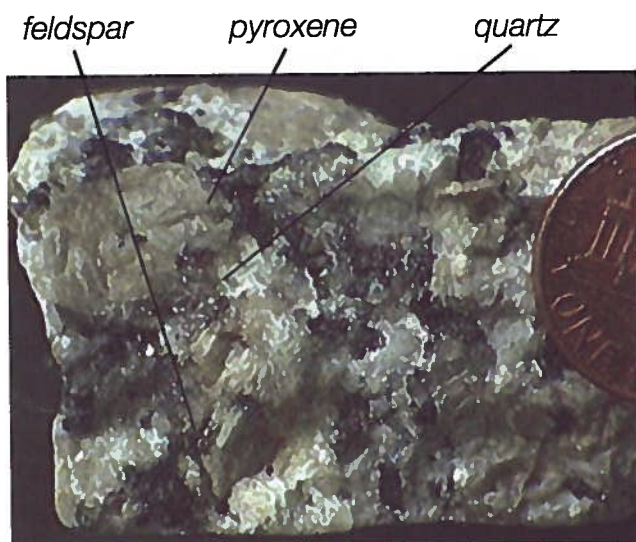


Roll the clock back about 245 million years. Thousands of feet inside of Earth a large pool of molten rock took form. All of the individual atoms in the magma mixed together, moving around freely. There were atoms of calcium, magnesium, sodium, aluminum, iron, silicon, and oxygen and smaller amounts of other elements.

Because magma is less dense than solid rock, the magma began moving toward the surface. The magma began to lose heat to surrounding cooler, solid rock. As it cooled, atoms slowed down and moved closer together. The magma began to solidify into crystals of minerals. After a very long time the whole mass of magma crystallized into solid rock.



*As magma cools, different minerals come together to form crystals, as in this granite. The crystals grow together, filling the spaces.*

We are going to follow some calcium atoms that came together with some silicon and oxygen atoms to form feldspar. This feldspar was in a group of minerals that formed into the rock gabbro. Forces deep in Earth (tectonic forces) began pushing the gabbro upward. As the gabbro rose, rain, snow, ice, and wind eroded the rocks over the gabbro. Finally the gabbro was exposed at the surface.

For the next several years sun, rain, and ice broke the rocks apart and ground them into sediments. The gabbro broke into its component minerals, and the mineral particles that resulted ended up in rivers, on beaches, and in bays.



*Gabbro is a coarse grained igneous rock that usually includes the minerals pyroxene, feldspar, olivine and a small amount of magnetite.*

The action of the waves, currents, and tides eroded the small grains even further. The grains eventually broke apart into their individual atoms, dissolved, and were carried away into the ocean.

Clams absorbed some of the calcium. The calcium atoms from the gabbro combined with carbon and oxygen atoms to make calcium carbonate. Calcium carbonate became part of some organisms' shells. Other calcium atoms were carried into warmer parts of the ocean, where they combined with oxygen and carbon atoms to form calcium carbonate. The calcium carbonate settled to the bottom of the ocean as an ooze. The ooze got thicker and thicker. The water was squeezed out, and the ooze slowly turned to rock. The calcium that started in the igneous gabbro is now relocated in sedimentary limestone.