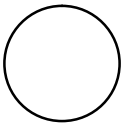
NAME: _____ PERIOD: _____ DATE: _____

REVIEW SHEET FOR THE EARTH SCIENCE REFERENCE TABLES (2010 EDITION)

A - Measurements

1. The length of this paper is _____ cm.
2. The width of this paper is _____ cm.
3. The diameter of this circle is _____ cm.



B - Radioactive Decay

1. How long does it take for half of the remaining isotope of Carbon-14 to decay into Nitrogen-14? _____
2. What is the half-life for Uranium-238? _____
3. After 2.8×10^9 years, what percent of your original Potassium-40 will be left? _____ %
4. What does Carbon-14 decay into? _____
5. If you started out with 20 g of Carbon-14 and let it decay for 22,400 years, how many grams of C^{14} would you have left? _____ g

C - Geologic Map of New York State

1. Name a city where you would find Silurian bedrock. _____
2. Intensely metamorphosed rock could be found at which city? _____
3. Long Island's bedrock is composed of what materials? _____
   _____
4. In which portion of New York State would you find the oldest rocks? _____
5. Where would you find the youngest rock materials? _____
6. The bedrock at Watertown was formed between _____ mya and _____ mya.
7. Where might you expect to find dinosaur fossils? _____
8. At which cities would you have the best chance of finding fossils of Eurypterids? _____
   _____
9. What is the longitude of Elmira? (To the nearest minute.) _____
10. What is the latitude of Oswego? (To the nearest minute.) _____
11. What is the distance in miles from Oswego to Syracuse? _____ miles.
12. What is the distance in kilometers from Elmira to Utica? _____ km.
13. What is the age of the rocks found in the Tug Hill Plateau? _____
14. What type of rock do you find in the Catskills? _____

D - Surface Ocean Currents

1. (a) What is the name of the current that passes along the east coast of the United States? _____
   (b) In what direction is the water in this current traveling? _____
   (c) Describe the temperature of this current. _____
2. (a) What is the name of the current that passes along the west coast of the United States? _____
   (b) In what direction is the water in this current traveling? _____
   (c) Describe the temperature of this current. _____

E - Tectonic Plates

1. In what general direction are the following plates moving?
   (a) North American _____
   (b) Australian _____
   (c) Eurasian _____
2. How many hot spots are there on this map? _____
3. What feature is located at the interface (boundary) between the African and American plates?
   _____
4. Describe what is happening to the Pacific plate along its western and northern boundaries?
   _____
5. Why does California have more serious and more frequent earthquakes than New York? _____
   _____
   _____
6. What is happening to the Earth's crust along the Atlantic-Indian ridge? _____
   _____
7. Why does Iceland have so many earthquakes and volcanoes? _____
   _____

F - The Rock Cycle

1. List the steps taking place in the formation of sedimentary rocks. _____
   _____
   List the steps necessary for the formation of igneous rocks. _____
   _____
   List the processes taking place in the formation of metamorphic rocks. _____
   _____
2. What types of rocks may form metamorphic rocks. _____

G - Stream Load Graph

1. How fast must a stream flow to carry a particle 0.1 cm in diameter? _____ cm/sec.
2. What type of particle is this? _____
3. How would you classify a particle with a diameter of 0.0073 cm? _____
4. What types of particles can be carried by a stream with a velocity of 250 cm/sec? _____
5. As the velocity of a stream increases, the size of the particles carried by the stream will _____
   _____.

H - Igneous Rocks

1. Where does granite form? _____
2. As a rock becomes more dense, its color usually becomes _____.
3. As the amount of iron in an igneous rock becomes greater its density will _____ .
4. As the percent of aluminum in a rock increases, the color of the rock will usually become _____ .

5. List the minerals that make up granite (5). _____

_____

(Continued on page 3.)

6. List the minerals that make basalt (5). _____

_____

7. A dense igneous rock that cooled slowly is known as _____.
8. A light color felsic rock that cooled on the surface is known as _____.
9. List the minerals that make up Peridotite (2). _____
10. What does "vesicular" mean? _____

I - Sedimentary Rocks

1. What grain size of particles make up the rock conglomerate? _____
2. Sand size sediments may form into which sedimentary rock? _____
3. Which land derived sedimentary rock is made of the smallest size sediments? _____
4. Which sedimentary rock may form from biological activities? _____
5. Name some sedimentary rocks that may form from the evaporation of sea water. _____

_____

6. What sedimentary rock is made of particles that are 0.003 cm in diameter? _____
7. What is the difference between conglomerate and breccia? _____

_____

8. Which rocks can be either crystalline or bioclastic? _____
9. Which sedimentary rock is composed of: (a) Calcite - _____

(b) Carbon - _____ (c) Halite - _____

J - Metamorphic Rocks

1. What minerals do we find in gneiss (6). _____

_____

2. What happens to heat and pressure as depth within the Earth increases? _____

_____

3. What rock is formed by low grade metamorphism of shale? _____
4. What rock contains distorted or stretched pebbles? _____
5. Quartzite is a metamorphic rock that formed from the rock _____ and is composed of the mineral _____.
6. What happens to the grain size in a rock as it goes from low to high grade? _____

_____

7. Which metamorphic rocks are composed of organic materials? _____
8. Which has bituminous coal as its protolith? _____

K - Properties of The Earth's Interior

1. The Moho is the interface between which two layers? _____
2. What is the depth at the bottom of the mantle? _____ km
3. The Earth's greatest density is _____ g/cm^3. This occurs in the _____.
4. S-waves do not travel through the _____ because it is in the _____ state of matter.
5. The pressure at the Mantle/Outer Core boundary = _____.
6. The temperature at the center of the Earth = _____°C.
7. Where in the Earth is the temperature of the rocks greater than the melting point of those rocks? _____. What is the result of this situation? _____ _____
8. The Outer/Inner Core boundary (interface) is at a depth of _____ km.
9. As the depth below the surface increases, the pressure in the rocks _____.
10. As the depth below the surface increases, the temperature in the Earth _____.
11. What method of heat transfer is responsible for the movement that is taking place within the asthenosphere (plastic mantle)? _____
12. What is happening to the Pacific Ocean plate where it meets the South American crustal plate? _____
13. What is happening to the crust along the Mid-Atlantic Ridge? _____ _____
14. What is the composition of the Inner Core? _____
15. Which is the denser, the continental crust or the oceanic crust? _____
16. What temperature would you have inside the Earth at the region where the pressure reaches 1,500,000 atmospheres? _____

L - Chemical Composition Table

1. The most abundant element by volume: In the Crust = _____
   In the Hydrosphere = _____
   In the Troposphere = _____
2. What is the most common element by mass in the Crust? _____

M - Earthquake Graph

1. How many Kilometers will a P-wave travel in 9 minutes? _____ km
2. How long will it take an S-wave to travel 2,500 km? _____
3. If a P-wave arrives at your seismograph at 1:20:30 p.m., and the S-wave arrives at 1:27:00 p.m., how many kilometers away was the epicenter of the earthquake? _____ km

4. How far away is an earthquake if there is a 3 minute interval between the arrival times of P-waves and S-waves?

   _____ km

N - Dewpoint And Relative Humidity Charts

1. If the dry bulb temperature is 10°C and the wet bulb temperature is 6°C, what is the dewpoint temperature?

   _____

2. What is the relative humidity if the air temperature is 16°C and the wet bulb temperature is 10°C?

   _____

3. The air temperature is 5°C and the wet bulb temperature is 3°C. What is the relative humidity of this air?

   _____

4. What happens to the relative humidity as the wet bulb and dry bulb temperatures become closer together?

   _____

   _____

O - Temperature

1. 60°C = _____ °K = _____ °F
2. Freezing point of water = _____ °C = _____ °K = _____°F
3. Boiling point of water = _____ °C = _____ °K = _____°F
4. Absolute Zero = _____°K

P - Weather Map Information

Answer the first 10 questions using the Station Model below.

1. Air pressure = _____
2. Air temperature = _____
3. Dewpoint temperature = _____
4. Amount of precipitation in last 3 hours = _____
5. Wind direction = _____
6. Wind speed = _____ knots = _____ miles/hour
7. Percent of cloud cover = _____
8. Visibility = _____
9. Present Weather = _____
10. Explain the barometric trend in words. _____

    _____

    _____

11. Describe each of the following air masses:

	Map Symbol	**Characteristics**
(a) Continental Tropical	_____	_____ and _____
(b) Continental Polar	_____	_____ and _____
(c) Maritime Tropical	_____	_____ and _____
(d) Maritime Polar	_____	_____ and _____

12. Draw the map symbol for the weather fronts listed below:

(a) Warm Front:

(c) Stationary Front

(b) Cold Front:

(d) Occluded Front:

Q - Pressure Chart

1. A pressure of 1017 mb = _____ inches
2. A pressure of 29.5 inches = _____ mb
3. If a barometer reads 1020 mb and a few hours later a storm passes over the barometer, give one possible reading during the storm. _____ mb
4. A wind is blowing from New York City to Detroit. If the pressure at Detroit is 1011.0 mb, give one possible reading at New York City. _____ mb
5. One Standard Atmosphere of pressure = _____ mb = _____ inches

R - Electromagnetic Spectrum

1. Which form electromagnetic energy has the shortest wavelength? _____
2. Energy is absorbed by the Earth's surface as sunlight (visible) is changed into (infrared). During this change the wavelength _____.
3. What color of visible light has the longest wavelength? _____
4. Which part of the electromagnetic spectrum has the shortest wavelength? _____
5. Which part of the electromagnetic spectrum has the longest wavelength? _____

S - Solar System Data

1. Which has the greatest mass, the Sun, Earth, or Moon? _____
2. Which has the greatest density, the Sun, Earth, or Moon? _____
3. What is the equatorial diameter of the Earth? _____ km
4. Which planet is: (a) closest to the Sun? _____ (b) furthest? _____
5. Which planet has the: (a) shortest period of rotation? _____
   (b) longest period of rotation? _____
6. Which planet is the: (a) smallest? _____ (b) largest? _____
7. Which planet would float (if you could find a big enough swimming pool or bathtub to put it in)? _____
8. Which planet has the: (a) roundest orbit? _____
   (b) most elliptical orbit? _____

9. How long is: (a) one period of rotation on Earth? _____

   (b) one period of revolution on Earth? _____

10. Which planet has the highest density? _____

11. If the distance between the Earth and the Moon was doubled, how would the new gravitational attraction differ from the original? _____

12. If the mass of one object is tripled, what would happen to the gravitational attraction between the two objects? _____

T - Atmospheric Properties

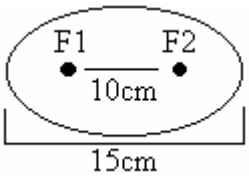
1. At the tropopause:
   a. The altitude (elevation) = _____ km = _____ miles
   b. The temperature = _____ °C
   c. The air pressure = _____ atmospheres
   d. the amount of water vapor = _____ g/m^3
2. As you increase your altitude, air pressure will _____.
3. As you increase your altitude, the amount of water vapor will _____.
4. As you increase your altitude in the tropopause, the temperature will _____.

U - Planetary Wind And Moisture Belts

1. (a) What are the latitudes of the zone of converging winds? _____
   (b) What type of moisture conditions do you find there? _____
2. Long Island is located at 41°N latitude. What is the direction of our planetary winds? _____
3. What are the moisture conditions at the poles? _____
4. In what direction do the planetary wind belts shift during the summer in the northern hemisphere? _____
5. At which latitudes do you find rising (ascending) air? _____

V - Formulas And Equations

1. What is the eccentricity of the ellipse at the right? (To the nearest *thousandth*.)



   The answer to question #1 is _____.

2. What is the eccentricity of a (perfect) circle? _____
3. On a contour map a stream slope drops 5 feet in 10 miles. What is the gradient of this stream? _____ feet/mile
4. If a 25 gram rock was weathered down to 10 grams over 5 years, what is the rate of weathering? _____
5. A cube is 3 cm on a side. If its mass is 67.5 g, its density will equal _____ g/cm^3.
6. What is the mass of an object that is 5.0 g/ml and has a volume of 32.1 ml? _____
7. What is the volume of an object with the density of 0.2 g/ml and measures 5 grams? _____

W - Physical Constants

1. At what temperature is the density of water equal to 1.0 g/ml? _____°C

2. You have samples of all 9 substances in the Specific Heat Chart. Each sample has the same mass and the same temperature. If you add the same amount of heat energy to each one of the samples, which will show the greatest increase in temperature? _____ The least _____
3. What is the specific heat of iron? _____
4. How many Joules are needed to raise the temperature of 10 grams of (liquid) water 10°C? _____
5. How much heat energy is released when water freezes? _____

X - Geologic Time Scale

1. Dinosaurs first appeared at about _____ mya (million years ago).
2. Man first appeared on Earth about _____ mya.
3. During which time period were the Palisade Cliffs of New York/New Jersey formed? _____
4. The earliest land animals appeared about _____ mya.
5. During which time Era were all the continents together? _____
6. The Solar System first began about _____ mya.
7. Circle the time periods that you might expect to find fossils from in New York State:

   Devonian Oligocene Triassic Cambrian Jurassic
8. Would you expect to find Permian fossils in New York State? Explain your answer. _____
   _____
   _____
9. Why wouldn't you expect to find Precambrian fossils in New York State? _____
   _____
   _____
10. Which mountain building period (orogeny) happened most recently? _____
11. What was the cause of the formation of the Appalachian Mountains? _____
    _____
12. When did the Atlantic Ocean first begin to form? _____
13. What is the most recent important geologic event to take place in New York State? _____
14. During which period was the animal that is now the New York State fossil at its peak time of development?
    _____
15. What happened to the distance between North America and Africa from the Pennsylvanian period until the Tertiary period? _____
    _____
16. You will find dinosaur footprints all over the cover of this reference chart. When did this dinosaur live?
    _____ mya.
17. How many cavemen and cavewomen were attacked and eaten by dinosaurs during the Earth's past geologic history?
    _____

18. Explain how you determined your answer to question #17? _____

_____

_____

(Continued on page 9.)

19. The names below represent the ages of rock layers. Some of the rock layers have been disturbed. (Example: Folding, Faulting, Unconformity)

A	B	C	D
Permian	Permian	Ordovician	Devonian
Carboniferous	Devonian	Silurian	Silurian
Silurian	Silurian	Devonian	Ordovician
Ordovician	Ordovician	Silurian	Devonian
Cambrian	Cambrian	Ordovician	Silurian
Precambrian	Precambrian	Cambrian	Ordovician
			Cambrian

a. Which of these layers of rock strata were disturbed in some way? _____

b. Explain the possible cause of this disturbance in each case using terms such as folding, faulting, and/or unconformity.

A) _____

B) _____

C) _____

D) _____

Y - Luminosity And Temperatures of Stars

1. What does the symbol "⊕" mean? _____
2. What does "luminosity" mean? _____

_____

_____

3. According to the H-R Diagram, what is the luminosity of the most massive stars? _____ What is the luminosity of the small stars? _____
4. What is the coldest temperature given on the chart? _____ What color would this star be?

_____

5. What is the temperature of the hottest star on the chart? _____ What color would it be?

_____

6. Out of Polaris or the Sun:

a. Which is larger? _____

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b. Which seems brighter? _____ c. Which is hotter? _____

7. Between Sirius or Polaris: a. Which is larger? _____
   b. Which seems brighter? _____ c. Which is hotter? _____
8. Between Rigel or Betelgeuse: a. Which is larger? _____
   b. Which seems brighter? _____ c. Which is hotter? _____
9. What type of star is Procyon B? _____
10. What color is Betelgeuse? _____

Z - Minerals

1. What color is the streak of hematite? _____
2. What is the difference between muscovite and biotite? _____
3. What is the hardness of fluorite? _____
4. What is a mineral that has a nonmetallic luster, a hardness of 6, cleavage in 2 directions at 90°, and can be used in ceramics or glass? _____
5. Pyrite is sometimes called "fools gold," because it looks a lot like real gold. The chemical composition for gold is Au. What is the chemical composition for pyrite? _____
6. What is the distinguishing characteristic that is special to calcite? _____
7. How does halite taste? _____ How does sulfur smell? _____
8. Will dolomite bubble when acid is dropped on it? _____
9. How is dolomite different from calcite (3 ways)? _____
   _____
   _____
10. Magnetite and hematite are very similar. They can both have many of the same traits, but what is a characteristic of magnetite that is **not** a characteristic of hematite? _____
    _____
11. What elements are in: (a) Quartz? _____
    (b) Dolomite? _____
    (c) Halite? _____
    (d) Galena? _____
    (e) Potassium Feldspar? _____

AA - Odds and Ends

1. What is the name of the state fossil of New York State? _____.
2. What is the chemical symbol for lead? _____
3. What element has the letter "K" as its chemical symbol? _____

BB - Lapse Rate

1. As you increase your altitude, the air temperature _____.

2. If the air temperature on the ground is 20°C, what is the temperature at 3 km above the ground?

   _____

3. When the surface temperature is 30°C, at what altitude would the temperature be 10°C?

   _____

4. When the air temperature is -10°C at 4 km above the surface, what is the temperature at the ground?

   _____

5. As dry air rises, it cools off by _____ °C/km.

Lapse Rate/Cloud Base