

Glossary

cementation Part of lithification that involves minerals crystallizing in pore space and holding sediments together, hardening the sediment. This happens when water flows through pores between sediments. Ions in the water will combine to form minerals (crystals) that fill the pores, holding the sediments together. Some sedimentary rocks are "well cemented," making them quite hard. Some sedimentary rocks are "poorly cemented" and may crumble in your hand. Quartz and calcite are the two minerals that most commonly form the cement in sedimentary rocks.

chemical sedimentary rock Rocks formed by an accumulation and lithification of minerals that crystallized in water. Because the water must be saturated with ions to form these minerals, these rocks most often form in oceans (ions make seawater taste salty). These rocks include those made of minerals crystallized by organisms, which are sometimes called biochemical or bioclastic sedimentary rocks. Limestone, chert, rock salt, and rock gypsum are all types of chemical sedimentary rocks.

chemical weathering Processes that break a rock apart by changing the chemical composition of minerals or dissolving minerals entirely. For example, salt dropped into a glass of water will dissolve, in which case it will change from the mineral (NaCl) to ions (Na⁺ and Cl⁻) that float about in the water. Another example is rust, in which oxygen enters an iron-bearing mineral and changes it into a different (oxidized and smaller) mineral. Chemical weathering is responsible for making the oceans salty and creating all of the clay minerals on Earth. Clay minerals form when feldspar (the most common minerals in Earth's crust) chemically weather.

clastic sedimentary rock Rocks made of lithified clastic sediments. Mudstone (shale), siltstone, sandstone, and conglomerate (made of lithified gravel) are types of clastic sedimentary rock.

clastic sediments (detrital sediments) Fragments (broken pieces) of rocks and minerals. Gravel, sand, silt, and mud/clay are types of clastic sediments.

compaction The squeezing together of sediments at the bottom of a pile by the weight of additional sediments deposited on top. This reduces pore space and is part of lithification.

crystallization The combining together of ions to make minerals. The minerals that form are called *crystals*. In sedimentary rocks, the ions are found dissolved in water. When the water becomes saturated in these ions (the concentration becomes too high), the ions combine to form minerals. Organisms (such as corals and plankton) can cause minerals to crystallize. Crystallization also happens in magma, but in that case the created minerals combine to make igneous rocks, and

crystallization can also happen in relatively hot, squishy rocks during metamorphism.

deposition When sediments are dropped by the erosion agent (wind, waves, streams, gravity, or waves) to form a layer (bed).

erosion The transportation of sediments, during which *erosion agents* pick up and move loose sediment. The “agents” can be wind, waves, streams (the geologic word for all flowing water), glaciers, and gravity. Which pieces (clastic sediments) can be picked up by wind, streams, and waves depends on the energy level of the wind, streams, and waves. A stream with higher energy can carry large and small sediments with a range of densities. If the stream loses energy, it will drop the heaviest pieces (the largest or densest) and continue to carry smaller pieces. In this way, streams, wind, and waves sort sediment.

evaporites (aka evaporite mineral deposits) Chemical sedimentary rocks formed when salt water evaporates.

industrial mineral resources Mineral resources that are nonmetallic are often grouped together as industrial minerals.

ions Charged atoms or molecules. For example, Na^+ is a sodium atom with a +1 charge. The silicate ion is a molecule (SiO_4) with a +4 charge. Ions can bond together (during crystallization) to make a mineral. When a mineral melts or chemically weathers, it is broken into ions and ceases to be a mineral.

lithification (lithify) Processes that turn loose sediment into hard rock. This happens by *compaction* (when sediments are buried by newer sediment and squeezed together) and *cementation* (when minerals crystallize in pores and hold sediments together).

mechanical weathering (physical weathering) Processes break rock into smaller pieces of that same rock and/or minerals in that rock.

mineral reserve A mineral or rock resource that can be extracted (mined) for a profit. This means that the resources must be found in high enough concentrations and quantities and that other factors (economic, social, governmental, technological, etc.) are favorable for its extraction.

mineral resource Any mineral or rock mined from the earth and used in products.

placer deposits Mineral resources collected by gravity sorting in streams, beaches, and sand dunes.

residual weathering deposits Mineral resources formed when chemical weathering removes some elements, leaving high concentrations of the mineral resource behind in the residual weathering deposit.

sorted sediments Sediment can be sorted by size and or composition during deposition. If sediment is sorted, then most of the deposited sediment all has the same size or composition. For example, streams commonly sort sediment, so that in one part of the stream you might find a gravel bar (the size of most of the sediment is gravel), and along another place there might be a sand bar (the size of most of the sediment is sand).

stable minerals Mineral stability is a mineral property. Stable minerals do not chemically weather very readily, whereas unstable minerals will chemically weather.

weathering Processes that break rocks and minerals apart. There are two types of weathering processes: mechanical and chemical.