

**If you know these facts, then you should do well on your SOL test!**

### **GENERAL SCIENCE & MAPPING**

1. *Density* = mass/volume The S.I... Units for Density are : grams/cm<sup>3</sup> or g/ml
2. *Volume* for irregular objects is found by water displacement.
3. Warm (air, water, magma) rises because it is less dense. Cold Sinks.
4. As pressure increases so does density.
5. Water is most dense as a liquid. Density = 1 g/ml
6. The same substance has the same density. As mass increases so does the volume.
7. A hypothesis is a prediction about a problem that can be tested. Accurate results are needed to become a theory.
8. A variable is a changeable factor in an experiment.
9. Constants are factors that are the same.
10. Any valid scientific theory has passed tests designed to invalidate it.
11. There can be more than one explanation for any phenomena.
12. The altitude of Polaris equals your Latitude.
13. Latitude lines go East- West but measure North and South of the Equator.
14. Longitude lines go North- South but measure East and West of the Prime Meridian.
15. The closer the Contour Lines, the steeper the slope.
16. Contour lines form V's and point upstream of rivers and creeks.

### **PLATE TECTONICS**

17. The Earth consists of a solid Inner core( Fe & Ni), A liquid outer core( Fe & Ni), a plastic- like mantle (Si, O, Fe, Ni) and a thin rocky crust (Si & O)
18. The lithosphere is the crust and upper mantle.
19. Ocean Crust is thinner, younger, & denser than continental crust.
  - Oceanic crust is made of basaltic rock.
20. Convection currents move tectonic plates.
  - Hot material rises, cools, becomes more dense and sinks.
21. Convergent Boundaries are colliding plates which cause folded or thrust faulted mountains, subduction zones (volcanoes & trenches), & reverse faults.
22. Divergent boundaries are dividing plates and cause Sea- Floor Spreading, Mid- Ocean Ridges, Rift Valleys, & Volcanoes. Normal faults are produced from this movement.
23. Transform boundaries slide past each other. Strike slip faults and Earthquakes are produced.
24. Earthquakes can result with any plate movement.
25. Hot Spots are not related to plate movement. Hawaii is a hot spot.
26. A fault is a break or crack in the Earth's Crust where movement has occurred.
27. Appalachian Mountains are folded mountains.
28. Volcanic activity is associated with subduction, rifting, or sea floor spreading.
29. An Ocean plate will always sink under a continental plate because it is more dense.
30. 3 seismic stations are needed to find the epicenter of an Earthquake.
31. P waves travel the fastest and reach the Seismic station first.
  - travel through solids and liquids.
33. S waves reach the seismic station 2<sup>nd</sup>. They do not travel through liquids.

### **WEATHERING & EROSION**

34. Weathering is the process that rocks are broken down by water, air, and organisms.
35. Chemical Weathering occurs in warm, humid climates. Rocks compositions are changed into new material.
36. Mechanical Weathering - breaks rocks into smaller pieces. Ex: Ice Wedging
37. Erosion is the process by which Earth materials are transported by moving water, ice, or wind.
  - Gravity causes all these to happen.
38. Streams and moving water are the major agents of Erosion.
39. Deposition is the dropping or settling out of sediment.
40. High Erosion = high relief areas High deposition = low relief areas
41. Large particles settle out first.
  - Sediment size from largest to smallest- breccia/conglomerate, sandstone, siltstone, shale.

42. As particle size increases, permeability (the ability to transport water) increases.
43. Soil Evolution starts with the weathering of bedrock.
  - Organic material called humus must be present in order to have Soil.
44. Soil profile consists of 3 horizons      A- Top Soil, humus (most evolved)  
       B- leaching from A      C- Weathered Rock

### **GOUNDWATER & VA PROVINCES**

45. Karst Topography has caves and sinkholes produced by acidic groundwater dissolving limestone.
46. Valley and Ridge Province is famous for Karst topography.
47. Ground water layers from the surface down would include zone of aeration, water table, & zone of saturation.
48. An Aquifer is a layer of rock that transports groundwater freely.
  - Largest aquifer in VA is ground water filled from rain.
49. A spring is an area where the water table reaches the land's surface.
50. Hydrologic cycle includes the processes of evaporation, condensation, precipitation, and runoff.
51. The Coastal plain is the flattest area underlain by all types of sediments produced by the erosion of the Appalachian mountains. Fossils are abundant here.
52. Piedmont is underlain by igneous and metamorphic rocks produced by ancient volcanoes.
  - Separated by the fall line from the Coastal plain.
53. Blue- Ridge- oldest in the State
54. Valley and Ridge- long parallel ridges composed of folded and faulted rocks that occurred during the collision of Africa and North America during the Paleozoic.
  - Karst Topography & fossils are abundant.
55. Appalachian Plateau is underlain by sedimentary rocks. Coal resources are found here which is the most abundant resource in VA. Fossils present.

### **ROCK & MINERALS**

56. A mineral is found in nature, inorganic, solid, with a definite chemical composition and structure. A gem is a valuable mineral.
57. Mineral properties depend on their atomic structure.
58. Ores are useful and profitable.
59. Igneous rocks are classified by composition and texture.
60. Igneous Rocks are produced by the cooling of magma or lava.
61. Fast cooling = Extrusive - Texture includes small mineral grains, glassy, air holes present.  
       ( Pumice, Basalt, Obsidian)
62. Slow cooling = Intrusive- Texture includes coarse or large mineral grains.( Granite)
63. Metamorphic formed by heat and pressure.
64. Metamorphic include foliated ( banded) and non foliated.
65. Foliated rocks are slate, schist, gneiss. Non foliated include marble and quartzite. Makes good building material.
66. Limestone morphs into marble. Sandstone morphs into quartzite.
67. Sedimentary rocks form from rock fragments, organic material, or chemical precipitation through compaction and cementation.
68. Sedimentary are found in flat layers or strata. Fossils are found in these layers.
69. Sedimentary subclasses include clastic, organic, and chemical.
70. Limestone is formed both chemically and organically.
71. Clastic rocks are made of fragments- Conglomerate, sandstone, and shale.

### **RESOURCES & GEOLOGIC DATING**

72. Virginia resources include limestone, coal, and gravel.
73. Renewable resources can be replaced by nature at a rate close to the rate at which they are used. Includes vegetation, water, and soil.
74. Nonrenewable are renewed very slowly or not at all. Includes coal, oil, and minerals.
75. The Earth's Water Supply is renewable but also finite.
76. A fossil is the remains, impressions, or other evidence of a former existence of life preserved in rock.
77. Virginia's fossils are mostly marine and are from all Era's in history.



78. Law of Superposition states that the oldest rocks are found on the bottom of strata and the youngest on top of strata.
79. Law of Cross-cutting relationships states that an igneous intrusion is younger than the layers it cuts across.
80. Fossils, Superposition, and Cross-cutting are used to determine relative ages.
81. Relative ages are placing events in sequence without assigning exact numerical ages.
82. Absolute time places a numerical age to an event.
83. Radioactive decay or half-life is used to determine the absolute age of rocks. Rock disappears at an equal rate.
84. Uranium dating is used to find the ages of the oldest rocks. Carbon-14 is used to find the ages of human artifacts.
85. The Earth is about 4.6 billion years old.
86. Coal Evolution from softest to hardest- Peat, Lignite, Bituminous, Anthracite
87. Unconformities are missing rock layers usually a result of erosion.

### **OCEANOGRAPHY**

88. 2 high tides and 2 Low tides occur each day. Earth, moon and sun align for highest high tides.
89. Tides are caused by the gravitational pull of the Earth and the Moon.
90. The salinity of the ocean is referring to the salt in the ocean. Ocean water with more salt is denser than water with less salt. Salinity helps drive ocean currents because dense water will sink and less dense water will rise.
  - Currents move from cold to warm areas because density difference too.
91. Upwelling brings cold, nutrient rich water from the bottom of ocean to the surface.
  - This is rich in biological activity.
92. Estuaries are areas where salt water mixes with fresh water. Example: Chesapeake Bay
93. Sea Level rises when ice caps melt.
94. Cyanobacteria was responsible for the first oxygen on Earth. (Existed before Oxygen)
  - Presently Blue Green Algae is an important source of Oxygen.
95. The ocean is the largest reservoir of heat at the Earth's surface.
  - It drives the weather of the Earth. Warm ocean water produces the energy for storms like hurricanes and typhoons.
96. Cities that lie near water will experience different temperatures than cities that lie inland.
  - Coast cities will experience medium temperatures the whole year.
  - Inland cities will experience really hot temperature and really cold temperatures over the course of the year.
97. Large bodies of water have a moderating effect on climates.

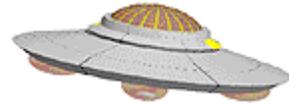
### **METEOROLOGY**

98. The Dew Point is the temperature when the air is saturated with water.
99. The Early atmosphere was mostly CO<sub>2</sub> and very little O<sub>2</sub>.
100. The Earth's atmosphere is 21% Oxygen, 78% Nitrogen, 1% trace gases.
101. Human activities such as burning fossil fuels has increased CO<sub>2</sub> levels.
102. High CO<sub>2</sub> levels produce the Greenhouse effect.
103. CFC's are decreasing the ozone levels of the upper atmosphere
104. Areas near the Equator receive the most direct radiation.
105. Clouds form when air is at or below its dew point and condensation nuclei are present.
106. Coriolis Effect causes deflections of the atmosphere & oceans due to rotation of Earth.
107. A psychrometer measures humidity in the air. A barometer measures air pressure.
108. Highs are cool and dry: Lows are warm and wet.
109. Wind is due to unequal cooling that causes air pressure differences.
110. Wind blows from high to Low.
111. Cold fronts move quickly and produce rain at the Front.
112. Warm fronts move slow and produce miles and miles of clouds.
113. The highest pressure is found at Sea level.
114. High pressure moves clock-wise and outward.
115. Low pressure moves Counter- Clockwise and inward.
  - A typhoon is the same thing as a hurricane. They are low pressure systems that form over warm water.
116. U.S. weather is dominated by prevailing westerlies. Weather moves west to east.

### **ASTRONOMY**

117. Summer Solstice is June 21<sup>st</sup> (longest day). Winter Solstice is December 21<sup>st</sup> (shortest day).

118. Solstice is when the sun is at its most Northern or Southern Point.
119. Equinoxes are when the sun is directly over the equator.
  - Spring March 21<sup>st</sup> and Fall September 22<sup>nd</sup> (12 hours of daylight and 12 hours of night)
120. The Earth is closer to the sun in the winter.
121. The Earth rotates W to E once in 24 hours.
122. The Earth revolves CCW around the sun once in 365 ¼ days.
123. The Earth is the 3rd planet from the sun.
123. The moon has phases because of reflected sunlight and the angle at which we view it.
124. Foucault's pendulum and coriolis effect prove the Earth rotates.
125. Parallax and Seasonal constellations prove the Earth's revolution.
126. Two types of planets-- Inner (rocky) and Outer (gaseous)
127. Comets are known as dirty snowballs in space and originate in the Oort cloud.
128. Comet's tail is the result of the Solar Wind and points away from the sun.
129. Comet's coma is the result of the sun's radiation.
130. Asteroids are rocky or metallic iron objects with origins between Mars and Jupiter.
131. AU= distance of Earth and Sun. We measure planet distances in AU's.
132. A Light Year is the distance light travels in a year. We measure star and galaxy distances with Light years.
133. Apollo 11 was the 1<sup>st</sup> manned landing on the moon.
  - Neil Armstrong was the 1<sup>st</sup> man on the moon.
134. The Big- Bang explains the origin of the Universe.
  - The Universe began as a dense sphere that expanded and condensed into galaxies.
135. The Solar Nebula Theory explains that the sun and the planets formed from the condensing of a giant cloud of gas and dust.
136. Our Sun's Life cycle is Nebula - protostar -Yellow Main Sequence Star - Red Giant – Planetary nebula - White dwarf - black dwarf.
137. Black holes are a death stage of massive stars.
138. We are located in the Milky Way Galaxy, which is a spiral galaxy.
139. The 3 types of Galaxies are spiral, elliptical, and irregular.
141. The Hubble Space telescope has improved our knowledge and understanding of the Universe.
142. Red Shifts indicate the Universe is expanding outward.
  - This is used to support the Big Bang Theory.



#### To do well on your SOL's

1. Relax
2. You've seen this stuff before, so relax!!!
3. Take your time.
4. Read the questions and answers. Mark your answer in your test booklet and come back and read it again before marking it on your Scan-tron.
5. Try to eliminate 2 answers. This gives you a 50- 50 chance.
6. Use your ruler to read graphics and to mark points on a graph.
7. Draw diagrams to help you visualize questions.
8. Don't leave any questions blank.
9. Skip over hard questions and come back to them later. Something else in the test might give you an idea of the answer.
10. Get a good nights sleep and have a healthy dinner and breakfast before the test.
11. The Most important thing is to try your best!!

