

## MINERAL GROUPS - PAGE 1

<b><u>GROUP</u></b>	<b>Luster</b>	<b>Color</b>	<b>Streak</b>	<b>Density</b>	<b>Hardness</b>	<b>Cleavage/ Fracture</b>	<b>Special Properties</b>	<b>Mineral Name</b>
<b><u>Silicates</u></b>	500+ minerals	Largest & Most Abundant Group	hard average density translucent	Compounds either single	in which or linked	metallic Si-O	elements tetrahedra	combine with $(\text{SiO}_4)^{4-}$ .
	vitreous	green	W (colorless)	3.27-4.32	6.5 - 7	imperfect / conchoidal	soluble in HCl acid	<b>Olivine</b>
	vitreous - dull	green, brown, black	greenish	3.23-3.52	5.5 - 6	2 at nearly right angles	short prismatic crystals	<b>Augite (pyroxene)</b>
	vitreous - pearly	colorless - white	W (no streak)	2.77-2.88	2.5 - 4	1 perfect	translucent	<b>Muscovite</b>
	vitreous	black	W (nearly colorless)	2.7 - 3.4	2.5 - 3	1 perfect	translucent	<b>Biotite</b>
	pearly - dull greasy	gray, white, green, brown	W	2.58-2.83	1	1 perfect	feels greasy	<b>Talc</b>
	vitreous - submetallic	green, brown, black	W (colorless)	3.28-3.41	5 - 6	2 perfect 56° and 124°	splintery	<b>Hornblende (amphibole)</b>
	vitreous - pearly	colorless, white, gray...	W	2.60-2.63	6 - 6.5	good 2 planes poor 3rd	Na+ feldspar fine striations	<b>Albite (plagioclase)</b>
	vitreous - pearly	white, gray, pink	W	2.55-2.63	6 - 6.5	good - 2 directions	“K-spar”	<b>Microcline (orthoclase)</b>
	vitreous	various rarely white	W (colorless)	3.0 - 3.2	7 - 7.5	none / uneven to conchoidal	prismatic, vertically striated crystals	<b>Tourmaline</b>
	vitreous	various	W (colorless)	2.6 - 2.9	7 - 8	indistinct 1 direction	emerald, aquamarine	<b>Beryl</b>
	vitreous - resinous	deep red to brown-black	W (colorless)	4.1 - 4.3	6.5 - 7.5	parting in 6 directions	crystals often dodecahedral	<b>Almandine Garnet</b>

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<b><u>Sulfides</u></b>	300+ minerals	sulphosalts tellurides arsenides	variable properties	important ores of lead, zinc, iron, and copper	Compounds in combine with	which one or sulfur.	more metallic	elements
	resinous	yellow, brown, red, green, black	light brown always lighter than itself	3.9 - 4.1	3.5 - 4	perfect 6 directions	HCl will get a H <sub>2</sub> S smell	<b>Sphalerite</b>
	metallic	pale yellow brassy yellow	greenish-black	4.9 - 5.2	6 - 6.5	none / uneven to conchoidal	gives off sparks when struck by a hard metal object	<b>Pyrite</b>
	metallic	brass-yellow golden yellow	greenish-black	4.3 - 4.4	3.5 - 4	poor 1 direction / uneven fracture	important ore of copper	<b>Chalcopyrite</b>
	metallic	dark lead-gray	dark lead-gray	7.4 - 7.6 (7.58)	2.5	perfect 3 directions @ 90°	HCl will get a H <sub>2</sub> S smell	<b>Galena</b>
<b><u>Halides</u></b>	100 minerals	very soft low density		Compounds in chlorine,	which metallic bromine,	elements combine fluorine, and	with halogens, iodine.	the elements
	vitreous	colorless	W	2.1 - 2.2	2 - 2.5	perfect 3 directions @ 90°	cubic crystals salty taste	<b>Halite</b>
	vitreous	various	W	3.1 - 3.3	4	perfect 4 directions	crystals are cubic & octahedral	<b>Fluorite</b>
<b><u>Native Elements</u></b>	50 minerals	Metals: dense, soft, malleable, ductile, opaque	Semimetals: poor conductors of electricity	Non-metallic: translucent and crystalline	Native elements	are free and	uncombined.	
	metallic	steel-gray iron-black	gray to black	2.1 - 2.3	1 - 2	perfect 1 direction	feels greasy marks paper	<b>Graphite</b>
	resinous greasy	yellow brown	W	2.0 - 2.1	1.5 - 2.5	poor 2 directions	transparent yellow crystals	<b>Sulfur</b>
	metallic	brass-yellow gold-yellow	gold-yellow shiny	15.6-19.3	2.5 - 3	none / hacky fracture	malleability high density	<b>Gold</b>

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<b><u>Oxides &amp; Hydroxides</u></b>	250+ minerals	gem varieties metallic ores	Oxides have one combined with	or two metallic oxygen.	elements	Hydroxides are element, water,	compounds with and hydroxyl(OH).	a metallic
	vitreous greasy	various	W	2.65	7	none / uneven to conchoidal	hexagonal crystals	<b>Quartz</b>
	vitreous greasy	milk white	W	2.65	7	none / uneven to conchoidal	SiO <sub>2</sub>	<b>Milky Quartz</b>
	dull	various	W	2.65	7	none / uneven to conchoidal	microcrystalline SiO <sub>2</sub>	<b>Chert (Chalcedony)</b>
	metallic	iron-black	black	4.9 - 5.2	5.5 - 6.5	none	magnetic	<b>Magnetite</b>
	metallic	red-brown black	brownish-red	4.9 - 5.3	5 - 6	none		<b>Hematite</b>
	silky to dull vitreous	yellow brown	yellowish- brown	2.7 - 4.3	4 - 5.5	none		<b>Limonite</b>
<b><u>Carbonates</u></b>	200 minerals	Nitrates Borates	dissolve readily in HCl acid	Compounds in elements	which one or combine with	more metallic the carbonate	or semimetallic radical (CO <sub>3</sub> ) <sup>-2</sup> .	
	vitreous dull	white, pale shades	W	2.71	3	perfect 3 directions	rhombohedral cleavage	<b>Calcite</b>
<b><u>Sulfates</u></b>		Chromates Molybdates Tungstates	soft light colors low in density	Compounds in combine with	which one or the sulfate	more metallic radical (SO <sub>4</sub> ) <sup>-2</sup> .	elements	
	vitreous silky	white colorless	W	2.3 - 2.4	1.5 - 2	perfect in 1 distinct in 2 directions	Satin Spar is a fibrous form	<b>Gypsum</b>
<b><u>Phosphates</u></b>	200+ minerals but not abundant	Turquoise Apatite	Arsenates Vanadates	Compounds in with phosphate	which metallic (or arsenate or	elements vanadate).	combine	