science...

This is the major information that you need to know before you walk into the final exam in a few weeks.

- I. Earthquakes (earth shaking because of faults)
 - a. Fault- break in the rock layers.
 - b. Fold- bend in the rock layers.
 - c. Epicenter- center of EQ on surface.
 - d. Focus- Center of EQ underground.
 - e. Seismometers- tool to measure EQ waves.
 - f. Scales- Richter 1-10 measured from seismometers.
 - i. Mercalli 1-12 from how it felt.
 - g. P-waves- fastest waves (goes through S, L & G)
 - h. S-waves- Slower waves (goes through S ONLY)
- II. Finding EQ epicenter
 - a. Find P & S arrival times
 - b. Subtract those two times (p-s travel time)
 - c. Use that time to look up in ESRT p11 to find distance. (between lines)
- III. Continental Drift & Plate Tectonics
 - a. CD- plates floating on surface of earth and can move where ever they want.
 - b. PT- Plates on mantle and moved by convection currents.
 - c. Evidence- Convection, Rifting (magnetic reversals) Fossils on MTs.
 - d. Boundaries- Convergent- coming together (Vol, EQ, Trenchs).
 - 1. Divergent- Pulling apart (Vol).
 - 2. Transform- Side by Side (EQ, Vol).

-
1. Most igneous rocks form by which processes?
 - (1) melting and solidification
 - (2) heat and pressure
 - (3) erosion and deposition
 - (4) compaction and cementation
 2. Which is a fine-grained igneous rock made up primarily of pyroxene and plagioclase feldspar?
 - (1) gabbro (3) granite
 - (2) basalt (4) rhyolite
 3. Which rock is of felsic composition, low in density, light in color, and coarse grained?
 - (1) rhyolite (3) granite
 - (2) basalt (4) gabbro
 4. A coarse-grained igneous rock contains plagioclase feldspars and pyroxenes, but no quartz. This rock is most likely
 - (1) basalt (3) granite
 - (2) rhyolite (4) gabbro
 5. Which sedimentary rock formed from the compaction and cementation of fragments of the skeletons and shells of sea organisms?
 - (1) shale (3) limestone
 - (2) gypsum (4) conglomerate
 6. Which type(s) of rock can be the source of deposited sediments?
 - (1) igneous and metamorphic rocks, only
 - (2) metamorphic and sedimentary rocks, only
 - (3) sedimentary rocks, only
 - (4) igneous, metamorphic, and sedimentary rocks
 7. What is the main difference between metamorphic rocks and most other rocks?
 - (1) Many metamorphic rocks contain only one mineral.
 - (2) Many metamorphic rocks have an organic composition.
 - (3) Many metamorphic rocks exhibit banding and distortion of structure.
 - (4) Many metamorphic rocks contain a high amount of oxygen-silicon tetrahedra.
 8. Metamorphic rocks result from the
 - (1) erosion of rocks
 - (2) recrystallization of rocks
 - (3) cooling and solidification of molten magma
 - (4) compression and cementation of soil particles
 9. Which rocks would most likely be separated by a transition zone of altered rock (metamorphic rock)?
 - (1) sandstone and limestone
 - (2) granite and limestone
 - (3) shale and sandstone
 - (4) conglomerate and siltstone
 10. Which two rocks are primarily composed of a mineral that bubbles with acid?
 - (1) limestone and marble
 - (2) granite and dolostone
 - (3) sandstone and quartzite
 - (4) slate and conglomerate
-

11. What causes the characteristic crystal shape and cleavage (breaking along flat surfaces) of the mineral halite as shown in the diagram below?



- (1) metamorphism of the halite
(2) the internal arrangement of the atoms in halite
(3) the amount of erosion the halite has undergone
(4) the shape of other minerals located where the halite formed
12. Minerals are identified on the basis of
(1) the method by which they were formed
(2) the type of rock in which they are found
(3) the size of their crystals
(4) their physical and chemical properties
13. Which mineral can be found in granite, andesite, gneiss, and hornfels?
(1) quartz (3) olivine
(2) pyroxene (4) biotite mica
14. Which statement best describes a general property of rocks?
(1) Most rocks have a number of minerals in common.
(2) Most rocks are composed of a single mineral.
(3) All rocks contain fossils.
(4) All rocks contain minerals formed by compression and cementation.

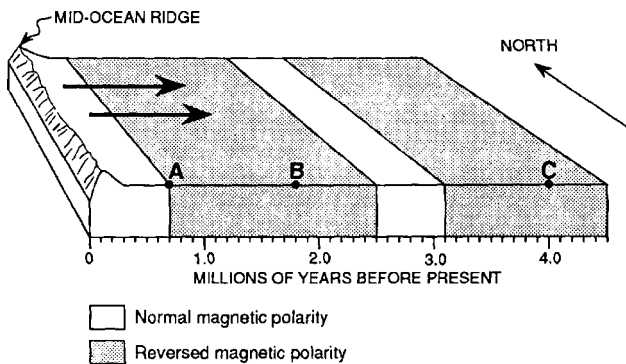
15. A rock that forms directly from land-derived sediments is
(1) sandstone (3) gabbro
(2) dolostone (4) granite
16. Which sedimentary rock would be composed of particles ranging in size from 0.0004 centimeter to 0.006 centimeter?
(1) conglomerate (3) siltstone
(2) dolostone (4) shale
17. Which property best describes a rock which has formed from sediments?
(1) crystalline structure
(2) distorted structure
(3) banding or zoning of minerals
(4) fragmental particles arranged in layers
18. One of the most abundant minerals in beach sand is quartz. Which property of quartz could account for its abundance?
(1) hardness (3) color
(2) texture (4) luster
19. Which mineral is composed of Calcium and Fluorine?
(1) Amphiboles (3) Hematite
(2) Calcite (4) Fluorite
20. Which mineral property is illustrated by the peeling of muscovite mica into thin, flat sheets?
(1) luster (3) hardness
(2) streak (4) cleavage

1. The border between the South American plate and the African plate is best described as
 - (1) converging and located at an oceanic ridge
 - (2) converging and located at an oceanic trench
 - (3) diverging and located at an oceanic ridge
 - (4) diverging and located at an oceanic trench

Base your answers to questions 2 through 5 on the information and diagram below.

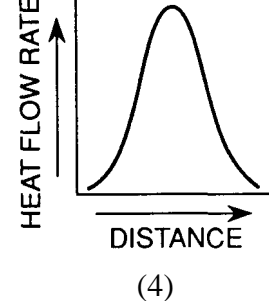
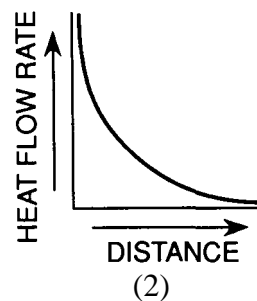
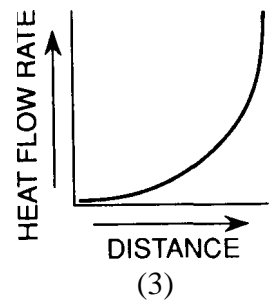
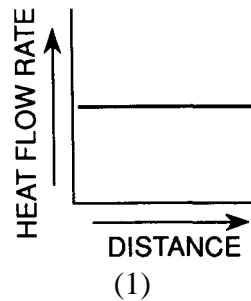
At intervals in the past, the Earth's magnetic field has reversed. The present North magnetic pole was once the South magnetic pole, and the present South magnetic pole was once the North magnetic pole. A record of these changes is preserved in the igneous rocks that formed at mid-ocean ridges and moved away from the ridges.

The diagram below represents the pattern of normal and reversed magnetic polarity in the igneous rocks composing the ocean crust on the east side of a mid-ocean ridge.

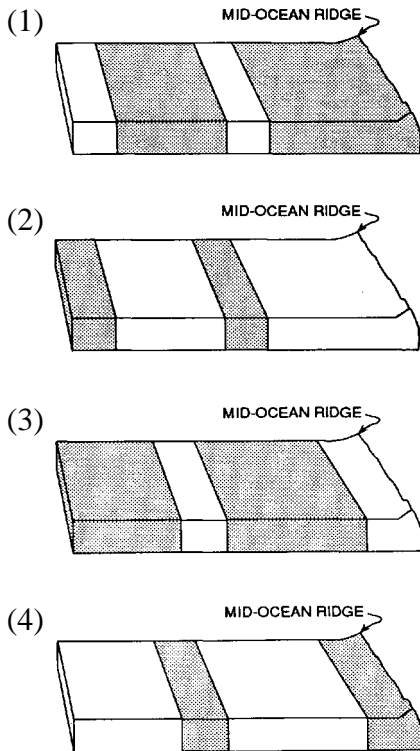


2. Approximately how many million years were required to form the material shown between A and B in the diagram?
 - (1) 2.5
 - (2) 1.8
 - (3) 1.1
 - (4) 0.7

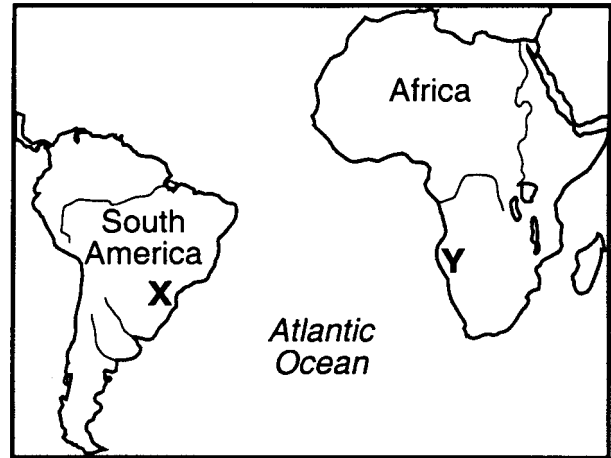
3. The igneous material along this mid-ocean ridge was found to be younger than the igneous material farther from the ridge. This fact supports the theory of
 - (1) crustal subsidence
 - (2) seafloor spreading
 - (3) superposition
 - (4) dynamic equilibrium
4. The younger extrusive igneous rocks on the ocean floor have a higher heat flow rate than older extrusive igneous rocks. Which graph best shows the relationship between heat flow rate and distance from the mid ocean ridge?



5. Which diagram below best shows the pattern of normal and reversed polarity on the west side of the mid-ocean ridge?



6. The map below shows the present-day locations of South America and Africa. Remains of *Mesosaurus*, an extinct freshwater reptile, have been found in similarly aged bedrock formed from lake sediments at locations X and Y.



Which statement represents the most logical conclusion to draw from this evidence?

- (1) *Mesosaurus* migrated across the ocean from location X to location Y.
 - (2) *Mesosaurus* came into existence on several widely separated continents at different times.
 - (3) The continents of South America and Africa were joined when *Mesosaurus* lived.
 - (4) The present climates at locations X and Y are similar.
7. Which statement best supports the theory of continental drift?
- (1) Basaltic rock is found to be progressively younger at increasing distances from a mid-ocean ridge.
 - (2) Marine fossils are often found in deep-well drill cores.
 - (3) The present continents appear to fit together as pieces of a larger landmass.
 - (4) Areas of shallow-water seas tend to accumulate sediment, which gradually sinks.

8. During which geologic period were the continents all part of one landmass, with North America and South America joined to Africa?

- (1) Tertiary (3) Triassic
- (2) Cretaceous (4) Carboniferous

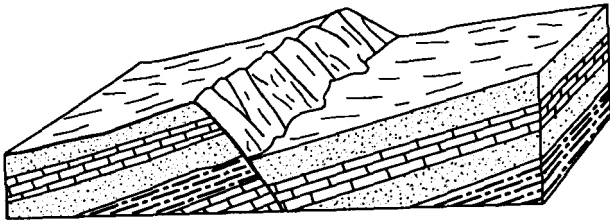
9. The inferred latitude of Pennsylvania 362 million years ago was closest to

- (1) where it is now (3) the Equator
- (2) the North Pole (4) 45° south

10. Rock strata containing fossils of shark's teeth are found at an elevation of 5,000 meters. Which process most likely caused the shark's teeth to be located at this elevation?

- (1) crustal subsidence
- (2) ocean floor spreading
- (3) crustal uplift
- (4) continental glaciation

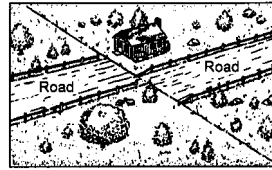
11. The block diagram below represents a geologic cross section of a mountain range.



What action most likely formed this mountain range?

- (1) contact metamorphism
- (2) glacial erosion
- (3) volcanic eruptions
- (4) earthquake faulting

12. The diagram below shows land features that have been disrupted by an earthquake.



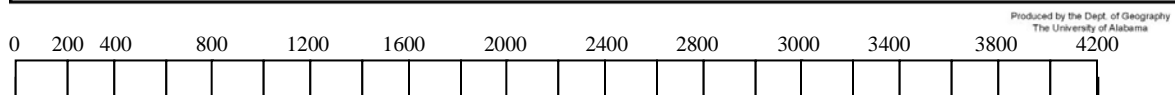
Which type of crustal movement most likely caused the displacement of features in this area?

- (1) vertical lifting of surface rock
- (2) folding of surface rock
- (3) down-warping of the crust
- (4) movement along a transform fault

13. Where are earthquakes most likely to take place?

- (1) along the core-mantle interface
- (2) where the composition of the Earth tends to be uniform
- (3) near the Earth's Equator
- (4) near a fault zone

| Station Name | P-Wave Arrival Time (00:00:00) | S-Wave Arrival Time (00:00:00) | S - P Time (00:00:00) | Distance to Epicenter (Km) | P-Wave Travel Time (00:00:00) | Origin Time (00:00:00) |
|-------------------|-----------------------------------|-----------------------------------|--------------------------|-------------------------------|----------------------------------|---------------------------|
| Atlanta, Ga | 06:12:27 | 06:14:37 | | | | |
| Boise, Idaho | 06:13:57 | 06:17:27 | | | | |
| Oklahoma City, Ok | 06:10:57 | 06:12:07 | | | | |



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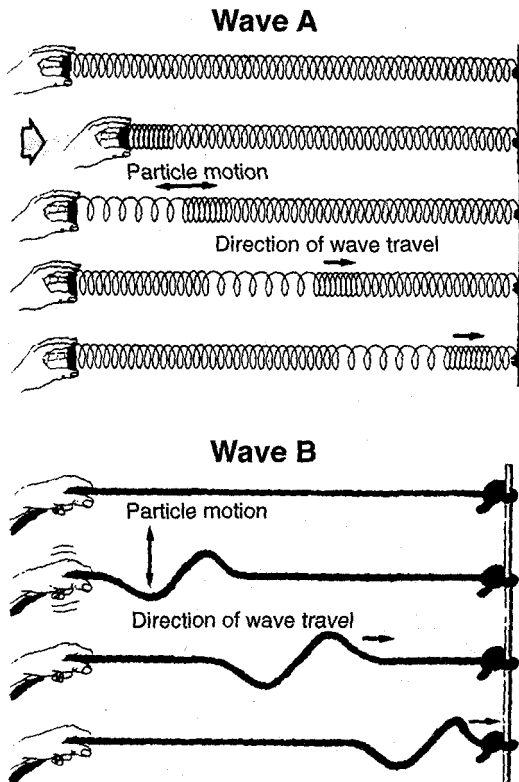
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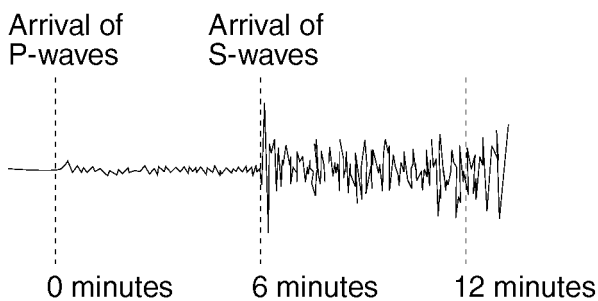
1. The diagrams below show demonstrations that represent the behavior of two seismic waves, A and B.



Which statement concerning the demonstrated waves is correct?

- (1) Wave A represents a compressional wave, and wave B represents a shear wave.
 - (2) Wave A represents a shear wave, and wave B represents a compressional wave.
 - (3) Wave A represents compressional waves in the crust, and wave B represents compressional waves in the mantle.
 - (4) Wave A represents shear waves in the crust, and wave B represents shear waves in the mantle.
2. How long would it take for the first S-wave to arrive at a seismic station 4,000 kilometers away from the epicenter of an earthquake?
- (1) 5 min 40 sec
 - (2) 7 min 0 sec
 - (3) 12 min 40 sec
 - (4) 13 min 20 sec
3. An abrupt change in the speed of seismic waves is an indication that the
- (1) seismic waves are colliding
 - (2) shear wave has overtaken the compressional wave
 - (3) waves are going into a material with different properties
 - (4) waves are passing through material of the same density
4. Approximately how long does an earthquake P-wave take to travel the first 6500 kilometers after the earthquake occurs?
- (1) 6.5 min
 - (2) 8.0 min
 - (3) 10.0 min
 - (4) 18.5 min
5. Approximately how far will a P-wave travel in 8 minutes?
- (1) 2.2×10^3 km
 - (2) 4.8×10^3 km
 - (3) 6.5×10^3 km
 - (4) 11.2×10^3 km
6. In 8 minutes, an earthquake P-wave travels a total distance of
- (1) 2,100 km
 - (2) 4,700 km
 - (3) 6,600 km
 - (4) 11,300 km
7. A seismic station recorded an earthquake with an epicenter distance of 4,000 kilometers. If the origin time of the earthquake was 11:00 a.m., what time did the P-wave arrive at the seismic station?
- (1) 10:53 a.m.
 - (2) 11:05 a.m.
 - (3) 11:07 a.m.
 - (4) 11:12 a.m.
8. What is the approximate total distance traveled by an earthquake's P-wave in its first 9 minutes?
- (1) 2,600 km
 - (2) 5,600 km
 - (3) 7,600 km
 - (4) 12,100 km
9. Earthquake S-waves do *not* travel through the Earth's
- (1) crust
 - (2) moho
 - (3) mantle
 - (4) core

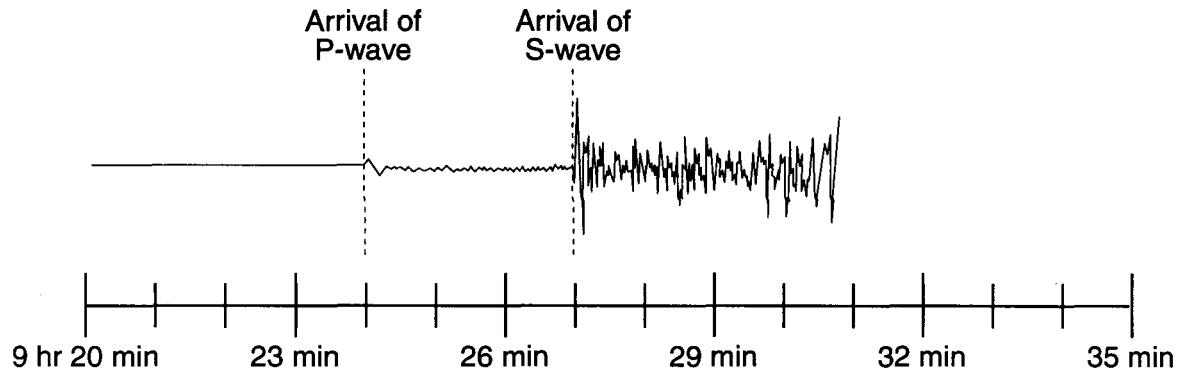
10. The epicenter of an earthquake is located 2,800 kilometers from a seismic station. Approximately how long did the *S*-wave take to travel from the epicenter to the station?
- (1) 11 min 15 sec (3) 5 min 20 sec
(2) 9 min 35 sec (4) 4 min 20 sec
11. A seismic station received the *P*-waves generated by an earthquake but did not receive the *S*-waves. Which statement best explains the absence of the *S*-waves?
- (1) The earthquake was too weak to produce *S*-waves.
(2) The earthquake's epicenter and focus were at the same location.
(3) The *S*-waves were absorbed by a fluid layer as they traveled toward the seismic station.
(4) The *S*-waves were reflected away from the seismic station when they reached the Moho interface.
12. Approximately how far away from the receiving station is the epicenter of an earthquake if the difference in arrival times of *P*- and *S*-waves at the station is 6 minutes and 30 seconds?
- (1) 3,000 km (3) 6,300 km
(2) 5,000 km (4) 8,000 km
13. The seismogram below shows *P*-wave and *S*-wave arrival times at a seismic station following an earthquake.



The distance from this seismic station to the epicenter of the earthquake is approximately

- (1) 1,600 km (3) 4,400 km
(2) 3,200 km (4) 5,600 km

14. The seismogram below shows the arrival times of an earthquake's *P*-wave and *S*-wave recorded at a seismic station in Portland, Oregon.



What was the distance from Portland to the earthquake's epicenter?

- (1) 1800 km (2) 2500 km (3) 3200 km (4) 4100 km
-
15. At which epicenter distance is the difference in arrival times between *P*-waves and *S*-waves greatest?
- (1) 1,000 km (3) 5,000 km
(2) 3,000 km (4) 7,000 km

Name: _____

Review Book (Yellow book) problems for Unit 3 & 4

Page 49/50 q 1-27

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Page 73/74 q1-19

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Weathering, Erosion and Deposition UNIT

Review outlines for Units covered in Earth Science...

This is the major information that you need to know before you walk into the final exam in a few weeks.

Unit 4 Outline

Weathering, Erosion & Deposition

- I. Weathering (breaking down of matter)
 - a. Physical Weathering (making smaller particles)
 - i. Abrasion
 - ii. Frost Action
 - iii. Root Pry
 - b. Chemical Weathering (Chemical Change)
 - i. Acid Rain
 - ii. Rusting
- II. Soil (a mix of dirt, rock and organic matter)
 - a. Rocks break down and organisms die adding nutrients.
- III. Erosion- Transport of sediments
 - a. Gravity- Landslides Unsorted.
 - b. Water- Sorted.
 - c. Wind- Sorted.
 - d. Glaciers- Unsorted.
- IV. Water Erosion
 - a. Fastest water in middle no friction.
 - b. Meander is a turn in the river.
- V. Deposition
 - a. Factors
 - i. Size, Shape, Density, Time, Sorting.
- VI. Landscapes
 - a. Plateau- large flat elevated area.
 - b. Plain- large flat area with few hills.

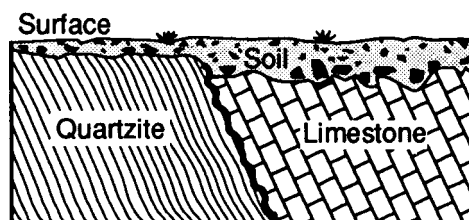
Earth's History UNIT

Earth's History

- I. Rules
 - a. Uniformitarianism
 - b. Superposition
 - c. Horizontality
 - d. Crosscutting relationships
- II. Intrusions
 - a. Creates contact metamorphism
- III. Folds & faults
 - a. Folds
 - i. Bending rocks
 - b. Faults
 - i. 3 types
 - 1. Normal
 - 2. Reverse
 - 3. Strike-slip
- IV. Dating rock layers
 - a. Relative ages
 - i. Fossils
 - ii. Mountains
 - iii. Superposition
 - b. Absolute ages
 - i. Volcanic ash
 - ii. Radioactive dating
- V. Rock layers
 - a. Stratigraphic column
 - i. A picture of the rock layers
 - b. Correlation
 - i. Connecting two or more strat columns to guess what rocks are below the surface.
 - c. Index fossils
 - i. Short lived large area.
- VI. Mass extinctions
 - a. Large amounts of living things die off due to super-natural causes
- VII. Radioactive dating
 - a. Half-lives
 - b. C-14 young things
 - c. U-238 old things
- VIII. ESRT page 8/9

1. Which property of water makes frost action a common and effective form of weathering?
 - (1) Water dissolves many earth materials.
 - (2) Water expands when it freezes.
 - (3) Water cools the surroundings when it evaporates.
 - (4) Water loses 80 calories of heat per gram when it freezes.
2. By which processes are rocks broken up and moved to different locations?
 - (1) evaporation and condensation
 - (2) weathering and erosion
 - (3) burial and cementation
 - (4) compaction and transportation
3. Water is a major agent of chemical weathering because water
 - (1) cools the surroundings when it evaporates
 - (2) dissolves many of the minerals that make up rocks
 - (3) has a density of about one gram per cubic centimeter
 - (4) has the highest specific heat of all common earth materials
4. Which activity demonstrates chemical weathering?
 - (1) freezing of water in the cracks of a sandstone sidewalk
 - (2) abrasion of a streambed by tumbling rocks
 - (3) grinding of talc into a powder
 - (4) dissolving of limestone by acid rain
5. A rock will weather faster after it has been crushed because its
 - (1) volume has been increased
 - (2) surface area has been increased
 - (3) density has been decreased
 - (4) molecular structure has been altered
6. Which change would cause the topsoil in West Virginia to increase in thickness?
 - (1) an increase in slope
 - (2) an increase in biologic activity
 - (3) a decrease in rainfall
 - (4) a decrease in air temperature

7. The cross section below shows residual soils that developed on rock outcrops of metamorphic quartzite and sedimentary limestone.



Which statement best explains why the soil is thicker above the limestone than it is above the quartzite?

- (1) The quartzite formed from molten magma.
 - (2) The limestone is thicker than the quartzite.
 - (3) The quartzite is older than the limestone.
 - (4) The limestone is less resistant to weathering than the quartzite.
8. Solid bedrock is changed to soil primarily by the process of

| | |
|----------------|-------------------|
| (1) erosion | (3) infiltration |
| (2) weathering | (4) transpiration |
 9. Granite pebbles are found on the surface in a certain area where only sandstone bedrock is exposed. Which is the most likely explanation for the presence of these pebbles?
 - (1) The granite pebbles were transported to the area from a different region.
 - (2) Some of the sandstone has been changed into granite.
 - (3) The granite pebbles were formed by weathering of the exposed sandstone bedrock.
 - (4) Ground water tends to form granite pebbles within layers of sandstone rock.
 10. A sediment particle transported by a stream over a long period of time will most likely show
 - (1) a decrease in mass and number of angular edges
 - (2) a decrease in density and size
 - (3) an increase in weight and hardness
 - (4) an increase in volume and number of cleavage planes

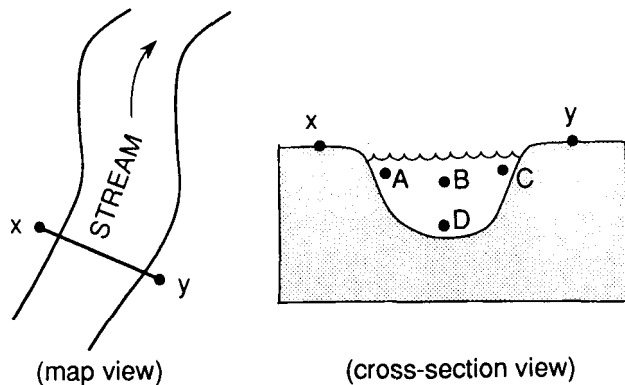
11. Which erosional force acts alone to produce avalanches and landslides?

- (1) gravity
- (2) winds
- (3) running water
- (4) sea waves

12. The best evidence that erosion has taken place would be provided by

- (1) deep residual soil observed on a hillside
- (2) sediment observed at the bottom of a cliff
- (3) tilted rock layers observed on a mountain
- (4) faulted rock layers observed on a plateau

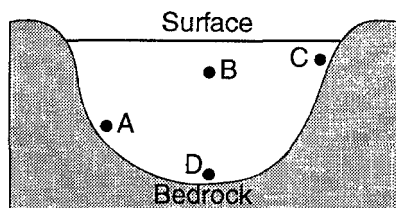
13. The diagrams below represent the map view of a stream and the cross section of the stream at line XY. Letters A, B, C, and D identify four locations within the stream.



At which location is the water moving fastest?

- (1) A
- (2) B
- (3) C
- (4) D

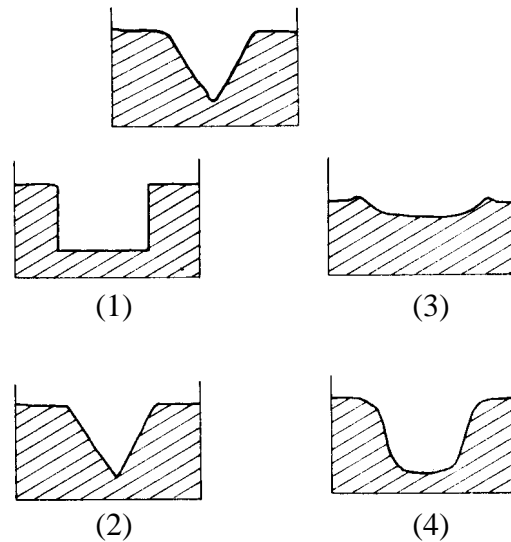
14. The diagram below shows a cross section of a river. Letters A, B, C, and D represent points in the river.



At which point is the water most likely to have the greatest velocity?

- (1) A
- (2) B
- (3) C
- (4) D

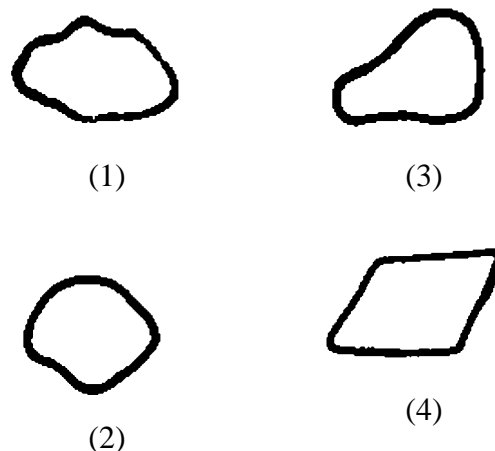
15. The diagram below represents a stream valley. Which diagram below best shows how this valley might be modified after a glacier has moved through it?



16. At the present time, glaciers occur mostly in areas of

- (1) high latitude or high altitude
- (2) low latitude or low altitude
- (3) middle latitude and high altitude
- (4) middle latitude and low altitude

17. Based on the diagrams of rock fragments below, which shows the *least* evidence of erosion?



18. Which rock particles will remain suspended in water for the longest time?

- (1) pebbles
- (2) sand
- (3) silt
- (4) clay

19. Which agent of erosion is mainly responsible for the formation of the depressions occupied by both the kettle lakes and finger lakes found in New York State?

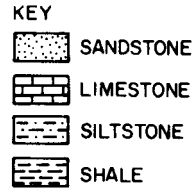
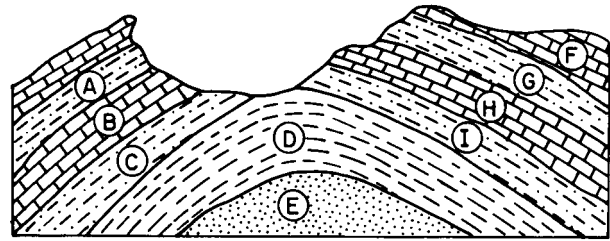
- | | |
|-----------|--------------|
| (1) wind | (3) streams |
| (2) waves | (4) glaciers |

20. Long, sandy islands are composed mostly of sand and rounded pebbles arranged in sorted layers. The agent of erosion that most likely shaped and sorted the sand and pebbles while transporting them to their island location was

- | | |
|----------------|-----------------|
| (1) glaciers | (3) wind |
| (2) landslides | (4) ocean waves |
-

1. Which conclusion can be made based on existing fossil evidence?
 - (1) Present life forms have always existed.
 - (2) The Earth's environment has always been the same.
 - (3) Many life forms have become extinct.
 - (4) All life forms will remain the same in the future.
2. What is the estimated length of time of the Mesozoic Era?
 - (1) 65 million years (3) 225 million years
 - (2) 160 million years (4) 345 million years
3. For which segment of the Earth's geologic history are fossils rarely found?
 - (1) Cenozoic (3) Paleozoic
 - (2) Mesozoic (4) Precambrian
4. During which geologic era did trilobites and sharks coexist?
 - (1) Cenozoic (3) Paleozoic
 - (2) Mesozoic (4) Precambrian

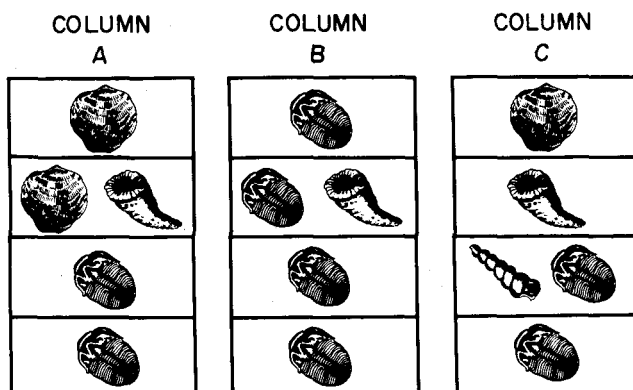
5. Base your answer to the following question on the diagram below which represents a cross section of an eroded fold that has *not* been overturned.



The fossils found in rock layer *G* will most closely resemble those found in rock layer

- (1) *A* (3) *C*
- (2) *I* (4) *E*

6. The geologic columns A, B, and C in the diagrams below represent widely spaced outcrops of sedimentary rocks. Symbols are used to indicate fossils found within each rock layer. Each rock layer represents the fossil record of a different geologic time period.



According to the diagrams for all three columns, which would be the best index fossil?



(1)



(3)



(2)



(4)

7. Dinosaur footprints have been discovered in New York State surface bedrock. These footprints were most probably found in rocks formed during the
- (1) Devonian Period (3) Precambrian Period
(2) Triassic Period (4) Jurassic Period
8. Approximately how many years ago did the Palisades Sill form?
- (1) 195 million (3) 570 million
(2) 2 million (4) 1,650 million
9. The rock record preserved in New York State indicates that
- (1) Jurassic rock is very abundant
(2) early Paleozoic rock is very abundant
(3) dinosaurs existed at the time of the Taconian Orogeny
(4) the Palisades Sill formed before the extinction of the trilobites
10. Which area of New York State has the youngest bedrock?
- (1) the area south of the Finger Lakes
(2) the area around Mt. Marcy
(3) the area between Syracuse and Rochester
(4) the area east of Albany

Name: _____

Review Book (Yellow Book) problems for Unit 5 & 6

Page 108/109 q 1-25

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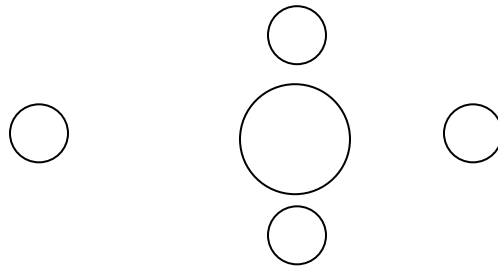
Page 134/135 q1-12

- 1.) _____
- 2.) _____
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- 5.) _____
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- 8.) _____
- 9.) Put in order below
 - a. _____ The fault was formed
 - b. _____ The shale was deposited
 - c. _____ The basalt was formed
 - d. _____ The sandstone was deposited
- 10.) _____

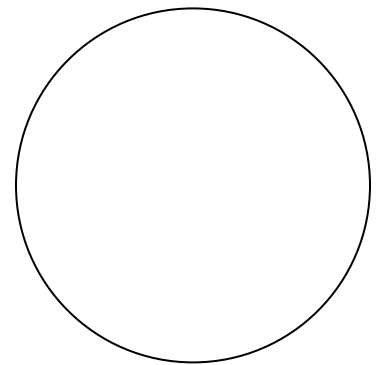
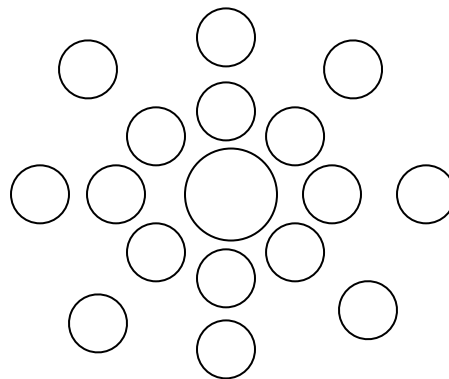
- 11.) _____
- 12.) _____

Unit 7 Astronomy

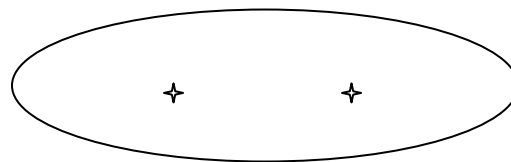
- I. Seasons
 - a. Tilt of Earth
 - b. Angle of insolation
 - c. Revolution
 - d. Dates: 3/21; 6/21; 9/21; 12/21
 - e. Lines of Latitude: T. of Cancer T. of Capricorn
 - f. Diagram



- II. Moon
 - a. Facts in ESRT
 - b. Diagram



- III. Planets
 - a. Large ball orbiting the sun
 - b. Solid core
 - c. ESRT
 - d. Eccentricity



- IV. Stars
 - a. Temperature & Color
 - b. Size and luminosity
 - c. ESRT

- V. Other
 - a. Comets (frozen ball of gas)
 - b. Meteors (Small)
 - c. Asteroids (Large)

Name: _____

Astronomy Review

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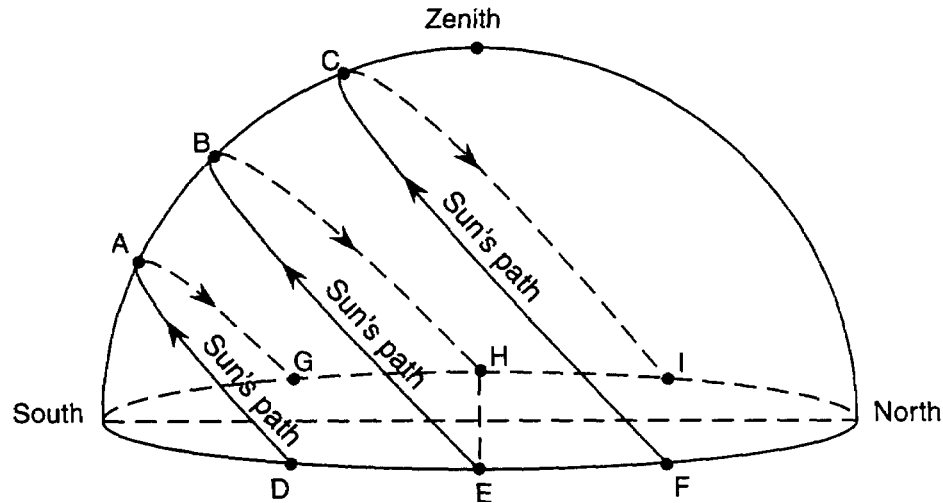
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1. The diagram below represents a plastic hemisphere upon which lines have been drawn to show the apparent paths of the Sun at a location in New York State on the first day of each season. Letters A through I represent points on the paths.



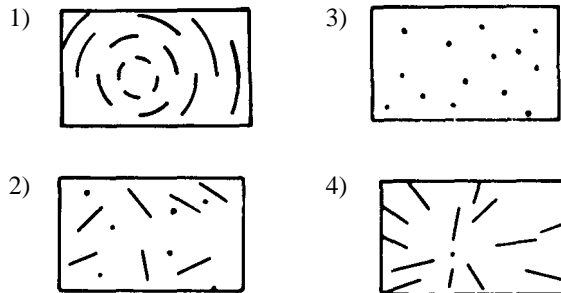
Which point represents the sunrise location on the first day of winter?

- 1) G 2) F 3) E 4) D

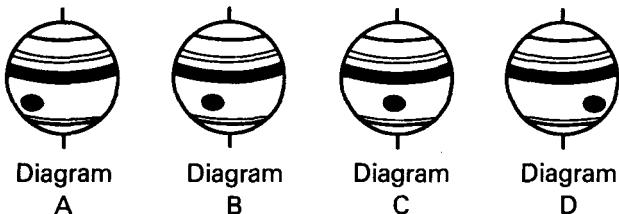
2. In which direction on the horizon does the Sun appear to rise on July 4 in Maine?

- 1) due north 3) north of due east
2) due south 4) south of due east

3. How would a three-hour time exposure photograph of stars in the northern sky appear if the Earth did *not* rotate?



4. A planet was viewed from Earth for several hours. The diagrams below represent the appearance of the planet at four different times.



The best inference that can be made based on the diagrams is that this planet is

- 1) tilted on its axis 3) revolving
2) changing seasons 4) rotating

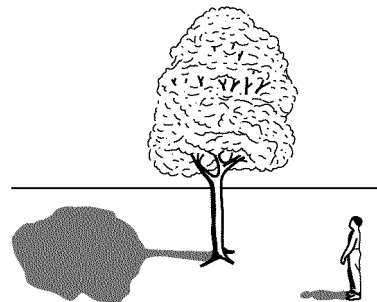
5. The passage of the Moon into Earth's shadow causes a

- 1) lunar eclipse 3) new Moon
2) solar eclipse 4) full Moon

6. The shape of the orbits of most of the planets in the solar system would best be described as

- 1) elliptical and very elongated
2) parabolic
3) nearly circular
4) perfectly circular

7. The diagram below shows the noontime shadows cast by a student and a tree.



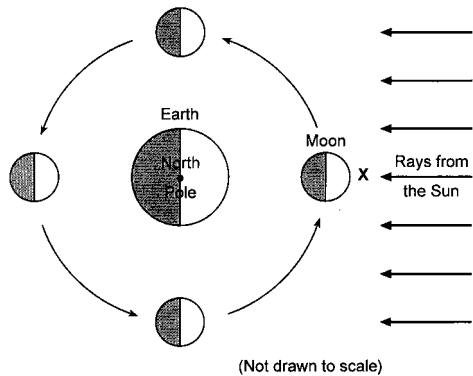
If the time is solar noon and the student is located in New York State, in what direction is the student facing?

- 1) north 3) east
2) south 4) west

8. To an observer located at the Equator, on which date would the Sun appear to be directly overhead at noon?

- 1) February 1 3) March 21
2) June 6 4) December 21

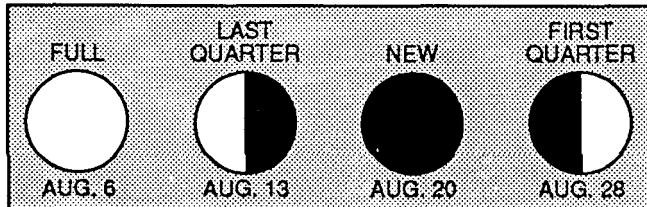
9. The diagram below shows the Moon at four positions in its orbit around Earth as viewed from above the North Pole.



Beginning with the Moon at position X (the new-Moon phase), which sequence of Moon phases would be seen by an observer on Earth during 1 month?

- 1) → → → →
- 2) → → → →
- 3) → → → →
- 4) → → → →

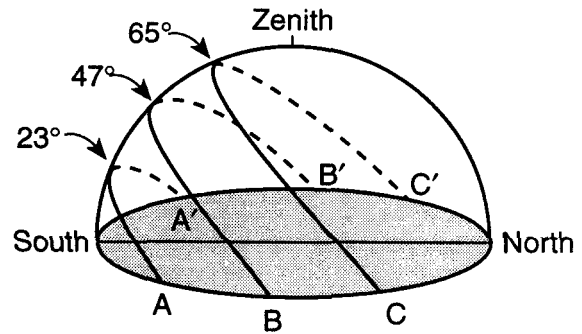
10. The diagrams below show the phases of the Moon as viewed by an observer in New York State at different times in August.



Which phase could have been observed on August 17?

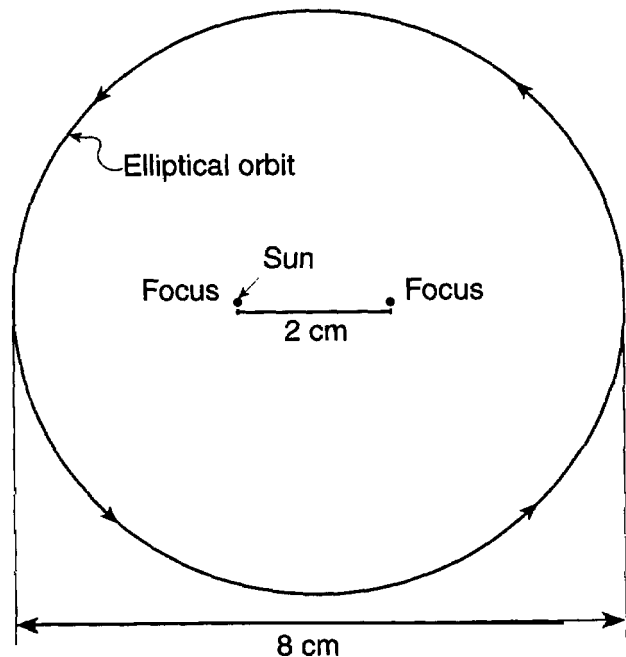
- 1) **NEW CRESCENT**
- 2) **NEW MOON**
- 3) **OLD GIBBOUS**
- 4) **OLD CRESCENT**

11. The model below shows the apparent path of the Sun on 3 days at a certain location in New York State.



What could be the Sun's apparent path at this location on March 21?

- 1) along path A-A'
 - 2) south of path A-A'
 - 3) along path B-B'
 - 4) north of path C-C'
12. Which location on the Earth would the Sun's vertical rays strike on December 21?
- 1) Tropic of Cancer ($23\frac{1}{2}^{\circ}$ N)
 - 2) Equator (0°)
 - 3) Tropic of Capricorn ($23\frac{1}{2}^{\circ}$ S)
 - 4) South Pole (90° S)
13. The constructed ellipse below is a true scale model of the orbit of a planet in our solar system. This ellipse best represents the orbit of the planet



- 1) Neptune
 - 2) Jupiter
 - 3) Pluto
 - 4) Mars
14. Which is the largest planet in our solar system?
- 1) Earth
 - 2) Uranus
 - 3) Saturn
 - 4) Jupiter

15. Which object is located at one foci of the elliptical orbit of Mars?

- 1) the Sun
- 2) *Betelgeuse*
- 3) Earth
- 4) Jupiter

16. Which planet would float if it could be placed in water?

- 1) Mercury
- 2) Earth
- 3) Saturn
- 4) Pluto

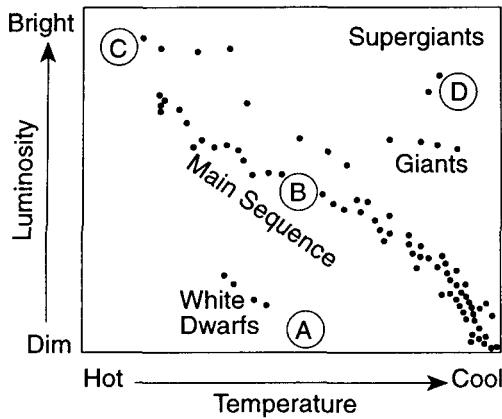
17. Approximately how many times larger is the diameter of the sun compared to the earth?

- 1) 10 times
- 2) 100 times
- 3) 1000 times
- 4) 10,000 times

18. The "fuel" of the sun is

- 1) hydrogen
- 2) helium
- 3) oil and various hydrocarbons
- 4) oxygen

19. The graph below represents the brightness and temperature of stars visible from Earth.



Which location on the graph best represents a star with average brightness and temperature?

- 1) A
- 2) B
- 3) C
- 4) D

20. An astronomer can estimate the temperature of a star by observing its

- 1) size
- 2) shape
- 3) color
- 4) brightness

21. The hottest stars appear

- 1) blue
- 2) yellow
- 3) red
- 4) white

22. Which star has the greatest luminosity?

- 1) *Barnard's star*
- 2) *Procyon*
- 3) *Alpha Centauri*
- 4) *Rigel*

23. Compared to the sun, Polaris is

- 1) hotter and less luminous
- 2) cooler and more luminous
- 3) the same temperature and larger
- 4) hotter and larger

24. When a star less massive than our sun consumes all of its nuclear fuel it will then become a

- 1) white dwarf
- 2) nova
- 3) supernova
- 4) black hole

Base your answers to questions **25** and **26** on the newspaper article shown below, written by Paul Recer and printed in the *Times Union* on October 9, 1998.

Astronomers peer closer to big bang

WASHINGTON — The faintest and most distant objects ever sighted — galaxies of stars more than 12 billion light years away — have been detected by an infrared camera on the Hubble Space Telescope.

The sighting penetrates for the first time to within about one billion light years of the very beginning of the universe, astronomers said, and shows that even at that very early time there already were galaxies with huge families of stars.

“We are seeing farther than ever before,” said Rodger I. Thompson, a University of Arizona astronomer and the principal researcher in the study.

Thompson and his team focused an infrared instrument on the Hubble on a narrow patch of the sky that had been previously photographed in visible light. The instrument detected about 100 galaxies that were not seen in the visible light and 10 of these were at extreme distance.

He said the galaxies are seen as they were when the universe was only about 5 percent of its present age. Astronomers generally believe the universe began with a massive explosion, called the “big bang,” that occurred about 13 billion years ago.

Since the big bang, astronomers believe that galaxies are moving rapidly away from each other, spreading out and becoming more distant.

25. The big-bang theory is widely believed by astronomers to explain the beginning of the universe. Why does the light from distant galaxies support the big-bang theory?

26. Compare the age of Earth and our solar system to the age of these distant galaxies of stars.

Name: _____

Review Book (Yellow Book) problems for Unit 7

Page 179 q1-10

1.) _____

2.) _____

3.) _____

4.) _____

5.) _____

6.) _____

7.) _____

8.) _____

9.) _____

10.) _____

Things that make you go Hmm.....

Have you ever failed a test? Have you ever read a question and been frustrated because you don't know what it is asking? Well what do you do? What do YOU do? Life is all about how YOU deal with problems; Science is all about how YOU use the information to think about topics.

A question?

By now many of you have learned or think you have learned that you are bad test takers, right? Have you ever wanted to cry, yell, throw something, sleep, quit, laugh or stare at the question? You study all the stuff that your teacher said to, you flipped through the book, you read the notes and then there you sit staring at a question. What do you do?

A thought!

“Your success isn't always measured in how many questions you got right, sometimes it's how you deal with adversity.”

You are NOT a bad test taker!

I have seen many, many, TOO MANY students say they are bad at tests. True or not YOU MUST do your best to deal with this. WHY? Because there will be questions in this class and everywhere in life that you aren't going to know the answers to! But knowing how to deal with them is what will make you stand apart from others. Don't believe me, ask your parents, or grandparents if they knew how to raise a child when they had one? Ask if they knew how to drive when they were born? What about talking? When you're young you learn a lot, so why have you stopped? Maybe you haven't!

So what now?

What do you do? You're taking a test that you must pass and you're looking at a question you don't know what to do with. What do you do? Guess? Skip it? Get frustrated? Cry? Stop taking the test? Copy off of someone else? Read, re-read and stare? Flip through ESRT? Underline? Stare some more? I have seen ALL of these done during a test. The question is WHAT DO YOU DO?

SO NOW WHAT????

Steps to take:

- 1.) **Be Positive!** No matter what, if you think about all the negatives you will never get past that negative feeling.
- 2.) Get some sleep the night before **ANY** test.
- 3.) **EAT**, like a car your body needs fuel to work, without it you cannot function!
 - a. No sugary foods, you will crash half way through test! (try it drink 3 energy drinks then go about your business for the day. After lunch think about how you felt from the time you woke up till then!
- 4.) Take a second, breath in deep and hold it for a few seconds. No matter what you're here now at the test site and you might as well focus on it a try.
- 5.) **Focus!** I don't me stare at the questions. I mean prepare your brain, close out distractions. Forget your friend's problems for now; ignore what your boy/girlfriend said 10 minutes ago. Ignore that nerdy kid in front of you who is sniffing and will not get a tissue.
 - a. You **MUST** focus on the task ahead.
 - b. A race horse has blinders on when they race, why?
- 6.) **READ!**
 - a. Read everything! If its printed for you, then you need to read it.
 - b. Look at the pictures if there are any, we don't give you pictures to fill space!
 - c. Read ALL answers before you choose.
 - d. Cross out ALL answers that YOU think are wrong.
- 7.) **ESRT.** I cannot say it enough **USE THE ESRT.** This is the only class that when you sit down to take a test we hand you a book of answers (like an open book).
- 8.) **Underline ALL key words.** Those keywords are the important words in the questions and possible answers. They might help now and later on in the test.
- 9.) **Cross out dumb answers.** There are always a few dumb choices. Can you pick them out? If not well then you might need to look them up.
- 10.) **Skip a question** if you're stuck or lose your focus.
 - a. Everyone needs a break from a task at hand. Even professional athletes need a time out.
 - b. Remember to circle the question number and leave the answer spot blank for now.
- 11.) **50/50.** Once you cancel out a few dumb choices now and only now should you guess if you're lost. Only if you have no choice!
- 12.) Take a deep breath, and get away (mentally) from the test.
 - a. Even an athlete needs a time out now and then.
- 13.) Give your best! That's all you can do.
- 14.) Check for blanks.
- 15.) If you have time please check all your answers. Sometimes we all circle one thing and mean another.

Remember our goal, "Beat the Monkey!" A monkey can score a 30% (yes that's guessing)

Name: _____

Date: _____

EARTH SCIENCE "MUST KNOW" FACTS WORKSHEET

1.) A landscape with cliffs and angles would be found in a(n) _____ climate, while a landscape with rounded hills would be found in a(n) _____ climate.

2.) The altitude of the star _____ equals the _____ of an observer in the _____ hemisphere.

3.) The Sun APPEARS to move from _____ to _____ because Earth rotates from

_____ to _____ at the rate of _____ ° per hour.

4.) _____ air moves faster than _____ air.

_____ air always rises up and above the _____ air.

5.) _____ air is capable of holding the most moisture (humidity).

6.) State the direction of movement for a HIGH (Cold) Pressure System.

_____ and _____

State the direction of movement for a LOW (Warm) Pressure System.

_____ and _____

7.) Which is denser: warm or cold air? _____

Why?

8.) What is the main cause of seasons.

9.) State the SIZE of the Igneous Rock Crystals. Write "None" if no crystals would form.

Slow Cooling; Underground _____

Fast Cooling; on Earth's Surface _____

Super Quick Cooling (Quenching); on or above Earth's Surface

10.) Latitude Lines run _____ to _____. The main reference line is the

_____ and it divides the Earth into the _____ and _____ hemispheres.

Longitude Lines run _____ to _____. The main reference line is the _____ and it divides the Earth into the _____ and _____ hemispheres. Longitude lines meet at the _____.

11.) Sediments deposited by rivers are _____.

12.) Sediments deposited by glaciers are _____.

13.) What is largely responsible for a mineral's physical properties? _____

14.) Most of the sun's electromagnetic energy that reaches earth is in the form of:
_____.

15.) Terrestrial radiation, leaving Earth, is in the _____ wavelength,
also known as _____.

16.) The dominant agent of weathering of rocks in New York State is:
_____.

17.) Chemical weathering is most active in _____
climates,

while Physical weathering is most dominant in _____
climates.

18.) "V"-shaped valleys were carved by _____ and "U"-shaped valleys
were carved by _____.

Density

1. The same substance always has the same density, no matter what the size.
2. As pressure increases, density increases.
3. As temperature increases, density decreases.
4. Water expands when it freezes.
5. Water is densest at 4°C as a liquid.

Changes

6. Most changes in the environment are cyclic.

Shape of the Earth/Measuring the Earth

7. The true shape of the earth is an **Oblate Spheroid**. It is flattened at the poles and bulging at the equator.
8. The best model for the shape of the earth is a sphere.
9. The best evidence for the spherical shape of the earth are pictures from space.
10. Positions on earth are located using the coordinate system of latitude and longitude.
11. Latitude lines (parallels) are drawn from east to west and measured from north to south (Equator)
12. Longitude lines (meridians) are drawn from North Pole to South Pole and are measure from east to west (Prime Meridian).
13. Latitude is based on the altitude of Polaris, (the North Star).
14. Longitude is based on the observations of the sun (also a star).
15. The closer the isolines (isotherms, isobars, contour lines...), the steeper the gradient (slope).
16. Contour lines bend upstream as they cross a stream or river.

Astronomy

17. The earth **ROTATES** on its axis from west to east (counterclockwise).
18. One Earth rotation takes approximately 24 hours. One hour equals 15° of rotation.
19. The earth **REVOLVES** around the sun counterclockwise.
20. One earth revolution takes 365.26 days in a slightly elliptical orbit.
21. All planets orbits are in the shape of an ellipse with the sun at 1 focus point. (This includes moons, satellites, comets...).
22. **All celestial objects appear** to move from east to west.
23. The moon has phases because of the angle at which we view its surface.
24. $\frac{1}{2}$ the moon is always lit by the sun (we can only ever see 1 side of the moon).
25. The moon phases are: (waxing) crescent-quarter-gibbous-full- (waning) gibbous-quarter-crescent-new (sing it loud!).
26. The moon waxes and wanes from right to left.
27. The moon's phases take $29\frac{1}{2}$ days to complete the cycle (about 1 month).
28. The planets appear to move backwards (retrograde motion) as the earth passes them it its orbit.
29. The seasons are due to the **tilt of the earth's axis**, $23\frac{1}{2}^\circ$.
30. Summer Solstice ("sun-stop") June 21st - longest day of the year in NYS - sunrise north of east. Vertical ray located at Tropic of Cancer, $23\frac{1}{2}^\circ$ north latitude.
31. Winter Solstice - December 21st - shortest day of the year in NYS - sunrise south of east. Vertical ray located at the Tropic of Capricorn $23\frac{1}{2}^\circ$ south latitude.
32. Equinoxes (equal night) - September 23rd - Autumnal, March 21st - Vernal. Vertical ray located at the equator. 12 hours of daylight and 12 hours of darkness everywhere on earth.
33. The Equator always has 12 hours of daylight (everyday).
34. The lower the altitude of the sun the longer the shadow.
35. At noon in NYS a shadow will always point north.

- 36. Evidence for rotation is the Foucault Pendulum - appears to change direction, and the Coriolis Effect - deflects winds to the right in the Northern Hemisphere.
- 37. Earth is closer to the sun (perihelion) around January 3rd or 4th (winter).
- 38. The closer the planet is to the sun, the faster it travels in its orbit. Why?
- 39. Geocentric model - Earth centered, Ptolemy.
- 40. Heliocentric model - Sun centered, Copernicus.

Energy

- 41. **Temperature** is the average KE of the molecules in a substance.
- 42. Black (dark) absorbs, white (light) reflects, rough absorbs, smooth reflects.
- 43. **Conduction**: energy transfer through molecular collisions; solids in contact.
- 44. **Convection**: energy transfer through differences in density. Circulating currents of gasses and liquids. (Occurs in the atmosphere and asthenosphere).
- 45. **Radiation**: energy transfer through space. How light energy travels here from the sun and the stars.
- 46. Energy moves from the source (highest temp.) to the sink (lowest temp.).
- 47. **Kinetic Energy (KE)**: energy of motion. As velocity increases, KE also increases.
- 48. **Potential Energy (PE)**: energy of position. As the position of an object increases away from the center of the earth, PE increases.
- 49. There is **NO** temperature change during a phase change.

Insolation and the Seasons

- 50. Earth absorbs short waves (visible light).
- 51. Earth radiates long waves (infrared energy).
- 52. Carbon Dioxide (CO₂), methane (CH₄), and water vapor are good absorbers of infrared energy. (Causes the Greenhouse Effect).

- 53. A **good absorber** of electromagnetic energy (EME) is also a **good radiator** of EME.
- 54. Hottest days of the year are usually 1-month after the day of maximum insolation, June 21st, "seasonal temperature lag".
- 55. Hottest time of any 24-hour period is usually 1 - 2 hours after noon (max insolation), "daily temperature lag".
- 56. Summer Solstice in the northern hemisphere is **21 June**. Duration of insolation is the longest. Intensity of insolation strongest. 24 hours of daylight at 90° North.
- 57. Winter Solstice in the northern hemisphere is **21 December**. Duration of insolation is the shortest. Intensity of insolation is the least. 24 hours of daylight at 90° South.
- 58. The **equatorial region** always has approximately 12 hours of daylight all year.

Weather

- 59. As temperature increases, air pressure decreases.
- 60. As humidity (moisture content of the air) increases, air pressure decreases.
- 61. As altitude/elevation increases, air pressure decreases.
- 62. **High Pressure** = sinking air currents, dry conditions, little to no clouds.
- 63. **Low Pressure** = rising air currents, moist conditions, increase in cloud development.
- 64. Wind occurs due to differences in air pressure.
- 65. Wind always moves from regions of high pressure to regions of low pressure perpendicular to the isobars.
Isobars close together = steep pressure gradient = high wind speeds.
- 66. Wind is named by the direction it is coming from.
- 67. Surface High Pressure (anticyclones) = Clockwise and divergent winds.
- 68. Surface Low Pressure (cyclones) = Counterclockwise and convergent winds.
- 69. The closer the dew point temperature gets to the air temperature the greater the chance for precipitation.
Dew point = Air temp > brings 100% humidity!!

70. In the middle latitudes (U.S.), weather moves from the west to the east (northeast).
Prevailing Westerlies.
71. Precipitation occurs when: warm, moist air rises,

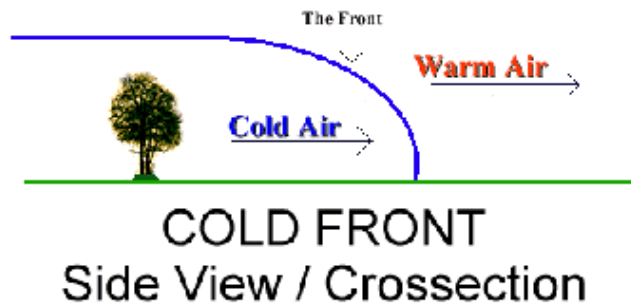
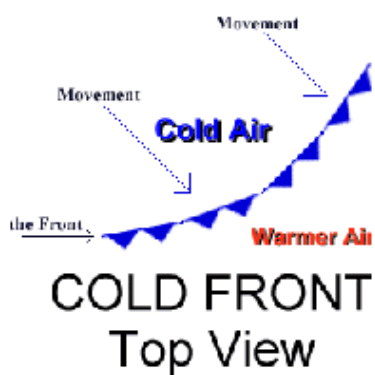
cools adiabatically (due to expansion),

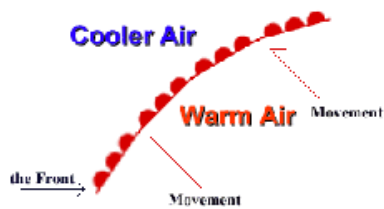
reaches the dew point temp.,

condensation occurs (on condensation nuclei),

the droplets collect in masses (cloud formation)

when the drops are large enough = precipitation.
72. Air cools adiabatically as it rises due to expansion from the higher atmospheric pressure at low elevations to the lower atmospheric pressures at higher elevations.
73. Air warms adiabatically as it sinks due to compression by the heavier atmospheric pressure at lower elevations.
74. Air masses are characterized by their TEMPERATURE and MOISTURE characteristics.
75. The leading edge of the air mass is called the FRONT.
76. Fronts





Warm Front
Top View

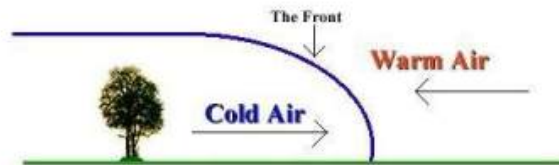


Warm Front
Side View / Crosssection

The Stationary Front

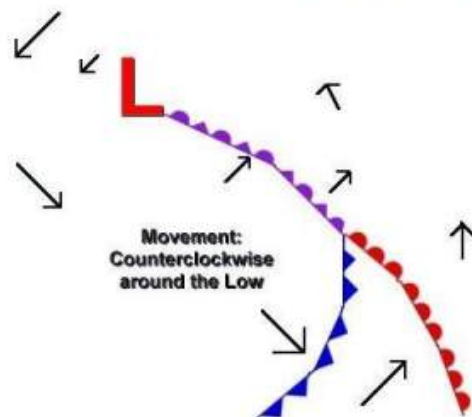


Bird's Eye View



Crosssection View

The Occluded Front



Bird's Eye View



Crosssection View

Climate

77. Mountains force air up the windward (cool/moist) side and down the leeward (warm/dry) side (the Orographic Effect).
78. Large bodies of water moderate coastal climates, (warmer winters, cooler summers).

Ground Water/Erosion

79. Porosity (percentage of empty space) does NOT depend on particle size.
80. Permeability, the ability to flow through ground material, pores must be connected. As particle size increases, permeability also increases.
81. Capillarity, Upward movement of water through the ground depends on surface area. As Particle size decreases, capillarity increases.
82. **Gravity** is the main **FORCE** behind all erosion.

weathering is the breakdown of rock into sediments
erosion is the transporting of those sediments

83. **RUNNING WATER** (streams, rivers) is the number 1 **AGENT** of erosion in NYS.

Deposition

84. Water and wind create sorted deposits of sediments. Gravity and Glaciers form unsorted deposits of sediments.
85. A common glacial deposit is called a moraine. Glacial deposits are **unsorted**.
86. Stream velocity depends on **SLOPE** and **DISCHARGE** (the amount of water moving through the stream at any one time).
87. In a meander, velocity is greater (therefore erosion is greater also) on the **OUTSIDE** of the curve.
88. Streams and rivers carve a **V-shaped** valley. Glaciers carve a **U-shaped** valley.
89. Heavy-Dense (large) particles settle to the bottom of a calm body of water faster.
90. Colloids (clay-sized particles) remain suspended in bodies of water for long periods of time.
91. In graded bedding (vertical sorting) the largest sediments are on the bottom.

Minerals and Rock

- 92. Sedimentary rocks (strata) form (flat) horizontal layers.
- 93. Igneous rock (fire-formed) are classified by texture (grain size). Coarse (large) grains = Intrusive - (cooled slowly below surface). Fine (small) grains = Extrusive (cooled quickly). Glassy (no visible crystals) = Extrusive.
- 94. Metamorphic Rock - changed by heat and/or pressure. Shows banding/foliation (stripes) and distorted structure. Higher density, very resistant rock.
- 95. The formation of igneous rock causes contact metamorphism. Extrusion - bottom only affected, Intrusion - top and bottom affected.
- 96. **All minerals properties are due to the internal arrangement of the atoms.**
- 97. Silicon and oxygen form earth's basic mineralogical structural unit - the tetrahedron.

The Dynamic Crust

- 98. Subsidence - the sinking of the crust
- 99. Uplift - the lifting of the crust (forms mountains...)
- 100. Earth's plates move due to convection currents in the upper-mantle (asthenosphere)
- 101. At the Mid-Ocean ridges (spreading center) new crust is created, age of the rock increases as distance from the ridge increases. Divergent Plate Boundary
- 102. Ocean trenches (subduction zone) where old crust is destroyed. Convergent Plate Boundary
- 103. P-waves travel faster than S-waves.
- 104. P-waves travel through solids and liquids.
- 105. S-waves travel through solids only (can't go through the outer core).
- 106. Need a minimum of three (3) seismograph stations to determine the location of an epicenter.

Geologic History

- 107. Undisturbed rock - oldest layer is on the bottom (superposition).
- 108. Intrusions and faults are younger than the rock they cut through.
- 109. Unconformity: buried erosional surface - a gap in the rock record.
- 110. Carbon 14 (^{14}C) - dates recent organic (once living) remains up to 50,000 years old.
*Radioisotope decay is constant and unaffected by environmental changes.

Landscape Development

- 111. Landscapes are dependant on bedrock structure and climate.
- 112. Arid landscapes - steep slopes, angular features.
- 113. Humid Landscapes - smooth, rounded slopes and features.
- 114. The Catskills ARE NOT mountains (dissected plateau - horizontal bedrock).
- 115. The Age of the earth is 4.6×10^9 years old, 4.6 billion years old, 4,600 million years.

Earth Science Facts you MUST know:

- 1. When you cut an object into pieces, **you don't change its density.**
- 2. The Altitude of Polaris is equal to the latitude of the observer.
- 3. The Coriolis force deflects currents to the right in the northern hemisphere.
- 4. Condensation = phase change from gas to liquid - remove heat energy.
No temperature change.
- 5. Freezing = phase change from liquid to solid - remove heat energy.
No temperature change.

6. Boiling (vaporization) = liquid to gas - add heat - needs the most energy.
No temperature change.
7. There is **no temperature change** during a phase change (see 4, 5, and 6).
8. Low Pressure = lousy, cloudy, humid weather, rising air currents, counterclockwise and convergent circulation.
9. High Pressure = happy, cloudless, dry weather, sinking air currents, clockwise and divergent circulation.
10. Weather moves from west to east (northeast trend) in the United States.
11. Porosity **is not** affected by particle size.
12. Potential Evapotranspiration (E_p) depends on TEMPERATURE ONLY!
13. Minerals have different properties due to their internal arrangement of atoms.
14. Marine fossils (seashells...) on mountain tops indicate that the land has been uplifted.
15. The Equatorial regions receive 12 hours of daylight EVERYDAY.
16. Always remember: "*when it doubt, take it out* -----your Reference Tables (that is)!!!"

Earth Science in a page. Take some notes

Vocabulary Terms to Know!

- I. **Prologue (ESRT cover)**
 - a. Density
 - b. Scientific notation

- II. **Earth (ESRT Cover, 2,3,10)**
 - a. Shape
 - b. Size
 - c. Latitude and Longitude
 - d. Polaris
 - e. Mapping & profile
 - f. Gradient

- III. **Rocks & Minerals (ESRT 5,6, 16)**
 - a. 3 types
 - b. Rock cycle
 - c. Minerals

- IV. **Dynamic Earth (ESRT 5, 8, 9, 10, 11)**
 - a. Continental drift
 - b. Plate tectonics & Proof
 - c. Earthquake
 - d. Volcanoes
 - e. Plate boundaries

- V. **Weathering, Erosion and Deposition (ESRT 2,3, 6)**
 - a. Physical and Chemical
 - b. Surface area
 - c. Soil
 - d. Types of erosion
 - i. Glacier
 - ii. Water
 - iii. Wind
 - iv. Gravity
 - e. Landscapes

VI. **Earth's History (ESRT 3, 8, 9)**

- a. 3 main rules
- b. Index fossils
- c. Mass extinction
- d. Radiometric dating (1/2 life)

VII. **Weather and climate (ESRT Cover, 4, 12, 13, 14)**

- a. Atmosphere
- b. Pressure
- c. Temperature
- d. Dew Point
- e. Humidity
- f. Measuring variables
- g. Land and sea breezes
- h. Coriolis effect
- i. Insolation
- j. Fronts
- k. Mapping
- l. Air Masses
- m. Stations
- n. Permeability & Porosity
- o. Capillarity
- p. Green House
- q. Factors affecting Climate

VIII. **Astronomy (ESRT 15)**

- a. Models
- b. Rotation & Revolution
- c. Seasons
- d. Moon Phases
- e. Eclipses
- f. Tides
- g. Planets
- h. Stars

How to pass the Earth Science Regents Exam

1.) STUDY!

- a. Get organized- use any material you have, outlines, vocabulary, notes, old tests and quizzes.
- b. Try to **"write, recite and visualize"**
 - i. Write down anything you need to remember
 - ii. Recite the words you wrote
 - iii. Visualize pictures or a story
- c. Avoid distractions
 - i. Get away from friends, phones, family anything that might distract you at all!
- d. Take Breaks when studying
 - i. Your brain cannot focus without some break for more than 20 minutes! Get up move around bathroom whatever but then get back to your work.

2.) The night of the test:

- a. Study, but not too late!
- b. Eat a healthy dinner.
- c. Get plenty of sleep. Get your normal amount of sleep. Too much or too little will make you sleepy the next day.

3.) The day of the test:

- a. Feed your brain! Eat breakfast it will help fuel you the whole day! Avoid sugary junk foods and caffeine; these will only make you crash later.
- b. Arrive on time and prepared!
- c. Wear comfortable clothing.
- d. Relax- think positive thoughts, nothing you do now will help you learn more, but panic will make you forget what you do know!
- e. Use the bathroom before the test, so you can stay focused during the test.

4.) When taking the test:

- a. Relax and take your time! You have plenty of time.
- b. Read everything! And then THINK before you answer.
- c. Use your ESRT.
- d. Make sure question numbers match up.
- e. Pace yourself. 1 minute a question, anything more you need to skip and go back later.
- f. If you feel like you're getting frustrated, stop and take a short break at your seat.
- g. DO NOT leave anything blank it will be wrong; take a guess if you must but only as a last resort.
- h. When finish check your answers.

Tips for taking a test:

- 1.) Multiple Choice:
 - a. Read the question first and try to answer it before you look at the answer choices.
 - b. Read through all of the choices before you choose one.
 - c. Eliminate answers.
 - d. In long wordy questions, underline key terms.
- 2.) Short answers:
 - a. Answer in complete sentences but don't ramble on.
 - b. Underline key terms
 - c. Write down as much detail as possible
- 3.) Math:
 - a. Write down the formula first
 - b. Substitute your numbers from the question
 - c. Add your units
- 4.) Essays:
 - a. Restate the topic questions
 - b. Use vocabulary from the course
 - c. Use appropriate grammar and format. Paragraphs and good sentence structure.
 - d. Try not to use "I" or first person unless told to.