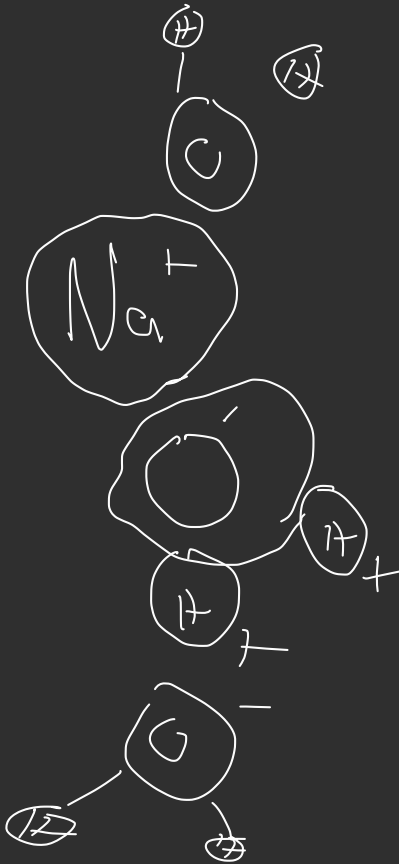


Periodic Table

1 H Hydrogen																	2 He Helium	
3 Li Lithium	4 Be Beryllium											5 B Boron	6 C Carbon	7 N Nitrogen	8 O Oxygen	9 F Fluorine	10 Ne Neon	
11 Na Sodium	12 Mg Magnesi...											13 Al Aluminum	14 Si Silicon	15 P Phosph...	16 S Sulfur	17 Cl Chlorine	18 Ar Argon	
19 K Potassium	20 Ca Calcium	21 Sc Scandium	22 Ti Titanium	23 V Vanadium	24 Cr Chromium	25 Mn Mangan...	26 Fe Iron	27 Co Cobalt	28 Ni Nickel	29 Cu Copper	30 Zn Zinc	31 Ga Gallium	32 Ge Germani...	33 As Arsenic	34 Se Selenium	35 Br Bromine	36 Kr Krypton	
37 Rb Rubidium	38 Sr Strontium	39 Y Yttrium	40 Zr Zirconium	41 Nb Niobium	42 Mo Molybde...	43 Tc Technet...	44 Ru Ruthenium	45 Rh Rhodium	46 Pd Palladium	47 Ag Silver	48 Cd Cadmium	49 In Indium	50 Sn Tin	51 Sb Antimony	52 Te Tellurium	53 I Iodine	54 Xe Xenon	
55 Cs Caesium	56 Ba Barium	57 La Lanthan...	72 Hf Hafnium	73 Ta Tantalum	74 W Tungsten	75 Re Rhenium	76 Os Osmium	77 Ir Iridium	78 Pt Platinum	79 Au Gold	80 Hg Mercury	81 Tl Thallium	82 Pb Lead	83 Bi Bismuth	84 Po Polonium	85 At Astatine	86 Rn Radon	
87 Fr Francium	88 Ra Radium	89 Ac Actinium	104 Rf Rutherfo...	105 Db Dubnium	106 Sg Seaborg...	107 Bh Bohrium	108 Hs Hassium	109 Mt Meitneri...	110 Ds Darmsta...	111 Rg Roentge...	112 Cn Coperni...	113 Nh Nihonium	114 Fl Flerovium	115 Mc Moscovi...	116 Lv Livermo...	117 Ts Tenness...	118 Og Oganes...	
			58 Ce Cerium	59 Pr Praseod...	60 Nd Neodym...	61 Pm Prometh...	62 Sm Samarium	63 Eu Europium	64 Gd Gadolini...	65 Tb Terbium	66 Dy Dyspros...	67 Ho Holmium	68 Er Erbium	69 Tm Thulium	70 Yb Ytterbium	71 Lu Lutetium		
			90 Th Thorium	91 Pa Protact...	92 U Uranium	93 Np Neptunium	94 Pu Plutonium	95 Am Americium	96 Cm Curium	97 Bk Berkelium	98 Cf Californi...	99 Es Einsteini...	100 Fm Fermium	101 Md Mendele...	102 No Nobelium	103 Lr Lawrenc...		

- Alkali metals
- Alkaline earth metals
- Transition metals
- Post-transition metals
- Metalloids
- Reactive nonmetals
- Noble gases
- Lanthanides
- Actinides
- Unknown properties

Hydration



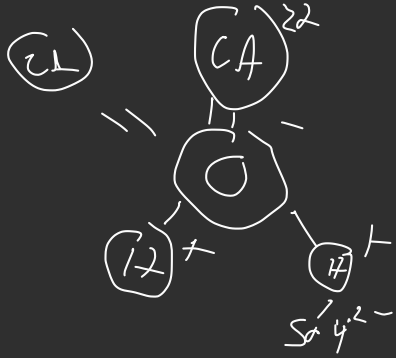
Hydrolysis



Dissolution

Water dissolves minerals by hydrating
cations and anions

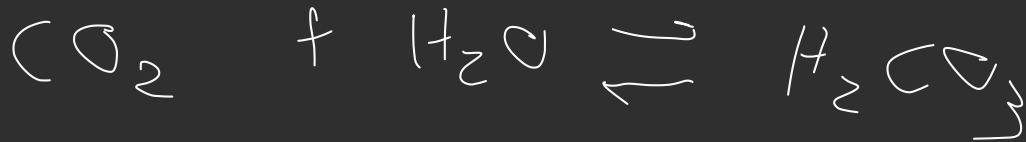
Gypsum



Acid Reactions

→ Weathering by Acids

→ increase in Hydrogen ions and thus increased activity by low K_{eq} in water.



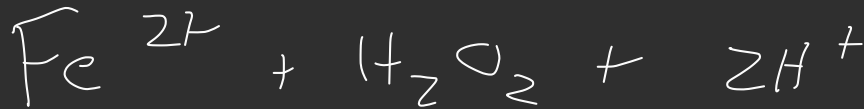
Oxidation - Reduction Reactions

↳ Losing electrons

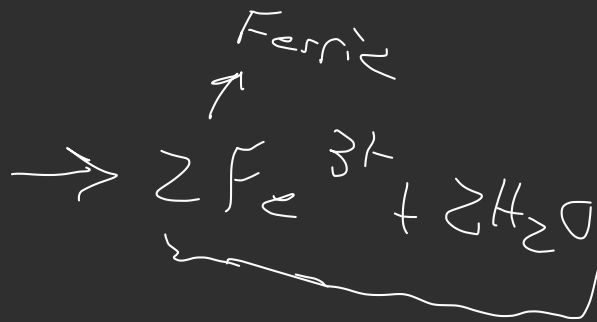
↳ Gaining electrons

Ferrous → Iron, Manganese, Sulfur

↑



Solid



Ferrie
↑

Red coloring

Solution

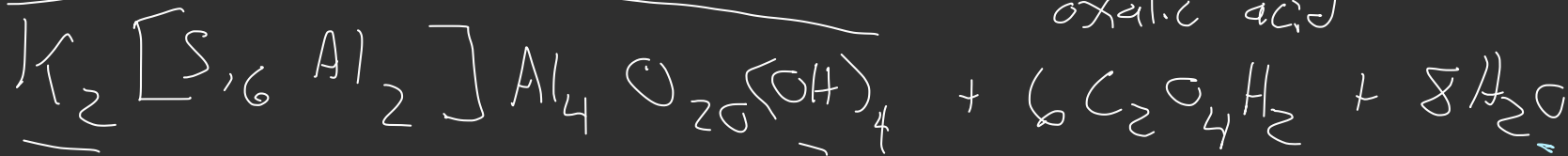
Synthesized
by life (L)
↑

Complexation

1000x faster with
life!

→ Organic acids (oxalic, citric, tartaric acid)

↳ These acids engage in acid weathering
but also produce organic compounds with Al
muscovite



solution

solution

Complexation



Rock



Integrated Weathering

Physical + Chemical weathering
happen simultaneously



Soil Genesis → Soil Formation

$$S_i = f(c, b, \tau, p, t)$$

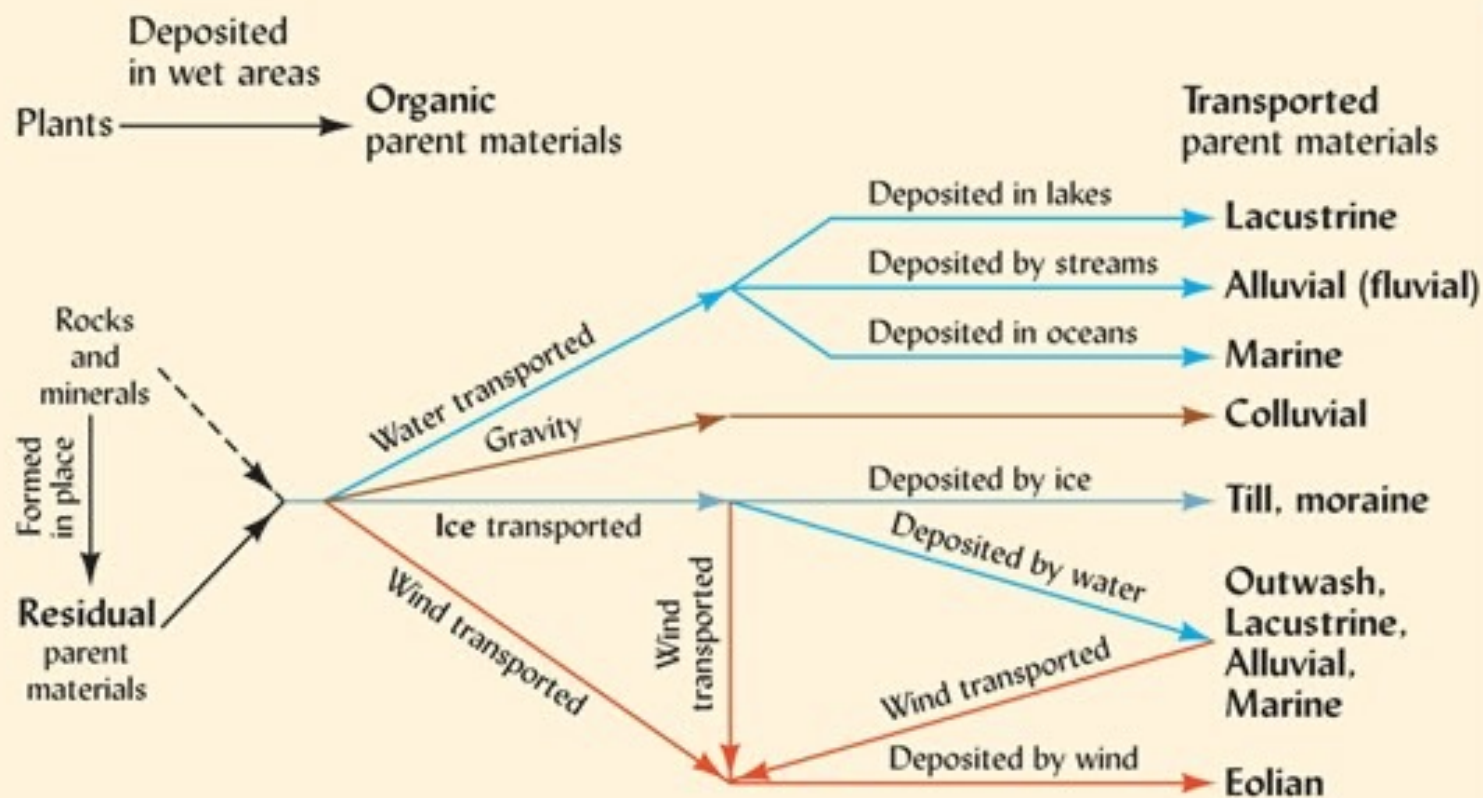
- A Soil ↗
1. Climate
 2. Time
 3. Parent Material
↳ Rock
 4. Topography
 5. Biota

Soils can . . .

Be formed in place or
be deposited somewhere.

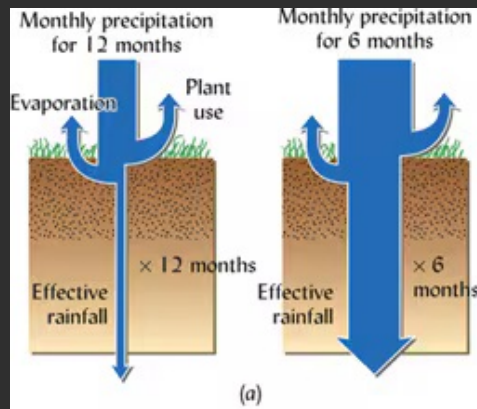
Water! Alluvial (fluvial) → sands
Lacustrine (lakes)
Marine

Ice Moraines; Till Wind → Eolian
Outwash! → Craters → Concretion
Angular

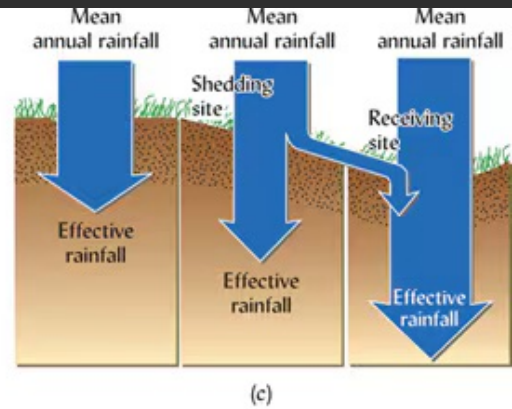


Climate \rightarrow H_2O

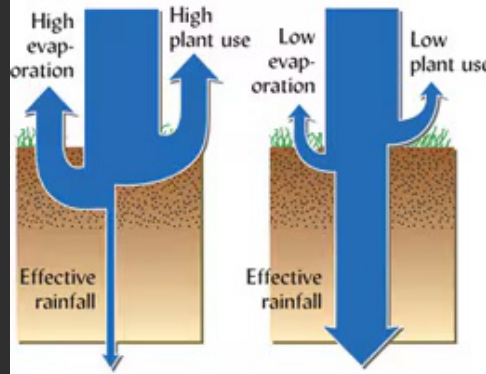
\rightarrow Evapotranspiration
and precipitation



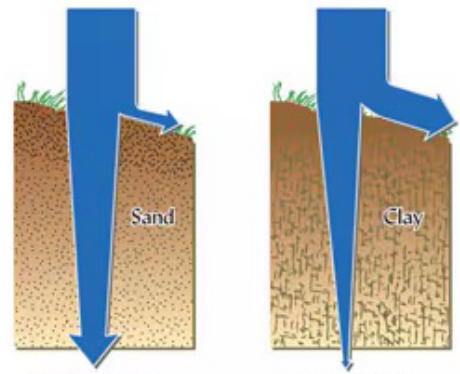
(a)



(c)



(b)



(d)