

The Water Cycle ☁️

3 Main Steps

- 1.) Evaporation through solar energy
- 2.) Condensation of vapor into clouds
- 3.) Precipitation of rain

Relationships ❤️ Symbiosis

symbiosis	a relationship between two different species
parasitism	one benefits while other is harmed 😊 / 😞
mutualism	both benefits 😊 / 😊
commensalism	one benefits and other is unaffected 😊 / 😊

Vocabulary

abiotic factors	nonliving, physical features
biotic factors	living organisms
population	same species in one given area (breed to have fertile children)
carrying capacity	the limit a population can grow to
limiting factor	the reason why populations can't grow infinitely

Vocabulary Pt. 2

competition	occurs when two or more species rely on similar limiting factors
interspecific competition	competition between different species
Intraspecific competition	competition between same species
predation	one animal captures and feeds on another animal 🦋
cryptic coloration	literally just camouflage 🦋
aposematic coloration	bright, warning patterns 🦋
batesian mimicry	harmless species mimics a dangerous one
mullerian mimicry	a few different species mimic each other, so predators know to avoid animals with that pattern

Energy Vocabulary

energy	capacity to do work or cause change
chemical energy	energy ⚡ stored in organic molecules
free energy	portion of energy ⚡ released during reactions that is available to do work
autotrophs	make own food
heterotrophs	obtain food from outside source

Energy Vocabulary (cont)

activation energy	energy ⚡ needed to "activate" reaction and break the bonds between atoms
catalysts	speed up the rate of reaction by lowering the activation energy ⚡ needed (is not used up or changed in reaction)

Vocabulary Pt. 3

synthesis	"building-up" reactions - store energy
decomposition	"breaking down" reactions - result in energy release
ATP energy	cellular energy currency

^^ ATP can store/release small amounts of energy. The bond between the 2nd and 3rd phosphate is made or broken to exchange energy.

The Nitrogen Cycle

Nitrogen is essential to building DNA & Proteins (which make up you)

The main steps in this process are:

- 1.) Nitrogen-fixing bacteria can change nitrogen in the air into something that can be used to make DNA & Proteins
- 2.) Bacteria give that nitrogen to plants most of the time, and then it moves its way up the food chain



Population 🌐

Density Independent Factors

affect population sizes no matter the size

- * Natural disasters
- * Climate change
- ^ Drought, extreme weather, or events

Density Dependent Factors

affect populations size as they approach carrying capacity

- * Competition for space, shelter, food
- * Predators, disease, stress, parasitism

Ecological Succession 🌳

Definition:

The process by which an existing community is gradually replaced by another community

Pioneer Species:

first to colonize new, or previously disturbed or damaged ecosystems, beginning a chain of ecological succession that ultimately leads to a more biodiverse steady-state ecosystem

Succession Steps:

- 1.) Lichen and Moss, as well as bacteria, grow and put nitrogen in the soil
- 2.) Grasses start to dominate the area and put even more nitrogen back in the soil
- 3.) Bushes, shrubs, and small trees inhabit the area next and put EVEN MORE nitrogen back in the soil
- 4.) Finally, there is enough nitrogen in the soil to support large trees and forest which come last.

Types of Reactions ⚡

Endothermic

- Stores energy overall
- **More energy is needed to break bonds** than amount of energy released

- Ex: photosynthesis

Exothermic

- Energy is released
- Less energy is needed to break bonds than is **released when forming new bonds**

- Ex: cellular respiration

Energy Exchange in Cells

- Decomposition reactions release energy
- **Oxidation** is the removal of electrons from a molecule
- Bonds are broken and rearranged
- Some energy of the original molecule is released as heat and free energy
- Free energy is finally captured in **ATP (adenosine triphosphate)**

Enzymes

- **Protein molecules that act as catalysts**
- Specific to a Substance or Reaction
- Speeds up Biological Reactions to 10,000,000,000 Times Faster

How Enzymes Work

- Bind to specific reactants to form a complex
- Reactant enzymes interact with **substrates**

Enzymes (cont)

- Substrates bind to the enzyme in a location called the **Active Site**

Factors Affecting Enzyme Action

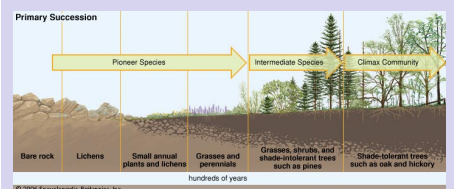
- When conditions are not ideal for an enzyme, it **denatures**
- **Denaturing an enzyme** will cause the 3D shape of the active site, making the enzyme nonfunctional

The Carbon Cycle 💎

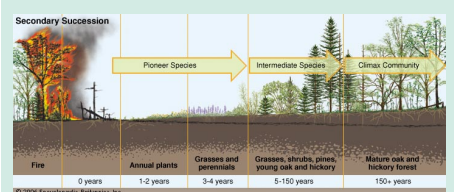
The main steps in this cycle are:

- 1.) Photosynthesis removes CO₂ from the atmosphere
 - 2.) Death/Decomposition and Respiration add CO₂ to the atmosphere
- Burning of fossil fuels adds CO₂ to the atmosphere as well

Primary Succession



Secondary Succession

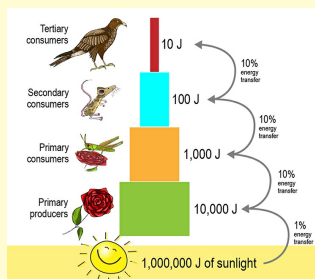


Defleating Succession

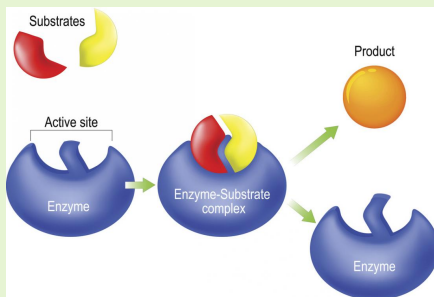
Preventing and deflecting succession

- Human activities can prevent normal climax community from developing – Plagioclimax
 - Eg Dorset heath land nature reserve
- Deflected succession is when succession is prevented by human activity but the plagioclimax is different to any of the natural stages of the ecosystem
 - Eg mowed or grazed grassland

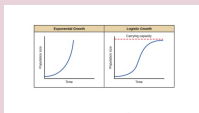
Energy Transfer Through Trophic Levels



Ezyme



S Curves vs J Curves



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Page 3 of 3.

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