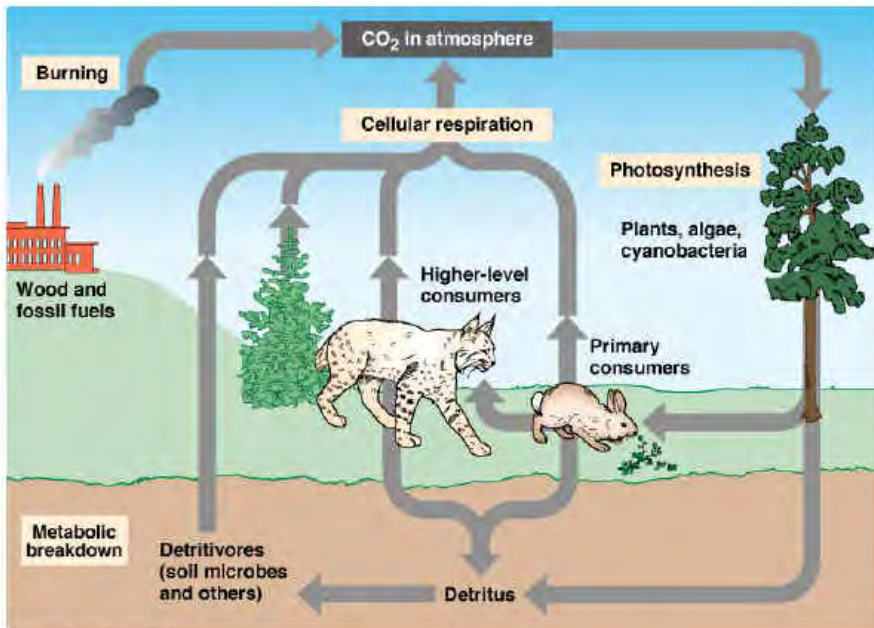
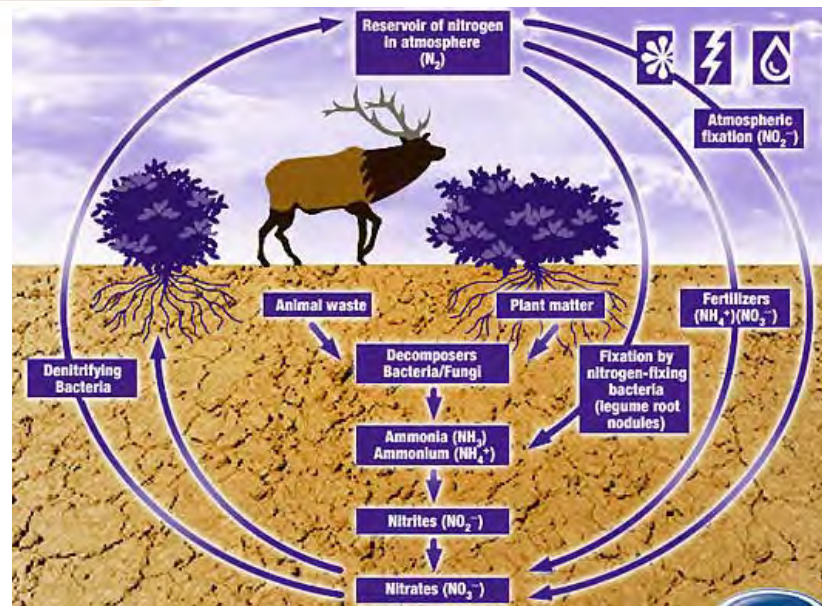


## CARBON CYCLE



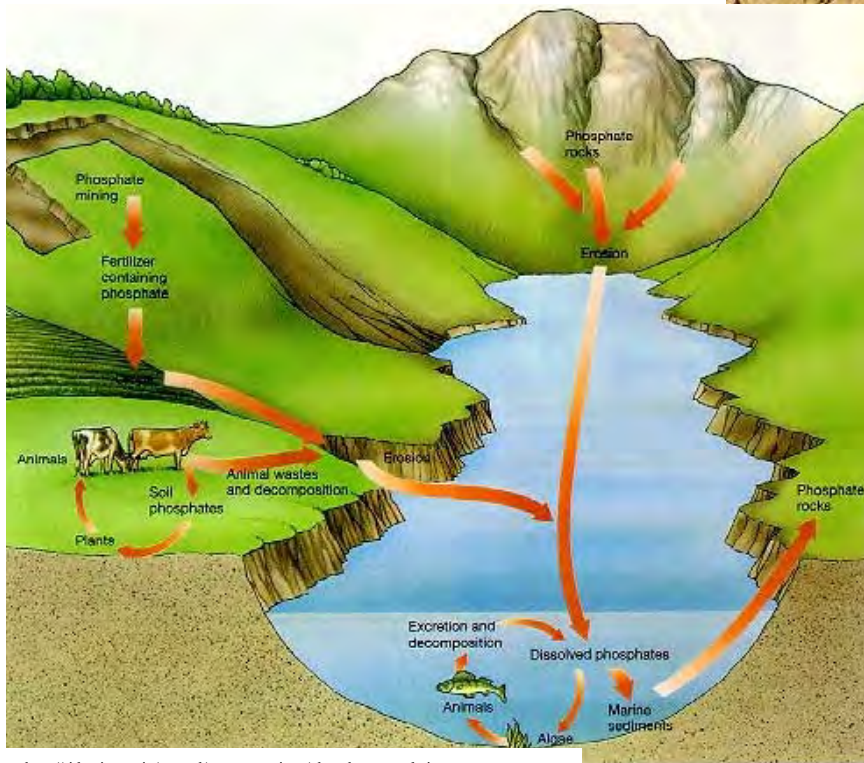
www.iusd.k12.ca.us

## 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<sub>2(gas)</sub>] in the atmosphere  
→ dissolves in H<sub>2</sub>O to form HCO<sub>3</sub><sup>-</sup>
2. Carbonate rocks (limestone & coral = CaCO<sub>3</sub>)
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 → CO<sub>2</sub>
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 N<sub>2</sub> gas

\* N is essential to plants and animals

\* Plants and animals can't use N<sub>2</sub> gas

\* Usable N: ammonia (NH<sub>3</sub>) or nitrate (NO<sub>3</sub><sup>-</sup>)

\* **Conversion of atmospheric N<sub>2</sub> to NH<sub>3</sub> and NO<sub>3</sub><sup>-</sup>:**

→ *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 (NO<sub>3</sub><sup>-</sup>), nitrite (NO<sub>2</sub><sup>-</sup>), and ammonia (NH<sub>3</sub>)

\* **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