Warm-up 4/15

Page: 718, 1. What is the picture showing on this page, and where is it located:

Devils Tower, Wyoming

Page: 718, 2. American Indian legend states it was formed by a giant _____ _____ its _____.

Bear scraping its claws

Page: 718, 3. The picture is actually the solidified core of a _____.

volcano

Warm-up

Page: 98, 1. A _____ is a combination of two or more substances that are not chemically combined.

mixture

Page: 98, 2. A mixture can be separated by _____ means.

physical

Page: 98, 3. The rock granite is a mixture made up of the minerals _____, feldspar, hornblende, and _____.

Quartz, biotite

Today's Objectives:

Students will be able to…

- Define "*mineral*"
- List 5 characteristics of minerals
- Define crystal
- Identify cubic and hexagonal crystal shape by number of faces
- Make a model of a crystal system

Activities:

- Warm-up
- Notes/discussion
- Make paper model of one of the 6 major crystal shapes
- Answer question – based on crystal models an systems using mineral chart

Chapter 21 sec.3

Minerals of Earth's Crust

Minerals

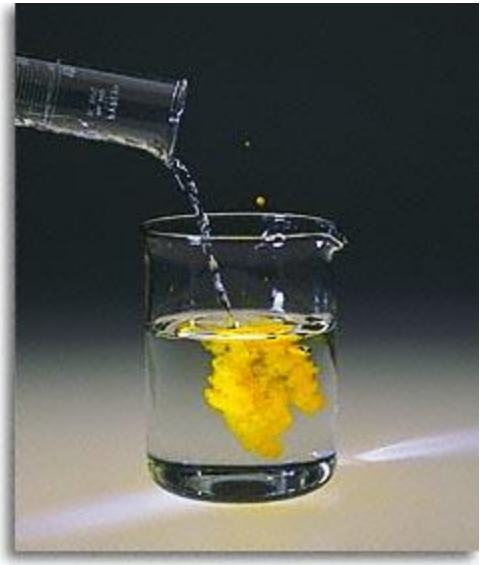
What is a mineral?

- **Mineral** – Is a naturally occurring, inorganic solid element or compound with a definite structure (crystal shape) and composition.

5 Mineral Characteristics

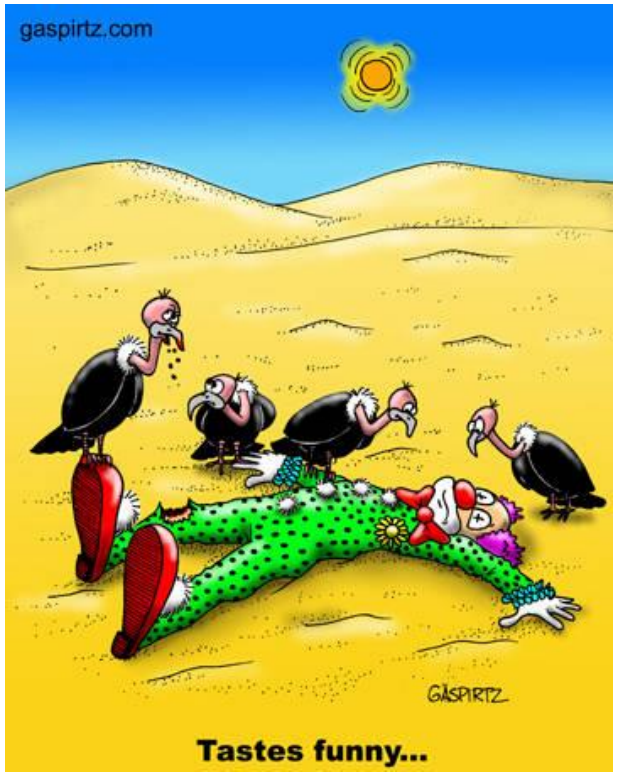
5 Mineral Characteristics

1. Formed by natural Earth processes



Credit: Kidzone Fu

2. Are not alive or never were alive (inorganic)



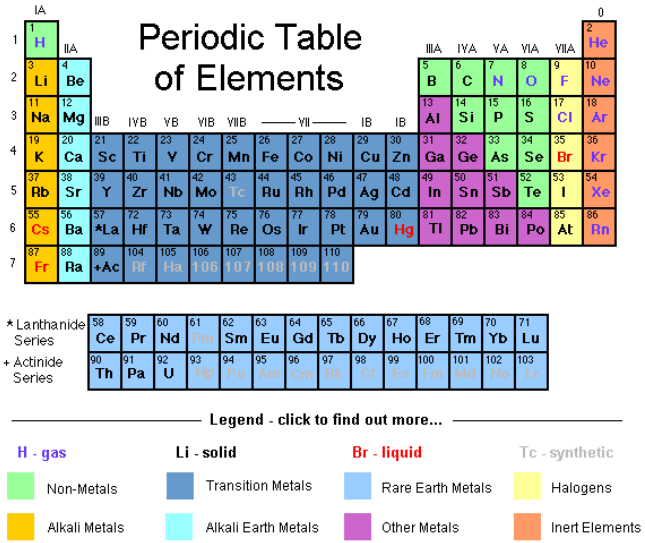
http://www.minsocam.org/MSA/K12/properties/minpropindex.html

3.Must be a solid

SOLID

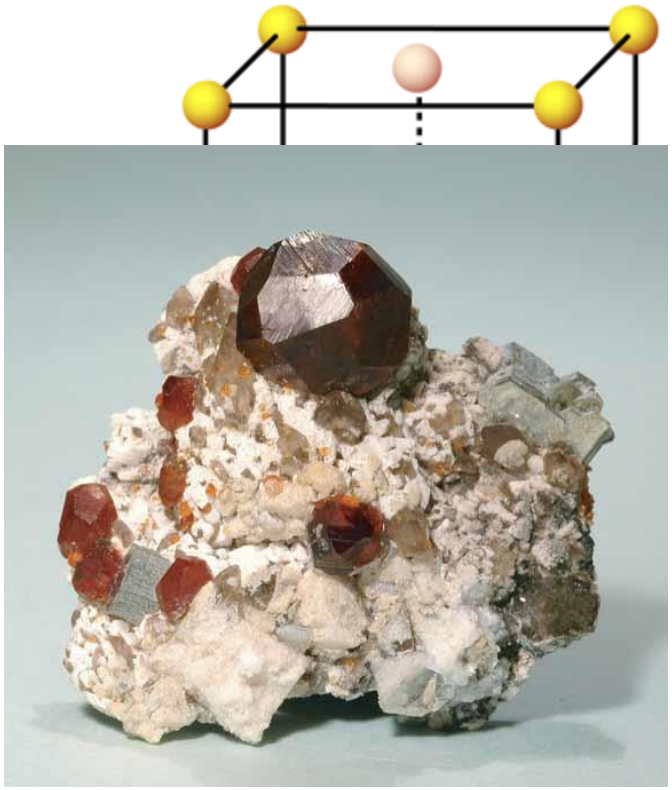
5 Mineral Characteristics

4. Either an element or compound



Mineral Group	Major Minerals	Chemical Formula
Carbonates	Calcite Dolomite	$CaCO_3$ $Ca\ Mg\ (CO_3)_2$
Silicates	Quartz Potassium Feldspar Biotite Pyroxene Amphibole Olivine	SiO_2 $KalSi_3O_8$ $K(MgFe)_3AlSi_3O_{10}\ (OH_2)$ $(Mg, Fe)_2Si_2O_6$ Variable $(Mg, Fe)_2\ SiO_4$
Sulfides	Galena Pyrite Sphalerite	PbS FeS_2 ZnS
Oxides	Hematite Magnetite Corundum	Fe_2O_3 Fe_3O_4 Al_2O_3
Sulfates	Gypsum Anhydrite	$CaSO_4 \cdot H_2O$ $CaSO_4$
Halides	Halite Fluorite	NaCl CaF_2
Native Elements	Silver Gold Graphite/Diamond	Ag Au C

5. Atoms or molecules are in a fixed pattern **(crystal shape)**



Crystal – is a solid whose atoms, ions, or molecules are arranged in a regular, repeating pattern

6 Major Crystal Shapes

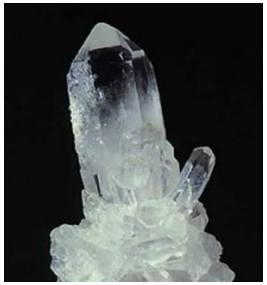
6 Major Crystal Shapes (p120)

1. **Cubic** (isometric) – has 3 axis of equal length
   - ***Examples***: Halite(salt), Galena(lead), Diamonds

6 Major Crystal Shapes

6 Major Crystal Shapes (p120)

2. **Hexagonal** *(six-sided)* – has 3 of equal length axes in the same plane which intersect at 120° angles.
   - ***Examples***: quartz, corundum, rubies



6 Major Crystal Shapes

<u>6 Major Crystal Shapes (p120)</u>

Crystal face – one side or one flat surface of a crystal.

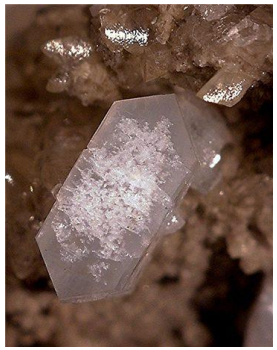
Synthetic – an object made by process of man (man-made). ***Examples***: cubic zirconium, plastic, steel, styrofoam

6 Major Crystal Shapes

6 Major Crystal Shapes (p120)

3. **Tetragonal** – chalcopyrite zircon

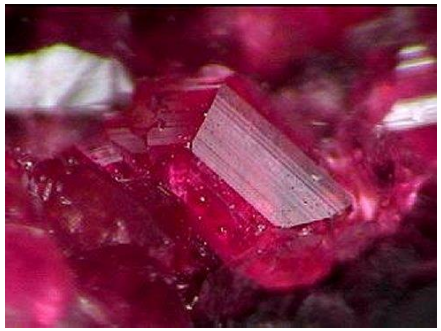
4. **Orthorhombic** – sulfur, topaz



6 Major Crystal Shapes

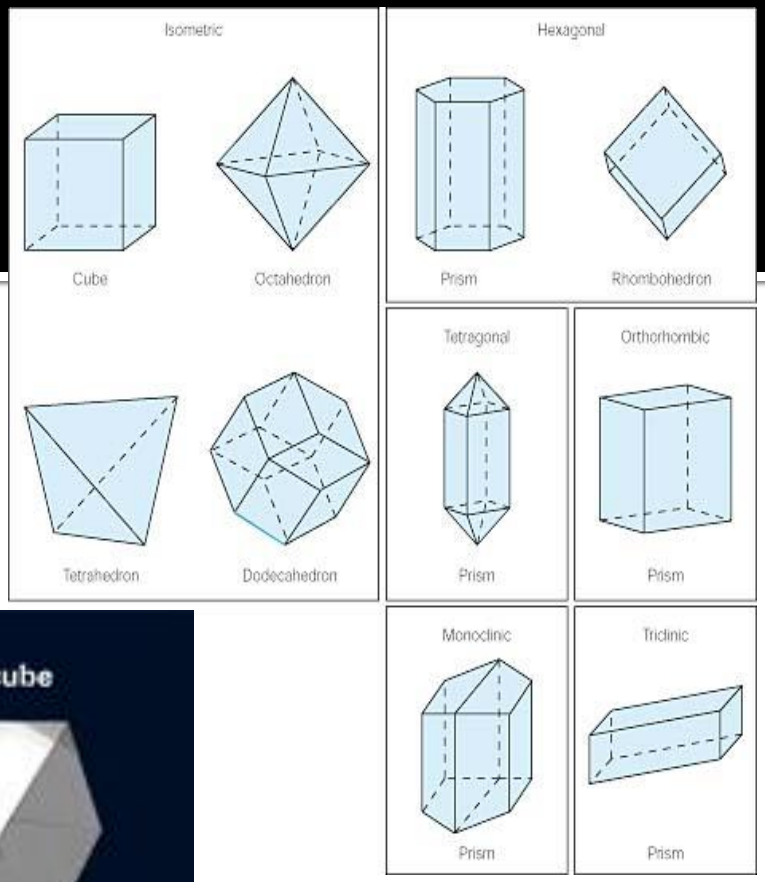
6 Major Crystal Shapes (p120)

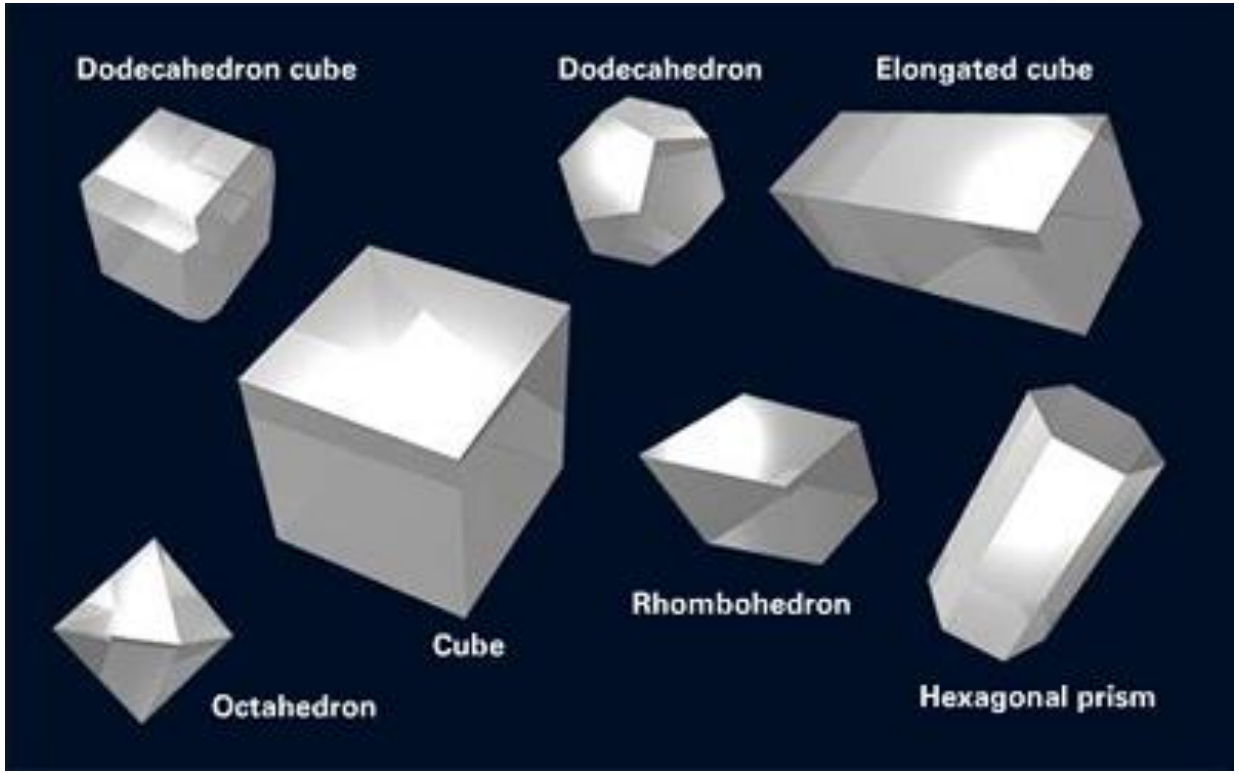
5. **Monoclinic –** gypsum, talc



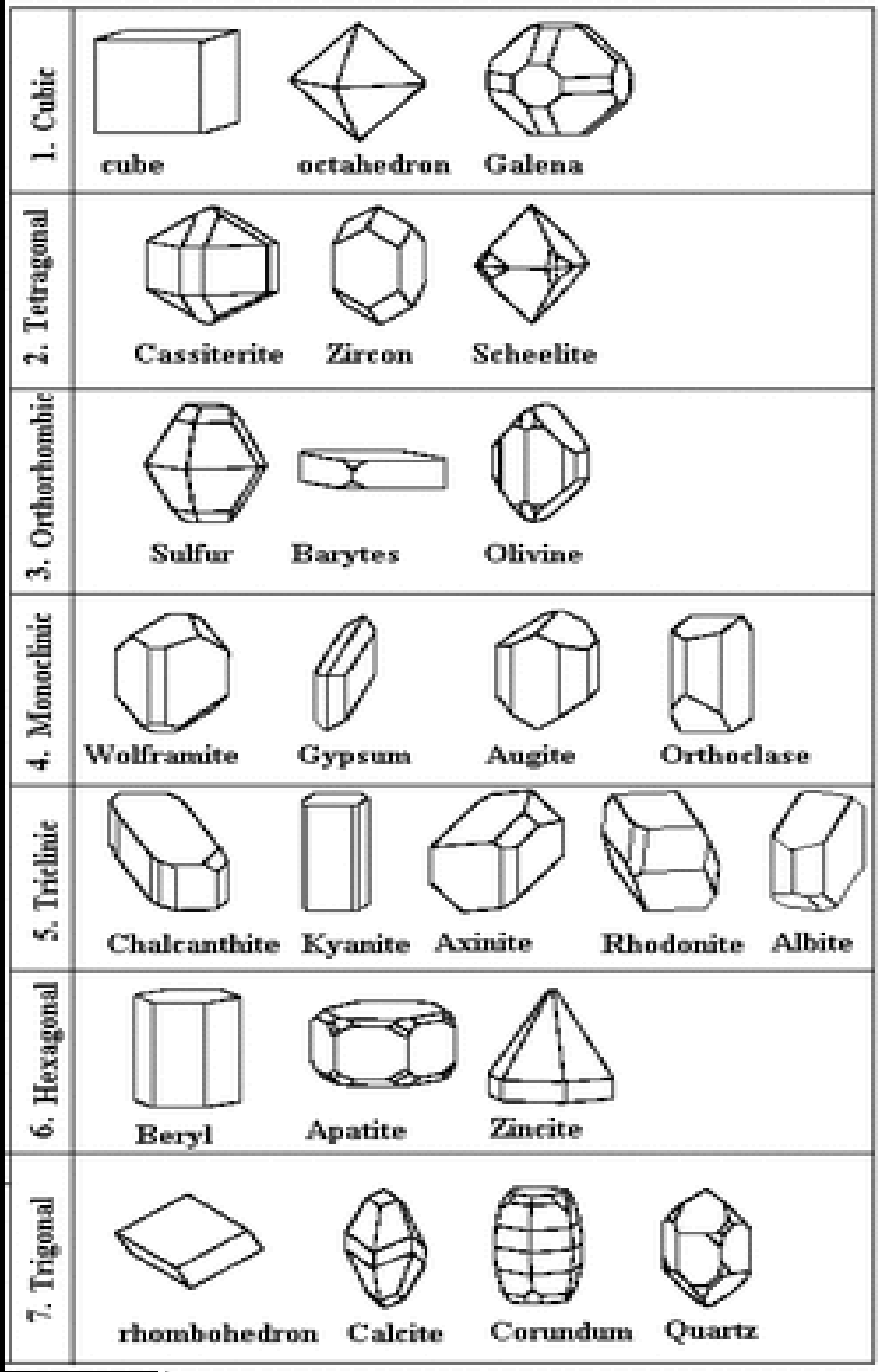
6. **Triclinic** – sulfur, topaz

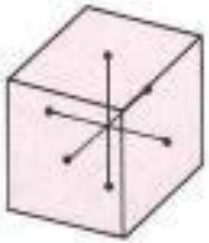
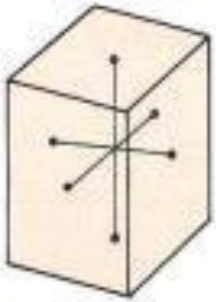
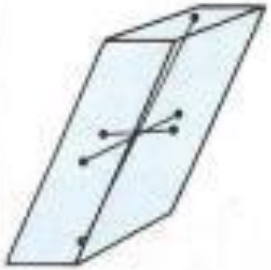
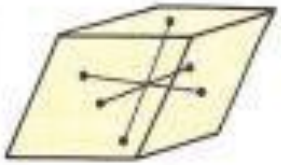

Isometric
Hexagonal
Tetragonal
Trigonal
Orthorhombic
Monoclinic
Triclinic
Isometric
Hexagonal
Tetragonal
Trigonal
Orthorhombic
Monoclinic
Triclinic


Isometric
Cube
Octahedron
Tetrahedron
Dodecahedron
Hexagonal
Prism
Rhombohedron
Tetragonal
Prism
Orthorhombic
Prism
Monoclinic
Prism
Triclinic
Prism


Dodecahedron cube
Dodecahedron
Elongated cube
Cube
Rhombohedron
Octahedron
Hexagonal prism

Crystal form of the seven crystal systems



cubic	tetragonal	hexagonal	orthorhombic	monoclinic	triclinic
					
examples: halite galena	examples: zircon chalcopyrite	examples: quartz calcite	examples: sulfur staurolite	examples: mica gypsum	examples: feldspar rhodonite

Cool-down

1. What term means alive or once was alive?

Organic

2. What do you call one flat side of a crystal?

Face or facet

Cool down

1. Solid matter plus enough energy(heat) causes _____.

Melting

2. Name the following: FeO_2, NaCl, SiO_2, $CaCO_3$

Iron oxide(rust), sodium chloride (salt), silicon dioxide (quartz), calcium carbonate (limestone)