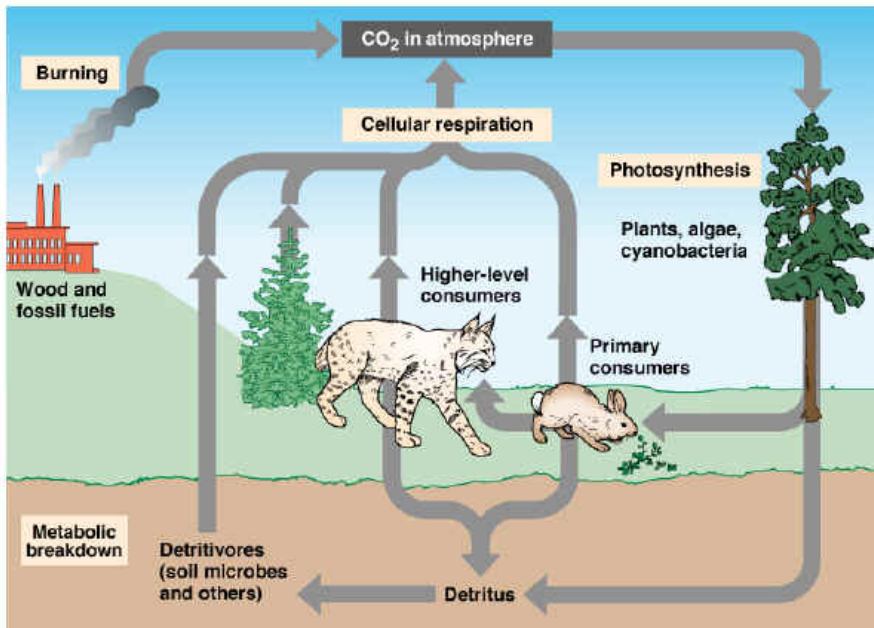
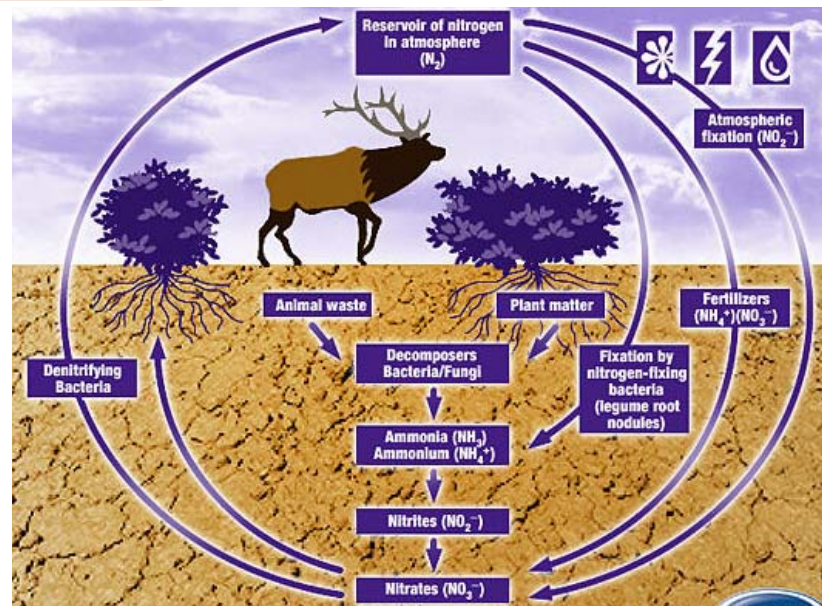


CARBON CYCLE



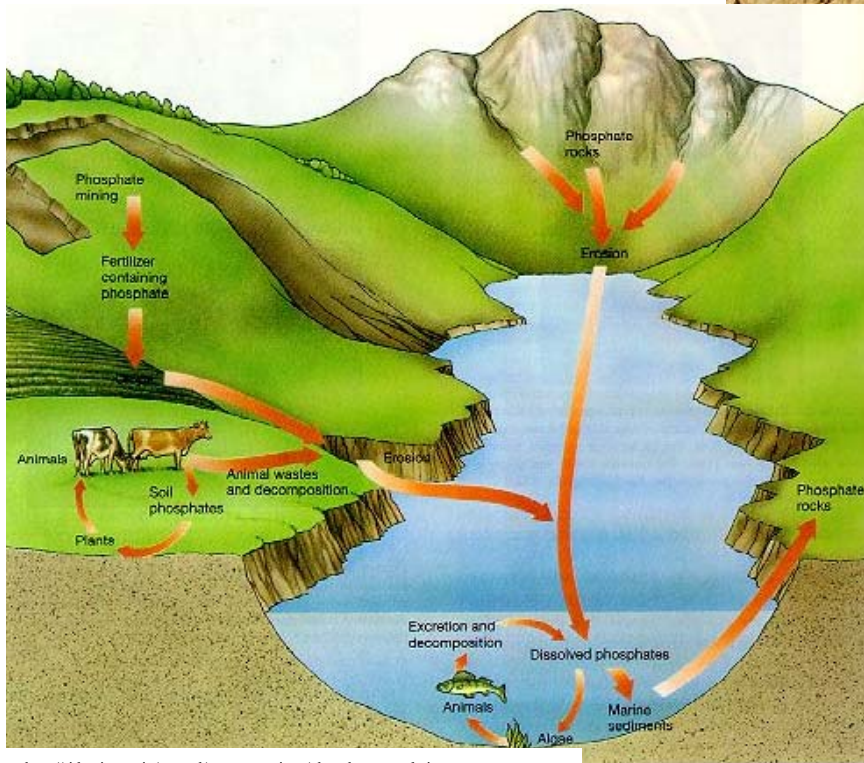
www.iusd.k12.ca.us

NITROGEN CYCLE



www.h2ou.com

PHOSPHORUS CYCLE



http://ridge.icu.ac.jp/gen-ed/ecosystem-jpgs/phosphorus-cycle.jpg

Nutrient Cycles

Notes:

Carbon Cycle

* **Carbon EXISTS in abiotic environment as:**

1. Carbon dioxide [CO_{2(gas)}] in the atmosphere
→ dissolves in H₂O to form HCO₃⁻
2. Carbonate rocks (limestone & coral = CaCO₃)
3. Deposits of coal, petroleum, and natural gas
→ derived from once living things
4. Dead organic matter (humus in the soil)

* **Carbon ENTERS biotic environment through:**

1. Photosynthesis: changes light energy to chemical energy

* **Carbon RETURNS to atmosphere by:**

1. Respiration → CO₂
2. Decomposition / Decay
3. Burning

* **Carbon Cycle and Humans:**

1. Removal of photosynthesizing plants
2. Combustion of fossil fuels

Nitrogen Cycle

* ~79% of air is N₂ gas

* N is essential to plants and animals

* Plants and animals can't use N₂ gas

* Usable N: ammonia (NH₃) or nitrate (NO₃⁻)

* **Conversion of atmospheric N₂ to NH₃ and NO₃⁻:**

→ *Nitrogen fixation*

1. Aquatic ecosystems: blue-green algae
2. Terrestrial ecosystems: bacteria on root nodules of legumes (peas, beans, alfalfa, clover)
3. Lightening

* **Nitrogen RETURNS to soil by:**

1. decomposition of once living things
→ ammonifying bacteria + fungi
2. exists in soil as nitrate (NO₃⁻), nitrite (NO₂⁻), and ammonia (NH₃)

* **Nitrogen returns to atmosphere by:**

1. denitrifying bacteria

Nitrogen Cycle and Humans:

1. Nitrogen required for genetic materials (DNA, RNA, amino acids)

Phosphorus Cycle

* Major environmental reservoir: rocks

1. Leaching: water dissolves phosphates in rocks and carries to lake, stream, etc.
2. Dissolved phosphate: used by plants and passed through food chain
3. Animals return phosphorus to environment by:
 - * excretion
 - * death and decay

Phosphorus Cycle and Humans:

1. Phosphates mined for fertilizers → returns P to soil
2. Erosion: P in soil and rocks washed away into water systems