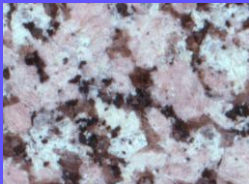


Rock vs. mineral

- Rock
 - Aggregate of minerals



Compounds

- Combinations of one or more elements



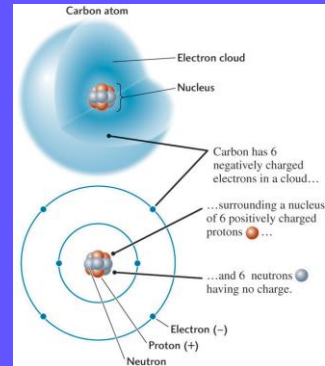
“Layperson” = salt

Chemist = NaCl (sodium chloride)

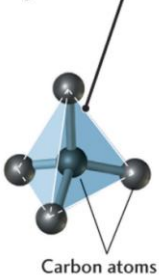
Geologist = Halite (mineral)

So what is a mineral?

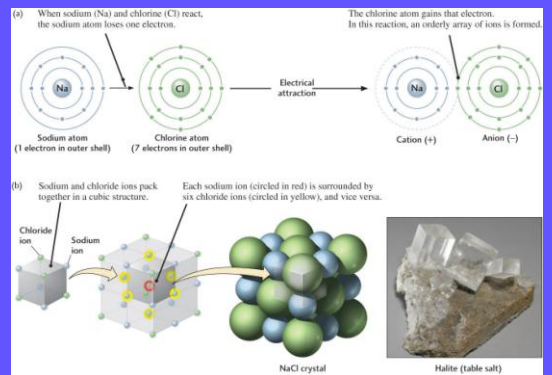
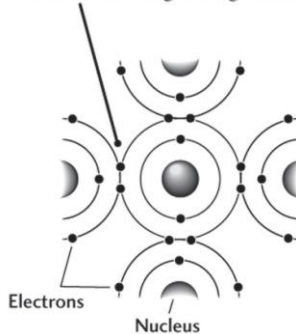
- Solid
- Inorganic
- Natural
- Chemical composition
- Atoms ordered
 - Crystal lattice














Carbon atoms in diamond are arranged in regular tetrahedra...



...that share an electron with each of four neighboring atoms.

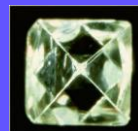


CATIONS	Silicon (Si ⁴⁺)	Aluminum (Al ³⁺)	Iron (Fe ³⁺)	Magnesium (Mg ²⁺)	Iron (Fe ²⁺)	Sodium (Na ⁺)	Calcium (Ca ²⁺)	Potassium (K ⁺)
								
	0.27	0.53	0.65	0.72	0.73	0.99	1.00	1.38
ANIONS	Oxygen (O ²⁻)	Chloride (Cl ⁻)	Sulfide (S ²⁻)					
								
	1.40	1.81	1.84					

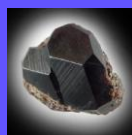
Crystals



Halite



Diamond



Staurolite



Quartz

Crystal power?



The Crystalline Crapper



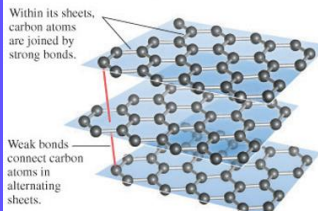
Crystal faces

A perfect quartz crystal



A natural quartz crystal

Graphite is formed at lower pressures and temperatures than diamond. Its carbon forms sheets whose atoms are more loosely packed than those in diamond.



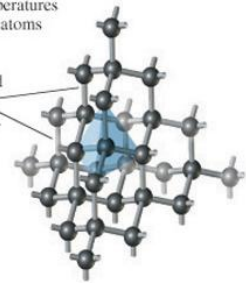
Graphite

Natural **diamond** is formed by very high pressures and temperatures in Earth's mantle. Its carbon atoms are closely packed.

All carbon atoms in diamond are closely packed, and all the bonds are very strong.



Diamond



Crystal structure



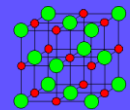
● Na^+

● Cl^-

Determined by the way the atoms are packed

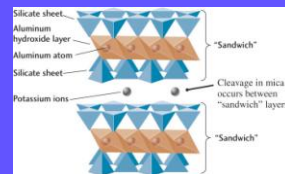
Atoms pack as a cube...

So halite is cubic



● Na^+

● Cl^-



What makes up minerals?

Abundant elements in continental crust

- 1) Silicon (Si)
- 2) Oxygen (O)
- 3) Aluminum (Al)
- 4) Iron (Fe)
- 5) Calcium (Ca)