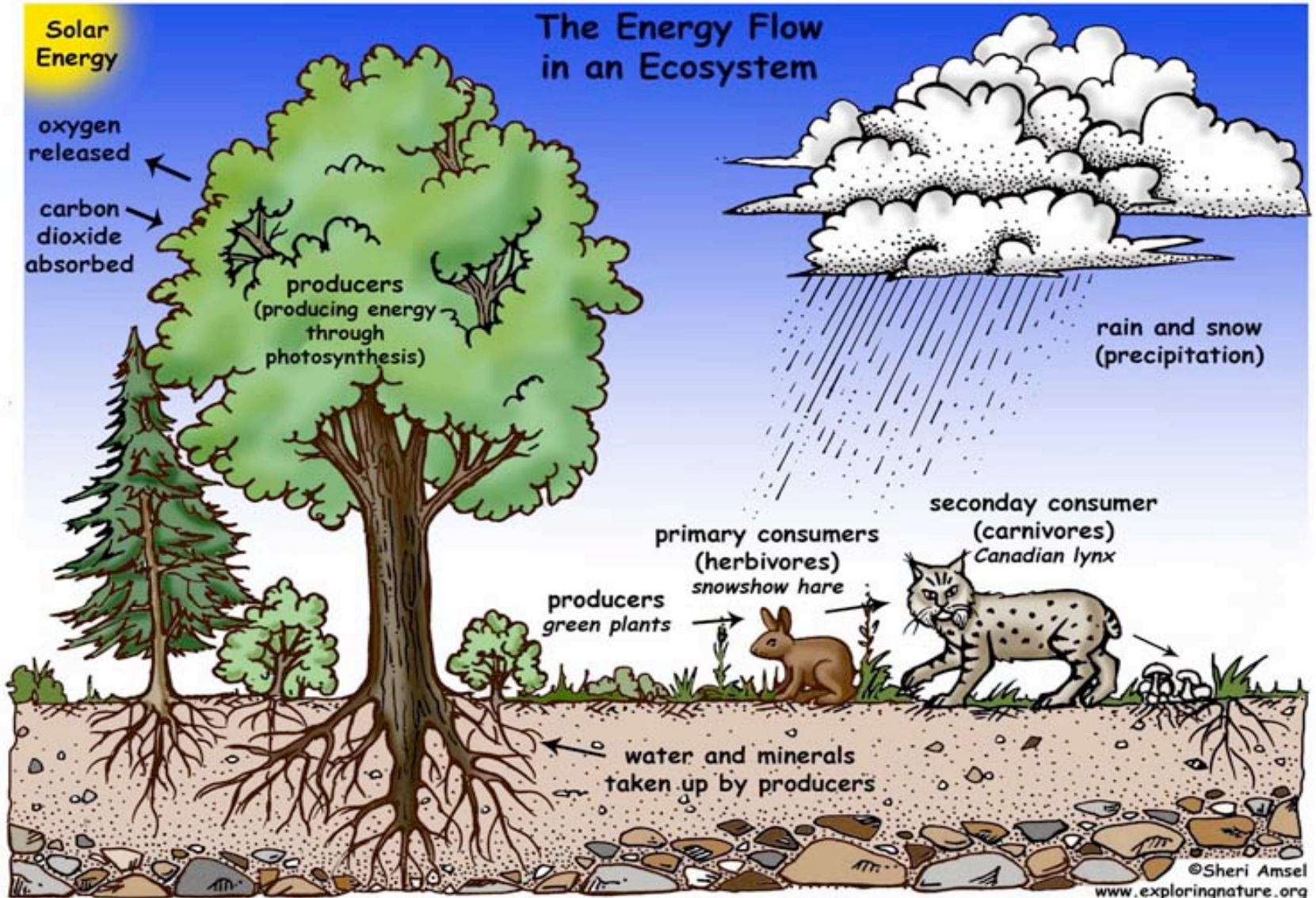
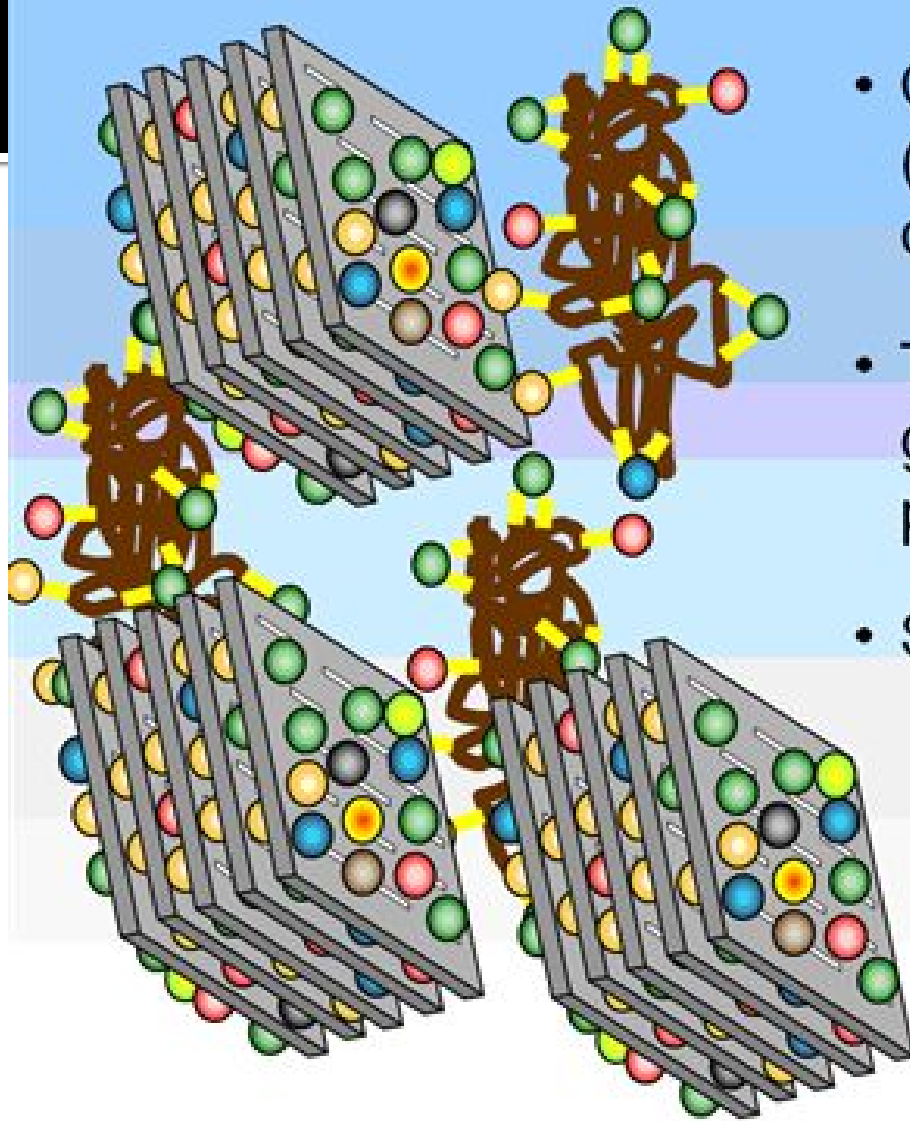


The Energy Flow in an Ecosystem



Cation Exchange Capacity



- Cation exchange capacity (CEC) is the total amount of cations that a soil can retain
- The higher the soil CEC the greater ability it has to store plant nutrients
- Soil CEC increases as
 - The amount of clay increases
 - The amount of organic matter increases
 - The soil pH increases

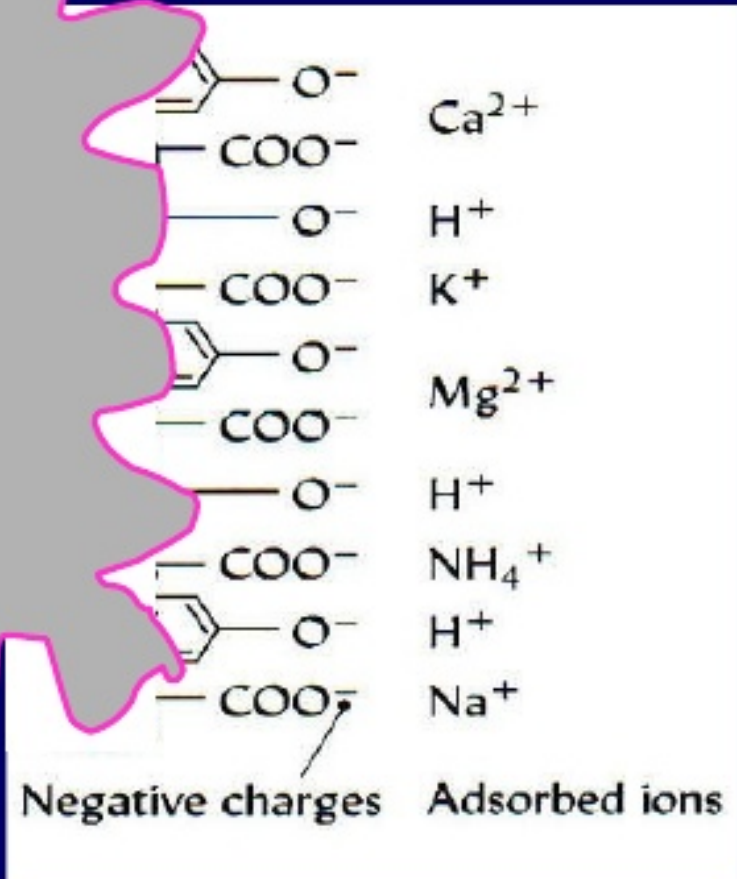
Negative charges on humus

ENORMOUS external surface area!
(but no internal surface – all edges)

Explore Soil
Organic Matter
(SOM) HERE

Central unit of a
humus colloid
(mostly C and H)

Charge is pH dependent



Cation: (+)	A Positively Charged Ion
Anion: (-)	A Negatively Charged Ion

Cations in Soil		NUTRIENTS	Anions in Soil	
K^+	Potassium		NO_3^-	Nitrate
NH_4^+	Ammonium		SO_4^{-2}	Sulfate
Mg^{+2}	Magnesium		$H_2PO_4^-$	Phosphate
			HPO_4^{-2}	
Ca^{+2}	Calcium		Cl^-	Chloride
Mn^{+2}	Manganese		BO_3^{-2}	Borate
Zn^{+2}	Zinc		MoO_3^{-2}	Molybdate
		<u>NON-NUTRIENTS</u>		
Na^+	Sodium		OH^-	Hydroxyl
H^+	Hydrogen*		$H_2CO_3^-$	Bicarbonate
Al^{+3}	Aluminum		CO_3^{-3}	Carbonate

* Hydrogen as a nutrient is obtained primarily from water. H^+ ions in the soil affect soil pH and many chemical and biological processes.

Soil Organic Matter: A Source Of Plant Nutrients

Soil organic matter and humus are terms which refer to the partially decomposed residue of

promotes water movement and root penetration while reducing soil crusting, clod

