

# Biogeochemical Cycles

# TEKS

(12D) Describe the flow of matter through the carbon and nitrogen cycles and explain the consequences of disrupting these cycles.

# Vocabulary

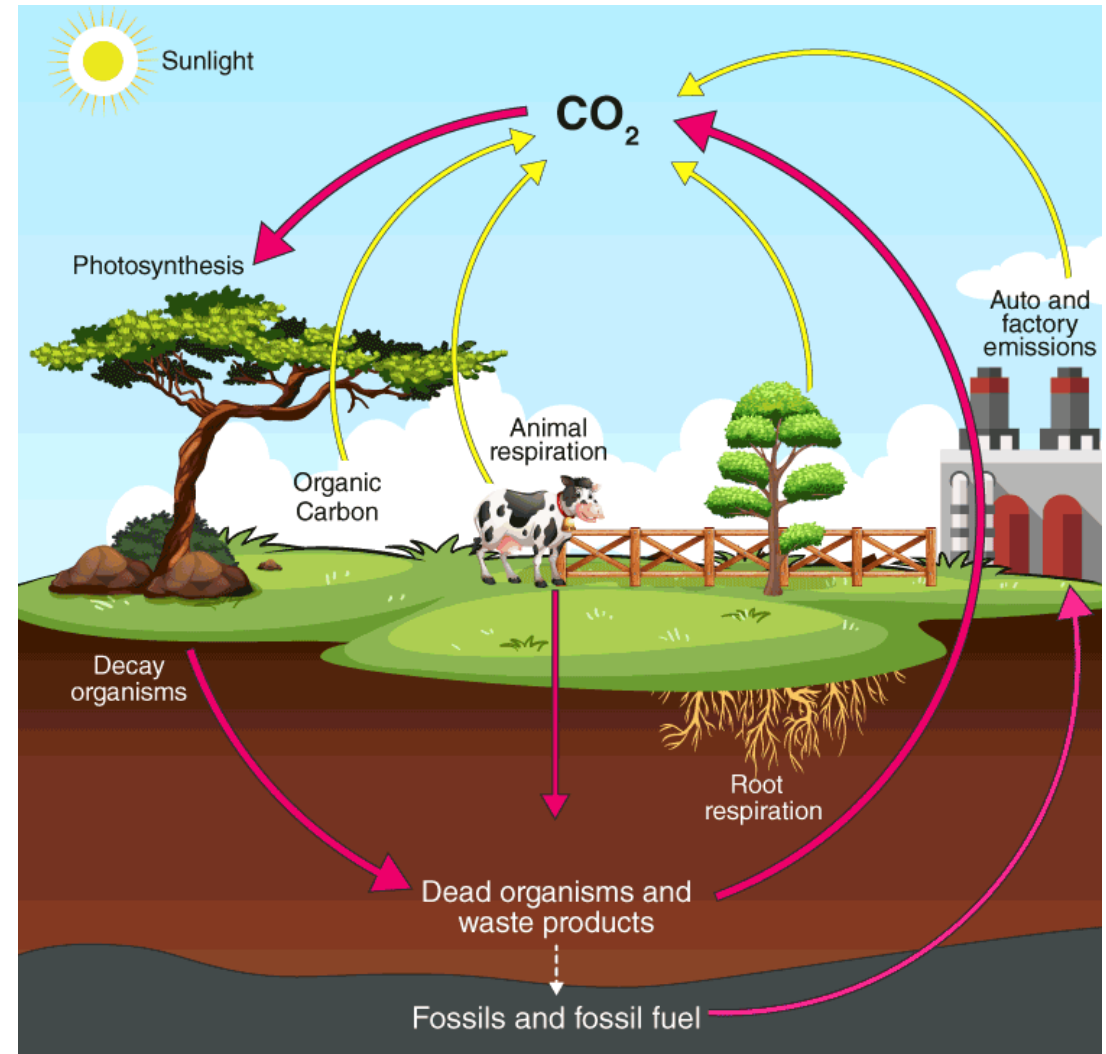
- Photosynthesis
- Cellular Respiration
- Decomposer
- Global Warming
- Nitrogen Fixation
- Algae Blooms
- Condensation
- Precipitation
- Evaporation
- Percolation/Infiltration

# Essential Question

- How can human disruption of biogeochemical cycles cause environmental problems?

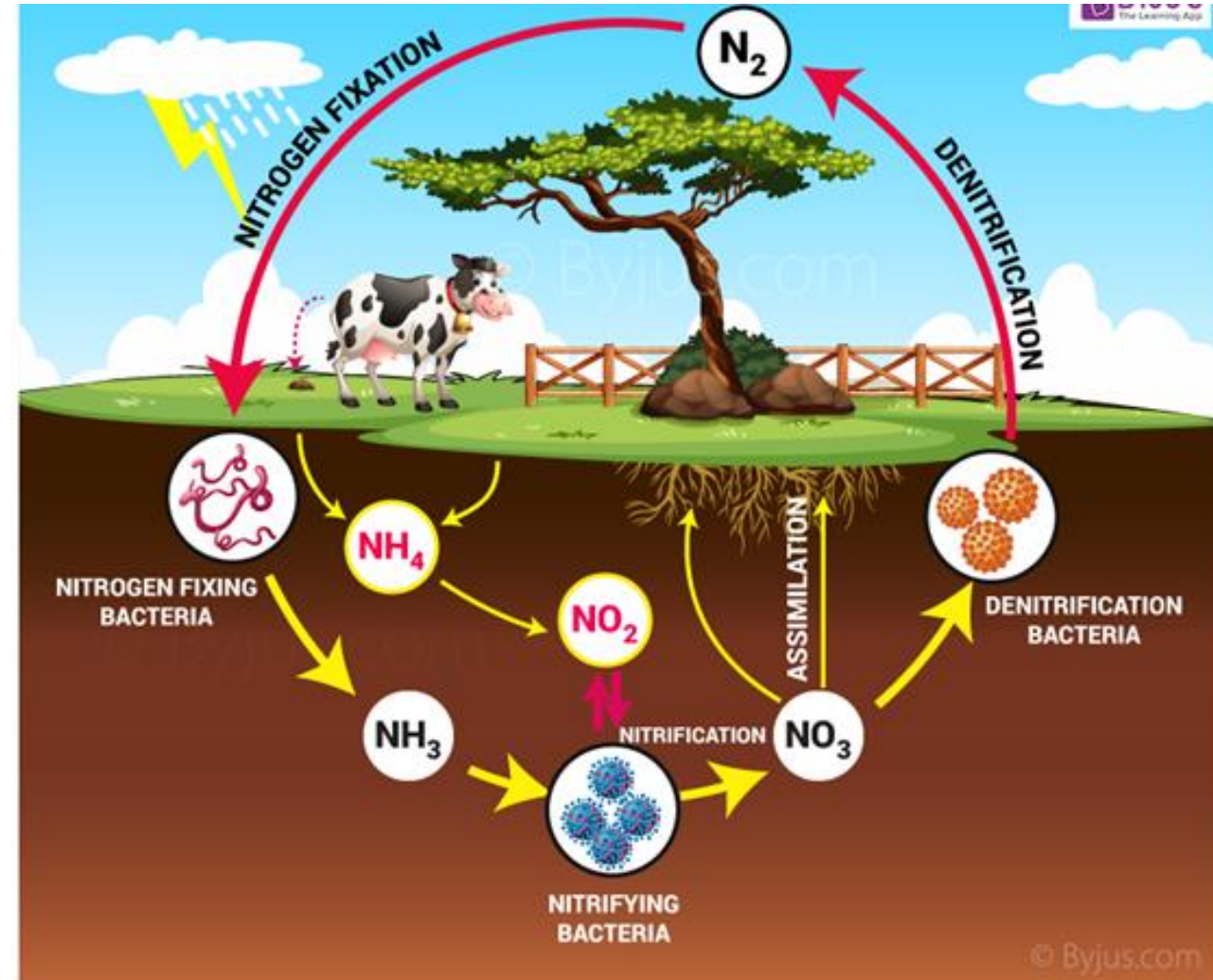
# Carbon Cycle

- Connects **Photosynthesis** to **Cellular Respiration** (and decomposition)
- Follows Glucose and  $\text{CO}_2$
- Disruptions like pollution can lead to Green House Gases ( $\text{CO}_2$ , Methane, etc.) building up in the atmosphere which causes **Global Warming**



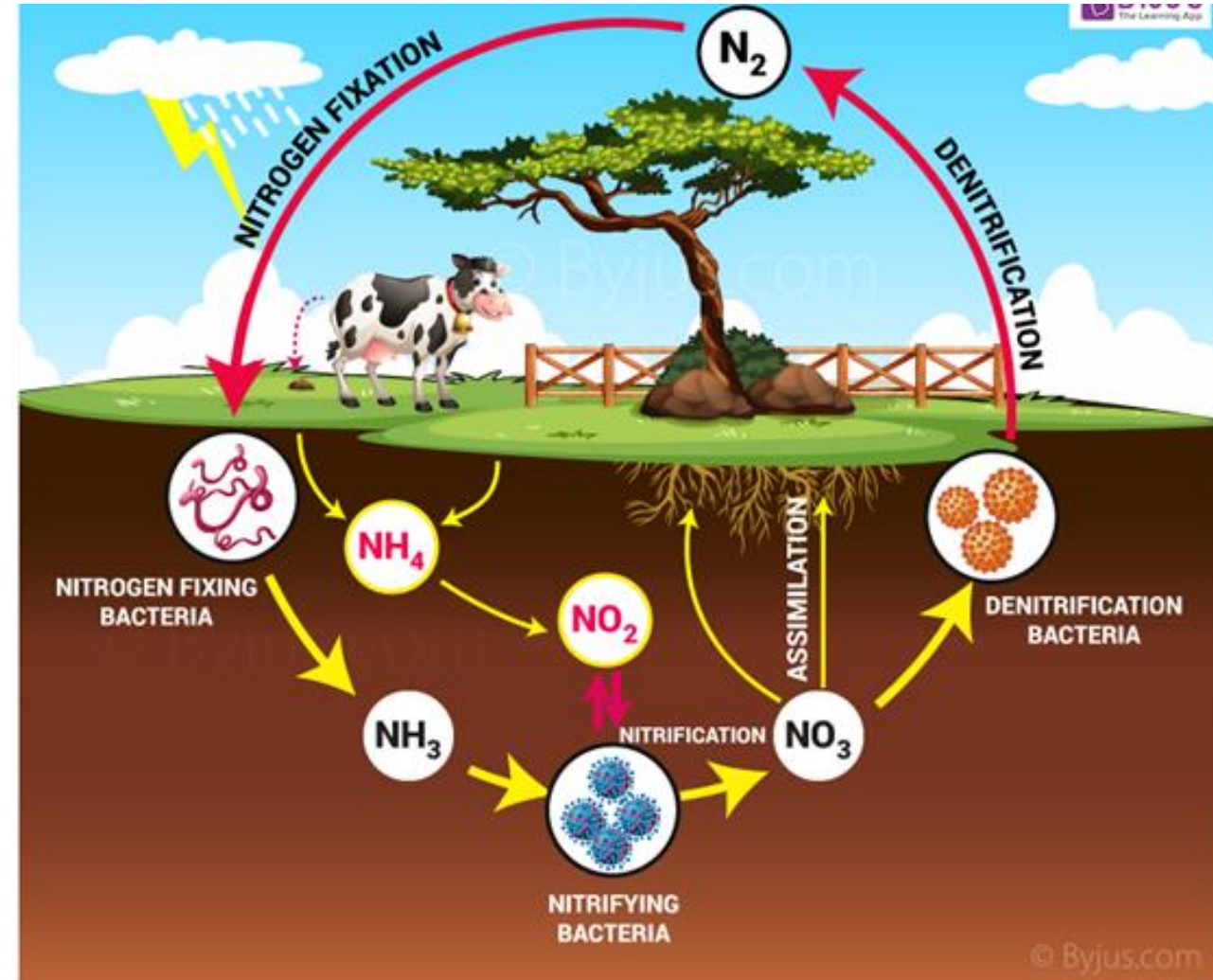
# Nitrogen Cycle

- Follow nitrogen gas ( $N_2$ ) through Amino Acids and Nitrogenous Bases
- **Nitrogen Fixation** - Atmospheric Nitrogen ( $N_2$  gas) is not usable by eukaryotes, so prokaryotes convert it into Ammonia ( $NH_4$ ) and Nitrates ( $NO_2$ ) so plants can turn them into Amino Acids and Nitrogenous bases



# Nitrogen Cycle

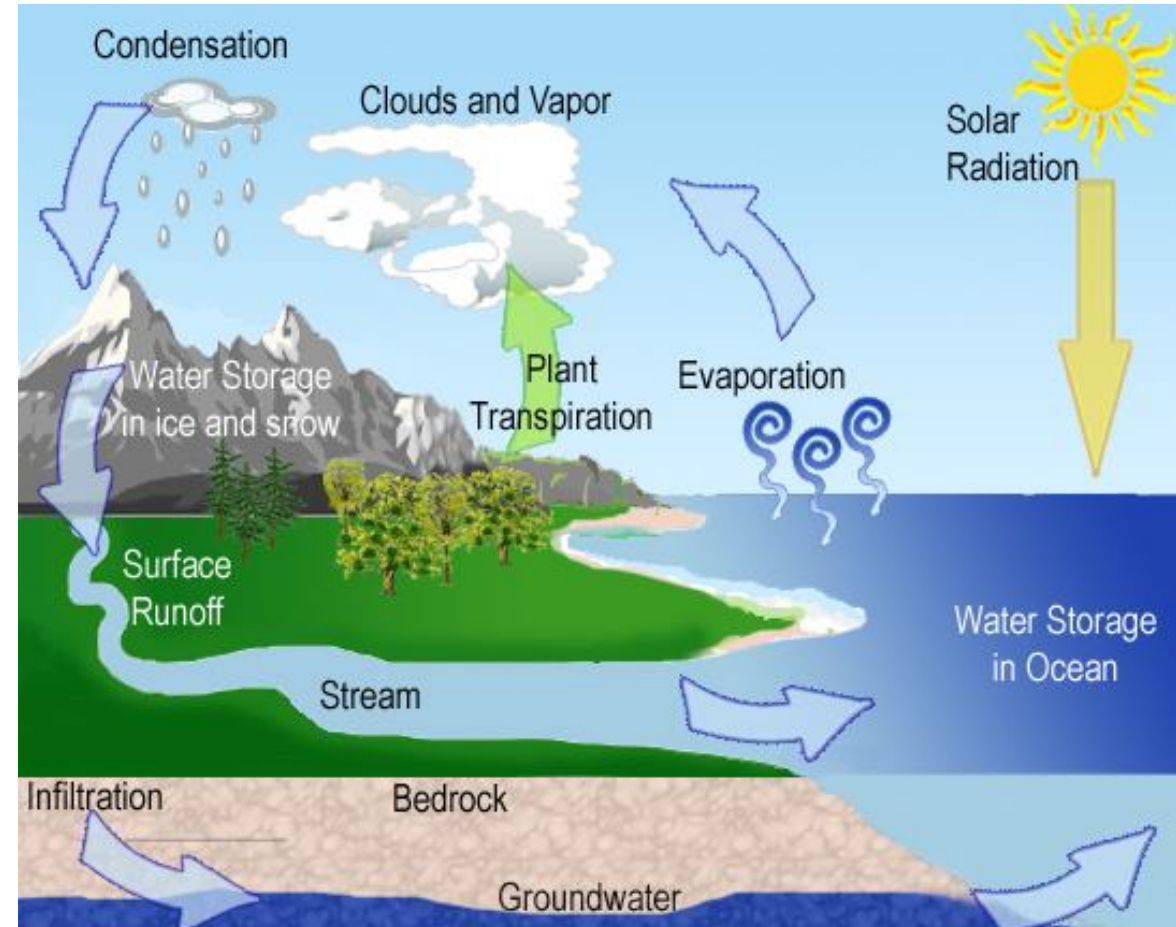
- Disruptions can lead to algae blooms and fish kills.
- Farm fertilizers have large quantities of nitrogen in them, so when humans over fertilize it can be washed into the rivers and streams, causing Algae (protists) populations to grow out of control and suffocate aquatic life at night.





# Water Cycle

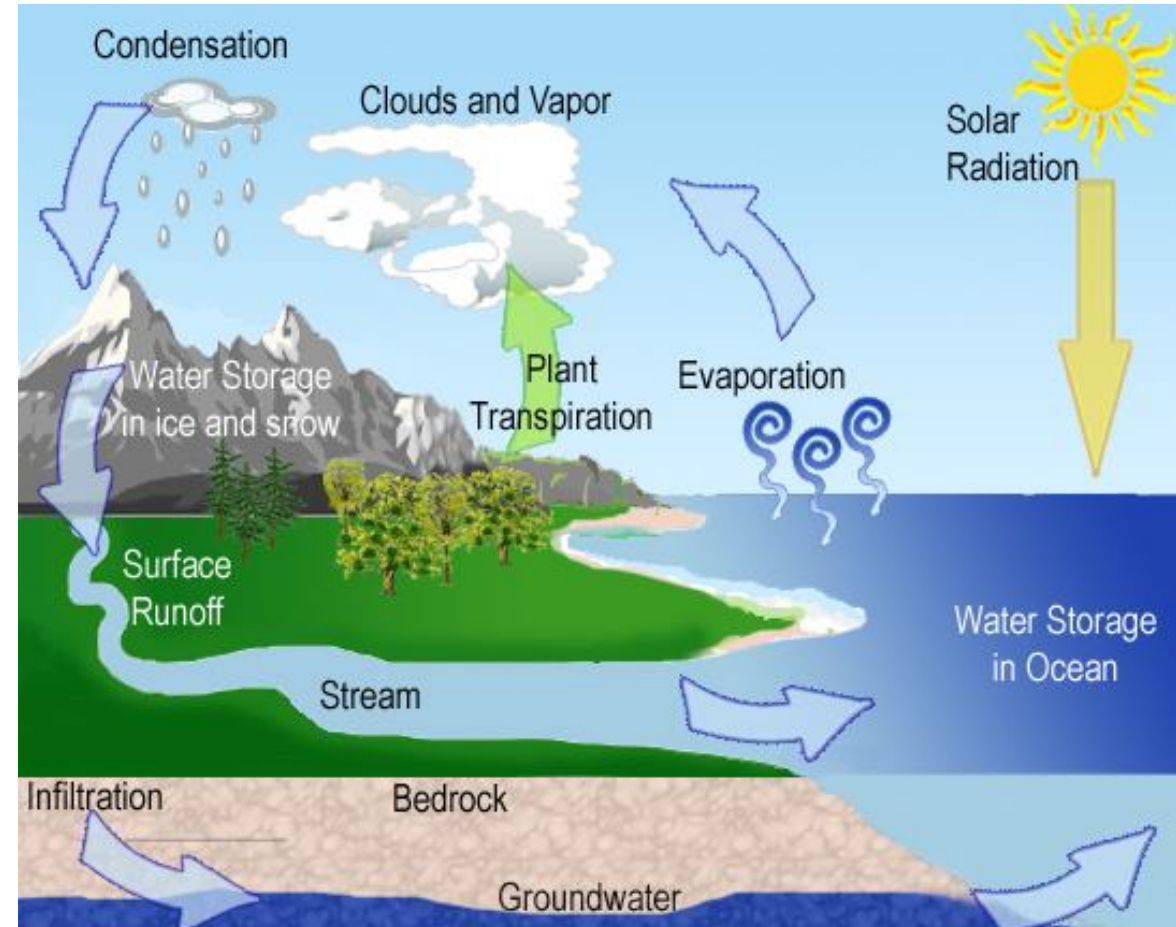
- Follows water through atmosphere:
  1. Condenses into clouds in atmosphere from gas to liquid
  2. Precipitates (rains) to the ground
  3. Runoff to streams, rivers and ocean
  4. Infiltrate/Percolate into the ground water
  5. Evaporate due to solar radiation from liquid to gas, back to atmosphere





# Water Cycle

- Disruptions are usually associated with pollution of the water cycle by humans.
- Can lead to toxic water supply for land organisms (including humans)
- Can lead to the death of marine organisms



# Phosphorus Cycle

- Water cycle **erodes/weathers** the mountains (land) where phosphorus is stored in the rocks/soil.
- Runoff phosphorus is used by prokaryotes, algae and plants to create Phosphate groups for carbon compounds (Nucleotides, Phospholipids, Methionine, etc)
- Excess phosphorus is deposited on ocean floor that compresses to stone and rises up through **plate tectonics** (creates the continents)

