

### Population Ecology

biotic/abiotic factors → response: acclimate, regulate, conform, migrate, torpor, etc.

fundamental niche=range of factors/resources a species could use

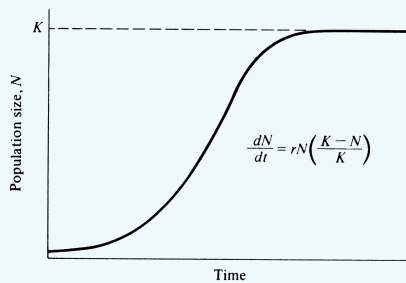
realized niche=actual use of potential environment

uniform dispersion=evenly spaced

random dispersion=unpredictable spacing

clumped dispersion=aggregate in patches

### Logistic Growth



K-selection=sensitive to population density  
 r-selection=maximizes r (reproductive rate)  
 density independent= pop. density does not affect birth/death rate  
 density dependent= ↑ pop. density → ↓ birth rate/ ↑ death rate

### Species Richness and Diversity

species richness # of different species in a community

species diversity # & size of each population in a community

relative abundance proportion of different species in a community

dominant species most abundant species w/ highest biomass

keystone species has pivotal ecological role/niche

### Interspecific Interactions

#### Competitive Exclusion Principle

2 species can't survive in the same ecological niche; fundamental ≠ realized

#### Predation

+/-; adaptations: cryptic/aposematic coloration, Batesian/Müllerian mimicry

#### Symbiosis

-parasitism: +/-, endo & ecto  
 -mutualism: +/+, obligate vs facultative  
 -commensalism: +/- interaction

### Community Disturbance

primary succession colonization by pioneer organisms (bacteria/algae/lichens/moss) in a virtually lifeless area to form soil

secondary succession colonization of an area where the existing community was cleared but soil is intact

### Learning

habituation loss of responsiveness to stimuli w/no new info

imprinting formation of permanent long-lasting response to an individual during sensitive period

spatial landmarks, cognitive maps

associative classical/operant conditioning

cognitive awareness, reasoning, judgment → problem solving



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### Social Behavior

cooperation	behavior done as a group
agonistic	aggressive behavior
dominance hierarchies	dictate social position of an animal in a culture
territoriality	behavior to defend an area from others
altruism	↓ individual's reproductive fitness, ↑ fitness of colony

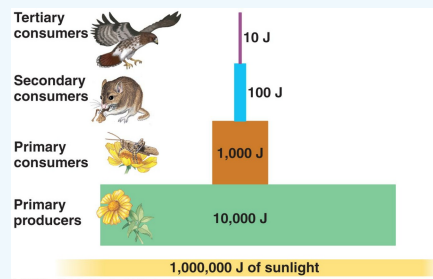
### Chemical Cycles

Water	evaporation, condensation, precipitation, runoff/transpiration
Carbon	photosynthesis & respiration, burning fossil fuels
Nitrogen	fixation: free nitrogen → $\text{NH}_4^+$ nitrification: $\text{NH}_4^+$ → nitrites/nitrates denitrification: nitrates → $\text{N}_2$ decomposition: organic matter → ammonia

### Animal Behavior

Proximate Cause	how a behavior occurs/is modified
Ultimate Cause	why behavior occurs in context of natural selection
Fixed Action Pattern	highly stereotypic behavior that is unchangeable and carried to completion
Sign Stimulus	external cue that triggers FAP exchanged within a species = releaser
Communication	visual (waggle dance), chemical (pheromones), tactile, & auditory (birdsong)
Kinesis & Taxis	change in activity in response to stimulus; oriented movement toward/away from stimulus

### Ecosystem Energy Flow



bottom-up model: influence from low → high  
top-down (trophic cascade) model: influence from high → low  
biological magnification: ↑ trophic level = ↑ accumulated toxin concentration



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