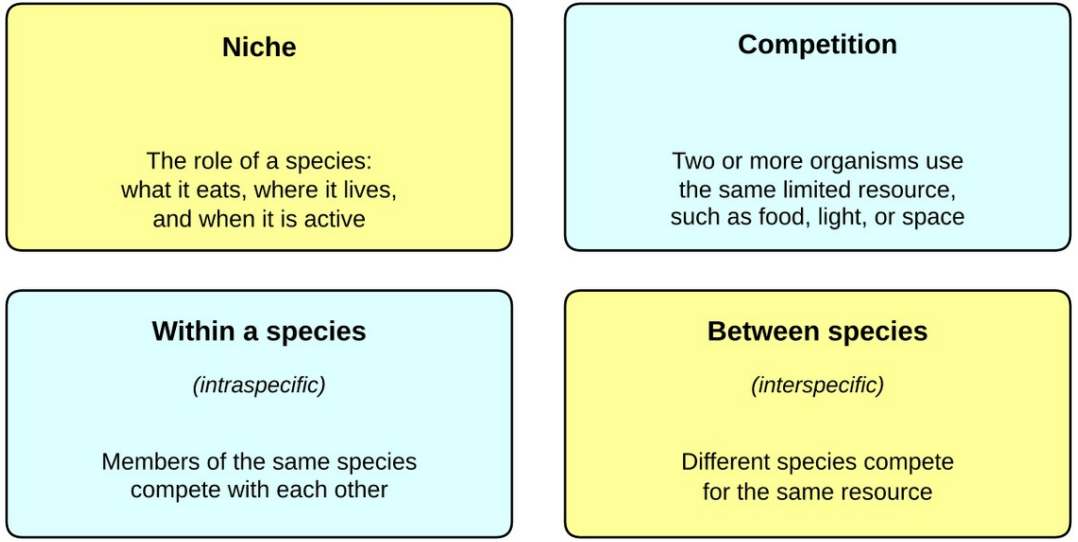
## Essential Question

What happens when two species need the same resources?

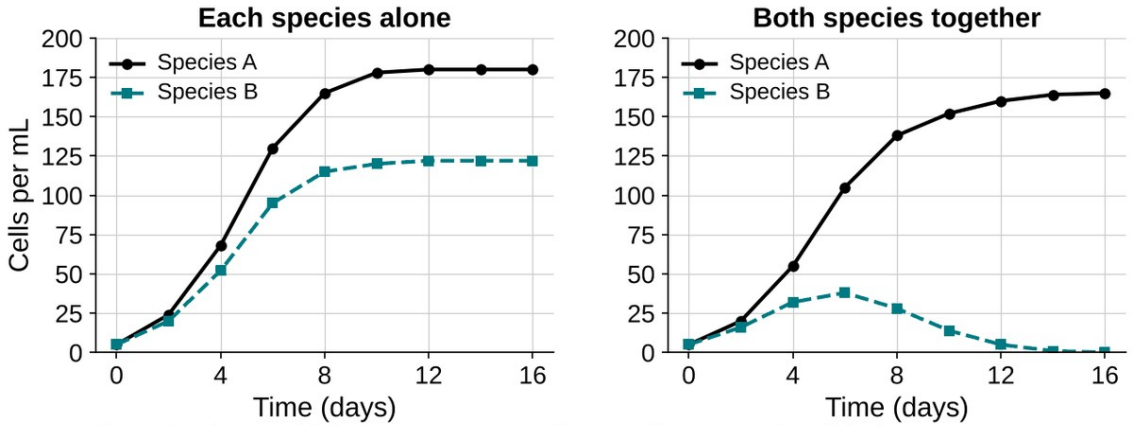
# Niches and Competition

- Niche: a species' role in its community
- Competition: using the same limited resource
- Intraspecific: within one species
- Interspecific: between different species



# Competitive Exclusion

- Species with very similar niches compete strongly
- A small advantage can matter over time
- The weaker competitor may decline in that habitat
- Seen in lab experiments such as Gause's Paramecium

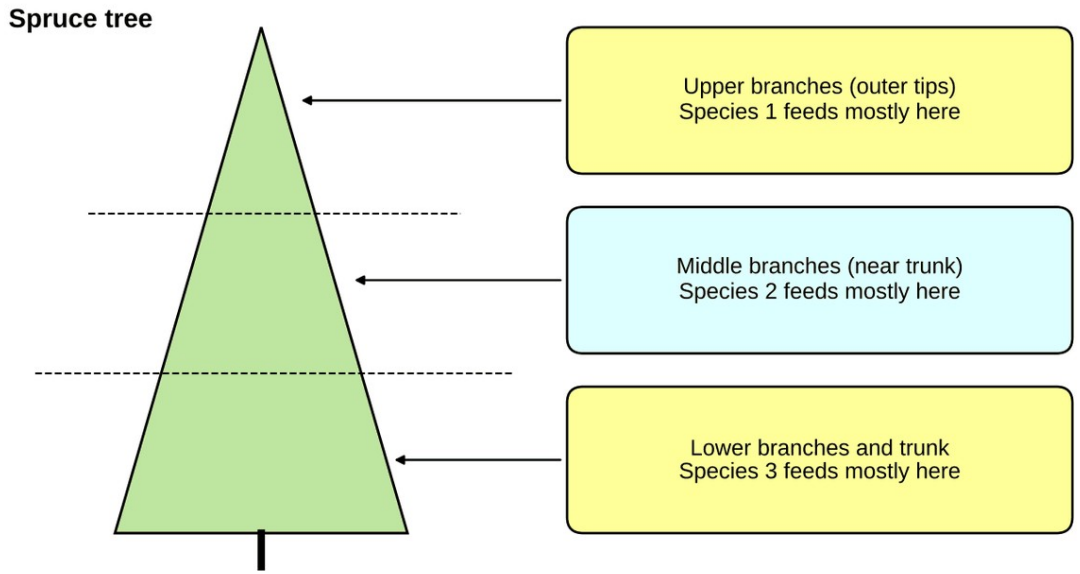



*Illustrative data modeled on Gause's Paramecium experiments, not the original measurements.*

# Competition and Niche Partitioning

## Resource Partitioning

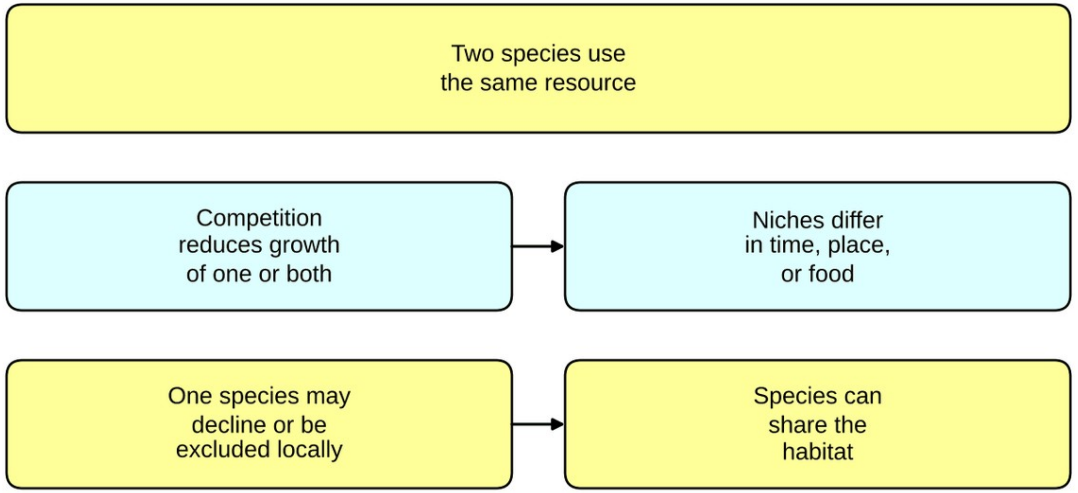
- Species may use different parts of a resource
- Different place, food, or time of activity
- Less niche overlap means less competition
- Lets similar species live together




*Simplified model. Real warblers overlap somewhat and also vary in how they hunt.*

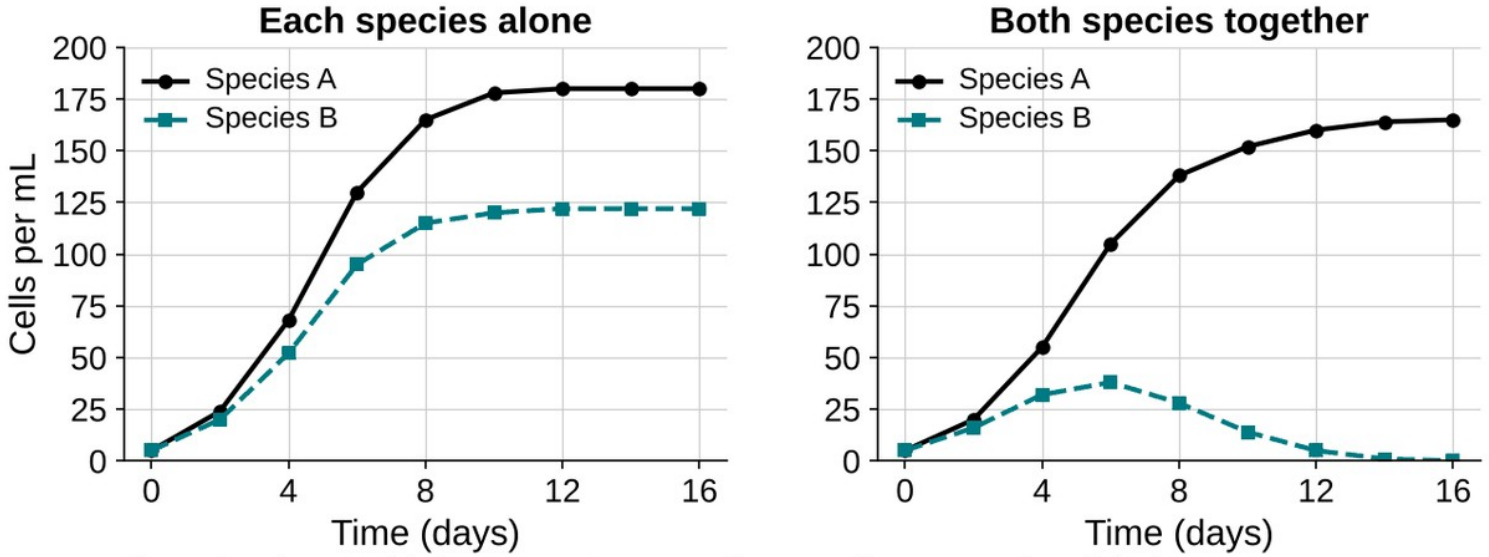
# Outcomes of Competition

- Competition can lower growth of one or both species
- One species may decline locally
- Or species can come to use resources differently
- Outcomes depend on the conditions



# Example: Two Species in One Container

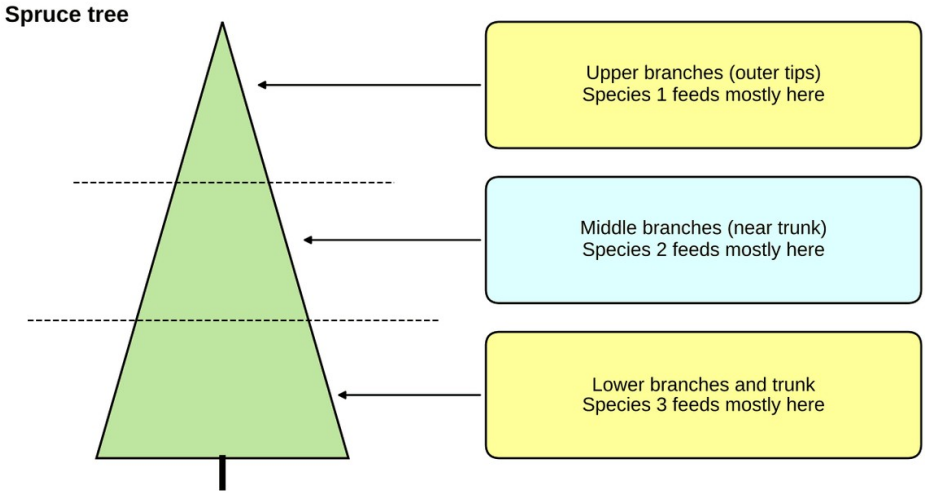
Use the graph. When the two species were grown together, which one was outcompeted? Write a claim, evidence, and reasoning.




*Illustrative data modeled on Gause's Paramecium experiments, not the original measurements.*

# Example: A New Warbler Arrives

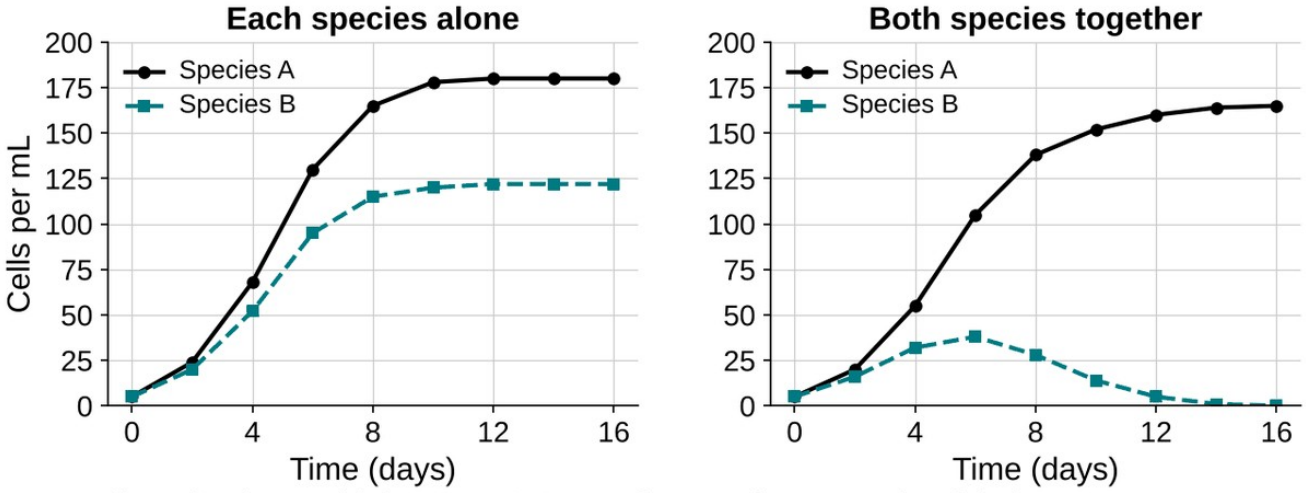
Use the spruce tree model. A new warbler species arrives that feeds mostly on the middle branches near the trunk, the zone species 2 uses. Predict what might happen and explain with the idea of niche overlap.




*Simplified model. Real warblers overlap somewhat and also vary in how they hunt.*

# Example: How Much Did Species B Decline?

In the graph where both species are grown together, species B peaks at 38 cells/mL on day 6 and is at 5 cells/mL on day 12. What percent decrease is this? Round to the nearest tenth of a percent.




*Illustrative data modeled on Gause's Paramecium experiments, not the original measurements.*

# Competition and Niche Partitioning

## Big Ideas

- A niche is a species' role in its community
- Competition happens when organisms use the same limited resource
- Strong niche overlap can lead to one species declining locally
- Resource partitioning lets similar species share a habitat
- Outcomes depend on conditions and often take time