

Data Presentation Lab

Goal: Graphing & data analysis. Qualitative = physical quantitative = measurements

Axes: X = IV (the cause being tested) | Y = DV (the effect being measured)

Title: "Effect of [IV] on plant effect [DV]."

Stats: Mean (avg). Error bars = graph variability. $P < 0.05$ = significant. Interpolation = what can be used for estimates Extrapolation = confidence on estimate

Natural Selection Simulation

Concept: Evolution via selective pressure.

Model organism: Forks (most successful over generations)

Trait: Adaptation and different results in amount of prey

Pressure: climate changes, competition with other predators, and adaptations in their prey

Result: Favorable trait = Forks' speed of catching prey

Term: Allele Frequency = how common a gene is.

Plant Biology Lab

Flower dissected: Angiosperm (sunflowers or orchids)

Male: Stamen (Anther + Filament) smaller

Female: Carpel/Pistil (Stigma + Style + Ovary, Ovule) bigger

Fruit forms from: Ovary | Seeds from: Ovules

Plant Experiment Setup

IV: Fertilizer applications

DV: Number of Herbivorous insects

Control (no effect): A wheat field area with no fertilizer applied

Constants: same temperature, same amount of water given, and same amount of soil moisture

Growth toward light? = Phototropism

Chaparral & Riparian

Chaparral: Dry shrubland. Hot/dry. Fire risk. Adaptations: more rainfall per year, have dense woody shrubs and evergreen plants, temperatures are milder, and their soils hold more organic material

Riparian: Near water. Moist soil. Plants: Coast live oak, Western Sycamore, and Arroyo Willow

Difference: Riparian = wetter/cooler.

Biomes & Evolution

Biome: Climate + organisms. Biomes studied:

Adaptations: Desert = water storage. Tundra = heat retention. Rainforest = broad leaves.

Trophic Relationships

Producer: (autotrophs, photosynthetic plants/algae/bacteria) produce their own food using chemosynthesis or photosynthesis

Primary Consumer: eat producers (herbivores)

Secondary Consumer: eat primary consumers (carnivores)

Tertiary Consumer: eat secondary consumers, etc. (top carnivores)

Energy Transfer: Only 10% moves up.

Keystone Species: Major impact if removed (e.g., wolf).

ToolLab

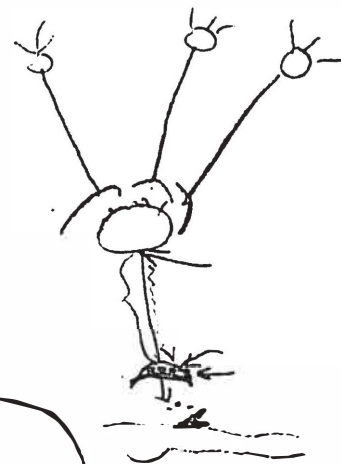
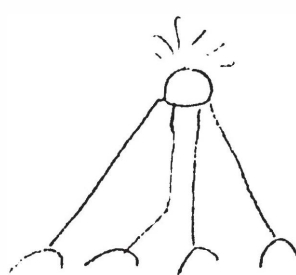
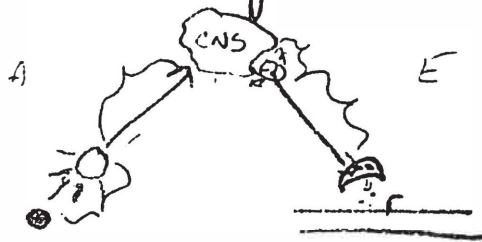
Quadrat: A small square frame placed on the ground/To count organisms in a fixed area.

Transect: A long measuring tape or rope stretched across a habitat/To sample how organisms change across a distance

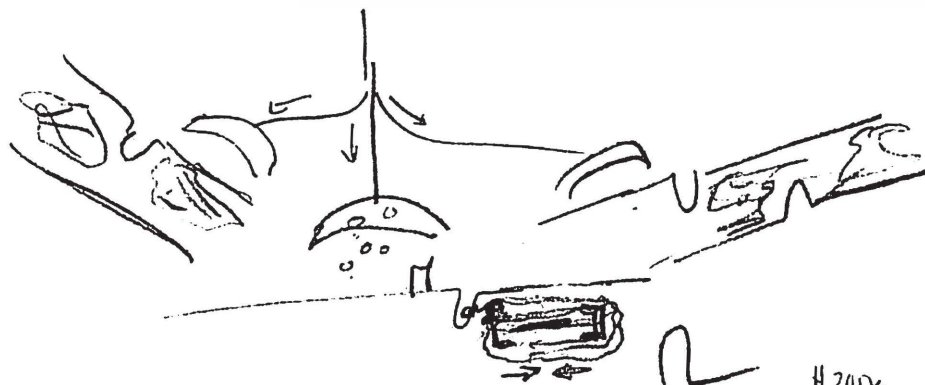
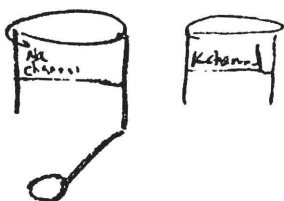
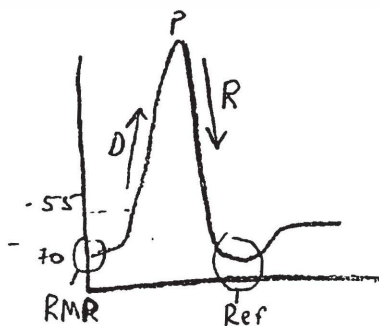
Petri dish: A small round dish used to grow microbes/To culture bacteria, fungi, or mold.

Divide into 3: bottom/g == strang: intense = 0H; wide M/middle = N-H; ~3000 = spec-H; 3000 = spec-H
300 = spec-H; ~100 very sharp spec-L or C = N; ~100 intense C = O; ~1600 C = C(M); ~1500 = finger print

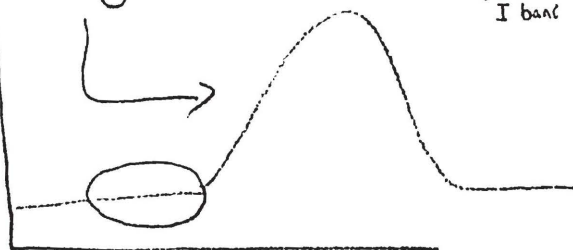
Memory Aides (MR)



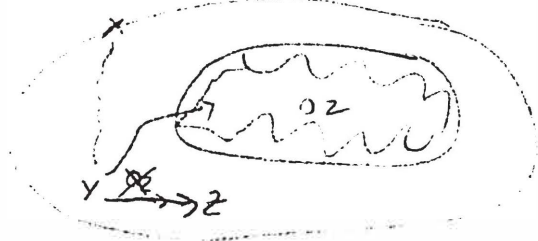
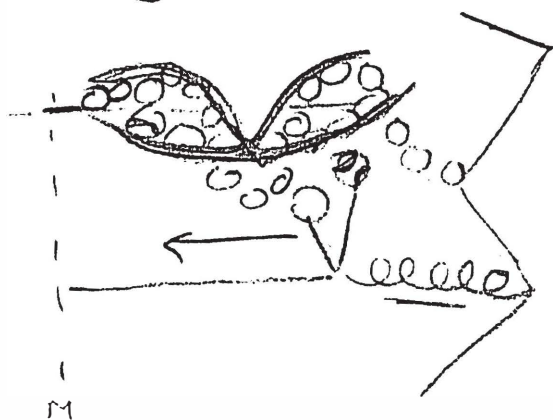
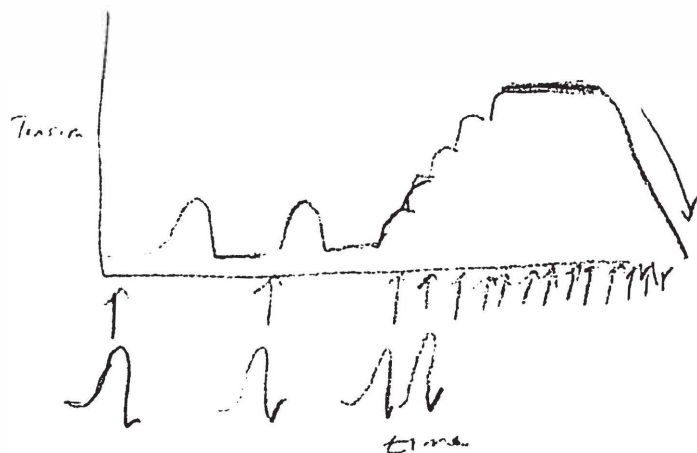
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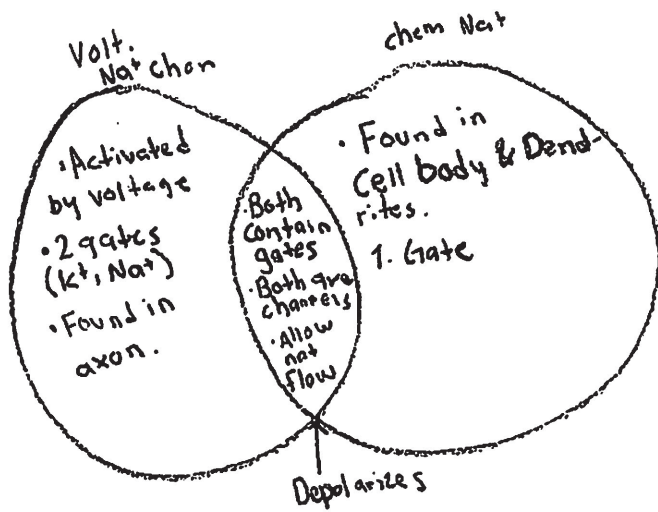
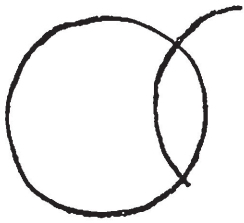


y =

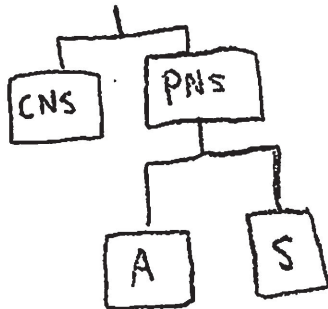


x =





Greater stim → More freq AP



Metals: Sodium, Calcium, Magnesium, Iron, Nickel, Potassium, Aluminum

Nonmetals: Oxygen, Fluorine, Carbon, Nitrogen, phosphorous, sulfur, hydrogen, chlorine

Metals lose electrons, nonmetals gain/share electrons

Polar, shared unequally, nonpolar, shared equally

Two ions with opposite charges attract each other

Water's H bonds resist temperature, Heat must be absorbed to break hydrogen bonds; heat is released when hydrogen bonds form

Ice is less dense than liquid water, so it floats and insulates the water below.

Water is an excellent solvent, The partial positive charge on hydrogen atoms and partial negative charge on the oxygen atom allow water molecules to attract, break apart

P: $-6\text{H}_2\text{O} + 6\text{CO}_2 + \text{sunlight} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$ CR: $-\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \rightarrow 6\text{H}_2\text{O} + 6\text{CO}_2 + \text{energy (ATP)}$

A population is a group of individuals of the same species that occupy a given area

A community consists of ALL the populations of different species interacting within an ecosystem

An ecosystem consists of ALL the organisms in a given area, along with the abiotic factors with which they interact

1st Law: Energy can't be created or destroyed, it can only be transferred from one form to another, 2nd Law: Each energy conversion results in the production of energy that is unavailable for work (i.e., heat)

Decomposers extract energy from the remains or waste products of organisms

Detritivores break leaves, twigs, and other detritus into small chunks to facilitate decomposition

At any given time, zooplankton may outnumber algae Algae reproduce very quickly, and can replace themselves just as fast as they are eaten

Biomagnification is the process where the concentration of toxic pollutants, such as mercury or DDT, increases at each successive trophic level in a food chain

BU: Ecosystem structure is controlled by resources at the lowest trophic level (usually producers like plants or phytoplankton).

TD: Ecosystem structure is controlled by predators at the top trophic level.

Individuals with beneficial traits tend to leave

more offspring than others, As a result, favorable traits accumulate in a population over generations

Natural selection -- process in which organisms better suited to their environment experience greater reproductive success than other less-adapted individuals in the population.

An adaptation is a heritable trait that enhances an individual's survival & reproduction in its given environment

DCS: favors individuals at one extreme of a phenotypic distribution that have greater reproductive, shifts to extreme success in a particular environment.

SS: favors intermediate forms and acts against extremes, it favors the average phenotype, stays the same

DRS: favors individuals at BOTH extremes of the phenotypic range, splits into two

BSC: Natural group of populations whose members have the potential to interbreed in nature & produce viable, fertile offspring

Hybrids are the offspring of crosses between different species

phylogenetic species concept -- the smallest group of individuals that share a common ancestor (based on genetic sequencing)

Allopatric Speciation involves physical separation of populations by a geographical barrier

Sympatric speciation members of a species within the same range diverge into two or more different species.

chromosomal "mistakes" can result in a new species in a single generation

Adaptive radiation is the process in which 1 ancestral species gives rise to multiple species that exploit different features of an environment

Convergent evolution is the independent evolution of a similar characteristic in two species NOT derived from a recent, common ancestor

Variation: The existence of differences in traits (e.g., height, eye color) among individuals within a population

Heritability: A measure of how much of the variation in a trait within a population can be attributed to genetic differences. It indicates how well offspring resemble their parents due to shared genes.

Differentiation: The process by which generic stem cells become specialized, developing distinct structures and functions