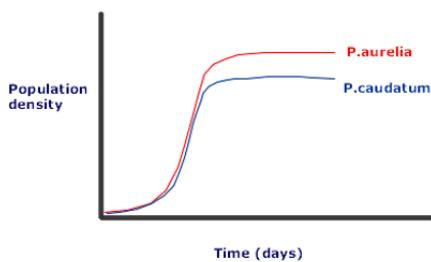


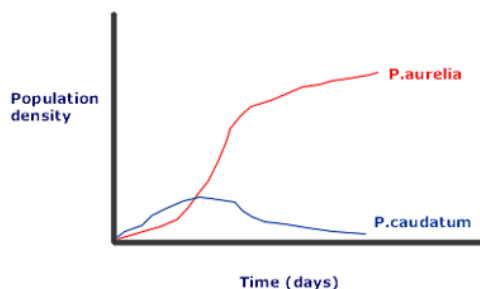
## Interspecific Relationships

- A community includes all the species/ living organisms found in a particular location.
- These organisms interact with each other in a variety of ways
- Interspecific relationships include commensalism, mutualism, parasitism, predation, herbivory and competition.
  - ☐ **Predation** - One animal species eats members of another animal species
  - ☐ **Herbivory** - An animal species eats parts of a plant species
  - ☐ **Competition** - Members of different species compete for the same resources
  - ☐ **Parasitism** - members of one species live on or inside members of another species, feeding off them
  - ☐ **Mutualism** - Two species provide each other with different resources
  - ☐ **Commensalism** - one species benefits from or aids another species while not being affected itself
- **Competition** exists when organisms need the same resource that is scarce. Examples of such resources are: food, light and water. If the competition is between members of different **species** it is called **interspecific**.
- The earliest experiments on this form of competition were carried out by Gause, who set up cultures of two closely related freshwater **protozoa**, *Paramecium caudatum* and *Paramecium aurelia*.

When grown separately, both species flourish as shown in the graph.



However, when they were grown together in a mixed culture the smaller *P. aurelia* was successful and the *P. caudatum* was eliminated.



By adjusting the conditions, Gause was able to change which species was eliminated - but there was always one species eliminated.

He came up with a conclusion known as **Gause's law** or the **principle of competitive exclusion**,





**No two species can occupy the same niche indefinitely in the same habitat.'**


	Organism 1 (+ / - / 0)	Organism 2 (+ / - / 0)	Example
Predation	+ Predator	- Prey	Lion
Herbivory	- Plant	+ Grazer	Sheep, deer or rabbits
Competition	- Comp. A	- Comp. B	lion and hyena
Parasitism	- Host	+ Parasite	Stomach worms in sheep
Mutualism	+ Species A	+ Species B	Tick cleaning bird and cattle
Commensalism	+ User species	0 Provider	Barnacles and whales

NOTE: Predation, herbivory and parasitism are all examples of **exploitation**.

Many species have evolved partnerships in which both species benefit / mutualism by **co-evolution**

You will be required to identify the relationship and give reasons. Below are a number of examples, with the types of reasons needed. Remember it's always about surviving long enough to be healthy and breed leaving offspring so the species can survive.

Example	Relationship	Reason
	Mutualism	Both organisms benefit – the clownfish cleans the anemones, chasing away their predators and dropping food for the anemones to eat
	Competition	Both organisms are harmed as they both eat the grass and are therefore competing for their food
	Predation	One organism the zebra (prey) is killed and harmed while the lion (pray) gets food so benefits
	Mutualism	Both organisms benefit – the Tui (pollinator) gets nectar (food) from the flower while the flower (flax) gets its pollen transferred between plants (pollination)

	Herbivory OR Parasitism	The Caterpillars are eating the plant. The caterpillars benefit as they get food while the plant is harmed (eaten)
	Parasitism	The host plant - Pohutukawa tree is harmed as the parasite – mistletoe grows roots into the host and takes nutrients and water from the host, therefore harming it
	Competition	Both are harmed as they are fighting for food OR territories, both want the same resources
	Commensalism	Barnacles benefit, whales are unaffected - Barnacles grow on whales so gain a habitat while the whale is unaffected.
	Predation	Tuatara (predator) are considered sit-and-wait predators, they sit motionless for young birds – in this case a bellbird (prey) to eat
	Mutualism	Tuatara sometimes share burrows of shorebirds; the bird lets the Tuatara stay because the reptile eats any unwanted insects that maybe in the burrow.
	Commensalism	A plant that grows on another plant and depends on it for support but not food. Epiphytes get moisture and nutrients from the air or from small pools of water that collect on the host plant

Over a much longer period, predators and prey shape each other's *evolution*...Predators show adaptations OR evolve for obtaining food and prey for avoiding being eaten.

Predator adaptations – to make hunting more successful	Prey adaptations – to give them the best chance of surviving long enough to breed
built for speed sharp teeth and claws camouflage to avoid being seen by prey eyes to the front of the head to judge size and distance well	live in groups built for speed defences such as poison or stings camouflage to avoid being seen by predators

	eyes to the side of the head to get a wide field of view trickery: false features and mimicry
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