Guided Notes: Rocks

**Rocks**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** are any solid mass of mineral or mineral-like matter occurring naturally as part of our planet.

**Types of Rocks**

1. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** **rock** is formed by the crystallization of molten magma.

2. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** **rock** is formed from the weathered products of preexisting rocks that have been transported, deposited, compacted, and cemented.

3. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** **rock** is formed by the alteration of pre-existing rock deep within Earth (but still in the solid state) by heat, pressure, and/or chemically active fluids.

**The Rock Cycle**

* Shows the interrelationships among the three rock types (igneous, sedimentary, and metamorphic)
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is molten material that forms deep beneath the Earth’s surface.
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is magma that reaches the surface.
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is a process in which rocks are broken down by water, air, and living things.
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is weathered pieces of Earth elements.

**Energy That Drives the Rock Cycle**

* Processes driven by heat from the Earth’s **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** are responsible for forming both igneous rock and metamorphic rock.
* Weathering and the movement of weathered materials are **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** processes powered by energy from the sun.
* External processes produce **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** rocks.

**Formation of Igneous Rocks**

1. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** **igneous rocks** are formed when magma hardens beneath Earth’s surface.

2. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** **igneous rocks** are formed when lava hardens.

**Classification of Igneous Rocks**

- **I**gneous rocks can be classified based on their composition and texture.

1. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

• Coarse-grained texture is caused by **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** cooling resulting in larger crystals.

• Fine-grained texture is caused by **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** cooling resulting in smaller, interconnected mineral grains.

• **Porphyritic texture** is caused by different rates of cooling resulting in varied sized minerals.

2. Composition

• **Granitic composition** rocks are made mostly of light-colored quartz and feldspar.

• **Basaltic composition** rocks are made mostly of dark-colored silicate minerals and plagioclase feldspar.

• **Andesitic composition** rocks are between granitic light-color minerals and basaltic composition dark-colored minerals.

• **Ultramafic** composition rocks are made mostly from iron and magnesium-rich minerals.

**Formation of Sedimentary Rocks**

* Weathering, Erosion, and Deposition

• **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** involves the weathering and the removal of rock.

• **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** occurs when an agent of erosion**—**water, wind, ice, or gravity**—**loses energy and drops sediments.

* Compaction and Cementation

• **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is a process that squeezes, or compacts, sediments.

• **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** takes place when dissolved minerals are deposited in the tiny spaces among the sediments.

**Classification of Sedimentary Rocks**

**-** Two Main Groups

1. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** **sedimentary rocks** are composed of weathered bits of rocks and minerals.

• Classified by particle size

• Common rocks include

- Shale (most abundant)

- Sandstone

- Conglomerate

2. **Chemical sedimentary rocks** form when dissolved substances precipitate, or separate, from water.

* Common rocks include
	+ limestone**—**most abundant chemical rock
	+ microcrystalline quartz known as chert, flint, jasper, or agate
	+ evaporites such as rock salt or gypsum
	+ coal

**Formation of Metamorphic Rocks**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** means “to change form.”
* Most metamorphic changes occur at elevated temperatures and pressures.
* Conditions for formation are found a few kilometers below the Earth’s surface and extend into the upper mantle.
* **Contact metamorphism** occurs when magma moves into rock.
* Occurs near a body of **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Changes are driven by a rise in **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* **Regional metamorphism** results in large-scale deformation and high-grade metamorphism.
* Directed pressures and high temperatures occur during **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** building.
* Produces the greatest **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** of metamorphic rock

**Agents of Metamorphism**

**◆** **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

* Provides the energy needed to drive chemical reactions

◆ **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

* Causes a more compact rock with greater density

◆ **Hydrothermal Solutions**

* Hot **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** -based solutions escaping from the mass of magma
* Promote recrystallization by dissolving original minerals and then depositing new ones

**Classification of Metamorphic Rocks**

1. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** **Metamorphic Rock**

* + Has a banded or layered appearance

2. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** **Metamorphic Rock**

* + Does not have a banded texture