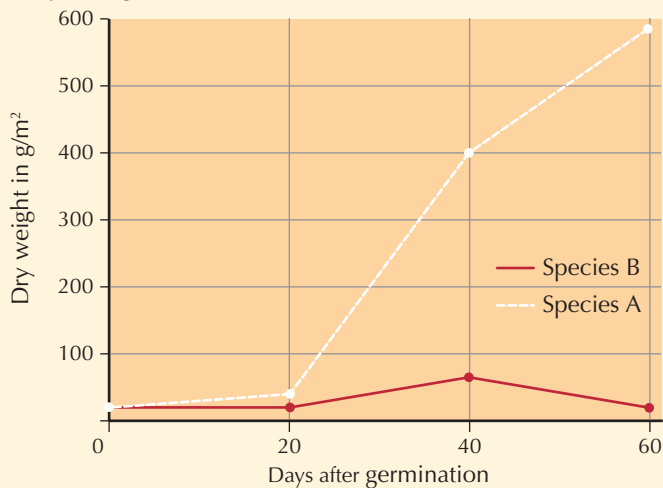


Activity 23A: Ecological niche

- Distinguish between the terms:
 - environment and habitat
 - biotic and abiotic.
- Define the terms:
 - ecological niche
 - physiological tolerance
 - adaptation
 - Gause's principle.
- The graph following shows the changes in biomass (dry weight) of two species of clover grown together in equal numbers in the same plot. Equal numbers of each species germinated.



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Explain how these results support Gause's principle.

- Surveys of some of the streams in the high country of Otago and Canterbury produced the following data.

Stream	pH of stream water	Number of plant species	Number of animal species
1	4.0	8	7
2	8.1	19	13
3	4.4	11	6
4	6.6	23	19
5	5.7	16	9

- Explain the relationship between the pH of the stream and the number of animal species.
- Explain why *Stream 4* has the greatest biodiversity.
- Explain which stream ecosystem would be expected to be the least stable.

5. Prolonged exposure to high temperatures may dehydrate organisms and cause death. Do a quick bit of research if necessary and describe what happens to organisms experiencing dehydration and explain why dehydration may cause death.

Activity 23A answers: Ecological niche

1.
 - a. The environment is the general surroundings (biotic and abiotic factors) that affect an organism, while the habitat is the particular set of these factors that the organism lives in.
 - b. Biotic refers to living factors, while abiotic refers to non-living factors.
2.
 - a. The position or role that the organism occupies in its community; it is a combination of where the organism lives (habitat) and how it lives there (adaptations).
 - b. An organism's physiological ability to withstand a range of an environmental factor.
 - c. A feature of an organism (structural, physiological or behavioural) that allows it to survive successfully in its niche.
 - d. No two organisms can occupy the same niche / co-exist with each other, as one will outcompete and eliminate the other.
3. When both species of clover are grown together, *Species A* increases in numbers while *Species B* decreases/is killed off; this is because *Species A* is the more successful competitor and is outcompeting and eliminating *Species B*.
4.
 - a. As the pH decreases below pH 7 or increases above pH 7, the number of animal species decreases. This is because the lower the pH, the more acidic the water and animals cannot tolerate (high) acidity; and the higher the pH, the more alkaline the water – and animals cannot tolerate (high) alkalinity.
 - b. It has the most (different) animal *and* plant species because the pH (of 6.6) is nearly neutral (neither acidic nor basic), which is the optimum pH for most species.
 - c. Stream 3 would be least stable, because it has the least biodiversity. The fewer the species in a community, the less complex any food web is (i.e. there are fewer links) and the more prone to collapse food webs are if a link is removed.
5. Cell functions/reactions take place in an aqueous ('watery') environment. Dehydration results in cells losing water, so cell functions/reactions cease – transport systems stop, gas exchange ceases, digestion and excretion cannot occur; death results.