

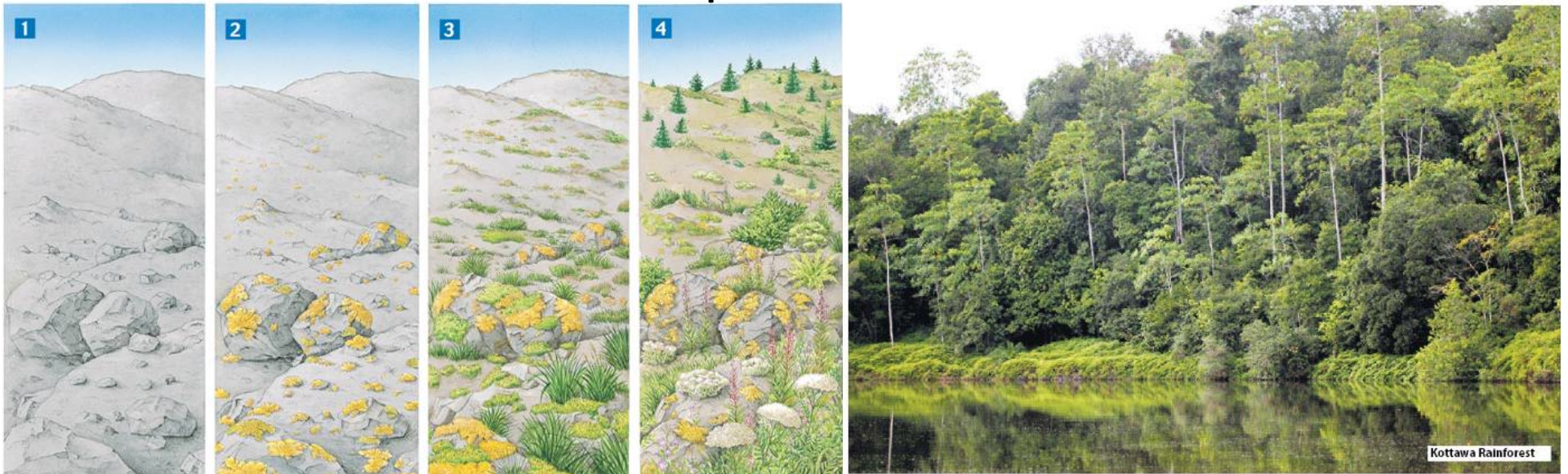
Ecological Succession

- Ecosystems are constantly changing
 - Changes can start after quick disturbances, like a wildfire or volcano erupting.
 - Changes can be slow and gradual, where older species die out and newer ones replace them.



2 Types of Ecological Succession

1. **Primary Succession** – essentially starts on rock.
 - **Pioneer Species** – the first species to grow on the rock, usually lichen.
2. **Secondary Succession** – occurs after natural events like weather or wildfire OR after human activities like farming.
 - **Climax Communities** – mature ecosystems containing a stable collection of plants and animals.





Relationships in Communities

Describe what is happening here



Describe what is happening here



Describe what is happening here



Describe what is happening here



Describe what is happening here



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Relationships in Communities

- Niche
- Predation
- Competition
- Symbiosis

Biosphere

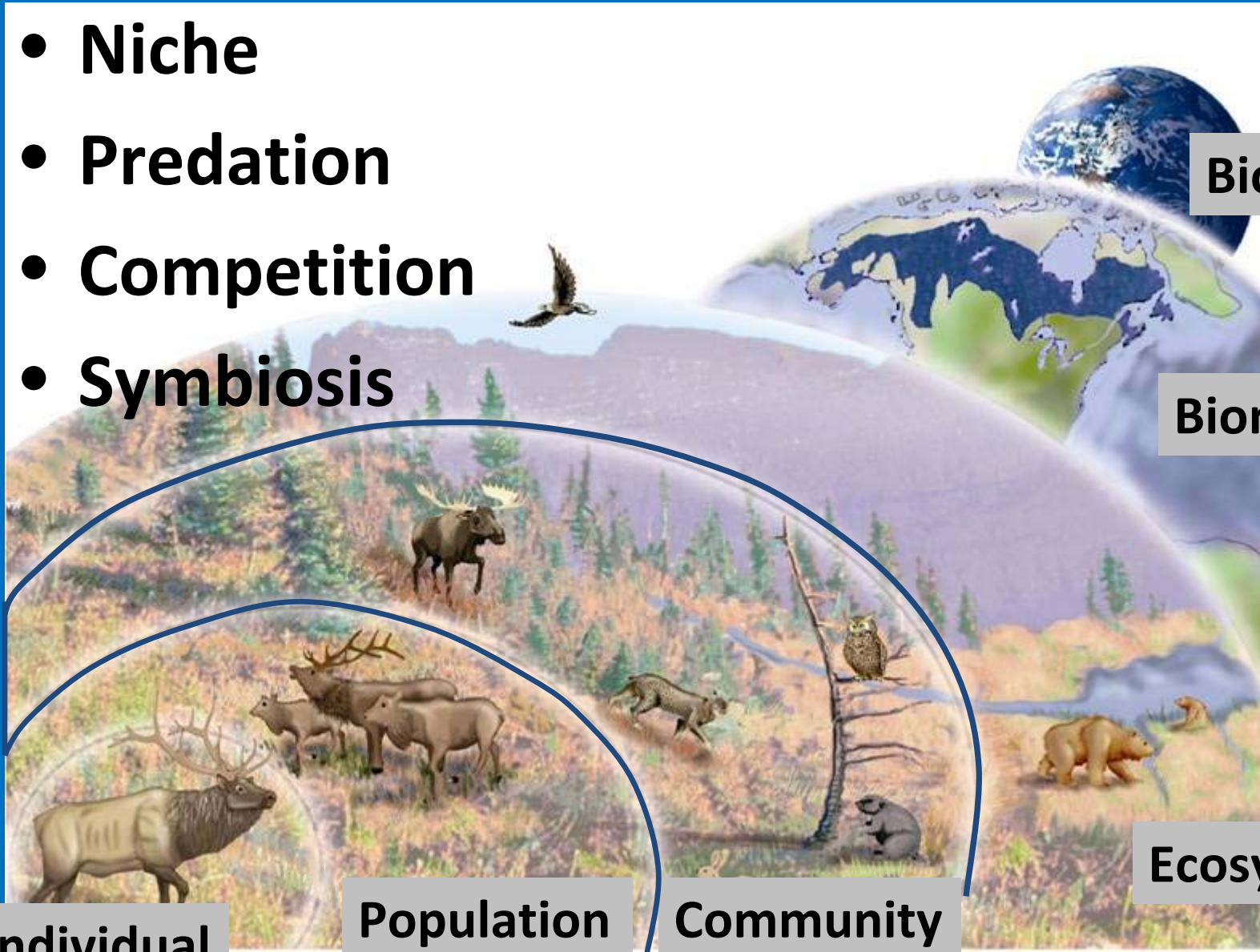
Biome

Ecosystem

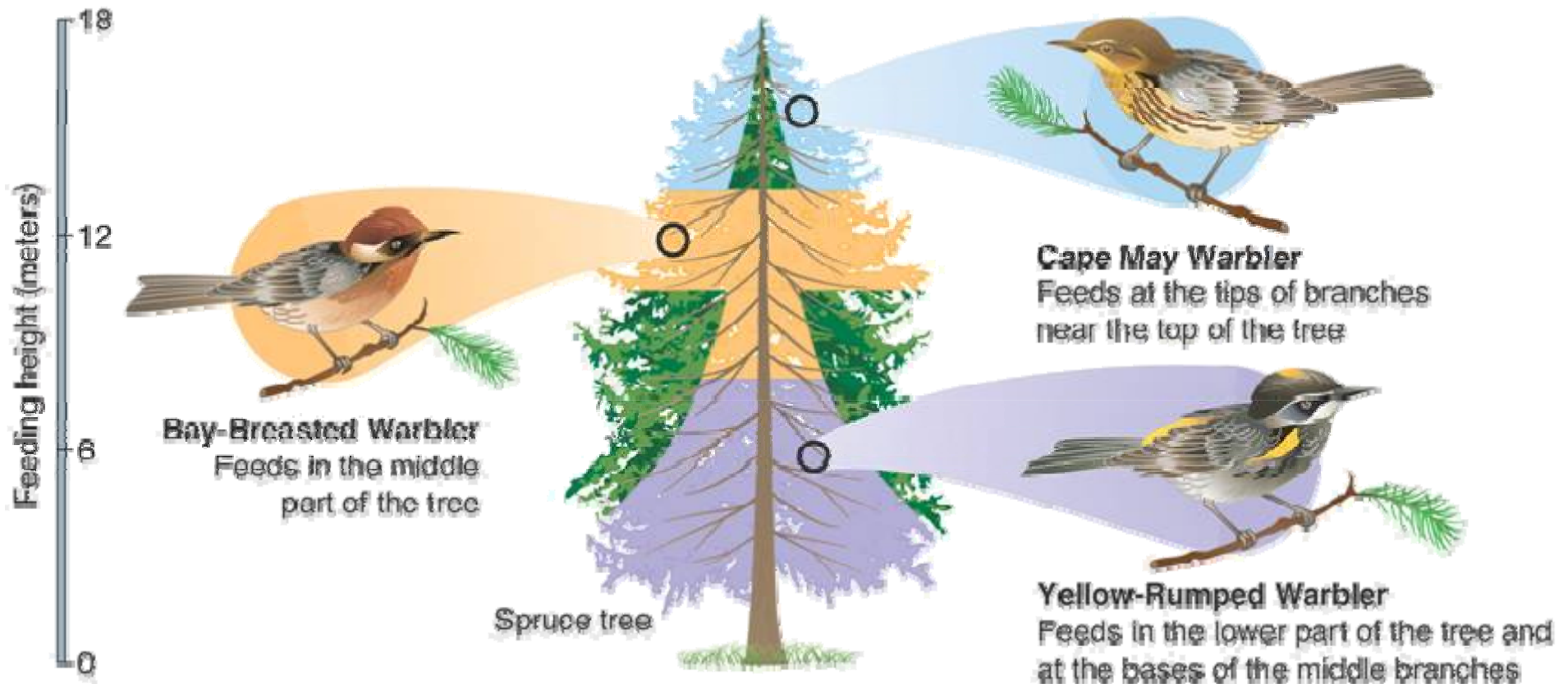
Individual

Population

Community



Niche: the role an organism has & the environmental conditions it needs to survive.



Predation ☺ ☹

(predator-prey relationship)

- **one organism captures and feeds on another organism.**



- **Example: bears catch and eat salmon**

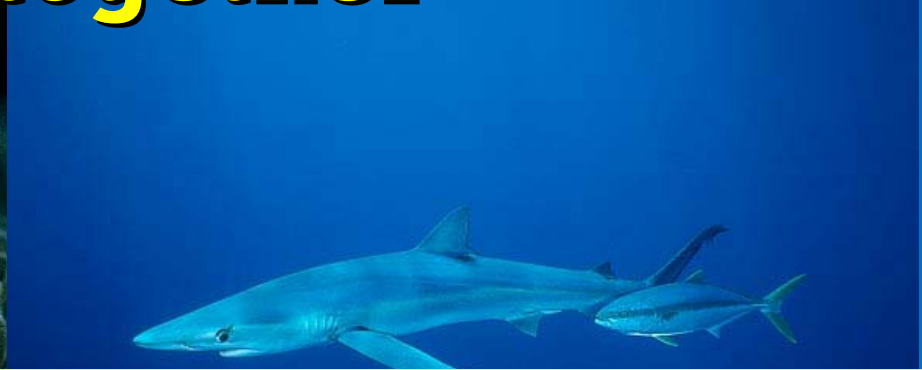
Competition ☹️ ☹️

- 2 organisms compete for limited resources, such as food, water, or territory.



- Example: bullfrogs & foothill yellow legged frog compete for food.

Symbiosis: organisms that are living together



3 Types of Symbiotic Relationships:



1. Mutualism 😊 😊

- Both organisms benefit from the relationship



Photo credit: JimmyHu

Example: Otters and Kelp

The otters help the kelp by eating the sea urchins that endanger the kelp. The kelp provides an anchor for the otters while they sleep.

2. Commensalism 😊 😐

- One species benefits & the other is not affected.

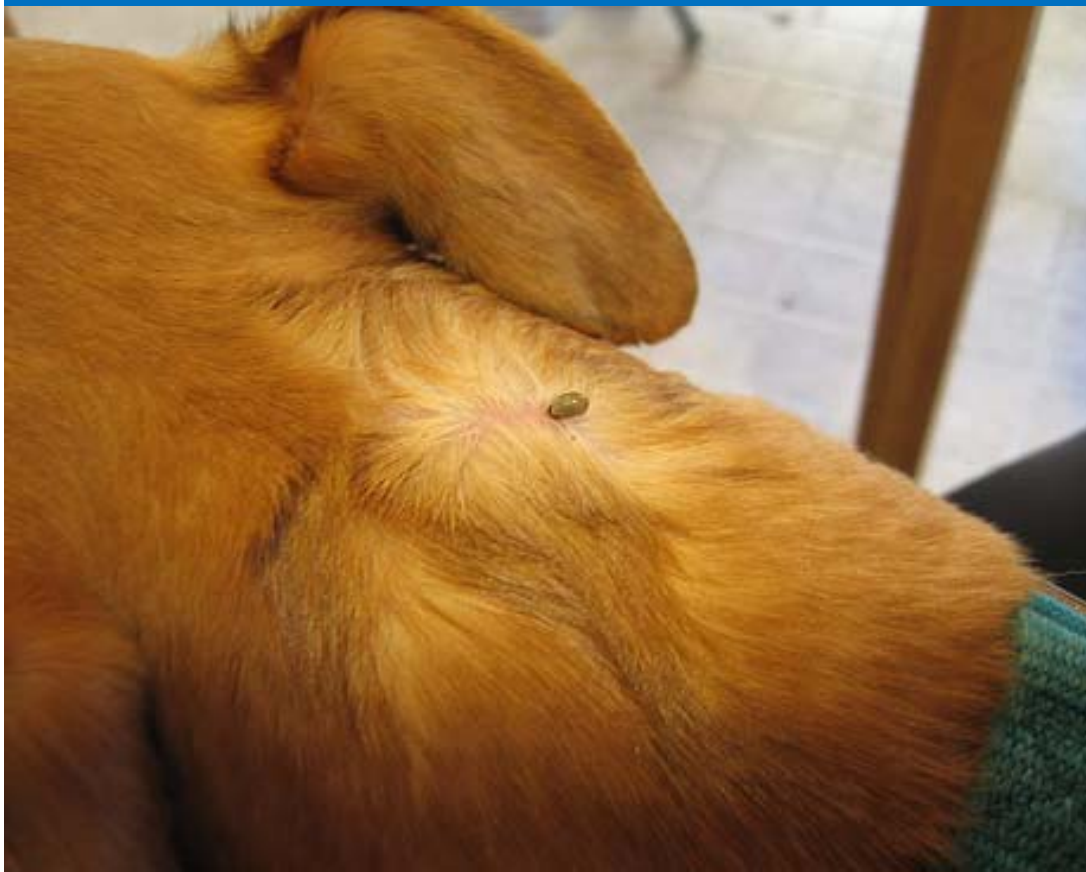
Example: bluefin shark & yellowtail fish

Yellowtail fish brush against sharks to get rid of old scales or parasites on their scales. The sharks are not affected.



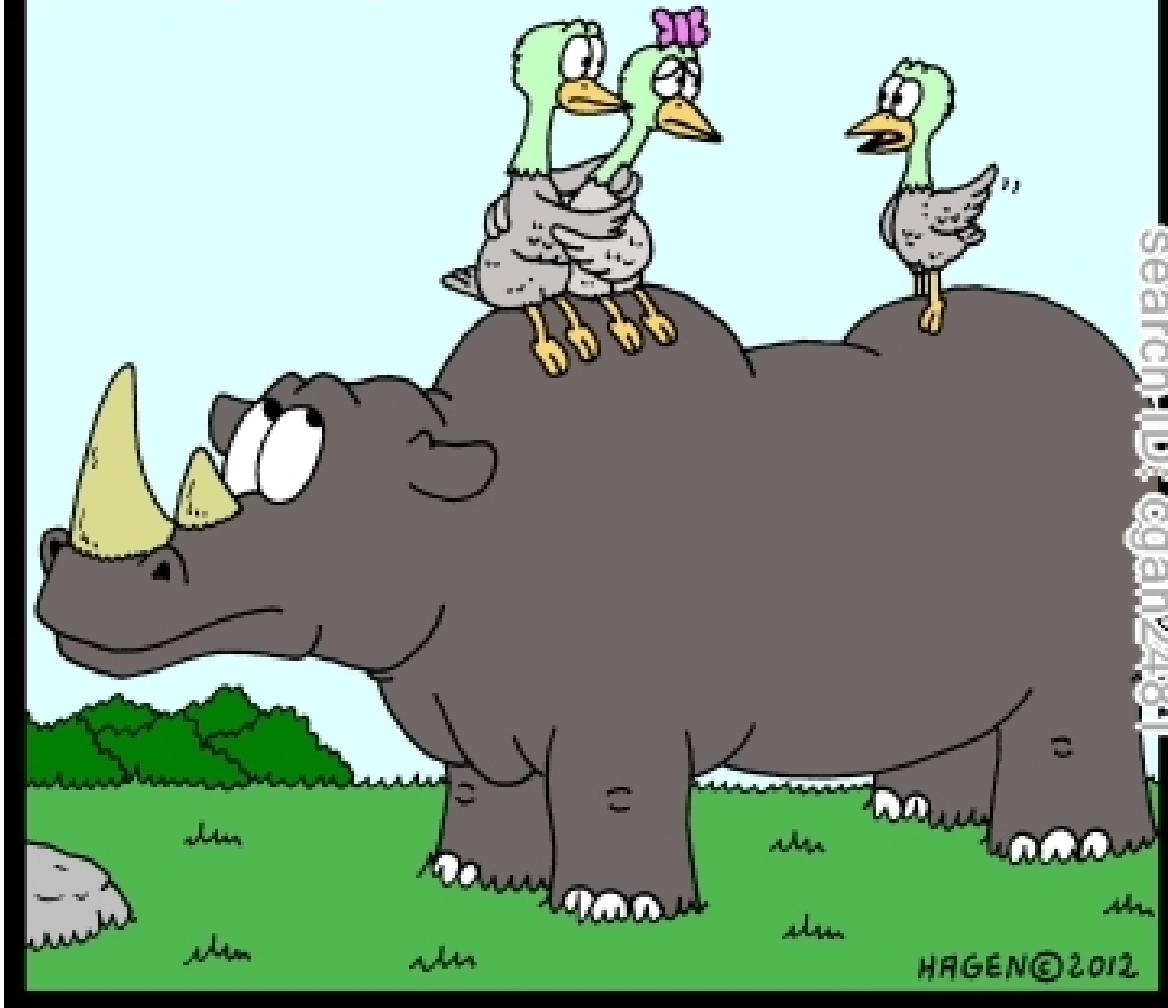
3. Parasitism 😊 ☹️

- One organism benefits while the other is harmed.
 - Example: Ticks on dogs



Ticks attach to and feed on a host organism like this dog. Ticks may also carry disease-causing organisms.

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Mum, Dad, I think it's time I move out
and find my own rhinoceros...

Review – Identify the correct definition

- Mutualism is a relationship where



- ? One organism benefits and the other is unaffected.
- ? Both organisms benefit.
- ? One organism benefits and the other is harmed.

The cleaner fish eats parasites and food bits out of the inside of this moray eel. It gets a meal and is protected from predators by the fierce eel.

Review – Identify the correct definition

- Commensalism is a relationship where



- ? One organism benefits and the other is unaffected.
- ? Both organisms benefit.
- ? One organism benefits and the other is harmed.



Figure 1. A gall-making cynipid wasp.

The oak gall wasp stings the oak tree.
The tree then grows a gall which is a nest for the wasp's babies.
Does not help or hurt the oak tree

Review – Identify the correct definition

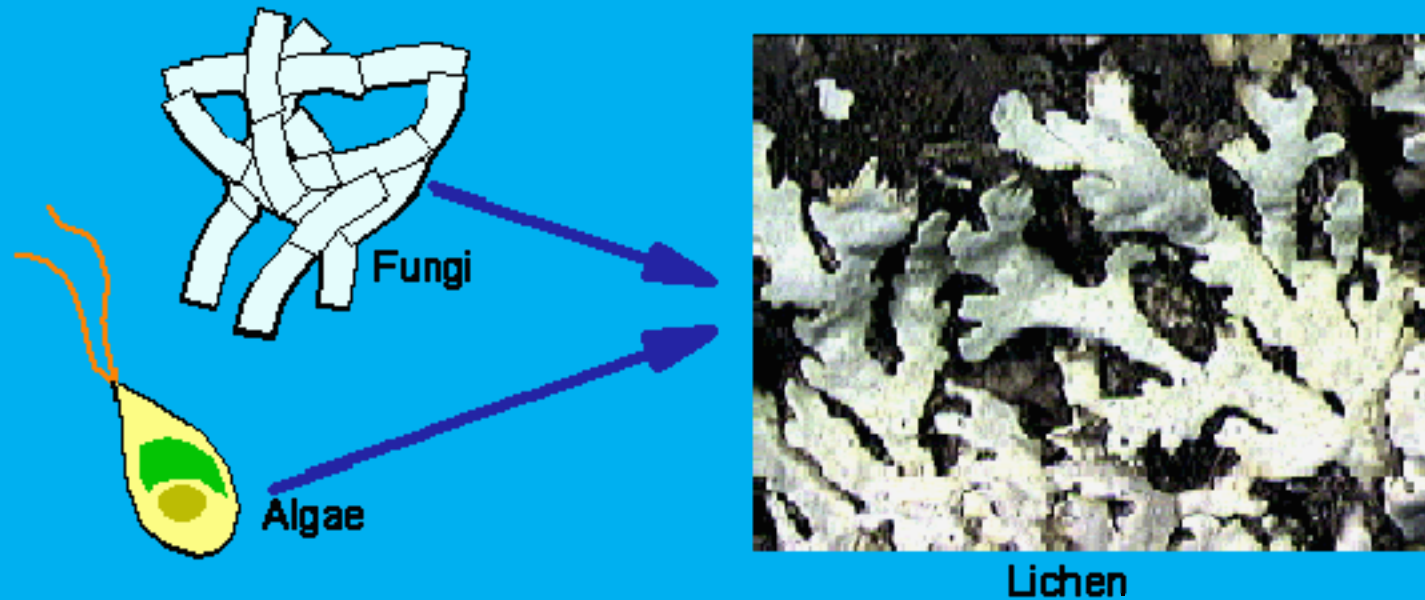
- Parasitism is a relationship where



- ? One organism benefits and the other is unaffected.
- ? Both organisms benefit.
- ? One organism benefits and the other is harmed.

Mistletoe is a parasite that has no roots of its own and lives off the tree that it attaches itself to. Without that tree it would die. It slowly chokes out the life of the host tree.

Lichen – Mutualism? Commensalism? Or Parasitism?



- Lichen is really two organisms: algae and fungus. The fungus needs food but cannot make it. The algae makes food but needs some way to keep moist. The fungus forms a crust around the algae which holds in moisture. Both organisms benefit.

Barnacles and Whales – Mutualism? Commensalism? Or Parasitism?

Barnacles need a place to anchor. They must wait for food to come their way. Some barnacles hitch a ride on unsuspecting whales who deliver them to a food source. This does not effect the whale in any way.



Video Links for Relationships in Communities WS

- [Tiger Shark & Loggerhead Turtle](#)
- [Aphids & Ladybirds \(aka ladybugs\); Honey pot ants & Aphids](#)
- [Clownfish & Sea Anemone](#)
- [Black Wasps & Aphids](#)
- [Sharks & Fishermen](#)

How Populations Grow

- Natural populations don't always stay the same size...
 - They might grow quickly OR they might decrease in size.
- **Population Density** is one characteristic of populations:
 - The number of organisms that live in a specific area.
- 4 factors affect population size:
 - Number of births
 - Number of deaths
 - Immigration (individuals moving INTO an area)
 - Emigration (individuals moving OUT of an area)

How Populations Grow

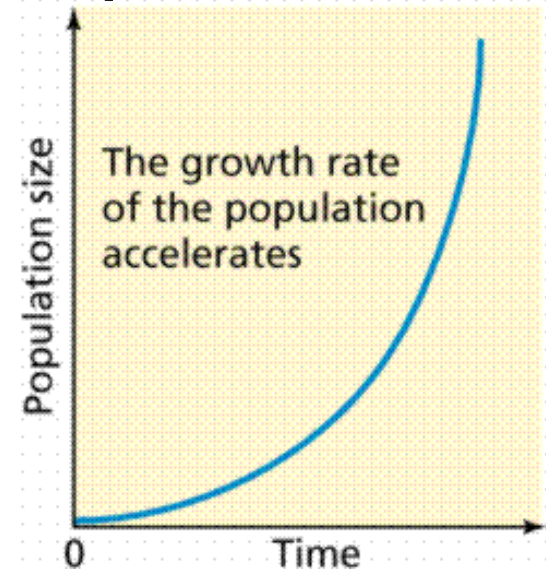
- Population Growth Curves:

- Exponential Growth:
unrestricted growth

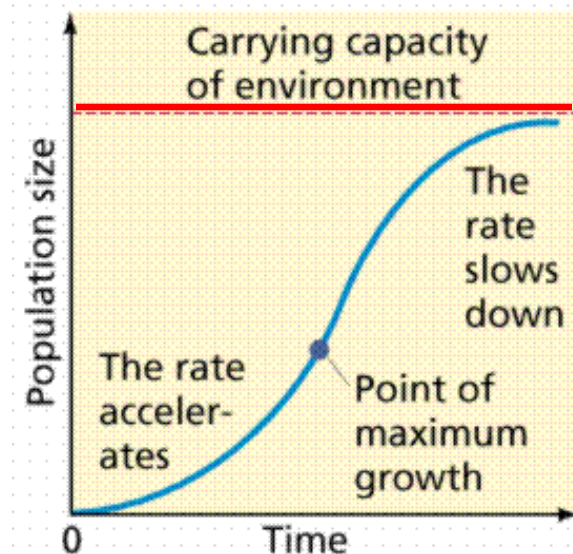
- Logistic Growth:
restricted growth

- Carrying Capacity: the maximum number of individuals that can be supported in an area.

Exponential Growth



Logistic Growth



Limiting Factors to Population Growth

- **Density-Independent Factors:** environmental factors that don't depend on the population density.
 - Ex: weather, fire, human activity
- **Density-Dependent Factors:** factors that DO depend on the population density.
 - Ex: disease, competition, parasites

