

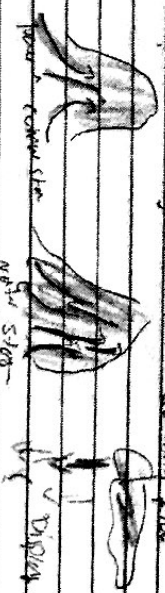
August 11
 MINA
 Per G

The three phases of water cause of liquid, snow, and ice. In a solid, the phase of the molecules are closely bound to one another by molecular forces, so that they are neither over nor liquid, they are not.

Whether it is the state of the atmosphere depends on the average the degree to which it is air, the weight of dry climate, the average condition prevailing in an area is general over a long period a region will possess a certain weather condition.

Fairly moderate effect on area having relative high pressure due to the effect of a topographic barrier, especially a mountain range, that causes the prevailing wind to lose their moisture on the windward side leaving the leeward side to be ^{relatively} drier.

is the phenomenon that occurs when heating of the earth's surface causes the body of liquid or gas when surface of fluid is heated, it expands and becomes less dense and thus more buoyant and the density falls.



Earth's tilt is the cause for the seasons. The snow cover caused by the earth's tilt causes the snow cover during the sun over year. Summer happens in the hemisphere tilted toward the sun and winter happens in the hemisphere away from the sun.

Understand the cycle over part of the earth, water of the crust and upper mantle.

Understand the upper layer of the earth mantle, how it happens in which the is relatively late feature to

Plates form
 First the upper layer of the earth's surface the surface and the mantle which is up to 100 miles deep
 break more or less Oceanic crust
 formed through cooling and solidification of magma
 or lava

formed by depositing a substance composed of
 the iron transform of earth's heat energy in a process called metamorphism with iron ore formation

Process of folding of being created by wind
 water or other matter against the appearance of texture of sandstone by long time to the air

Magma is composed of molten rock and silicon
 in the earth's crust there is magma that rises in the surface of the earth
 Diagenesis part pull any form earth water

convergent boundary also known as a destructive plate boundary is a region of active deformation

Subduction is a geological process that occurs at convergent boundaries of tectonic plates when one plate moves under another



The circular movement of a mass of water rising or falling as it becomes a convection cell, uses a difference in density to drive it

Precipitation

Transform one plate's edge into another's surface pass
 Earth after a transform boundary's displacement is
 called creation of faulting



located around north edges of the Pacific Ocean, in the west coast of the Americas, the east coast of Siberia



backbone or raised edge is steep with the eastern face is where the earth's crust begins to grow? rather than the spot where crusts move



Pain on earth surface vertical above the focus point in the crust where a seismic wave begins

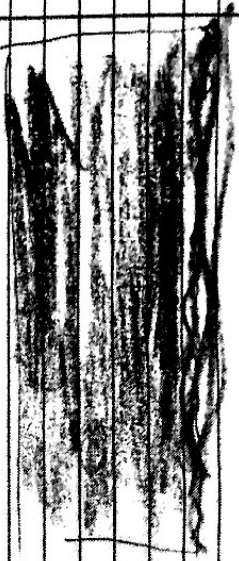
the great size of extent of the earth's crust
 higher frequency than surface waves in the first few
 of body wave is the source from beneath



Secondary waves are higher
 elastic waves



Surface waves have longer wave lengths than body waves and they take more time to travel the body of the earth

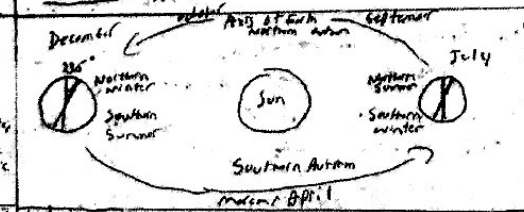


Phases of matter - Solid, liquid, gas.

Weather - Short term properties of the Troposphere at a particular place and time
Climate - A region's general pattern of atmospheric or weather conditions over a long period

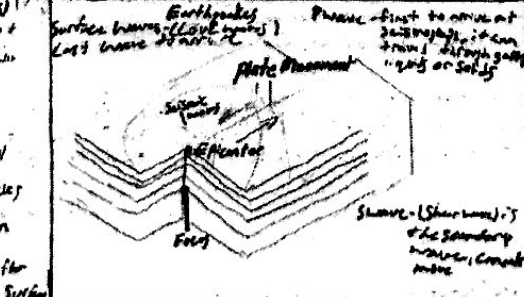
Earth Systems Austin man 1#3

Rain Shadow Effect - Lower precipitation and the resulting semi-arid or arid conditions on the leeward side of high mountains.
 windward warm moist air → Dry Air (Promotes evaporation)



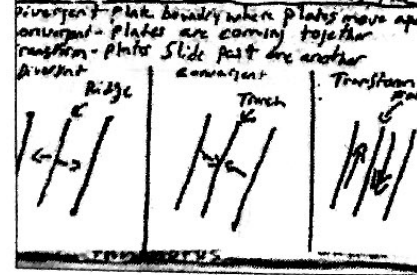
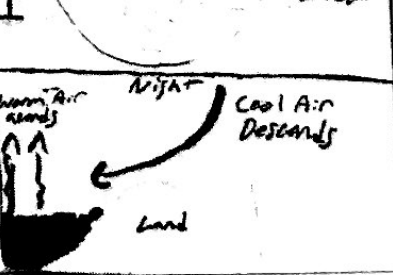
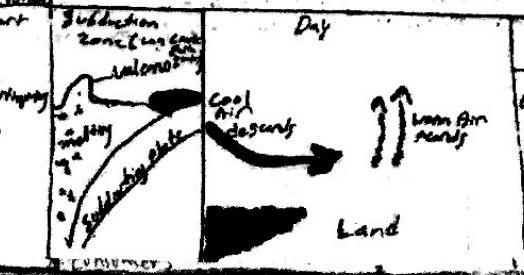
Convection Cells
 The circular movement of gases or liquid rising or falling as it becomes hotter or cooler is a convection cell. The motion in hot causes a decrease in density causing it to rise. Subsequently as it subsides it rises its density and sinking it sinks back down.
 air cools and SINKS
 HIGH PRESSURE
 air rises
 LOW PRESSURE

Rocks and Plate Tectonics
Lithosphere - The rigid outer part of the Earth, consisting of the crust and upper mantle
Asthenosphere - The upper layer of the Earth's mantle below the lithosphere in which there is relatively low resistance to plastic flow and convection is thought to occur



Monsoon - 3000 km/hour - 1000 km/hour - 1000 km/hour - 1000 km/hour
 4 major convection cells
 - Air moving between large high and low pressure systems at the base of the three major convection cells creates the global wind belts
 - Because more solar energy hits the earth, the air heats up and forms a low pressure zone. At the top of the troposphere, the air half moves toward the north pole and half moves toward the south pole.
 - Albedo - Amount of energy reflected in the surface
 Polar cell, Ferrel cell, Hadley cell, Trade winds, Convergence, Divergence, Coriolis Effect

Rocks and Plate Tectonics (cont)
Igneous - Volcanic rocks, formed by the cooling of molten magma
Sedimentary - formed from preexisting rocks, usually through weathering (erosion)
Metamorphic - formed as another type of rock and are chemically altered and become a new type of rock (metamorphism)
Fracturing - the movement of broken down rocks
Weathering - the process of breaking down rocks / soils
Magmas - molten rock under ground / Lava - major after it reaches the surface



Biomes

Tundra Biome - The Tundra Biome is the coldest of all the biomes. There are very few trees and very few large animals. The ground is mostly frozen and the vegetation is very low.

Boreal Forest - The Boreal Forest is also known as Taiga. It is a biome characterized by coniferous forests consisting mostly of pines, spruces, and firs.

Desert - The Desert Biome is an ecosystem that is characterized by low levels of rainfall and high temperatures. The desert biome is generally composed of mountains and plants. The chaparral biome receives more rainfall for part of the year.

Temperate Forest - A temperate forest is found in temperate regions. Regions of the world with warm seasons and cool winters. The temperate forest is found in North America, Europe, and Asia.

Tropical Forest - Tropical Forests are found in the tropics. They are characterized by high temperatures and high rainfall. The tropical forest is found in South America, Africa, and Asia.

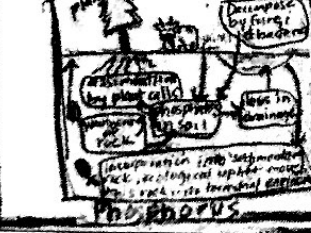
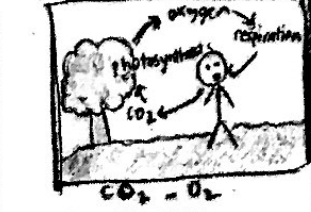
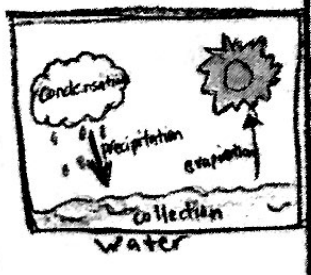
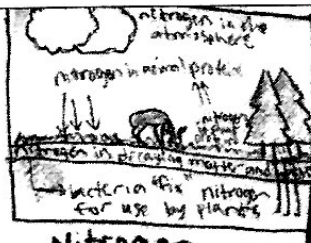
Savanna - A savanna is a grassy plain with scattered trees. It is found in Africa, South America, and Australia.

How do Ocean Currents affect weather? Ocean currents move heat from the equator to the poles. This helps to regulate the climate. For example, the Gulf Stream keeps Europe warm even though it is far from the equator.

Examples: The Atlantic Ocean has a large system of currents. It includes the Gulf Stream, the North Atlantic Drift, and the Canary Current. These currents affect the climate of Europe, North America, and Africa.

Thermohaline circulation is a part of the large-scale ocean circulation that is driven by global density gradients created by surface heating and cooling. It is a part of the ocean circulation that is driven by differences in density. It is caused by differences in temperature and salinity.

Flotation: Flotation is the process of floating in water. It is caused by the buoyant force of the water. This force is equal to the weight of the displaced water.



Nitrogen fixation: changing nitrogen into nitrate and ammonium

Ammonification: conversion of organic nitrogen into ammonium

Assimilation: the uptake of ammonium and nitrate by plants

Denitrification: conversion of nitrate to nitrogen by anaerobic bacteria

Legumes: plants that have a symbiotic relationship with bacteria that fix nitrogen

Species: a population of one type of organism that naturally interbreeds to produce fertile offspring

Population: a group of one species

Community: populations of different species interacting naturally

Ecosystem: all biotic and abiotic factors in an area

Biosphere: the total world of life

NPP = GPP - Respiration

Trophic level:

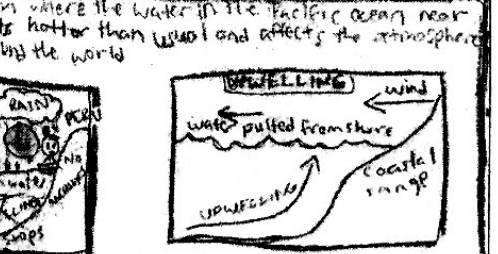
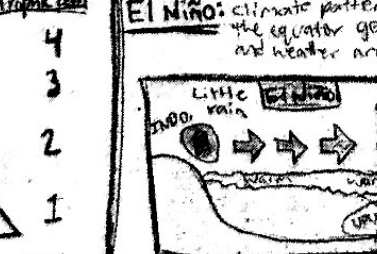
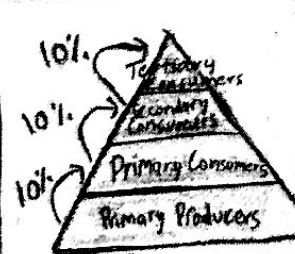
Ecotone: transitional area where two ecosystems meet

Tolerance Range: range of minimal and physical conditions that must be maintained for population to function normally

Limiting Factors: factor that limits growth, abundance, or distribution of a population

Photosynthesis: the process where sunlight is used to combine carbon dioxide and water to produce oxygen, glucose, etc.

Chemosynthesis: extracting inorganic compounds from their environment and converting them into organic nutrients in the absence of sunlight



Food Chain: a succession of organisms in an ecological community with food energy transferring from one organism to another (linear)

Food Web: interweaving/connected food chains (non-linear)

Producer/Autotroph: create their own food from sunlight/chemical energy

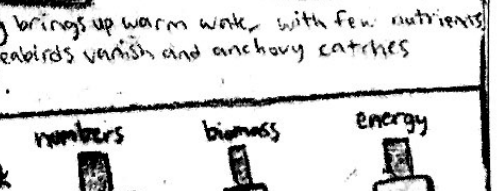
Primary Consumer: eat producers (herbivores)

Secondary Consumer: eat primary consumers (carnivores/omnivores)

Tertiary Consumer: eat secondary consumers

El Niño: climate pattern where the water in the Pacific Ocean near the equator gets hotter than usual and affects the atmosphere and weather around the world.

During El Niño, upwelling brings up warm water, with few nutrients. Populations of fish and seabirds vanish and anchovy catches dwindle during El Niño.



Producers/Autotrophs: create their own food from sunlight/chemical energy

Primary Consumer: eat producers (herbivores)

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Pyramid of numbers vs. biomass pyramid vs. energy pyramid

Sparrowhawk

blue jay

caterpillar

Oak tree

Chapter 6

Types of Competition:

Interspecific: competition between two different species for resources (same niches)

Intraspecific: competition among same species

Competitive exclusion: one species eliminates the other due to use of limited resources

Resource partitioning: use resources in different times, different ways, or in different places to reduce competition, stick fighting expends energy

Priority effects: one species limits another's access to same resource

Exploitation competition: both species have access to resources but differ in how fast or efficiently they use the resource

Succession Concepts:

Primary succession: ecological succession that begins in an area where no living community previously existed.

Secondary succession: occurs on pre-existing soil or other substrates that are not completely destroyed by fire or other disturbances.

Disturbance: events that create or renew suitable conditions for other species but not itself.

Intermediate disturbance hypothesis: predicts an area suitable for other species but not itself.

Steady state: predicts an area suitable for other species but not itself.

Stable: is similar to steady state.

Theory of Island Biogeography

Species richness on islands is determined by interaction of rate of immigration and rate of extinction.

Rate of immigration is high for species from main land, low for species on island.

Rate of extinction is high for species on island, low for species from main land.

Number of species on island is determined by the balance of immigration and extinction rates.

Effect of island size: larger islands have higher species richness.

Effect of distance from main land: islands closer to main land have higher species richness.

Types of Species

Keystone species: species that have a disproportionately large effect on their environment relative to their abundance.

Indicator species: species that normally live in a particular community or environment and whose presence or absence is a sign of environmental change.

Endemic species: species that are found only in a particular geographic area.

Ecological niche: the role of a species in an ecosystem, including its interactions with other species and its use of resources.

Biological niche: the role of a species in an ecosystem, including its interactions with other species and its use of resources.

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Charcoal product

Charcoal is usually produced by **slow pyrolysis** - the **HEATING** of wood or other substrates in the absence of oxygen.

Eco-tourism

Community-based **eco-tourism** is a form of tourism that involves **visiting** in the **Dainty** Reserve in **Brazil**.



Generating valuable information. You can increase understanding of the impact and effectiveness of REDD+ related activities in priority forest areas within the Dainty Reserve by addressing socio-environmental safeguards.

Economic Value of Trees

Trees combat climate change. Trees clean the air. Trees provide oxygen. Trees cool the streets and help conserve energy. Trees save water. Trees help prevent water pollution. Trees provide shade. Trees provide food. Trees provide wood. Trees provide fiber.

HOT SPOTS

Hot spots are places within the world where risks are high to conserve nature. The presence of a hot spot is determined by a high level of biodiversity and a high level of threat to that biodiversity.

DEBT-FOR-NATURE SWAPS

Debt-for-nature swaps are financial transactions in which a portion of a developing nation's foreign debt is forgiven in exchange for local investments in environmental conservation measures.

MONOCULTURE

the planting of just one type of crop in a large area. Monoculture is a type of agriculture that involves the planting of a single crop over a large area.

Old-growth forest

Old-growth forests are natural areas that have developed over a long period of time, often over several hundred years, without significant human disturbance. They are characterized by a high level of biodiversity and a complex structure.

TRACES

TRACES provide essential services. TRACES require air pollution by trapping particulate matter in their sticky surfaces and by absorbing various pollutants.

- 1) reduced air pollution
- 2) storm-water control
- 3) carbon storage
- 4) improved water quality
- 5) reduced energy consumption that include

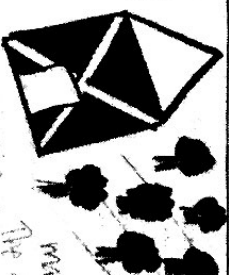


Deforestation Primary Causes

Infrastructure Expansion
 Agricultural Expansion
 Logging
 Pastoralism
 Mining
 Overgrazing
 Overfishing
 Overhunting
 Overexploitation
 Overuse of land
 Overuse of water
 Overuse of resources
 Overuse of energy
 Overuse of land
 Overuse of water
 Overuse of resources
 Overuse of energy

Secondary Causes of Deforestation

Population growth
 Industrialization
 Urbanization
 Global warming
 Pollution
 Deforestation
 Logging
 Mining
 Overgrazing
 Overfishing
 Overhunting
 Overexploitation
 Overuse of land
 Overuse of water
 Overuse of resources
 Overuse of energy



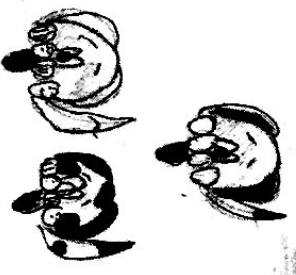
TREE FARMS

A tree farm is a privately owned forest managed for timber production. The trees are planted in rows and are harvested on a regular basis. The trees are usually planted in rows and are harvested on a regular basis. The trees are usually planted in rows and are harvested on a regular basis.

Species Richness

Number of different species represented in an ecological community, landscape or region. Species richness is simply a count of species and it does not take into account the abundance of the species or their relative abundance distributions.

Kennedy Cabrera Period 6



Secondary forest

Shannon Diversity

Index of species diversity. It is commonly used to measure diversity in a community.

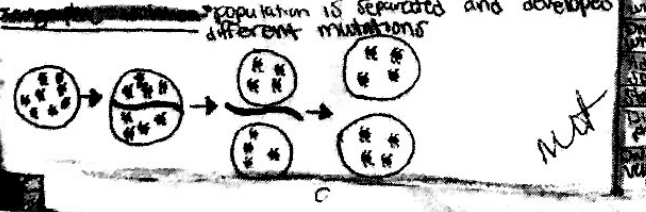
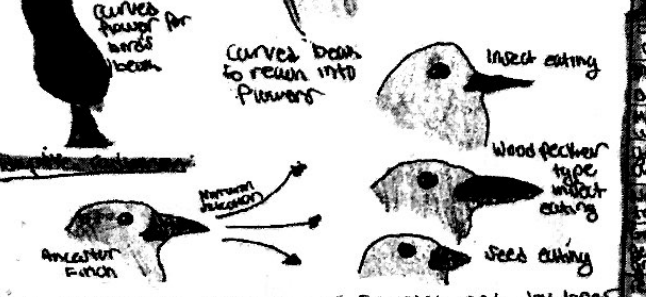
$$H = -\sum (p_i \times \ln p_i)$$

H = the Shannon diversity index
 p_i = proportion of the population made up of species i
 S = number of species in sample

Ch. 8.5-8.9, 13, 25

Removing water and other soluble constituents from animal and veg. detritus. Marks first tropical forest conservation initiative led to extract resources protected forest areas. Involves large-scale reforestation where a portion of developing nations forest debt is forgiven in exchange for local investment in crop in an area. Cultivation of a single crop in an area. Trees grow together in close proximity.

widespread and rapid decrease in biodiversity on earth, 5 mass extinctions, water, etc



Look Knox PERG

Stormwater runoff reduction
 Air quality improvement
 Energy savings
 Improved water quality, air quality, storm water control, carbon storage, red energy consumption
 CO2 reduction
 Incentive
 Property value increase

primary forest - forest attain great age without significant disturbance
 conversion to agricultural land, logging, palm oil, urbanization, cattle ranching, mining

Look Knox PERG

Evolution - change in heritable charac. of biological pops. over successive generations

Microevolution - evolution on a scale at or above the level of species

Mutations - random change in DNA molecules, missing genes, insertion (DNA) changes in anatomy, physiology or behavior of a gene pool - set of all genes, or genetic info, in any population, usually of a particular species

Natural selection - better adapted organisms to their env. tend to survive and produce more offspring

Genetic drift - population of species separated from exchanging genetic material with other organisms -> new mutations in each population

Genetic bottleneck - inability of species to breed successfully with fewer alleles due to geo. isolation, physiological, genetic isolation

Speciation - accumulation of differences between groups which can lead to form of new reproductively isolated groups

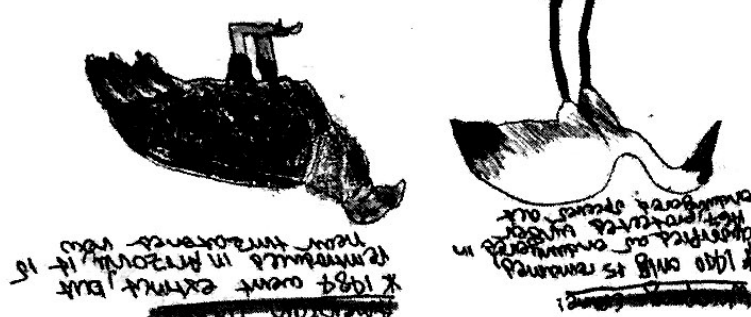
Adaptive radiation - rapidly from ancestral species into multiple of new forms when change in env.

Artificial selection - favoring of individuals with interbreeding potential

Artificial selection - extreme phenotype favored over other phenotypes over time to direction of their phenotype

Artificial selection - changes in population which extreme phenotypes are favored over intermediate

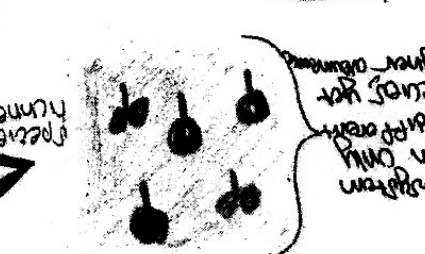
- High reproduction rate
- Generalist species
- Big birth fields
- Dominated by intense competition
- Ex: Carp, the black rat, cane toad



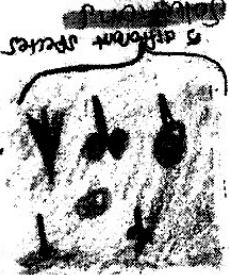
American Crows
 * 1984 went extinct but is reintroduced in Arizona, it is near threatened now

- Habitat protection
- Reduce presence of invasive species
- Reduce use of herbicides/pesticides
- Create wildlife refuges to protect

Endangered/Threatened



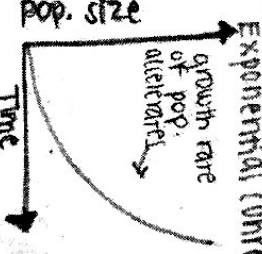
used to characterize species diversity in a community -
 records for both abundance and evenness of species that are endangered/threatened or
 indicators of the ecosystem on which they depend
 Conservation of the ecosystem on which they depend must be restored - many primary groups or food
 web interactions
 species number - no
 ecology community - no



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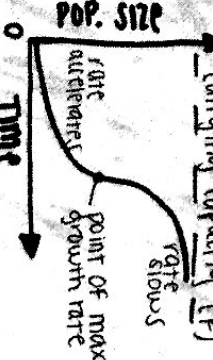
- Trade in endangered species is an international agreement between governments to make sure trade in wild specimens won't affect their survival
- CITES (Convention on International Trade in Endangered Species) is an international agreement between governments to make sure trade in wild specimens won't affect their survival
- Trade permits trade (wildlife, fish) and plants that have been illegally taken, possessed, transported or sold

POPULATION: that grows



Exponential (unrestricted) growth
 growth rate of pop. unaffected

LOGISTIC (restricted) growth
 * carrying capacity (K)
 * seen where resources are unlimited
 * rate of feeding

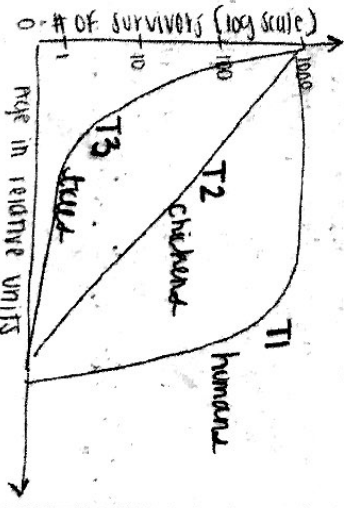


point of max. growth rate
 rate slows

DENSITY-DEPENDENT:
 population-limiting factors that are result of size of pop.
 • increased predation
 • competition for food/living space
 • disease
 • buildup of toxic materials

DENSITY-INDEPENDENT:
 population-limiting factors operate independently of size
 • fire
 • storms
 • earthquakes
 • other catastrophic events

SURVIVORSHIP CURVE



POPULATION CHARACTERISTICS
 POP DENSITY: # of individuals that inhabit certain unit of land or water area
 POP DISPERSION:
 • RANDOM position of each individual not determined by others; uncommon
 • CLUMPING individuals flock together in feeding suitable for life; most common
 • UNIFORM members uniformly spaced throughout region, often result of competition for resources

* more realistic pop growth model
 * AS POP. APPROACHES (K), GROWTH RATE WILL DECREASE, SIZE OF POP. WILL STABILIZE

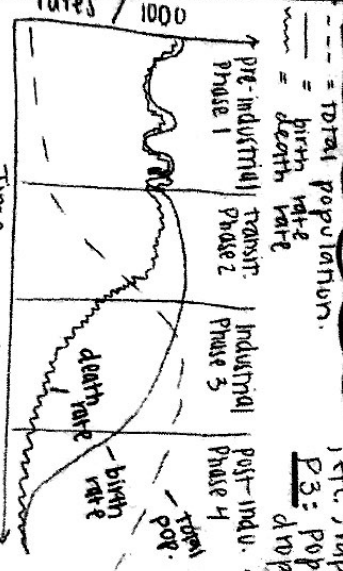
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IMPORTANT TERMS

- **BIRTH RATE:** # of live births per 1000 members of pop. in a year
- **DEATH RATE:** # of deaths per 1000 members of pop. in a year
- **INFANT MORTALITY RATE:** # of deaths in first year of life / # of live births
- **IMMIGRATION:** movement of people into a population
- **EMIGRATION:** movement of people out of a population
- **TOTAL FERTILITY RATE:** # of children a woman will bear in her lifetime
- **FERTILITY RATE:** # of children a couple must have to replace themselves
- **MALNUTRITION:** poor nutrition from poorly balanced diet
- **UNDER-NOURISHED:** have not been provided sufficient quantity or quality nourishment for proper health
- **CARRYING CAPACITY:** maximum pop. size that can sustainably be supported by resources in region
- **POP. RESISTANCE:** amount population would grow w/ unlimited resources

DEMOGRAPHIC TRANSITION



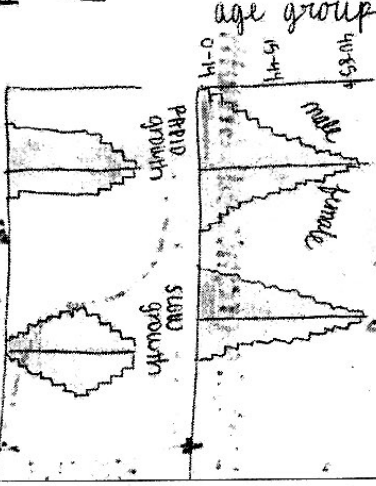
Human migration factors: TIME, famine - food, genocide

POP MATH

$$\text{Actual growth rate} = \frac{\text{birth rate} + \text{immigration} - \text{death rate} - \text{emigration}}{1,000}$$

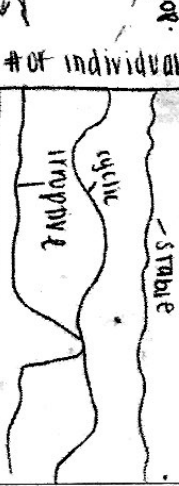
$$\text{Rate of } r = \frac{r}{\text{growth rate}} = \text{doubling time}$$

AGE-STRUCTURE PYRAMID



P1: slow growth rate; high birth & death rate due to harsh conditions
 P2: birth rates high, better food, water etc.; rapid pop. growth
 P3: pop growth fairly high; birth rate drops becoming similar to death rate
 P4: pop. approaches and reaches zero growth rate

POPULATION CURVES



CHARMIE MUDA

Energy

Net energy?

- It takes energy to make energy
 - The usable amount of high quality energy available from a given quantity of an energy resource.

Renewable v. Nonrenewable

• A type of energy source that is unlimited.
 ex: solar energy, wind power, hydroelectric etc.



• A type of energy source that is limited (once consumed cannot be replaced)
 ex: fossil fuels, crude oil, coal, nuclear, etc.



Active v. Solar Heating

• Installed solar panels convert solar energy then distribute throughout house.



• The sun hits the windows of the house and heats up the rooms of the house.



Photovoltaic cells vs. Solar Thermal

• PV energy conversion directly converts sun's energy into electricity



• Solar energy concentration generates light from sun in create heat energy



EFFICIENCY & CONSERVATION = IMPORTANT: energy conservation is the practice of reducing our fuel needs and the impact we have on the environment as we produce energy. we must be efficient with our energy creation because we cannot consume more than we can replace.