

THE ROCK CYCLE

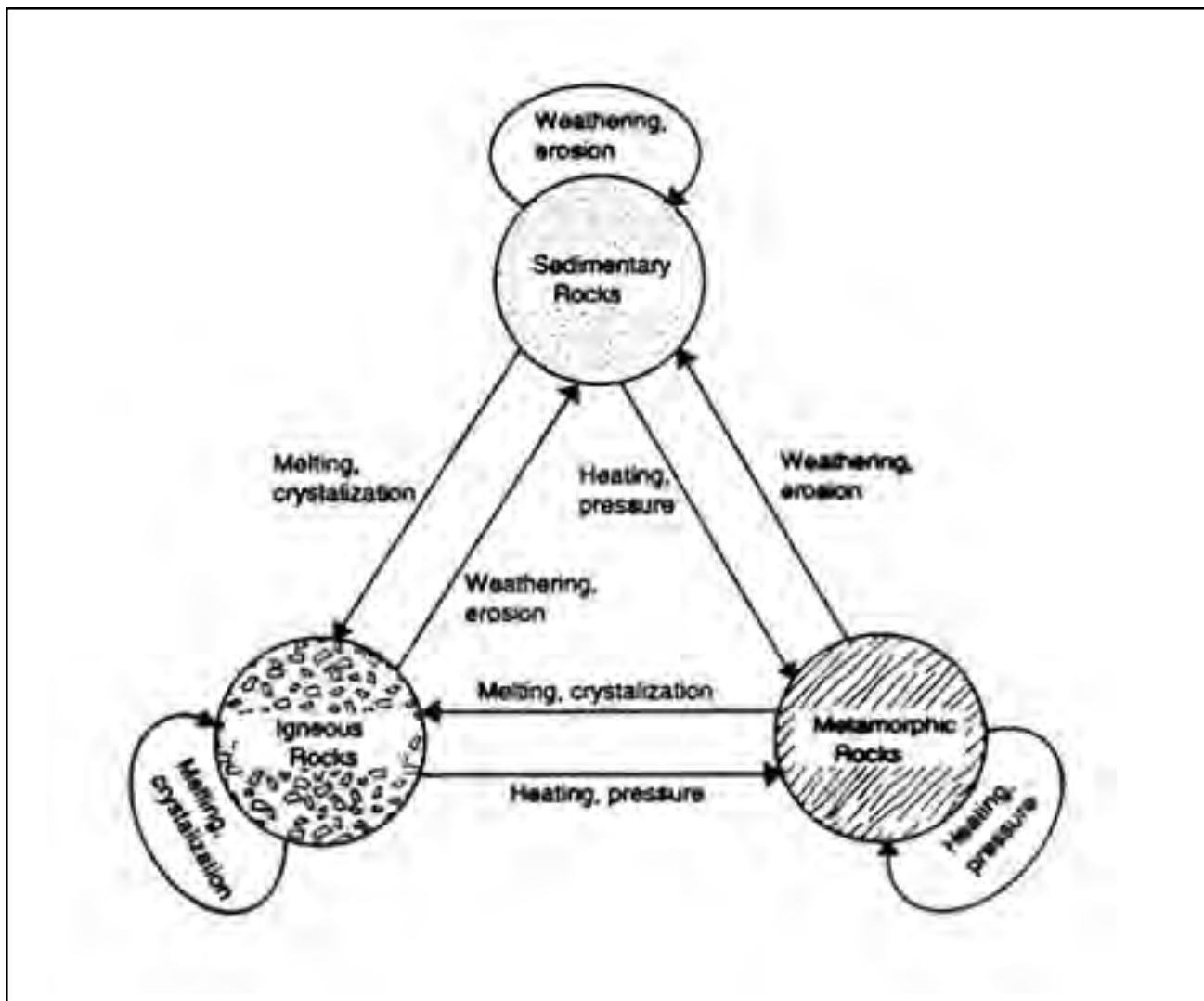
Rocks fall into three groups:

Igneous rocks cool from molten material, either extrusive as in volcanic rocks such as basalt, or intrusive as in, for example, granite. Radiometric age dating is usually performed on igneous rocks for the purposes of dating fossils because the time of origin of the rock is clearly marked by crystal formation and solidification, which locks chemical constituents into a structural framework, holding them and their decay products in a closed system (ideally). Radiometric dates determined from igneous rocks provide age limits for fossils through stratigraphic and structural relationships of datable igneous rocks and fossiliferous sedimentary rocks.

Sedimentary rocks are formed from the weathered and eroded residue of preexisting rocks or precipitated from solution, usually by organisms, and are deposited in specific environments of deposition, which allow past environments to be interpreted. Fossils are found overwhelmingly in sedimentary rocks because under appropriate conditions entombing sediments protect organic remains from destruction. Shells and other durable organic material may constitute a large percentage of the sedimentary particles in a rock. Fossils are not generally found in rocks other than sedimentary rocks because organic matter is destroyed by high heat and pressure that leads to melting and metamorphism. Radiometric dates from sedimentary rocks date the age of the source rock from which the sedimentary particle is derived.

Metamorphic rocks are derived from pre-existing rocks by mineralogical, chemical, and structural changes resulting from changes in temperature, pressure, chemical environment, and shearing stress, but without melting, and below the zones of weathering and cementation. Radiometric dates from metamorphic rocks date the time of metamorphism.

All rocks potentially can take any path in the rock cycle.



Fossils are any evidence of past life. Past in geological terms means older than 10,000 years. Usually fossils are formed from the more durable parts of organisms: bones, teeth, shells, pollen, for instance. Molds or casts of the hard parts of organisms are also common. Fossils can also be traces, like dinosaur footprints, or even fossil excrement. Soft tissues, and therefore fossils of soft-bodied organisms, are exceedingly rare as fossils because they are destroyed before they can be buried and preserved.

The fossil record is historical geology recorded in rocks, which are composed to some degree of the body parts of organisms, thus emphasizing the synergistic relationship of the biosphere and lithosphere.