

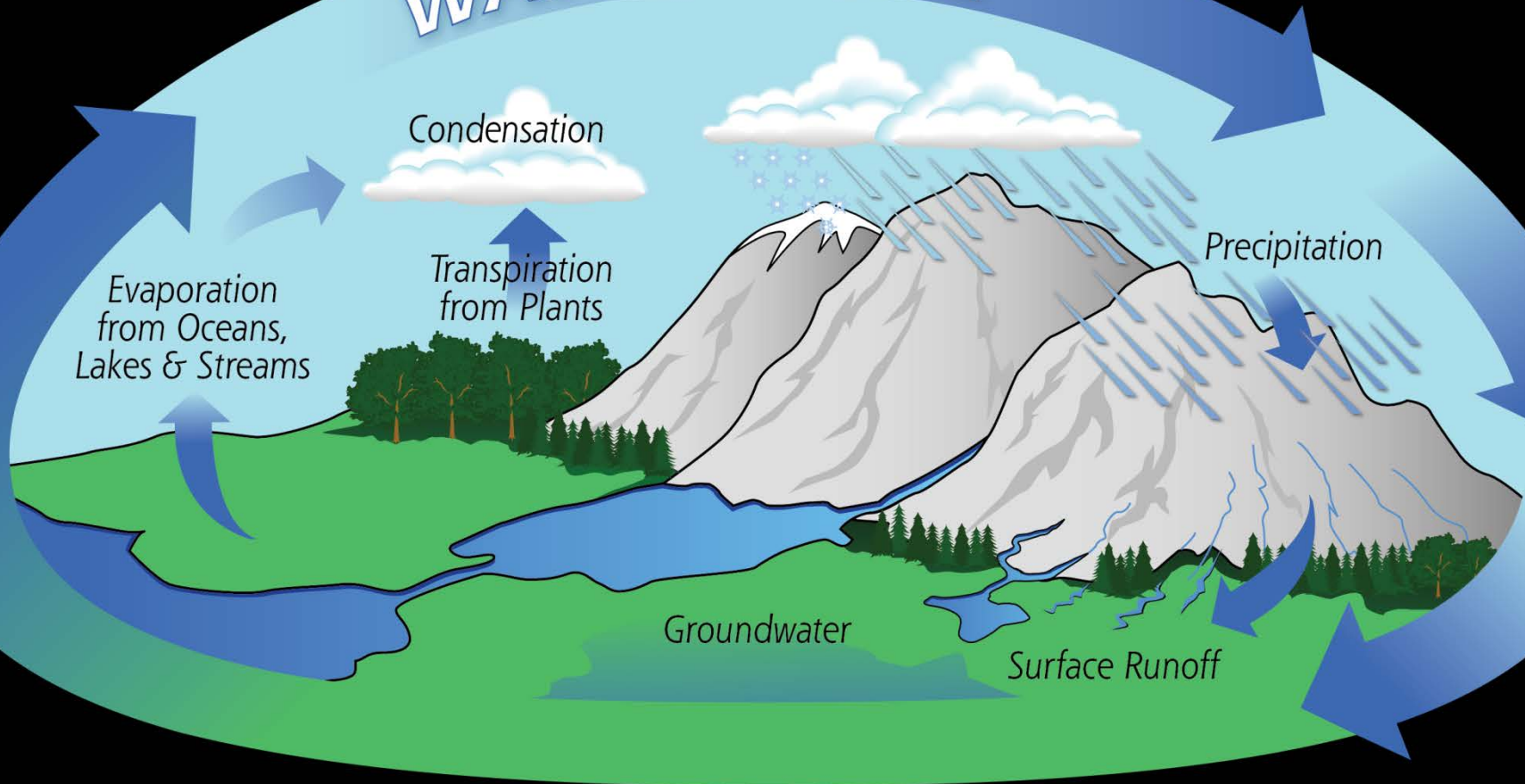
Cycles of Matter

Chp 3.3

Biogeochemical cycles

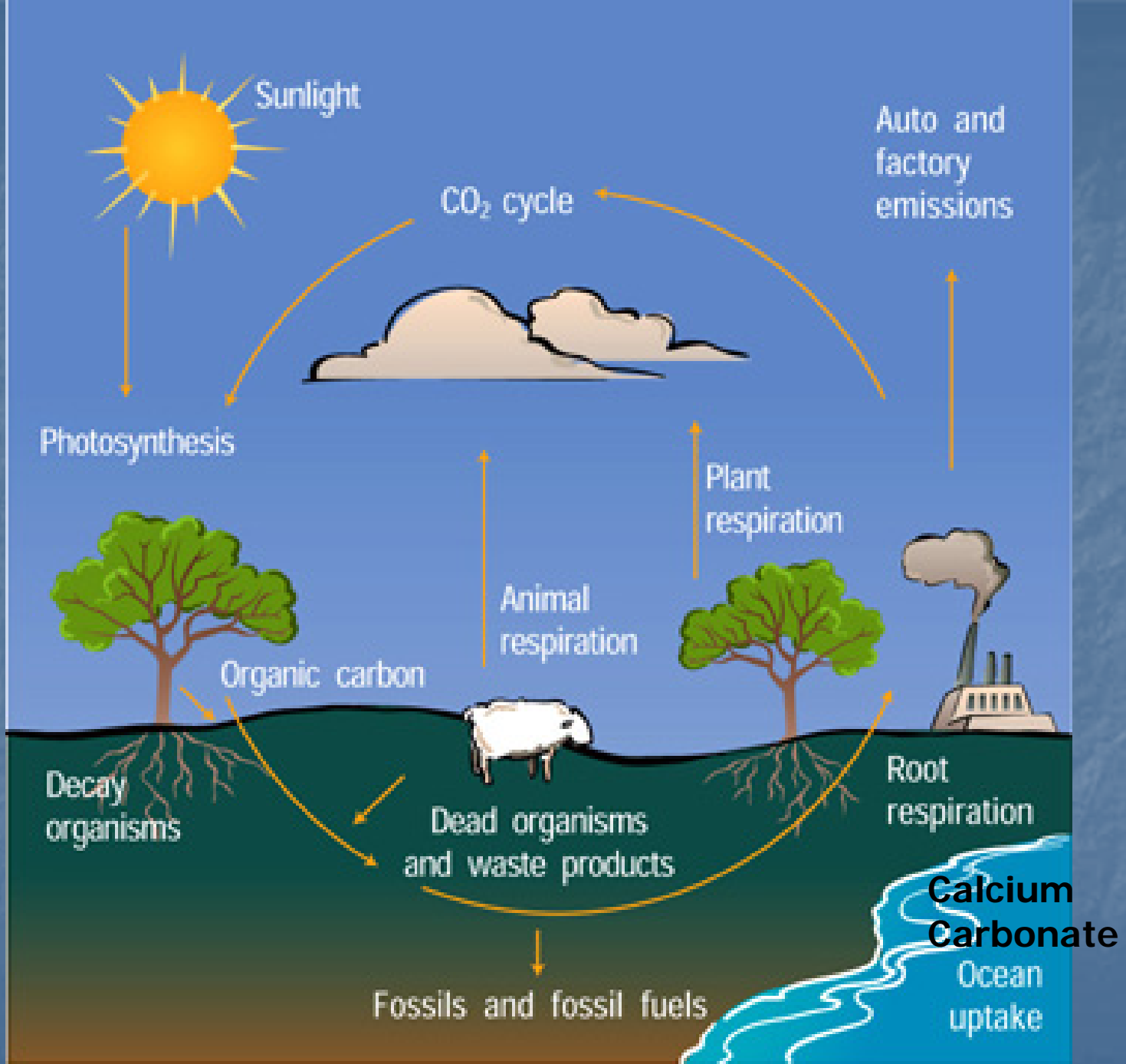
- All matter is cycled within and between ecosystems

WATER CYCLE



Carbon Dioxide (CO₂)

- CO₂ is released into the atmosphere by
 - Volcanic Activity (out gassing)
 - Respiration (exhale CO₂)
 - Decomposition
 - Burning wood or fossil fuels



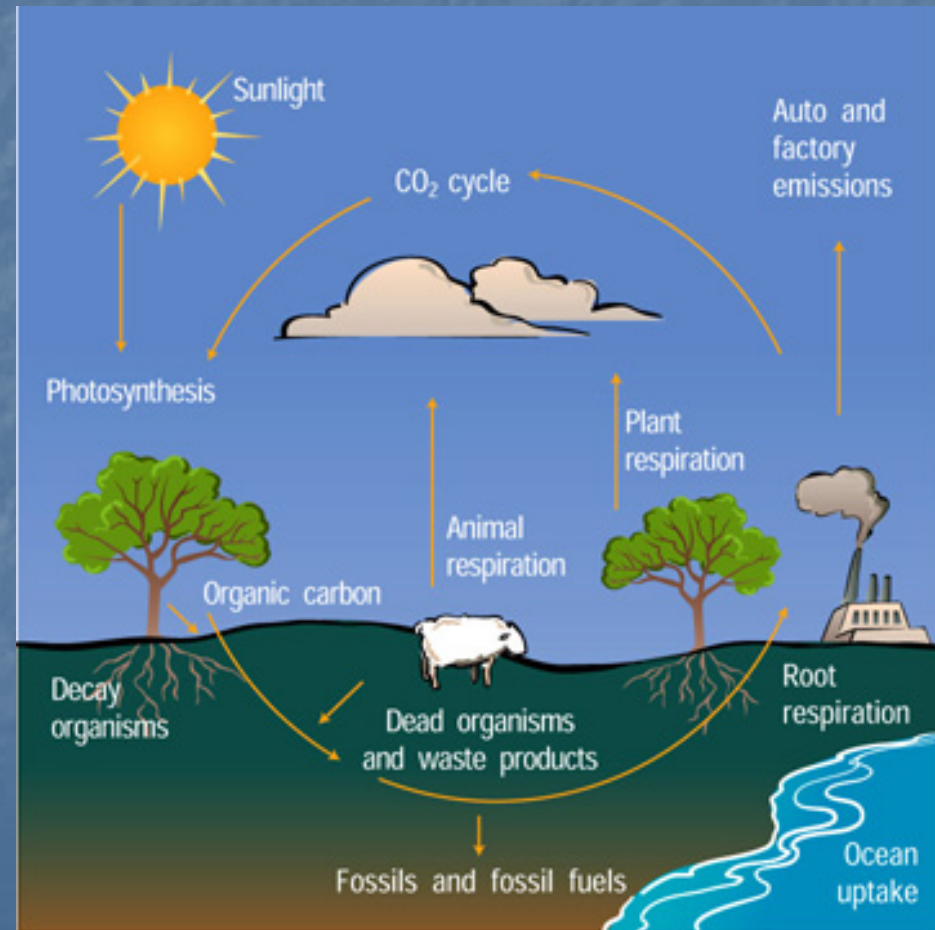
Volcanoes

- Origin of CO₂ in atmosphere
- Current eruptions also release CO₂



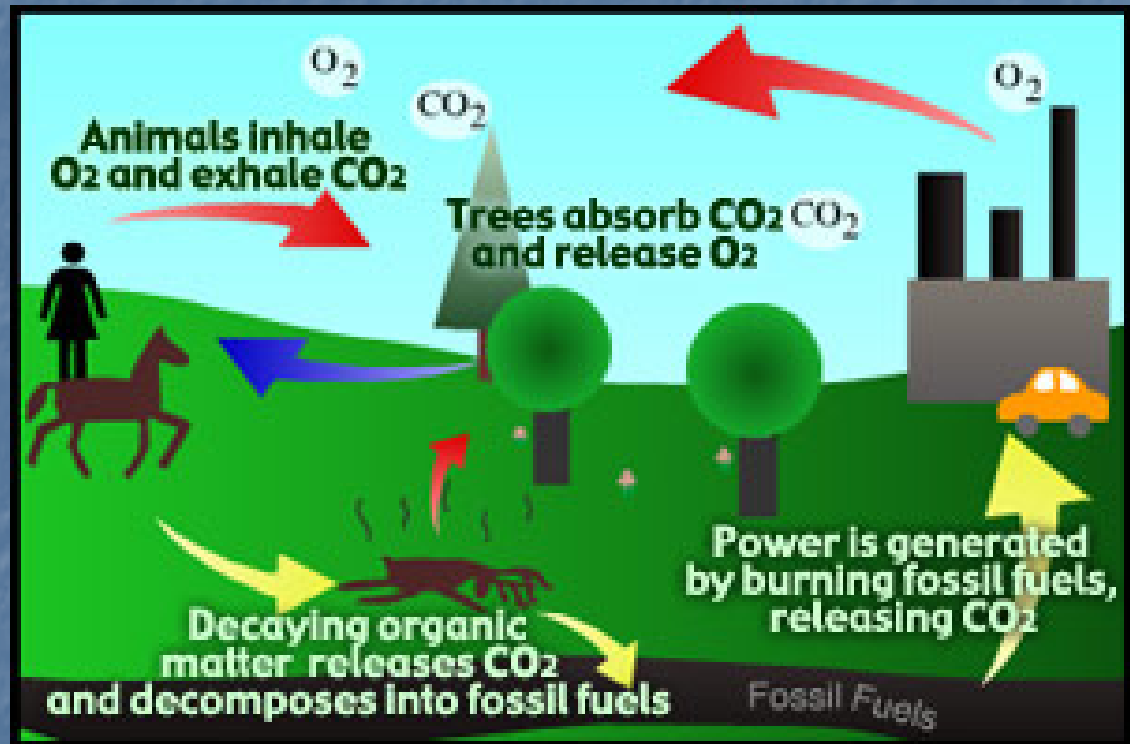
Photosynthesis and Respiration

- Plants consume CO_2 to produce carbohydrates
- Animals eat the carbohydrates
- Oxygen is used to burn carbohydrates for energy
- CO_2 is released into atmosphere



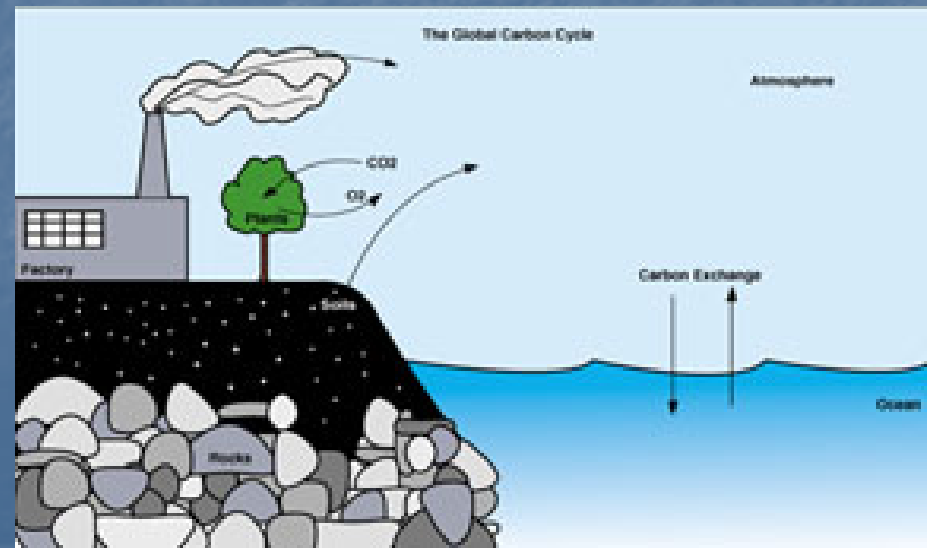
Decomposition and Burning

- CO₂ is released into atmosphere
- Carbon is also returned to soil
- Decomposing dinosaurs and plants formed coal and oil (carbon storage)



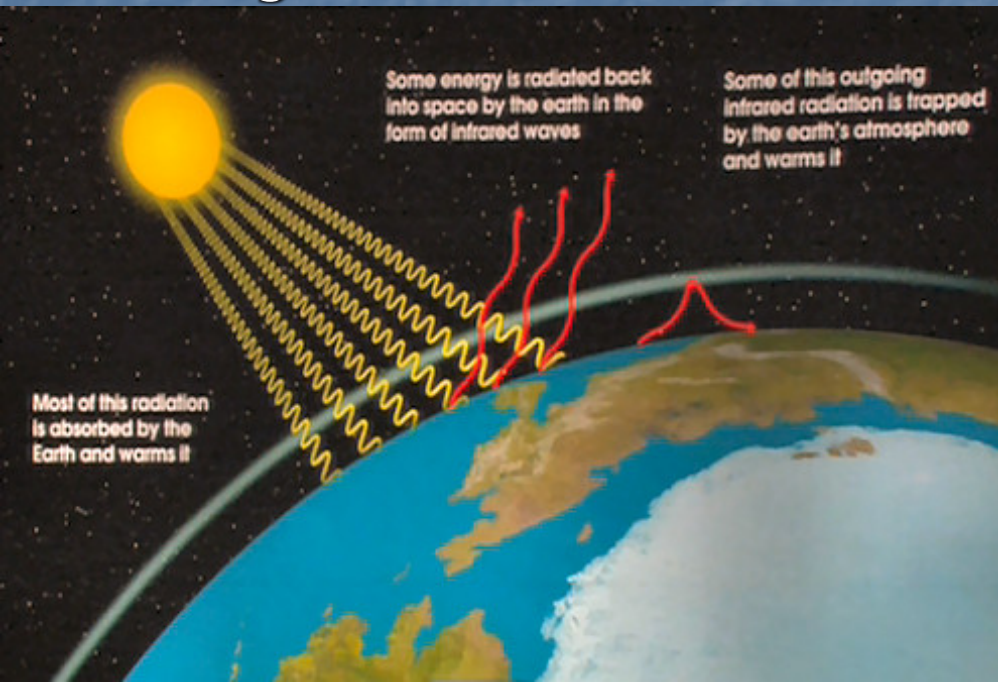
Carbon in Ocean

- Dissolves into oceans
- Forms Calcium Carbonate
- Marine organisms use calcium carbonate to make shells and bones
- Shells and bones break down over time
- Carbon is returned to atmosphere

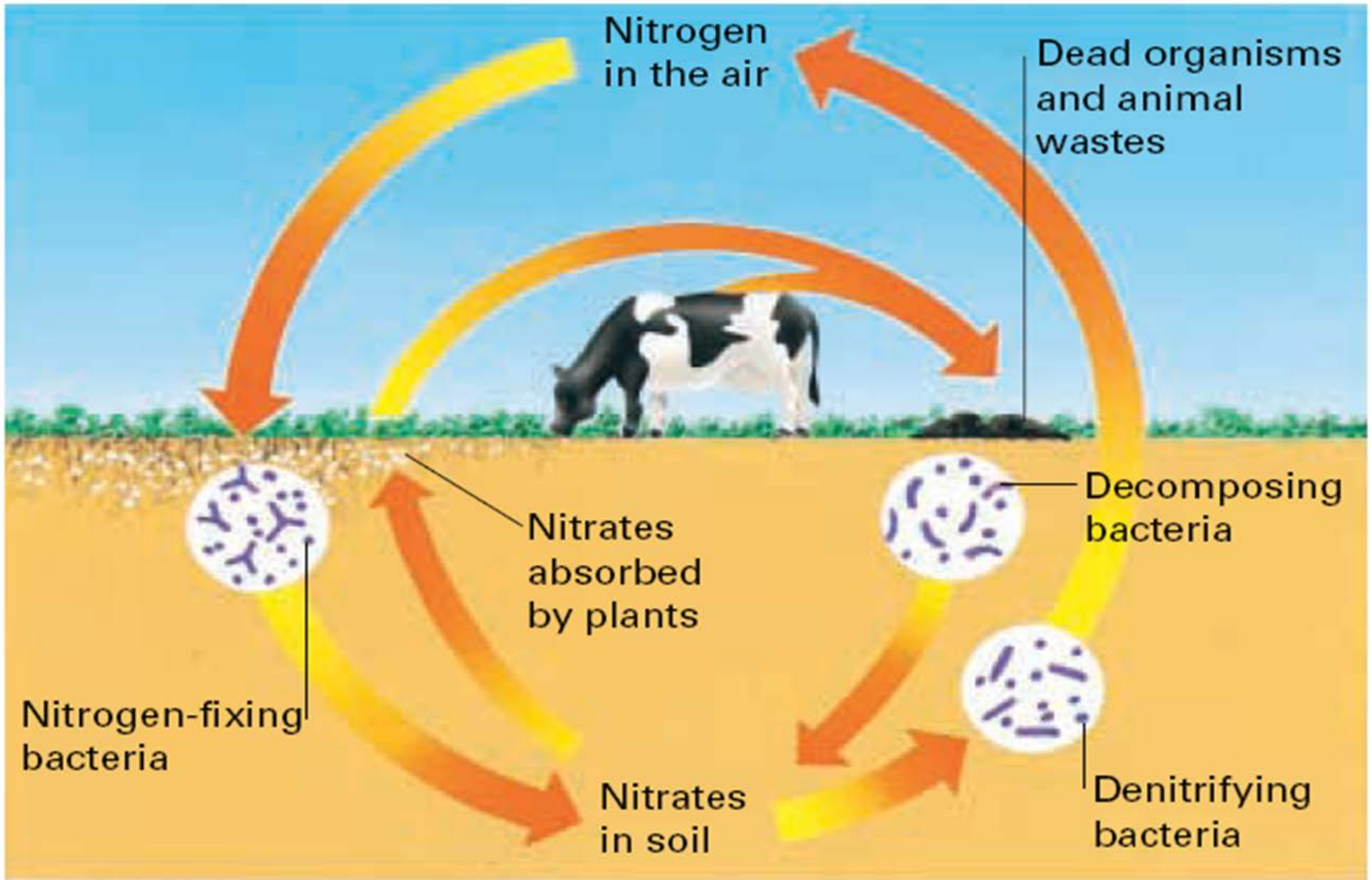


Greenhouse effect

- Carbon dioxide, methane, water vapor trap heat (blanket)
- Increased burning of fossil fuels increases amount of CO₂ in the atmosphere
- Global Warming
- Drought, melting ice caps
- rising sea levels



Nitrogen cycle



Nitrogen Fixation

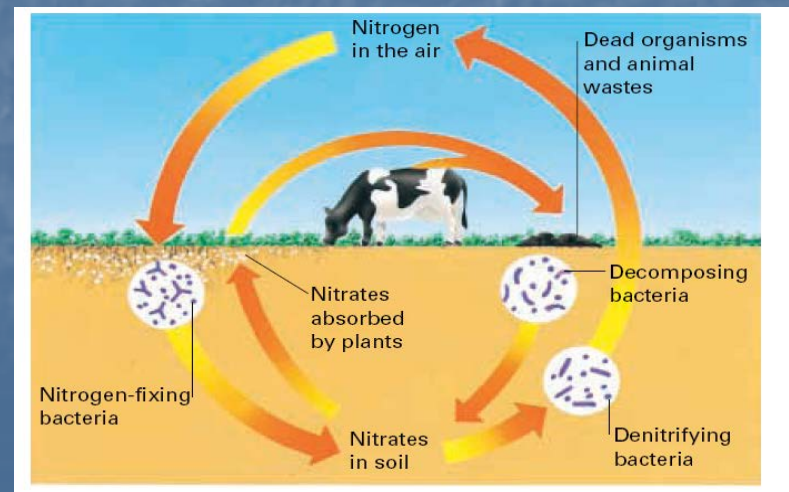
- Process where nitrogen fixing bacteria change nitrogen in the air into soil nitrates (nitrogen compounds that plants can use)
- Nitrogen fixing bacteria live in soil and root nodules of some plants
 - Beans, peas, lentils, other legumes

Root Nodules on Soybean plant



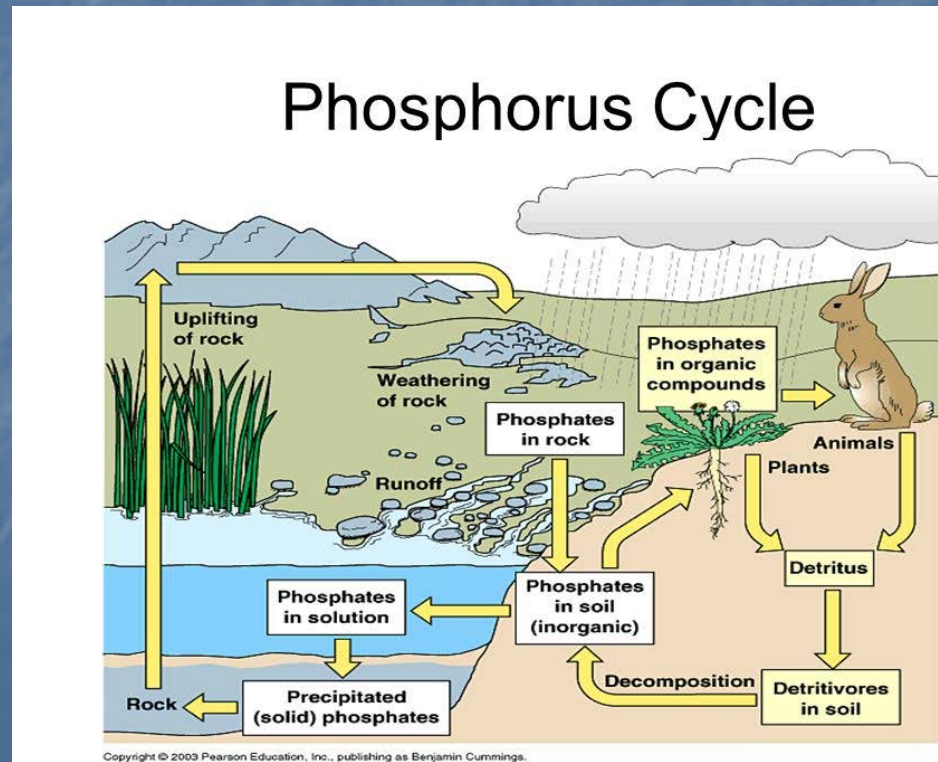
Proteins

- Plants use nitrogen to make proteins
- Animals eat the protein from plants and other animals
- Nitrogen then enters their bodies and is used to make different proteins



Phosphorous cycle

- Phosphate is an important part of DNA
- Phosphorous is never in the atmosphere
- Phosphate is found in living things, rocks, soil, ocean sediment



Nutrient Limitation

- Limiting nutrient – whatever nutrient is the most scarce
- Limits growth of producers
- Producers grow quickly when more of the limiting nutrient is added
- Fertilizers
- Algal bloom – when excess phosphates or nitrogen cause an overgrowth of algae.



Photographer: Paul Schmidt
Credit: Charlotte Sun Herald