Mineral Physical Properties Chart		
PHYSICAL PROPERTY	**Definition***	**Testing Method**
Cleavage	Breakage of a mineral along planes of weakness in the crystal structure.	Examine the mineral for areas where the mineral is broken. Look for areas where the light reflects from planar surfaces. This can be easily confused with a crystal face and is the most difficult properties for students to master.
Color	Visible light spectrum radiation reflected from a mineral.	Look at the sample and determine its color - white, black, green, clear, etc.
Crystal Form	Geometric shape of a crystal or mineral.	Examine and describe the geometric shape of the mineral - cubic, hexagonal, etc. Not commonly seen in most introductory lab samples.
Fracture	Breakage of a mineral, not along planes of weakness in the crystral structure.	Examine the mineral for areas where the mineral is broken. Describe the breakage as either irregular or conchoidal (has the appearance of broken glass)
Hardness	Resistance to scratching or abrasion.	Use minerals of known hardness from the Mohs Hardness Kits. Scratch the unknown mineral with a known hardness to determine which mineral is harder. Continue doing this with harder or softer minerals from the kit until the hardness is determined.
Luster	Character of the light reflected by a mineral.	Look at the sample to determine if the mineral is metallic in appearance (looks like a chunk of metal) or non-metallic (doesn't look like a chunk of metal).
Magnetism	Electromagnetic force generated by an object or electrical field.	Use a magnet to determine if the magnet is attracted to the sample.
Reaction to HCl	Chemical interaction of hydrochloric acid and calcium carbonate ($CaCO_3$).	Place one small drop of HCl on a sample a watch for a reaction - effervesces (bubbles). Click here to see an short animation (351 Kb)
Specific Gravity	Ratio of the mass of a mineral to the mass of an equal volume of water.	Generally not determined in an introductory lab. Look this information up in your lab manual once the mineral has been identified.
Streak	Color of the mineral when it is powdered.	Grind a small amount of a mineral into a powder on a porcelain streak plate and determine the color of the powder.
Taste	Nerve ending reaction in the tongue to different chemicals.	Lick the mineral. (not recommended in an introductory lab - you don't know who has handled or licked the sample before you).
Other Properties	Fluorescence, Radioactivity	Requires special equipment such as a UV lamp and geiger counter. These are not commonly tested for in an introductory lab.

Mineral Identification - Diagnostic Physical Properties	
Apatite	Green color, H=5, may show hexagonal crystal form
Augite	Dark or dull green color, 2 cleavages at ~90 degrees, similar properties to Hornblende
Biotite	Black color, one perfect direction of cleavage resulting in the mineral pealing into thin, flexible sheets, similar properties to Muscovite
Calcite	H=3, reacts with HCl, 3 directions of cleavage (rhombic cleavage)
Corundum	H=9, often shows hexagonal crystal form
Dolomite	Reacts to HCL in its powdered form, similar properties to calcite
Fluorite	H=4, 4 directions of cleavage, often purple in color (can be white, clear, yellow, green)
Galena	Gray, metallic mineral, 3 directions of cleavage (cubic)
Garnet	Typically reddish brown color, no cleavage, commonly found in twelve-sided crystals (dodecahedrons)
Graphite	"Pencil lead", soft metallic mineral, gray streak
Gypsum	H=2, can be scratched with a fingernail
Halite	"Salt", H=2.5, cannot be scratched with a fingernail, 3 directions of cleavage (cubic), salty taste
Hematite	Reddish brown streak, "rust"
Hornblende	Black to dk. green color, 2 directions of cleavage at 120 or 60 degrees, similar properties to Augite
Magnetite	Magnetic, metallic mineral
Muscovite	Clear or translucent color, one perfect direction of cleavage resulting in the mineral pealing into thin, flexible sheets, similar properties to Biotite
Olivine	Apple green or yellowish green color, H=7 (often difficult to determine), conchoidal fracture, no cleavage
Orthoclase	H=6, salmon pink color is typical, perthitic intergrowths are common, 2 directions of cleavage at 90 degrees, similar properties to plagioclase
Plagioclase	H=6, white or gray color, striations may be seen on cleavage surface, 2 directions of cleavage at 90 degrees, similar properties to orthoclase
Pyrite	"Fool's Gold", gold metallic color
Quartz	H=7, conchoidal fracture, no cleavage, color is typically white or clear but can be pink, red, purple, black
Sulfur	Yellow color, "rotten egg" smell if burned
Talc	H=1, very soft, easily scratched by fingernail

METALLIC TO SUBMETALLIC MINERALS

FRACTURE CLEAVAGE	STREAK	COLOR	HARDNESS	FRACTURE CLEAVAGE	LUSTER	DIAPHANEITY	OTHER PROPERTIES	SPECIFIC GRAVITY	MINERAL NAME
CLEAVAGE	yellow or brown	yellow, brown, black	5 - 5.5	one direction indistinct	submetallic	translucent	silky, fibrous appearance	3.3 -4.3	**GOETHITE**
	white, yellow, or brown	white, red yellow, brown, green, black	3.5 - 4	perfect cleavage in 6 directions	submetallic	translucent	brittle, looks like resin	3.9 - 4.1	**SPHALERITE**
	colorless	dark green, dark brown, or black	2.5 - 3	perfect cleavage in one direction	submetallic	translucent	thin flakes, tough, flexible	2.8 - 3.2	**BIOTITE**
	black	black, silver, or gray	1 - 2	cleavage sometimes indistinct	metallic or submetallic	opaque	marks paper, soils fingers, slippery	2.23	**GRAPHITE**
FRACTURE	black	brassy yellow	6 - 6.5	conchoidal fracture	metallic	opaque	sometimes in crystal shapes	5.02	**PYRITE**
	reddish	red -brown, black, silver	5 - 6.5	fracture	metallic or submetallic	opaque	sometimes oolitic or magnetic	5.56	**HEMATITE**
	black	black or silver	6	fracture	metallic or submetallic	opaque	strongly magnetic	5.18	**MAGNETITE**
	black	brownish	4	fracture	metallic	opaque	weakly magnetic	4.58 - 4.65	**PYRRHOTITE**
	greenish black	brassy yellow	3.5 - 4	fracture	metallic	opaque	brittle	4.1 - 4.3	**CHALCOPYRITE**
	black	brassy with iridescent colors	3	indistinct cleavage	metallic	opaque	iridescent peacock colors	5.0 -5.1	**BORNITE**

NONMETALLIC MINERALS
HARDNESS (7 - 4)

	STREAK	COLOR	HARDNESS	FRACTURE CLEAVAGE	LUSTER	DIAPHANEITY	OTHER PROPERTIES	SPECIFIC GRAVITY	MINERAL NAME
CLEAVAGE	white or colorless	green to black	6 - 7	one direction indistinct	vitreous - dull	transparent, translucent	typically pistachio green	3.35 -3.4	**EPIDOTE**
	white or colorless	white, gray, pink, clear, green, yellow	6 - 6.5	two directions at 90 degrees	vitreous	transparent, translucent	few if any striations	2.5 - 2.6	**ORTHOCLASE**
	white or colorless	white, gray clear, blue green	6	two directions at 90 degrees	vitreous	transparent, translucent	striations on cleavage faces	2.6 -2.8	**PLAGIOCLASE**
	white or colorless	colorless, gray, white	5.5 - 6	one direction indistinct	greasy - vitreous	transparent, translucent	softer than quartz, cleavage	2.6 - 2.65	**NEPHELINE**
	greenish	green, gray brown, black	5 - 5.5	two directions intersects at 90 degrees	vitreous to dull	transluscent	brittle	3.2 - 3.6	**AUGITE**
	colorless	brown, dark green, black	5 - 6	two directions intersects at 56 & 124 degrees	vitreous	transluscent	appears fibrous or silky	3.0 - 3.4	**HORNBLENDE**
	yellow or brown	yellow, brown, or black	5 - 5.5	one direction indistinct	dull to admantine	transluscent	appears fibrous or silky	3.3 - 4.3	**GOETHITE**
	white	green, brown yellow, pink violet, etc.	5	poor cleavage in one direction	vitreous	transparent, translucent	brittle, fractured masses	3.1 - 3.2	**APATITE**
	white to gray	greenish, yellowish, black	3 - 5	one direction indistinct	greasy to waxy	transparent, translucent	varigated, sometimes fibrous	2.3	**SERPENTINE**
	white, yellow, or brown	white, red yellow, brown green, black	3.5 - 4	perfect cleavage in 6 directions	resinous to adamantine	transluscent	brittle, looks like resin	3.9 - 4.1	**SPHALERITE**
	white	pink, white gray, and others	3.5 - 4	3 direction, rhombic indistinct	vitreous pearly	transparent, translucent	HCl fizz only with powder	2.85	**DOLOMITE**

NONMETALLIC MINERALS

HARDNESS (4 - 1)

	STREAK	COLOR	HARDNESS	FRACTURE CLEAVAGE	LUSTER	DIAPHANEITY	OTHER PROPERTIES	SPECIFIC GRAVITY	MINERAL NAME
CLEAVAGE	white	any color clear, yellow purple, blue	4	perfect four directions	vitreous	transparent, transluscent	sometimes fluorescent	3.18	**FLUORITE**
	white	white, gray red, brown clear, etc.	3 - 3.5	perfect 3 directions small faces	vitreous- pearly	transparent, transluscent	very heavy for a nonmetallic mineral	4.3 - 4.6	**BARITE**
	white	white, gray green, yellow clear, etc.	3	perfect 3 directions, "rhombic"	vitreous- pearly	transparent, transluscent	breaks rhombic HCl reaction double refraction	2.71	**CALCITE**
	colorless	dark green dark brown or black	2.5 - 3	perfect cleavage in one direction	nonmetallic	transluscent	thin flakes, tough, flexible	2.8 - 3.2	**BIOTITE**
	colorless to white	yellow to brown in thin sheets	2.5 - 3	perfect in one direction	vitreous to pearly	transparent	frequently a copper - like luster	2.68	**PHLOGOPITE**
	gray to green	greenish, gray, black	2 - 2.5	perfect in one direction indistinct	vitreous dull pearly	transparent, transluscent	foliated or scaly appearance	2.6 - 3.3	**CHLORITE**
	colorless	clear, white yellowish, silvery, etc.	2 - 2.5	perfect cleavage in one direction	vitreous to pearly	transparent	splits into thin sheets	2.7 - 3.0	**MUSCOVITE**
	white	white, gray, yellowish	2 - 2.5	one direction but usually indistinct	dull, earthy	transluscent	plastic when wet crumbly when dry	2.6	**KAOLINITE**
	white	white, gray blue, red clear	2 - 2.5	perfect 3 directions at 90 degrees	vitreous to pearly	transparent, transluscent	water soluble, tastes salty	2.16	**HALITE**
	white	white, gray brown, red clear & others	1.5 - 2	perfect in one direction 2 indistinct	vitreous to pearly	transparent, transluscent	sometimes as fibrous masses	2.3 - 2.4	**GYPSUM**
	white	green, gray white, silver & other colors	1	one direction but usually indistinct	pearly to greasy	transluscent, opaque	feels greasy, tiny flakes upon rubbing	2.7 - 2.8	**TALC**

NONMETALLIC MINERALS

HARDNESS (9 - 1)

	STREAK	COLOR	HARDNESS	FRACTURE CLEAVAGE	LUSTER	DIAPHANEITY	OTHER PROPERTIES	SPECIFIC GRAVITY	MINERAL NAME
FRACTURE	colorless	brown, pink, blue & others	9	fracture, sometimes with parting	vitreous to adamantine	transparent, transluscent	sometimes has hexagonal crystals	4.02	**CORUNDUM**
	colorless	black, green brown, pink yellow	7 - 7.5	fracture	vitreous	transparent, to opaque	sometimes striations	3.02 - 3.2	**TOURMALINE**
	colorless	usually red, green, black or any color	6.5 - 7.5	fracture	vitreous to resinous	transparent, to opaque	sometimes isometric crystals	3.5 - 4.3	**GARNET**
	colorless	any color	7	conchoidal fracture	vitreous to greasy	transparent to transluscent	sometimes has hexagonal crystals	2.65	**QUARTZ**
	colorless	olive, green, brown	6.5 - 7	conchoidal fracture	vitreous	transparent to transluscent	frequently as granular masses	3.27 - 4.27	**OLIVINE**
	reddish	red - brown, silver, or black	5 - 6.5	fracture	dull	opaque	sometimes oolitic or magnetic	5.26	**HEMATITE**
	yellowish-brown	yellow, brown, or black	4 - 5.5	fracture	dull	transluscent, opaque	earthy color and appearance	2.7 - 4.3	**LIMONITE**
	white	white, gray yellow, red brown	1 - 3	fracture	dull earthy	transluscent, opaque	pisolitic	2.00 - 2.55	**BAUXITE**