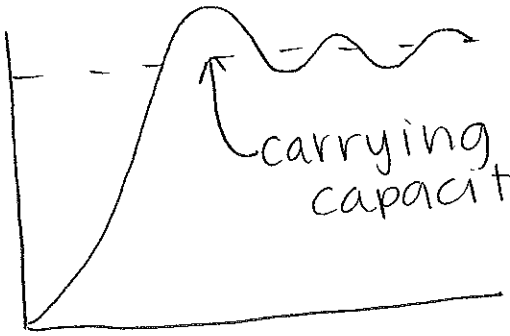
The Last EOCT Review-

Animal vs. Plant Cells

- Animal: Cell Membrane, Flagella or Cilia
- Plant: Large central vacuole, Cell wall, Chloroplasts

* Cell wall protects
Mitochondria = powerhouse
Nucleus = contains DNA
ER = transfers proteins
Ribosomes = creates proteins
Vacuole = stomach
Centrioles & Microtubules = cell division / mitosis

Carrying Capacity - max population size a ecosystem can sustain based on necessities of life



Limited Factors: Food, water, Eco. cond, & Space

Density-Dependent Factors: starvation [food], predation, & disease ["living factors"]

Density Independent Factors: abiotic factors - weather, temps, & natural disasters

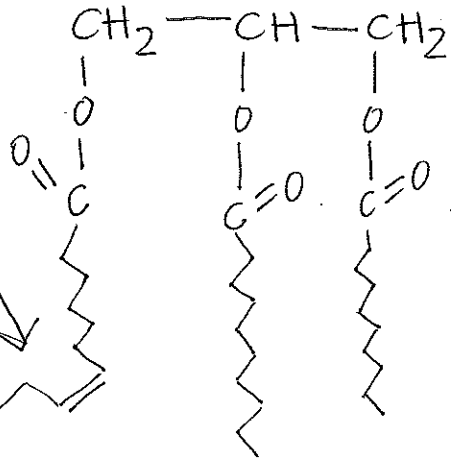
Lipids-

↑ Energy [long-term E]

Made of fatty acids & glycerol

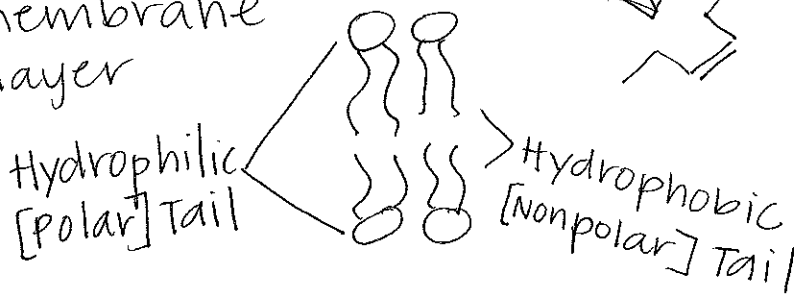
CHO [organic Molecule]

or



Ex: waxes, oil, steroids, glycerol, saturated [CH] or unsaturated [contains a Dbl. bond]

Create cell membrane
- Lipid bi-layer



Primary vs. Secondary Succession

* change in species structure of a ecological community over time

↳ Newly exposed rock, sand, & lava surfaces

↓

More common; occurs where living things once lived [natural disaster; deforestation]

* Pioneer Species: 1st species to grow; lichen & moss

* Climax community: fully functioning ecosystem; final life stage

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ATP - Adenosine Triphosphate

Energy currency of life

created in mitochondria through glycolysis

* End product of photophosphorylation, cellular respiration, & fermentation

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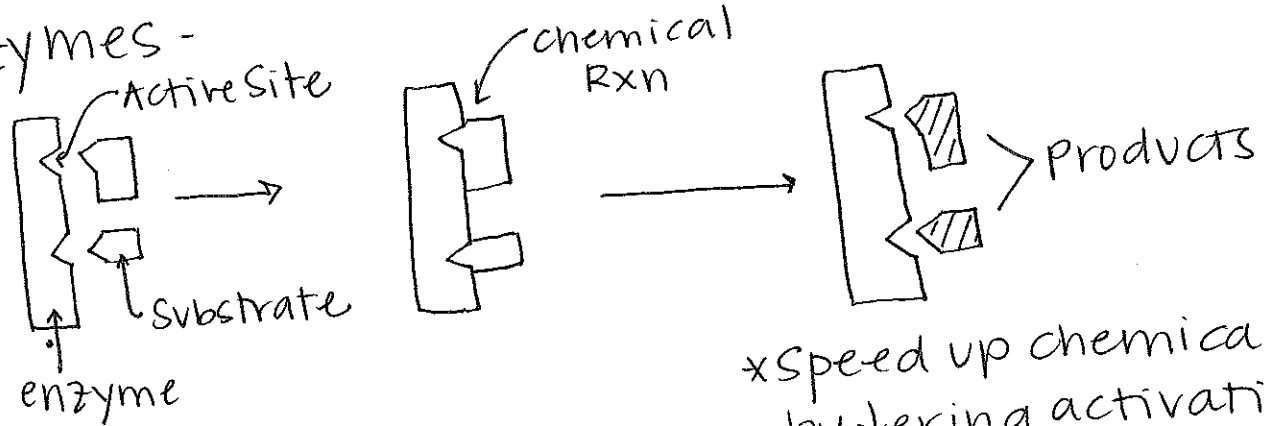
Enzymes -

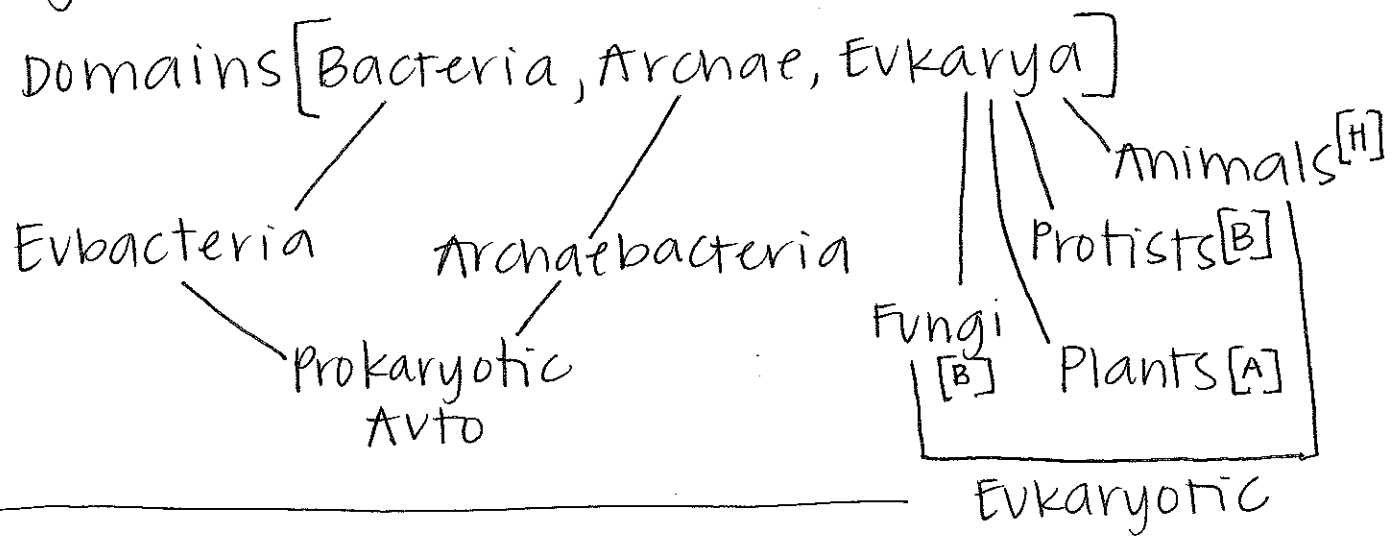


* Affected by temp. & pH

* speed up chemical rxns by ↓ering activation E [catalysts]

* very specific

6 kingdoms:



Producers: green plants; use E from sun to create food [photosynthesis] ~ some bacteria

↳ 1st trophic level; ↑est energy

Consumers: eat plants & other animals; obtain E from eating others

↳ 2nd & 3rd trophic levels

Decomposers: breakdown decaying organisms into molecules; fungi & bacteria

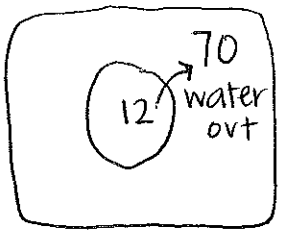
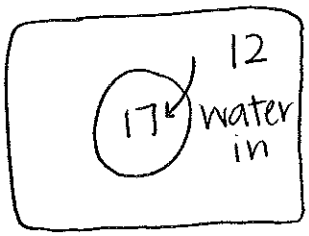
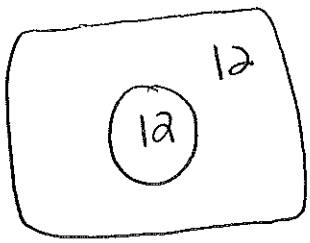
Mitosis [Cell Division]

- Separation of sister chromatids
- Replication
- Somatic [Body] cells
- Comparable to Meiosis II

Meiosis [Separation of genetic information]

- Meiosis I: separation of homologous pairs
- Meiosis II: separation of sister chromatids
- Gametes [sex] cells
- 1 cell to 4 < 4 sperm / 1 egg & 3 polar bodies

Recognize steps of both

Hyper-	Hypo-	Iso-
 Cell Shrivels *Flaccid	 Cell Expands * Lyse * Burst * Turgid [Plant]	 No Movement

Natural Selection - natures way of specifically selecting for desirable traits

Ex: Darwin's finches
Galapogos tortoises [adapted to specific island]
Giraffes - longer necks were able to reach food & thus survived to reproduce & pass on genetics

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Symbiosis: organisms work together

Mutualism: both benefit
Ex. Cattle & microorganisms in rumen/stomach

Commensalism - one benefits & the other is neither harmed or benefits
Ex. Orchids that grow on trees

Parasitism - one benefits & the other is harmed
Ex. Roundworms in stomachs of cats

Charles Darwin -
"The Origin of Species" - sailed to Galapogos Islands on HMS Beagle
"Father of Evolution"
Studied finches & tortoises

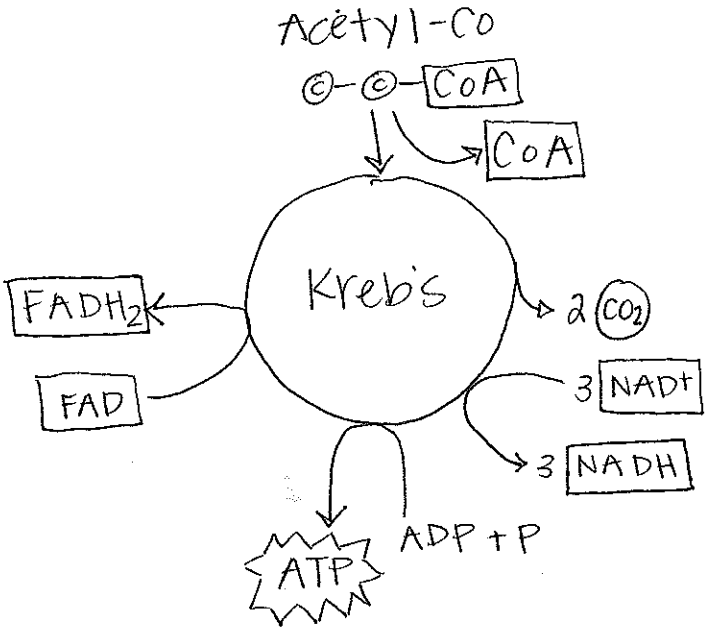
Cellular Respiration: aerobic harvesting of E from food molecules by cells; creates ATP

$$C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O + \text{ATP}$$

* Can produce up to 38 ATP molecules from 1 glucose, rest is released as heat

Krebs cycle [citric Acid cycle]

* 3 Stages:
  1. Glycolysis
  2. Krebs cycle
  3. Oxidative Phosphorylation



2 carbons enter via Acetyl-CoA & $2CO_2$, 3 NADH, 1 $FADH_2$, & 1 ATP exit

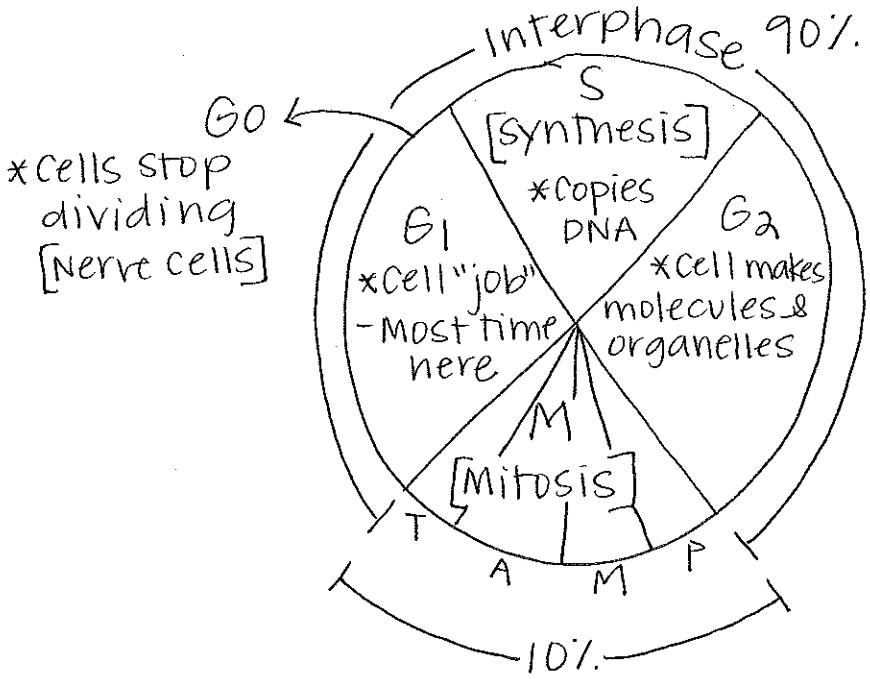
Calvin Cycle [sugar factory within a chloroplast]

↳ Doesn't require light

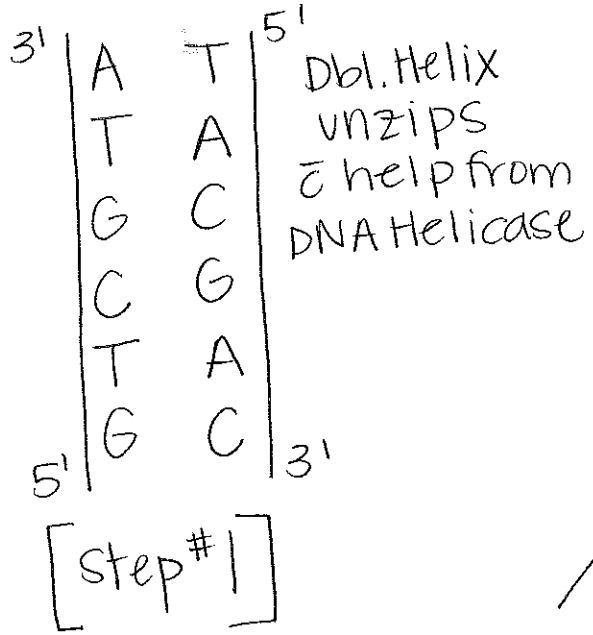
- occurs in stroma, NADPH donates H & electrons, ATP donates Energy, CO_2 donates C & O to make glucose

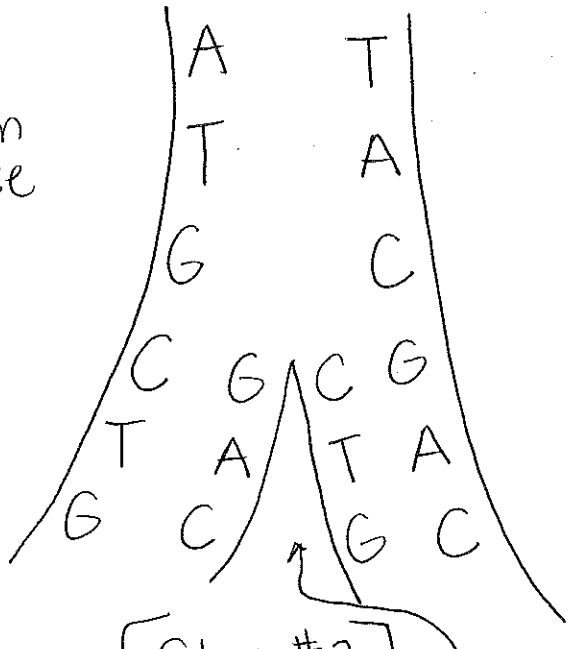
* To synthesize 1 molecule of glucose the calvin cycle must turn 6 times, using $6CO_2$, 18 ATP, & 12 NADPH
* and stage of photosynthesis

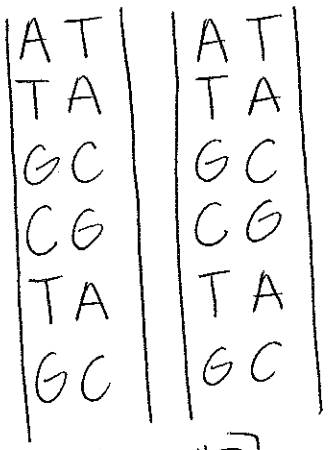
Cell Cycle:



DNA Replication:







Complete Dominance:

* Dominant Gene: masks recessive gene → Homozygous Dominant [BB], Heterozygous [Bb]
* Recessive Gene: masked gene → Homozygous Recessive [bb]

Homoz. Dom & Heterozygous forms are Phenotypically the same [Ex: Eyecolor, Hair color]; Homoz. Recessive displays 2nd trait

Ex. Homoz Brown × Blue
BB × bb

	B	B
b	Bb	Bb
b	Bb	Bb

100% Heterozygous Brown offspring

Sex-Linked: Traits aqvired via sex chromosomes; carried on X-chromosome since Y-chromosome is too short & doesn't match X

* Gene is shown in exponent form of X & Y
* Homoz. Dom = Normal
  Heterozygous = Carrier [Female only]
  Homoz. Rec = Affected

Ex. Hemophilia [H=Normal, h=Affected]
Carrier ♀ × Normal ♂

	X^H	Y
X^H	$X^H X^H_N$	$X^H Y_N$
X^h	$X^H X^h_C$	$X^h Y_A$

50% Normal
25% Carrier
25% Affected

or

50% ♀ Normal & 50% ♀ Carrier
50% ♂ Normal & 50% ♂ Affected

Sex Influenced: Traits controlled by alleles found on autosomes; expression is influenced by gender
Ex. Pattern baldness, Peacock feather coloring

Genetic variability/variation: variations in alleles of genes, provides genetic material for natural selection; brought about primarily through mutation; crossing over & random segregation during meiosis also create variation

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Nondisjunction: failure of homologous chromosomes or sister chromatids to separate during cell division

Meiosis I [Homologous chromosomes]
Down Syndrome [Trisomy 21]

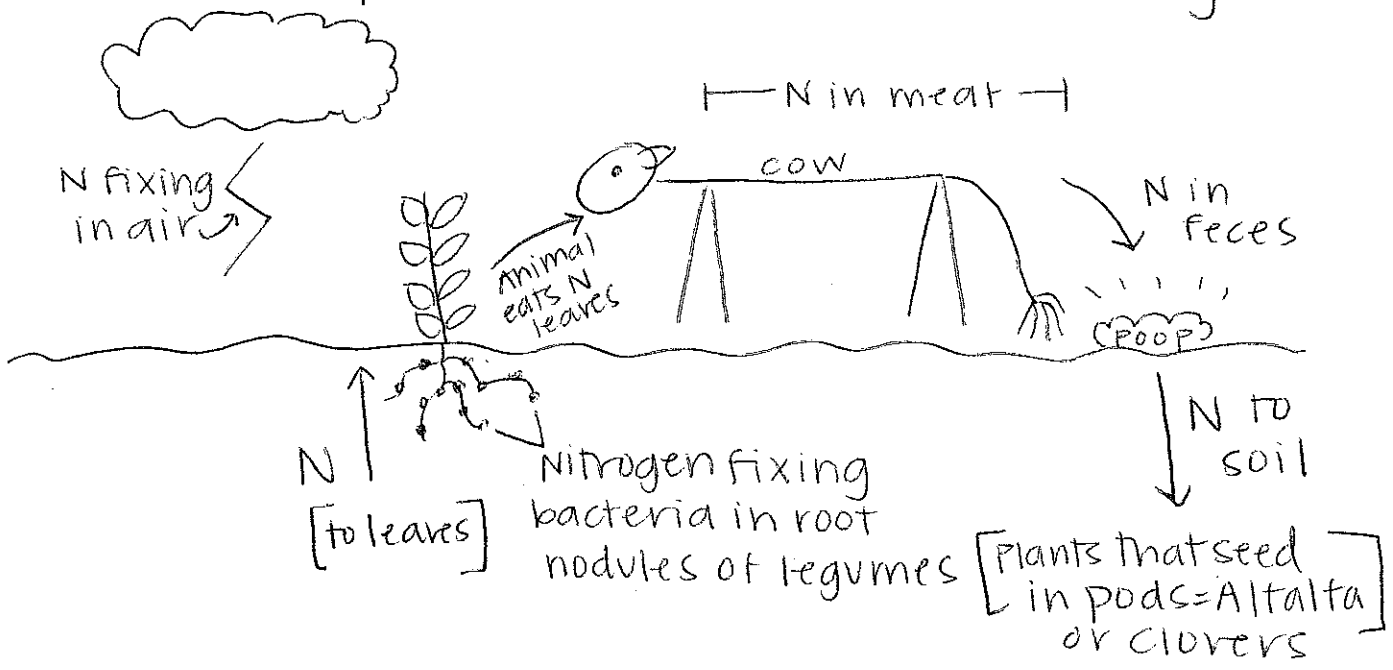
Meiosis II [sister chromatids]
Turner Syndrome [XO]

Mitosis [sister chromatids]

* Shown via Karyotype *

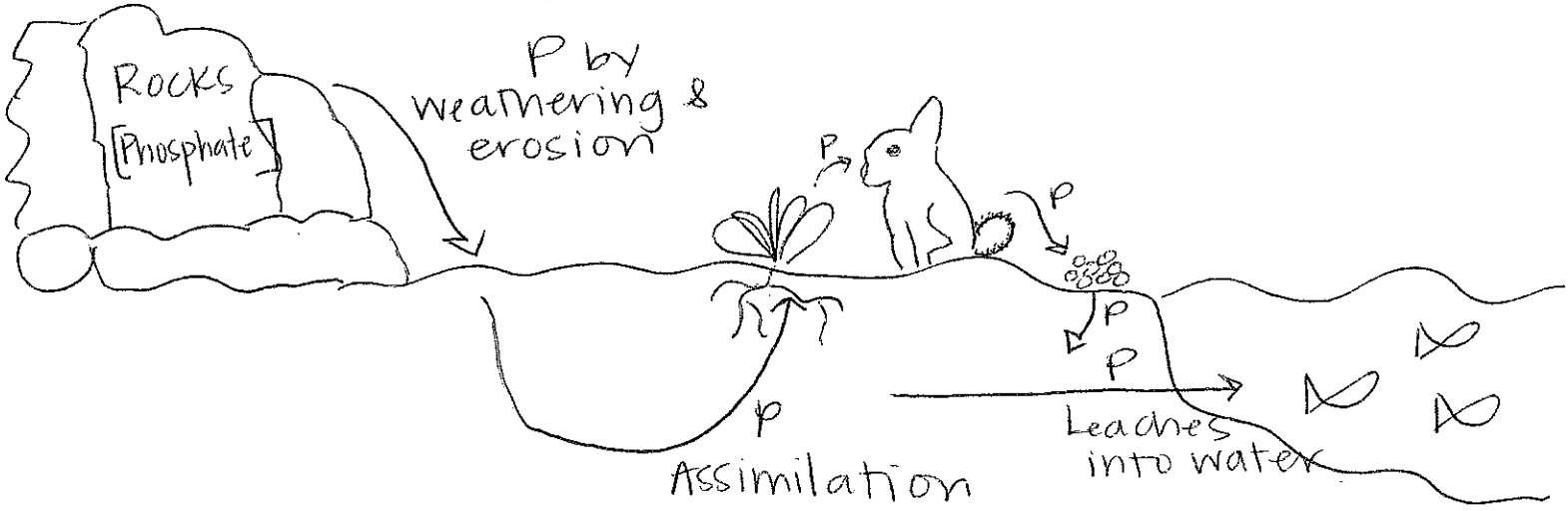
Nitrogen Cycle

* 78% of atmosphere, but it can't be used directly

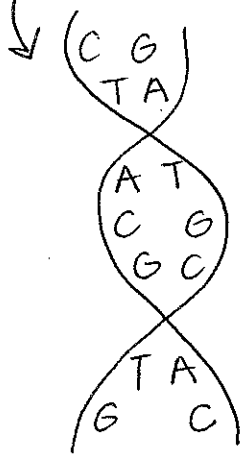


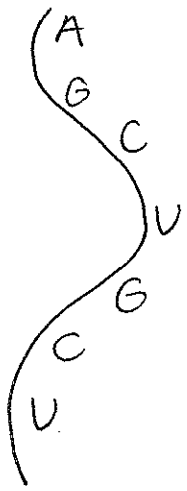
Phosphorus Cycle:

* Not really a part of atmosphere like other cycles
* slowest cycle due to rock weathering
* ocean is largest reserve.



DNA & RNA





Cytosine to Guanine

Adenine to — Uracil [RNA]

Thymine [DNA]

*Double stranded

*Single stranded

Transcription & Translation

[DNA to RNA] in nucleus

[RNA to proteins] in cytoplasm & ribosomes

64 codons = all possible proteins/AA

Start: Methionine [AUG]

Stop: UGA, UAA, UAG

3 codons = Amino Acids