Q4 • Evolution
• Ecology

Evolution

- natural selection (DARWIN)
  - genetic variation
  - competition of Resources
  - overpopulation
  - survival of the fittest
    - ↳ Reproduce + pass on favorible traits
  - adaptations = behaviors or physical traits that help them be "fit" for their environment
- Evidence
  - Comparative Anatomy
    1. Homologous Structures
       - common ancestor
       - same structure different function
       - (bird wing, human arm)
    2. Analogous structures
       - NO common ancestor
       - different structure same function
       - similar because of the environment
       - (bird wing, bee wing)
    3. Vestigial
       - no function but functioned in ancestor
       - tail bone, appendix in humans
  - Embryology
    - similar development
    - common ancestor
  - biochemistry
    - similar proteins, RNA, DNAs
    - most accurate evidence for evolution
  - Selective Breeding
    - humans select which traits are prefered
      ex- Agriculture, Dogs

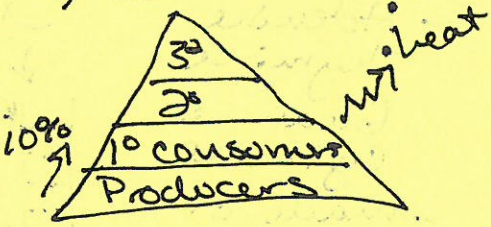
Ecology

(grass → Rabbit → snake

food chains = linear flow of energy

food web = many food chains in the same ecosystem

10% of energy moves to the next level, Rest is lost as heat



individual
↓
Population: same species
↓
community: All the different living organisms
↓
~~ecosystem~~ ecosystem: Biotic + Abiotic
↓
Biome: same climate.
↓
Biosphere: Earth

Symbiosis:

mutualism = ☺ ☺
commensalism = ☺ ☹
Predator | Prey = ☺ ☹
Parasitism = ☺ ☹
Competition = ☹ ☹

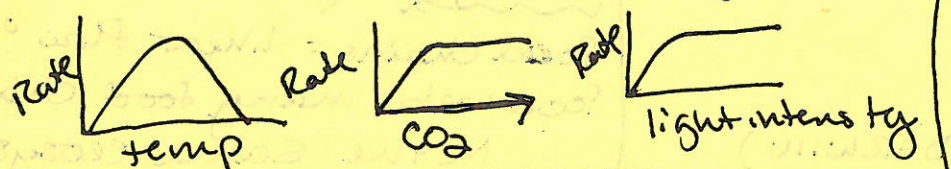
Succession:

Primary Succession =
- No soil, only bare rock
- start with lichens + moss
- gradual build soil, then grass, then small trees then full forest

Secondary Succession =
- Natural Disaster clears the forest, SOIL Present, grass → small trees → forest

~~Etc~~ Cycles: • Water (transpiration, Leaves from plants)
• Carbon (Photo, Cell Resp., Combustion) • Nitrogen (bacteria).

Factors that affect Photosynthesis



Q3
- DNA vs RNA
- Protein Synthesis
- Genetics
- Cell Division

DNA
- Double helix
- Adenine
  Thymine
  Guanine
  Cytosine
- made of nucleotides

- found in nucleus

backbone (sugar + phosphate)

"rungs" Nitrogen bases

RNA
- single stranded
- Adenine
- Uracil
- Guanine
- Cytosine

Nitrogen Bases

mRNA = messenger
- copy DNA & take it the Ribosome

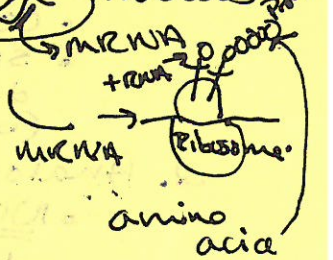
tRNA = transfer
- carry amino acids to the Ribosome

rRNA = Ribosomal
- make up the structure of the Ribosome

Protein Synthesis:

TRANSCRIPTION =
occurs in nucleus
mRNA copies DNA

TRANSLATION =
occurs in Ribosome
mRNA + tRNA pair up to build a protein



Mutations
errors in transcription or translation that allow for a different amino acid to bind

Cell Division

Mitosis =
- occurs in all BODY cells
  - growth + Repair
- make 2 identical cells

IPMATC
interphase, prophase, metaphase, Anaphase, telophase, Cytokinesis

Prophase = Chromosomes condense

Metaphase = Chromosomes line up in the middle

Anaphase = Chromosomes Pull Apart

Telophase = nucleus is Reformed
cleavage furrow (animal)
cell plate (plants)

Meiosis =
- produce gametes (sex cell)
- produce 4 genetically different cells
- 1 Diploid cell (2 set chromosomes) → 4 haploid cells (1 set)
- 2 divisions I (PMAT I) (PMAT II) (46 → 23)

Genotypes

- heterozygous - Aa
- homozygous Dom = AA
- homozygous Rec = aa

Phenotype

= physical appearance (blue eyes, Purple flowers)

1. Incomplete Dominance (Blending)
   AA = red, aa - white, Aa = Pink
2. Co-Dominance (Both expressed)
   AA red, aa white, Aa = Red + White
3. Sex - linked (traits found on X or Y chromosome)
   colorblindness
   X^bX^b = colorblind female
   X^bY = colorblind male

Pedigrees ○ = female □ = male
● = have trait
□ = do not have trait

Organic vs **inorganic**

= contains carbon

ex: • carb
• Proteins
• lipids
• nucleic acids
• Vitamins

= Does NOT contain Carbon

• H_2O (water)
• minerals

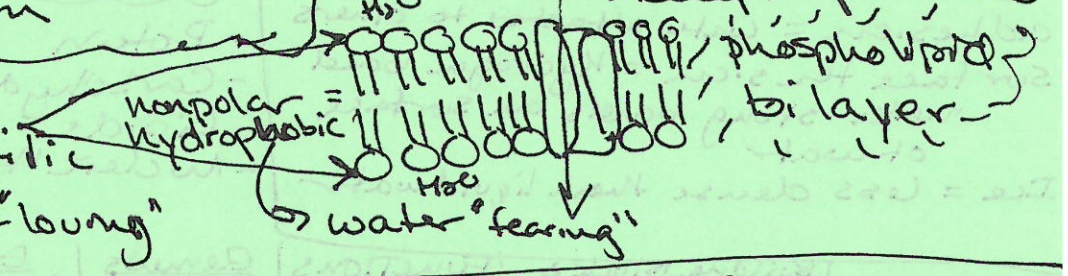
D = Bone Development
E = Cell Function
A = Visual Activity
C = Cut Curing
K = Blood "Klotting"

Q2
- Cell membrane
- Transport (Osmosis / Diffusion)
- Photosynthesis
- Cell Respiration

Cell Membrane

- phospholipids
- Proteins • channel proteins • Receptor proteins

Polar
Nonpolar



TRANSPORT

Diffusion = Molecules move from an area of **High** concentration to **Low** concentration until equilibrium

PASSIVE TRANSPORT = no energy (High → low)

ACTIVE TRANSPORT = need energy (ATP) (Low → High)

OSMOSIS = WATER move from High to Low concentration until equilibrium

Isotonic environment

85% W / 15% S ⇄ 85% W / 15% S

(in & out at same rate)

Hypertonic environment

50% / 50% ← 85% W / 15% S

(water move out of cell)

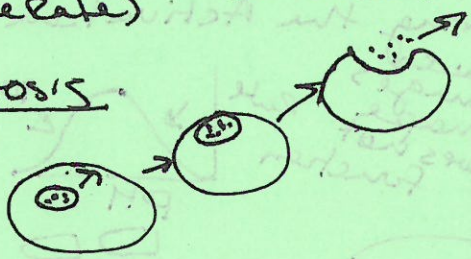
Hypotonic environment

100% W / 0% S → 85% W / 15% S

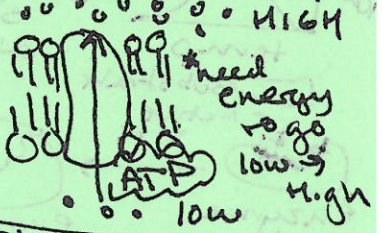
(water moves in cell)

Endocytosis (enter) "cell eating"
- Phagocytosis
- Cell drinking
- Pinocytosis

Exocytosis (exit)



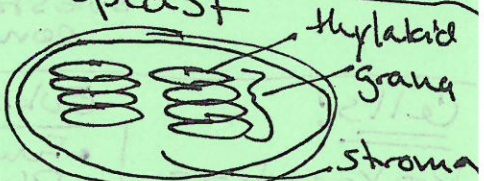
Protein Pump



Photosynthesis (Plants only) = occurs in Chloroplast

$CO_2 + H_2O \xrightarrow{\text{sunlight}} C_6H_{12}O_6 + O_2$

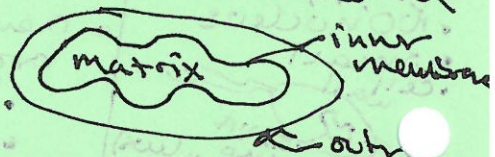
(carbon Dioxide) (water) (Glucose) (oxygen)



Cellular Respiration (All organisms) = occur in mitochondria

$C_6H_{12}O_6 + O_2 \rightarrow CO_2 + H_2O + ATP$

(Reactants) (Products)



Chemosynthesis (bacteria in deep sea hydrothermal vents)
- NO sunlight, Process is used to make Glucose
- Hydrogen Sulfide ((Chemical)) to make Glucose

QUARTER 1 HSA REVIEW

MRS. KOHOOT PD #2

- Scientific Method
- Properties of water
- Enzymes
- Cells
- Organic molecules

Scientific Method

Hypothesis - Educated Guess
Experimental group = What is tested.
Control group = Comparison group.
Constants = Same for every group

Scientific Notation

$3000. = 3.0 \times 10^{3}$

$.0003 = 3.0 \times 10^{-4}$

Properties of water H_2O

Polarity = opposite charges (+/-)

Cohesion = water attracted to water
adhesion = water attracted to others
surface tension = Hydrogen bond make strong bonds on surface of water
Ice = less dense than liquid water

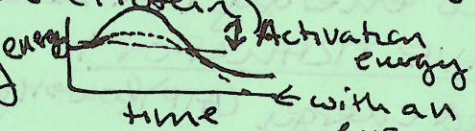
Organic Molecules (Macromolecules)

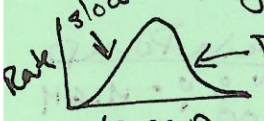
- Protein
- Carbohydrate (-ose)
- Lipids
- Nucleic Acids

	Building Blocks	Functions	Elements	Examples	Structure
CARBS	Monosaccharides	short-term energy	CHO	sugar - Di, Bread - Poly (glucose - mono)	mono, di, poly
PROTEINS	amino acids	muscles, enzymes, hormones	CHON	muscles, insulin (meat)	20 different amino acids o-o-o-o-o-o
LIPIDS	Glycerol & fatty acids	long-term energy, cell membrane	CHO	fats, phospholipids	fatty acids
Nucleic Acids	nucleotides	heredity	CHONP	DNA + RNA	Phosphate, sugar, nitrogen base

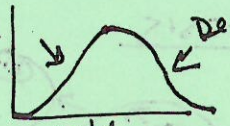
ENZYMES → made of amino acids (Protein)

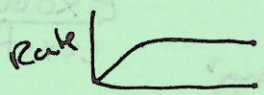
- speed up chemical Reactions
- by lowering the Activation Energy

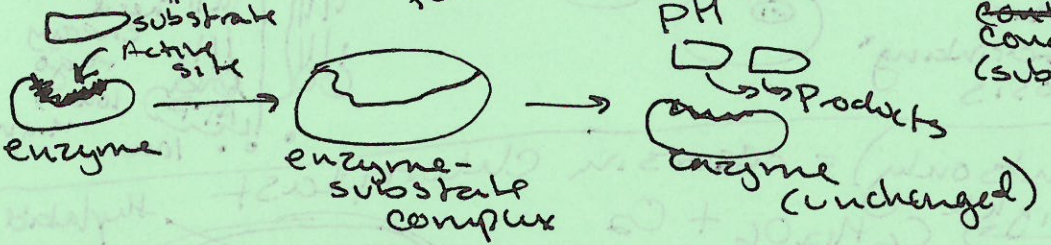




Denatured
- changes shape
- does not function

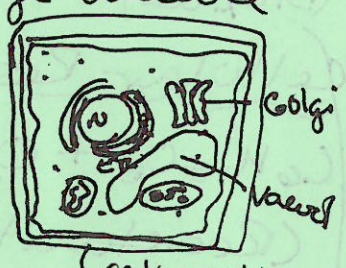






Plant cells

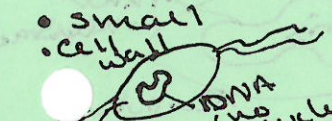
- Cell wall
- Chloroplast
- Large Vacuole



Cells:

Prokaryotes =

- bacteria
- NO nucleus
- small
- cell wall



- Ribosome
- Cell membrane
- cytoplasm
- DNA (no nucleus)

Eukaryotes

- Fungus, Animals Plants
- Nucleus (DNA)
- membrane-bound organelles
  - mitochondria = energy
  - chloroplast = makes (plants only) glucose
  - Lysosome = Break down materials
  - Ribosome = make protein

Animal Cells