

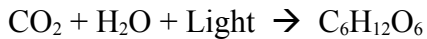
AP Environment Science

# Biogeochemical Cycles

## 1. Carbon Cycle

CO<sub>2</sub> is 0.03% of Atmosphere

Abiotic



Biotic

- 1. Respiration by Living Organisms → CO<sub>2</sub>  
2. Combustion (Wood, Oil, Coal) → CO<sub>2</sub>  
3. Limestone (Erosion CO<sub>3</sub><sup>2-</sup>HCO<sub>3</sub><sup>-</sup>) → CO<sub>2</sub>

## 2. Nitrogen Cycle

### Nitrogen Fixation

N<sub>2</sub> (gas) → Bacteria, Cyanobacteria → NH<sub>3</sub> (ammonia) →  
Lots of Energy Needed

### Nitrification

Nitrococcus Nitrobacter  
→ NO<sub>2</sub><sup>-</sup> (Nitrite) → NO<sub>3</sub><sup>-</sup> (Nitrate) → NO<sub>3</sub><sup>-</sup>  
Nitrosomonas

### Assimilation

→ Proteins, Nucleic Acids →  
(Found in Living Organisms)

### Ammonification

→ Urea, Uric Acid, Decomposition → NH<sub>3</sub> → NO<sub>3</sub><sup>-</sup> → N<sub>2</sub> (gas)  
Anaerobic bacteria

### Denitrification

## 3. Phosphorus Cycle (No gaseous state)

Uplifted Rock → Rain, Water → PO<sub>4</sub><sup>3-</sup> → Plants →  
Phosphate

→ Animals → Decomposers → Land → Plants  
→ Soil (feces) → PO<sub>4</sub><sup>3-</sup> → Oceans → Sea Floor Sediments → Uplifted Rock

#### 4. Hydrologic Cycle

Oceans → Evaporation, Transpiration <sup>(Plant leaves)</sup> → Precipitation <sup>(rain, snow)</sup> → Groundwater, Runoff →  
→ Oceans