Trophic Levels
First Trophic Level: Producers
Second Trophic Level: Herbivores
Third Trophic Level: Carnivores/Omnivores

Only 10% of an organism's energy moves up the food chain; the rest is used up in bodily processes or released as heat

Food chains show the trophic/predatory levels of organisms, but only show one organism of each level
Food webs shows the trophic/predatory relationships between all organisms of a particular habitat

Predatory Levels
Producers: Produce their own energy (via photosynthesis or chemosynthesis)
Primary Consumers: Herbivores
Secondary Consumers: Predators
Tertiary Consumers: Apex Predators

Ecological Terms
Species: A group of organisms capable of producing fertile offspring with each other
Population: The number of living organisms of a certain species living in a particular area
Community: a group of two or more populations (of different species) living in the same habitat
Ecosystem: A collection of habitats/communities of a given geographical area that interact with each other in a trophic manner
Biosphere: The entirety of ecosystems that ultimately affect each other, typically by atmosphere pollution; aka the Earth
Ecotone: An area where two biomes meet
Tolerance Range: A range of an abiotic factor (i.e. pH, temp., etc...) that a particular species can live within
Limiting Factor: the slowest/ most limited factor in a process

Gross Primary Production: Total rate at which the ecosystem captures carbon and produces producer biomass
Net Primary Production: GPP subtracted by plant respiration

Producer Processes
Photosynthesis: Produces energy via sunlight
Chemosynthesis: Produces energy via chemical reactions

El Nino
- In the pacific, wind typically blows from East to West. The positive feedback of this cycle is water "piling up" on the west side of the pacific, and, eventually, the negative feedback kicks in to equalize the situation. This comes in the form of El Nino, which is water and winds rushing back towards the East, leveling out the Pacific.
- Upwelling: As water rushes away from the shore, water from the depths rushes up to take it's place. This typically brings up nutrient-rich water.
- El Nino makes the thermocline (level of which the water drops below a certain temperature) higher in the West and lower in the East. This messes with upwellings, as the reason they bring up nutrient-rich water is because of the cold water. This causes a lack of nutrients which interferes with ecosystems.

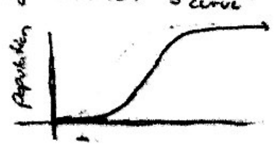
Key terms

- Birth rate, or crude birth rate:
  # of live births per 1000 people per year
- Death rate, or crude death rate:
  # of deaths per 1000 people per year
- Infant mortality rate:
  # of babies that die in their first year per 1000 live births.
- Total fertility rate (TFR):
  an estimate of the average # of children a women will have during her child-bearing years.
- Replacement fertility rate:
  the TFR rate at which a population replaces itself from one generation to the next generation
- Carrying capacity:
  the maximum number of individuals that can be sustained by the environment indefinitely given the available food, water, resources, etc.
- Biotic potential:
  the [redacted] population of living species to increase under ideal environmental conditions; determined primarily by reproduction rate and litter size.
- Malnutrition =
  faulty nutrition due to lack of intake of nutrients or ability to use them
- Undernutrition:
  nutritional deficiency due to lack of food intake.

Growth curves

Exponential growth: "J curve"

logistic curve: "S curve"



Population | Population Math

Rate of increase (as a %) $= \frac{(B+I)-(D+E)}{10}$

D = crude death rate
B = crude birth rate
E = emigration rate
I = immigration rate

Net migration rate = (I − E)

Doubling time "the rule of 70"

$T = \frac{70}{r}$ r = rate as a percent

or $T = \frac{\ln(2)}{r}$ r = rate as a decimal

Predicting Population Size:

(continuous growth) $P = P_0 e^{rt}$

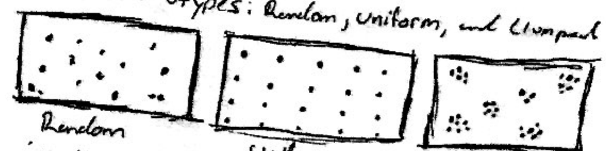
P = final population
P_0 = current, or initial, population
r = rate of growth as a decimal
t = time
e = euler's number ≈ 2.718

Population Characteristics

Density = a [redacted]ure of population per unit area. Ex. 10 people/mile²

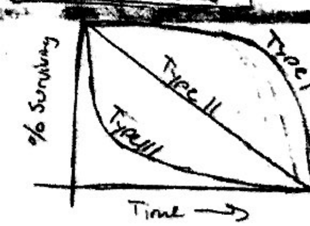
Size – the actual number of individuals in a population.

Distribution: 3 types: Random, Uniform, and Clumped



Random   Uniform   Clumped (most common)

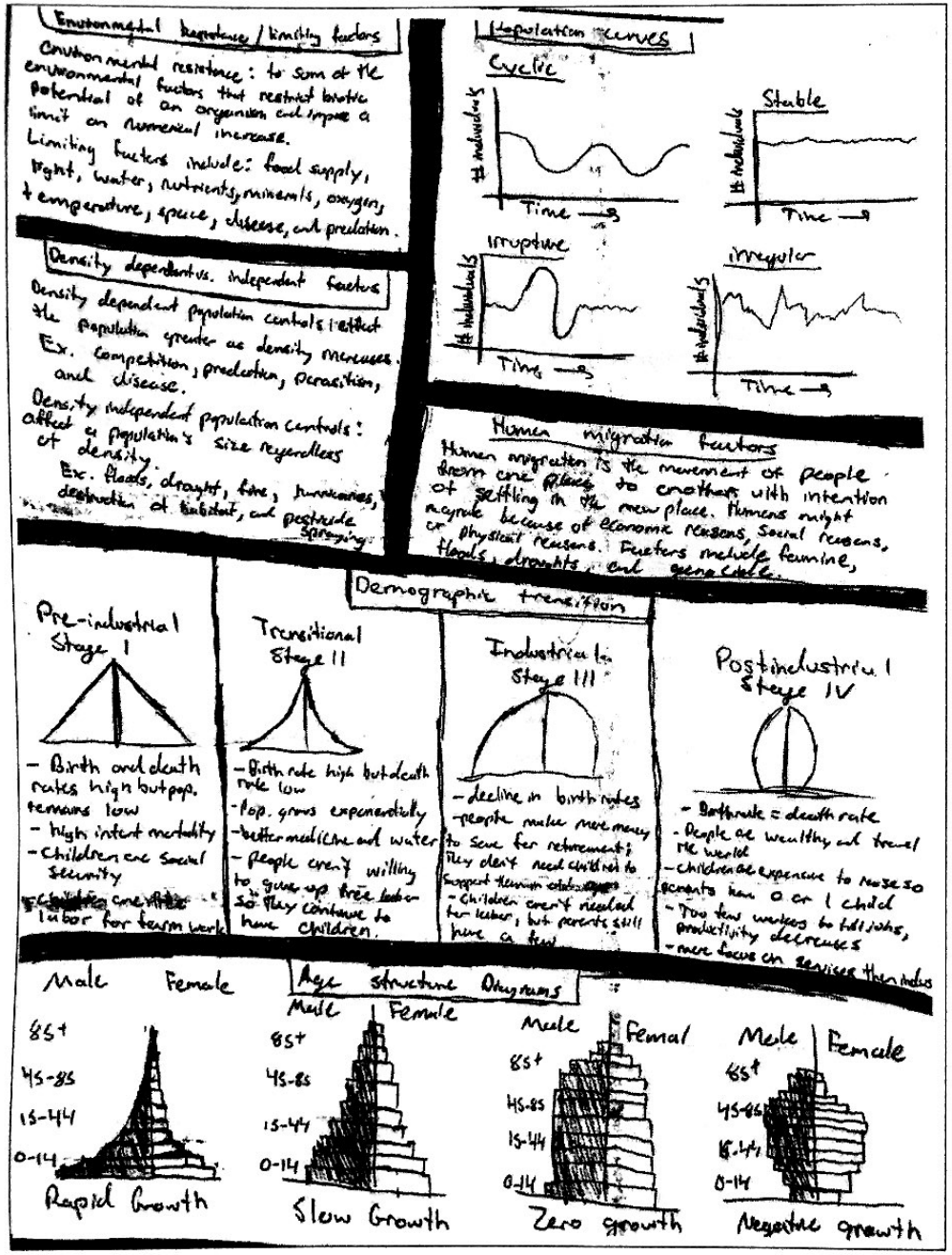
Survivorship Curves



K-strategists
Type 1 – late loss Ex. humans
Type 2 – constant loss Ex. birds
Type 3 – early loss Ex. fish
& R strategists

K strategists
- fewer but large and strong offspring
- long parental care
- long life expectancy

R Strategists
- many offspring, low survival
- little parental care.



Populations (Unit 8)

Terms:

Birth rate – annual number of live births per 1000 persons in the population of a geographical area at the midpoint of a given year

Death rate – annual number of deaths per 1000 persons in the population of a geographical area at the midpoint of a given year

Infant Mortality Rate – number of babies out of every 1000 born each year that die before their first birthday

Immigration Rate – rate at which people are entering into a country or area to take up a permanent residence

Emigration Rate – rate at which people leave out of one country or area to take a permanent residence in another country or area

Total Fertility Rate – estimate of the average number of children that will be born alive to a woman during her lifetime if she passes through all her childbearing years (15-44) conforming to age-specific fertility rates of a given year

Replacement-Level Fertility – number of children a couple must have to replace themselves, the average for a country/world is usually slightly higher than 2

Carrying Capacity – maximum population of a particular species that a given habitat can support over a given period of time

Biotic Potential – maximum rate at which the population of a given species can increase when there are no limits of any sort on its growth rate

Malnutrition – faulty nutrition, caused by a diet that does not supply an individual with enough proteins, essential fats, vitamins, minerals, and other nutrients needed for good health

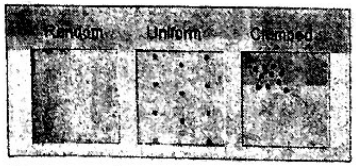
Undernutrition – consuming insufficient food to meet one's minimum daily energy

Population Characteristics:

Population Density – a measurement of population per unit area or unit volume: it is a quantity of type number density

Population Size – the actual number of individuals in a population

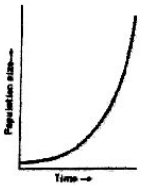
Population Distribution – the pattern of where people live, places which are sparsely populated contain few people and places which are densely populated contain many people



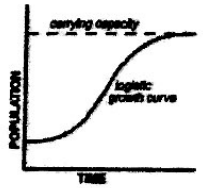
Environmental Resistance and Limiting Factors:

- Increasing death rates
- Decreasing birth rates
- Flood, fire, earthquake, or other natural disaster
- Limits imposed on population growth by both the biotic and abiotic environment

Exponential Growth is growth whose rate becomes eve more rapid din proportion to the growing total number size



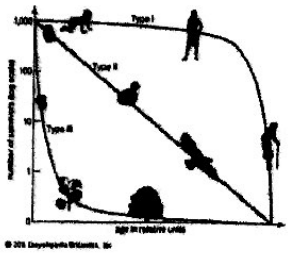
Logistic growth is when growth rate decreases as the population reaches carrying capacity



A survivorship curve is a graph showing the number or proportion of individuals surviving to each age for a given species or group. Survivorship curves can be constructed for a given cohort based on a life table.

K strategist – species that produce few "expensive" offspring and live in stable environments

R strategist – those species that produce many "cheap" offspring and live in unstable environments



Density Dependent vs Density Independent:

The density dependent factors are factors whose effects on the size or growth of the population vary with the population density. There are many types of density dependent limiting factors such as: availability of food, predation, disease, and migration. However, the main factor is the availability of food.

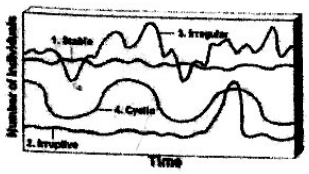
[redacted]

• Formaldehyde – comes from resins, adhesives

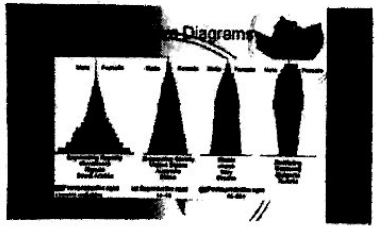
Cyclic Growth Curve – when a population rises and falls often

Stable Growth Curve – when a population size fluctuates slightly

Irruptive Growth Curve – when a population goes to a high peak and then crashes to a more stable lower level, or very low level



Population pyramids are a way of displaying the age/sex structure of a population. You could be asked to talk about the population structure of an area and the implications of that structure for the future. In other words, what is the percentage of males and females, how old are they, and why does it matter. It is a graphic profile of the population's residents. The three shapes that are formed are a **pyramid shape, building shape, and diamond shape.**



Demographic Transition – the transition from high birth and death rates to lower birth and death rates as a country or region develops from a pre-industrial to an industrialized economic system

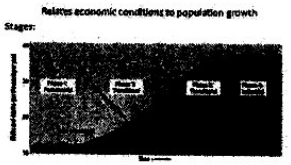
Pre-Industrial Stage – refers to social attributes and forms of political and cultural organization that were prevalent before the advent of the Industrial Revolution, a time before there were machines and tools to help perform tasks in mass

Transitional Stage – the human population begins to increase due to high birth rates and declining death rates

Industrial Stage – technology and culture are much more advanced, and civilization is largely reliant on machines to sustain itself

Post-Industrial Stage – the stage of society's development when the service sector generates more wealth than the manufacturing sector of the economy

Demographic Transition



Human migration – the movement by people from one place to another with the intentions of settling, permanently or temporarily in a new location. The movement is often over long distances and from one country to another, but internal migration is also possible.

Economic Factors – moving to find work or follow a particular career path

Social Factors – moving somewhere for a better quality of life or to be closer to family or friends

Political Factors – moving to escape political persecution or war

Environmental Factors – natural disaster such as flooding or tornado

Population Math Formulas:

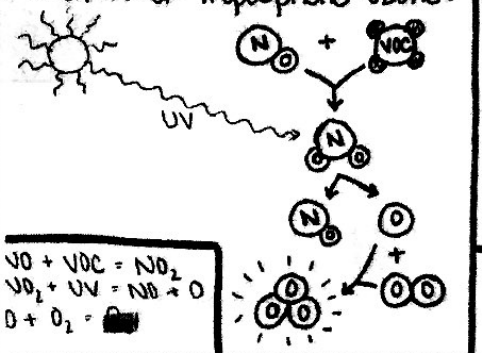
- Global Population Growth Rate (Rate of Increase) = (CBR-CDR)/10
- Population Doubling Time = 70/% growth rate
- Net Migration Rate = (I-E)
- Population Growth Rate = ([(births + immigration) – (deaths + emigration)]/total population) x100
- Birth Rate = (total births/total population) x100
- Death Rate = (total deaths/total population) x100

[redacted]

• Formaldehyde – comes from resins, adhesives

Global Warming, Ozone, and Air Pollution Guide

1. Creation of Tropospheric Ozone:

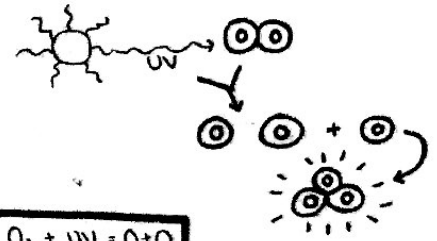


$NO + VOC = NO_2$

$NO_2 + UV = NO + O$

$O + O_2 =$ [redacted]

2. Creation of Stratospheric Ozone:

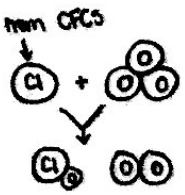


$O_2 + UV = O + O$ (atomic oxygen)

$O + O_2 =$ [redacted]

3. Destruction of Stratospheric Ozone:

* Ozone in the stratosphere is the good kind; prevention of this process is crucial



$O_3 + UV = O + O_2$

$O + O_3 = 2O_2$

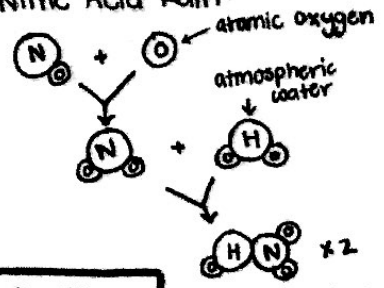
$2O_3 + UV = 3O_2$

or

$X + O_3 =$ [redacted]

NOTE: X can be Cl, NO, Br or CFCs which is Cl and F

4. Nitric Acid Rain:

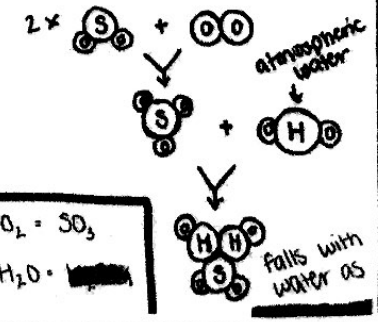


$NO + O = NO_2$

$NO_2 + H_2O =$ [redacted]

falls with water as [redacted]

5. Sulfuric Acid Rain:

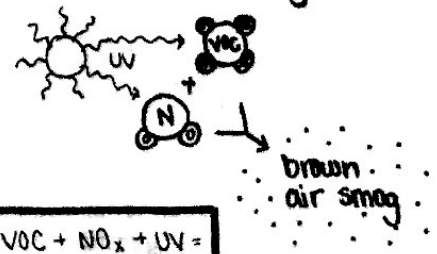


$2SO_2 + O_2 = 2SO_3$

$SO_3 + H_2O =$ [redacted]

falls with water as [redacted]

6. Brown Air Smog:



$VOC + NO_x + UV =$ brown haze

$NO \rightarrow NO_2$ creates

6. [redacted]

- PM_{10} - particulate matter 10 micrometers or less that cause serious lung problems
- $PM_{2.5}$ - particulate matter 2.5 micrometers or less that cause asthma, inflammation and even promote cancers
- Primary Pollutants - CO, NO_x, SO_x, SO_2, VOCs that come from vehicles, industrial sites, and agriculture
- Secondary Pollutants - NO_2, acid rain, ozone that are created from reactions

7. [redacted]

- Formaldehyde - comes from resins, adhesives, solvents, insulation and causes irritation and inflammation (*"new car" smell)
- Radon - comes from the natural decay of Uranium, can be found in igneous rock, and causes lung diseases and lung cancer (*can be under homes)
- Asbestos - insulation, ceilings, flooring and causes fibrotic lung disease, COPD, cancer, and emphysema (*mostly old homes)
- Cigarette smoke - causes lung damage like from asbestos scarring and the symptoms

9. [redacted]

Volcanic Eruptions - release dust and ash that clouds skies, blocking the sun and creating acid rain

CFCs - created from Chlorine and Fluorine for refrigerants, air conditioning, insulation; can remove ozone by breaking it down

Temperature Inversion - condition where atmosphere is warmer at higher altitudes and traps smog and other harmful substances closer to the ground

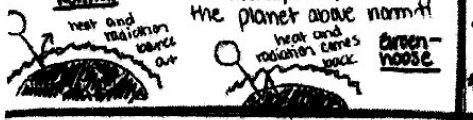
10. [redacted]

- Photochemical Smog - conditions that are best for this smog are valleys and mountains that trap pollutant
- Acid Deposition - any rain, snow, hail, fog, or dust with acidity
- Acid Rain - dissolves nutrients in soil then washes them away; also introduces toxic substances to plant life

*LICHENS can act as indicators for pollution when they appear hard or crusted

11. [redacted]

- The Gases - CO_2, MH_4 (methane), N_2O, and Fluorinated gases
- The Sources - Fossil fuels, deforestation, intensive livestock raising, synthetic fertilizer, industries
- The Effect - traps heat and radiation in the atmosphere, warming the planet above normal



12. [redacted]

- UV-A rays - penetrate the ozone layer, penetrate skin the deepest, cause skin damage/aging/cancer
- UV-B - also penetrate the ozone layer and the skin, causes skin burning and irritation and even cancer
- UV-C - shortest UV ray that is absorbed by the ozone layer

*TOO MUCH UV RAYS can decrease ozone and disrupt whole ecosystems

13. [redacted]

- on Disease - promotes hot weather that mosquitos need to breed, climate changes spread illness as well
- on Agriculture - increases CO_2 levels that plants can thrive on, yet can also prevent growth and kill yields; farmers can also shift to new crops
- on Plants and Animals - alters entire ecosystems, changes life cycles, causes certain habitats to disappear, and results in different migration

14. [redacted]

- Clean Air Act - 1963 act that set regulations on mobile and stationary pollution sources; completed by EPA
- Montreal Protocol - 1987 global agreement to phase out ozone depleting substances/products
- Wet Scrubber - removes particulates with water/suction
- Bagnouse Filter - filters boiler exhaust
- Cyclone Separator - uses vanes to remove particulate no filter needed
- Electrostatic Precipitator - applies energy only to

Water and Water Pollution

Water Quality

- Benthic macroinvertebrates are commonly used as indicators of the biological condition of waterbodies.
- Benthic macroinvertebrates are small aquatic animals and the aquatic larval stages of insects
- The EPT/Midge Ratio metric compares the total number of intolerant organisms

Clean Water Act

Regulates the discharge of pollutants into the nation's surface waters, including lakes, rivers, streams, wetlands, and coastal areas

Safe Water Drinking Act

Protects public drinking water throughout the nation and sets standards for drinking water quality

More Water Quality

Ways to test water quality:

- Dissolved oxygen - if water is stagnant and has too much organic material, there will be lower dissolved oxygen levels because bacteria will consume the oxygen
- pH - acidity level of water; if water is acidic it may kill organisms
- Temperature - governs species of aquatic life
- Nitrates - measure whether water is drinkable
- Total Suspended Fluids - cloudiness or haziness of a fluid; shows how dirty

Water Conservation

greywater - relatively clean wastewater from sinks, baths, and other appliances that can be used to water lawns and plants

portable reuse - the process of treating waste water for drinking later; direct or indirect

desalination - process of extracting minerals/salts from saline water

[redacted]

[redacted]

Creation of Tropospheric Ozone

- $CO + 2O_2 \rightarrow CO_2 + O_3$

Creation of Stratospheric Ozone

- $O_2 + UV \rightarrow O + O \quad O + O_2 \rightarrow O_3$

Destruction of Stratospheric Ozone

- $CFCl_3 + UV \rightarrow CFCl_2 + Cl \Rightarrow Cl + O_3 \rightarrow ClO + O_2$, $ClO + O \rightarrow Cl + O_2$

Nitric Acid Rain

- $2NO_{2(g)} + H_2O_{(l)} \rightarrow HNO_{3(aq)} + HNO_{2(aq)}$
- $2HNO_{2(aq)} + O_{2(g)} \rightarrow 2HNO_3$

Sulfuric Acid Rain

- $SO_{2(g)} + H_2O_{(l)} \rightarrow H_2SO_{3(aq)} \Rightarrow 2H_2SO_{3(aq)} + O_{2(g)} \rightarrow 2H_2SO_4$

Brown Air Smog

- NO_2 + sunlight $\rightarrow NO + O \quad O + O_2 \rightarrow O_3$
- $O_3 + NO \rightarrow NO_2 + O_2 \quad NO_2 + VOC_s \rightarrow$ PAN (smog)

Concepts and Terms

- Sick Building Syndrome: condition where person experiences fatigue, headaches, dizziness, nausea
  Causes: poor indoor air quality, air pollutants spread
- Formaldehyde: Organic Compound CH_2O
  USES: common building materials → wood → glue (paneling)
  EFFECTS: nausea, burning sensation in eyes, nose, and throat, coughing, cancer
- Radon: produce from radioactive decay of Uranium 238 - present in granite and shale.
- Asbestos: silicate mineral
  Sources: building materials for fireproofing
  effects: only dangerous when airborne → lung cancer and mesothelioma
- Cigarette smoke:
  Sources: cigarettes
  effects: tar-buildup, decreasing blood circulation, lung cancer
- Tropospheric Ozone: O_3
  effects: chest pain, coughing, throat irritation and congestion

Wastewater Treatment

Primary - temporarily holds sewage in a basin

Secondary - removes dissolved and suspended biological matter

Tertiary - is only used when water needs to be further treated after Primary and Secondary

Anaerobic Digestion - a collection of processes by which microorganisms break down biodegradable material in place of oxygen

Water Concepts

- Wetlands prevent flooding by holding water like a sponge
- Estuaries are partially enclosed coastal bodies. They form a transition zone between river and marine environments
- Watersheds are areas of land that drain rain, water, or snow into one location such as a stream, lake, or wetland

Positives and Negatives

Canals - easier to ship goods, easier transportation	expensive, use of land
Aqueducts - water conservation, energy production	soil erosion, stream channelization
Reservoirs - store water, can be used for drinking water	expensive to build, sediment buildup
Dams - hydroelectric power, flood control, water storage	prevent migration of fish, sediment buildup, erosion of surrounding soil

Central Vally Project

- provides recreation
- flood control
- includes 20 dams
- allowed cities to grow w/ rivers instead of them flooding every spring

State Water Project

- collects water from rivers in nor-cal and distributes them south

Aquifers

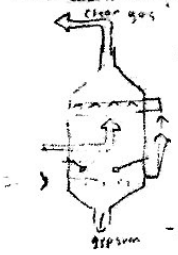
Unconfined - water seeps from the ground surface directly above the aquifer

Confined - impermeable dirt/rock layer exists that prevents water from seeping into the aquifer from the ground surface located directly above

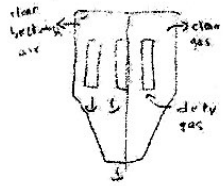
Salt Water Intrusion - the movement of saline water into freshwater aquifers, which can lead to contamination of drinking water sources

THE CLEAN AIR ACT: Passed in 1963, amended in '70 and '90

what did it do? → has reduced key air pollutants that cause smog and particulate pollution by more than 50%



Wet Scrubber
- waste liquid is drained off
- introduces dirty gas stream with scrubbing liquid
- particulate collected in liquid



Baghouse Filter:

Air pollution control device.
- removes particulates out of air or gas released from commercial processes or combustion

Cyclone Separator → removes particulates from air/gas/liquid through vortex separation

Electrostatic Precipitator → removes suspended dust particles from a gas or exhaust by applying high voltage particle/static charge and collecting particles on charged plates

Greenhouse gases

H_2O (water vapor) → from evaporation Ozone → O_3 (industrial plants)

CFC_s → air conditioners Methane → cattle, coal production N_2O → fossil fuel

SF_6 → Electric Industry

Greenhouse effect - infrared radiation passes through atmosphere but is then absorbed and reemitted by greenhouse gases - warms earth

- Volcanoes release both greenhouse gases, which warm earth and particulate matter (shades solar radiation)
- LICHENS

CFCs - produce free chlorine atoms that can break ozone apart in stratosphere - industrial processes

Thermal Inversion - normal decrease in air temperature with altitude reversed - traps daily pollutants below

OZONE → beneficial in stratosphere by blocking UV rays otherwise causing skin cancer
→ harmful in troposphere → breathing difficulties, lung cancer, coughing,

PM_{10} vs $PM_{2.5}$ → PM_{10} has larger particles → settle to ground by gravity in hours 2.5, remain for weeks, both can build in lungs and can cause difficulty breathing, asthma, etc.

Primary Pollutants: CO, NO_x, PM → cars Secondary Pollutants - Tropospheric Ozone - $CFC_s + O_2$

Photochemical Smog conditions; Nitrogen Oxides react with VOCs to create PAN_s - 11-4pm temperature and little cloud cover

Acid Deposition: wet: in rain, sleet, snow or fog (Nitric or Sulfuric acid Rain)
dry: deposition of pollutants, including gas and particulate matter

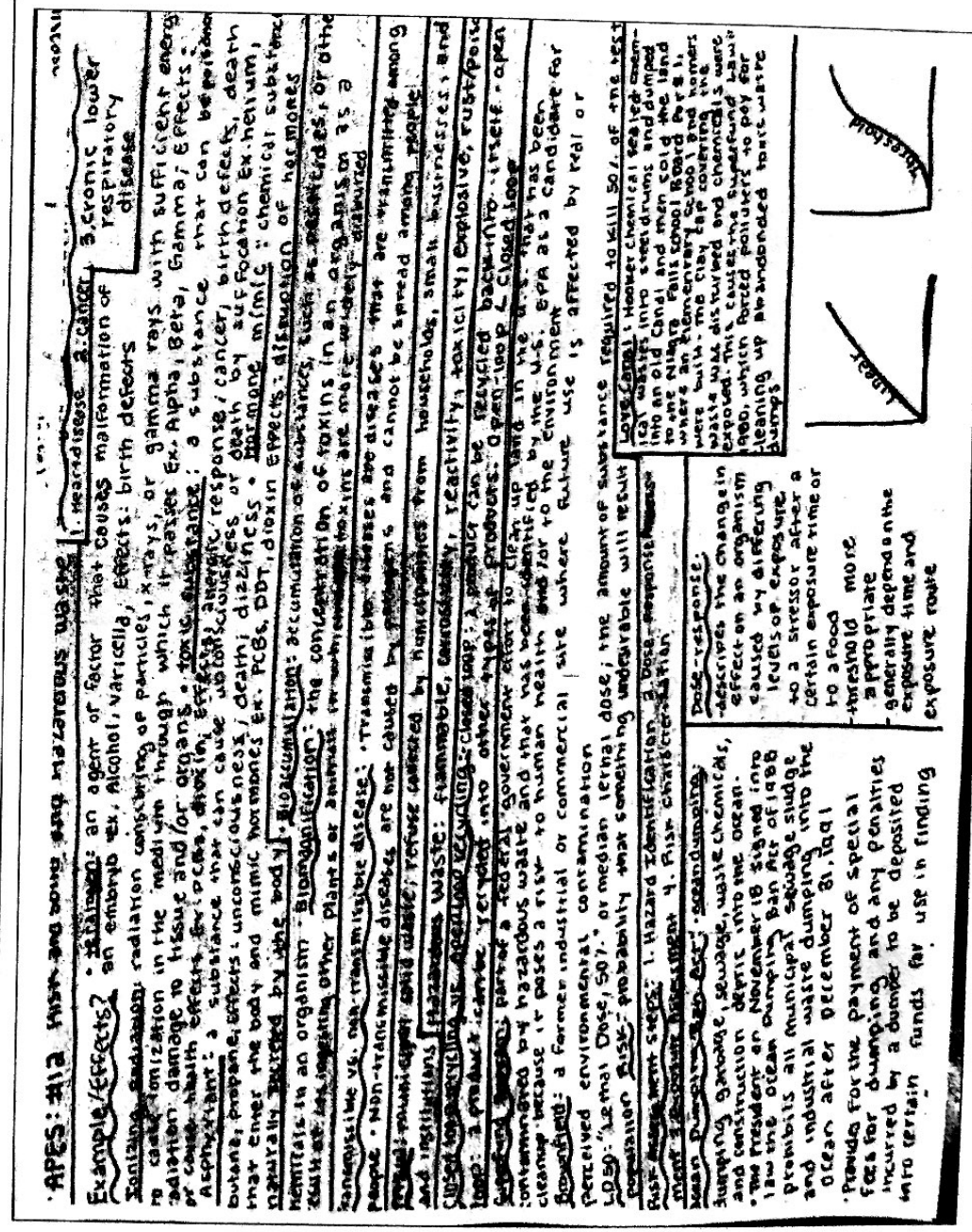
pH scale: as $[H^+]$ concentration increases, pH decreases and acidity increases
$[OH^-]$ concentration ↑ pH ↑ acidity decreases
→ increased leaching of soil nutrients

OZONE → ozone in the stratosphere blocks almost all of UVA and UVB rays, lets (some) UVC pass
- seasonality → Ozone thinning in Antarctic as stratospheric clouds form + UV, rapid O_3 depletion

→ Increase in UV rays can harm eyesight, skin cancer, etc.

Global warming → increase disease transmission, decrease agricultural output,

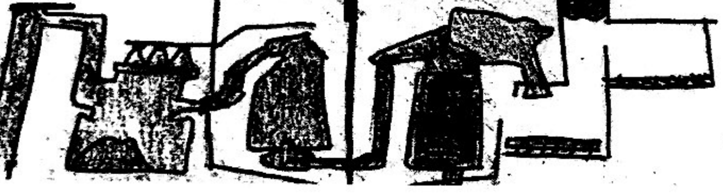
Montreal Protocol: Landmark international protocol designed to protect stratospheric ozone layer - the treaty originally signed in 1987 and amended in 90 + 97:



Goals of TSCA and FIFRA:

FIRFA: goal is to regulate the manufacture and use of pesticides

TSCA: EPA-can regulate chemicals deemed a risk to health to the environment



Burn-to-waste incinerator

Disadvantages:

- Incineration may emit trace amounts of unwanted pollutants
- Ash + wastewater is produced.

Advantages:

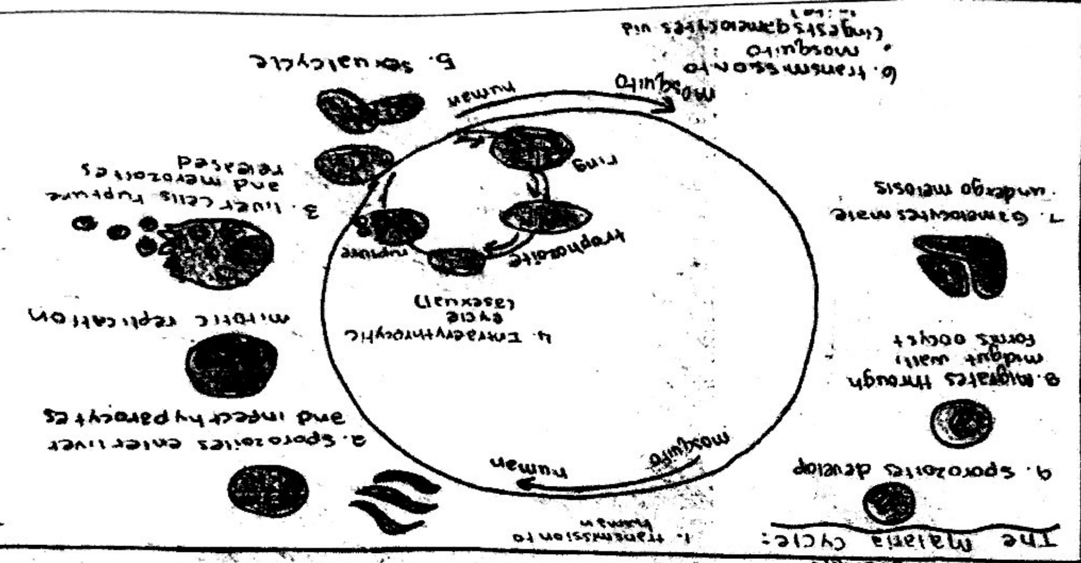
- potentially destroy any material containing organic carbon including pathogens
- reduce volume and mass of material
- heat can be used to generate steam or hot water

Black Death:

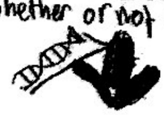
- medieval England
- killed 1.5 million people / 4 million between 1348 and 1350
- Deadly Plague
- often called Bubonic Plage
- Disease was airborne
- Fleas on rats began the infections
- death was quick for victims
- symptoms: lumps, black spots, fevers, welts
- spread by sneezing and coughing
- disposal of bodies was very crude and helped spread disease

Landfill leaching: Leachate is the liquid that drains or leaches from a landfill. It varies widely in composition regarding the age of the landfill and the type of waste that contains. Chemical treatment is used to treat it. People utilize a natural low cost material.

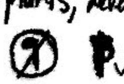
The Malaria Cycle:



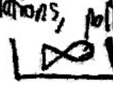
[redacted] - forces genes from other plants and animals into a plant making it more better and stronger. Benefits the farmer by producing stronger crops and harms the concerns of the consumer of whether or not it is healthy to consume.



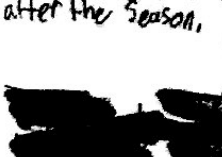
[redacted] - Breeding particular phenotypic traits in plants, developing a well desired line of plants.



[redacted] - pros are that it creates jobs for local communities, supplying foods for family. The cons are how fish farming can cause diseases and parasites to local wild fish populations, polluting local bodies of water



[redacted] - perennials regrow every spring, while Annual plants grow then die after the season.



Unit 15

MOX

[redacted]

Insecticides - Insects
Herbicides - Plants
Rodenticides - Rodents
Bactericides - Bacteria
Fungicides - Fungi
Larvicides - larvae

[redacted]: an organic compound containing one covalent bonded atom of chlorine.

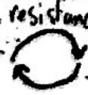
[redacted]: widely used insecticide and can harm humans by damaging the enzyme in the body.

[redacted]: Kills a wide variety of living things on plants

[redacted] is the opposite, only killing certain living things on plants

[redacted]: spray more and more pesticides to kill the pest, as it gains more resistance from it.

Spray chemicals ← → Pests resist.



[redacted]: is the accumulation of pesticides

[redacted]: The concentration of pesticides in a plant.

[redacted]: Adding a predator to eat the pests

[redacted]: Aims to supress the pest to a low economic injury level

[redacted]

[redacted]: uses chemicals and synthetics

[redacted]: slash and burn constantly moving after nutrients are drained.

[redacted]: offer more natural planting method, no chemicals

[redacted]: Small skale to feed a family

[redacted]: Modification of the land to plant unnative plants.

[redacted]: 1950-1970 Planting monoculture and lost of chemical.

[redacted]: 1970s- present Planting genetically inginered plants with high-yield.

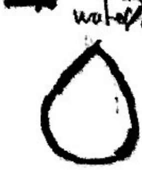
[redacted]: enhances change

[redacted]: dampen change

[redacted]: ocean/salt water is given to crops causing them to die leaving salt field.

NaCL

[redacted]: Flooding fields of plants will water over watering.



APES FINAL REVIEW

[redacted]: Planting crops in strips with shrubs and trees beside the alley.

[redacted]: Planting on the contours of the land to prevent erosion.

[redacted]: planting different crops in rows to prevent soil erosion.

[redacted]: Levels of pizzelled plant rows to prevent soil erosion.

[redacted]

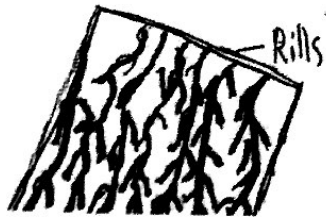
[redacted]: A water-worn ravine

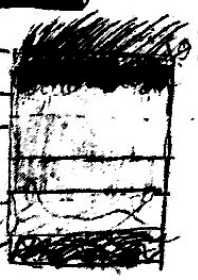
[redacted]: cracks in the ground that flows the water past the ground eroding the soil.

[redacted]: waterlogging of lots of rain drains out nutrient in soil.

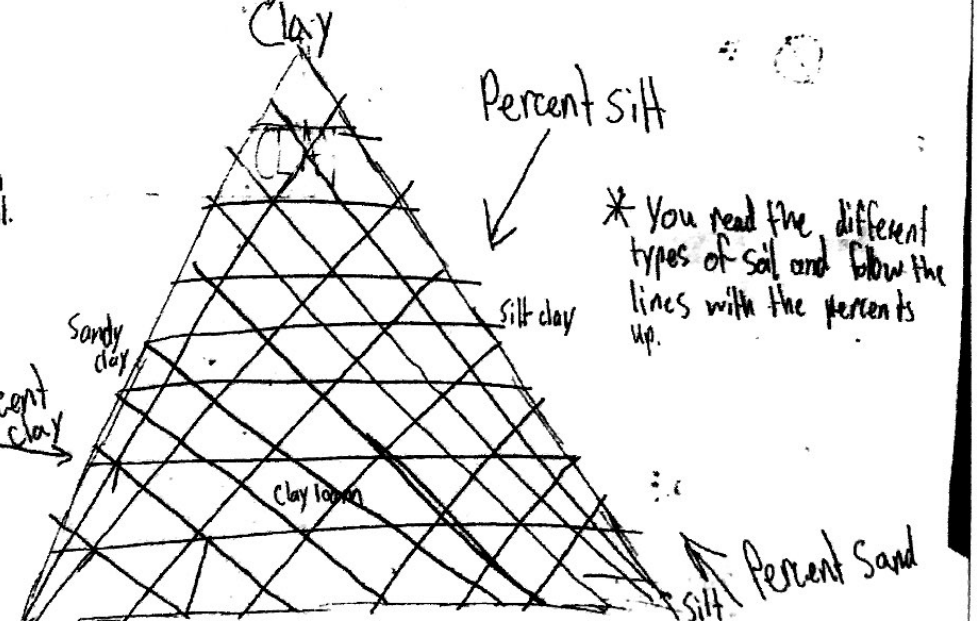
[redacted]

Organic is plant and animal based while Inorganic is synthetic based fertilizer, or not natural.





A soil horizon is a layer parallel to the soil surface, whose physical characteristics differ from the layers above and beneath. Each soil type usually has three or four horizons. Horizons are defined in most cases by obvious physical features, chiefly colour and texture.



* You read the different types of soil and follow the lines with the percents up.

1st Green Revolution: great increase in production of food grains that resulted from the introduction into developing countries of new, high-yielding varieties beginning in the mid-20th century. It required large amounts of chemical fertilizers and pesticides to produce their high yields.

2nd Green Revolution: an increase in agricultural production widely thought necessary to feed and sustain the growing population on Earth.

Positive feedback: enhances or amplifies changes - makes it more unstable

Negative feedback: tends to dampen or counter changes; this tends to hold a state of equilibrium making it more stable

Salinization: the process of increasing soil salinity; the salt content in the soil. Increasing this content hinders the growth of crops by limiting their ability to take up water.

Water logging: the saturation of soil with water. this limits the ability to grow crops and produce agriculture. Due to the plants lack of ability to breathe the oxygen.

Agricultural Practices:

Alley cropping: Planting rows of trees at wide spacings with a companion crop grown in the alleyways between the rows.

Terracing: make of form cropping land) into a number of level flat areas resembling a series of steps

Contour Plowing: plowing along the contours of the land in order to minimize soil erosion

Strip cropping: cultivation in which different crops are sown in alternate strips to prevent soil erosion.

Erosion: the gradual destruction or diminution of something

Gully: a small valley or ravine originally worn away by running water and serving as a drainageway

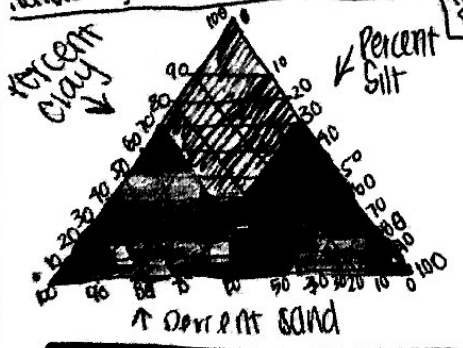
Rills: a shallow channel cut into soil by the erosive action of flowing water

Sheet: the uniform removal of soil in thin layers by the forces of raindrops and overland flow. It's a very effective erosive process.

Organic fertilizer: contain only plant or animal-based materials that are either a by-product or end product of naturally occuring processes

Inorganic fertilizers: manufactured artificially and contains minerals or synthetic chemicals

HUMUS: the organic component of soil, formed by the decomposition of leaves and other plant material by soil microorganisms



Soil Horizons: