

### **13 Must-Know Earth Science Facts**

Post this sheet in the bathroom, by your telephone, next to your bed, on the door to your refrigerator, the latch for your cage and your breakfast table. Keep reading these until you know them in your sleep.

1. If you cut an object into pieces, you don't change its density.
2. The altitude of Polaris equals your latitude.
3. The Coriolis Effect deflects winds and currents to the right in the N. Hemisphere.
4. Condensation: water vapor changing into liquid water.
5. Boiling/evaporation: liquid water changing into water vapor.
6. Planets take longer to revolve around the sun the further they are from the sun.
7. Low Pressure: wet weather (warm).
8. High Pressure: dry weather (cool).
9. Weather moves west to east.
10. Porosity does not depend on particle size.
11. The Earth is closest to the sun in Winter.
12. Minerals have different properties because of the internal arrangement of atoms.
13. Marine (sea) fossils on mountain tops indicate that the land has been uplifted.

### **99 Pieces of Mental Luggage To Bring To The Earth Science Regents Exam**

1. The same substance always has the same density.
2. As pressure increases, density increases.
3. As temperature increases, density decreases.
4. Water expands when it freezes.
5. Most changes in the environment are cyclic.
6. Water is densest at 4°C, when it is a liquid.
7. The true shape of the earth is an OBLATE SPHEROID.
8. The best model of the earth's shape is (looks like) a sphere.
9. The altitude of Polaris equals your latitude.
10. Latitude lines go east-west, but measure how far above or below the equator.
11. Longitude lines go north-south.
12. Longitude (and also time) is based on observations of the sun.
13. USE THE REFERENCE TABLES!
14. The closer isolines (contour-isobar-isotherm) are, the steeper the slope or gradient.
15. The earth rotates west to east- counterclockwise as seen from N. Pole (in 24 hours).
16. The earth revolves counterclockwise (365¼ days).
17. All celestial objects APPEAR to move to the west.
18. The moon has phases because of the angle at which we view its surface (Remember though: half of it is always lit).
19. Planets APPEAR to go backwards (retrograde) as the earth passes them in space.

20. Summer solstice - June 21 - 16 hours daylight - sun rises north of east-vertical ray on  $23\frac{1}{2}^{\circ}$  North, Tropic of Cancer.
21. Winter solstice - December 21 - 8 hours daylight - sun rises south of east-vertical ray on  $23\frac{1}{2}^{\circ}$  South, Tropic of Capricorn.
22. Equinoxes - Vernal - March 21, Autumnal - September 23, 12 hours daylight, sun rises due east, vertical ray on equator.
23. Equator always has 12 hours of daylight.
24. The lower the altitude of the sun, the longer shadows it casts.
25. There are two evidences that the earth rotates:  
FOUCAULT'S PENDULUM: appears to change its direction of swing.  
CORIOLIS EFFECT: deflects to the right in the N. hemisphere.
26. Earth is closer to the sun in winter.
27. USE THE REFERENCE TABLES!
28. The closer a planet is to the sun, the faster it orbits.
29. GEOCENTRIC: earth centered universe
30. HELIOCENTRIC: sun centered
31. Black absorbs / white reflects
32. Conduction: heat transfer from molecule to molecule through collisions.
33. Convection: heat transfer through fluids (gases, liquids) due to density differences.  
Hot rises, cold sinks
34. Radiation: heat transfer through space (vacuum) ex. light.
35. Energy moves from source to sink, high to low.
36. Kinetic energy: energy of motion, increases with velocity.
37. Potential energy: stored or at rest, increases with height.
38. There is NO temperature change at a phase change.
39. Infrared has long wavelength.
40. Carbon dioxide ( $\text{CO}_2$ ) and water vapor absorb infrared radiation.
41. Good absorbers of radiation are good radiators.
42. Hottest part of the year is July/August (after June 21- time lag).
43. Hottest part of the day is 1-2 PM (after 12 noon- time lag).
44. As temperature increases, air pressure decreases: hot air rises.
45. As moisture content increases, air pressure decreases: clouds form in rising air.
46. Air pressure decreases with altitude.
47. Highs are cool and dry; Lows are warm and wet.
48. Wind is due to air pressure differences and wind blows from high to low pressure.
49. Use the Handy Dandy Earth Science Reference Tables.
50. Wind is named for the direction it is coming from.
51. Highs are regions of divergence (clockwise)
52. Lows are regions of convergence (counterclockwise)
53. The closer the air temperature is to the dew point temperature, the greater the chance of precipitation.

54. Weather moves from west to east.
55. Cold Front
56. Warm Front
57. Occluded Front
58. Cold fronts move the fastest.
59. Porosity (the amount of holes); it DOES NOT depend on particle size.
60. Permeability (connection of holes); as particle size increases, permeability increases.
61. Capillarity (movement of water upward); is highest in smallest particles.
62. Ep (potential evapotranspiration- "strength of the sun") depends on temperature.
63. Water is stubborn- it is the hardest thing to heat up and cool down.
64. Frost action works best where temps fluctuate above & below freezing.
65. Chemical weathering favors warm wet climates.
66. Continental drift: fossils on opposite shores, puzzle fit of continents, tropical fossils in cold climates.

67. Evaporation happens faster on large surface areas.

68. Water bodies moderate temperature.

69. Air cools as it rises.

70. Orographic effect (Adiabatic changes)- Mountain barrier

71. Gravity is behind all erosion.

72. Streams are the number one agent of erosion.

73. Stream velocity depends on slope and discharge (amount of water in the stream).

74. Velocity is faster on outside of meander bend.

75. Heavy-dense-round particles settle out first in water.

76. Vertical sorting (graded bedding) biggest sediments on the bottom.

77. Glacial sediments are unsorted, scratched, U-shaped valley.

78. Stream deposits are sorted, round and smooth, V-shaped valley.

79. Sedimentary rocks - strata = flat layers.

80. Igneous rocks:

cools fastly - small crystals

cools slowly - large crystals

81. Metamorphic rocks: banding-distorted structure.

82. Mineral properties depend on internal arrangement of atoms.

83. Silicon - oxygen tetrahedron: basic unit

84. Isostasy: earth's crust in equilibrium

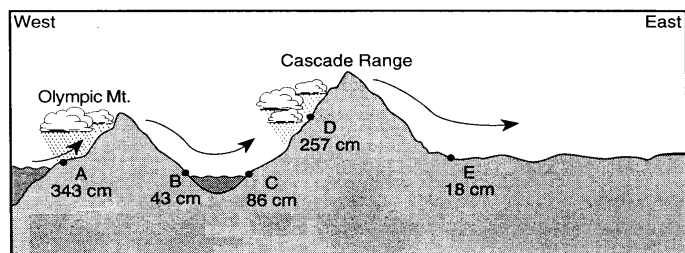
85. Mid-ocean ridges: crust created

86. Trenches: crust destroyed

87. P-waves are phastest, phirst, push-pull, pass through everything.

88. S-waves, slower, secondary, shake, solids only.

89. Need 3 seismometer stations to locate an epicenter



(Not drawn to scale)

90. Undisturbed strata: bottom layer is oldest
91. Intrusions and faults are younger than the rock they are in
92. Unconformity: buried erosional surface
93. Arid landscape: steep slopes
94. Humid landscape: smooth, rounded slopes
95. Memorize the "Dreaded 13 Must-know Earth Science Facts "
96. Uranium<sup>238</sup> dates old rocks
97. Carbon<sup>14</sup> dates recent, once living objects
98. Convection currents in the mantle move the plates
99. Always try to eliminate two answers
100. USE THE REFERENCE TABLES!