



ROCK COLLECTION BOX LABELS

Albuquerque Gem &
Mineral Junior Club

3/24/14

Name: Location: Date: By:	Name: Location: Date: By:	Name: Location: Date: By:
Name: Location: Date: By:	Name: Location: Date: By:	Name: Location: Date: By:
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JOURNAL LOG

Albuquerque Gem &
Mineral Junior Club

3/24/14

Sample Name:	Sample #:
Where Found:	Notes:
By:	Date:

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PHYSICAL PROPERTIES OF SOME COMMON MINERALS

Albuquerque Gem & Mineral Junior Club

3/24/14

Metallic Luster

MINERAL	COLOR	STREAK	HARDNESS	CRYSTALS	BREAKAGE
GRAPHITE	Black to gray	Black to gray	1-2	Hexagonal	Scales
SILVER	Silvery, white	Light gray to silver	2.5	Cubic	Hackly
GALENA	Gray	Gray to black	2.5	Cubic	Perfect, cubic
GOLD	Pale-golden yellow	Yellow	2.5-3	Cubic	Hackly
COPPER	Copper red	Copper red	3	Cubic	Hackly
CHROMITE	Black or brown	Brown to black	5.5	Cubic	Irregular
MAGNETITE	Black	Black	6	Cubic	Conchoidal
PYRITE	Light brassy yellow	Greenish black	6.5	Cubic	Uneven

Nonmetallic Luster

MINERAL	COLOR	STREAK	HARDNESS	CRYSTALS	BREAKAGE
TALC	White, greenish	White	1	Monoclinic	In 1 direction
BAUXITE	Gray, red, brown, white	Gray	1-3	--	--
GYPSUM	Colorless, gray, white	White	2	Monoclinic	Basal cleavage
SULFUR	Yellow	Yellow to white	2	Orthorhombic	Conchoidal
MUSCOVITE	White, gray, yellow, rose, green	Colorless	2.5	Monoclinic	Basal cleavage
HALITE	Colorless, red, white, blue	Colorless	2,5	Cubic	Cubic
CALCITE	Colorless, white	Colorless, white	3	Hexagonal	In 3 directions
DOLOMITE	Colorless, white, pink, green, gray	White	3.5-4	Hexagonal	In 3 directions
FLUORITE	Colorless, white, blue, green, red, yellow, purple	Colorless	4	Cubic	Cleavage
HORNBLLENDE	Green to black	Gray to white	5-6	Monoclinic	In 2 directions
FELDSPAR	Gray, green, white	Colorless	6	Monoclinic	2 planes
QUARTZ	Colorless, colors	Colorless	7	Hexagonal	Conchoidal
GARNET	Yellow-red, green, black	Colorless	7.5	Cubic	Conchoidal
TOPAZ (gemstone)	White, pink, yellow, blue, colorless	Colorless	8	Orthorhombic	Basal
CORUNDUM (gemstone)	Colorless, blue, brown, green, white, red pink	Colorless	9	hexagonal	Fracture



PROPERTIES OF MINERALS

An Identification Chart

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3/24/14

Metallic Luster

MAGNETITE	Black; strongly magnetic; hardness 6.
GRAPHITE	Lead-pencil black; smudges fingers; hardness 1.
PYRITE	Brass yellow, black streak; cubic crystals; commonly with striations; hardness 6-6.5.
CHALCOPYRITE	Brass yellow; may be tarnished; black streak; hardness 3.5-4.
GALENA	Shiny gray; black streak; very heavy; hardness 2.5.

Light-colored Nonmetallic Luster

ORTHOCLASE <i>(Potassium Feldspar)</i>	White or flesh-colored; hardness 6. Large, irregularly veined crystals are Perthite.	Hard (Hardness of 5 or greater)
PLAGIOCLASE	White or green-gray; hardness 6.	
QUARTZ	White, clear, or any color; glassy luster; transparent to translucent; hexagonal (6 sided) crystals; hardness 7.	
OLIVINE	Various shades of green and yellow; glassy luster; granular masses and crystals in rocks; hardness 6.5-7.	
OPAL	Any color or variegated, glassy luster; hardness 5-6.	
CHALCEDONY <i>(Agate)</i>	Any color or variegated; waxy luster; hardness 7.	

HALITE	Colorless to white; salty taste; cubic cleavage; hardness 2.5.	Soft (Hardness of less than 5)
CALCITE	White, yellow to colorless; hardness 3; effervesces with dilute hydrochloric acid.	
DOLOMITE	Pink, colorless, white, or dark; hardness 2.5-4; effervesces with dilute hydrochloric acid only if powdered.	
GYPSUM	White to transparent; hardness 2.	
TALC	Green to white; feels soapy; hardness 1.	
MUSCOVITE	Colorless to light yellow or green; transparent in thin sheets that are very elastic; hardness 2-2.5 (white mica)	
ASBESTOS	Green to white; fibrous; may form veins	
SULFUR	Yellow to greenish; resinous luster; hardness 1.5-2.5	



PROPERTIES OF MINERALS

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Dark-colored Nonmetallic Luster

AUGITE	Black to dark green; hardness 5-6.	Hard (Hardness of 5 or greater)
HORNBLLENDE	Black to dark green; hardness 5-6.	
GARNET	Red to red-brown; hardness 6.5-7.5	
OLIVINE	Various shades of green and yellow; glassy luster; granular masses and crystals in rocks; hardness 6.5-7.	
QUARTZ	White, clear, or any color; glassy luster; transparent to translucent; hexagonal (6-sided) crystals; hardness 7.	
OPAL	Any color or variegated, glassy luster; hardness 5-6.	
CHALCEDONY (Agate)	Any color or variegated; waxy luster; hardness 7.	
HEMATITE	Red to brown; red streak; earthy appearance; hardness 5.5-6.6.	
LIMONITE (Goethite)	Yellow-brown to dark brown, may be almost black; streak yellow-brown; earthy; hardness 5-5.5.	

BIOTITE	Brown to black; hardness 2.5-3 (black mica)	Soft (Hardness of less than 5)
CHLORITE	Various shades of green; hardness 2-2.5 (green mica)	
SPHALERITE	Yellow-brown, dark brown, or black; streak white to pale yellow; resinous luster; hardness 3.5-4.	
CINNABAR	Scarlet to red-brown; scarlet streak; hardness 2-2.5; high specific gravity.	
GRAPHITE	Lead-pencil black; smudges fingers; hardness 1.	
SERPENTINE	Dark to light green; greasy or waxy luster; some varieties are fibrous; hardness 2-5, generally 4	

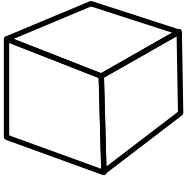


MINERALS AND THEIR IDENTIFICATION

Minerals are natural substances that have definite crystal structure and chemical composition.

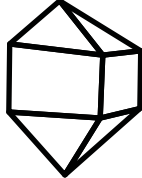
Crystal Shape

galena



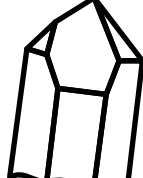
cubic

zircon



tetragonal

quartz



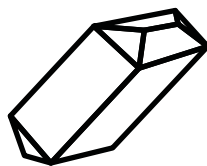
hexagonal

sulfur



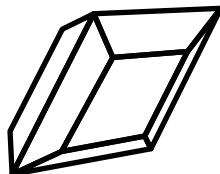
orthorhombic

turquoise



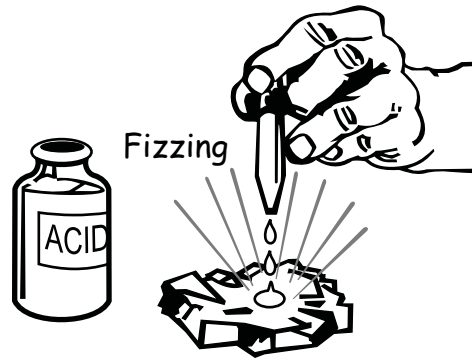
triclinic

gypsum



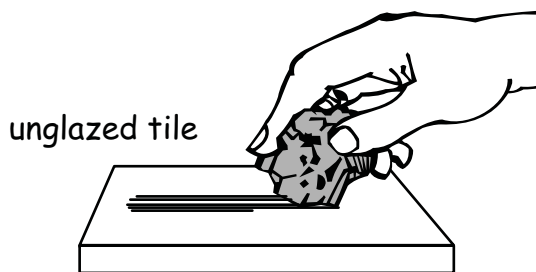
monoclinic

Acid Test



carbonate minerals
calcite
dolomite

Streak Test



Streak Color

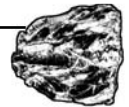
lead gray
green
yellow-brown
red-brown
black-green
scarlet
light blue

Mineral

galena
olivine
limonite
hematite
pyrite
cinnabar
azurite

Hardness Test

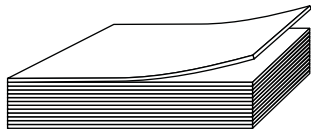
1. talc & pencil lead softest
2. gypsum
3. calcite
4. fluorite
5. apatite
6. feldspar
7. quartz
8. topaz
9. corundum
10. diamond hardest



1. What two means could be used to identify the mineral quartz?
2. Iron pyrite is known as "fool's gold". What test can be used to identify it?
STUDY QUESTION: What other tests are used to identify minerals?

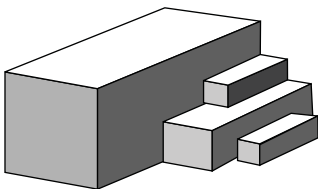
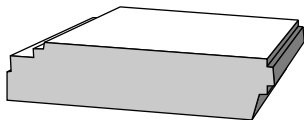
Cleavage

Cleavage planes are the surfaces along which a mineral breaks. The number of cleavage planes a mineral has, and the angles between them, provide useful clues to identification.



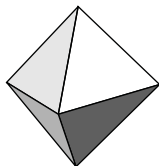
Mica has perfect cleavage in one direction only.

Feldspar has two cleavage directions. This gives four smooth surfaces and two rough ones.



Galena has three cleavages so it breaks into cubes. Calcite also has three but they are at an angle so it breaks into 'rhombs'.

Fluorite and diamond are examples of minerals with four cleavages. They form double-pyramid crystals.



Shape

Shape, also called 'habit', can be a useful clue to minerals that do not form large flat-sided crystals. These examples are shapes made up of thousands of tiny crystals. Each habit has a special name.



'Mamillated' Hematite often forms rounded masses of radiating crystals.

'Dendritic' Copper is an example of a mineral that forms branching growths.



'Fibrous' Asbestos forms masses of long parallel crystals that 'fray' into mineral 'wool'.

Density

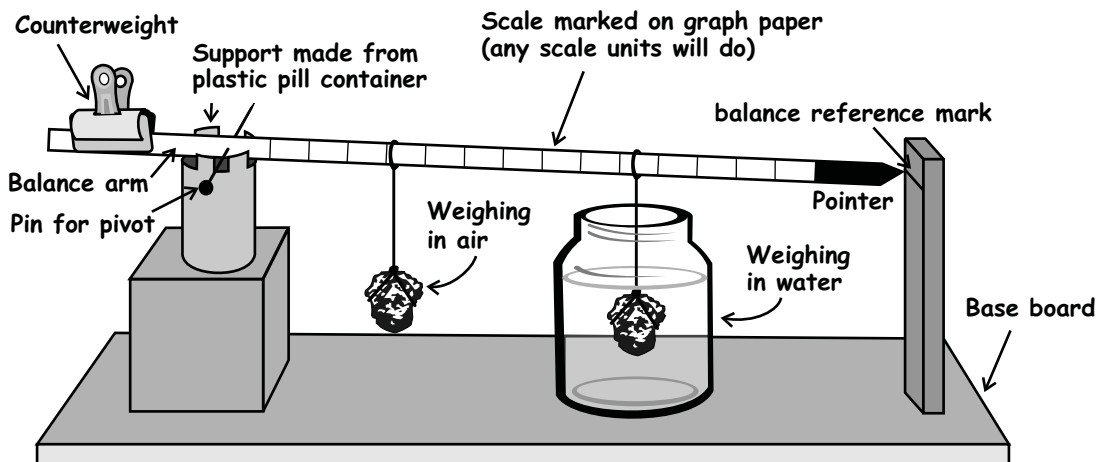
Density is another very important property. You can measure it with this simple home-made apparatus.

Hang your specimen from the long arm of the balance and add weights (bulldog clips are ideal) to the other end of the arm. Adjust the position of the specimen backward or forward on the arm until it is balanced and the pointer is exactly opposite the reference mark. Note the number of the scale units at the point where the sample is hanging. Call this reading A. Now place a container of water under the sample so that it is submerged. Don't move the bulldog counterweights at all. Instead, slide your sample along the arm to its new balance point. Take a new reading B. The density of your sample is given by this simple formula:

$$\text{Density} = B \div (B-A)$$

So, if your first reading had been 8 units and the second 12 units, the density would have been:

$$12 \div (12-8)=3.$$

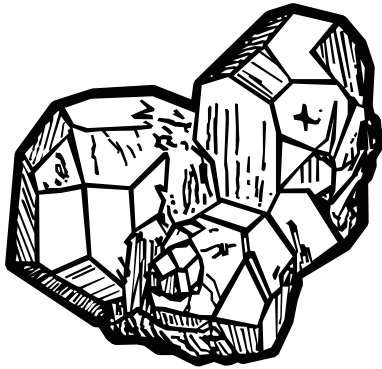




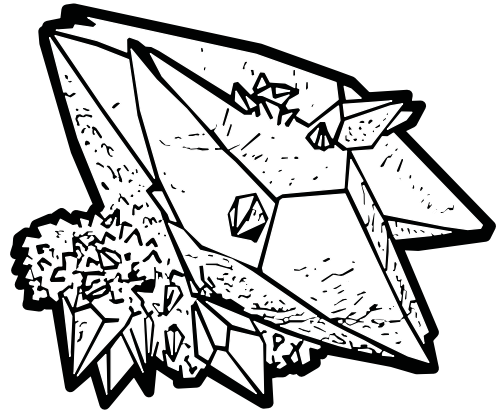
HAND SPECIMEN MINERAL SAMPLER

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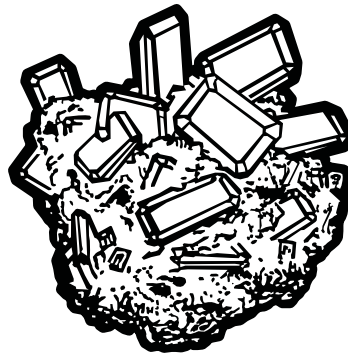
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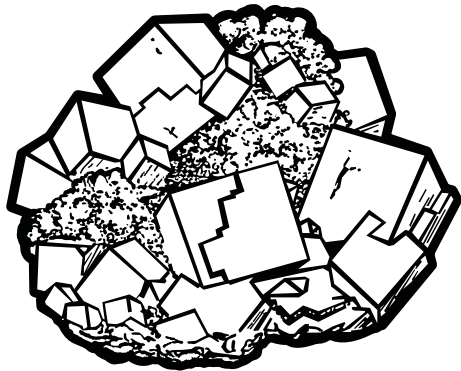
Rutile
Graves Mtn., Georgia
(Reddish Black)



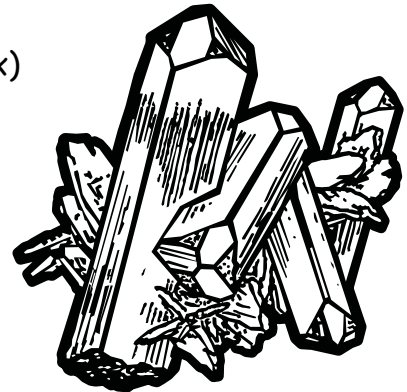
Calcite
Pugh Quarry, Ohio
(Honey Yellow)



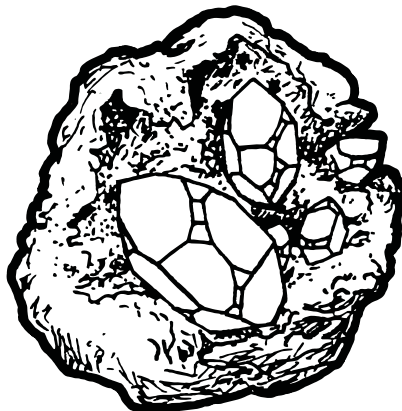
Wulfenite
Red Cloud Mtn., Arizona
(Bright Orange on Brown Mtrx)



Fluorite
Rosiclare, Illinois
(Light Violet on White Mtrx)



Tourmaline
Pala, California
(Pink with White
Cleavelandite Mtrx)



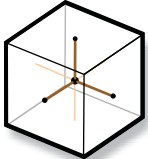
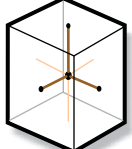
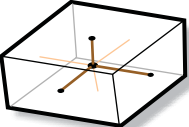
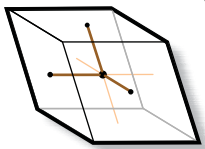
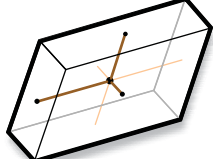
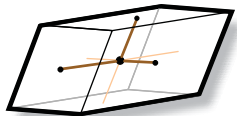
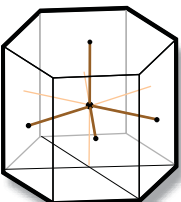
Quartz ("Herkimer Diamond")
Herkimer, New York
(Clear on Rusty Brown Mtrx)



Mineral Crystal Shapes

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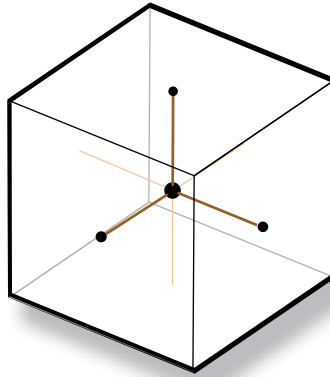
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Type	Number of Surfaces	Shape of Surfaces	Examples
cubic/isometric 	6	All are square Right angles	alum, pyrite, silver, gold, diamond, garnet, sodium chloride
tetragonal 	6	4 rectangles 2 squares Right angles	zircon, white tin
orthorhombic 	6	All rectangles 3 pairs of rectangles with different sizes Right angles	topaz, rhombic sulfur, epsom salt
rhombohedral/trigonal 	6	Rhombuses on all sides No right angles	calcite
monoclinic 	6	4 rectangles 2 parallelograms 16 right angles 8 other angles	gypsum, sugar, borax
triclinic 	6	Parallelograms No right angles	boric acid, copper sulfate
hexagonal 	8	2 hexagons 6 rectangles Right angles	ice, ruby, apatite, emerald, quartz, sapphire



- All 6 sides are squares
- All corners are 90°

cut on solid line
fold on dashed line



cubic
isometric

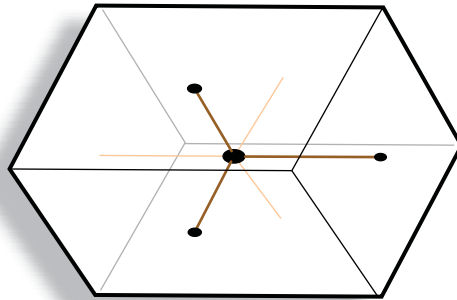
Examples:

Alum, Aluminum, Copper,
Cuprite, Diamond,
Fluorite, Galena, Gold,
Iron, Lead, Magnetite,
Nickel, Pyrite, Rhodium,
Silver, Spinel



- Two opposite sides are squares
- The 4 remaining sides are identical rectangles with short edge length = square face edge.
- All corners are 90° angles

cut on solid line
fold on dashed line



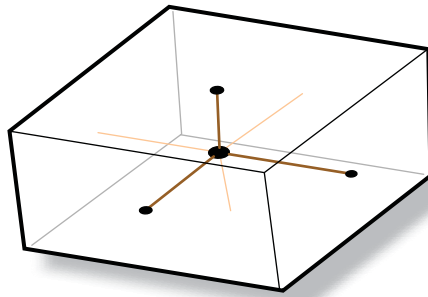
tetragonal

Examples:
Chalcopyrite, Rutile, Zircon



- Three pairs of opposing rectangles
- All corners are 90° angles

cut on solid line
fold on dashed line



orthorhombic

Examples:

Andalusite, Bornite, Calcocite,
Crysoberyl, Chrysocolla,
Goethite, Stibnite, Sulfur, Topaz,
Variscite

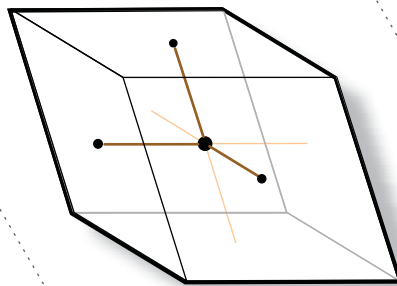


What you get when you “shift”
a cubic or isometric crystal in 2
directions.

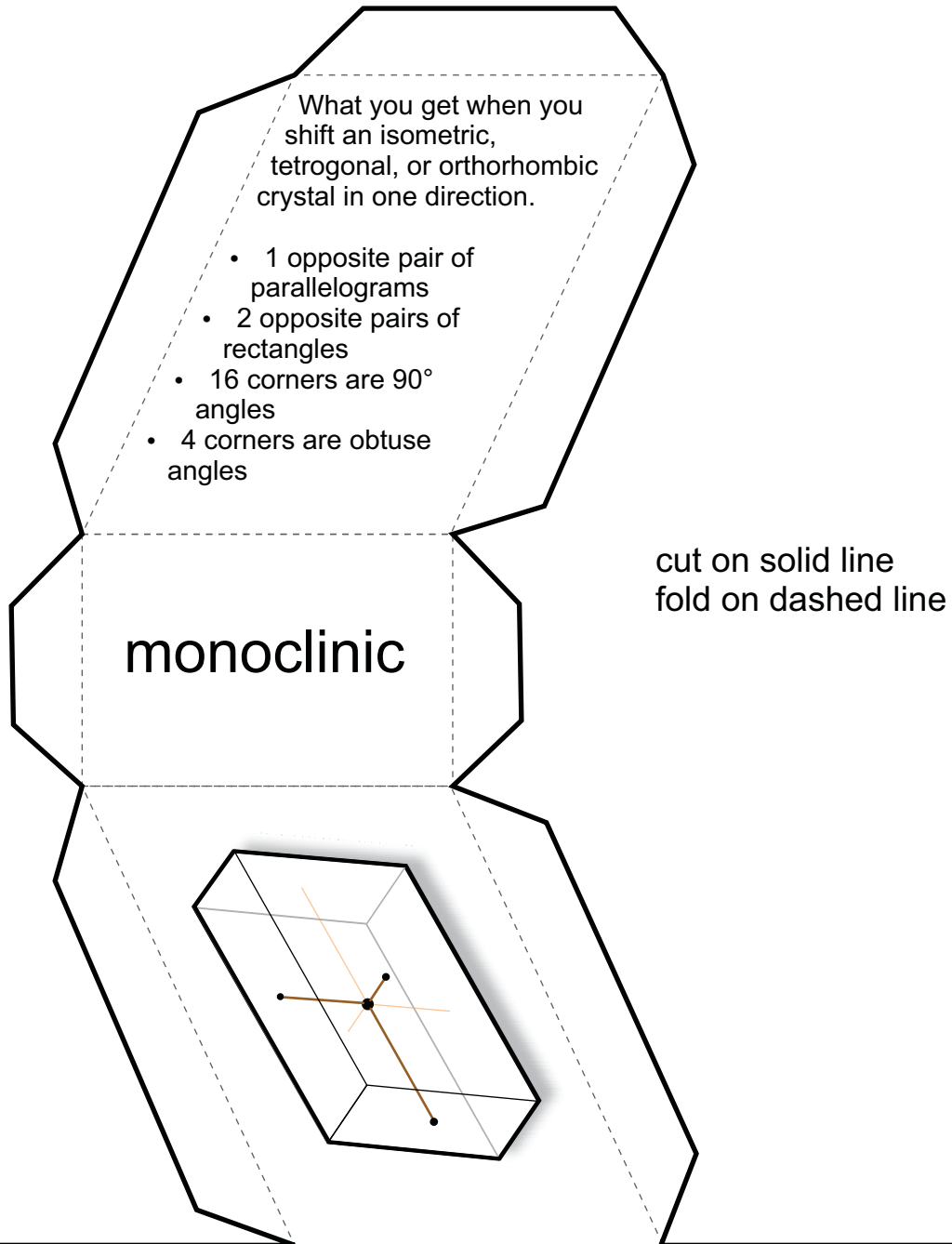
- All 6 sides are identical rhomboids
- All edges are the same length
- No corners are 90° angles
- All are either obtuse or acute

cut on solid line
fold on dashed line

rhombohedral



Examples:
Dolomite, Diopase,
Calcite, Hematite

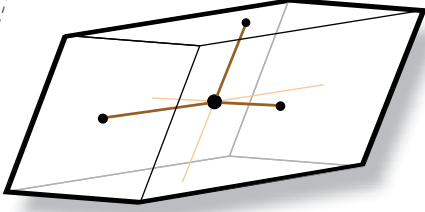


Examples:

Azurite, Diopside, Feldspar,
Gypsum, Hornblende,
Jadeite, Malachite,
Muscovite, Orthoclase, Talc



cut on solid line
fold on dashed line



What you get when you shift a
tetragonal or orthorhombic
crystal in 2 directions.

- 3 opposing pairs of
parallelograms
- No corners are 90° angles
- All corners are either
obtuse or acute

triclinic

Examples:
Feldspar, Kyanite,
Labradorite, Rhodonite,
Turquoise



cut on solid line
fold on dashed line

- Six matching rectangular faces with corners of 90°
- 2 opposing hexagonal faces with corners of 120°

hexagonal

Examples:
Beryl, Apatite, Emerald,
Quartz, Sapphire, Graphite

