

# Class: BSc (H) Semester IV

## Core Course IX: Ecology (CBCS)

- Unit 9: Functional aspects of ecosystems

Topic for the week: Biogeochemical cycles

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# Disclaimer:

1. Some of the flowcharts are downloaded from freely available online e-resources.
2. Lecture is only circulation among the students of this class only strictly not for any commercial purposes.

# Instructions to the Students

1. Online teaching-learning mode is in addition to the class room teaching (not a substitute) so as to share latest e-resources available globally.
2. You go-through this lecture and also see the last year question papers provided to you in earlier. Make a list of your questions.
3. You may ask/discuss any related queries on-line anytime or in class room after March 31, 2020.
4. For on-line mode, I am still upgrading this lecture and will be available on college website shortly.

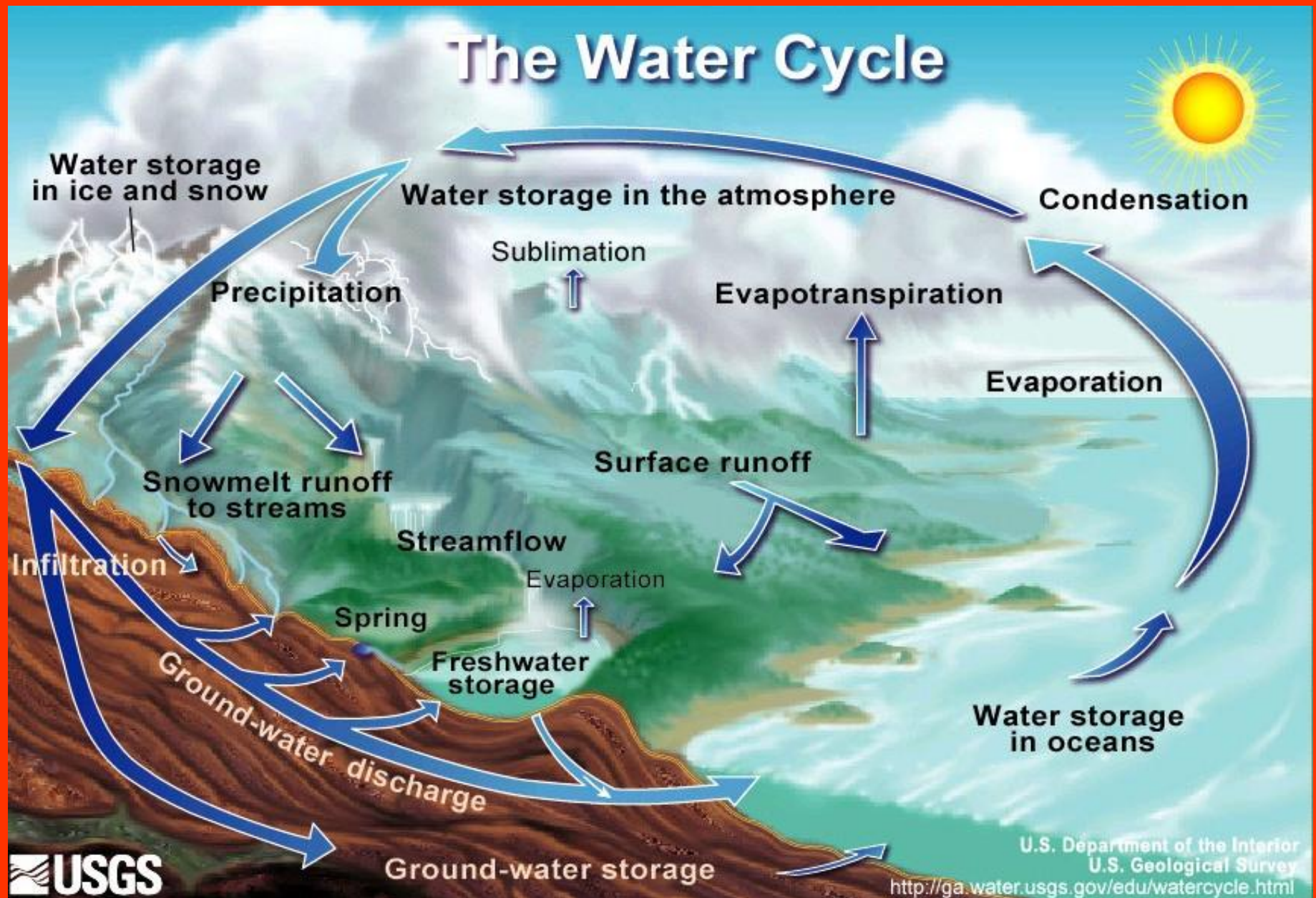
# Biogeochemical cycle

It is the cycling or turnover of materials/substances is a cycle/pathway by which a chemical material/substance moves through biotic –within the living systems (biosphere), and between living to nonliving systems- abiotic systems (atmosphere, hydrosphere and lithosphere) compartments of Earth.

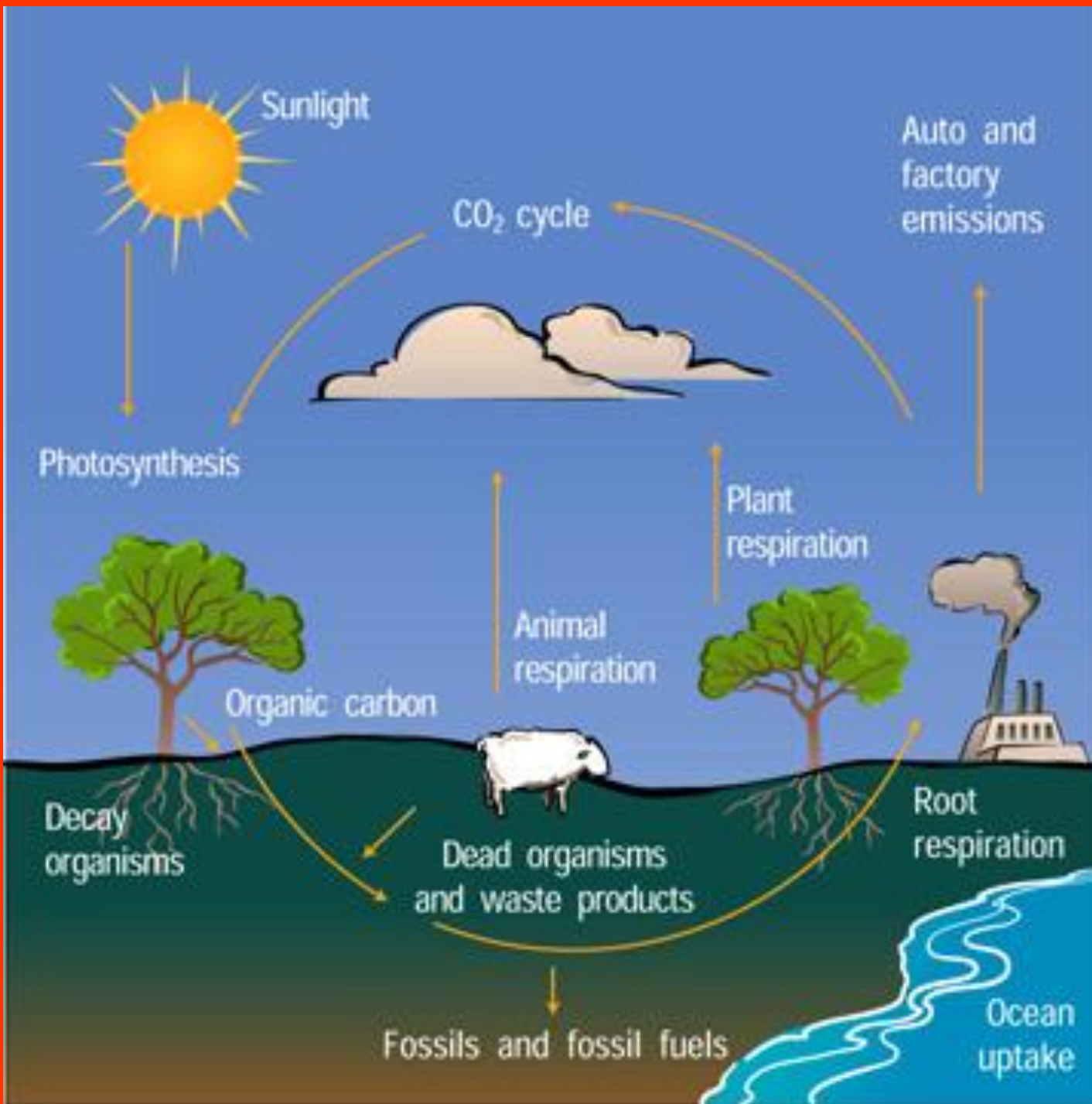
# Types of Biogeochemical cycle

- Hydrological – water cycle
- Gaseous – carbon, nitrogen cycle
- Sedimentary – phosphorus, sulphur

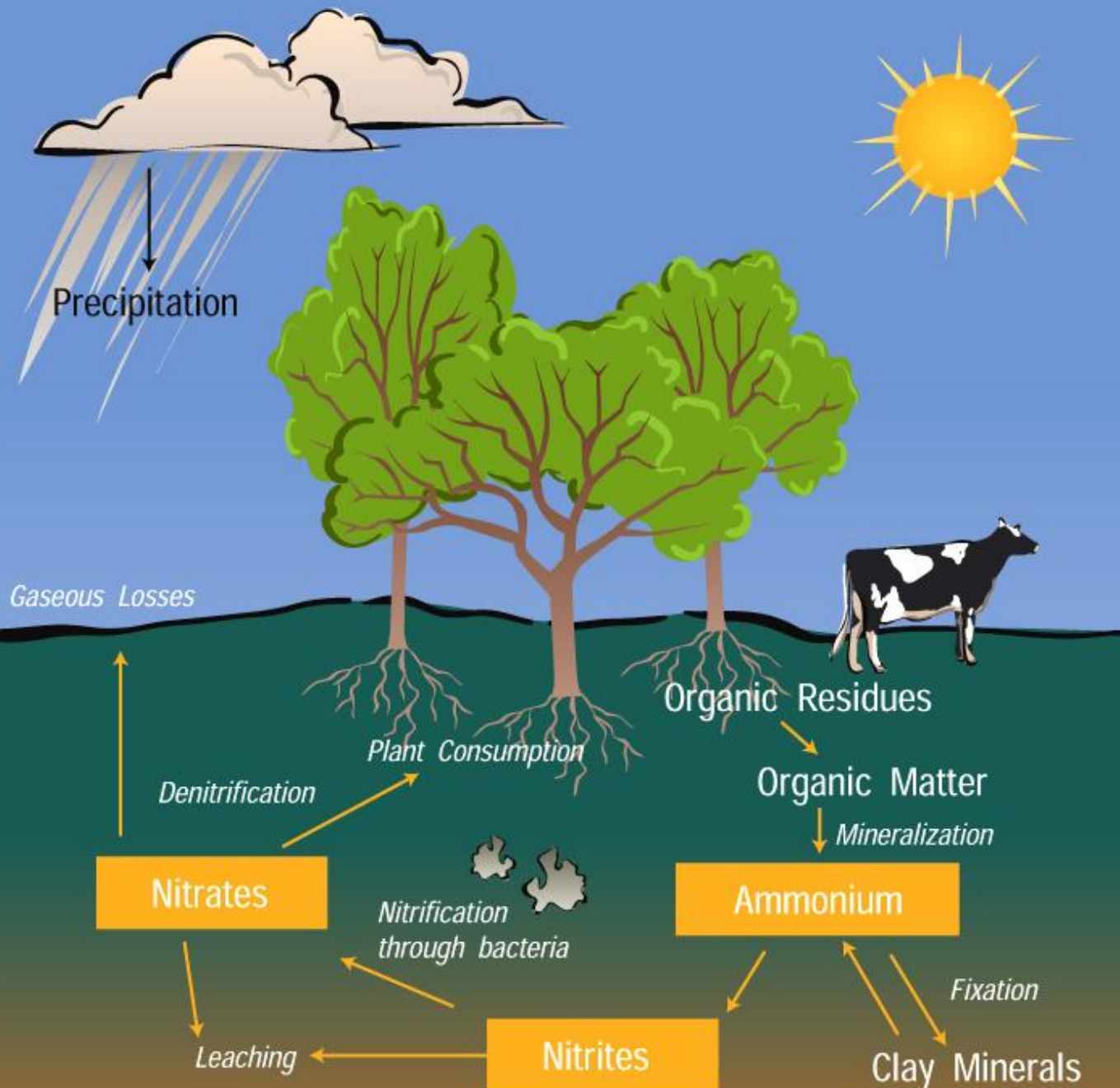
# The Water Cycle



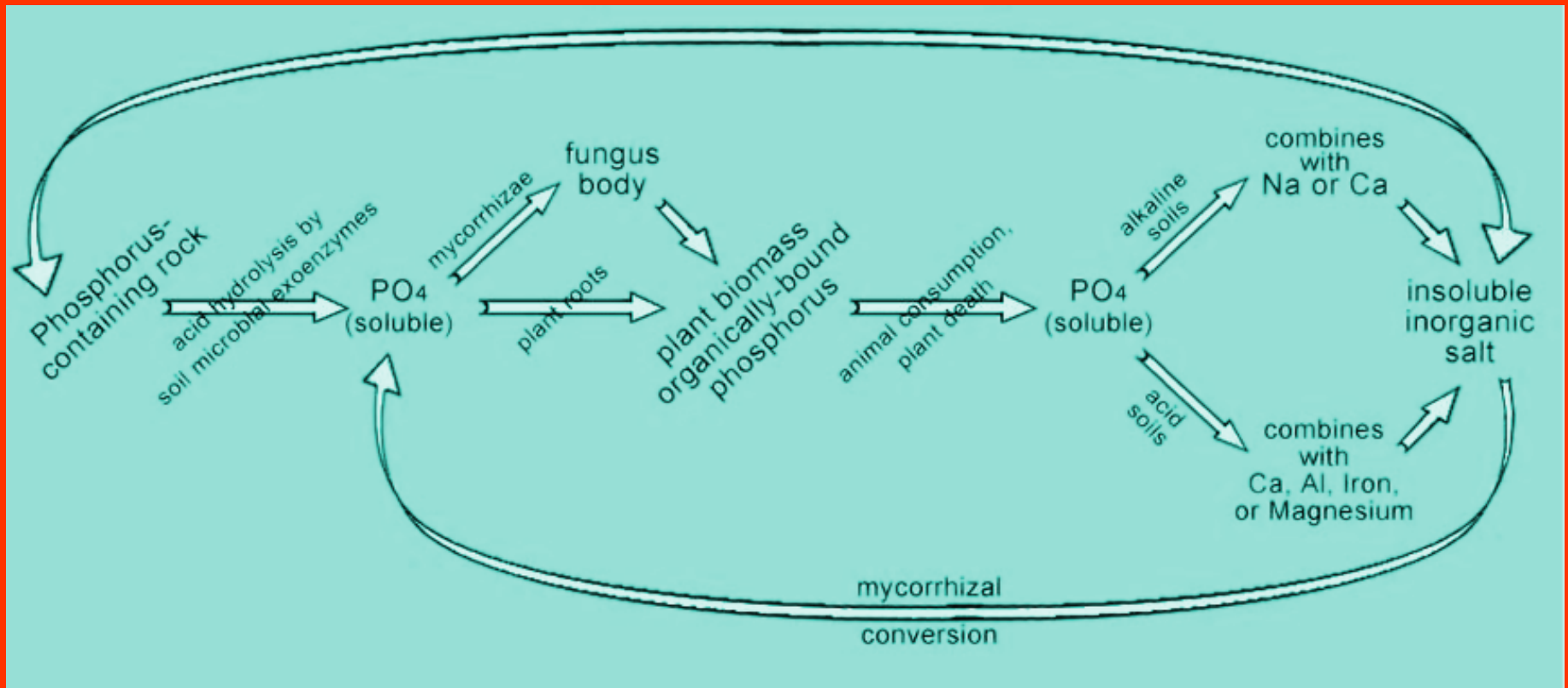
# Carbon Cycle



# Nitrogen Cycle



# Phosphorus Cycle



$\text{PO}_4^{3-}$  ion is soluble in water

$\text{PO}_4^{3-}$  is the only form that plants take in the roots

$\text{PO}_4^{3-}$  forms insoluble salts VERY rapidly, therefore  $\text{PO}_4$  (the only useful form of Phosphorous) is usually limiting for plant growth.

Mycorrhizae (many different types) are able to solubilize the complex inorganic phosphate salts of heavy metals.

# Natural Phosphate, $\text{PO}_4^{-3}$ , Cycle



← Erosion  
Phosphate  
in plants  
Bacterial  
decay



Phosphate in  
rocks, fossil  
bones, guano

↑  
uplifted

Water  
food  
chains → Bacterial  
decay → Phosphate  
dissolved in  
water

Shallow water  
sediments

Deep sea  
sediments

## References/E-resources

[https://en.wikipedia.org/wiki/Biogeochemical\\_cycle](https://en.wikipedia.org/wiki/Biogeochemical_cycle)

<https://www.youtube.com/watch?v=Bn41lXKyVWQ>

<https://www.youtube.com/watch?v=Wzo-uFS7LUA>

<https://onlinelibrary.wiley.com/doi/full/10.1111/j.1747-0765.2007.00195.x>