Guided Notes

Rocks & Minerals

1. What is a Mineral
2. Mineral Properties
3. Rock Cycle
4. Igneous Rocks
5. Sedimentary Rocks
6. Metamorphic Rocks

1. What are minerals?

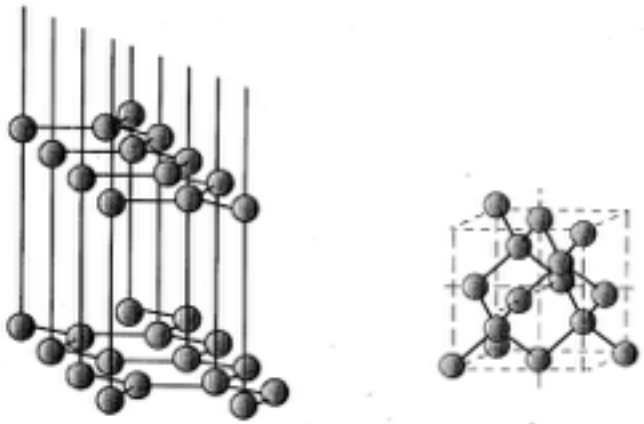
- **Minerals**: **common Earth materials that are important to our everyday lives & the building blocks of rocks.**

2. **What are the characteristics of a mineral?**

- Minerals are:
  - Solid: **not liquid or gas**
  - Inorganic: **not living/never were living/ not created by a living thing**
  - Naturally occurring: **not man-made**
  - Definite chemical composition: **not a mixture, always know what its made of**
  - Crystalline structure: **made of regular patterns of atoms or molecules**

3. **How are the physical properties of minerals determined?**

- Physical properties are due to the **internal arrangement of the atoms.**
- *Common Example:* Graphite & diamond are 100% carbon. Since the carbon atoms are arranged in a different manner, they have very different properties:



Properties of Common Minerals

LUSTER	HARDNESS	CLEAVAGE	FRACTURE	COMMON COLORS	DISTINGUISHING CHARACTERISTICS	USE(S)	COMPOSITION*	MINERAL NAME
Metallic luster	1–2	✔		silver to gray	black streak, greasy feel	pencil lead, lubricants	C	Graphite
	2.5	✔		metallic silver	gray-black streak, cubic cleavage, density = 7.6 g/cm^3	ore of lead, batteries	PbS	Galena
	5.5–6.5		✔	black to silver	black streak, magnetic	ore of iron, steel	Fe_3O_4	Magnetite
	6.5		✔	brassy yellow	green-black streak, (fool's gold)	ore of sulfur	FeS_2	Pyrite
Either	5.5 – 6.5 or 1		✔	metallic silver or earthy red	red-brown streak	ore of iron, jewelry	Fe_2O_3	Hematite
Nonmetallic luster	1	✔		white to green	greasy feel	ceramics, paper	$Mg_3Si_4O_{10}(OH)_2$	Talc
	2		✔	yellow to amber	white-yellow streak	sulfuric acid	S	Sulfur
	2	✔		white to pink or gray	easily scratched by fingernail	plaster of paris, drywall	$CaSO_4 \cdot 2H_2O$	Selenite gypsum
	2–2.5	✔		colorless to yellow	flexible in thin sheets	paint, roofing	$KAl_3Si_3O_{10}(OH)_2$	Muscovite mica
	2.5	✔		colorless to white	cubic cleavage, salty taste	food additive, melts ice	NaCl	Halite
	2.5–3	✔		black to dark brown	flexible in thin sheets	construction materials	$K(Mg,Fe)_3$ $AlSi_3O_{10}(OH)_2$	Biotite mica
	3	✔		colorless or variable	bubbles with acid, rhombohedral cleavage	cement, lime	$CaCO_3$	Calcite
	3.5	✔		colorless or variable	bubbles with acid when powdered	building stones	$CaMg(CO_3)_2$	Dolomite
	4	✔		colorless or variable	cleaves in 4 directions	hydrofluoric acid	CaF_2	Fluorite
	5–6	✔		black to dark green	cleaves in 2 directions at 90°	mineral collections, jewelry	(Ca,Na) (Mg,Fe,Al) $(Si,Al)_2O_6$	Pyroxene (commonly augite)
	5.5	✔		black to dark green	cleaves at 56° and 124°	mineral collections, jewelry	$CaNa(Mg,Fe)_4$ $(Al,Fe,Ti)_3$ $Si_6O_{22}(O,OH)_2$	Amphibole (commonly hornblende)
	6	✔		white to pink	cleaves in 2 directions at 90°	ceramics, glass	$KAlSi_3O_8$	Potassium feldspar (commonly orthoclase)
	6	✔		white to gray	cleaves in 2 directions, striations visible	ceramics, glass	$(Na,Ca)AlSi_3O_8$	Plagioclase feldspar
	6.5		✔	green to gray or brown	commonly light green and granular	furnace bricks, jewelry	$(Fe,Mg)_2SiO_4$	Olivine
	7		✔	colorless or variable	glassy luster, may form hexagonal crystals	glass, jewelry, electronics	SiO_2	Quartz
	6.5–7.5		✔	dark red to green	often seen as red glassy grains in NYS metamorphic rocks	jewelry (NYS gem), abrasives	$Fe_3Al_2Si_3O_{12}$	Garnet

*Chemical symbols:

Al = aluminum	Cl = chlorine	H = hydrogen	Na = sodium	S = sulfur
C = carbon	F = fluorine	K = potassium	O = oxygen	Si = silicon
Ca = calcium	Fe = iron	Mg = magnesium	Pb = lead	Ti = titanium

✔ = dominant form of breakage

Review - Properties of Minerals: Identify those that are minerals and those that are not minerals. Explain why based on the definition of a mineral.

Ex. Gold __mineral____ Water _non-mineral_ _not a solid___

	Mineral / non-mineral	Why
1. Oxygen	_____	_____
2. Broccoli	_____	_____
3. Plastic	_____	_____
4. Nickel	_____	_____
5. Silver	_____	_____
6. Milk	_____	_____
7. Textbook	_____	_____
8. Calcium	_____	_____