

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
int^{er}specific competition	competition between different species
Intr^aspecific competition	competition between s ^a me 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

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

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)**

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

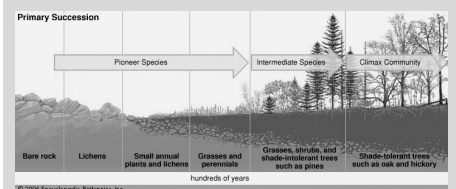
Enzymes

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

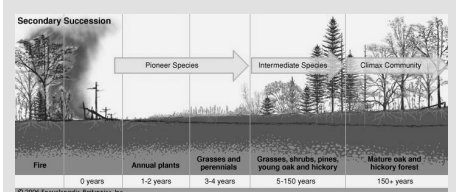
How Enzymes Work

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

Primary Succession



Secondary Succession



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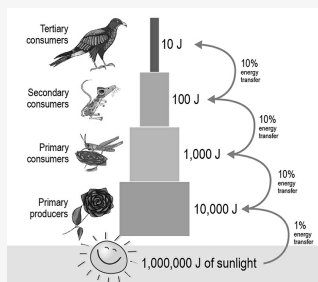
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Deflecting Succession

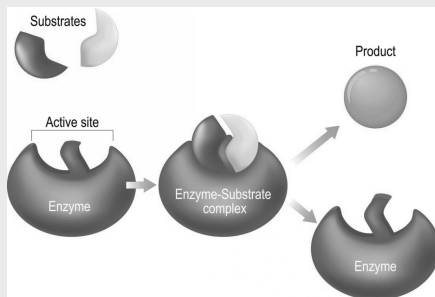
Preventing and deflecting succession

- 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

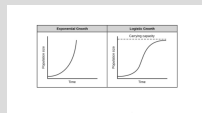
Energy Transfer Through Trophic Levels ⚙



Ezyme



S Curves vs J Curves



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