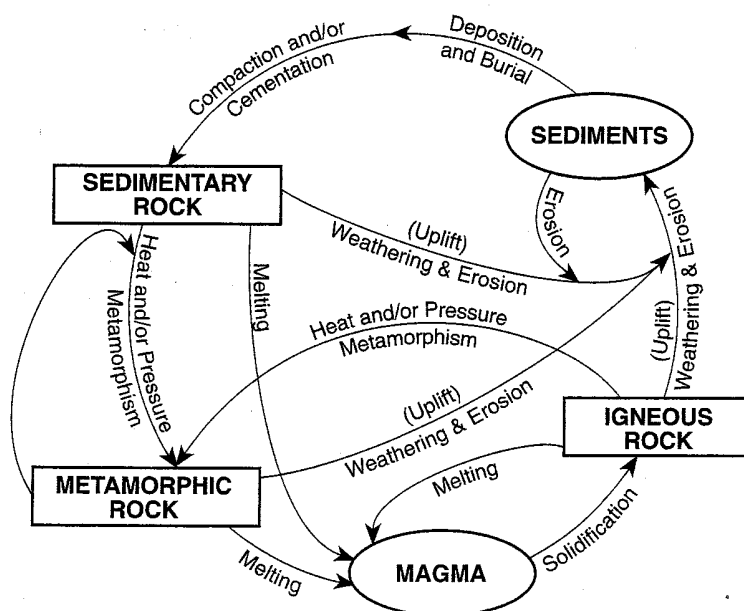


# Rock Cycle in Earth's Crust



**Overview:**

All rocks can be classified as igneous, metamorphic, or sedimentary. As permanent as rocks appear, eventually geological forces act on them, causing major changes. These changes may alter the rock to be reclassified into a different family of rocks. Even rocks that have been melted within the mantle forming magma may one day surface as lava, solidifying only to be exposed to the forces of the “Rock Cycle.” So the real question is: “Are rocks ever really destroyed?”

**The Chart:**

The outside circle shows the processes and steps that change rocks from one family into another. This path is not a one-way route. The rock cycle shows many other paths represented by inner circles. Following all the arrows representing the different paths, it would appear that any path is possible for a particular rock. This is almost true. Let’s look at each type of rock family and how it fits in the rock cycle.

*Sedimentary Rocks* – Sediments are smaller pieces of rocks that are easily moved by water and eventually settle in a lake, shallow sea, or by the ocean shoreline. Locate Sediments. The path shows that these sediments are deposited and buried (almost always underwater), becoming compacted (compaction) from the weight above them. Dissolved minerals slowly cement (cementation) the sediments together, producing sedimentary rocks. If these rocks are uplifted, emerging out of the water, weathering forces will reduce them to smaller sediments, and erosion will transport them away to start another sedimentary cycle. But sedimentary rocks can take two other paths, the metamorphic rock path or the igneous rock path. Both paths involve different processes.

*Metamorphic Rocks* – Heat and/or pressure applied to rocks may cause them to change into metamorphic rocks. Notice all arrows heading to metamorphic rocks have this process of heat and/or pressure as a requirement. The arrows (paths) show all rocks can undergo metamorphism, including a metamorphic rock. Plate collision is the major force producing the heat and pressure of metamorphism.

*Igneous Rocks* – The initial process for an igneous rock is melting, producing magma. As this magma/lava cools, it undergoes the process of solidification, changing the molten material to a solid igneous rock. The igneous rock may be remelted and cycled back to magma; or it may be subjected to heat and/or pressure, changing it to a metamorphic rock; or over time, weathering and erosion can break down the igneous rock into sediments for future sedimentary rocks.

**Additional Information:**

- When heat and pressure is added to a rock, the chart shows the resulting rock is metamorphic. If too much heat is added and melting occurs, upon solidification the resulting rock must be igneous.
- Use this chart to help you find the processes for the formation of the different classifications of rocks.

---



---

**Set 1 — Rock Cycle in Earth’s Crust**

---



---

1. Rocks are classified as igneous, sedimentary, or metamorphic based primarily on their

- (1) texture
- (2) crystal or grain size
- (3) method of formation
- (4) mineral composition                    1 \_\_\_\_\_

2. When granite melts and then solidifies, it becomes

- (1) a sedimentary rock
- (2) an igneous rock
- (3) a metamorphic rock
- (4) sediments                                    2 \_\_\_\_\_

3. Which statement about the rock cycle is *not* true?

- (1) Cementation is a process that leads to sedimentary rocks.
- (2) When heat is applied to a rock and it melts, it may form a metamorphic rock.
- (3) A sedimentary rock in the future may change into another type of sedimentary rock.
- (4) Solidification is always needed to form an igneous rock.                    3 \_\_\_\_\_

4. The burial process involving sedimentary rocks is usually

- (1) deep within the Earth.
- (2) at the surface of the Earth.
- (3) within a water environment.
- (4) at an ocean ridge.                                    4 \_\_\_\_\_

5. The solidification of magma produces

- (1) igneous and metamorphic rocks.
- (2) sedimentary rocks and igneous rocks.
- (3) only igneous rocks.
- (4) only metamorphic rocks.                    5 \_\_\_\_\_

6. Which statement about a metamorphic rock is not supported by the rock cycle?

- (1) A metamorphic rock may become sediments.
- (2) Metamorphic rocks may one day undergo melting.
- (3) A metamorphic rock has undergone cementation.
- (4) A metamorphic rock may eventually become another type of metamorphic rock.                    6 \_\_\_\_\_

**Set 2 — Rock Cycle in Earth's Crust**

7. The process of uplift is essential to the rock cycle for
- (1) increasing the weight necessary for compaction.
  - (2) forming ocean trenches where erosion is dominant.
  - (3) exposing rocks to the forces of weathering and erosion producing sediments.
  - (4) increase the temperature needed to produce magma.
- 7 \_\_\_\_\_

8. The crystals of many metamorphic rocks are aligned in bands as a result of
- (1) earthquake faulting
  - (2) cooling and solidification
  - (3) mechanical weathering
  - (4) heat and pressure
- 8 \_\_\_\_\_

9. Which statement about an igneous rock is not supported by the rock cycle?
- (1) All igneous rocks eventually become sedimentary rocks.
  - (2) An igneous rock may be remelted and solidified into another type of igneous rock.
  - (3) All igneous rocks must have been a liquid at one time.
  - (4) An igneous rock can undergo metamorphism.
- 9 \_\_\_\_\_

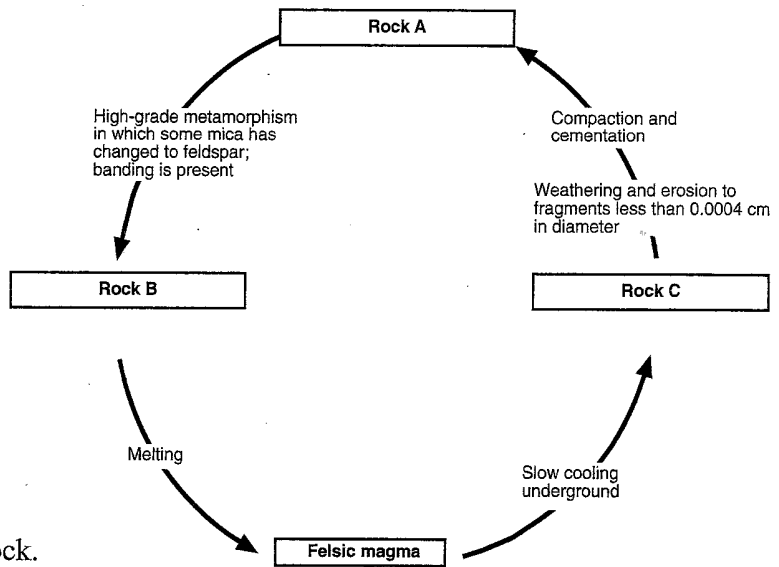
10. Uplift, weathering and erosion leads to the formation of
- (1) magma
  - (2) sediments
  - (3) cementation
  - (4) igneous rocks
- 10 \_\_\_\_\_

11. State the rock family that should be listed in the rectangle for:

Rock A \_\_\_\_\_

Rock B \_\_\_\_\_

Rock C \_\_\_\_\_



12. Give the processes to form an igneous rock.

\_\_\_\_\_

13. Give the processes to form a sedimentary rock.

\_\_\_\_\_