

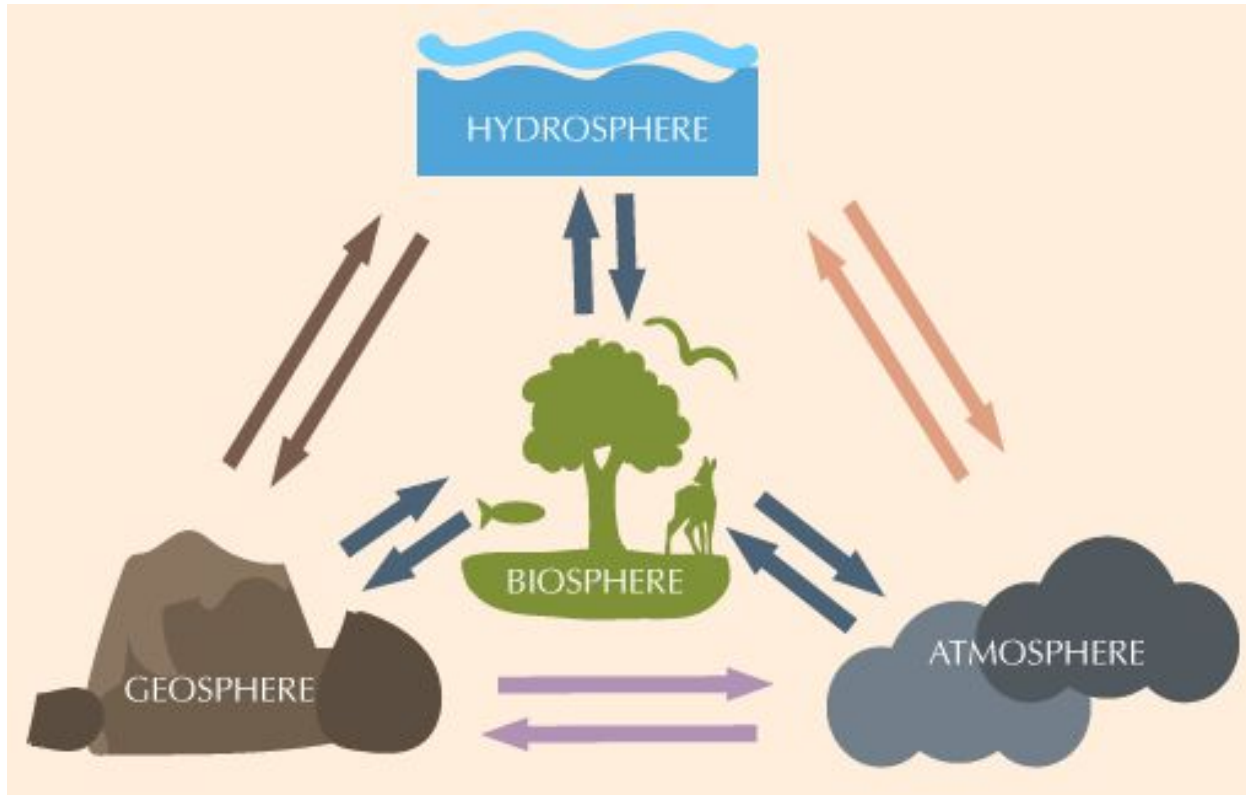
Chemical Cycles

Carbon, Oxygen, Hydrologic, & Nitrogen

Ms. Larsh

What are Earth's Systems?

Earth's Systems



LITHOSPHERE



BIOSPHERE



ATMOSPHERE



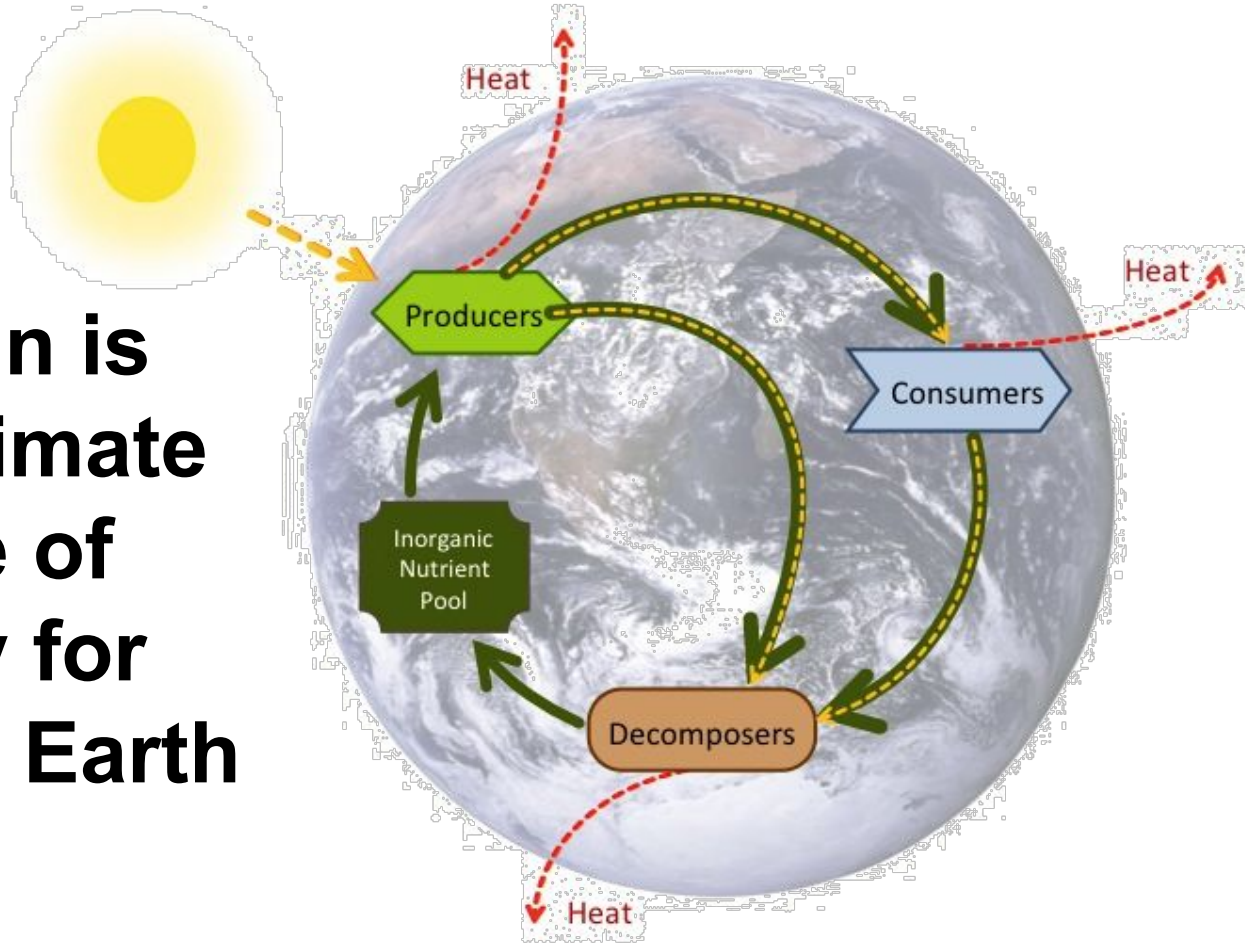
HYDROSPHERE



CRYOSPHERE



**The Sun is
the Ultimate
Source of
Energy for
Life on Earth**



What is Chemical Cycling?

nutrients move through the ecosystem in biogeochemical cycles. A biogeochemical cycle is a circuit/pathway by which a chemical element moves through the biotic and the abiotic factors of an ecosystem.



BIOTIC
bio="life"



VS

ABIOTIC
a="without" bio="life"

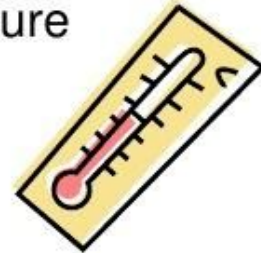


Biotic vs. Abiotic Factors

- Living
- Examples
 - Plants
 - Animals
 - Fungi
 - Bacteria



- Non-Living
- Examples
 - Water
 - Sunlight
 - Soil
 - Air
 - Temperature



Photosynthesis

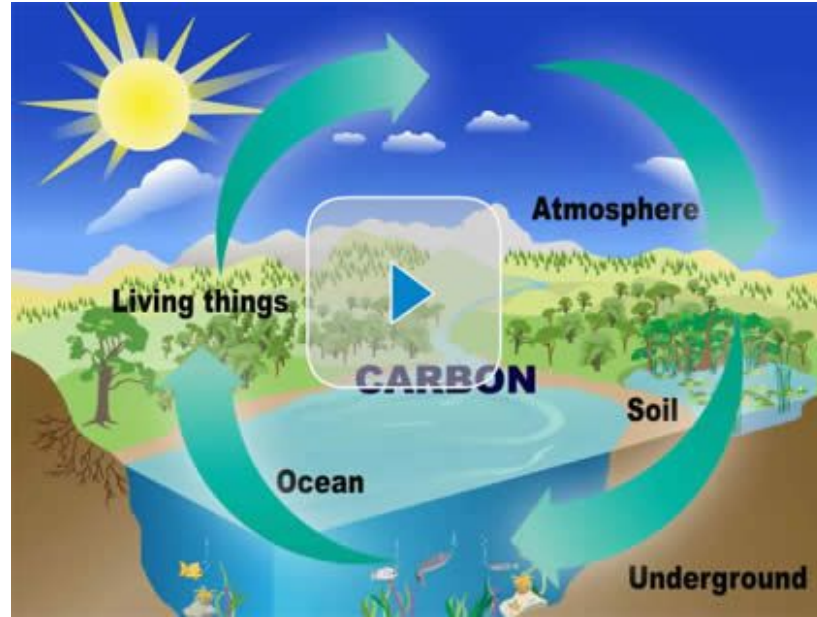


Respiration

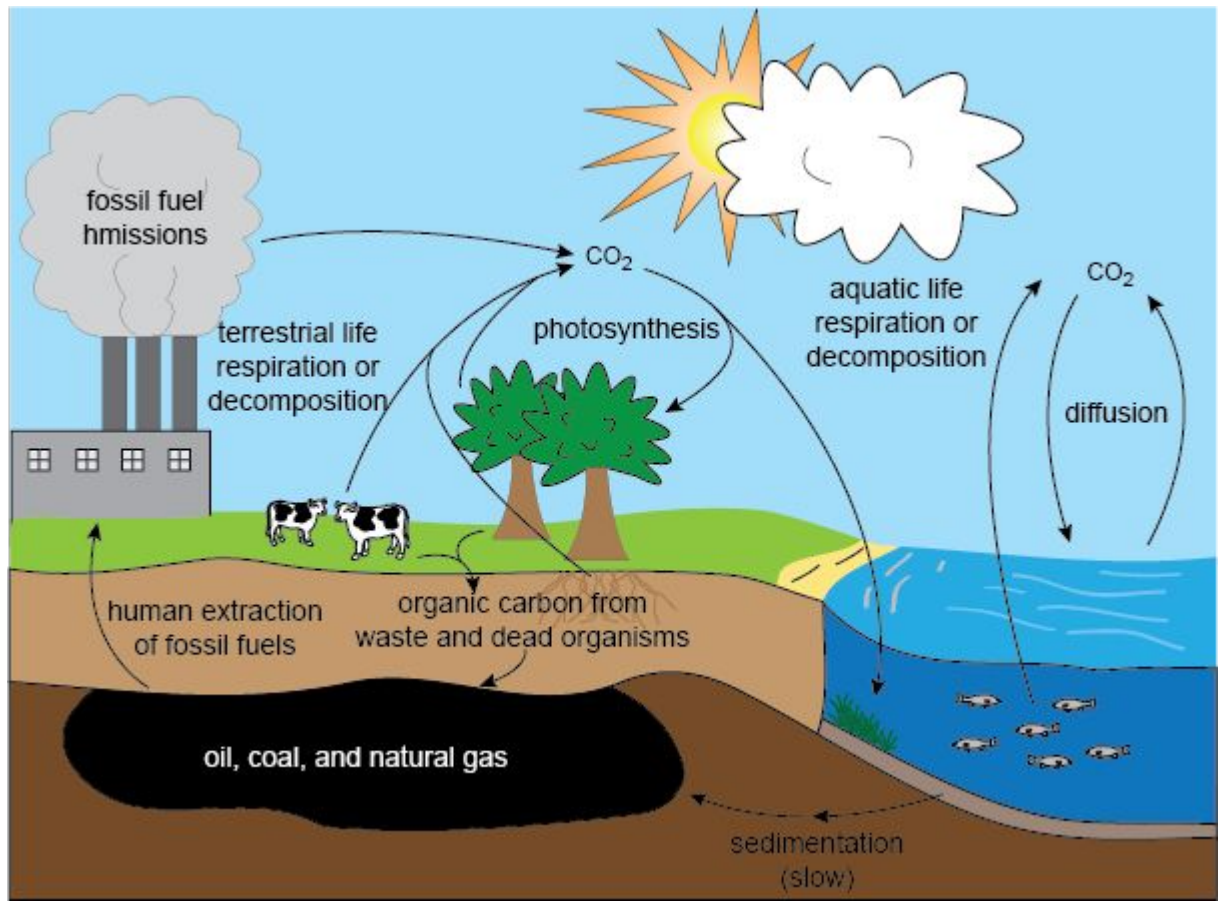


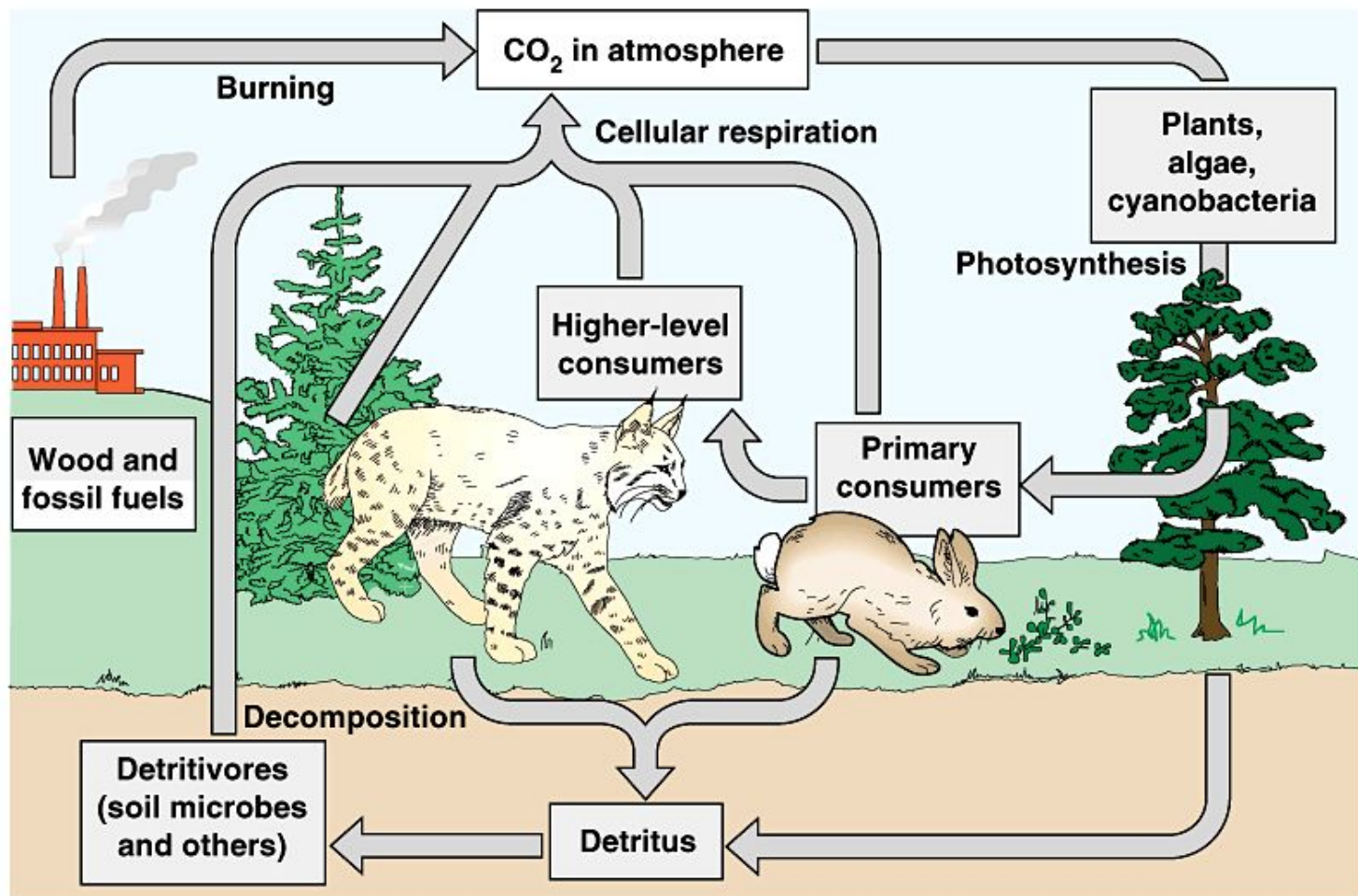
The Carbon Cycle

the series of processes by which carbon compounds are interconverted in the environment, involving the incorporation of carbon dioxide into living tissue by photosynthesis and its return to the atmosphere through respiration, the decay of dead organisms, and the burning of fossil fuels



<https://archive.epa.gov/climatechange/kids/basics/today/carbon-dioxide.html>





The Oxygen Cycle

the series of processes by which oxygen compounds are interconverted in the environment, involving the incorporation of oxygen into living tissue by respiration and its return to the atmosphere through photosynthesis

Space



Professor ▽▽, I found a habitable planet!



0.02

Loss of H₂

Atmosphere

Oxidation of Organic C, FeS₂, FeO...
16 ± 7

Surface Outgassing
0.3

Photosynthesis
5000

Respiration
5000

Burial of Organic C, FeS₂, FeO...
18 ± 7

Submarine Outgassing and serpentinization
1.2

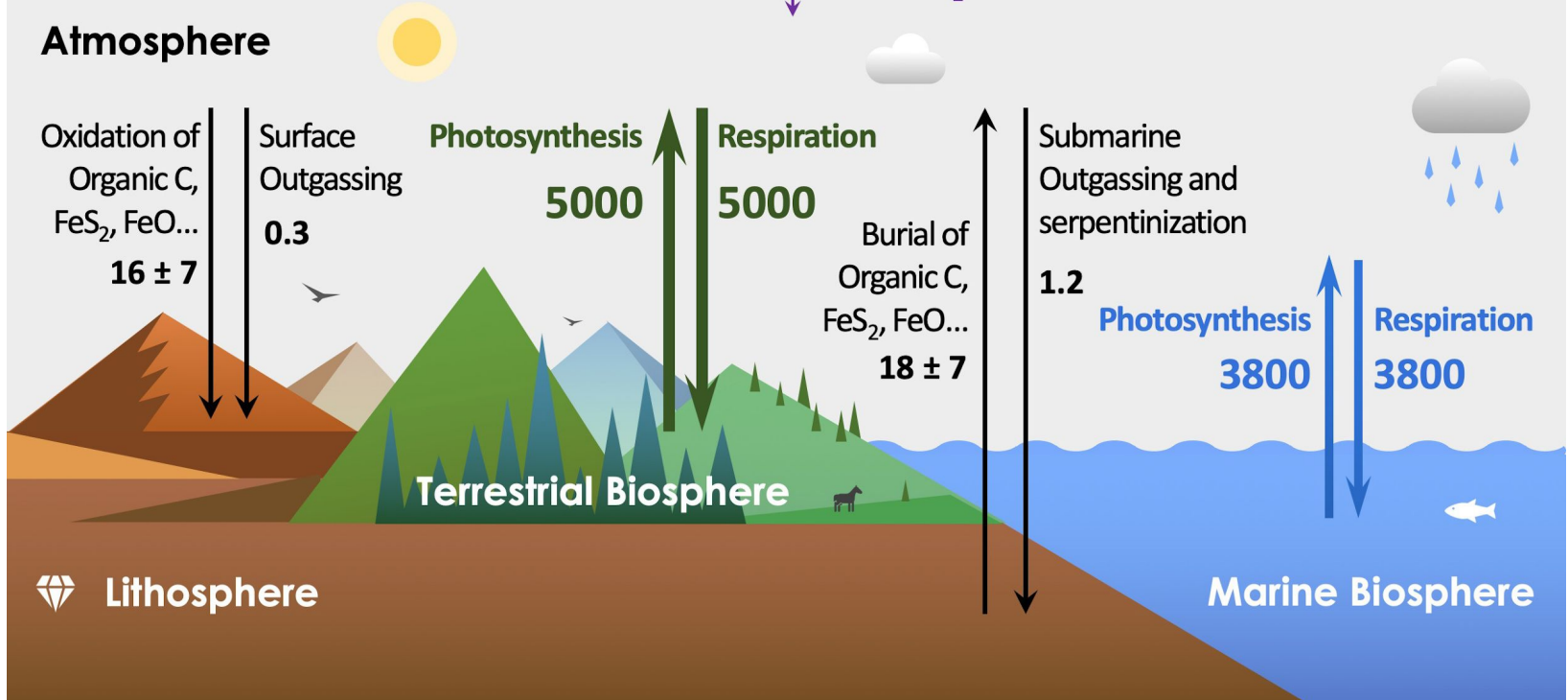
Photosynthesis
3800

Respiration
3800

Terrestrial Biosphere

Marine Biosphere

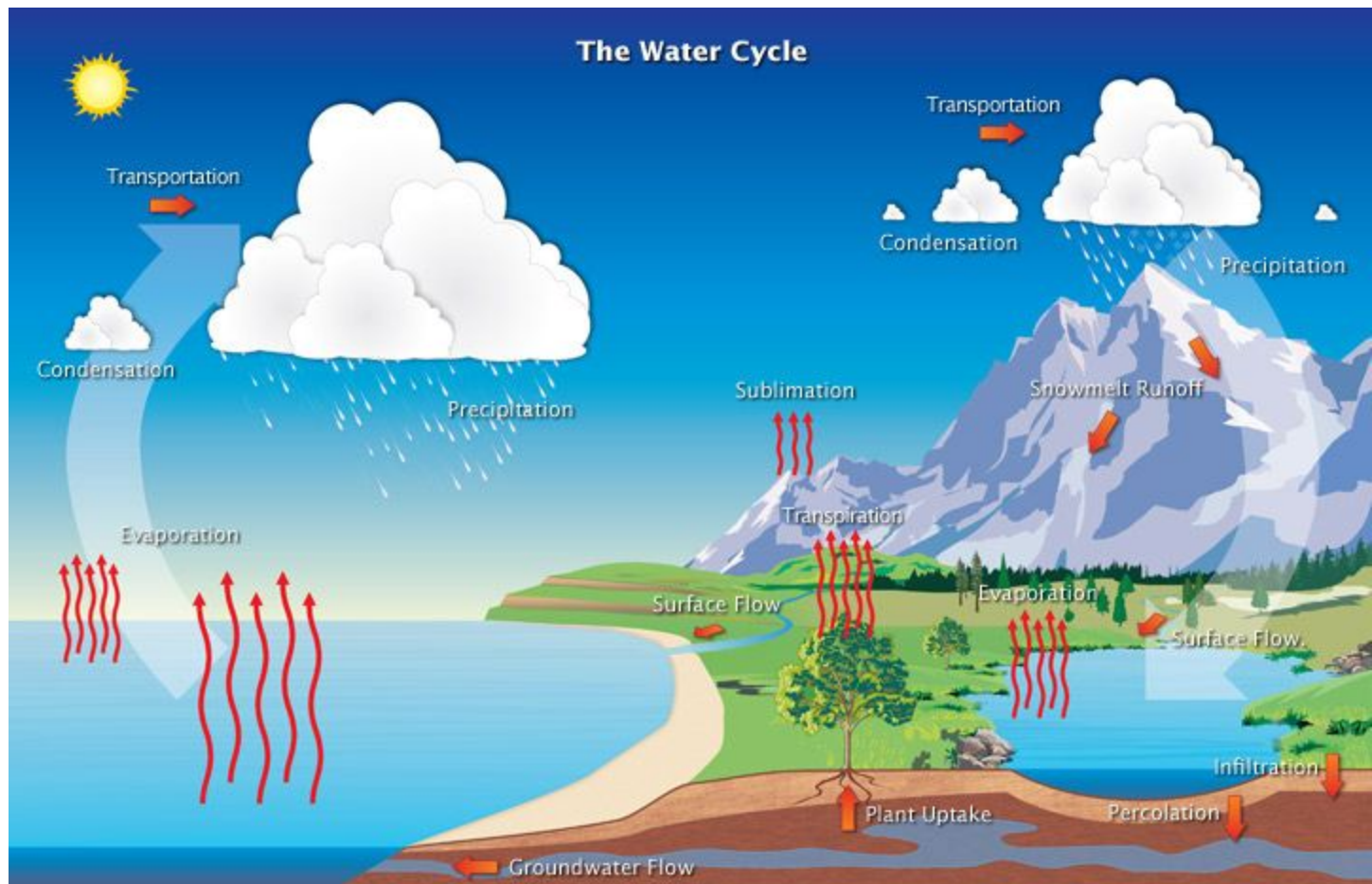
Lithosphere



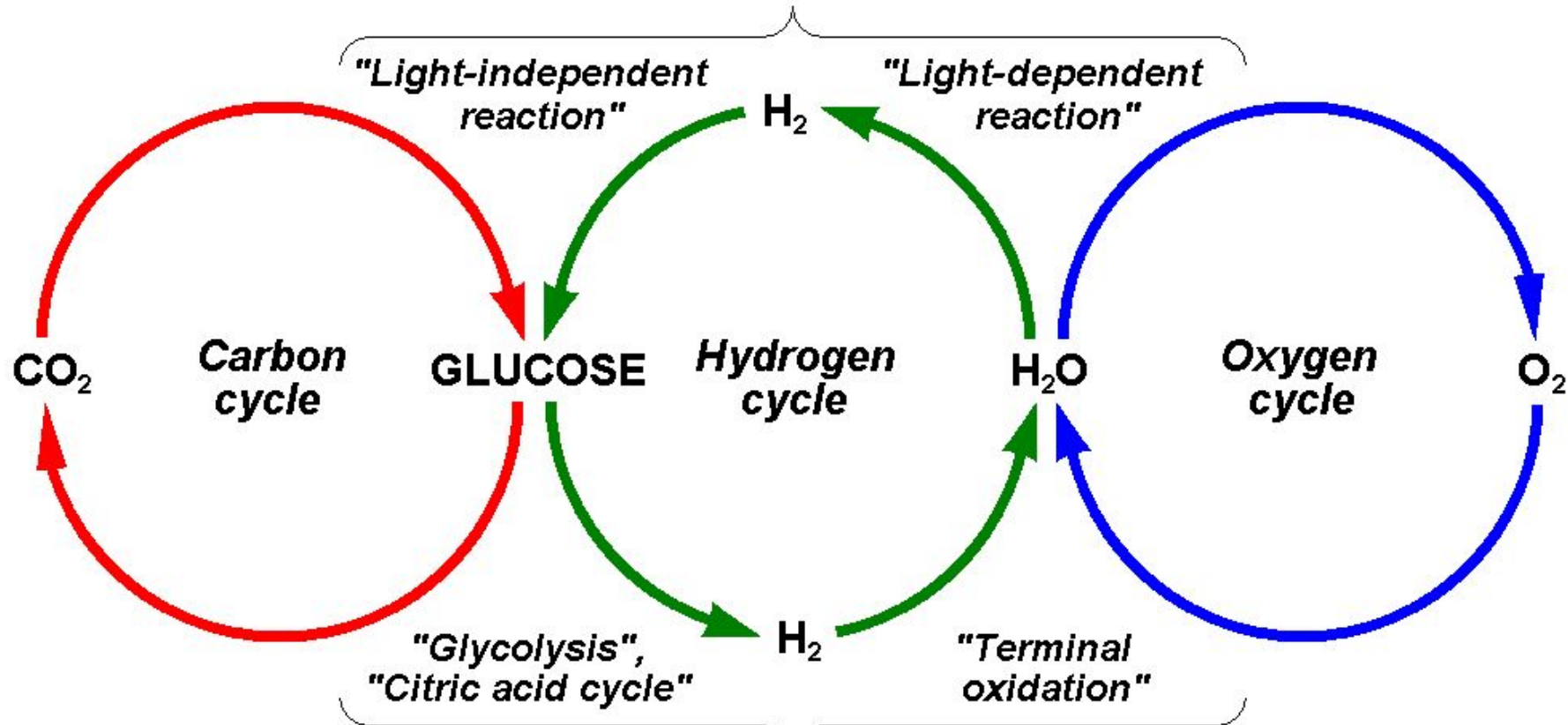
The Hydrologic Cycle

the water cycle, also known as the hydrologic cycle or the hydrological cycle, describes the continuous movement of water on, above and below the surface of the Earth

The Water Cycle



ASSIMILATION

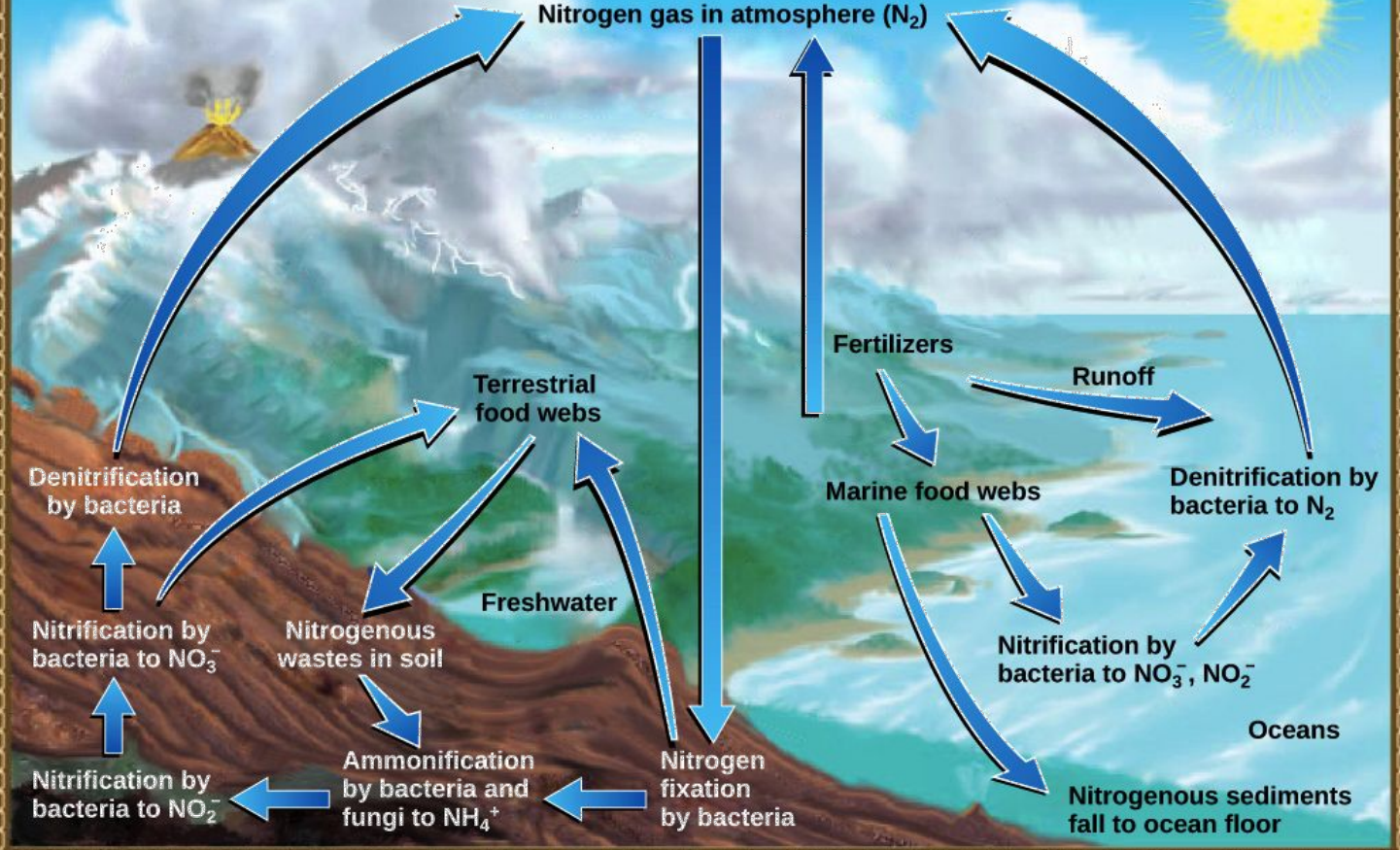


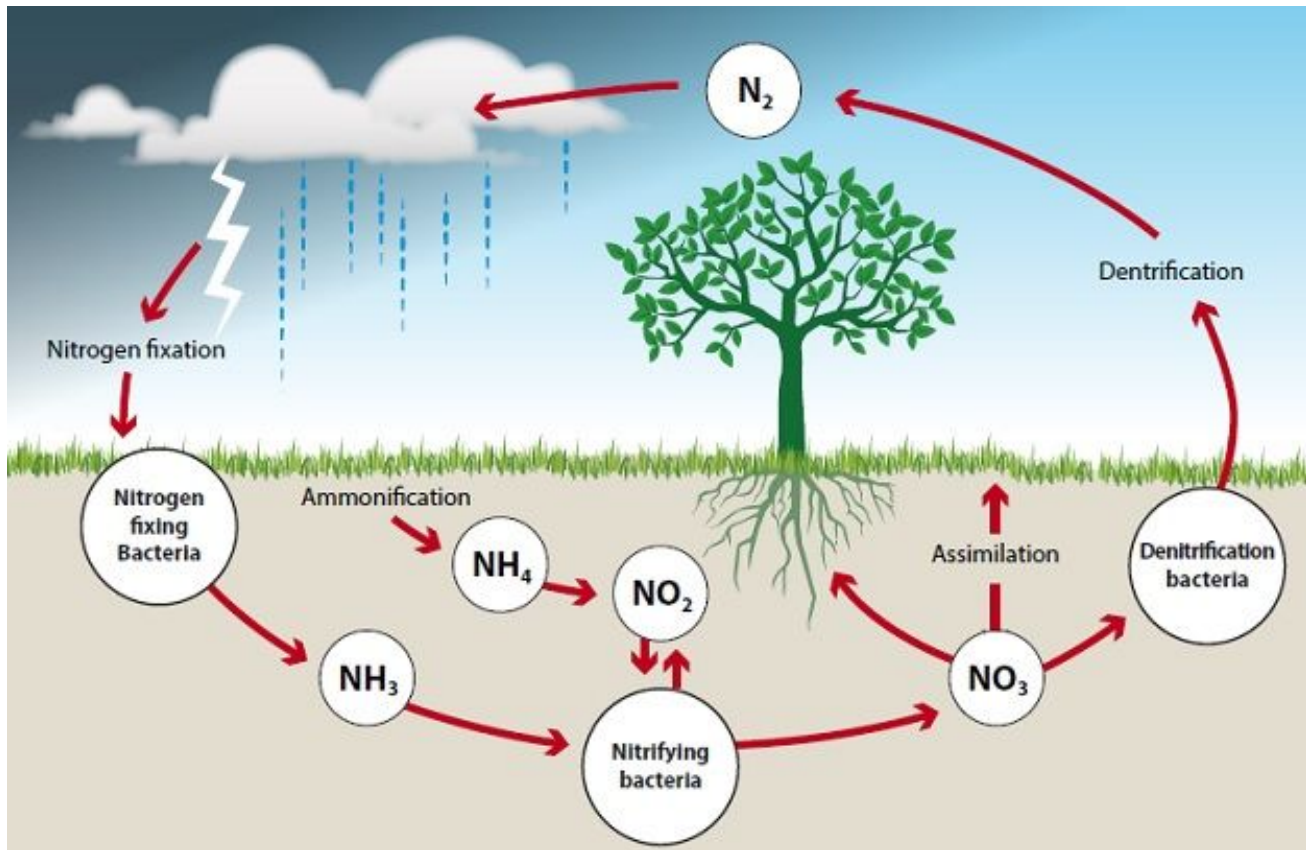
DISSIMILATION

The Nitrogen Cycle

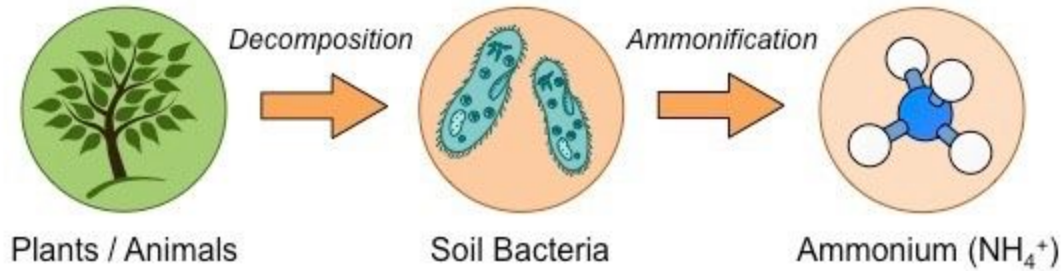
The nitrogen cycle is the biogeochemical cycle by which nitrogen is converted into multiple chemical forms as it circulates among atmosphere, terrestrial, and marine ecosystems. The conversion of nitrogen can be carried out through both biological and physical processes

The Nitrogen Cycle

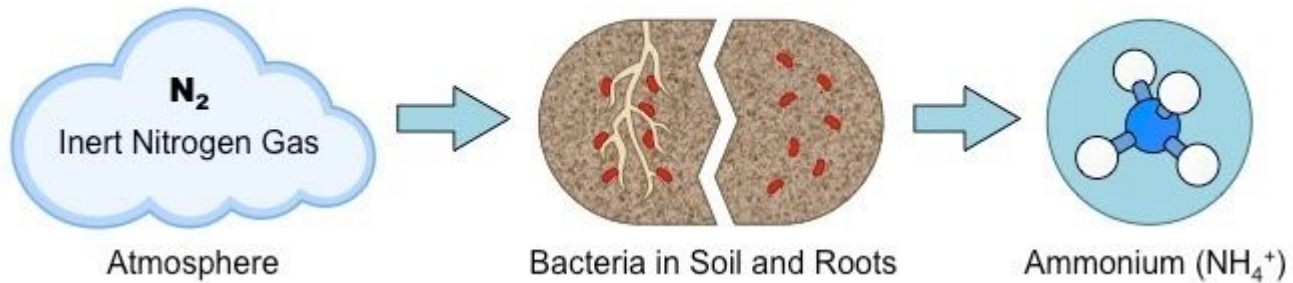




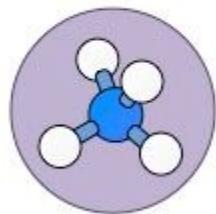
Ammonification



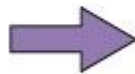
Nitrogen Fixation



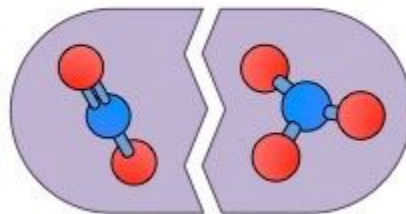
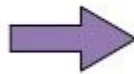
Nitrification



Ammonium (NH_4^+)

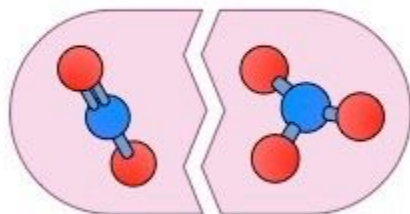


Soil Bacteria

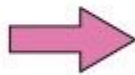


Nitrites (NO_2^-) and Nitrates (NO_3^-)

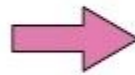
Denitrification



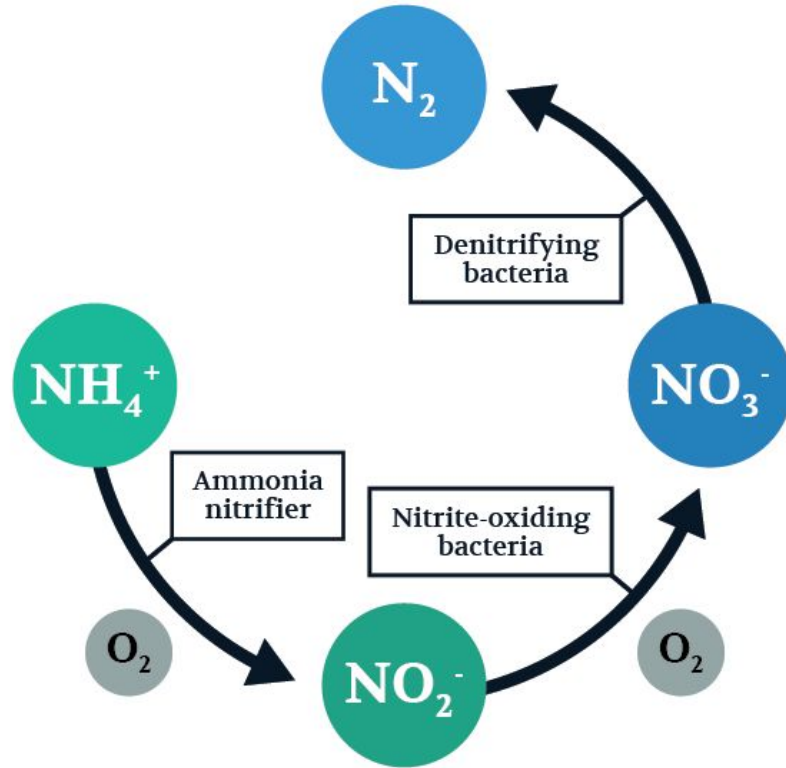
Nitrites (NO_2^-) and Nitrates (NO_3^-)



Soil Bacteria



Atmosphere



Reaction route of conventional nitrification and denitrification

Key Terms

- Hydrosphere
- Atmosphere
- Biosphere
- Lithosphere
- Cryosphere
- Producers
- Consumers
- Decomposers
- Inorganic
- Organic
- Biogeochemical
- Biotic
- Abiotic
- Photosynthesis
- Diffusion
- Sedimentation
- Detritus
- Detritivores
- Oxidation
- Outgassing
- Condensation
- Evaporation
- Precipitation
- Transpiration
- Sublimation
- Infiltration
- Percolation
- Denitrification
- Nitrification
- Ammonification
- Nitrogen Fixation
- Assimilation
- Respiration
- Cellular Respiration
- Glucose