торіс **8.5**



Community Ecology

<u>ENE-4.A.1</u>

The structure of a community is measured and described in terms of species composition and species diversity.

торіс **8.5**



Community Ecology

<u>ENE-4.B.1</u>

Communities change over time depending on interactions between populations.

RELEVANT EQUATION Simpson's Diversity Index—

Diversity Index = $1 - \Sigma \left(\frac{n}{N}\right)^2$

- n = the total number of organisms of a particular species
- N = total number of organisms of all species

TOPIC **8.5**



Community Ecology

<u>ENE-4.B.2</u>

Interactions among populations determine how they access energy and matter within a community

<u>ENE-4.B.3</u>

Relationships among interacting populations can be characterized by positive and negative effects and can be modeled. Examples include predator/prey interactions, trophic cascades, and niche partitioning.

торіс **8.5**



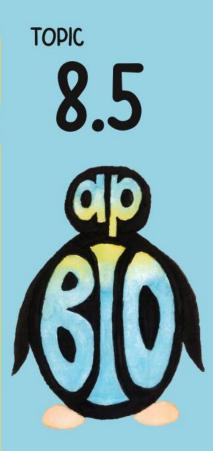
Community Ecology

<u>ENE-4.B.4</u>

Competition, predation, and symbioses, including parasitism, mutualism, and commensalism, can drive population dynamics.

<u>ENE-4.C.1</u>

Cooperation or coordination between organisms, populations, and species can result in enhanced movement of, or access to, matter and energy



There's 4 different species. What's the species richness?

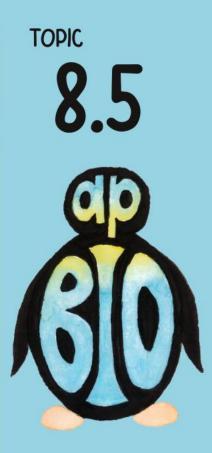
There's 4 different species. What's the species richness?

C. 4



Species richness is the number of different species in an area.

There are 4 different species so the species richness is 4.

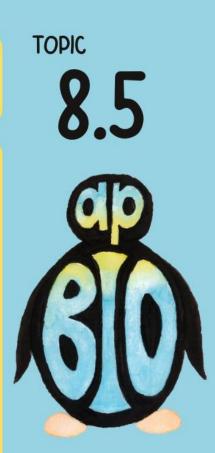


In Simpson's Index formula, what does "backward E" mean?

- A. Equilibrium
- **B. Exponential**
 - C. Factorial
- D. Summation

In Simpson's Index formula, what does "backward E" mean?

D. Summation



The " Σ " means summation. You will add all the individual numbers together.

As predator population increases, prey population...

AP BIO INSTA-REVIEW

A. Decreases

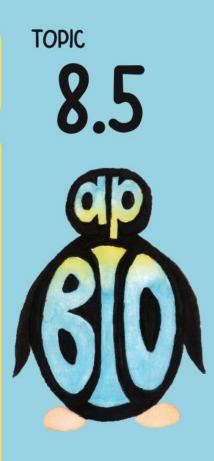
- **B.** Increases
- C. Stay the Save

As predator population increases, prey population...

A. Decreases



The predator consumes the prey. If there are more predators, they will be consuming more prey so the prey population will decrease.



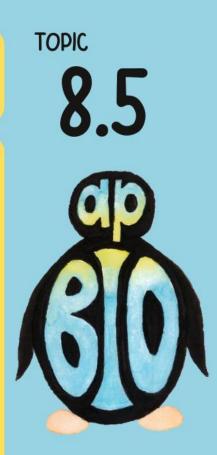
As prey population increases, predator population...

A. Decreases

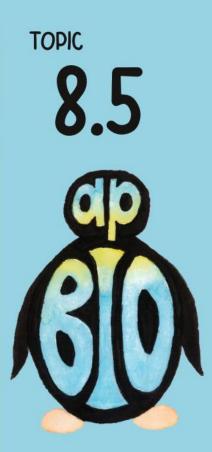
- **B.** Increases
- C. Stay the Save

As prey population increases, predator population...

B. Increases



The predator consumes the prey. If the prey population increases, there will be more food available for the predator so the predator population will increase.

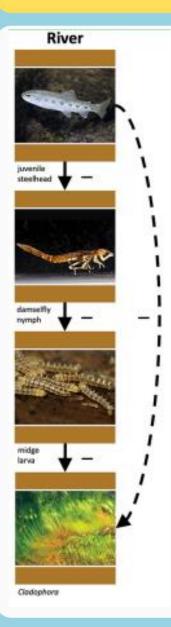


In a trophic structure of four organisms, what is the effect on the last one?

- All **3** organisms have a negative effect on the organism below them in the chain
 - A. Negative
 - **B.** No effect
 - C. Positive

In a trophic structure of four organisms, what is the effect on the last one? All 3 organisms have a negative effect on the organism below them in the chain

A. Negative



Each of the organisms has a negative impact on the organism below in the trophic structure, so overall there will be a negative effect. If there's two negative impacts, the overall impact will be positive. If there's three negative impacts, the overall impact will be negative.

TOPIC

85



Describe the interaction: Competition

D. -/-

Describe the interaction: Competition

Competition is negative for both parties as both populations or species will be negatively impacted with less resources.



Describe the interaction: Predator/Prey

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/ —

Describe the interaction: Predator/Prey

A. +/-



The predator is benefited (received nutrients) while the prey is harmed (it is consumed by the predator).



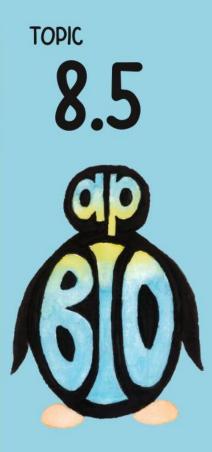
Describe the interaction: Mutualism

D. -/-

Describe the interaction: Mutualism

Mutualism is both populations/species are benefited.

example: termites & microorganisms in gut



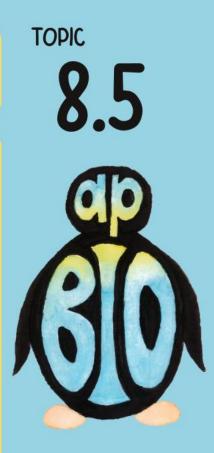
Describe the interaction: Host/Parasite

Describe the interaction: Host/Parasite

The host is negatively impacted (the parasite steals nutrients or harms the host) while the parasite is positively impacted (obtains nutrients from the host)

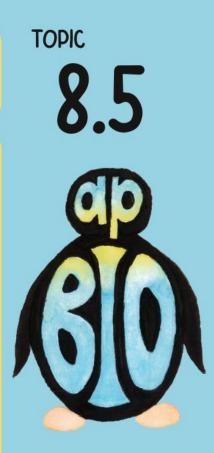


What is cooperation?



What is cooperation?

Interaction between organisms, populations, community to enhance movement of/access to matter and energy



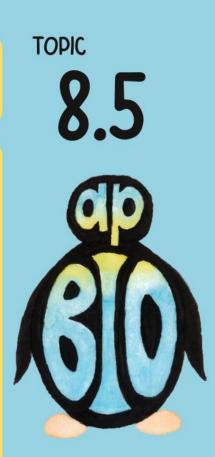
What is a species?

- A. Group of individuals that live in same area
- B. Group of individuals that mateC. Group of individuals able to mateand produce fertile, viable offspringD. Group of individuals that look the

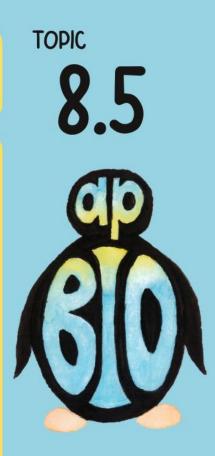
same

What is a species?

C. Group of individuals able to mate and produce fertile, viable offspring



The biological species concept refers to two individuals are from the same species if they are able to interbreed and produce fertile, viable offspring.

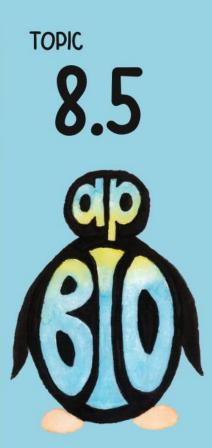


What is species richness?

- A. The number of different species
 - B. The number of individuals in a species
 - C. The total species that exist on Earth
 - D. The total money that's the species is worth

What is species richness?

A. The number of different species



Species richness is the number of species in an area. The more species, the more rich the area. The less species, the less rich the area.

Solve with Simpson's Index

Penguins = 10 Monkeys = 5

RELEVANT EQUATION Simpson's Diversity Index—

Diversity Index = $1 - \Sigma \left(\frac{n}{N}\right)^2$

- n = the total number of organisms of a particular species
- N = total number of organisms of all species

Solve with Simpson's Index

> Penguins = 10 Monkeys = 5



$1 - [(10/15)^2 + (5/15)^2]$

1-[(0.44)+(0.11)]

1-0.55

0.45



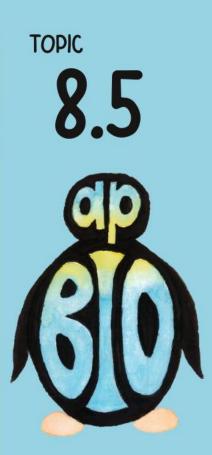
Two species are able to survive with the exact same niche

A. True

B. False

Two species are able to survive with the exact same niche

B. False



The competitive exclusion principle states that two species cannot survive with the exact same niche. It is favorable for the two species to undergo resource partitioning to divide up the resources to ensure both species are successful.



Interaction in which both organisms are harmed.

- A. Competition
- **B.** Cooperation
 - C. Mutualism
 - D. Parasitism

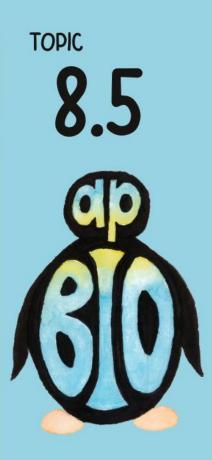
Interaction in which both organisms are harmed.

A. Competition



Competition is -/- as both individuals are harmed since they are competing for the same resource.

Cooperation is +/+ Mutualism is +/+ Parasitism is +/-



Interaction in which both species are benefited

- A. Competition
- **B.** Cooperation
 - C. Mutualism
 - D. Parasitism

Interaction in which both species are benefited

C. Mutualism



Mutualism is +/+ as both individuals are benefited since they are providing a service or resource to each other.

> Competition is -/-Cooperation is +/+

Parasitism is +/-



Interaction in which one species benefits and other is harmed

- A. Competition
- **B.** Cooperation
 - C. Mutualism
 - D. Parasitism

Interaction in which one species benefits and other is harmed

D. Parasitism



Parasitism is +/- as one is benefited (parasite) while the other is harmed (host) due to the parasite taking resources from the host.

> Competition is -/-Cooperation is +/+ Mutualism is +/+

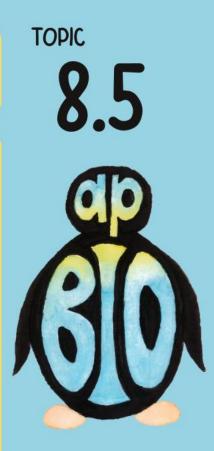


What type of interaction is predator/prey?

A. +/+ B. +/-C. +/() D. -/-

What type of interaction is predator/prey?

The predator is positively impacted because it obtains nutrients (and food) while the prey is negatively impacted because it dies (and is consumed by the predator).



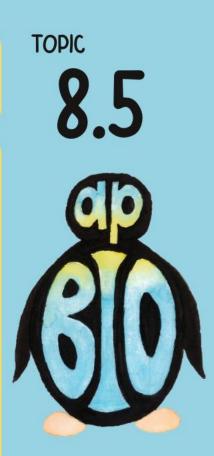
Predict the result if you separate two obligate mutualistic organisms.

A. No response

- B. Organism 1 grows, organism 2 dies
- C. Both organisms increase growth
- D. Both organisms decrease growth

Predict the result if you separate two obligate mutualistic organisms.

D. Both organisms decrease growth



Obligate mutualistic organisms CANNOT survive without the other organism. If you were toe isolate either of these organisms, neither organism will survive.



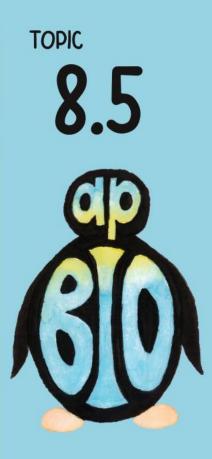
Why would both organisms decline if obligate mutualistic organisms are separated?

Why would both organisms decline if obligate mutualistic organisms are separated?



I always tell my students they are obligated to be together.

They are unable to survive without the other. An example of this would be the microorganisms that live in the gut if a termite. If you kill the microorganism in their gut, the termite will no longer be able to digest cellulose thus it will starve as it only eats wood.



If two organisms share a niche, how do they both survive?

- A. Competitive exclusion
- **B.** Resource partitioning

If two organisms share a niche, how do they both survive?

TOPIC 85

B. Resource partitioning

Resource partitioning is a process where species will divide up the resources. This allows the species to co-exist in the same area without the competitive exclusion principle which states that two species cannot share the same niche.