Invasive, Endemic and Indicator Species

An **invasive** species is a species which is not native to the ecosystem and causes harm to that ecosystem. An **endemic** species is a species whose habitat is restricted to a particular area or space on the globe. An **indicator** species is sensitive to slight environmental changes and therefore serves as an early warning indicator for things such as global warming or chemical changes.

Effects of Acid Rain

Soil	Burn skin of earthworm and increases soils acidity (lowers the pH)
Vegetation	Damages the waxy coating that protects leaves from infection and affects plants roots ability to absorb nutrients
Water	Makes bodies of water more acidic (lowers pH)
Aquatic Animals	Dissolve the shells of shellfish

Soil Types

Sandy Soil	Large sand particles, permit root growth and air pockets, permit water to drain away quickly, carrying essential nutrients, away from roots, less fertile than loam soil
Loam Soil	Has rock particles, has pockets that hold air o water, lots of humus, drains well without drying out, most fertile soil
Clay Soil	Small particles packed tightly together, plant roots do not grow well, block root growth, and trap water, making soil wet, least fertile soil (Houston)

Exponential Growth Formula

Formula: $P(t) = P(initial)e^{(rt)}$

P(t) = Population at time

P(i)= Initial Population

t=time

r=rate of increase (or r max)

e = exponential growth

Species Diversity Levels

Alpha	Within Habitat
Beta	Between communities
Gamma	In a region

Logistic Growth Formula

$dN/dt=RmaxN(K-N)/(K)$

dN/dt = The population at certain times
r max = Maximum growth rate
N = Logistic Growth
K = carrying capacity

Terminology

Density-dependent Limiting Factors	Limiting factors that operate more strongly on large populations than on small ones
Tertiary Consumer	An organism that eats secondary consumers
Commensalism	Beneficial to one species but neutral to another
10%	amount of energy transferred from one trophic level to another
uniform species distribution.	individuals are equally spaced apart a seen with allelopathy
covert life table	recording the death of a group of individuals born at relatively same time
Type 1 Graphs	organisms have lower mortality rates at low ages which gradually increase with age (humans)
Type 2 Graphs	organisms that have mortality rates that stay the same throughout life (birds lizards)
Type 3 Graphs	organisms that have the largest mortality rates at birth (fish, oysters frogs)
Exponential Growth Rate	occurs when the growth rate remains the same while the population grows. it creates a j shaped curve

Cellular Respiration

Cellular respiration is a process in which the plant uses the stored energy (sugar) and O2 produced in photosynthesis and it converts and releases it as CO2, H2O and energy. The plant is able to use this released energy for cellular functions such as; movement, growth and reproduction. The formula for this equation is C6H12O6+O2 in to CO2, H2O and energy. Both plans and animals undergo cellular respiration.

Ex-situ and In-situ Conservation

Ex-situ	This conservation method is when we remove the species from their natural habitat. This method is used when a species habitat is threatened or no longer exists or if the existing population is extremely small.
In-situ	This conservation method is focused on conserving the species in their natural habitat

Pyramid of Energy

Energy loss and transfer between trophic levels. Species in the highest trophic levels have less energy available to them than the species near the bottom.Energy pyramids begin with producers on the bottom (such as plants) and proceed through the various trophic levels (such as herbivores that eat plants, then carnivores that eat herbivores, then carnivores that eat those carnivores, and so on). The highest level is the top of the food chain

Keystone Species

A keystone species is a species that when added or removed from an ecosystem leads to major changes in abundance or occurrence of at least one other species.

Protecting Endangered Species

The plans to protect endangered species involves:
>Governments, industries and communities working together
>Identifying the specific causes of the problem
>Developing specific plans to fix the problems
>Monitoring conditions to check that the actions taken are working

Terminology

Natality	birth rate
Parasitism	Type of symbiotic relationship in which one species benefits and the other is harmed (tick)
Steady State	Final stage in logistic growth in which birth rate = death rate
homothermal	maintain constant body temperature
Poikilotherm	body temperature fluctuates based on outside conditions
cohert life table	recording the death of a group of individuals born at relatively same time

Terminology (cont)

static life table	recording the age of death of a group of individuals. assuming they have experienced the same events
interference competition	organism fight physically for resources
exploitation competition	organisms consume scarce resources
recourse partitioning	organisms split the recourse to avoid competition
amensalism	one organism is damaged or killed and the other is infected usually caused yb chemical secretion