

BISA review

Quarter one!

- scientific method
- enzyme
- properties of water
- cells
- organic molecules

Scientific Method

- 1 problem
- 2 research
- 3 hypothesis
- 4 experiment
- 5 collect data
- 6 analyze
- 7 conclusion
- 8 retest

constant: all the same
controlled group: Test + 1 variable
independent variable: what scientist is testing (x-axis)
dependent variable: what changes + is measurable (y-axis)
experimental group: the group that is tested
controlled group: comparison group

Properties of Water (H₂O)



polarity: opposite charge (+ & -)

cohesion: water sticks to water [Kanye + Kanye]

ice: less dense than liquid water

Adhesion: water sticks to other things [Kanye + Kim]

Water tension: bugs can walk on water due to hydrogen bonds.

Organic Molecules: contain carbon

inorganic: no carbon

building block

Function

element

example

carbs Monosaccharides short term energy C, H, O Polysaccharide Monosaccharide

lipids Fatty acids long term energy C, H, O Fat, oils, Phospholipid

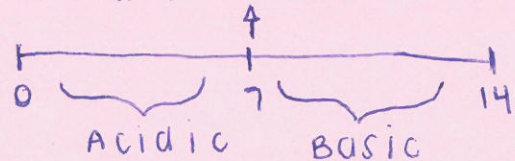
protein Amino acids muscles, enzyme hormones C, H, O, N Meat, insulin

nucleic acids nucleotides heredity (DNA + RNA) C, H, O, N, P DNA, RNA

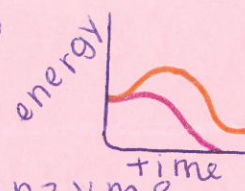
Vitamins organic molecule

- D: bone develop
- K: blood "clotting"
- E: cell function
- A: visual activity
- C: cut curing

pH scale neutral

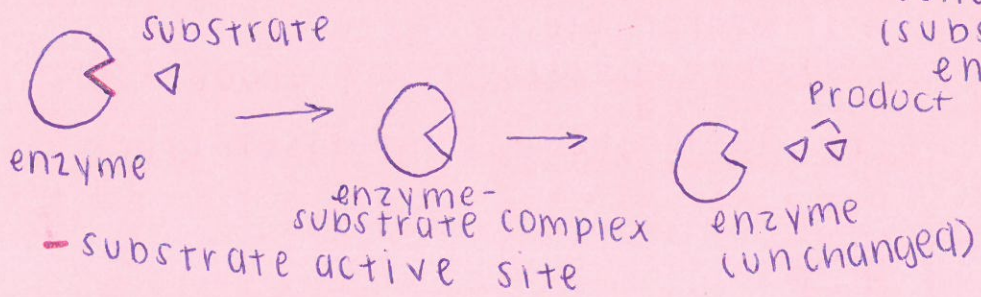
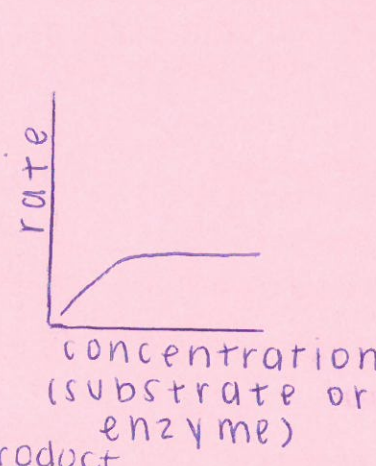
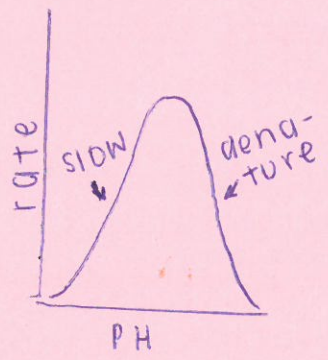
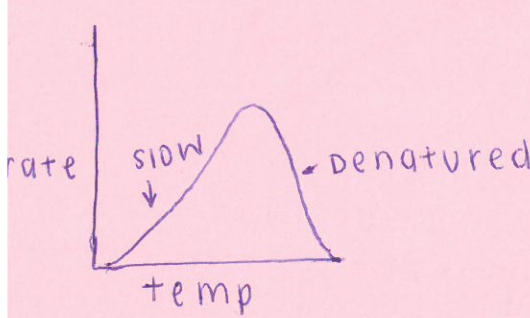


Enzymes: made of amino acids (proteins)
 • speed up chemical reactions
 • lowers activation rate



- w/ enzyme
 - w/out enzyme

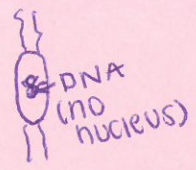
Denatured: changes shape of enzyme causing it not to function



cells

Prokaryotes

- bacteria
- no nucleus
- small
- cell wall
- cell membrane
- ribosome
- cytoplasm
- DNA



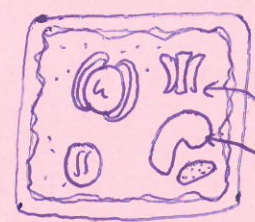
Eukaryotes

- fungus, animal, plants
- nucleus (DNA)
- membrane: bounds organelles
- cytoplasm: makes (plant only) glucose
- lysosome: breaks down material
- ribosome: makes proteins
- Mitochondria: powerhouse of cell (only in eukaryote)

Animal cell



Plant cell



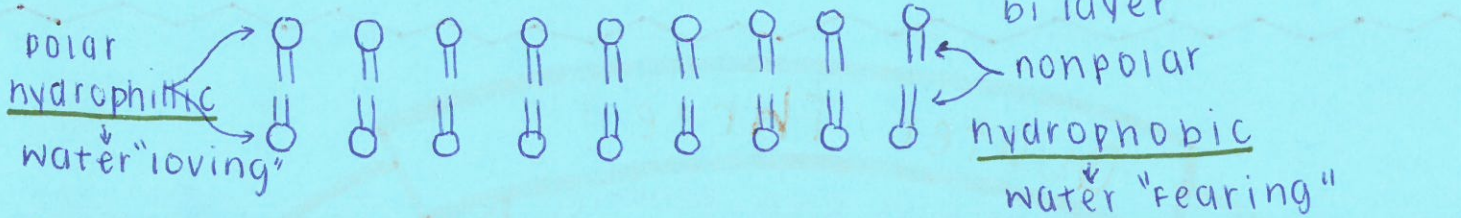
- cell wall
- chloroplast
- large vacuole
- golgi
- vacuole

Quarter Two!

- cell membrane
- photosynthesis
- transport (osmosis, diffusion)
- cell respiration

cell membrane

- proteins (channel + receptor protein)
- phospholipids



Transport

DIFFUSION = molecules move from an area of high concentration to low concentration until equilibrium.

OSMOSIS = water moves from high concentration to low concentration until equilibrium.

passive transport: no energy (↑ → ↓)

Active transport: need energy (ATP + ↓ → ↑)

isotonic: water moves in + out @ the same rate (passive)

hypertonic: water leaves cell. could shrink (passive)

hypotonic: water move in. could burst. (passive)

(endo-enter)

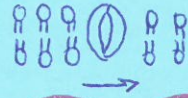
endocytosis: moves in

- ☉ → ☉ - cell eating (phagocytosis)
- ☉ → ☉ - cell drinking (pinocytosis)

exocytosis: move out

☉ → ☉

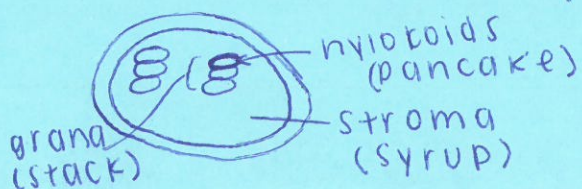
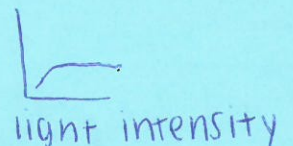
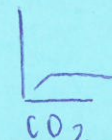
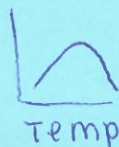
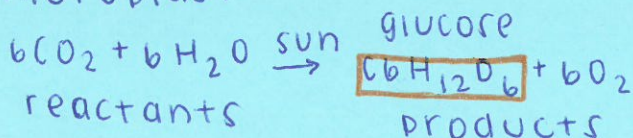
protein pump: pumps out nucleus low to high.



photosynthesis

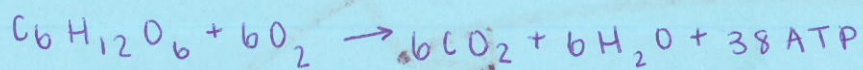
* plants only *

- chloroplast



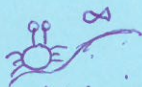
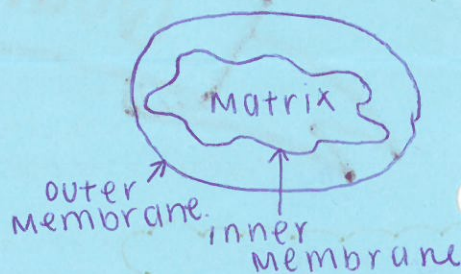
cellular respiration

- all organisms
- mitochondria



chemo synthesis

- bacteria
- convert chemicals into glucose
- when no light is available



Quarter Three!

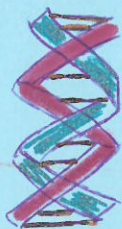
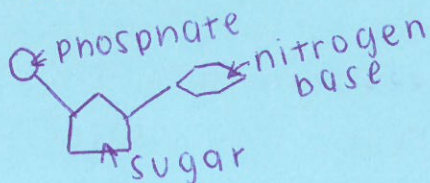
- DNA vs RNA
- genetics
- protein synthesis
- cell division

DNA vs RNA

DNA

- double helix
- nitrogen base
- Adenine
- Thymine
- guanine
- cytosine

• made of nucleotides



Adenine pairs w/ ~~thymine~~ Thymine
 guanine pairs w/ cytosine

RNA

- single stranded
- Adenine - Guanine
- uracil - cytosine } nitrogen bases

mRNA

- messenger
- copies DNA + takes it to ribosome

tRNA

- transfer
- carry amino acids to the ribosome

rRNA

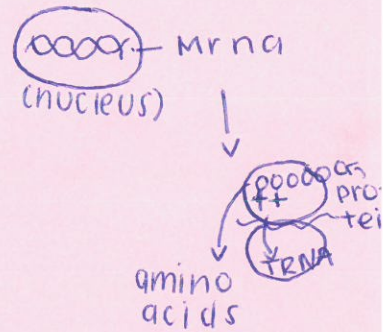
- ribosome
- make up the ribosome

Protein synthesis

Transcription: occurs in nucleus mRNA copies dna

Translation: occurs in ribosome mRNA + tRNA pair to build a protein

Mutation: error in nucleic acid sequence.



Cell division

Mitosis: body cells
 - growth + repair
 - makes 2 identical cells.

I, P, M, A, T, C

Interphase: DNA replication

Prophase: chromosomes condense

Metaphase: chromosome line up in the middle.

Anaphase: chromosomes pull apart

Telophase: cleavage furrow (in animals)
 cell plate (plant cells)



Meiosis: sex cells

Diploid: 2 chromosome - produce gametes (sperm/egg)
 haploid: 1 chromosome - make 4 genetically different cells
 - diploid → 4 haploid cell
 - 2 divisions (46 chromosomes → 23 chromosomes)

I, (P, M, A, T), (C, P, M, A, T, II)

Genotype

Hetero: Aa
Homo dom: AA
Homo rec: aa

sex linked: x + y chromo

pedigrees: ○ = F, □ = M, ● = has trait, ○ = no trait

Phenotype

physical or behavioral
 - blue eyes, purple flower

incomplete dom: blend
 AA: red, Aa: pink, aa: white

codom: both expressed
 AA: red, Aa: red + white, aa: white

○ dom, ● reces

Quarter FOUR!

• evolution • ecology

evolution • Natural selection (Darwin)

- survival of the fittest
 - reproduce and pass on favorable trait.
- genetics variation
- compete for resources
- overpopulation
- Adaptions
 - behaviors/physical traits that help them be better fit than for their environment.

evidence

biochem

- similar protein DNA + RNA.
- most accurate evidence for evolution

selective breeding

- select (humans) preferable traits ex: dogs

- comparative anatomy

1. Homologous

- common ancestor - same structure, dif function

2. Analogous

- no common ancestor - dif structure, same function

- similar because of similar environment

3. Vestigial

- no function, but function for ancestor

- tail bone, appendix in humans.

- embryology

- similar development - common ancestor

Ecology

Food chain: linear show of energy Foodweb: Many food chains in ecosystem

10% of energy moves to next level, rest is lost as heat.

individual → population → community → ecosystem → biome → biosphere

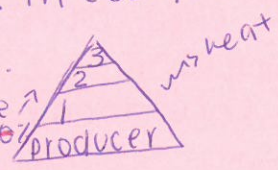
same species

All dif living things

biotic + abiotic

same climate

earth



Symbiosis:

- Mutualism
- Commensalism
- Pred/prey
- Parasitism
- Competition

Succession

Primary - no soil only bare rock. start w/ lichens + moss. gradually build soil, then grass, then small trees, the full forest.

Secondary natural disaster. soil still present then grass then small trees then full forest

Cycles

Water (trans-evap from plants) → Carbon (photo com - cell resp dust) → Nitrogen (bacteria)

