

Geology Notes

1. The Earth consists of a solid inner core (Fe and Ni), a liquid outer core (Fe and Ni), a plastic-like mantle (Si, O, Fe, Ni), and a thin rocky crust (Si, O).
2. The lithosphere is the crust and upper mantle.
3. Ocean crust (made of basalt) is thinner, younger, and denser than continental crust (made of granite).
4. Convection currents move tectonic plates. Hot material rises, cools, becomes more dense, and sinks.
5. Convergent boundaries are colliding plates which cause folded or thrust faulted mountains, subduction zones, (volcanic and trenches) and reverse faults.
6. Divergent boundaries are dividing plates and cause sea-floor spreading, mid-ocean ridges, rift valleys, and volcanoes. Normal faults are produced from this movement.
7. Transform boundaries slid past each other and strike slip faults and earthquakes are produced.
8. Earthquakes can result with any plate movement.
9. Hot spots are not related to plate movement.
10. A fault is a break or crack in the Earth's crust where movement has occurred.
11. Appalachian mountains are folded mountains.
12. Volcanic activity is associated with subduction, rifting, or seafloor spreading.
13. An ocean plate will always sink under a continental plate because it is more dense, creating a trench.
14. 3 seismic stations are always needed to find the epicenter of an earthquake.

15. P waves travel the fastest and reach the seismic station first. P waves travel through solids and liquids. P waves slow down and bend when they hit the liquid outer core.
16. S waves do not travel through liquids.
17. L waves, surface waves cause the most damage.
18. Most volcanoes and earthquakes occur in the “Ring of Fire.”
19. The San Andreas Fault is responsible for the earthquakes in California.
20. The North American Plate is traveling in a westward course.
21. The Pacific Plate is traveling in a northwestern course.
22. There are 3 kinds of volcanoes, shield, composite (also known as strata), and cone.
23. Magma is found underground and lava is above ground.
24. A mineral is found in nature, inorganic, solid, with a definite chemical composition and structure.
(crystalline)
25. Mineral properties depend on their atomic structure.
26. Ores are useful and profitable.
27. Minerals are determined by their streak, cleavage, hardness, fracture, color, luster, and special properties.
28. Igneous rocks are classified by their composition and texture.
29. Igneous rocks are produced by the cooling of magma or lava.
30. Fast cooling = extrusive, small crystals. Slow cooling = intrusive, larger crystals.
31. Extrusive small grains, glassy, air holes present
(obsidian, pumice, basalt)

32. Intrusive large grained, granite
33. Metamorphic formed by heat and pressure
34. Metamorphic classified as foliated (banded) or non foliated
35. Foliated rocks are slate, schist, gneiss. Non-foliated include marble and quartzite
36. Limestone morphs into marble. Sandstone morphs into quartzite
37. Sedimentary rocks are formed from rock fragments, organic material, or chemical precipitation
38. Sedimentary are found in flat layers or strata. Fossils are found in these layers.
39. Sedimentary are classified as clastic, organic, and chemical
40. Limestone is formed both chemically and organically
41. Clastic rocks are made of fragments –conglomerate, sandstone, shale
42. Chemical weathering occurs mainly in warm, humid climates
43. Weathering can occur as either a mechanical or chemical process.
44. Erosion is the process of materials being transported by moving water, ice, wind, or gravity.
45. Streams and moving water are the major agents of erosion.
46. Deposition is the dropping or settling out of sediments.
47. High erosion= high relief areas, high deposition= low relief areas.
48. Large particles settle out first, sediment size from largest to smallest- sand, silt, clay.

49. As particle size increases, permeability increases (ability to hold water).
50. Porosity is the amount of pore space in a rock or sediment.
51. Permeability is the ability of a material to drain.
52. Soil evolution starts with the weathering of bedrock. Organic material must be present in order to have soil. (humus)
53. Soil profiles consist of 3 horizons: A topsoil (humus) most evolved, B less humus, leaching of minerals from A, and C weathered rock. These layers are on top of bedrock.
54. Karst topography has caves and sinkholes produced by acidic groundwater dissolving limestone.
55. Valley and Ridge province is famous for Karst topography.
56. Groundwater layers from the surface down would include zone of aeration, water table, and zone of saturation.
57. An aquifer is a layer of rock that transports groundwater freely.
58. A spring is an area where the water table reaches land's surface.
59. The Coastal Plain is the flattest area underlain by all the types of sediments produced by the erosion of the Appalachian Mountains. Fossils are abundant here.
60. Piedmont is underlain by igneous and metamorphic rocks produced by ancient volcanoes. Separated by the fall line from the Coastal Plain.
61. Blue Ridge Mountains are oldest in the state.

62. 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 and fossils are abundant.
63. Appalachian underlain by sedimentary rocks. Coal resources are found here. Fossils present.
64. Virginia resources include limestone, coal and gravel.
65. Renewable resources can be replaced by nature at a rate at which they are used. Includes vegetation, water, and soil.
66. Nonrenewable resources are renewed very slowly or not at all. Includes coal, oil, and minerals.
67. The Earth's water supply is renewable but also finite.
68. A fossil is the remains, impressions, or just the evidence of life preserved in rock.
69. Virginia's fossils are mostly marine and are from all eras in history.
70. The Principle of Superposition states that the oldest rocks are found on the bottom of strata and the youngest are found on top.
71. The Principle of Cross-cutting relationships state that an igneous intrusion is younger than the layers it cuts across.
72. Fossils, Superposition, and Cross-cutting relationships are used to determine relative ages.
73. Relative ages are placing events in sequence without assigning exact numerical ages.
74. Absolute age give numerical age to an event.
75. Radioactive decay of half-life is used to determine the absolute age of rocks.

76. Uranium dating is used to find the ages of the oldest rocks. Carbon-14 is used to find the ages of human artifacts.
77. The Earth is about 4.6 billion years old.