A TABLE FOR THE IDENTIFICATION OF NEVADA'S COMMON MINERALS PART OF UNIVERSITY OF NEVADA BULLETIN, VOL. XXII, No. 1, PREPARED FOR THE MACKAY SCHOOL OF MINES AND THE STATE MINING LABORATORY BY O. R. GRAWE

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	STREAK	н.	SP. GR.	COLOR	LUSTER	STRUCTURE	CRYSTAL FORMS	PLANES OF CLEAVAGE	FRACTURE	TENACITY	DIAPHANEITY	REMARKS AND SPECIAL PROPERTIES	NAME OF MINERAL	CHEMICAL COMPOSITION	PERCENTAGE OF CHIEF COMPONENT	OCCURRENCE	CHIEF USES
	e conservative a year dispection and a final description of the conservation of the co	1	1.6	White, colorless.	Silky	Fibrous, acicular rounded masses.				Brittle.	Transparent to translucent.	Tasteless, insoluble in water.	Ulexite.	NaCaB ₅ O ₉ .8H ₂ O	43.0% B ₂ O ₃	In salt marshes and dry lake beds.	Source of borax.
		1-1.5	5.5	Colorless, white, gray, purple, black.	Waxy, dull.	Massive, stalactitic, dendritic, encrustation.			Conchoidal.	Sectile.	Translucent.	Turns purple in the sunlight.	Cerargyrite, horn- silver.	AgCl	75.3% Ag	A mineral of the weathered and altered portions of silver ore bodies, zone of oxidation.	An ore of silver.
		1-2.5	2.6	White, often colored, gray, red, yellow, brown, black.	Dull, pearly.	Earthy, compact, clayey, mealy, friable, scaly.		Bearing and a second se	Earthy.	Brittle.	Opaque.	Often plastic when wet, clayey odor, sticks to tongue.	KAOLIN.	H ₁ Al ₂ Si ₂ O ₉		Formed by alteration of rock minerals, especially feldspars.	Chief constituent of many clays and shales. Used for making brick, tile, porcelain, chinaware, cement, etc.
		1-2.5	2.7	Gray, yellowish, greenish, gray, white, etc. White, apple green,	Pearly, greasy, dull.	Foliated, scaly, tabular, fibrous, compact, massive.	-	One good.	Uneven.	Tough.	Translucent to opaque.	Soapy feel, thin, laminae, flexible, never plastic.	TALC.	H ₂ Mg ₃ Si ₄ O ₁₂		Found in platy, schistose metamorphic rocks.	Massive talc has a wide use in table tops, tanks, sinks, etc.; electric insulation, powder, soap, filler.
		1-2	2.9	grayish and brownish, green and white.	Pearly, glistening, dull.	Foliated, lamellar, radial, granular, compact, fibrous.		One good.		Flexible.	Subtransparent to opaque.	Greasy or soapy feel. Like talc but contains Al instead of Mg. Not common.	Pyrophyllite.	H ₂ Al ₂ Si ₄ O ₁₂	SECTION STREET	Found in schists and rocks associated with them.	Used in slate pencils and sometimes as a medium for carving.
		1.5-2	1.5	Colorless, white.	Glassy.	Crystalline, massive, granular, encrustations.			Uneven.	Brittle.	Transparent. Subtransparent,	Soluble, cooling taste, alters to white, powdery thenardite.	Mirabilite, Glau- ber salt.	Na ₂ SO ₄ .10H ₂ O	AND AND AND AND AND AND COLUMN AND AND AND AND AND AND AND AND AND AN	A mineral of dry lake basins.	No present use.
		1.5-2	1.8	dish, yellowish.	Glassy, silky, dull.		- Annual Control of the State o			Brittle.	subtranslucent. Transparent to	Taste of common alum. Soluble in water. Cooling taste, gives violet coloration when held in flame. Gives brown fumes when heated	9	Al ₂ (SO ₄) ₃ .18H ₂ O		Alteration product of aluminum minerals. Associated with guano. In caves inhabited by bats. Often	Possible source of alum.
		1.5-2	2.1	Colorless, white.	Glassy.	Crystalline, granular, encrustations, acicular, tufted. Crystalline, granular, encrustation, massive.		Good. Rhombohedral.	Uneven. Conchoidal.	Brittle. Brittle.	opaque. Transparent to opaque.	with potassium acid sulphate. Soluble in water, gives yellow flame. Cooling taste, often salty, also acts like niter with potassium acid sulphate.	Niter.	NaNO ₃		bedded. Associated with guano, occurs in bat caves. Bedded or in layers.	Fertilizer, source of nitrogen compounds. Fertilizer, used in manufacture of nitric acid, and KNO ₈ . Source of iodine.
		***************************************	THE RESIDENCE OF THE PARTY OF T		Glassy, pearly, silky	Crystalline, massive and fine granular (alabaster), columnar, fibrous (satin spar), earthy (gypsite), compact, scaly, granular (rock gypsum), lamellar (selenite).	Marking and the Control of the Addition of the Control of the Cont	Two perfect; one very pronounced.	ACCESS AND	Sectile, not elastic.	Transparent (seli-	Changes to a white powder when heated.	GYPSUM.	CaSO ₄ ,2H ₂ O	** Automotivation of the state	Occurs in altered rocks, lake bed deposits, and other sediments.	Used chiefly for production of Plaster of Paris, fertilizer (land plaster), flux, cement.
		1-3	2.3	Colorless, white. Colorless, white, red.	Glassy, dull.	Crystalline, earthy, powdery.		very promoundation	Uneven.	Brittle.	Transparent to opaque.	Soluble in water. Often occurs as a white powder on mirabilite. Cooling saline taste.	_	Na ₂ SO ₁	makera keri A. Amis a fina A. Makhari Nah 1974A 261 MANAHATA ARKA (Albahari serimen	Found on shores of salt lakes and in lake beds. Alteration product of mirabilite.	No present use.
		2	1.9	Yellowish to brassy green.	Glassy to dull.	Earthy, encrustation, stalactitic, fibrous, crystalline, powdery.			Uneven, con- choidal.	Brittle.	Transparent to opaque.	Soluble in water. Astringent, metallic taste.	Melanterite Copperas.	FeSO ₄ .7H ₂ O		Formed by alteration of marcasite.	No present use.
		2-2.5	1.7	Colorless, white, gray, bluish white.	Dull, glassy, resinous.	Powdery, crystalline encrustation.			VECOPORTO CONTRACTO A CONTRACTO PROPERTY AND AND ADMINISTRATION OF THE CONTRACTOR AND	Brittle.	Transparent to opaque. Transparent,	Soluble in water, sweet taste. Changes to a white powder in air.	Borax.	Na ₂ B ₁ O ₇ .10H ₂ O	36.6% B ₂ O ₃	Dry lake beds, bedded.	Antiseptic uses, cleansing agents, soans, used in medicines, metal cleaner. Boracic acid is made from it. Used as a preservative of meat, in manufacture of chemi-
	70	2-2.5	2.2	Dark brown, black,	Glassy. Submetallic,	Crystalline, granular, massive, encrustation. Micaceous, platy, foliated, flaky, crystalline, often disseminated in rocks as scales.	Cubes.	Cubic. One very good.		Brittle. Elastic, sectile, tough.	translucent. Transparent, translucent.	Soluble in water, salty taste. Streak may be pale brown and shiny. Easily told by its mica characteristics and dark color.	HALITE. BIOTITE Black mica.	NaCl (H.K) ₂ (MgFe) ₂ . (AlFe) ₂ (SiO ₄) ₃		Sedimentary rocks and in dry lake beds. Common rock mineral especially in igneous and metamorphic rocks.	cals, as a condiment, production of glazes and enamels. No commercial value.
				Colorless, pale, gray, yellow, brown, green,		Micaceous, platy, foliated, flaky, crystalline, often disseminated in rock.	W	One very good.	adicado a destacen e en consciente con consciente de conserva de c	Elastic, sectile,	Transparent,		MUSCOVITE White mica "Isinglass."	H ₂ (K.Na). [Al ₃ (SiO ₄) ₃]		Common rock mineral especially in igneous and metamorphic rocks.	Used as windows in furnaces, stoves, etc., electric insulation, used in heavy lubricants, paints, wall paper.
		2-3	2.8-3.1	red. White, yellow, gray, brownish.	Glassy, pearly. Silky.	Fine scaly aggregates foliated, fibrous.		One good.	gandauft Alvan, iga ginn ei eigen eile gegen eile eile gestelle eile gesche Stad Alvan gehölt bei der eile best	Flexible, sectile.	translucent. Translucent to opaque.	Like biotite but not strongly colored. A whitish muscovite.	Sericite.			Formed by alteration of muscovite and other minerals.	Rock forming mineral in altered rocks especially metamorphic rocks like schist.
	*	2-3	10.5	White.	Silvery, metallic.	Irregular masses, scaly, wiry, crystalline, disseminated in rock as filaments in cavities.			Hackly.	Malleable, ductile.	Opaque.	Tarnishes gray, brown or black.	Silver.	Ag	100% Ag	In veins, particularly in zones of oxidation and secondary enrichment.	Ore of silver.
		2-4	2.7	Green, grayish green, yellowish gray, red, brown, black.	Greasy, dull, resin- ous, glassy.	Compact, earthy, columnar, fibrous, lamellar, foliated.		des grades and a medical page indicates a 4 to the days of the second control of the sec	Splintery, con- choidal.	Brittle, tough.	Translucent to opaque.	Multicolored, often mottled, often soapy feel, character- istically of a grayish green color.	SERPENTINE.	H ₄ MgSi ₂ O ₉	and the second and appropriate after the second and appropriate and the second an	A product of rock alteration. Found in metamorphic rocks.	A fibrous form is chrysotile or commercial asbestos, verde antique is a serpentine marble. Translucent variety used as a gem.
		2.5	2.3	Blue, greenish blue.	Glassy.	Crystalline, stalactitic, reniform, drusy, fibrous, encrusta-			Conchoidal.	Brittle.	Transparent, translucent. Transparent.	Metallic taste, blue solution in water. Becomes coated white on exposure to dry air. Soluble in water, alkaline taste. Will give bubbles of gas	vitriol.	CuSO ₄ .5H ₂ O Na ₂ CO ₃ .NaHCO ₃ .	25.9% Cu	Formed by alteration of copper ores in zone of oxidation. Found in muds of dry lakes and as thin coatings on altered	Minor ore of copper.
		2.5-3	2.1	yellowish gray. Whitish, grayish,	Glassy. Pearly, waxy.	Massive, crystalline, encrustation, fibrous. Foliated, massive, fibrous.		One good.	Uneven.	Brittle. Flexible to elastic, folia, sectile.	translucent. Transparent, translucent.	when treated with acid. Much like some forms of talc. Alters to hydromagnesite.	Trona, "Urao." Brucite.	Mg(OH) ₂	69% MgO	rocks. In metamorphosed limestone, dolomite, and in serpentine.	Source of magnesia for stucco.
		2.5-3	4.5	bluish, greenish. Colorless, white, brown, yellow, blue, red.	Glassy, pearly.	Massive, crystalline, lamellar, nodular, granular, fibrous, earthy, reniform.	Tabular, prismatic.	Good cleavage.	Uneven.	Brittle.	Transparent to opaque.	Easily distinguished as a soft heavy mineral.	BARITE Barytes, heavy spar.	BaSO ₄		Common gangue in veins, hot spring deposit. Replacement in limestones.	Used in manufacture of paints, glass, lithopone, artificial ivory. Used as paper filler. Source of barium compounds.
		8	2.7	Colorless, gray, white, black, yellow, red, blue, green.	Glassy to dull.	Crystalline, massive, granular, stalactitic, drusy, earthy, encrustation, banded.	Rhombohedrons, prisms and pyra- mid-like forms.	Three, perfect rhombohedral.		Brittle.	Transparent to opaque.	Usually shows the rhombohedral cleavage, will give of gas when treated with cold acid like vinegar. Chalk is an earthy variety. Mexican onyx or travertine is banded.	CALCITE Dog tooth spar.	CaCO ₃	56% CaO	Chief constituent of limestone. Product of rock weathering and alteration lake deposit.	As limestone it is used as a building material, for manufac- ture of lime and cement, fertilizer. Has many uses.
		3	6.4	Colorless, white, yellow, brown, gray.	Adamantine to greasy.	Crystalline, granular, nodular, stalactitic.	A NAMES AND ADDRESS OF THE PARTY OF THE PART	Good.	Conchoidal.	Brittle.	Transparent to opaque.	Often coated black, occurs as a heavy white or yellow concentrate in gold pan. Often has a sugary or marble-like appearance and most	Anglesite.	PbSO ₄	68.3% Pb	Formed by oxidation of lead sulfides in zone of oxidation. Occurs in upper part of veins. Occurs in upper parts of ore veins, in beds and in lake	Ore of lead. Used as a fertilizer, as a medium for ornaments and statu-
	æ	3-3.5	3	White, bluish, greenish, reddish, white, black.	Glassy, pearly.	Crystalline, granular, massive, fibrous.	And the second company of the second company of the second control		Conchoidal.	Tough. Brittle.	Translucent to opaque. Translucent to	often pearly in luster. One of heavy white concentrates on panning for gold.	Anhydrite.	CaSO ₁	ng ool Th	deposits. Occurs in zones of oxidation and secondary enrichment.	ary. Much like alabaster gypsum. Ore of lead.
		3-8.5	2.2	White, yellow, brown. White.	Glassy to dull. Vitreous, pearly, dull.	Crystalline, granular, earthy, fibrous. Acicular, earthy, powdery, amorphous.	Managaran dina dia dia dia dia dia dia dia dia dia di			Brittle.	Opaque.	Effervesces with cold acid.	Cerrusite. Hydromagnesite.	PbCO ₃ 3MgCO ₃ .Mg(OH) ₂ . 3H ₂ O	77.9% Pb 43.9% MgO	Alteration product of brucite.	Possible source of magnesia for stucco, cement, etc.
		3.5	2.9	Colorless, white, gray or tinted.	Glassy.	Crystalline, columnar, concentric, stalactitic, banded, colitic, reniform, encrustation.	Prisms, needle- like.	One good.		Brittle.	Transparent, translucent.	Effervesces in cold acid but is usually needle-like or columnar and does not have rhombohedral cleavage.	Aragonite.	CaCO ₃	56% CaO	Bedded with gypsum, hot and cold spring deposit. Deposited from sulphate waters.	Can be used for calcite.
		3.5-4	2.7	White, pink, red.	Glassy, pearly.	Crystalline, compact, granular, fibrous, earthy.	Rhombohedrons.	One plane.	Uneven, con- choidal.	Brittle.	Transparent, translucent.	Much like anhydrite but contains water and is harder.	Alunite, alum stone.	K ₂ SO ₄ .Al ₂ (SO ₄) ₃ . 4Al(OH) ₃	CONTRACTOR OF THE PROPERTY OF	Occurs in cracks and veins in acidic lavas. A product of rock alteration.	Source of potash and aluminum. Almost a natural alum.
•	Selection and	3.5-4	2.9	Colorless, white, tinted.	Glassy, pearly.	Crystalline, granular, massive.	Rhombohedrons.	as good as in cal- cite.	Conchoidal (when	Friable, brittle.	Transparent, translucent.	Will not effervesce in cold acid as calcite does. Often granular. Rhombohedral faces often curved. Often porcelaneous. Much like chert. Does not effervesce	DOLOMITE Pearl spar.	CaMg(CO ₃) ₂	39.2% MgO	Common gangue and sedimentary rock mineral. In lime- stone and marble.	Source of magnesium salts. Building and decorative stone. Used as source of magnesium compounds, in bricks for fur-
*	Silver	3.5-4	8.1	Colorless, white, gray, brown. Colorless, white, gray,	Glassy to dull.	Crystalline, dense, massive, granular.		Imperfectly prismatic	Conchoidal (when dense).	Brittle.	Transparent to opaque. Transparent,	in cold acid. Much like aragonite, gives a deep crimson tinge to an	Magnesite.	MgCO ₃	85.8% MgO	Bedded in sediments. In veins, in metamorphic rocks. Occurs in limestones. Rare in Nevada.	nace linings, in paper industry, for stucco, cement.
		3.5-4	3.7	white, usually brown, yellow, black.	Glassy, greasy. Glassy to dull.	Crystalline, compact, acicular, radiating, fibrous, granular. Crystalline, granular, massive, botryoidal, nodular, earthy.		prismatic. Rhombohedral.	Conchoidal. Conchoidal.	Brittle. Brittle.	translucent. Translucent to opaque.	alcohol flame when hydrochloric acid is added.	Strontianite. Siderite, spathic iron ore.	FeCO ₃	70.1% SrO 48.2% Fe		A minor ore of iron. Often contains enough manganese for use in steel production.
		8.5-4.5	2.4	Colorless, white, yellow- ish, gray.	Glassy to dull.	Crystalline, granular, massive.		One good.	Uneven, subcon- choidal.	Brittle.	Transparent to opaque.	Often porcelaneous or chalky.	Colemanite.	Ca ₂ B ₆ O ₁₁ ,5H ₂ O	52.9% B ₂ O ₃	In irregular beds associated with basalt and limestone.	Source of borax and boracic acid.
		3.5-4.5	3.5	Pink, rose red.	Glassy, pearly.	Crystalline, granular, encrustations, botryoidal.	and participations and an analysis of the desired that the company of the second secon	Rhombohedral. At least one good	Uneven. Uneven, con-	Brittle.	Translucent. Transparent to	Much like siderite but pink.	Rhodochrosite.	MnCO ₃	47.8% Mn	Common gangue in veins. Bedded, often result of hydro- thermal alteration. Derived by alteration of minerals in igneous rocks, especi-	Source of manganese compounds. Occasionally used as a gem.
		3.5-5	2-2.4	Colorless, white, pale tints. Colorless, white, green,	silky.	Crystalline, acicular, fibrous, radiating, granular, massive. Crystalline, massive, granular, drusy, disseminated.	Challenge	At least one good cleavage. Octahedral.	Uneven, con- choidal. Uneven.	Brittle.	Transparent to opaque. Transparent, translucent.	Flies apart on heating, shows good cleavage.	Zeolite group. FLUORITE Fluor spar.	Hydrated alkaline silicates.		ally volcanic rocks.	Source of fluorine compounds, flux in iron smelting, used in enamels, lenses, as a gem.
\$6 1		4 5-5	3.2	White, greenish, bluish,	Glassy. Glassy, pearly.	Crystalline, massive, granular, drusy, disseminated. Massive, granular, botryoidal, fibrous, stalactitic.	Cubes, octahedrons. Tabular.	Two good.	Uneven to sub- conchoidal.	Brittle.	Transparent to translucent.	Flies apart on heating, shows good cleavage.	Calamine.	H ₂ ZnSiO ₅	54.2% Zn	A secondary mineral usually found in limestones. Derived from other zinc ores.	Zine ore.
		4.5-5	3.5 4.1	yellowish, brownish. Nearly white to pale yellow.	Greasy, pearly, earthy.	Acicular.	MANAGEMENT CONTRACTOR	AMAZERIA GENERALINIA MARIANIA	Uneven.	Brittle.	Opaque.		Cervantite.	Sb ₂ O ₃	78.9% Sb	Alteration product of stibnite.	
•		4-6	14-19	White, gray, black.	Silvery, metallic.	Granular, scaly, disseminated, crystalline.	Annable Market Market Market And Parket Report to Annable Report t		Hackly.	Malleable, ductile, sectile.	Opaque.	Usually alloyed with other metals, sometimes magnetic. Hardness only four in long direction and seven at right	Platinum.	Pt	100% Pt	In placers, river gravels, in basic dark-colored igneous rocks.	Source of platinum for jewelry, scientific and industrial uses.
		4-7	3.6	Blue, gray, yellow, green, brown. White, yellow, brown,	Glassy, pearly.	Bladed, platy, crystalline, columnar.	Tabular crystals,	One excellent.	Splintery. Uneven.	Brittle. Brittle.	Transparent, translucent. Translucent to	angles to it.	Cyanite, kyanite. Scheelite.	$ m Al_2SiO_5$ $ m CaWO_4$	80.6% Wo ₃	A mineral of metamorphic rocks as gneisses and schists. Occurs in gold quartz veins and at contact of veins with limestone.	Used in manufacture of porcelain and as a gem. Ore of tungsten and its compounds.
		4.5-5	4.5	green, red. Colorless, gray, yellow, green, brown.	Glassy, pearly, waxy, dull.	Crystalline, massive, granular, disseminated, reniform. Botryoidal, stalactitic, encrustation, reniform, cellular, earthy, crystalline.	pyramids.	One good.	Uneven, splintery.	Brittle.	Translucent to opaque.	Yellow powder produced when boiled in nitric acid. Usually hard to detect in Nevada ore.	Smithsonite, "Dry bone ore."	ZnCO ₃	52.1% Zn	Occurs in upper oxidized part of veins as residuum on limestone, and in veins in limestone.	An ore of zinc.
		5-5.5	3.2	Colorless, green, brown, red, yellow.	Glassy to resinous.	Crystalline, granular, nodular, massive, compact.	Prisms, tabular.		Uneven, con- choidal.	Brittle.	Transparent to opaque.	Occurs in beds with limestone and shales. Often brown but will not scratch glass easily if at all.	Apatite, rock phosphate.	3Ca ₃ (PO ₄) ₂ . Ca (F,Cl) ₂		Common accessory mineral of igneous rocks. Contact metamorphic mineral.	Fertilizer, source of phosphorous and its compounds.
		5-5.5	8.5	Yellow, green, brown, red, black.	Adamantine to resinous.	Crystalline, disseminated, lamellar, massive, compact.	Wedge-like.	Two.	Conchoidal.	Brittle.	Transparent to opaque.	Besides occurrence noted it also is found on walls of cavities in acid igneous rocks and as an alteration product of other titanium minerals.	Titanite, sphene.	CaTiSiO ₅		Common accessory mineral of igneous rocks. Contact metamorphic mineral.	Transparent variety used as a gem.
	$U\Omega$	5-6	2.8	Bluish green to greenish blue.	Waxy, dull.	Botryoidal, stalactitic, reniform, disseminated, encrustation.			Conchoidal.	Brittle.	Translucent to opaque.	See copper test under azurite.	Turquois.	H ₅ [Al(OH) ₂] ₆ . Cu(OH)(PO ₄) ₄		An alteration product.	Gem mineral.
: 4		5-6	3	Dark grass green. Colorless, milky, red,	Glassy, silky.	Crystalline, bladed, fibrous, columnar, granular.		Prismatic.	Uneven, splintery.	Brittle.	Transparent to opaque.	Grass green color characteristic.	Actinolite.	(MgFe) ₃ Ca(SiO ₃) ₄		A metamorphic rock forming mineral.	
		5.5-6.5	2.1	yellow, blue, green, black, brown.	Pearly, waxy, dull.	Massive, botryoidal, stalactitic, reniform, earthy.			Conchoidal.	Brittle.	Transparent to opaque.	Earthy varieties as diatomaceous earth are as soft as 1. Massive opal checks in drying.	OPAL.	SiO ₂ .xH ₂ O		Occurs as a hot spring deposit (gyserite, or sinter), as an alteration product, and in sedimentary beds.	Used for gems, ornaments. Earthy varieties as tripolite and diatomite used as scouring agents, fillers, in concrete, etc. Transparent variety used as gem, iridescent variety as
•		6	2.5-2.8	Colorless, white, cream, red, green, gray.	Glassy.	Crystalline, massive, disseminated.		Two good.	Uneven.	Brittle.	Transparent to opaque.	Often striated, sometimes iridescent, especially gray labradorite. Transparent variety is sanidine.	FELDSPARS. Sillimanite,	Aluminum silicates of K,Na,Ca	generalistic year older and manual of the SEE SEE SEE SEE SEE SEE SEE SEE SEE SE	Common rock mineral.	ornamentation, other varieties are used in glazes, fluxes, fillers, etc.
		6-7	3.2	Gray, yellowish, green- ish, brownish. Brown, red, yellow,	Glassy, silky, greasy.	Acicular, fibrous.	Dodecahedrons,	One good.	Uneven, con- choidal.	Brittle. Brittle.	Transparent, translucent. Transparent,	Surface often coated by softer minerals. Usually brown	fibrolite.	Al ₂ SiO ₅ (Ca,Mg,Fe,Mn) ₃ .		A metamorphic rock, schist forming mineral. In veins and as a metamorphic mineral, especially in contact metamorphosed limestones.	Spark plug porcelain. Transparent varieties used as gems, hard varieties used as abrasive.
		6-7.5	3.4-4.3	Yellowish, green, dark yellowish green,		Crystalline, granular, disseminated.	most common.		INCOME AND ADDRESS OF THE PROPERTY OF THE PROP	Brittle.	translucent. Transparent to	and hard enough to scratch glass. Its yellowish green to olive green color, columnar or needle-		$\frac{(Al, Fe. Cr)_2(SiO_1)_3}{Ca_2(Al, Fe)_2Al(OH)}.$		A mineral of metamorphic rocks. Often in contact metamorphic zone.	and the state of t
		6.5	3-5	brown, red. Colorless, bottle green, yellow, brown.	Glassy.	Crystalline, granular, bladed. Crystalline, granular, disseminated.		One good.	Conchoidal.	Brittle.	Transparent, translucent.	like structure, and glassy luster are characteristic. Often sugary, friable, occasionally found in metamorphosed limestones.		(SiO ₄) ₃ (Mg,Fe) ₂ SiO ₄	aan A. Link kansan filito muusuu viin eyn eji nejiin fi ohtussa ajakkii saa kay aasingaga jiraa A.A.	Rock forming mineral of basic igneous rocks.	Transparent green peridot is a gem.
-		7	2.7	Colorless, white, pink, amethyst, red, gray,	Glassy, waxy,	Crystalline, granular, nodular, banded, sintery, colitic, botryoidal, massive, etc.	Pyramid-like faces and prisms.		Conchoidal.	Brittle.	Transparent to opaque.	Crystal faces often striated, the porcelaneous variety, chert is common in limestones. Infusible, insoluble,	QUARTZ.	SiO2	and distribution of a major symmetry symmetry and a second from the self-pink distribution of	Occurs in all kinds of rocks and under many conditions. Common vein mineral.	Used as abrasive, as building material as in sand and sand- stone and quartzite, in pottery, jewelry, etc.
		7	3.3	smoky, brown, black. Purple, blue, pink, green, white, colorless.	Glassy, dull.	Fibrous, columnar, acicular, spherulitic, massive.	Prisms.	One good.	Even.	Brittle.	Transparent, translucent.		Dumortierite.	$\mathrm{HBAl_{5}Si_{3}O_{20}}$		In igneous and metamorphic granular rocks.	Used in manufacture of spark plug porcelain.
		7–7.5	2.9-3.2	Colorless, green, pink, gray, yellow. Usually black.	Glassy, pitchy.	Crystalline, massive, disseminated.	Long six-sided prisms.		Uneven, con- choidal.	Brittle.	Transparent to opaque.	Crystals vertically striated and usually black, long and six- sided.	Tourmaline.	Complex boro-alu- minum silicate.		In veins, and granitic igneous rocks. At contact of granite and limestone.	Transparent variety used as a gem and in optical instruments.
		7-7.5	3.2	Gray, brown, reddish brown, bluish.	Glassy, dull.	Crystalline, granular, columnar.	Nearly square prisms.	Prismatic.	Uneven.	Brittle.	Transparent to opaque.	Surface often coated by softer minerals.	Andalusite.	$\mathrm{Al_2SiO_5}$		and slates.	Transparent varieties are used as gems. Used in production of spark plug porcelain and refractory bricks. Used as an abrasive. Transparent red variety is ruby.
· ·		9	4	White, brown, red, gray, blue. Deep blue, pale blue,	Adamantine, glassy	WELL AND THE SECOND CONTROL OF THE SECOND CO	Pyramids, prisms.	A plane of parting.	Conchoidal, uneven.	Brittle.	Transparent, translucent. Transparent.	Crystals striated, very hard. Soluble in water, metallic taste, becomes coated white in	Corundum, emery. Chalcanthite, blue	Al ₂ O ₃		limestone. Occurs in mine waters and formed by oxidation of copper	Transparent blue variety is sapphire.
	Light Blue	2.5 3.5-4	3.8	greenish blue. Dark to pale azure blue.	Glassy, dull.	Crystalline, encrustation, stalactitic, reniform, fibrous. Crystalline, earthy, massive, botryoidal, reniform, encrustation.	Tabular.		Conchoidal.	Brittle. Brittle.	Translucent. Transparent to opaque.	air. Yields blue solution. Like other copper minerals it will dissolve in acid and vield a blue solution on addition of ammonia water.	vitriol, blue stone. AZURITE Blue carbonate.	CuSO ₄ .5H ₂ O 2CuCO ₃ .Cu(OH) ₂	25.9% Cu 55.2% Cu	ores. Found in upper part of copper veins, alteration product of copper sulfides.	Minor ore of copper. Sometimes used as a gem. Ore of copper, used for ornamental and decorative purposes.
	or reen	2-4	2.2	Green, blue, brown, black.	Glassy, pearly, dull.	Compact, reniform, earthy, globular, encrustation.			Conchoidal.	Brittle.	Translucent to opaque.	Glaze-like appearance, often contains malachite.	CHRYSOCOLLA.	CuSiO ₃ .H ₂ O	36.2% Cu	Occurs in upper part of copper veins, alteration product of copper sulfides.	Minor ore of copper, sometimes used as a gem.
	Green uish G	3.5-4	3.9	Bright green, grass green, blackish green.	Adamantine, silky, dull.	Encrustations, massive, concentric, reniform, botryoidal, stalactitic, earthy, fibrous, acicular.	The state of the s		Conchoidal, splintery.	Brittle.	Translucent to opaque. Transparent.	See copper test under azurite.	MALACHITE.	CuCO ₃ .Cu(OH) ₂	57.5% Cu	Occurs in upper parts of copper veins, alteration product.	Ore of copper, also used for ornamental purposes and as a gem.
	Light ight Bl	3.5-4	3.9	Emerald green, dark green.	Glassy, pearly.	Crystalline, drusy, fibrous.	Prisms.	One good.	Splintery. Conchoidal.	Brittle. Brittle.	translucent. Translucent to	See copper test under azurite. See copper test under azurite.	Brochantite. Turquois.	$ \begin{array}{c c} & \text{CuSO}_{1}.3\text{Cu}(\text{OH})_{2} \\ \hline & \text{H}_{5}[\text{Al}(\text{OH}_{2})]_{6} \\ & \text{Cu}(\text{OH})(\text{PO}_{4})_{4} \end{array} $	56.2% Cu	A mineral formed by alteration of copper sulfides. Formed by alteration of copper minerals.	Minor ore of copper. Gem mineral.
		1-2.5	2.8	Bluish green. Grayish green, green- ish black.	Waxy, dull. Submetallic, greasy.	Amorphous, earthy, compact, botryoidal. Foliated, lamellar, scaly, earthy.	 Антериорияти поставуний достовительного достоять, ануже автомного менения 	One perfect.	ACCORDINATION OF THE PROPERTY	Brittle, tough, flexible.	Translucent to opaque.	Soapy feel, usually dark green, foliated.	CHLORITE.	H ₃ Mg ₅ Al ₂ Si ₃ O ₁₈		A common metamorphic mineral.	
#.1	hrayish	2.4	2.7	Green, yellow, red, gray, brown, black.	Dull, resinous, waxy, greasy.	Compact, massive, earthy, fibrous, foliated, columnar.			Splintery, con- choidal.	Brittle.	Translucent to opaque.	Often mottled, clouded, multicolored, soapy feel.	SERPENTINE.	$ m H_4MgSi_2O_9$		Occurs in metamorphic rocks.	Asbestos is a fibrous form, verde antique is used in interior decoration.
Ä	Light (Gr	5-6	2.9-3.3	Black, greenish black, brown. Black, greenish black,	Glassy, dull.	Crystalline, granular, bladed, fibrous, columnar, massive, disseminated.	Prisms.	Prismatic.	Uneven.	Brittle.	Translucent to opaque. Translucent to	Long lath-like crystals and cleavage faces.	HORNBLENDE.	Complex silicate.		Common rock forming mineral.	
		5-6	3.2-3.6	green.	Glassy, dull.	Crystalline, granular, compact, disseminated. Encrustation, columnar, granular, disseminated, crystalline,	Short prisms.	Prismatic. Vertically striated, one good, beachy,	Uneven.	Brittle. Flexible plates, brit-	opaque. Subtransparent,	Short, stout crystals and cleavage faces.	AUGITE.	Complex silicate.		Common rock forming mineral.	
	y Whit	1.5-2	3.4-3.5	Bright lemon yellow or orange yellow.	Resinous, pearly.	foliated.	Prisms, indistinct.	pinacoid.	ADMINISTRAÇÃO (UNIVERSAD DE CARDE DE CARDE CONTRACTOR DE CARDE CON	tle, sectile.	subtranslucent. Transparent.	Becomes red on heating. Low melting point, burns with blue flame and gives a pungent gas. Gives a peculiar noise when two pieces are		As ₂ S ₃	61% As	Hot spring deposit, occurs in lead and silver quartz veins. Ground volcances hot spring deposit. Interbedded with	Used in manufacture of sulfuric acid, matches, insectides,
	r Westl	1.5-2.5	2	Lemon yellow, deep brownish yellow.	Resinous.	Crystalline, massive, globular, stalactitic, powdery. Granular, scaly, nodular, disseminated, fliform, crystalline.	Prisms, pyramids.		Conchoidal. Hackly.	Brittle. Malleable, ductile.	transparent, translucent. Opaque.	rubbed together. Often alloyed with silver.	Sulphur. Gold.	S Au	100% S 100% Au	gypsum. Occurs in veins and in stream deposits.	medicines, insulation, vulcanizer, bleaching agent. Ore of gold. Nuggets sometimes used as gems.
	llow on	2-3	19.5	white. Colorless, gray, orange, yellow, brown, red,	Metallic.	Granular, scaly, nodular, disseminated, filiform, crystalline.	701	0-	Conchoidal.	Brittle.	Transparent,	Often occurs as small crystals in vugs. Moistened with hydrochloric acid and rubbed with knife will yield a blue			39.3% MoO ₃ 56.5% Pb	Occurs in zone of oxidation of lead veins.	Ore of molybdenum. Minor ore of lead.
	ght Ye	3	6.8	green.	Glassy, resinous. Submetallic,	Crystalline, granular, drusy, massive.	Thin, tabular.	One good. Good, dodecahedral, more than one	and the state of t	AMERICAN MARIANTA MARIANTA MARIANTA AND AND AND AND AND AND AND AND AND AN	translucent. Transparent to	Often highly contaminated by hematite, seldom pure, color-	SPHALERITE	PbMoO ₄		Disseminated in limestone. In veins and in contact meta-	Ore of molybdenum. Minor ore of lead. Ore of zinc, often contains silver and cadmium.
	to a state	3.5-4	2.7-3.2	Brown, black, white. Dark brown, black.	resinous. Submetallic, glassy.	Crystalline, massive, disseminated, botryoidal. Micaceous, platy, foliated, flaky, crystalline, scaly, disseminated.		plane of cleavage. One very good.	Conchoidal.	Brittle. Elastic, sectile, tough.	opaque. Transparent, translucent.	less. Easily distinguished by micaceous character and dark color.	Jack. BIOTITE Black mica,	ZnS (H.K) ₂ (Mg.Fe) ₂ . (Al.Fe) ₂ (SiO ₁) ₃	67% Zn	morphic deposits. Common rock mineral.	suver and cadmium.
	Ligh Brown Nearl Whit	3.5-4	3.9	Brown, yellow, black.	Glassy, pearly.	Crystalline, granular, botryoidal, nodular, encrustation, earthy.		Rhombohedral.	Conchoidal.	Brittle.	Translucent to opaque.	Like any iron ore it will yield a magnetic residue if heated before blowpipe with soda and charcoal.	Cidente and the	FeCO ₃	48.2% Fe	Occurs in beds and in nodules gangue in ore deposits.	Minor ore of iron. Often contains enough manganese for use in spiegeleisen.
	Vn or Iow	1-2	2.8	Yellowish brown.	Dull.	Compact, earthy, massive.			Earthy.	Brittle.	Opaque.	Plastic when wet.	Ocher. LIMONITE	A limonite bearing kaolin.		A residual product of weathering.	Paint.
	sh Brov ish Yel	3-6	3.4-4	Reddish brown, yellow- ish brown, black.	Submetallic, dull. Submetallic.	Earthy, encrustation, botryoidal, reniform, massive, porous, amorphous.	Sometimes cubic after pyrite.		CONTRACTOR OF THE PROPERTY OF	Brittle.	Opaque. Translucent to	Often mixed with kaolinite, forms varnish-like coats on rocks, very common brown mineral. Like any manganese mineral, it will yield a green color on	Brown hematite, bog iron ore.	Fe ₂ O ₃ .xH ₂ O	Variable up to 60% Fe	A product of rock weathering. Found in beds and in upper parts of veins.	Ore of iron, often carries gold, silver, lead, zinc. Used in paint.
	ellowie	4.5-5.5	6.7	Pale yellow, red, brown, black.	dull.	Crystalline, bladed, compact, lamellar, fibrous.		One.	Uneven. Conchoidal.	Brittle.	opaque.	fusion with soda. Stained and contaminated by iron oxides, chert is dense,	Huebnerite.	MnWO ₄	76.6% WO ₃	Occurs in quartz veins. Occurs in sedimentary rocks.	Ore of tungsten. Road metal, colored varieties, used in some decorative work.
	H	1-6	2.8 5.2	Browns and reds. Red, reddish brown, steel gray, black.	Waxy, dull. Dull to splendent metallic.	Concretionary, dense, massive. Earthy, clayey, oolitic, granular, compact, botryoidal, columnar, reniform, platy, micaceous, disseminated.			Conchoidal. Uneven.	Brittle. Brittle.	Opaque.	dull, jasper is waxy. A very common reddish brown mineral. See iron test under siderite.		$ m SiO_2$ $ m Fe_2O_3$	70% Fe		Chief ore of iron, used in paint, often contains gold, silver, lead, zinc. Used as a polishing powder.
	Brown ish Rec	3-4		,		, , , , , , , , , , , , , , , , , , , ,	-		Uneven.	Brittle.			Tetrahedrite, gray	Cu ₃ Sb ₂ S ₇	52.6% Cu	A primary sulfide of copper occurring in veins below zone of oxidation.	Ore of copper, quite variable in composition. May carry silver, copper, lead, zinc, mercury.
A100.		**************************************	4.3-5.4	Steel gray, iron black.	Dull, metallic.	Massive, compact, granular, disseminated, crystalline.	Tetrahedrons.		CONTRACTOR OF THE PARTY OF THE		Opaque.	Tarnishes dull.	copper ore.	ZnS	67% Zn	A primary sulfide of zinc in yeins and disseminated.	Ore of zinc often containing cadmium and silver.
	Brow	3.5~4	4.3-5.4	Brown, black.	Dull, metallic. Submetallic. Submetallic,	Massive, compact, granular, disseminated, crystalline. Crystalline, massive, disseminated.	Tabular or	One good.	Conchoidal.	Brittle.	Opaque. Translucent on	Contains hematite. Sometimes feebly magnetic. Gives tests for manganese and	SPHALERITE Black Jack.	FeMnWO ₄	Market and	In voing and normatite dil	One of tungates
	Reddisi	5-5.5	7.1-7.5	Brown, black. Reddish brown, brownish black. Bright red, orange,	Submetallic.	Massive, compact, granular, disseminated, crystalline. Crystalline, massive, disseminated. Crystalline, bladed, lamellar, granular.		One good. One perfect. One rather good, clinopinacoidal.	Conchoidal. Uneven. Conchoidal.	Brittle. Brittle. Brittle.	Opaque.	Contains hematite.	SPHALERITE Black Jack.	AsS	76.5% WO ₃	In veins and pegmatite dikes. Occurs in veins and in hot spring deposits.	Ore of tungsten. Not a commercial source of As.
	Reddist			Brown, black. Reddish brown, brownish black.	Submetallic. Submetallic, greasy.	Massive, compact, granular, disseminated, crystalline. Crystalline, massive, disseminated.	Tabular or columnar.	One perfect. One rather good.	Uneven.	Brittle.	Opaque. Translucent on thin edges. Transparent,	Contains hematite. Sometimes feebly magnetic. Gives tests for manganese and tungsten.	SPHALERITE Black Jack. Wolframite.	AsS Ag ₆ As ₂ S ₆	ADDRESS	Occurs in veins and in hot spring deposits. In veins, usually in zone of secondary enrichment.	NOT SEED, THE OF THE PROPERTY
	18 Reds Beddish	5-5.5	7.1-7.5 3.6	Brown, black. Reddish brown, brownish black. Bright red, orange, yellow. Grayish black, scarlet. Vermillion red.	Submetallic. Submetallic, greasy. Resinous. Adamantine. Adamantine, dull.	Massive, compact, granular, disseminated, crystalline. Crystalline, massive, disseminated. Crystalline, bladed, lamellar, granular. Crystalline, encrustation, massive, granular, disseminated.	Tabular or columnar.	One perfect. One rather good.	Uneven. Conchoidal.	Brittle. Brittle.	Opaque. Translucent on thin edges. Transparent, translucent. Transparent, translucent. Transparent to opaque.	Contains hematite. Sometimes feebly magnetic. Gives tests for manganese and tungsten.	copper ore. SPHALERITE Black Jack. Wolframite. Realgar. Proustite, light ruby silver. Cinnabar, natural vermillion.		70.1% As	Occurs in veins and in hot spring deposits. In veins, usually in zone of secondary enrichment. In veins and in sediments cut by veins. In hot spring deposits.	Not a commercial source of As. Ore of silver. Ore of mercury.
	Various Reds Beddish	5-5.5 1.5-2 2-2.5 2-2.5 2.5-8	4 7.1-7.5 3.6 5.6 8.1 5.8	Brown, black. Reddish brown, brownish black. Bright red, orange, yellow. Grayish black, scarlet. Vermillion red. Grayish black, dark red.	Submetallic. Submetallic, greasy. Resinous. Adamantine. Adamantine, dull. Adamantine, metallic.	Massive, compact, granular, disseminated, crystalline. Crystalline, massive, disseminated. Crystalline, bladed, lamellar, granular. Crystalline, encrustation, massive, granular, disseminated. Crystalline, disseminated, massive, banded, encrustation. Crystalline, encrustation, massive, granular, disseminated, earthy. Crystalline, disseminated, encrustation, massive, banded.	Tabular or columnar.	One perfect. One rather good.	Uneven. Conchoidal. Uneven, conchoidal.	Brittle. Brittle. Brittle. Slightly sectile. Brittle.	Opaque. Translucent on thin edges. Transparent, translucent. Transparent translucent. Transparent to opaque. Thin splinters transmit red light.	Contains hematite. Sometimes feebly magnetic. Gives tests for manganese and tungsten. Burns with a garlic odor. Alters to orpiment. Will give white streaks when moistened with acid and rubbed on copper.	sopper ore. SPHALERITE Black Jack. Wolframite. Realgar. Proustite, light ruby silver. Cinnabar, natural vermillion. Pyrargyrite, dark ruby silver.	$\begin{array}{c} {\rm Ag_6As_2S_6} \\ {\rm HgS} \\ {\rm Ag_6Sb_2S_6} \end{array}$	70.1% As 65.4% Ag 86.6% Hg 60% Ag	Occurs in veins and in hot spring deposits. In veins, usually in zone of secondary enrichment. In veins and in sediments cut by veins. In hot spring deposits. In veins, usually with pyrargyrite. In upper parts of veins. In sediments cut by veins. In	Not a commercial source of As. Ore of silver. Ore of mercury. Ore of silver.
	Verious Reds Beddish	5-5.5 1.5-2 2-2.5 2-2.5 2.5-3	4 7.1-7.5 3.6 5.6 8.1	Brown, black. Reddish brown, brownish black. Bright red, orange, yellow. Grayish black, scarlet. Vermillion red.	Submetallic. Submetallic, greasy. Resinous. Adamantine. Adamantine, dull. Adamantine,	Massive, compact, granular, disseminated, crystalline. Crystalline, massive, disseminated. Crystalline, bladed, lamellar, granular. Crystalline, encrustation, massive, granular, disseminated. Crystalline, disseminated, massive, banded, encrustation. Crystalline, encrustation, massive, granular, disseminated, earthy.	Tabular or columnar.	One perfect. One rather good, clinopinacoidal.	Uneven. Conchoidal.	Brittle. Brittle. Brittle. Slightly sectile.	Opaque. Translucent on thin edges. Transparent, translucent. Transparent, translucent. Transparent to opaque. Thin splinters trans.	Contains hematite. Sometimes feebly magnetic. Gives tests for manganese and tungsten. Burns with a garlic odor. Alters to orpiment. Will give white streaks when moistened with acid and	copper ore. SPHALERITE Black Jack. Wolframite. Realgar. Proustite, light ruby silver. Cinnabar, natural vermillion. Pyrargyrite, dark	$ m Ag_0As_2S_6$ $ m HgS$	70.1% As 65.4% Ag 86.6% Hg	Occurs in veins and in hot spring deposits. In veins, usually in zone of secondary enrichment. In veins and in sediments cut by veins. In hot spring deposits. In veins, usually with pyrargyrite.	Not a commercial source of As. Ore of silver. Ore of mercury.
E A K CO	Nainy Various Reds Beddish Green.	5-5.5 1.5-2 2-2.5 2-2.5 2.5-8	4 7.1-7.5 3.6 5.6 8.1 5.8	Brown, black. Reddish brown, brownish black. Bright red, orange, yellow. Grayish black, scarlet. Vermillion red. Grayish black, dark red. Copper red. Reddish brown, red,	Submetallic. Submetallic, greasy. Resinous. Adamantine. Adamantine, dull. Adamantine, metallic.	Massive, compact, granular, disseminated, crystalline. Crystalline, massive, disseminated. Crystalline, bladed, lamellar, granular. Crystalline, encrustation, massive, granular, disseminated. Crystalline, disseminated, massive, banded, encrustation. Crystalline, encrustation, massive, granular, disseminated, earthy. Crystalline, disseminated, encrustation, massive, banded. Crystalline, massive, granular, disseminated, wiry.	Tabular or columnar.	One perfect. One rather good, clinopinacoidal.	Uneven. Conchoidal. Uneven, conchoidal. Hackly. Uneven, con-	Brittle. Brittle. Brittle. Slightly sectile. Brittle. Ductile, malleable. Brittle. Flexible, sectile.	Opaque. Translucent on thin edges. Transparent, translucent. Transparent, translucent. Transparent to opaque. Opaque. Transparent to transmit red light.	Contains hematite. Sometimes feelly magnetic. Gives tests for manganese and tungsten. Burns with a garlic odor. Alters to orpiment. Will give white streaks when moistened with acid and rubbed on copper. Often tarnished brown, green or blue.	copper ore. SPHALERITE Black Jack. Wolframite. Realgar. Proustite, light ruby silver. Cinnabar, natural vermillion. Pyrargyrite, dark ruby silver. Copper. Cuprite. Molybdenite.	$egin{array}{c} Ag_6As_2S_6 & & & \\ HgS & & & \\ Ag_0Sb_2S_6 & & & \\ Cu & & & \\ CuO & & & \\ MoS & & & \\ \end{array}$	70.1% As 65.4% Ag 86.6% Hg 60% Ag 100% Cu	Occurs in veins and in hot spring deposits. In veins, usually in zone of secondary enrichment. In veins and in sediments cut by veins. In hot spring deposits. In veins, usually with pyrargyrite. In upper parts of veins. In sediments cut by veins. In igneous rocks.	Not a commercial source of As. Ore of silver. Ore of mercury. Ore of copper. Ore of copper. Ore of molybdenum.
REAK CO	Gery Shiny Various Reds Beddist Brown Show	5-5.5 1.5-2 2-2.5 2-2.5 2.5-3 2.5-3 3.5-4	4 7.1-7.5 3.6 5.6 8.1 5.8	Brown, black. Reddish brown, brownish black. Bright red, orange, yellow. Grayish black, scarlet. Vermillion red. Grayish black, dark red. Copper red. Reddish brown, red, black. Bluish gray. Black to gray.	Submetallic. Submetallic, greasy. Resinous. Adamantine. Adamantine, dull. Adamantine, metallic. Metallic. Glassy, earthy.	Massive, compact, granular, disseminated, crystalline. Crystalline, massive, disseminated. Crystalline, bladed, lamellar, granular. Crystalline, encrustation, massive, granular, disseminated. Crystalline, disseminated, massive, banded, encrustation. Crystalline, encrustation, massive, granular, disseminated, earthy. Crystalline, disseminated, encrustation, massive, banded. Crystalline, massive, granular, disseminated, wiry. Crystalline, granular, earthy, massive. Scaly, foliated, disseminated, granular. Scaly, platy, foliated in clayey masses, disseminated in rock.	Tabular or columnar.	One perfect. One rather good, clinopinacoidal. One.	Uneven. Conchoidal. Uneven, conchoidal. Hackly. Uneven, con-	Brittle. Brittle. Brittle. Slightly sectile. Brittle. Ductile, malleable. Brittle.	Opaque. Translucent on thin edges. Transparent, translucent. Transparent to opaque. Thin splinters transmit red light. Opaque. Transparent to opaque. Transparent to Transparent to Opaque. Transparent to Opaque.	Contains hematite. Sometimes feebly magnetic. Gives tests for manganese and tungsten. Burns with a garlic odor. Alters to orpiment. Will give white streaks when moistened with acid and rubbed on copper. Often tarnished brown, green or blue. See copper test under azurite.	copper ore. SPHALERITE Black Jack. Wolframite. Realgar. Proustite, light ruby silver. Cinnabar, natural vermillion. Pyrargyrite, dark ruby silver. Copper. Cuprite.	$egin{array}{c} Ag_6As_2S_6 & & & \\ HgS & & & \\ Ag_0Sb_2S_6 & & & \\ Cu & & & \\ CuO & & & \\ MoS & & & \\ \end{array}$	70.1% As 65.4% Ag 86.6% Hg 60% Ag 100% Cu 88.8% Cu	Occurs in veins and in hot spring deposits. In veins, usually in zone of secondary enrichment. In veins and in sediments cut by veins. In hot spring deposits. In veins, usually with pyrargyrite. In upper parts of veins. In sediments cut by veins. In igneous rocks. Found in upper oxidized portion of copper veins.	Not a commercial source of As. Ore of silver. Ore of mercury. Ore of silver. Ore of copper. Ore of copper. Ore of molybdenum. Used in manufacture of black paint, polish, crucibles, lead pencils, lubricants.
TREAK CO	Blinis Shiny Various Reds Beddist Brown Br	5-5.5 1.5-2 2-2.5 2-2.5 2.5-3 2.5-3 3.5-4 1-1.5	4 7.1-7.5 2.6 5.6 8.1 5.8 8.8 6 4.7 4.8	Brown, black. Reddish brown, brownish black. Bright red, orange, yellow. Grayish black, scarlet. Vermillion red. Grayish black, dark red. Copper red. Reddish brown, red, black. Bluish gray.	Submetallic. Submetallic, greasy. Resinous. Adamantine. Adamantine, dull. Adamantine, metallic. Metallic. Glassy, earthy. Metallic. Submetallic,	Massive, compact, granular, disseminated, crystalline. Crystalline, massive, disseminated. Crystalline, bladed, lamellar, granular. Crystalline, encrustation, massive, granular, disseminated. Crystalline, disseminated, massive, banded, encrustation. Crystalline, encrustation, massive, granular, disseminated, earthy. Crystalline, disseminated, encrustation, massive, banded. Crystalline, massive, granular, disseminated, wiry. Crystalline, granular, earthy, massive. Scaly, foliated, disseminated, granular.	Tabular or columnar. Prisms, vertically striated.	One perfect. One rather good, clinopinacoidal. One. One. One very good. One good.	Uneven. Conchoidal. Uneven, conchoidal. Hackly. Uneven, con-	Brittle. Brittle. Brittle. Slightly sectile. Brittle. Ductile, malleable. Brittle. Flexible, sectile. Flexible in thin plates, sectile. Brittle.	Opaque. Translucent on thin edges. Transparent, translucent. Transparent to opaque. Thin splinters transmit red light. Opaque. Transparent to opaque. Thin flakes, translucent to opaque.	Contains hematite. Sometimes feebly magnetic. Gives tests for manganese and tungsten. Burns with a garlic odor. Alters to orpiment. Will give white streaks when moistened with acid and rubbed on copper. Often tarnished brown, green or blue. See copper test under azurite. Soapy feel, marks paper. Distinguished by its blue tinge. Soapy feel. Often carries gold. See manganese test under huebnerite.	copper ore. SPHALERITE Black Jack. Wolframite. Realgar. Proustite, light ruby silver. Cinnabar, natural vermillion. Pyrargyrite, dark ruby silver. Copper. Cuprite. Molybdenite. Graphite, pencil ore,	$egin{array}{c} Ag_6As_2S_6 & & & \\ HgS & & & \\ Ag_0Sb_2S_6 & & & \\ Cu & & & \\ CuO & & & \\ MoS & & & \\ \end{array}$	70.1% As 65.4% Ag 86.6% Hg 60% Ag 100% Cu 88.8% Cu 60% Mo	Occurs in veins and in hot spring deposits. In veins, usually in zone of secondary enrichment. In veins and in sediments cut by veins. In hot spring deposits. In veins, usually with pyrargyrite. In upper parts of veins. In sediments cut by veins. In igneous rocks. Found in upper oxidized portion of copper veins. Occurs in granite, gneiss, limestone and in quartz veins.	Not a commercial source of As. Ore of silver. Ore of mercury. Ore of copper. Ore of copper. Ore of molybdenum. Used in manufacture of black paint, polish, crucibles, lead pencils, lubricants. Used in manufacture of ferro manganese steels and bronzes, in paint, and in chemicals.
STREAK CO	Sinris Ninr Various Reds Beddist Brown Bro	5-5.5 1.5-2 2-2.5 2-2.5 2.5-3 2.5-3 3.5-4 1-1.5 1-2	4 7.1-7.5 3.6 5.6 8.1 5.8 8.3 6 4.7 4.8 2.2	Brown, black. Reddish brown, brownish black. Bright red, orange, yellow. Grayish black, scarlet. Vermillion red. Grayish black, dark red. Copper red. Reddish brown, red, black. Bluish gray. Black to gray.	Submetallic. Submetallic, greasy. Resinous. Adamantine. Adamantine, dull. Adamantine, metallic. Metallic. Glassy, earthy. Metallic. Submetallic, dull.	Massive, compact, granular, disseminated, crystalline. Crystalline, massive, disseminated. Crystalline, bladed, lamellar, granular. Crystalline, encrustation, massive, granular, disseminated. Crystalline, disseminated, massive, banded, encrustation. Crystalline, encrustation, massive, granular, disseminated, earthy. Crystalline, disseminated, encrustation, massive, banded. Crystalline, massive, granular, disseminated, wiry. Crystalline, granular, earthy, massive. Scaly, foliated, disseminated, granular. Scaly, platy, foliated in clayey masses, disseminated in rock. Earthy, granular, compact, radiating, dendritic, encrustation. Acicular, crystalline, bladed, radiating, columnar, granular.	Tabular or columnar. Prisms, vertically striated. Vertically striated, needle-like, prismatic.	One perfect. One rather good, clinopinacoidal. One. One. One very good. One good. One good. One good face often striated transversely.	Uneven. Conchoidal. Uneven, conchoidal. Hackly. Uneven, con-	Brittle. Brittle. Brittle. Slightly sectile. Brittle. Ductile, malleable. Brittle. Flexible, sectile. Flexible in thin plates, sectile. Brittle. Slightly sectile, flexible, brittle.	Opaque. Translucent on thin edges. Transparent, translucent. Transparent, translucent. Transparent to opaque. Thin splinters transmit red light. Opaque. Transparent to opaque. Opaque. Opaque. Opaque. Opaque.	Contains hematite. Sometimes feebly magnetic. Gives tests for manganese and tungsten. Burns with a garlic odor. Alters to orpiment. Will give white streaks when moistened with acid and rubbed on copper. Often tarnished brown, green or blue. See copper test under azurite. Soapy feel, marks paper. Distinguished by its blue tinge. Soapy feel. Often carries gold. See manganese test under huebnerite. Fuses easily, tarnishes black to iridescent or alters to a yellowish white oxide. Acicular structure not common as it is in stibnite. Often	copper ore. SPHALERITE Black Jack. Wolframite. Realgar. Proustite, light ruby silver. Cinnabar, natural vermillion. Pyrargyrite, dark ruby silver. Copper. Cuprite. Molybdenite. Graphite, pencil ore, plumbago. PYROLUSITE. STIBNITE.	$egin{array}{c} Ag_cAs_2S_0 & & & \\ HgS & & & \\ Ag_oSb_2S_0 & & & \\ Cu & & & \\ CuO & & & \\ MoS & & & \\ & & &$	70.1% As 65.4% Ag 86.6% Hg 60% Ag 100% Cu 88.8% Cu 60% Mo 100% C 63.2% Mn	Occurs in veins and in hot spring deposits. In veins, usually in zone of secondary enrichment. In veins and in sediments cut by veins. In hot spring deposits. In veins, usually with pyrargyrite. In upper parts of veins. In sediments cut by veins. In igneous rocks. Found in upper oxidized portion of copper veins. Occurs in granite, gneiss, limestone and in quartz veins. Occurs in all types of rocks. Chiefly a metamorphic mineral. Occurs in upper part of veins. A product of rock weathering.	Not a commercial source of As. Ore of silver. Ore of mercury. Ore of copper. Ore of copper. Ore of molybdenum. Used in manufacture of black paint, polish, crucibles, lead pencils, lubricants. Used in manufacture of ferro manganese steels and bronzes, in paint, and in chemicals. Source of antimony and its compounds. Used in fireworks, safety matches, rubber goods, percussion caps.
	Gray Burs Gree Gree Shiny Green Shiny Brown Brown Brown Brown Shink Green Shink Green Shink Green Shink Shin	5-5.5 1.5-2 2-2.5 2-2.5 2.5-8 2.5-3 3.5-4 1-1.5 1-2 1-2.5 2	4 7.1-7.5 3.6 5.6 8.1 5.8 8.3 6 4.7 4.8 2.2 4.8	Brown, black. Reddish brown, brownish black. Bright red, orange, yellow. Grayish black, scarlet. Vermillion red. Grayish black, dark red. Copper red. Reddish brown, red, black. Bluish gray. Black to gray. Black, dark steel gray. Lead gray. Lead gray.	Submetallic. Submetallic, greasy. Resinous. Adamantine. Adamantine, dull. Adamantine, metallic. Glassy, earthy. Metallic. Submetallic, dull. Metallic, dull. Metallic.	Massive, compact, granular, disseminated, crystalline. Crystalline, massive, disseminated. Crystalline, bladed, lamellar, granular. Crystalline, encrustation, massive, granular, disseminated. Crystalline, encrustation, massive, banded, encrustation. Crystalline, encrustation, massive, granular, disseminated, earthy. Crystalline, disseminated, encrustation, massive, banded. Crystalline, massive, granular, disseminated, wiry. Crystalline, granular, earthy, massive. Scaly, foliated, disseminated, granular. Scaly, platy, foliated in clayey masses, disseminated in rock. Earthy, granular, compact, radiating, dendritic, encrustation. Acicular, crystalline, bladed, radiating, columnar, granular. Foliated, acicular, massive, disseminated.	Tabular or columnar. Prisms, vertically striated. Vertically striated, needle-like, pris-	One perfect. One rather good, clinopinacoidal. One. One. One very good. One good. One good, face often striated trans-	Uneven. Conchoidal. Uneven, conchoidal. Hackly. Uneven, conchoidal.	Brittle. Brittle. Brittle. Slightly sectile. Brittle. Ductile, malleable. Brittle. Flexible, sectile. Flexible in thin plates, sectile. Brittle. Brittle.	Opaque. Translucent on thin edges. Transparent, translucent. Transparent to opaque. Thin splinters transmit red light. Opaque. Thin flakes, translucent to opaque. Opaque. Opaque. Opaque. Opaque. Opaque.	Contains hematite. Sometimes feelly magnetic. Gives tests for manganese and tungsten. Burns with a garlic odor. Alters to orpiment. Will give white streaks when moistened with acid and rubbed on copper. Often tarnished brown, green or blue. See copper test under azurite. Soapy feel, marks paper. Distinguished by its blue tinge. Soapy feel. Often carries gold. See manganese test under huebnerite. Fuses easily, tarnishes black to iridescent or alters to a yellowish white oxide. Acicular structure not common as it is in stibnite. Often coated with a yellow iridescent tarnish. Becomes dull on exposure. Swells and fuses when heated	copper ore. SPHALERITE Black Jack. Wolframite. Realgar. Proustite, light ruby silver. Cinnabar, natural vermillion. Pyrargyrite, dark ruby silver. Copper. Cuprite. Molybdenite. Graphite, pencil ore, plumbago. PYROLUSITE. STIBNITE. Bismuthinite.	Ag ₆ As ₂ S ₆ HgS Ag ₉ Sb ₂ S ₆ Cu CuO MoS C MnO ₂	70.1% As 65.4% Ag 86.6% Hg 60% Ag 100% Cu 88.8% Cu 60% Mo 100% C	Occurs in veins and in hot spring deposits. In veins, usually in zone of secondary enrichment. In veins and in sediments cut by veins. In hot spring deposits. In veins, usually with pyrargyrite. In upper parts of veins. In sediments cut by veins. In igneous rocks. Found in upper oxidized portion of copper veins. Occurs in granite, gneiss, limestone and in quartz veins. Occurs in all types of rocks. Chiefly a metamorphic mineral. Occurs in upper part of veins. A product of rock weathering.	Not a commercial source of As. Ore of silver. Ore of mercury. Ore of copper. Ore of copper. Ore of molybdenum. Used in manufacture of black paint, polish, crucibles, lead pencils, lubricants. Used in manufacture of ferro manganese steels and bronzes, in paint, and in chemicals. Source of antimony and its compounds. Used in fireworks,
	Lead Gray Bursh Grey Shiry Various Reds Brow	5-5.5 1.5-2 2-2.5 2-2.5 2.5-3 2.5-3 3.5-4 1-1.5 1-2	4 7.1-7.5 3.6 5.6 8.1 5.8 8.3 6 4.7 4.8 2.2 4.8	Brown, black. Reddish brown, brownish black. Bright red, orange, yellow. Grayish black, scarlet. Vermillion red. Grayish black, dark red. Copper red. Reddish brown, red, black. Bluish gray. Black to gray. Black, dark steel gray. Lead gray.	Submetallic. Submetallic, greasy. Resinous. Adamantine. Adamantine, dull. Adamantine, metallic. Metallic. Glassy, earthy. Metallic, dull. Metallic, dull. Metallic, dull.	Massive, compact, granular, disseminated, crystalline. Crystalline, massive, disseminated. Crystalline, bladed, lamellar, granular. Crystalline, encrustation, massive, granular, disseminated. Crystalline, disseminated, massive, banded, encrustation. Crystalline, encrustation, massive, granular, disseminated, earthy. Crystalline, disseminated, encrustation, massive, banded. Crystalline, massive, granular, disseminated, wiry. Crystalline, granular, earthy, massive. Scaly, foliated, disseminated, granular. Scaly, platy, foliated in clayey masses, disseminated in rock. Earthy, granular, compact, radiating, dendritic, encrustation. Acicular, crystalline, bladed, radiating, columnar, granular.	Tabular or columnar. Prisms, vertically striated. Vertically striated, needle-like, prismatic.	One perfect. One rather good, clinopinacoidal. One. One. One very good. One good. One good. One good face often striated transversely.	Uneven. Conchoidal. Uneven, conchoidal. Hackly. Uneven, conchoidal.	Brittle. Brittle. Brittle. Slightly sectile. Brittle. Ductile, malleable. Brittle. Flexible, sectile. Flexible in thin plates, sectile. Brittle. Slightly sectile, flexible, brittle. Slightly sectile.	Opaque. Translucent on thin edges. Transparent, translucent. Transparent, translucent. Transparent to opaque. Thin splinters transmit red light. Opaque. Transparent to opaque. Opaque. Opaque. Opaque. Opaque.	Contains hematite. Sometimes feebly magnetic. Gives tests for manganese and tungsten. Burns with a garlic odor. Alters to orpiment. Will give white streaks when moistened with acid and rubbed on copper. Often tarnished brown, green or blue. See copper test under azurite. Soapy feel, marks paper. Distinguished by its blue tinge. Soapy feel. Often carries gold. See manganese test under huebnerite. Fuses easily, tarnishes black to iridescent or alters to a yellowish white oxide. Acicular structure not common as it is in stibnite. Often coated with a yellow iridescent tarnish.	copper ore. SPHALERITE Black Jack. Wolframite. Realgar. Proustite, light ruby silver. Cinnabar, natural vermillion. Pyrargyrite, dark ruby silver. Copper. Cuprite. Molybdenite. Graphite, pencil ore, plumbago. PYROLUSITE. STIBNITE. Bismuthinite.	AgcA82Sc HgS AgcSb2Sc Cu CuO MoS C MnO2 Sb2S3 B12S3	70.1% As 65.4% Ag 86.6% Hg 60% Ag 100% Cu 88.8% Cu 60% Mo 100% C 63.2% Mn 71.4% Sb 81.2% Bi	Occurs in veins and in hot spring deposits. In veins, usually in zone of secondary enrichment. In veins and in sediments cut by veins. In hot spring deposits. In veins, usually with pyrargyrite. In upper parts of veins. In sediments cut by veins. In igneous rocks. Found in upper oxidized portion of copper veins. Occurs in granite, gneiss, limestone and in quartz veins. Occurs in all types of rocks. Chiefly a metamorphic mineral. Occurs in upper part of veins. A product of rock weathering. A quartz vein mineral.	Not a commercial source of As. Ore of silver. Ore of mercury. Ore of silver. Ore of copper. Ore of copper. Ore of molybdenum. Used in manufacture of black paint, polish, crucibles, lead pencils, lubricants. Used in manufacture of ferro manganese steels and bronzes, in paint, and in chemicals. Source of antimony and its compounds. Used in fireworks, safety matches, rubber goods, percussion caps.
	SO Lead Gray Suis Gree Gree Suis Brown Suis Brown Suis Suis Suis Suis Suis Suis Suis Suis	5-5.5 1.5-2 2-2.5 2-2.5 2.5-3 2.5-3 3.5-4 1-1.5 1-2 1-2.5 2 2-2.5	4 7.1-7.5 3.6 5.6 8.1 5.8 8.3 6 4.7 4.8 2.2 4.8 4.6 6.5	Brown, black. Reddish brown, brownish black. Bright red, orange, yellow. Grayish black, scarlet. Vermillion red. Grayish black, dark red. Copper red. Reddish brown, red, black. Bluish gray. Black to gray. Black, dark steel gray. Lead gray. Lead gray. Lead gray.	Submetallic. Submetallic, greasy. Resinous. Adamantine. Adamantine, dull. Adamantine, metallic. Metallic. Submetallic, dull. Metallic, dull. Metallic, dull. Metallic. Metallic, dull.	Massive, compact, granular, disseminated, crystalline. Crystalline, massive, disseminated. Crystalline, bladed, lamellar, granular. Crystalline, encrustation, massive, granular, disseminated. Crystalline, disseminated, massive, banded, encrustation. Crystalline, encrustation, massive, granular, disseminated, earthy. Crystalline, disseminated, encrustation, massive, banded. Crystalline, massive, granular, disseminated, wiry. Crystalline, granular, earthy, massive. Scaly, foliated, disseminated, granular. Scaly, platy, foliated in clayey masses, disseminated in rock. Earthy, granular, compact, radiating, dendritic, encrustation. Acicular, crystalline, bladed, radiating, columnar, granular. Foliated, acicular, massive, disseminated. Massive, encrustation, arborescent, disseminated.	Tabular or columnar. Prisms, vertically striated. Vertically striated, needle-like, prismatic. Needle-like.	One perfect. One rather good, clinopinacoidal. One. One. One very good. One good. One good. One good. One good. One good.	Uneven. Conchoidal. Uneven, conchoidal. Hackly. Uneven, conchoidal.	Brittle. Brittle. Brittle. Slightly sectile. Brittle. Ductile, malleable. Brittle. Flexible, sectile. Flexible in thin plates, sectile. Brittle. Slightly sectile, flexible, brittle. Slightly sectile. Sectile, brittle.	Opaque. Translucent on thin edges. Transparent, translucent. Transparent, translucent. Transparent to opaque. Thin splinters transmit red light. Opaque. Transparent to opaque. Opaque. Opaque. Opaque. Opaque. Opaque. Opaque. Opaque.	Contains hematite. Sometimes feebly magnetic. Gives tests for manganese and tungsten. Burns with a garlic odor. Alters to orpiment. Will give white streaks when moistened with acid and rubbed on copper. Often tarnished brown, green or blue. See copper test under azurite. Soapy feel, marks paper. Distinguished by its blue tinge. Soapy feel. Often carries gold. See manganese test under huebnerite. Fuses easily, tarnishes black to iridescent or alters to a yellowish white oxide. Acicular structure not common as it is in stibnite. Often coated with a yellow iridescent tarnish. Becomes dull on exposure. Swells and fuses when heated on charcoal before blowpipe.	copper ore. SPHALERITE Black Jack. Wolframite. Realgar. Proustite, light ruby silver. Cinnabar, natural vermillion. Pyrargyrite, dark ruby silver. Copper. Cuprite. Molybdenite. Graphite, pencil ore, plumbago. PYROLUSITE. STIBNITE. Bismuthinite. Argentite. GALENA. CHALCOCITE Copper glance.	$Ag_{0}As_{2}S_{0}$ HgS $Ag_{0}Sb_{2}S_{0}$ Cu CuO MoS C MnO_{2} $Sb_{2}S_{3}$ $B_{12}S_{3}$ $Ag_{2}S$	70.1% As 65.4% Ag 86.6% Hg 60% Ag 100% Cu 88.8% Cu 60% Mo 100% C 63.2% Mn 71.4% Sb 81.2% Bi 87.1% Ag	Occurs in veins and in hot spring deposits. In veins, usually in zone of secondary enrichment. In veins and in sediments cut by veins. In hot spring deposits. In veins, usually with pyrargyrite. In upper parts of veins. In sediments cut by veins. In igneous rocks. Found in upper oxidized portion of copper veins. Occurs in granite, gneiss, limestone and in quartz veins. Occurs in all types of rocks. Chiefly a metamorphic mineral. Occurs in upper part of veins. A product of rock weathering. A quartz vein mineral. A quartz vein mineral. A mineral of the zone of secondary enrichment. Occurs in veins and disseminated in limestones.	Not a commercial source of As. Ore of silver. Ore of mercury. Ore of silver. Ore of copper. Ore of copper. Ore of molybdenum. Used in manufacture of black paint, polish, crucibles, lead pencils, lubricants. Used in manufacture of ferro manganese steels and bronzes, in paint, and in chemicals. Source of antimony and its compounds. Used in fireworks, safety matches, rubber goods, percussion caps. Not common. Ore of silver. Ore of lead, often carries silver.
	ARLY SO Blursh Kery Green Name Various Reds Beddist lack Lead Gray Bulk Kery Green Island Brown	5-5.5 1.5-2 2-2.5 2-2.5 2.5-3 2.5-3 3.5-4 1-1.5 1-2 1-2.5 2 2 2-2.5 2.5-3	4 7.1-7.5 2.6 5.6 8.1 5.8 8.3 6 4.7 4.8 2.2 4.8 4.6 6.5 7.3	Brown, black. Reddish brown, brownish black. Bright red, orange, yellow. Grayish black, scarlet. Vermillion red. Grayish black, dark red. Copper red. Reddish brown, red, black. Bluish gray. Black to gray. Black dark steel gray. Lead gray. Lead gray. Lead gray. Lead gray. Lead gray. Bronze, copper red, purple.	Submetallic. Submetallic, greasy. Resinous. Adamantine. Adamantine, dull. Adamantine, metallic. Glassy, earthy. Metallic. Submetallic, dull. Metallic. Metallic. Metallic. Metallic. Metallic. Metallic. Metallic. Metallic.	Massive, compact, granular, disseminated, crystalline. Crystalline, massive, disseminated. Crystalline, bladed, lamellar, granular. Crystalline, encrustation, massive, granular, disseminated. Crystalline, encrustation, massive, banded, encrustation. Crystalline, encrustation, massive, granular, disseminated, earthy. Crystalline, disseminated, encrustation, massive, banded. Crystalline, massive, granular, disseminated, wiry. Crystalline, granular, earthy, massive. Scaly, foliated, disseminated, granular. Scaly, platy, foliated in clayey masses, disseminated in rock. Earthy, granular, compact, radiating, dendritic, encrustation. Acicular, crystalline, bladed, radiating, columnar, granular. Foliated, acicular, massive, disseminated. Massive, encrustation, arborescent, disseminated. Crystalline, granular, massive, disseminated. Massive, disseminated, granular, crystalline, earthy. Compact, granular, disseminated.	Tabular or columnar. Prisms, vertically striated. Vertically striated, needle-like, prismatic. Needle-like. Cubes, octahedrons.	One perfect. One rather good, clinopinacoidal. One. One. One very good. One good. One good. One good. One good. One good.	Uneven. Conchoidal. Uneven, conchoidal. Hackly. Uneven, conchoidal. Subconchoidal. Subconchoidal. Conchoidal.	Brittle. Brittle. Brittle. Slightly seetile. Brittle. Ductile, malleable. Brittle. Flexible, sectile. Flexible in thin plates, sectile. Brittle. Slightly sectile, flexible, brittle. Slightly sectile. Sectile, brittle. Brittle. Brittle. Brittle. Brittle. Brittle.	Opaque. Translucent on thin edges. Transparent, translucent. Transparent, translucent. Transparent to opaque. Thin splinters transmit red light. Opaque. Transparent to opaque.	Contains hematite. Sometimes feelly magnetic. Gives tests for manganese and tungsten. Burns with a garlic odor. Alters to orpiment. Will give white streaks when moistened with acid and rubbed on copper. Often tarnished brown, green or blue. See copper test under azurite. Soapy feel, marks paper. Distinguished by its blue tinge. Soapy feel. Often carries gold. See manganese test under huebnerite. Fuses easily, tarnishes black to iridescent or alters to a yellowish white oxide. Acicular structure not common as it is in stibnite. Often coated with a yellow iridescent tarnish. Becomes dull on exposure. Swells and fuses when heated on charcoal before blowpipe. Readily distinguished by its weight and cleavage. Takes on a black or dull red tarnish or a blue or green coat. Often coats other copper sulfides.	copper ore. SPHALERITE Black Jack. Wolframite. Realgar. Proustite, light ruby silver. Cinnabar, natural vermillion. Pyrargyrite, dark ruby silver. Copper. Cuprite. Molybdenite. Graphite, pencil ore, plumbago. PYROLUSITE. STIBNITE. Bismuthinite. Argentite. GALENA. CHALCOCITE Copper glance. BORNITE "Horse-flesh ore,"	AgcAs2Sc HgS AgcSb2Sc Cu CuO MoS C MnO2 Sb2Sc B12Sc PbS Cu2S Copper iron sulfide.	70.1% As 65.4% Ag 86.6% Hg 60% Ag 100% Cu 88.8% Cu 60% Mo 100% C 63.2% Mn 71.4% Sb 81.2% Bi 87.1% Ag 86.6% Pb 79.8% Cu 63.2% Cu	Occurs in veins and in hot spring deposits. In veins, usually in zone of secondary enrichment. In veins and in sediments cut by veins. In hot spring deposits. In veins, usually with pyrargyrite. In upper parts of veins. In sediments cut by veins. In igneous rocks. Found in upper oxidized portion of copper veins. Occurs in granite, gneiss, limestone and in quartz veins. Occurs in all types of rocks. Chiefly a metamorphic mineral. Occurs in upper part of veins. A product of rock weathering. A quartz vein mineral. A quartz vein mineral. A mineral of the zone of secondary enrichment. Occurs in veins and disseminated in limestones. Commonly found in the zone of secondary enrichment. A primary sulfide in quartz veins, a contact impregnation in sediments, also a mineral of secondary enrichment zone. Primary vein ore, disseminated in country rock. Common	Not a commercial source of As. Ore of silver. Ore of mercury. Ore of silver. Ore of copper. Ore of copper. Ore of molybdenum. Used in manufacture of black paint, polish, crucibles, lead pencils, lubricants. Used in manufacture of ferro manganese steels and bronzes, in paint, and in chemicals. Source of antimony and its compounds. Used in fireworks, safety matches, rubber goods, percussion caps. Not common. Ore of silver. Ore of lead, often carries silver. Ore of copper. Ore of copper, frequently carries small amounts of gold, silver.
	R WEARLY SO Tray-Black Lead Gray Blinis Gray Green Gray Bull of ay Bull of a	5-5.5 1.5-2 2-2.5 2-2.5 2.5-3 3.5-4 1-1.5 1-2 1-2.5 2 2-2.5 2.5-3 3.3-4	4 7.1-7.5 2.6 5.6 8.1 5.8 8.3 6 4.7 4.8 2.2 4.8 4.6 6.5 7.3	Brown, black. Reddish brown, brownish black. Bright red, orange, yellow. Grayish black, scarlet. Vermillion red. Grayish black, dark red. Copper red. Reddish brown, red, black. Bluish gray. Black to gray. Black dark steel gray. Lead gray. Lead gray. Lead gray. Lead gray. Steel gray. Bronze, copper red, purple. Steel gray, iron black.	Submetallic. Submetallic, greasy. Resinous. Adamantine. Adamantine, dull. Adamantine, metallic. Glassy, earthy. Metallic. Submetallic, dull. Metallic. Metallic. Metallic. Metallic. Metallic. Metallic. Metallic.	Massive, compact, granular, disseminated, crystalline. Crystalline, massive, disseminated. Crystalline, bladed, lamellar, granular. Crystalline, encrustation, massive, granular, disseminated. Crystalline, disseminated, massive, banded, encrustation. Crystalline, encrustation, massive, granular, disseminated, earthy. Crystalline, disseminated, encrustation, massive, banded. Crystalline, massive, granular, disseminated, wiry. Crystalline, granular, earthy, massive. Scaly, foliated, disseminated, granular. Scaly, platy, foliated in clayey masses, disseminated in rock. Earthy, granular, compact, radiating, dendritic, encrustation. Acicular, crystalline, bladed, radiating, columnar, granular. Foliated, acicular, massive, disseminated. Massive, encrustation, arborescent, disseminated. Crystalline, granular, massive, disseminated. Massive, disseminated, granular, crystalline, earthy.	Tabular or columnar. Prisms, vertically striated. Vertically striated, needle-like, prismatic. Needle-like.	One perfect. One rather good, clinopinacoidal. One. One. One very good. One good. One good. One good. One good. One good.	Uneven. Conchoidal. Uneven, conchoidal. Hackly. Uneven, conchoidal. Subconchoidal.	Brittle. Brittle. Brittle. Slightly sectile. Brittle. Ductile, malleable. Brittle. Flexible, sectile. Flexible in thin plates, sectile. Brittle. Slightly sectile, flexible, brittle. Slightly sectile. Brittle. Brittle. Brittle. Brittle.	Opaque. Translucent on thin edges. Transparent, translucent. Transparent, translucent. Transparent to opaque. Opaque. Transparent to opaque.	Contains hematite. Sometimes feebly magnetic. Gives tests for manganese and tungsten. Burns with a garlic odor. Alters to orpiment. Will give white streaks when moistened with acid and rubbed on copper. Often tarnished brown, green or blue. See copper test under azurite. Soapy feel, marks paper. Distinguished by its blue tinge. Soapy feel. Often carries gold. See manganese test under huebnerite. Fuses easily, tarnishes black to iridescent or alters to a yellowish white oxide. Acicular structure not common as it is in stibnite. Often coated with a yellow iridescent tarnish. Becomes dull on exposure. Swells and fuses when heated on charcoal before blowpipe. Readily distinguished by its weight and cleavage. Takes on a black or dull red tarnish or a blue or green coat. Often coats other copper sulfides.	copper ore. SPHALERITE Black Jack. Wolframite. Realgar. Proustite, light ruby silver. Cinnabar, natural vermillion. Pyrargyrite, dark ruby silver. Copper. Cuprite. Molybdenite. Graphite, pencil ore, plumbago. PYROLUSITE. STIBNITE. Bismuthinite. Argentite. GALENA. CHALCOCITE Copper glance. BORNITE	Ag ₆ As ₂ S ₆ HgS Ag ₀ Sb ₂ S ₉ Cu CuO MoS C MnO ₂ Sb ₂ S ₃ B ₁₂ S ₃ Ag ₂ S PbS Cu ₂ S	70.1% As 65.4% Ag 86.6% Hg 60% Ag 100% Cu 88.8% Cu 60% Mo 100% C 63.2% Mn 71.4% Sb 81.2% Bi 87.1% Ag 86.6% Pb 79.8% Cu	Occurs in veins and in hot spring deposits. In veins, usually in zone of secondary enrichment. In veins and in sediments cut by veins. In hot spring deposits. In veins, usually with pyrargyrite. In upper parts of veins. In sediments cut by veins. In igneous rocks. Found in upper oxidized portion of copper veins. Occurs in granite, gneiss, limestone and in quartz veins. Occurs in all types of rocks. Chiefly a metamorphic mineral. Occurs in upper part of veins. A product of rock weathering. A quartz vein mineral. A quartz vein mineral. Occurs in veins and disseminated in limestones. Commonly found in the zone of secondary enrichment. A primary sulfide in quartz veins, a contact impregnation in sediments, also a mineral of secondary enrichment zone.	Not a commercial source of As. Ore of silver. Ore of mercury. Ore of copper. Ore of copper. Ore of molybdenum. Used in manufacture of black paint, polish, crucibles, lead pencils, lubricants. Used in manufacture of ferro manganese steels and bronzes, in paint, and in chemicals. Source of antimony and its compounds. Used in fireworks, safety matches, rubber goods, percussion caps. Not common. Ore of silver. Ore of lead, often carries silver. Ore of copper, frequently carries small amounts of gold,
	ACK OR WEARLY SO Blinish Kery Green Various Reds Beddist Signature Grey-Black Lead Gray Bulkish Kery Green Brown	5-5.5 1.5-2 2-2.5 2-2.5 2.5-3 3.5-4 1-1.5 1-2 1-2.5 2 2 2-2.5 2.5-3 3.5-4 3.5-4 1-1.5 1-2 1-2.5	4 7.1-7.5 3.6 5.6 8.1 5.8 8.8 6 4.7 4.8 2.2 4.8 4.6 6.5 7.3 7.6 5.8 5	Brown, black. Reddish brown, brownish black. Bright red, orange, yellow. Grayish black, scarlet. Vermillion red. Grayish black, dark red. Copper red. Reddish brown, red, black. Bluish gray. Black to gray. Black dark steel gray. Lead gray. Lead gray. Lead gray. Lead gray. Lead gray. Bronze, copper red, purple.	Submetallic. Submetallic. greasy. Resinous. Adamantine. Adamantine, dull. Adamantine, metallic. Glassy, earthy. Metallic. Submetallic, dull. Metallic.	Massive, compact, granular, disseminated, crystalline. Crystalline, massive, disseminated. Crystalline, bladed, lamellar, granular. Crystalline, encrustation, massive, granular, disseminated. Crystalline, disseminated, massive, banded, encrustation. Crystalline, encrustation, massive, granular, disseminated, earthy. Crystalline, disseminated, encrustation, massive, banded. Crystalline, massive, granular, disseminated, wiry. Crystalline, granular, earthy, massive. Scaly, foliated, disseminated, granular. Scaly, platy, foliated in clayey masses, disseminated in rock. Earthy, granular, compact, radiating, dendritic, encrustation. Acicular, crystalline, bladed, radiating, columnar, granular. Foliated, acicular, massive, disseminated. Massive, encrustation, arborescent, disseminated. Crystalline, granular, massive, disseminated. Massive, disseminated, granular, crystalline, earthy. Compact, granular, disseminated. Massive, compact, granular, disseminated, crystalline.	Tabular or columnar. Prisms, vertically striated. Vertically striated, needle-like, prismatic. Needle-like. Cubes, octahedrons.	One perfect. One rather good, clinopinacoidal. One. One. One very good. One good. One good. One good. One good. Good cubic.	Uneven. Conchoidal. Uneven, conchoidal. Hackly. Uneven, conchoidal. Subconchoidal. Conchoidal. Uneven. Uneven. Uneven.	Brittle. Brittle. Brittle. Slightly sectile. Brittle. Ductile, malleable. Brittle. Flexible, sectile. Flexible in thin plates, sectile. Brittle. Slightly sectile, flexible, brittle. Slightly sectile. Brittle. Brittle. Brittle. Brittle. Brittle. Brittle. Brittle.	Opaque. Translucent on thin edges. Transparent, translucent. Transparent, translucent. Transparent to opaque. Thin splinters transmit red light. Opaque. Transparent to opaque. Thin flakes, translucent to opaque.	Contains hematite. Sometimes feebly magnetic. Gives tests for manganese and tungsten. Burns with a garlic odor. Alters to orpiment. Will give white streaks when moistened with acid and rubbed on copper. Often tarnished brown, green or blue. See copper test under azurite. Soapy feel, marks paper. Distinguished by its blue tinge. Soapy feel. Often carries gold. See manganese test under huebnerite. Fuses easily, tarnishes black to iridescent or alters to a yellowish white oxide. Acicular structure not common as it is in stibnite. Often coated with a yellow iridescent tarnish. Becomes dull on exposure. Swells and fuses when heated on charcoal before blowpipe. Readily distinguished by its weight and cleavage. Takes on a black or dull red tarnish or a blue or green coat. Often coats other copper sulfides. Tarnishes easily giving a peacock play of colors. Tarnishes dull, variable composition.	copper ore. SPHALERITE Black Jack. Wolframite. Realgar. Proustite, light ruby silver. Cinnabar, natural vermillion. Pyrargyrite, dark ruby silver. Copper. Cuprite. Molybdenite. Graphite, pencil ore, plumbago. PYROLUSITE. STIBNITE. Bismuthinite. Argentite. GALENA. CHALCOCITE Copper glance. BORNITE "Horse-flesh ore." Tetrahedrite. Melaconite, Tenorite.	AgcAs2Sc HgS AgcSb2Sc Cu CuO MoS C MnO2 Sb2S3 B12S3 Ag2S PbS Cu2S Copper iron sulfide.	70.1% As 65.4% Ag 86.6% Hg 60% Ag 100% Cu 88.8% Cu 60% Mo 100% C 63.2% Mn 71.4% Sb 81.2% Bi 87.1% Ag 86.6% Pb 79.8% Cu 63.2% Cu 52.6% Cu 79.8% Cu	Occurs in veins and in hot spring deposits. In veins, usually in zone of secondary enrichment. In veins and in sediments cut by veins. In hot spring deposits. In veins, usually with pyrargyrite. In upper parts of veins. In sediments cut by veins. In igneous rocks. Found in upper oxidized portion of copper veins. Occurs in granite, gneiss, limestone and in quartz veins. Occurs in all types of rocks. Chiefly a metamorphic mineral. Occurs in upper part of veins. A product of rock weathering. A quartz vein mineral. A quartz vein mineral. A mineral of the zone of secondary enrichment. Occurs in veins and disseminated in limestones. Commonly found in the zone of secondary enrichment. A primary sulfide in quartz veins, a contact impregnation in sediments, also a mineral of secondary enrichment zone. Primary vein ore, disseminated in country rock. Common in zone of secondary enrichment. Found in zone of oxidation of copper bearing veins. Primary sulfide in quartz veins. Contact metamorphic mineral. Also occurs in zone of secondary enrichment.	Not a commercial source of As. Ore of silver. Ore of mercury. Ore of copper. Ore of copper. Ore of molybdenum. Used in manufacture of black paint, polish, crucibles, lead pencils, lubricants. Used in manufacture of ferro manganese steels and bronzes, in paint, and in chemicals. Source of antimony and its compounds. Used in fireworks, safety matches, rubber goods, percussion caps. Not common. Ore of silver. Ore of lead, often carries silver. Ore of copper, frequently carries small amounts of gold, silver. Ore of copper, often carries silver, lead, zinc, mercury. Ore of copper, often contains gold and silver.
	BLACK OR NEARLY SO Greet Gray-Black Lead Gray Blans Greet is is Sainy Tarious Reds Brown Brown is the Greet State Brown	5-5.5 1.5-2 2-2.5 2-2.5 2.5-3 2.5-3 3.5-4 1-1.5 1-2 1-2.5 2 2-2.5 2.5-3 3.4 3-4 3-4	4 7.1-7.5 3.6 5.6 8.1 5.8 8.3 6 4.7 4.8 2.2 4.8 4.6 6.5 7.3 7.6 5.8 5 4.3-5.4 6	Brown, black. Reddish brown, brownish black. Bright red, orange, yellow. Grayish black, scarlet. Vermillion red. Grayish black, dark red. Copper red. Reddish brown, red, black. Bluish gray. Black to gray. Black dark steel gray. Lead gray. Lead gray. Lead gray. Lead gray. Steel gray. Bronze, copper red, purple. Steel gray, iron black. Brown, gray, black. Deep golden yellow. Bronze-gray, yellow, copper red.	Submetallic. Submetallic. greasy. Resinous. Adamantine. Adamantine, dull. Adamantine, metallic. Glassy, earthy. Metallic. Submetallic, dull. Metallic.	Massive, compact, granular, disseminated, crystalline. Crystalline, massive, disseminated. Crystalline, bladed, lamellar, granular. Crystalline, encrustation, massive, granular, disseminated. Crystalline, disseminated, massive, banded, encrustation. Crystalline, encrustation, massive, granular, disseminated, earthy. Crystalline, disseminated, encrustation, massive, banded. Crystalline, massive, granular, disseminated, wiry. Crystalline, granular, earthy, massive. Scaly, foliated, disseminated, granular. Scaly, platy, foliated in clayey masses, disseminated in rock. Earthy, granular, compact, radiating, dendritic, encrustation. Acicular, crystalline, bladed, radiating, columnar, granular. Foliated, acicular, massive, disseminated. Massive, encrustation, arborescent, disseminated. Crystalline, granular, massive, disseminated. Massive, disseminated, granular, crystalline, earthy. Compact, granular, disseminated. Massive, compact, granular, disseminated, crystalline. Massive, earthy, encrustation.	Tabular or columnar. Prisms, vertically striated. Vertically striated, needle-like, prismatic. Needle-like. Cubes, octahedrons. Tetrahedrons.	One perfect. One rather good, clinopinacoidal. One. One. One very good. One good. One good. One good. One good. Good cubic.	Uneven. Conchoidal. Uneven, conchoidal. Hackly. Uneven, conchoidal. Subconchoidal. Conchoidal. Uneven. Uneven. Uneven. Uneven. Uneven. Uneven. Uneven. Uneven.	Brittle. Brittle. Brittle. Slightly sectile. Brittle. Ductile, malleable. Brittle. Flexible, sectile. Flexible in thin plates, sectile. Brittle. Slightly sectile, flexible, brittle. Slightly sectile. Brittle.	Opaque. Translucent on thin edges. Transparent, translucent. Transparent, translucent. Transparent to opaque. Thin splinters transmit red light. Opaque. Transparent to opaque.	Contains hematite. Sometimes feebly magnetic. Gives tests for manganese and tungsten. Burns with a garlic odor. Alters to orpiment. Will give white streaks when moistened with acid and rubbed on copper. Often tarnished brown, green or blue. See copper test under azurite. Soapy feel, marks paper. Distinguished by its blue tinge. Soapy feel, Often carries gold. See manganese test under huebnerite. Fuses easily, tarnishes black to iridescent or alters to a yellowish white oxide. Acicular structure not common as it is in stibnite. Often coated with a yellow iridescent tarnish. Becomes dull on exposure. Swells and fuses when heated on charcoal before blowpipe. Readily distinguished by its weight and cleavage. Takes on a black or dull red tarnish or a blue or green coat. Often coats other copper sulfides. Tarnishes easily giving a peacock play of colors. Tarnishes dull, variable composition. Infusible. See copper test under azurite. Tarnishes, becomes darker and takes on an iridescent coat.	copper ore. SPHALERITE Black Jack. Wolframite. Realgar. Proustite, light ruby silver. Cinnabar, natural vermillion. Pyrargyrite, dark ruby silver. Copper. Cuprite. Molybdenite. Graphite, pencil ore, plumbago. PYROLUSITE. STIBNITE. Bismuthinite. Argentite. GALENA. CHALCOCITE Copper glance. BORNITE "Horse-flesh ore." Tetrahedrite. Melaconite, Tenorite. CHALCOPYRITE	AgcAs2Sc HgS AgcSb2Sc Cu CuO MoS C MnO2 Sb2Sc B12Sc PbS Cu2S Copper iron sulfide. Cu3Sb2Sc CuO	70.1% As 65.4% Ag 86.6% Hg 60% Ag 100% Cu 88.8% Cu 60% Mo 100% C 63.2% Mn 71.4% Sb 81.2% Bi 87.1% Ag 86.6% Pb 79.8% Cu 63.2% Cu 52.6% Cu 79.8% Cu	Occurs in veins and in hot spring deposits. In veins, usually in zone of secondary enrichment. In veins and in sediments cut by veins. In hot spring deposits. In veins, usually with pyrargyrite. In upper parts of veins. In sediments cut by veins. In igneous rocks. Found in upper oxidized portion of copper veins. Occurs in granite, gneiss, limestone and in quartz veins. Occurs in all types of rocks. Chiefly a metamorphic mineral. Occurs in upper part of veins. A product of rock weathering. A quartz vein mineral. A quartz vein mineral. A mineral of the zone of secondary enrichment. Occurs in veins and disseminated in limestones. Commonly found in the zone of secondary enrichment. A primary sulfide in quartz veins, a contact impregnation in sediments, also a mineral of secondary enrichment zone. Primary vein ore, disseminated in country rock. Common in zone of secondary enrichment. Found in zone of oxidation of copper bearing veins. Primary sulfide in quartz veins. Contact metamorphic mineral. Also occurs in zone of secondary enrichment. Magmatic segregation, contact metamorphic fissure filling, vein mineral.	Not a commercial source of As. Ore of silver. Ore of mercury. Ore of copper. Ore of copper. Ore of molybdenum. Used in manufacture of black paint, polish, crucibles, lead pencils, lubricants. Used in manufacture of ferro manganese steels and bronzes, in paint, and in chemicals. Source of antimony and its compounds. Used in fireworks, safety matches, rubber goods, percussion caps. Not common. Ore of silver. Ore of lead, often carries silver. Ore of copper. Ore of copper, frequently carries small amounts of gold, silver. Ore of copper, often carries silver, lead, zinc, mercury. Ore of copper.
	BLACK OR NEARLY SO Greet- Gray-Black Lead Gray Blurs Greet Greet is is a line of the state of t	5-5.5 1.5-2 2-2.5 2-2.5 2.5-3 2.5-3 3.5-4 1-1.5 1-2 1-2.5 2 2-2.5 2.5-3 3.4 3-4 3.5-4 4 5-5.5	4 7.1-7.5 3.6 5.6 8.1 5.8 8.3 6 4.7 4.8 2.2 4.8 4.6 6.5 7.3 7.6 5.8 6 4.3-5.4 6 4.2 4.5 7.1-7.5	Brown, black. Reddish brown, brownish black. Bright red, orange, yellow. Grayish black, scarlet. Vermillion red. Grayish black, dark red. Copper red. Reddish brown, red, black. Bluish gray. Black to gray. Black dark steel gray. Lead gray. Lead gray. Lead gray. Lead gray. Steel gray, iron black. Brown, gray, black. Deep golden yellow. Bronze-gray, yellow, copper red. Black, brownish black, reddish brown.	Submetallic. Submetallic. greasy. Resinous. Adamantine. Adamantine, dull. Adamantine, metallic. Glassy, earthy. Metallic. Submetallic, dull. Metallic. Metallic. Metallic. Metallic. Metallic. Metallic. Metallic. Metallic. Metallic. Metallic. Metallic. Metallic. Metallic. Submetallic. Metallic. Metallic.	Massive, compact, granular, disseminated, crystalline. Crystalline, massive, disseminated. Crystalline, bladed, lamellar, granular. Crystalline, encrustation, massive, granular, disseminated. Crystalline, disseminated, massive, banded, encrustation. Crystalline, encrustation, massive, granular, disseminated, earthy. Crystalline, disseminated, encrustation, massive, banded. Crystalline, massive, granular, disseminated, wiry. Crystalline, granular, earthy, massive. Scaly, foliated, disseminated, granular. Scaly, platy, foliated in clayey masses, disseminated in rock. Earthy, granular, compact, radiating, dendritic, encrustation. Acicular, crystalline, bladed, radiating, columnar, granular. Foliated, acicular, massive, disseminated. Massive, encrustation, arborescent, disseminated. Crystalline, granular, massive, disseminated. Massive, disseminated, granular, crystalline, earthy. Compact, granular, disseminated. Massive, compact, granular, disseminated, crystalline. Massive, granular, disseminated, crystalline. Crystalline, granular, disseminated. Crystalline, granular, disseminated. Crystalline, granular, disseminated. Crystalline, granular, disseminated.	Tabular or columnar. Prisms, vertically striated. Vertically striated, needle-like, prismatic. Needle-like. Cubes, octahedrons.	One perfect. One rather good, clinopinacoidal. One. One. One very good. One good. One good. One good. One good. Good cubic.	Uneven. Conchoidal. Uneven, conchoidal. Hackly. Uneven, conchoidal. Subconchoidal. Conchoidal. Uneven.	Brittle. Brittle. Brittle. Slightly seetile. Brittle. Ductile, malleable. Brittle. Flexible, sectile. Flexible in thin plates, sectile. Brittle. Slightly sectile, flexible, brittle. Slightly sectile. Brittle.	Translucent on thin edges. Transparent, translucent. Transparent, translucent. Transparent to opaque. Thin splinters transmit red light. Opaque. Thin flakes, translucent to opaque.	Contains hematite. Sometimes feelly magnetic. Gives tests for manganese and tungsten. Burns with a garlic odor. Alters to orpiment. Will give white streaks when moistened with acid and rubbed on copper. Often tarnished brown, green or blue. See copper test under azurite. Soapy feel, marks paper. Distinguished by its blue tinge. Soapy feel. Often carries gold. See manganese test under huebnerite. Fuses easily, tarnishes black to iridescent or alters to a yellowish white oxide. Acicular structure not common as it is in stibnite. Often coated with a yellow iridescent tarnish. Becomes dull on exposure. Swells and fuses when heated on charcoal before blowpipe. Readily distinguished by its weight and cleavage. Takes on a black or dull red tarnish or a blue or green coat. Often coats other copper sulfides. Tarnishes easily giving a peacock play of colors. Tarnishes dull, variable composition. Infusible. See copper test under azurite. Tarnishes, becomes darker and takes on an iridescent coat. Softer than pyrite and more yellow. Tarnishes bronze, slightly magnetic. Occasionally feebly magnetic.	copper ore. SPHALERITE Black Jack. Wolframite. Realgar. Proustite, light ruby silver. Cinnabar, natural vermillion. Pyrargyrite, dark ruby silver. Copper. Cuprite. Molybdenite. Graphite, pencil ore, plumbago. PYROLUSITE. Bismuthinite. Argentite. GALENA. CHALCOCITE Copper glance. BORNITE "Horse-flesh ore." Tetrahedrite. Melaconite, Tenorite. CHALCOPYRITE Copper pyrites. Pyrrhotite. Wolframite.	AgcAs2Sc HgS AgcSb2Sc Cu CuO MoS C MnO2 Sb2Sc B12Sc Ag2S PbS Cu2S Copper iron sulfide. Cu3Sb2S7 CuO CuFeS2 A variable iron pyrites. FeMnWO4	70.1% As 65.4% Ag 86.6% Hg 60% Ag 100% Cu 88.8% Cu 60% Mo 100% C 63.2% Mn 71.4% Sb 81.2% Bi 87.1% Ag 86.6% Pb 79.8% Cu 63.2% Cu 52.6% Cu 79.8% Cu 79.8% Cu	Occurs in veins and in hot spring deposits. In veins, usually in zone of secondary enrichment. In veins and in sediments cut by veins. In hot spring deposits. In veins, usually with pyrargyrite. In upper parts of veins. In sediments cut by veins. In igneous rocks. Found in upper oxidized portion of copper veins. Occurs in granite, gneiss, limestone and in quartz veins. Occurs in all types of rocks. Chiefly a metamorphic mineral. Occurs in upper part of veins. A product of rock weathering. A quartz vein mineral. A quartz vein mineral. A mineral of the zone of secondary enrichment. Occurs in veins and disseminated in limestones. Commonly found in the zone of secondary enrichment. A primary sulfide in quartz veins, a contact impregnation in sediments, also a mineral of secondary enrichment zone. Primary vein ore, disseminated in country rock. Common in zone of secondary enrichment. Found in zone of oxidation of copper bearing veins. Primary sulfide in quartz veins. Contact metamorphic mineral. Also occurs in zone of secondary enrichment. Magmatic segregation, contact metamorphic fissure filling, vein mineral. In veins and pegmatite dikes associated with acidic igneous rocks.	Not a commercial source of As. Ore of silver. Ore of mercury. Ore of copper. Ore of copper. Ore of molybdenum. Used in manufacture of black paint, polish, crucibles, lead pencils, lubricants. Used in manufacture of ferro manganese steels and bronzes, in paint, and in chemicals. Source of antimony and its compounds. Used in fireworks, safety matches, rubber goods, percussion caps. Not common. Ore of silver. Ore of lead, often carries silver. Ore of copper, Ore of copper, frequently carries small amounts of gold, silver. Ore of copper, often carries silver, lead, zinc, mercury. Ore of copper, often contains gold and silver. Often contains sufficient nickel and cobalt to be an ore. Source of sulfuric acid.
	BLACK OR NEARLY SO The Green Gray-Black Lead Gray Suive Greet Gray Bluck Greet Greet Fish	5-5.5 1.5-2 2-2.5 2-2.5 2.5-3 3.5-4 1-1.5 1-2 1-2.5 2 2-2.5 2.5-3 3.4 3.4 3.5-4 4 5-5.5 5-5.5	4 7.1-7.5 3.6 5.6 8.1 5.8 8.8 8.8 6 4.7 4.8 2.2 4.8 4.6 6.5 7.3 7.6 5.8 5 4.3-5.4 6 4.2 4.5 7.1-7.5	Brown, black. Reddish brown, brownish black. Bright red, orange, yellow. Grayish black, scarlet. Vermillion red. Grayish black, dark red. Copper red. Reddish brown, red, black. Bluish gray. Black to gray. Black to gray. Lead gray. Lead gray. Lead gray. Lead gray. Steel gray, iron black. Brown, gray, black. Deep golden yellow. Bronze-gray, yellow, copper red. Black, brownish black, reddish brown.	Submetallic. Submetallic. Submetallic. greasy. Resinous. Adamantine. Adamantine, dull. Adamantine, metallic. Glassy, earthy. Metallic. Submetallic, dull. Metallic. Metallic. Metallic. Metallic. Metallic. Metallic. Metallic. Metallic. Submetallic, dull. Metallic. Submetallic. Submetallic. Submetallic. Submetallic. Submetallic.	Massive, compact, granular, disseminated, crystalline. Crystalline, massive, disseminated. Crystalline, bladed, lamellar, granular. Crystalline, encrustation, massive, granular, disseminated. Crystalline, disseminated, massive, banded, encrustation. Crystalline, encrustation, massive, granular, disseminated, earthy. Crystalline, disseminated, encrustation, massive, banded. Crystalline, massive, granular, disseminated, wiry. Crystalline, granular, earthy, massive. Scaly, foliated, disseminated, granular. Scaly, platy, foliated in clayey masses, disseminated in rock. Earthy, granular, compact, radiating, dendritic, encrustation. Acicular, crystalline, bladed, radiating, columnar, granular. Foliated, acicular, massive, disseminated. Massive, encrustation, arborescent, disseminated. Crystalline, granular, massive, disseminated. Massive, disseminated, granular, crystalline, earthy. Compact, granular, disseminated. Massive, compact, granular, disseminated, crystalline. Massive, granular, disseminated, crystalline. Crystalline, granular, disseminated, crystalline. Crystalline, granular, disseminated, crystalline.	Tabular or columnar. Prisms, vertically striated. Vertically striated, needle-like, prisnatic. Needle-like. Cubes, octahedrons. Tetrahedrons. Wedge-shaped.	One perfect. One rather good, clinopinacoidal. One. One. One very good. One good. One good. One good. One good. One good. One of transversely. One good.	Uneven. Conchoidal. Uneven, conchoidal. Hackly. Uneven, conchoidal. Subconchoidal. Conchoidal. Uneven.	Brittle. Brittle. Brittle. Slightly sectile. Brittle. Ductile, malleable. Brittle. Flexible, sectile. Flexible in thin plates, sectile. Brittle. Slightly sectile, flexible, brittle. Sectile, brittle.	Translucent on thin edges. Transparent, translucent. Transparent, translucent. Transparent to opaque. Thin splinters transmit red light. Opaque. Transparent to opaque.	Contains hematite. Sometimes feely magnetic. Gives tests for manganese and tungsten. Burns with a garlic odor. Alters to orpiment. Will give white streaks when moistened with acid and rubbed on copper. Often tarnished brown, green or blue. See copper test under azurite. Soapy feel, marks paper. Distinguished by its blue tinge. Soapy feel. Often carries gold. See manganese test under huebnerite. Fuses easily, tarnishes black to iridescent or alters to a yellowish white oxide. Acicular structure not common as it is in stibnite. Often coated with a yellow iridescent tarnish. Becomes dull on exposure. Swells and fuses when heated on charcoal before blowpipe. Readily distinguished by its weight and cleavage. Takes on a black or dull red tarnish or a blue or green coat. Often coats other copper sulfides. Tarnishes easily giving a peacock play of colors. Tarnishes dull, variable composition. Infusible. See copper test under azurite. Tarnishes, becomes darker and takes on an iridescent coat. Softer than pyrite and more yellow.	copper ore. SPHALERITE Black Jack. Wolframite. Realgar. Proustite, light ruby silver. Cinnabar, natural vermillion. Pyrargyrite, dark ruby silver. Copper. Cuprite. Molybdenite. Graphite, pencil ore, plumbago. PYROLUSITE. STIBNITE. Bismuthinite. Argentite. GALENA. CHALCOCITE Copper glance. "Horse-flesh ore." Tetrahedrite. Melaconite, Tenorite. CHALCOPYRITE Copper pyrites. Pyrrhotite.	AgcAs2Sc HgS AgcSb2Sc Cu CuO MoS C MnO2 Sb2Sa B12Sa Ag2S PbS Cu2S Copper iron sulfide. Cu3Sb2S7 CuO CuFeS2 A variable iron pyrites.	70.1% As 65.4% Ag 86.6% Hg 60% Ag 100% Cu 88.8% Cu 60% Mo 100% C 63.2% Mn 71.4% Sb 81.2% Bi 87.1% Ag 86.6% Pb 79.8% Cu 63.2% Cu 52.6% Cu 79.8% Cu	Occurs in veins and in hot spring deposits. In veins, usually in zone of secondary enrichment. In veins and in sediments cut by veins. In hot spring deposits. In veins, usually with pyrargyrite. In upper parts of veins. In sediments cut by veins. In igneous rocks. Found in upper oxidized portion of copper veins. Occurs in granite, gneiss, limestone and in quartz veins. Occurs in all types of rocks. Chiefly a metamorphic mineral. Occurs in upper part of veins. A product of rock weathering. A quartz vein mineral. A mineral of the zone of secondary enrichment. Occurs in veins and disseminated in limestones. Commonly found in the zone of secondary enrichment. A primary sulfide in quartz veins, a contact impregnation in sediments, also a mineral of secondary enrichment zone. Primary vein ore, disseminated in country rock. Common in zone of secondary enrichment. Found in zone of oxidation of copper bearing veins. Primary sulfide in quartz veins. Contact metamorphic mineral. Also occurs in zone of secondary enrichment. Magmatic segregation, contact metamorphic fissure filling, vein mineral. In veins and pegmatite dikes associated with acidic igneous	Not a commercial source of As. Ore of silver. Ore of mercury. Ore of copper. Ore of copper. Ore of molybdenum. Used in manufacture of black paint, polish, crucibles, lead pencils, lubricants. Used in manufacture of ferro manganese steels and bronzes, in paint, and in chemicals. Source of antimony and its compounds. Used in fireworks, safety matches, rubber goods, percussion caps. Not common. Ore of silver. Ore of lead, often carries silver. Ore of copper, frequently carries small amounts of gold, silver. Ore of copper, often carries silver, lead, zinc, mercury. Ore of copper, often contains gold and silver. Often contains sufficient nickel and cobalt to be an ore. Source of sulfuric acid.
	BLACK OR NEARLY SO Survey	5-5.5 1.5-2 2-2.5 2-2.5 2.5-3 2.5-3 3.5-4 1-1.5 1-2 1-2.5 2 2-2.5 2.5-3 3.4 3-4 3.5-4 4 5-5.5	4 7.1-7.5 3.6 5.6 8.1 5.8 8.3 6 4.7 4.8 2.2 4.8 4.6 6.5 7.3 7.6 5.8 5 4.3-5.4 6 4.2 4.5 7.1-7.5	Brown, black. Reddish brown, brownish black. Bright red, orange, yellow. Grayish black, scarlet. Vermillion red. Grayish black, dark red. Copper red. Reddish brown, red, black. Bluish gray. Black to gray. Black dark steel gray. Lead gray. Lead gray. Lead gray. Lead gray. Steel gray, iron black. Brown, gray, black. Deep golden yellow. Bronze-gray, yellow, copper red. Black, brownish black, reddish brown.	Submetallic. Submetallic. greasy. Resinous. Adamantine. Adamantine, dull. Adamantine, metallic. Glassy, earthy. Metallic. Submetallic, dull. Metallic.	Massive, compact, granular, disseminated, crystalline. Crystalline, massive, disseminated. Crystalline, bladed, lamellar, granular. Crystalline, encrustation, massive, granular, disseminated. Crystalline, encrustation, massive, banded, encrustation. Crystalline, encrustation, massive, granular, disseminated, earthy. Crystalline, disseminated, encrustation, massive, banded. Crystalline, massive, granular, disseminated, wiry. Crystalline, granular, earthy, massive. Scaly, foliated, disseminated, granular. Scaly, platy, foliated in clayey masses, disseminated in rock. Earthy, granular, compact, radiating, dendritic, encrustation. Acicular, crystalline, bladed, radiating, columnar, granular. Foliated, acicular, massive, disseminated. Crystalline, granular, massive, disseminated. Crystalline, granular, disseminated. Massive, disseminated, granular, crystalline, earthy. Compact, granular, disseminated. Massive, compact, granular, disseminated, crystalline. Massive, granular, disseminated, crystalline. Crystalline, granular, disseminated. Crystalline, granular, disseminated. Crystalline, granular, disseminated. Crystalline, bladed, lamellar, granular. Usually massive. Reniform, columnar, disseminated.	Tabular or columnar. Prisms, vertically striated. Vertically striated, needle-like, prisnatic. Needle-like. Cubes, octahedrons. Tetrahedrons. Wedge-shaped.	One perfect. One rather good, clinopinacoidal. One. One. One very good. One good. One good. One good. One good. One good. One of transversely. One good.	Uneven. Conchoidal. Uneven, conchoidal. Hackly. Uneven, conchoidal. Subconchoidal. Conchoidal. Uneven.	Brittle. Brittle. Brittle. Slightly sectile. Brittle. Ductile, malleable. Brittle. Flexible, sectile. Flexible in thin plates, sectile. Brittle. Slightly sectile, flexible, brittle. Sectile, brittle.	Opaque. Translucent on thin edges. Transparent, translucent. Transparent, translucent. Transparent to opaque. Opaque. Transparent to opaque. Opaque.	Contains hematite. Sometimes feely magnetic. Gives tests for manganese and tungsten. Burns with a garlic odor. Alters to orpiment. Will give white streaks when moistened with acid and rubbed on copper. Often tarnished brown, green or blue. See copper test under azurite. Soapy feel, marks paper. Distinguished by its blue tinge. Soapy feel. Often carries gold. See manganese test under huebnerite. Fuses easily, tarnishes black to iridescent or alters to a yellowish white oxide. Acicular structure not common as it is in stibnite. Often coated with a yellow iridescent tarnish. Becomes dull on exposure. Swells and fuses when heated on charcoal before blowpipe. Readily distinguished by its weight and cleavage. Takes on a black or dull red tarnish or a blue or green coat. Often coats other copper sulfides. Tarnishes easily giving a peacock play of colors. Tarnishes dull, variable composition. Infusible. See copper test under azurite. Tarnishes, becomes darker and takes on an iridescent coat. Softer than pyrite and more yellow. Tarnishes bronze, slightly magnetic. Occasionally feebly magnetic. Tarnishes gray, black, green.	copper ore. SPHALERITE Black Jack. Wolframite. Realgar. Proustite, light ruby silver. Cinnabar, natural vermillion. Pyrargyrite, dark ruby silver. Copper. Cuprite. Molybdenite. Graphite, pencil ore, plumbago. PYROLUSITE. Bismuthinite. Argentite. GALENA. CHALCOCITE Copper glance. BORNITE "Horse-flesh ore," Tetrahedrite. Melaconite, Tenorite. CHALCOPYRITE Copper pyritcs. Pyrrhotite. Wolframite. Niccolite. Psilomelane, black hematite. Ilmenite.	AgcAs2Sc HgS AgcSb2Sc Cu CuO MoS C MnO2 Sb2Sc B18Sc Ag2S PbS Cu2S Copper iron sulfide. Cu5Sb2Sc CuO CuFeS2 A variable iron pyrites. FeMnWO4 NiAs	70.1% As 65.4% Ag 86.6% Hg 60% Ag 100% Cu 88.8% Cu 60% Mo 100% C 63.2% Mn 71.4% Sb 81.2% Bi 87.1% Ag 86.6% Pb 79.8% Cu 63.2% Cu 52.6% Cu 79.8% Cu 34.5% Cu 76.5% WO3	Occurs in veins and in hot spring deposits. In veins, usually in zone of secondary enrichment. In veins and in sediments cut by veins. In hot spring deposits. In veins, usually with pyrargyrite. In upper parts of veins. In sediments cut by veins. In igneous rocks. Found in upper oxidized portion of copper veins. Occurs in granite, gneiss, limestone and in quartz veins. Occurs in all types of rocks. Chiefly a metamorphic mineral. Occurs in upper part of veins. A product of rock weathering. A quartz vein mineral. A quartz vein mineral. A mineral of the zone of secondary enrichment. Occurs in veins and disseminated in limestones. Commonly found in the zone of secondary enrichment and in sediments, also a mineral of secondary enrichment zone. Primary sulfide in quartz veins, a contact impregnation in sediments, also a mineral of secondary enrichment zone. Primary vein ore, disseminated in country rock. Common in zone of secondary enrichment. Found in zone of oxidation of copper bearing veins. Primary sulfide in quartz veins. Contact metamorphic mineral. Also occurs in zone of secondary enrichment. Magmatic segregation, contact metamorphic fissure filling, vein mineral. In veins and pegmatite dikes associated with acidic igneous rocks. A product of alteration of manganese minerals. Zone of oxidation. Common minor constituent of igneous and metamorphic rocks. Occasionally occurs in large deposits.	Not a commercial source of As. Ore of silver. Ore of mercury. Ore of copper. Ore of copper. Ore of molybdenum. Used in manufacture of black paint, polish, crucibles, lead pencils, lubricants. Used in manufacture of ferro manganese steels and bronzes, in paint, and in chemicals. Source of antimony and its compounds. Used in fireworks, safety matches, rubber goods, percussion caps. Not common. Ore of silver. Ore of copper, Ore of copper, frequently carries small amounts of gold, silver. Ore of copper, often carries silver, lead, zinc, mercury. Ore of copper, often contains gold and silver. Often contains sufficient nickel and cobalt to be an ore. Source of sulfuric acid. Ore of tungsten. Source of Ni.
	BOAN- Greet Gray-Black Lead Gray Bines Greet Sis Brown Fish Greet Sis Brown Fish Greet Sis Brown Board Gray Bines Greet Sis Brown Br	5-5.5 1.5-2 2-2.5 2-2.5 2.5-3 2.5-3 3.5-4 1-1.5 1-2 1-2.5 2 2-2.5 2.5-3 3 3-4 3-4 3.5-4 4 5-5.5 5-6	4 7.1-7.5 3.6 5.6 8.1 5.8 8.3 6 4.7 4.8 2.2 4.8 4.6 6.5 7.3 7.6 5.8 5 4.3-5.4 6 4.2 4.5 7.1-7.5 7.3-7.7	Brown, black. Reddish brown, brownish black. Bright red, orange, yellow. Grayish black, scarlet. Vermillion red. Grayish black, dark red. Copper red. Reddish brown, red, black. Bluish gray. Black to gray. Black to gray. Lead gray. Lead gray. Lead gray. Lead gray. Steel gray, iron black. Bronze-gray, yellow, copper red. Black, brownish black, reddish brown. Pale copper red. Dark gray, iron black. Black. Black.	Submetallic. Submetallic. Submetallic. greasy. Resinous. Adamantine. Adamantine, dull. Adamantine, metallic. Glassy, earthy. Metallic. Submetallic, dull. Metallic. Metallic. Metallic. Metallic. Metallic. Submetallic. Metallic. Metallic. Metallic. Metallic. Submetallic. Metallic. Metallic. Metallic. Metallic. Metallic. Submetallic. Bronzy, metallic. Submetallic. Submetallic. Submetallic. Submetallic. Submetallic. Submetallic. Submetallic. Submetallic.	Massive, compact, granular, disseminated, crystalline. Crystalline, massive, disseminated. Crystalline, bladed, lamellar, granular. Crystalline, encrustation, massive, granular, disseminated. Crystalline, disseminated, massive, banded, encrustation. Crystalline, encrustation, massive, granular, disseminated, earthy. Crystalline, disseminated, encrustation, massive, banded. Crystalline, massive, granular, disseminated, wiry. Crystalline, granular, earthy, massive. Scaly, foliated, disseminated, granular. Scaly, platy, foliated in clayey masses, disseminated in rock. Earthy, granular, compact, radiating, dendritic, encrustation. Acicular, crystalline, bladed, radiating, columnar, granular. Foliated, acicular, massive, disseminated. Massive, encrustation, arborescent, disseminated. Crystalline, granular, massive, disseminated. Massive, disseminated, granular, crystalline, earthy. Compact, granular, disseminated. Massive, compact, granular, disseminated, crystalline. Massive, earthy, encrustation. Massive, granular, disseminated, crystalline. Crystalline, granular, disseminated. Crystalline, granular, disseminated. Crystalline, granular, disseminated. Crystalline, bladed, lamellar, granular. Usually massive. Reniform, columnar, disseminated. Botryoidal, reniform, nodular, stalactitic, encrustation.	Tabular or columnar. Prisms, vertically striated. Vertically striated, needle-like, prismatic. Needle-like. Cubes, octahedrons. Tetrahedrons. Wedge-shaped. Columnar and tabular crystals.	One perfect. One rather good, clinopinacoidal. One. One. One very good. One good. One good. One good. One good. One good. One of transversely. One good.	Uneven. Conchoidal. Uneven, conchoidal. Hackly. Uneven, conchoidal. Subconchoidal. Conchoidal. Uneven.	Brittle. Brittle. Brittle. Slightly seetile. Brittle. Ductile, malleable. Brittle. Flexible, sectile. Flexible in thin plates, sectile. Brittle. Slightly sectile, flexible, brittle. Sectile, brittle.	Opaque. Translucent on thin edges. Transparent, translucent. Transparent, translucent. Transparent to opaque. Thin splinters transmit red light. Opaque. Transparent to opaque. Transparent to opaque.	Contains hematite. Sometimes feebly magnetic. Gives tests for manganese and tungsten. Burns with a garlic odor. Alters to orpiment. Will give white streaks when moistened with acid and rubbed on copper. Often tarnished brown, green or blue. See copper test under azurite. Soapy feel, marks paper. Distinguished by its blue tinge. Soapy feel. Often carries gold. See manganese test under huebnerite. Fuses easily, tarnishes black to iridescent or alters to a yellowish white oxide. Acicular structure not common as it is in stibnite. Often coated with a yellow iridescent tarnish. Becomes dull on exposure. Swells and fuses when heated on charcoal before blowpipe. Readily distinguished by its weight and cleavage. Takes on a black or dull red tarnish or a blue or green coat. Often coats other copper sulfides. Tarnishes easily giving a peacock play of colors. Tarnishes dull, variable composition. Infusible. See copper test under azurite. Tarnishes, becomes darker and takes on an iridescent coat. Softer than pyrite and more yellow. Tarnishes bronze, slightly magnetic. Occasionally feebly magnetic. See manganese test under huebnerite. Slightly magnetic. Strongly magnetic.	copper ore. SPHALERITE Black Jack. Wolframite. Realgar. Proustite, light ruby silver. Cinnabar, natural vermillion. Pyrargyrite, dark ruby silver. Copper. Cuprite. Molybdenite. Graphite, pencil ore, plumbago. PYROLUSITE. STIBNITE. Bismuthinite. Argentite. GALENA. CHALCOCITE Copper glance. BORNITE "Horse-flesh ore," Tetrahedrite. Melaconite, Tenorite. CHALCOPYRITE Copper pyritcs. Pyrrhotite. Wolframite. Niccolite. Psilomelane, black hematite. Ilmenite. MAGNETITE Magnetic iron ore.	AgcAs2Sc HgS AgcSb2Sc Cu CuO MoS C MnO2 Sb2Sc B12Sc PbS Cu2S Copper iron sulfide. Cu3Sb2Sc CuO CuFeS2 A variable iron pyrites. FeMnWO1 NiAs MnO2.xH2O	70.1% As 65.4% Ag 86.6% Hg 60% Ag 100% Cu 88.8% Cu 60% Mo 100% C 63.2% Mn 71.4% Sb 81.2% Bi 87.1% Ag 86.6% Pb 79.8% Cu 63.2% Cu 52.6% Cu 79.8% Cu 34.5% Cu 76.5% WO3	Occurs in veins and in hot spring deposits. In veins, usually in zone of secondary enrichment. In veins and in sediments cut by veins. In hot spring deposits. In veins, usually with pyrargyrite. In upper parts of veins. In sediments cut by veins. In igneous rocks. Found in upper oxidized portion of copper veins. Occurs in granite, gneiss, limestone and in quartz veins. Occurs in all types of rocks. Chiefly a metamorphic mineral. Occurs in upper part of veins. A product of rock weathering. A quartz vein mineral. A quartz vein mineral. A mineral of the zone of secondary enrichment. Occurs in veins and disseminated in limestones. Commonly found in the zone of secondary enrichment. A primary sulfide in quartz veins, a contact impregnation in sediments, also a mineral of secondary enrichment zone. Primary vein ore, disseminated in country rock. Common in zone of secondary enrichment. Found in zone of oxidation of copper bearing veins. Primary sulfide in quartz veins. Contact metamorphic mineral. Also occurs in zone of secondary enrichment. Magmatic segregation, contact metamorphic fissure filling, vein mineral. In veins and pegmatite dikes associated with acidic igneous rocks. In quartz veins. A product of alteration of manganese minerals. Zone of oxidation. Common minor constituent of igneous and metamorphic	Not a commercial source of As. Ore of silver. Ore of mercury. Ore of copper. Ore of copper. Ore of molybdenum. Used in manufacture of black paint, polish, crucibles, lead pencils, lubricants. Used in manufacture of ferro manganese steels and bronzes, in paint, and in chemicals. Source of antimony and its compounds. Used in fireworks, safety matches, rubber goods, percussion caps. Not common. Ore of silver. Ore of lead, often carries silver. Ore of copper, frequently carries small amounts of gold, silver. Ore of copper, often carries silver, lead, zinc, mercury. Ore of copper, often contains gold and silver. Often contains sufficient nickel and cobalt to be an ore. Source of sulfuric acid. Ore of tungsten. Source of manganese. Used to some extent in making ferro-titanium and in the
	BLACK OR NEARLY SO Figure Green Green Green Green Green Figure Green Figure Figure Green Figure Figure	5-5.5 1.5-2 2-2.5 2-2.5 2.5-8 2.5-8 3.5-4 1-1.5 1-2 1-2.5 2 2-2.5 2.5-3 3.4 3-4 3.5-4 4 5-5.5 5-6 5-6 5.5-6 5.5-6	4 7.1-7.5 3.6 5.6 8.1 5.8 8.3 6 4.7 4.8 2.2 4.8 4.6 6.5 7.3 7.6 5.8 6 4.3-5.4 6 4.2 4.5 7.1-7.5 7.3-7.7 3.7-4.7	Brown, black. Reddish brown, brownish black. Bright red, orange, yellow. Grayish black, scarlet. Vermillion red. Grayish black, dark red. Copper red. Reddish brown, red, black. Bluish gray. Black to gray. Black dark steel gray. Lead gray. Lead gray. Lead gray. Lead gray. Steel gray, iron black. Brown, gray, black. Deep golden yellow. Bronze-gray, yellow, copper red. Black, brownish black, reddish brown. Pale copper red. Dark gray, iron black. Black.	Submetallic. Submetallic. greasy. Resinous. Adamantine. Adamantine, dull. Adamantine, metallic. Glassy, earthy. Metallic. Submetallic, dull. Metallic. Metallic. Metallic. Metallic. Metallic. Submetallic. Metallic. Submetallic.	Massive, compact, granular, disseminated. Crystalline, massive, disseminated. Crystalline, bladed, lamellar, granular. Crystalline, encrustation, massive, pranular, disseminated. Crystalline, disseminated, massive, pranular, disseminated, earthy. Crystalline, encrustation, massive, granular, disseminated, earthy. Crystalline, disseminated, encrustation, massive, banded. Crystalline, massive, granular, disseminated, wiry. Crystalline, granular, earthy, massive. Scaly, foliated, disseminated, granular. Scaly, platy, foliated in clayey masses, disseminated in rock. Earthy, granular, compact, radiating, dendritic, encrustation. Acicular, crystalline, bladed, radiating, columnar, granular. Foliated, acicular, massive, disseminated. Massive, encrustation, arborescent, disseminated. Crystalline, granular, massive, disseminated. Massive, disseminated, granular, crystalline, earthy. Compact, granular, disseminated. Massive, compact, granular, disseminated, crystalline. Massive, granular, disseminated, crystalline. Crystalline, granular, disseminated. Crystalline, granular, disseminated. Crystalline, granular, disseminated. Crystalline, bladed, lamellar, granular. Usually massive. Reniform, columnar, disseminated. Botryoidal, reniform, nodular, stalactitic, encrustation. Massive, compact, granular, disseminated. Crystalline, massive, granular, disseminated. Disseminated, granular, massive, nodular, acicular, reniform, Crystalline, granular, massive, condular, acicular, reniform, reniform, massive, rendular, acicular, reniform, renif	Tabular or columnar. Prisms, vertically striated, striated. Vertically striated, needle-like, prismatic. Needle-like. Cubes, octahedrons. Tetrahedrons. Wedge-shaped. Columnar and tabular crystals. Tabular. Octahedrons, dodecahedrons.	One perfect. One rather good, clinopinacoidal. One. One. One very good. One good. One good, face often striated transversely. One good. Good cubic. One.	Uneven. Conchoidal. Uneven, conchoidal. Hackly. Uneven, conchoidal. Subconchoidal. Conchoidal. Uneven. Uneven. Uneven. Uneven. Uneven. Uneven. Conchoidal. Uneven. Uneven. Uneven. Uneven. Uneven. Uneven.	Brittle. Brittle. Brittle. Slightly sectile. Brittle. Ductile, malleable. Flexible, sectile. Flexible in thin plates, sectile. Brittle. Slightly sectile, flexible, brittle. Slightly sectile. Brittle. Brittle.	Opaque. Translucent on thin edges. Transparent, translucent. Transparent, translucent. Transparent to opaque. Thin splinters transmit red light. Opaque. Transparent to opaque.	Contains hematite. Sometimes feebly magnetic. Gives tests for manganese and tungsten. Burns with a garlic odor. Alters to orpiment. Will give white streaks when moistened with acid and rubbed on copper. Often tarnished brown, green or blue. See copper test under azurite. Soapy feel, marks paper. Distinguished by its blue tinge. Soapy feel. Often carries gold. See manganese test under huebnerite. Fuses easily, tarnishes black to iridescent or alters to a yellowish white oxide. Acicular structure not common as it is in stibnite. Often coated with a yellow iridescent tarnish. Becomes dull on exposure. Swells and fuses when heated on charcoal before blowpipe. Readily distinguished by its weight and cleavage. Takes on a black or dull red tarnish or a blue or green coat. Often coats other copper sulfides. Tarnishes easily giving a peacock play of colors. Tarnishes dull, variable composition. Infusible. See copper test under azurite. Tarnishes, becomes darker and takes on an iridescent coat. Softer than pyrite and more yellow. Tarnishes bronze, slightly magnetic. Occasionally feebly magnetic. See manganese test under huebnerite. Slightly magnetic. Strongly magnetic. Often accompanied by a greenish stain. When struck with steel it emits a garlic-like odor. Tarnishes easily and forms a dull coat with the metallic	copper ore. SPHALERITE Black Jack. Wolframite. Realgar. Proustite, light ruby silver. Cinnabar, natural vermillion. Pyrargyrite, dark ruby silver. Copper. Cuprite. Molybdenite. Graphite, pencil ore, plumbago. PYROLUSITE. STIBNITE. Bismuthinite. Argentite. GALENA. CHALCOCITE Copper glance. BORNITE "Horse-flesh ore." Tetrahedrite. Melaconite, Tenorite. CHALCOPYRITE Copper pyrites. Pyrrhotite. Wolframite. Niccolite. Psilomelane, black hematite. Ilmenite. MAGNETITE Magnetic iron ore. ARSENOPYRITE Arsenical pyrites.	Ag ₆ As ₂ S ₆ HgS Ag ₀ Sb ₂ S ₆ Cu CuO MoS C MnO ₂ Sb ₂ S ₃ B ₁₂ S ₃ Ag ₂ S PbS Cu ₂ S Copper iron sulfide. Cu ₃ Sb ₂ S ₇ CuO CuFeS ₂ A variable iron pyrites. FeMnWO ₄ NiAs MnO ₂ .xH ₂ O FeTiO ₃ Fe(FeO ₂) ₂ FeAsS	70.1% As 65.4% Ag 86.6% Hg 60% Ag 100% Cu 88.8% Cu 60% Mo 100% C 63.2% Mn 71.4% Sb 81.2% Bi 87.1% Ag 86.6% Pb 79.8% Cu 63.2% Cu 52.6% Cu 79.8% Cu 34.5% Cu 76.5% WOg 43.9% Ni Variable.	Occurs in veins and in hot spring deposits. In veins, usually in zone of secondary enrichment. In veins and in sediments cut by veins. In hot spring deposits. In veins, usually with pyrargyrite. In upper parts of veins. In sediments cut by veins. In igneous rocks. Found in upper oxidized portion of copper veins. Occurs in granite, gneiss, limestone and in quartz veins. Occurs in upper part of veins. A product of rock weathering. A quartz vein mineral. A quartz vein mineral. A mineral of the zone of secondary enrichment. Occurs in veins and disseminated in limestones. Commonly found in the zone of secondary enrichment. A primary sulfide in quartz veins, a contact impregnation in sediments, also a mineral of secondary enrichment zone. Primary vein ore, disseminated in country rock. Common in zone of secondary enrichment. Found in zone of oxidation of copper bearing veins. Primary sulfide in quartz veins. Contact metamorphic mineral. Also occurs in zone of secondary enrichment. Magmatic segregation, contact metamorphic fissure filling, vein mineral. In veins and pegmatite dikes associated with acidic igneous rocks. In quartz veins. A product of alteration of manganese minerals. Zone of oxidation. Common minor constituent of igneous and metamorphic rocks. Occasionally occurs in large deposits. Found in segregations and disseminations in igneous rocks and along metamorphic contacts. Vein mineral, disseminated in country rock, fissure filling. Deposited from circulating water. Occurs chiefly in sedi-	Not a commercial source of As. Ore of silver. Ore of silver. Ore of sopper. Ore of copper. Ore of manufacture of black paint, polish, crucibles, lead pencils, lubricants. Used in manufacture of ferro manganese steels and bronzes, in paint, and in chemicals. Source of antimony and its compounds. Used in fireworks, safety matches, rubber goods, percussion caps. Not common. Ore of silver. Ore of lead, often carries silver. Ore of copper. Ore of copper, frequently carries small amounts of gold, silver. Ore of copper, often carries silver, lead, zinc, mercury. Ore of copper. Ore of copper, often contains gold and silver. Often contains sufficient nickel and cobalt to be an ore. Source of sulfuric acid. Ore of tungsten. Source of manganese. Used to some extent in making ferro-titanium and in the preparation of linings for puddling furnaces. Ore of iron.
	Green- Brws- Greet Gray-Black Lead Gray Bluis Greet Brown Brinis Greet Brown B	5-5.5 1.5-2 2-2.5 2-2.5 2.5-3 2.5-3 3.5-4 1-1.5 1-2 1-2.5 2 2-2.5 2.5-3 3.4 3-4 3.5-4 4 5-5.5 5-6 5-6 5.5-6	4 7.1-7.5 2.6 5.6 8.1 5.8 8.3 6 4.7 4.8 2.2 4.8 4.6 6.5 7.3 7.6 5.8 5 4.3-5.4 6 4.2 4.5 7.1-7.5 7.3-7.7 3.7-4.7 4.5-5 4.5	Brown, black. Reddish brown, brownish black. Bright red, orange, yellow. Grayish black, scarlet. Vermillion red. Grayish black, dark red. Copper red. Reddish brown, red, black. Bluish gray. Black to gray. Black dark steel gray. Lead gray. Lead gray. Lead gray. Lead gray. Steel gray, iron black. Brown, gray, black. Deep golden yellow. Bronze-gray, yellow, copper red. Pale copper red. Dark gray, iron black, reddish brown. Pale copper red. Dark gray, iron black. Black. Black. Black. Black.	Submetallic. Submetallic. greasy. Resinous. Adamantine. Adamantine, dull. Adamantine, metallic. Glassy, earthy. Metallic. Submetallic, dull. Metallic. Submetallic. Metallic. Bronzy, metallic. Submetallic. Submetallic. Submetallic. Metallic. Metallic. Metallic. Metallic.	Massive, compact, granular, disseminated, crystalline. Crystalline, massive, disseminated. Crystalline, bladed, lamellar, granular. Crystalline, disseminated, massive, banded, encrustation. Crystalline, encrustation, massive, granular, disseminated, earthy. Crystalline, disseminated, encrustation, massive, banded. Crystalline, massive, granular, disseminated, wiry. Crystalline, granular, earthy, massive. Scaly, foliated, disseminated, granular. Scaly, platy, foliated in clayey masses, disseminated in rock. Earthy, granular, compact, radiating, dendritic, encrustation. Acicular, crystalline, bladed, radiating, columnar, granular. Foliated, acicular, massive, disseminated. Massive, encrustation, arborescent, disseminated. Crystalline, granular, massive, disseminated. Massive, disseminated, granular, crystalline, earthy. Compact, granular, disseminated. Massive, compact, granular, disseminated, crystalline. Crystalline, granular, disseminated, crystalline. Crystalline, granular, disseminated. Crystalline, granular, disseminated. Crystalline, bladed, lamellar, granular. Usually massive. Reniform, columnar, disseminated. Botryoidal, reniform, nodular, stalactitic, encrustation. Massive, compact, granular, disseminated. Crystalline, massive, granular, disseminated. Disseminated, granular, massive.	Tabular or columnar. Prisms, vertically striated, striated. Vertically striated, needle-like, prismatic. Needle-like. Cubes, octahedrons. Tetrahedrons. Wedge-shaped. Columnar and tabular crystals. Tabular. Octahedrons, dodecahedrons.	One perfect. One rather good, clinopinacoidal. One. One. One very good. One good. One good. One good. Good cubic. One. One.	Uneven. Conchoidal. Uneven, conchoidal. Hackly. Uneven, conchoidal. Subconchoidal. Conchoidal. Uneven. Uneven. Uneven. Uneven. Uneven. Uneven. Uneven. Conchoidal.	Brittle. Brittle. Brittle. Slightly sectile, Brittle. Ductile, malleable. Brittle. Flexible, sectile. Flexible in thin plates, sectile, Brittle. Slightly sectile, flexible, brittle. Sectile, brittle. Brittle.	Opaque. Translucent on thin edges. Transparent, translucent. Transparent, translucent. Transparent to opaque. Thin splinters transmit red light. Opaque. Transparent to opaque.	Contains hematite. Sometimes feebly magnetic. Gives tests for manganese and tungsten. Burns with a garlic odor. Alters to orpiment. Will give white streaks when moistened with acid and rubbed on copper. Often tarnished brown, green or blue. See copper test under azurite. Soapy feel, marks paper. Distinguished by its blue tinge. Soapy feel. Often carries gold. See manganese test under huebnerite. Fuses easily, tarnishes black to iridescent or alters to a yellowish white oxide. Acicular structure not common as it is in stibnite. Often coated with a yellow iridescent tarnish. Becomes dull on exposure. Swells and fuses when heated on charcoal before blowpipe. Readily distinguished by its weight and cleavage. Takes on a black or dull red tarnish or a blue or green coat. Often coats other copper sulfides. Tarnishes easily giving a peacock play of colors. Tarnishes dull, variable composition. Infusible. See copper test under azurite. Tarnishes, becomes darker and takes on an iridescent coat. Softer than pyrite and more yellow. Tarnishes bronze, slightly magnetic. Occasionally feebly magnetic. See manganese test under huebnerite. Slightly magnetic. Strongly magnetic. Often accompanied by a greenish stain. When struck with steel it emits a garlic-like odor.	sphalerite Black Jack. Wolframite. Realgar. Proustite, light ruby silver. Cinnabar, natural vermillion. Pyrargyrite, dark ruby silver. Copper. Cuprite. Molybdenite. Graphite, pencil ore, plumbago. PYROLUSITE. Bismuthinite. Argentite. GALENA. CHALCOCITE Copper glance. BORNITE "Horse-flesh ore," Tetrahedrite. Melaconite, Tenorite. CHALCOPYRITE Copper pyrites. Pyrrhotite. Wolframite. Niccolite. Psilomelane, black hematite. Ilmenite. MAGNETITE MAGNETITE Magnetic iron ore. ARSENOP RITE Arsenical pyrites. Marcasite.	AgcAs2Sc HgS AgcSb2Sc Cu CuO MoS C MnO2 Sb2Sc B12Sc Ag2S PbS Cu2S Copper iron sulfide. Cu3Sb2Sc CuO CuFeSc A variable iron pyrites. FeMnWO1 NiAs MnO2.xH2O FeTiO3 Fe(FeO2)2	70.1% As 65.4% Ag 86.6% Hg 60% Ag 100% Cu 88.8% Cu 60% Mo 100% C 63.2% Mn 71.4% Sb 81.2% Bi 87.1% Ag 86.6% Pb 79.8% Cu 63.2% Cu 52.6% Cu 79.8% Cu 76.5% WOg 43.9% Ni Variable.	Occurs in veins and in hot spring deposits. In veins, usually in zone of secondary enrichment. In veins and in sediments cut by veins. In hot spring deposits. In veins, usually with pyrargyrite. In upper parts of veins. In sediments cut by veins. In igneous rocks. Found in upper oxidized portion of copper veins. Occurs in granite, gneiss, limestone and in quartz veins. Occurs in all types of rocks. Chiefly a metamorphic mineral. Occurs in upper part of veins. A product of rock weathering. A quartz vein mineral. A quartz vein mineral. A mineral of the zone of secondary enrichment. Occurs in veins and disseminated in limestones. Commonly found in the zone of secondary enrichment. A primary sulfide in quartz veins, a contact impregnation in sediments, also a mineral of secondary enrichment zone. Primary vein ore, disseminated in country rock. Common in zone of secondary enrichment. Found in zone of oxidation of copper bearing veins. Primary sulfide in quartz veins. Contact metamorphic mineral. Also occurs in zone of secondary enrichment. Magmatic segregation, contact metamorphic fissure filling, vein mineral. In veins and pegmatite dikes associated with acidic igneous rocks. In quartz veins. A product of alteration of manganese minerals. Zone of oxidation. Common minor constituent of igneous and metamorphic rocks. Occasionally occurs in large deposits. Found in segregations and disseminations in igneous rocks and along metamorphic contacts.	Not a commercial source of As. Ore of silver. Ore of silver. Ore of copper. Ore of copper. Ore of manufacture of black paint, polish, crucibles, lead pencils, lubricants. Used in manufacture of ferro manganese steels and bronzes, in paint, and in chemicals. Source of antimony and its compounds. Used in fireworks, safety matches, rubber goods, percussion caps. Not common. Ore of silver. Ore of lead, often carries silver. Ore of copper, Ore of copper, frequently carries small amounts of gold, silver. Ore of copper, often carries silver, lead, zinc, mercury. Ore of copper, Ore of copper, often contains gold and silver. Often contains sufficient nickel and cobalt to be an ore. Source of sulfuric acid. Ore of tungsten. Source of manganese. Used to some extent in making ferro-titanium and in the preparation of linings for puddling furnaces,

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5489