**STEWARDSHIP, MINERALS, AND ROCKS STUDY GUIDE**

* **Stewardship-** behavior that leads to the protection, conservation, and reclamation of natural resources
* **Conservation-** the wise use of and preservation of natural resources
* **Natural areas**are places that humans have left alone or restored to a natural state.
* Natural areas include forests, grasslands, and desert areas
* Much of the open land in rural areas is used for agriculture. Agricultural land is used to grow crops and raise cattle and other livestock.
* **Residential areas** can be rural or urban.
* **Rural areas** have a lot of open land and low densities of people.
* **Urban areas** have dense human populations and small areas of open land.
* **Urbanization** is the growth of urban areas caused by people moving into the cities.
* As cities and towns expand, commercial businesses are built, too, replacing rural or natural areas.
* Industrial businesses also use land resources
* Soil is a mixture of mineral fragments, organic material, water, and air.
* Soil provides habitat for organisms such as plants, earthworms, fungi, and bacteria.
* Plants get water and nutrients from the soil, healthy soil is important for land ecosystems.
* **Decomposers** are organisms that break down dead animal and plant material; some live in the soil
* Soil holds plant roots in place. Soil stores water and nutrients
* Soils are also part of the nutrient cycle. Plants take up nutrients and water from the soil. Plants and animals that eat them die and are broken down by decomposers. The decomposers release nutrients back into the soil, and the cycle starts again
* **Land degradation** is the process by which human activity and natural processes damage land to the point that it can no longer support the local ecosystem.
* When urbanization occurs at the edge of a city or town, it is called **urban sprawl***.* Urban sprawl replaces forests, fields, and grasslands with houses, roads, schools, and shopping areas. Urban sprawl decreases the amount of farmland available for growing crops, and it decreases the amount of natural areas that surround cities.
* **Erosion** is the process by which wind, water, or gravity transports soil and sediment from one place to another; can speed up when land is degraded or cleared for farming, exposing the soil to blowing wind and running water.
* Soil nutrients can get used up if the same crops are planted year after year.
* Pollution from industrial activities can damage land.
* Mining wastes, gas and petroleum leaks, and chemical wastes can kill organisms in the soil.
* **Desertification** is the process by which land becomes more desertlike and unable to support life. Without plants, soil becomes dusty and prone to erosion. Overgrazing, deforestation, and urbanization can lead to desertification.
* The removal of trees and other vegetation from an area is called **deforestation**. Logging for wood, surface mining, and urbanization can cause deforestation. Deforestation leads to increased soil erosion.
* A **mineral** is a naturally occurring, inorganic solid, definite crystalline structure and chemical composition.
* All minerals contain one or more **elements**,which are pure substances that cannot be broken down into simpler substances by chemical means. Each element is made up of one kind of **atom**, the building block of matter.
* A substance made up of molecules of two or more elements is called a **compound**.
* A mineral composed of only one element is called a **native element**.
* **Matter** is anything that has mass and volume. **Volume** refers to the amount of space something takes up. All minerals are solid, meaning each has a definite volume and shape.
* All minerals are inorganic, which means they are not produced by living things or from the remains of living things.
* All minerals form **crystals**,which are solid geometric forms produced by a repeating pattern of atoms or molecules.
* The type of mineral that forms depends on the elements present in the area and the temperature and pressure.
* Many minerals form from magma or lava
* Many minerals form by metamorphism. High temperature and pressure within Earth cause new minerals to form as bonds between atoms break and reform with different atoms.
* Minerals also form from solutions. Water usually has substances dissolved in it. As it evaporates, these substances form into solids and come out of solution, or **precipitate***.* As hot water cools, dissolved substances may precipitate out of solution.
* Minerals are usually classified based on chemical composition as silicate or nonsilicate minerals, **silicate minerals**, containing a combination of silicon and oxygen, **Nonsilicate minerals** do not contain the silicon and oxygen.
* IDENTIFYING MINERALS:
  + Magnetism, color, **streak** (more reliable than color), **luster** (2 major types metallic and non-metallic)
  + The tendency of a mineral to split along specific planes of weakness to form smooth, flat surfaces is called **cleavage**, breaks along flat surfaces that generally run parallel to planes of weakness in crystal structure. Minerals that don’t have cleavage will fracture, or break unevenly, along curved or jagged surfaces.
  + **Density***,* which is the amount of matter in a given amount of space, can be used to tell many similar-looking minerals apart.
  + A mineral’s resistance to being scratched is called its**hardness**. Mineral hardness is compared using the **Mohs hardness scale**.
* **Rock** is a naturally occurring solid mixture of one or more minerals that may also include organic matter.
* **Weathering** is the process by which rock is broken down by water, wind, ice, and changes in temperature; breaks down rock into fragments called **sediment***.*
* **Erosion** is the process by which sediment is moved from one place to another.
* Water, wind, ice, and gravity can erode sediments, which are eventually deposited in bodies of water and other low-lying areas. Sediment comes to rest by a process called **deposition**.
* Rock that is buried can be squeezed by the weight of rock or layers of sediment above it, at high enough temperature and pressure, buried rock can change into **metamorphic rock**.
* Sometimes rock gets hot enough to melt and form **magma**, or molten rock. If the magma reaches Earth’s surface, it is called **lava**. The magma and lava eventually cool to form new rock.
* **Igneous rock** forms when magma cools and hardens. It forms on or beneath Earth’s surface. As molten rock cools, crystals form, igneous rocks that form when magma cools beneath Earth’s surface are called **intrusive igneous rock**. Igneous rocks that form when lava cools on Earth’s surface are called **extrusive igneous rock**.
* **Sedimentary rock** forms when sediment from older rocks or minerals that form from solutions get pressed and cemented together, composed of minerals formed from solutions or sediments from older rock, occur mainly at or near Earth’s surface, classified as clastic, chemical, and organic sedimentary rock.
  + Clastic sedimentary rock forms when sediments are buried, compacted, and cemented together by calcite or quartz.
  + The size of the sediment, or clasts, that makes up the rock is used to classify clastic sedimentary rocks as fine-, medium-, or coarse-grained.
  + Chemical sedimentary rock forms when water, which usually contains dissolved minerals, evaporates.
  + As water evaporates, the minerals in it become concentrated, precipitate out of solution, and crystallize.
  + Organic sedimentary rock forms from the remains, or fossils, of once-living plants and animals.
  + Over time, the skeletons of marine organisms, made of calcium carbonate, collect on the ocean floor.
  + These animal remains, together with sediment, are eventually buried, compacted, and cemented together to form *fossiliferous* limestone.
* **Metamorphic rock** forms when pressure, temperature, or chemical processes change existing rock, high temperature and pressure change the texture and mineral content of rock, Under certain temperature and pressure conditions, metamorphic rock can melt and form magma, or form a different metamorphic rock.
  + The metamorphic rock texture in which mineral grains are arranged in planes or bands = **foliated**
  + Metamorphic rocks that do not have mineral grains that are aligned in planes or bands are called **nonfoliated**.
  + During metamorphism, mineral grains or crystals may change in size or the mineral may change in composition
* The series of processes by which rock changes from one type to another is called the **rock cycle**.
* **Uplift** is the rising of regions of the crust to higher elevations, increasing the rate of erosion.
* **Subsidence** is the sinking of regions of the crust to lower elevations, producing basins where sediment is deposited.
* A **rift zone** is a set of deep cracks that form between two tectonic plates that are pulling apart.
* A combination of one or more minerals or organic matter is called **rock**.
* To determine how to classify rocks, scientists observe their composition and texture.
* The minerals a rock contains determine the **composition**, or makeup, of that rock.
* The size, shape, and positions of the grains that make up a rock determine rock’s **texture**, can be coarse-grained or fine-grained