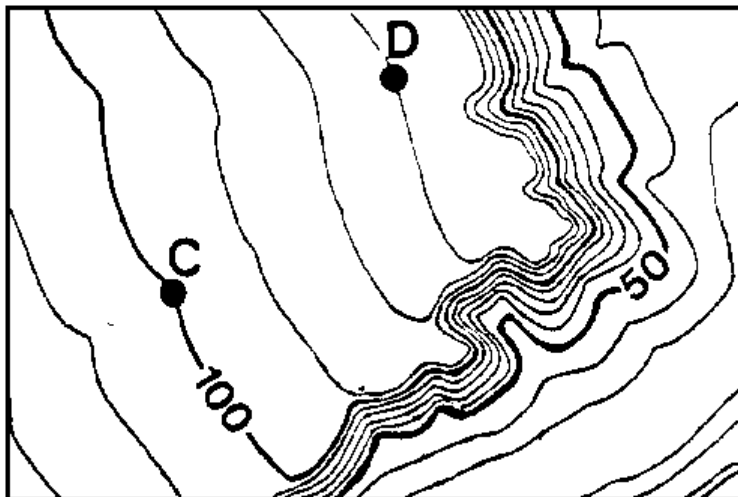


## Earth Science Reference Tables Review

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For the following questions use the *Earth Science Reference Tables*. Record your answers on the separate answer sheet that is provided.

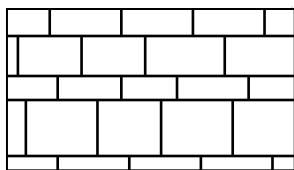
1. Which Earth material has the highest specific heat?
2. Which of the following materials will require the *least* amount of heat to raise its temperature from 20° C to 15° C? (basalt, ice, lead, or granite)
3. Which phase change of water requires the addition of the greatest amount of heat? (melting, freezing, vaporization, or condensation)
4. At what temperature is water's density 1.00 gram/milliliter.
5. Which radioactive isotope has a half life of 1,300,000,000 years?
6. Lead-206 is the daughter isotope for which radioactive isotope?
7. A fossil bone contains C<sup>14</sup> and N<sup>14</sup> in the ratio of 1:3. How old is the bone?
8. What is the percentage, by volume, of oxygen in Earth's crust?
9. A portion of a topographic map is shown below. Determine the gradient between points C and D on the map. Round to the *nearest tenth*. (The elevations shown by contour lines are in meters above sea level.)



SCALE: 1 cm = 0.5 km

10. A stream transports a sand grain 400 centimeters in 10 seconds. Calculate the rate at which the sand grain moved along the stream bed.
11. A mineral with a density of  $2.7 \text{ g/cm}^3$  has a volume of  $120 \text{ cm}^3$ . What is the mineral's mass?
12. Most of the bedrock exposed on the Allegheny Plateau was formed during which geologic time period?
13. In which of the following landscape regions would the oldest bedrock be found?
  - (1) Erie-Ontario Lowlands
  - (2) Atlantic Coastal Plain
  - (3) Tug Hill Plateau
  - (4) Adirondack Mountains
14. Would limestone and chemically formed sedimentary rocks be found in the Newark Lowlands?
15. Which landscape region separates the Adirondack Mountains from The Catskills?
16. Which landscape region is composed primarily of Cretaceous through Pleistocene weakly consolidated gravels, sands, and clays?
17. What landscape region is located at  $42^\circ 15' \text{ N}$ ,  $74^\circ 30' \text{ W}$ ?
18. At which location could rocks that are 1,200,000,000 years old be found? (Old Forge, Rochester, Kingston, or Massena)
19. What is the difference in surface elevation between Lake Ontario and Lake Erie?
20. The rocks of the Adirondack Mountains resulted from this type of metamorphism.
21. What warm ocean current flows northward along the east coast of the United States?
22. Cool ocean currents flow towards (higher, lower) latitudes?
23. The Mid-Atlantic Ridge is what type of plate boundary?
24. The convergence of two ocean plates is found at the
  - (1) Peru-Chile Trench
  - (2) Southeast Indian Ridge
  - (3) Aleutian Trench
  - (4) Southeast-Indian Ridge
25. A subduction zone is associated with what type of plate boundary?
26. What type of plate boundary is found at  $0^\circ$ ,  $80^\circ \text{ W}$ ?
27. Which Northern Hemisphere hot spots are found at about the same longitude?
28. What is the grain size of a fine-grained igneous rock?
29. Name four coarse-grained igneous rocks that contain no quartz.

30. Which felsic igneous rocks have a vesicular texture are not composed of minerals?
31. A volcanic igneous rock that contains potassium feldspar and has a vesicular texture is:
32. An igneous rock with approximately 70% pyroxene would contain approximately what percent plagioclase feldspar?
33. What mafic rock is composed of 100% olivine?
34. What is the primary difference between gabbro and basalt?
35. Which statement is supported by the Rock Cycle?
  - (1) Metamorphic rock often forms from older rocks being subjected to heat and/or pressure.
  - (2) Sedimentary rock can only be formed from igneous rock.
  - (3) All sediments are lithified directly into sedimentary rock.
  - (4) Igneous rock never results from melting of older rock and solidification of magma.
36. Sediments form as the result of what processes?
37. What is the size range for a pebble?
38. What is the diameter of the largest sized particle a stream could transport if its water velocity is 30 cm/s?
39. Which sedimentary rock is composed of cemented shells, shell fragments or precipitates of biologic origin?
40. Which clastic sedimentary rock contains the greatest range of particle sizes?
41. Which sedimentary rock is formed from compacted clay particles?
42. Which sedimentary rock can be identified by the acid test?
43. The symbol below represents which rock?

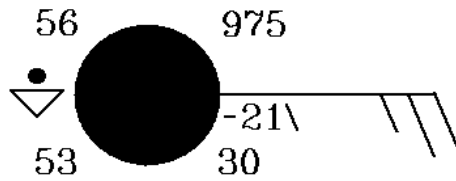


44. Which foliated metamorphic rock results from high-grade metamorphism?
45. Marble forms from the metamorphism of what rock?
46. Which rock forms as a result of *only* contact metamorphism?
47. Geologic time is subdivided into a number of time units called periods on the basis of
  - 1) rock thickness
  - 2) fossil evidence
  - 3) rock types
  - 4) radioactive dating of rocks

48. The Permian Period began how many million years before the present?
49. Which of the following fossils could be found Middle Proterozoic Era in rocks?  
 1) coelophysis    3) eurypterid  
 2) graptolite    4) stromatolites
50. Most of the bedrock found in New York State formed during which era?  
 1) Cenozoic     3) Paleozoic  
 2) Mesozoic    4) Early Proterozoic
51. What important geologic event occurred in NY State during the Late Proterozoic Period between 580 million and 542 million years ago??  
 1) Grenville Orogeny    3) Collision of North America and Africa  
 2) Rifting and initial opening of Iapetus Ocean              4) Erosion of Grenville Mountains
52. Which orogeny resulted from the collision of North America and Avalon during the Devonian Period?
53. During which period did North America separate from Africa causing the initial opening of the Atlantic Ocean?
54. During this period Pangaea formed as a result of the collision of North America and Africa.  
 1) Paleozoic    3) Early Permian  
 2) Permian     4) Phanerozoic
55. Which eurypterid species existed during only the Silurian Period?
56. Which subdivision of geologic time covers the shortest amount of time? (eon, era, period, epoch)
57. The Paleozoic Era lasted for how many years? (Express your answer in scientific notation.)
58. What events marked the end of the Paleozoic and Mesozoic eras?
59. Fossils of the earliest fishes are found during which epoch?
60. Oceanic oxygen began to enter the atmosphere during which era?
61. A rock containing fossils of *Cryptolithus* and *Valcouroceras*, formed during which epoch?
62. A rock containing the bones of *Coelophysis* would be dated from which epoch?
63. What sedimentary rock could be formed from fossils of *Lichenaria*?
64. This period began 359 million years ago and is divided into two different periods in North America due to the presence of a widespread unconformity.
65. What is the interior temperature at the boundary between Earth's mantle and the outer core?

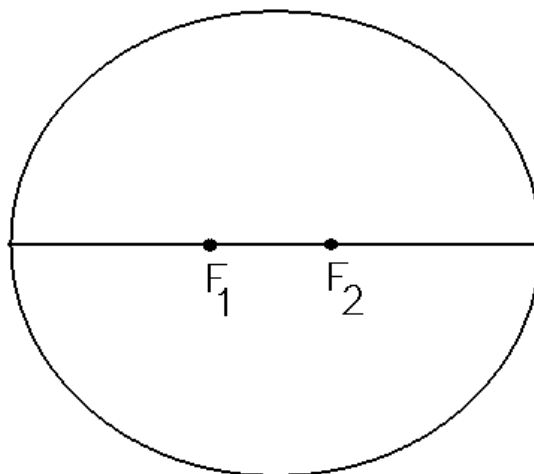
66. What is the pressure at a depth of 5,000 km below Earth's surface?
67. Which of Earth's interior zones is inferred to be completely liquid?
68. What term is used for the boundary between the mantle and the crust?
69. Which is denser, continental crust or oceanic crust?
70. Together, the crust and rigid mantle are part of the:
71. As depth increases, density: (decreases, increases, remains the same)
72. What feature is found on the seafloor offshore near the Cascades?
73. In which zone of Earth's interior is the density 11.0 grams/cm<sup>3</sup>?
74. What mineral would be found in the rocks found at a depth of 400 km?
  - (1) quartz
  - (2) orthoclase feldspar
  - (3) calcite
  - (4) olivine
75. In Earth's crust, what two elements are most abundant by mass?
76. What is the percent (by volume) of oxygen in the troposphere?
77. What is the distance to the epicenter of an earthquake if the arrival time of the P-wave is 10:12:00 and the arrival time of the S-wave is 10:15:40?
78. If the P-wave from an earthquake whose epicenter was 5,000 km from the seismograph station arrived at 21:10:00, what time did the S-wave arrive?
79. A seismograph 5,600 km from an earthquake's epicenter recorded the first arrival P-wave at 08:11:00. What was the origin time of the earthquake?
80. Which seismic wave travels at the fastest rate, the P-wave or the S-wave?
81. Find the relative humidity if the dry-bulb temperature is 14° C and the wet-bulb temperature is 8° C .
82. Find the dewpoint temperature if the dry-bulb temperature is 20° C and the wet-bulb temperature is 19° C ?
83. As the difference between the dry-bulb and the wet-bulb temperatures of a sling psychrometer increases, the relative humidity (decreases, increases, remains the same).
84. On a weather map, an air mass that is very warm and dry would be indicated by what abbreviation?
85. Draw the symbol used on a weather map for a cold front. Draw an arrow through the front that shows which way the front would be moving.
86. Convert 86° F to its equivalent temperature in degrees Celsius.
87. Convert 0° C to its equivalent temperature in degrees Fahrenheit.

Based on the station model shown below, identify the weather variables indicated.



88. Temperature
  89. Barometric pressure (convert to long form)
  90. Barometric pressure three hours ago based on the barometric trend
  91. Wind direction
  92. Wind speed
  93. Dewpoint temperature
  94. Cloud cover
  95. Present weather
- 
96. Find the relative humidity if the air temperature is  $68^{\circ}\text{F}$  and the dewpoint temperature is  $52^{\circ}\text{F}$
  97. Convert an air pressure of 996.0 mb to its equivalent in inches of mercury (Hg).
  98. Convert an air pressure of 29.10 inches of Hg to its equivalent in millibars.
  99. The greatest concentration of water vapor is present in which temperature zone of the atmosphere?
  100. What change in atmospheric pressure occurs with increasing altitude?
  101. What is the temperature in degrees Celsius at the tropopause?
  102. The stratopause is found at an altitude of approximately how many miles?
  103. As a rocket passes through the mesopause, it enters which temperature zone of the atmosphere?
  104. In which two temperature zones of Earth's atmosphere does temperature increase as altitude increases?
  105. Which visible wavelength of the electromagnetic spectrum has the shortest wavelength?
  106. Which electromagnetic wave is radiated by Earth's surface and warms the air in the Troposphere?
  107. Which electromagnetic wave is absorbed by ozone in the upper stratosphere?
  108. At which latitudes do surface winds converge?
  109. Between  $30^{\circ}\text{N}$  and  $60^{\circ}\text{N}$  planetary winds are generally from which compass direction?
  110. In the northern hemisphere, the Coriolis Effect appears to deflect wind in which direction (the right or the left) of the direction of travel?

111. What vertical motion of air is responsible for the dry conditions found at  $30^{\circ}$  N and  $30^{\circ}$  S?
112. Which star appears about 100 times brighter than the Sun?
113. Compared to Alpha Centauri, Rigel is  
(1) less massive and hotter (3) the same mass and hotter  
(2) more massive and cooler (4) more massive and hotter
114. What color stars are the hottest?
115. Which of the following stars is most massive, Sirius, Barnard's Star, Betelgeuse, or Procyon B?
116. At the end of its life cycle in about 4.5 billion years, the Sun will be most similar to which star?
117. Which planet takes the longest to travel once around the Sun along its orbit?
118. Which planet's period of rotation is closest to Earth's period of rotation?
119. What is the eccentricity of the orbit of Mars?
120. The shape of which planet's orbit is most eccentric?
121. Which planet's orbit has an eccentricity closest to that of a circle?
122. What is Saturn's mean distance from the Sun?
123. Which object in the Solar System has a period of revolution that is almost identical to its period of rotation?
124. How many times greater is Earth's equatorial diameter than the Sun's equatorial diameter?
125. Determine the eccentricity of the ellipse shown below. (Round your answer to the *nearest thousandth*.)



(DRAWN TO SCALE)

126. Name a nonmetallic mineral that will not scratch glass and cleaves in 4 directions.
127. What mineral is easily scratched by a fingernail and is used in the making of plaster of paris and drywall?
128. What mineral has a chemical formula of  $\text{FeS}_2$ ?
129. Name two minerals that are not compounds.
130. Which mineral is often seen as red glassy grains in New York State metamorphic rocks?
131. What is the chemical symbol for magnesium?
132. In which NY State landscape region are gneisses, quartzites, and marbles of Middle Proterozoic Eon age found?
133. What type of boundary is found between the North American Plate and the Caribbean Plate?
134. On which continent is a rift zone found?
135. What metamorphic rock forms from the regional metamorphism of bituminous coal?
136. What is the significance of the Ediacaran fauna?
137. Sediments from these two periods are found in NY State.
138. Oceanic oxygen began to enter the atmosphere during this era.
139. This term is used for forces and events leading to deformation of Earth's crust and the formation of mountains. In NY state four of these events occurred between the Middle Proterozoic Era and the Permian Period.
140. Which fossil group found in New York State has the longest range of existence?
141. What two elements are found in Earth's core?
142. What is the mean distance of Earth's Moon from Earth?
143. Which celestial object in the Solar System has the same period of revolution as its period of rotation?
144. What is the luminosity of the star Polaris?
145. A star in this stage of its life cycle is cool and dim.




**Answer Sheet: Earth Science Reference Tables Review**

1		26		51	
2		27		52	
3		28		53	
4		29		54	
5		30		55	
6		31		56	
7		32		57	
8		33		58	
9		34		59	
10		35		60	
11		36		61	
12		37		62	
13		38		63	
14		39		64	
15		40		65	
16		41		66	
17		42		67	
18		43		68	
19		44		69	
20		45		70	
21		46		71	
22		47		72	
23		48		73	
24		49		74	
25		50		75	

76		101		126	
77		102		127	
78		103		128	
79		104		129	
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82		107		132	
83		108		133	
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87		112			
88		113		137	
89		114		138	
90		115		139	
91		116		140	
92		117		141	
93		118		142	
94		119		143	
95		120		144	
96		121		145	
97		122			
98		123			
99		124			
100		125			

## Answer Key: Earth Science Reference Tables Review

1	Liquid water	26	Convergent (subduction zone)	51	(2) Rifting and initial opening of Iapetus Ocean
2	Lead	27	Iceland & Canary Island Hot Spots	52	Acadian Orogeny
3	Vaporization	28	less than 1 mm	53	Jurassic
4	3.98° C	29	Gabbro, Peridotite, Dunite, Diorite, and sometimes diabase	54	(2) Permian
5	Potassium - 40	30	Pumice and scoria because they're non-crystalline	55	<i>Eurypterus</i>
6	Uranium-238	31	Vesicular rhyolite	56	epoch
7	11,400 years	32	15%	57	1.91 x 10 <sup>6</sup> years
8	94.04%	33	Dunite	58	Extinctions
9	15.0 m/km	34	Texture (grain size)	59	Middle Cambrian
10	40 cm/sec	35	(1)	60	Early Proterozoic
11	324.0 grams	36	Weathering & Erosion	61	Middle Ordovician Epoch
12	Devonian	37	0.2 cm to 6.4 cm	62	Late Triassic
13	(4) Adirondack Mts.	38	About 0.5 cm	63	Limestone
14	No	39	limestone	64	Carboniferous Period
15	Hudson-Mohawk Lowlands	40	conglomerate	65	5,000° C
16	Atlantic Coastal Plain	41	shale	66	3,000,000 atmospheres
17	The Catskills	42	limestone (also dolostone)	67	Outer Core
18	Old Forge	43	limestone	68	The MOHO
19	100 meters (175 m - 75 m)	44	gneiss	69	oceanic crust
20	Regional Metamorphism	45	limestone	70	lithosphere
21	The Gulf Stream	46	hornfels	71	increases
22	Lower latitudes	47	(2) fossil evidence	72	a trench
23	Divergent	48	299 million years ago	73	Outer Core
24	(3) Aleutian Trench	49	(4) stromatolites	74	olivine
25	Convergent	50	(3) Paleozoic	75	oxygen and silicon

76	21.0%	101	-55° C	126	Gypsum (Selenite)
77	2,200 km	102	approximately 32 miles	127	Pyrite
78	21:16:40	103	Thermosphere	128	Graphite and Sulfur
79	08:02:00	104	Stratosphere & Thermosphere	129	Graphite and Sulfur
80	The P-wave	105	violet	130	Garnet
81	41%	106	infrared	131	Mg
82	19° C	107	ultraviolet	132	Adirondack Mountains
83	decreases	108	30° N and 30° S	133	Transform
84	cT	109	southwest	134	Africa
85		110	To the right	135	Anthracite coal
86	30° C	111	descending (sinking)	136	These were the first multicellular, soft-bodied marine organisms
87	32° F	112	Aldebaran		
88	56° F	113	(4)	137	Late Cretaceous and Quaternary
89	997.5 mb	114	Blue	138	Early Proterozoic
90	999.6 mb	115	Betelgeuse	139	Orogeny
91	easterly (from the east)	116	Procyon B	140	Brachiopods
92	25 knots	117	Neptune	141	Iron and Nickel
93	53° F	118	Venus	142	386,000 km
94	overcast (100%)	119	0.093	143	Earth's Moon
95	rain showers	120	Mercury	144	4,000 x the Sun's luminosity
96	30%	121	Venus	145	White Dwarfs
97	29.41 inches of Hg	122	1,426,700,000 km		
98	985.5 mb	123	Earth's Moon		
99	The Troposphere	124	109.1		
100	Pressure decreases	125	0.229		