

Mohs Hardness Scale is a relative hierarchy where each can scratch the previous and be scratched by the following. Hardness levels can also relate to the environment of formation.

10 - Diamond - Carbon crystal, Isometric structure. Premier hardness used as abrasive. Formed at great depth, brought to the surface in narrow, explosive, volcanic, "kimberlite" pipes.

9 - Corundum - Aluminum Oxide, (Al₂O₃) Hexagonal structure. Historically used as abrasive. Sapphire is blue, green, yellow and clear. Red color is Ruby. Found in high-temp igneous rocks and metamorphosed sediments like shale, (high aluminum. low in Silica).

Masonry drill bit = 8.5

8 - Topaz - Aluminum Silicate {Al₂SiO₄(F,OH)₂} Orthorhombic structure. Gem quality topaz is highly desired. Found in granitic rocks and high-temp veins, including gas cavities in rhyolite.

7-8 - **Garnet** - Aluminum Silicate with range of chemistry and same Isometric crystal structure. (Fe,Mg,Mn,Ca)Al₂(SiO₄)₃ Formed in high-grade metamorphic and igneous environments. A common mineral, but rarely gem quality, often mined for abrasives.

7.5-8 - **Beryl/Emerald** Hexagonal; found in high temp pegmatites as beautiful crystals.

7 - Quartz (SiO₂) Silica Oxide; Hexagonal. Earth's most common mineral, formed in broad range environments, from microcrystalline chert, flint & jasper to chalcedony & opal to high symmetry hexagonal crystals formed at higher temperature that include gem quality citrine, amethyst and smoky quartz. Rose and milky varieties form in veins. White quartz is a common guide to gold.

6.5-7 **Jadeite** - Sodium silicate; high pressure alteration of serpentine as granular masses.

Hardened steel (nail) = ~ 6.5

6 - Feldspar - Aluminum Silicates with variable components (Ca,K,Na)AlSi₃O₈ Mono & Triclinic 2nd most abundant of all minerals, from igneous and plutonic sources, resists weathering and remains a component of most sedimentary rocks, eventually breaking down to clay and shale.

5-6 **Turquoise** A secondary mineral of copper/aluminum composition, usually filling veins in shattered and weathered igneous rocks in deserts. Triclinic crystals are rare.

Glass = ~5.5 - Not a mineral, technically a fluid, primarily of silica.

5 - Apatite - Calcium phosphate Ca₅(Cl,F)(PO₄)₃ with range of composition; a common but minor constituent of lower temp igneous rocks; essentially the same as bone and **teeth enamel**.

Iron = 4.5

4 - Fluorite - Calcium fluoride (CaF₂) An abundant, Isometric, non-hydrous halide (salt) found in low temperature ore deposits and pegmatites and as alterations in sedimentary rocks. Cubic crystals indicate low temp; octahedral crystals indicate a high temperature formation.

3-4 **Pearl** - Calcium Carbonate, luster from overlapping platelets of aragonite crystals.

Copper penny = ~ 3

3 - Calcite - Calcium carbonate (CaCO₃) Hexagonal system, showing the largest variation of mineral forms; precipitates from seawater as **Limestone**; crystalizes in veins and hangs as stalactites in caves. **Travertine** precipitates from hot water passing through limestone.

2.5-3 - **Gold & Silver** - Native elements are formed primarily in hydrothermal veins.

Fingernail = >2

2 - Gypsum - hydrous Calcium Sulfate CaSO₄*2H₂O formed from evaporation of sediments. Monoclinic. Massive gypsum is alabaster. Crystals grow in human made pipes, mines and dumps.

1 - Talc - hydrous Magnesium Silicate Mg₃Si₄O₁₀(OH)₂ a fibrous, secondary mineral formed by alteration - of ultra-mafic, magnesium silicates (basalt/serpentine). Massive variety is soapstone.