



Objectives

- ✿ Compare and contrast the flow of matter and energy in an ecosystem.
- ✿ Describe how matter, including water, carbon, nitrogen, and phosphorous cycle through an ecosystem.
- ✿ Describe the effect that the sun has on both biotic and abiotic factors.
- ✿ Differentiate between climate and weather, and explain its role in determining the characteristics of an ecosystem/biome.
- ✿ Explain the process of succession.



A Quick Review

- ✳ Everything in the universe is made up of matter.
- ✳ The Law of Conservation of Matter states that “matter can not be created or destroyed, but can be converted from one form to another.”
- ✳ Energy follows a similar rule, with the exception that not all forms of energy are functional (useable.)
- ✳ According to the 2nd Law of Thermodynamics, conversions of energy always produce waste energy in the form of heat (no energy conversion is 100% efficient).
- ✳ This means that matter will forever cycle through an ecosystem, while energy moves in one direction through an ecosystem.



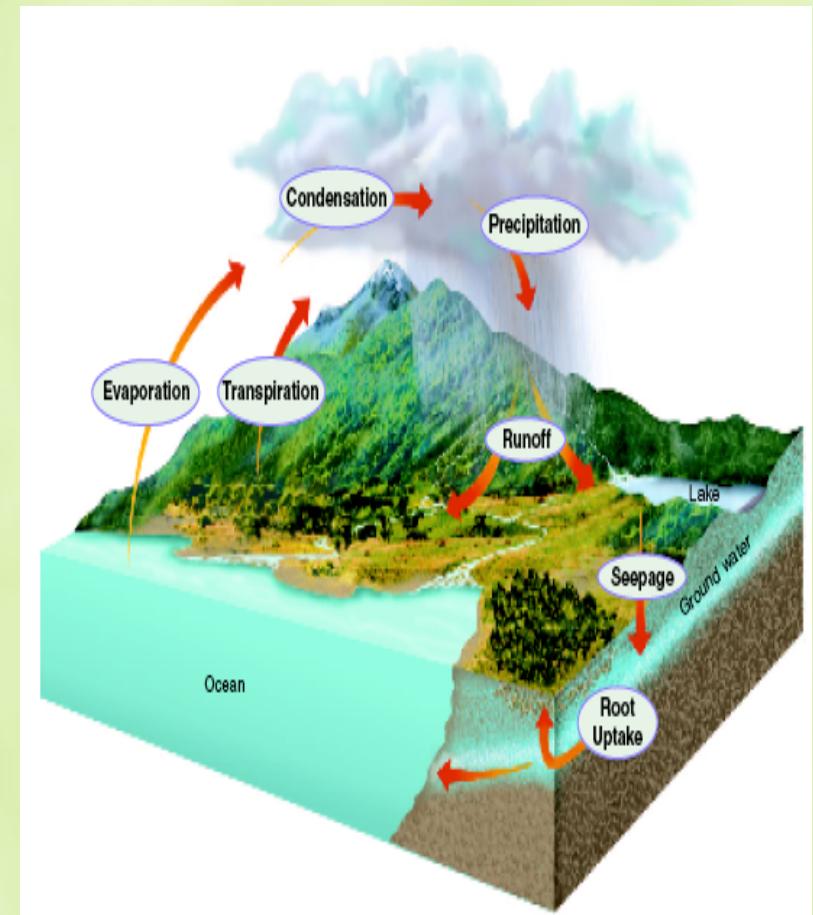
Matter (Biochemical) Cycles

- ➊ Each element has a unique way that it moves through an ecosystem, known as a Biochemical or Biogeochemical Cycle, each with steps specific to that cycle.
- ➋ Specific types of matter are essential for nutrients for living organisms.
- ➌ Some major matter cycles include:
 - ➍ Water Cycle
 - ➍ Carbon Cycle
 - ➍ Nitrogen Cycle



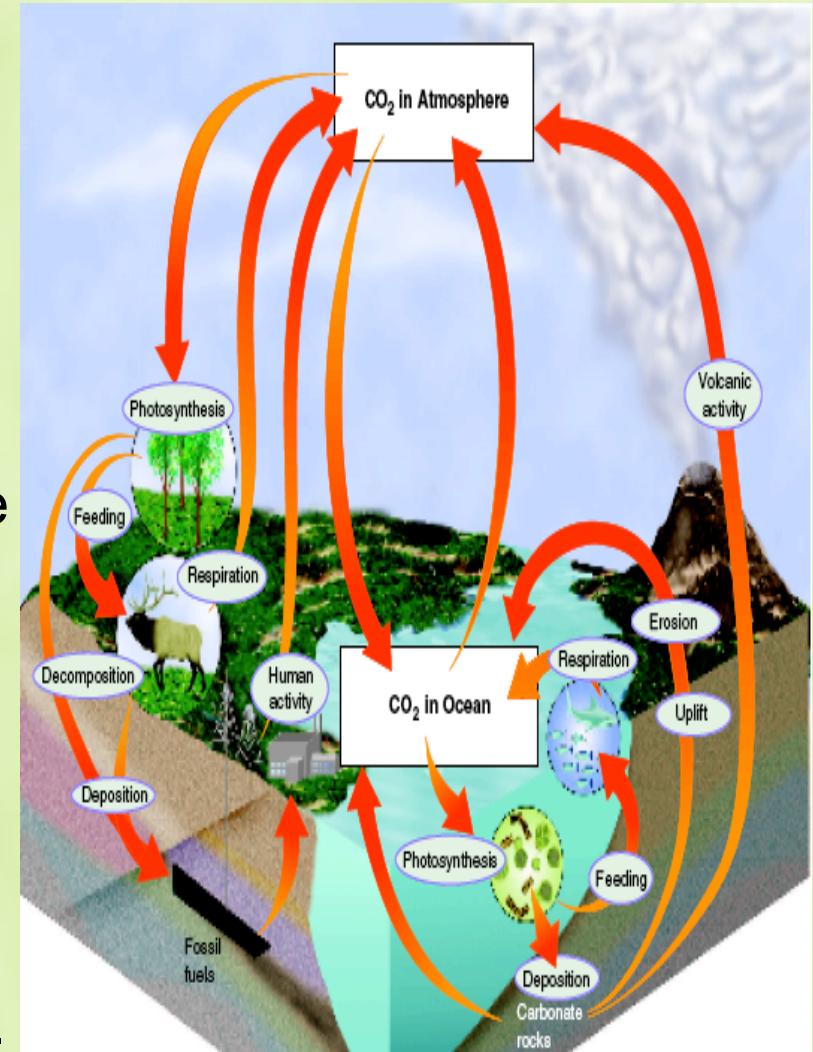
The Water Cycle

- Water, the most important inorganic compound for life, converts from liquid to gas through the processes of evaporation and transpiration.
- Water converts back to liquid from a gas through the processes of condensation and precipitation.
- Precipitation can run off and be absorbed by the soil, where plant roots uptake water back into the cycle.



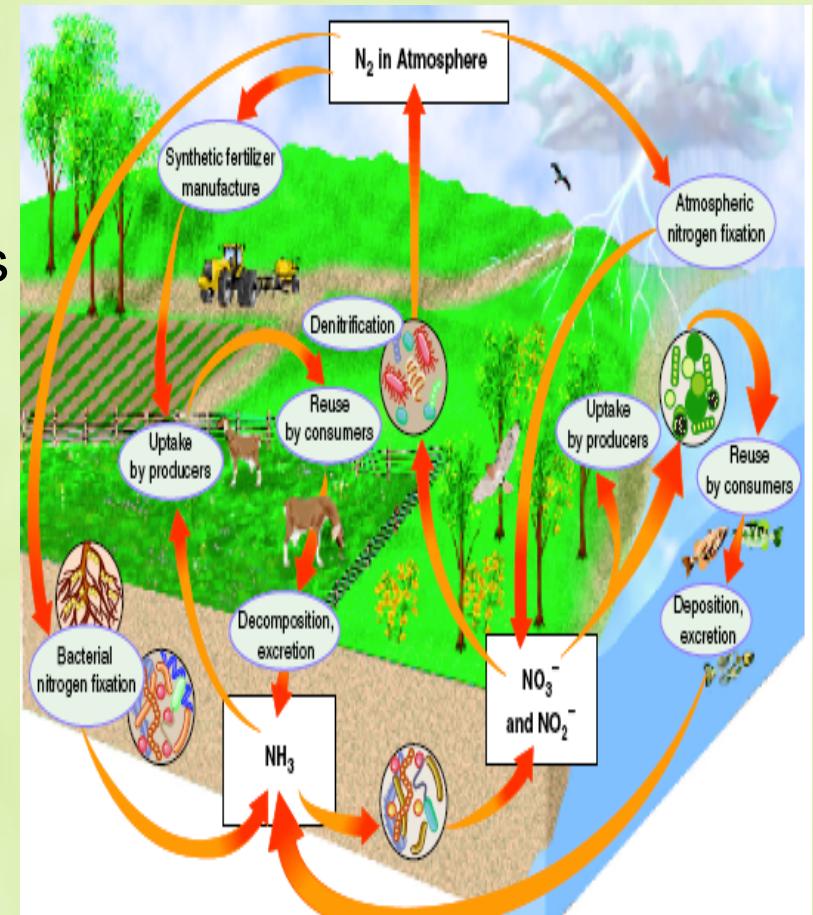
The Carbon Cycle

- Carbon dioxide is put into the atmosphere by:
 - Respiration
 - Volcanic Activity
 - Burning Fossil Fuels
- Carbon dioxide can be removed from the atmosphere and returned to the cycle by photosynthesis.
- Feeding among organisms allows for the exchange of carbon and other matter.
- Decomposition also returns matter back to the ecosystem.



The Nitrogen Cycle

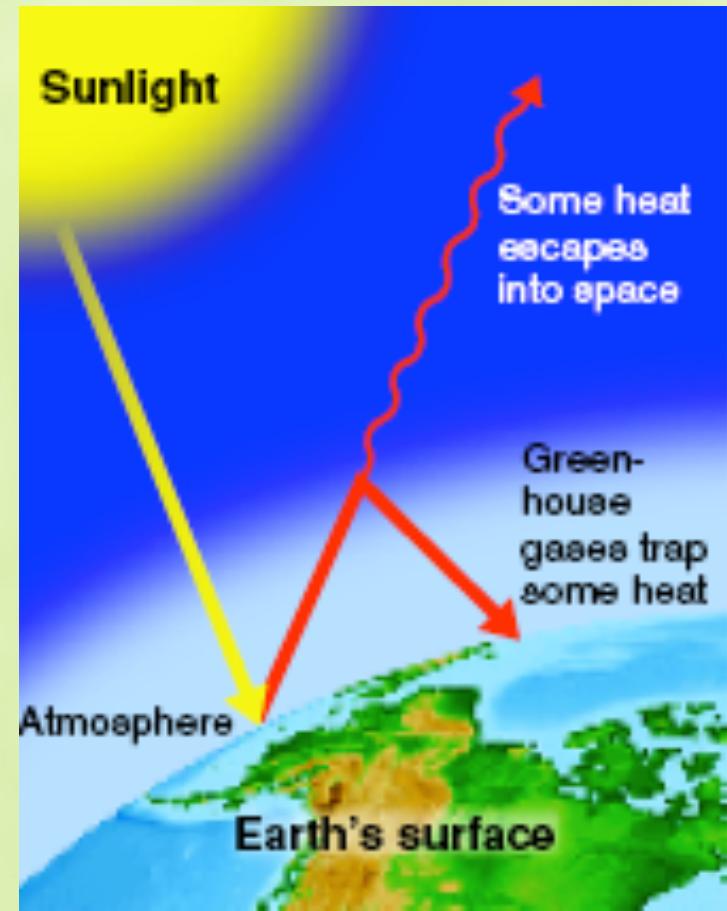
- Much of the atmosphere is made of nitrogen gas, but most organisms can not use it in this form.
- Nitrogen fixation is the process by which certain bacteria and atmospheric weather convert nitrogen gas into useable nitrogen –based compounds.
- Nitrogen compounds are absorbed by plants and then move through the ecosystem.
- Nitrogen is returned to the ecosystem by animal waste and decomposition.





Thank You Mr. Sun

- ✳ Not only is the sun the source of energy for living organisms through photosynthesis, but it is also the driving force behind climate and weather patterns.
- ✳ Air and water masses move from hot to cold.
- ✳ Air and water warmed by the sun create water and air currents which result in weather.



Climate vs. Weather

* Climate is the long-term average, year-to-year conditions including precipitation and temperature.

* Climate is determined by:

- Location or longitude
- Amount and angle of exposure to sunlight
- Elevation
- Proximity to water



* Weather is determined by:

- Air movement
- Water movement
- Time of year





Climate's Effect on Life

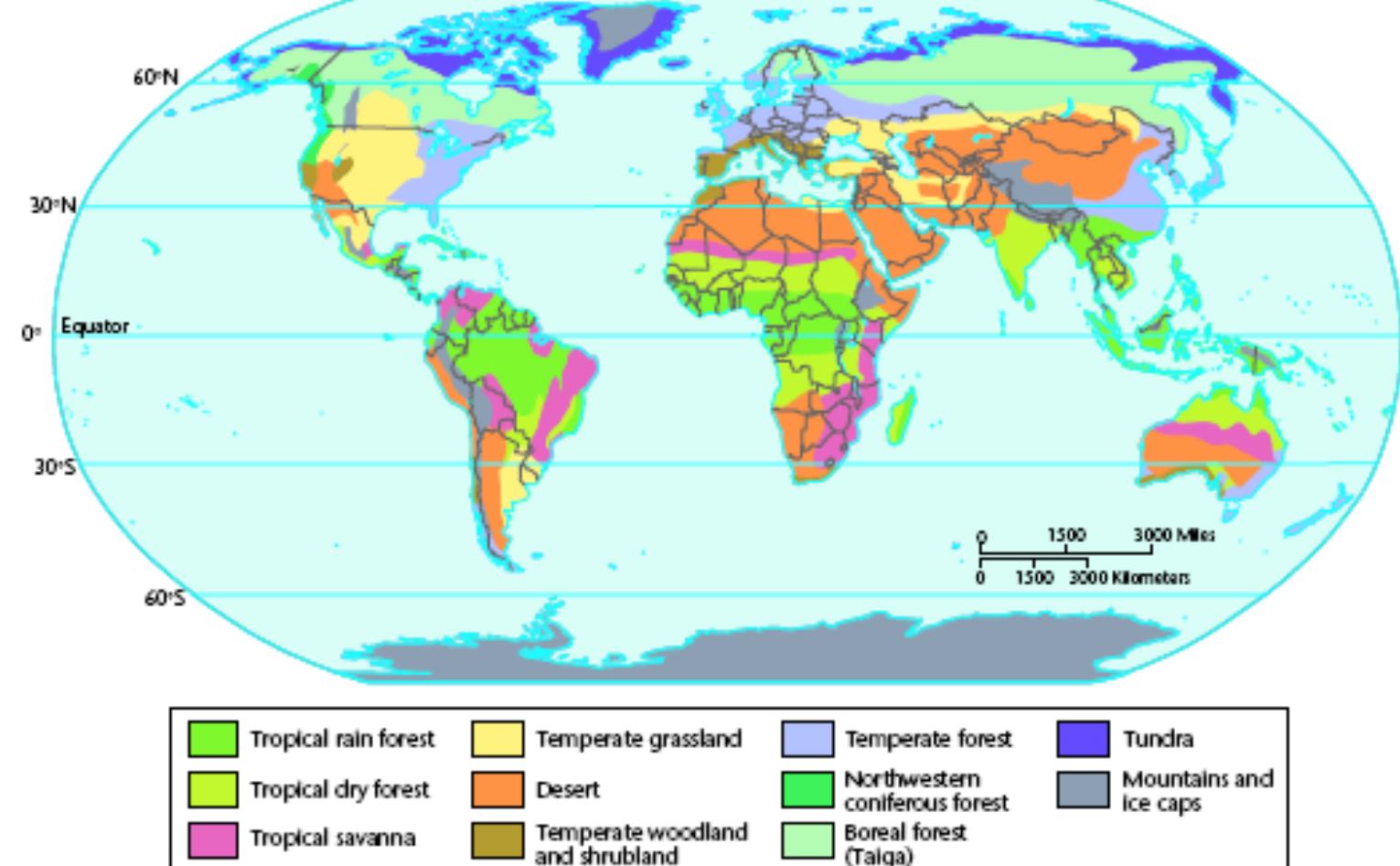
- ✿ Organisms require a narrow range of conditions to survive.
- ✿ Those conditions can include minimum or maximum temperatures, amount of water, etc.
- ✿ This means that climate directly controls what type of organisms live and survive in a particular area.
- ✿ Organisms often have similarities with other organisms that live in the same region because they have adapted to the conditions.



Biomes

- ✳ Biomes are defined by their climate and the types of organisms that call it home.
- ✳ Broadleafed, fruit producing trees need lots of warmth and sunlight, which is why they are more common in tropical areas.
- ✳ Conifers (pine trees) can withstand bitterly cold temperatures and are often found in colder biomes.
- ✳ Animals depend either directly or indirectly on plants, so they will associate with the climate that supports the plants that support them.
- ✳ The moral of the story is that the sun is “da man”!

Biomes (Cont.)





Succession

- ✳ Because climate will, in large part, determine what will grow and survive in a particular area, an area will most often return to its previous state after a catastrophic event changes it.
- ✳ Succession is the predictable series of changes that an ecosystem will go through over time.

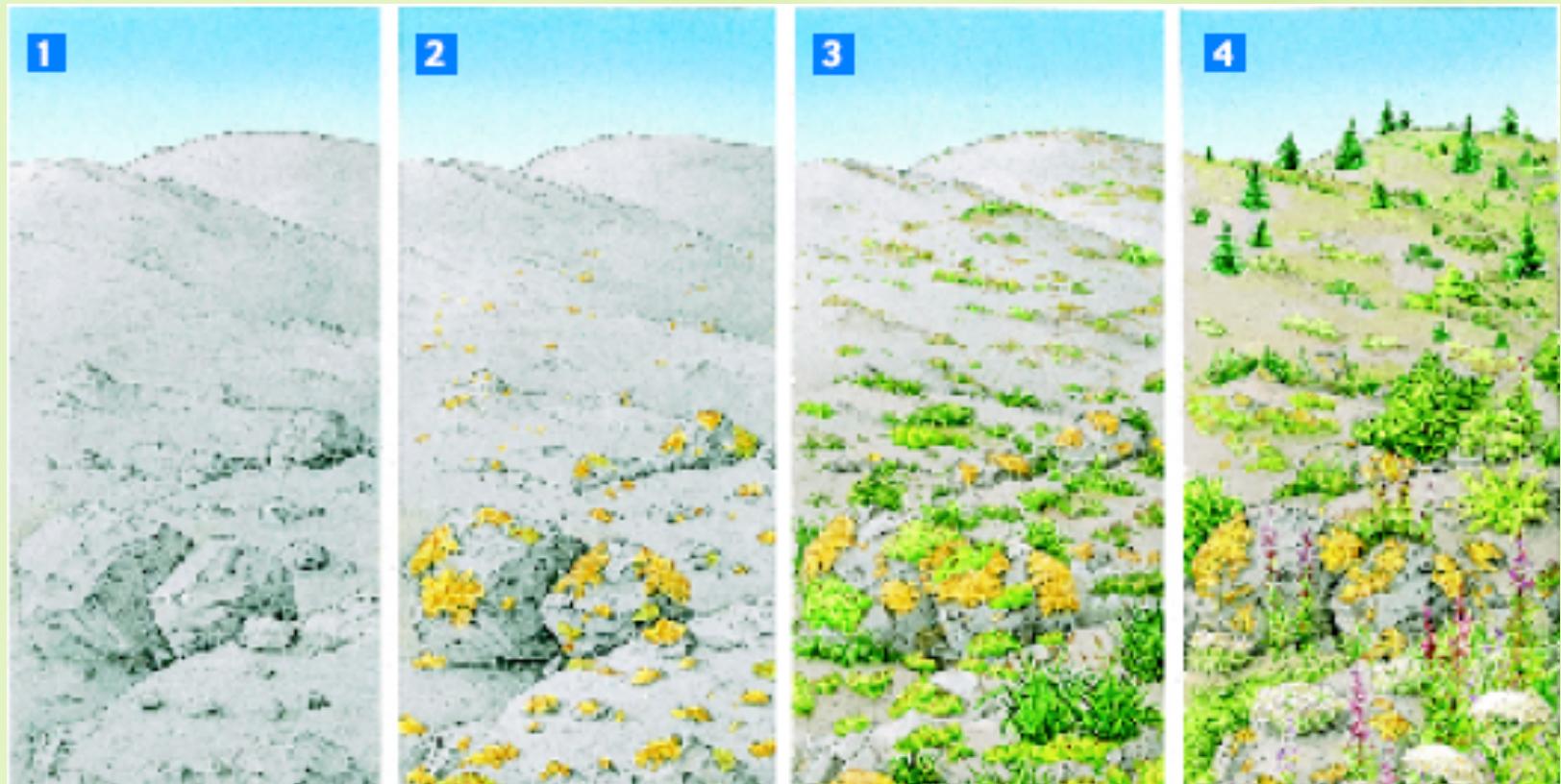


Primary & Secondary Succession

- ✿ Primary succession occurs when new soil must be formed.
 - ✿ It takes a long time because soil formation is slow.
 - ✿ It occurs after volcanic eruptions, when bare rock is exposed, or after extreme erosion.
- ✿ Secondary succession occurs when the soil remains, but plants and other life have been removed or have died off.
 - ✿ It does not take as long as P.S. because soil does not have to reform.
 - ✿ It occurs when a pond dries up, after a forest fire, or after a clearing.



Succession in Action





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