Activity 4: Producers

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| VCE key knowledge | * The distribution, density and size of a population of a particular species within an ecosystem and the impacts of factors including available resources, predation, competition, disease, chance environmental events, births, deaths and migration
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| VCE key science skills | * Process quantitative data using appropriate mathematical relationships and units
* Organise, present and interpret data using schematic diagrams and flow charts, tables, bar charts, line graphs, ratios, percentages and calculations of mean
* Access secondary data, including data sourced through the internet that would otherwise be difficult to source as raw or primary data
* Draw conclusions consistent with evidence and relevant to the question under investigation
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| Learning outcomes | * Describe how Ecologists work towards the conservation of species and ecosystems
* Describe how Ecologists conduct a wide range of experiments to learn about the ecosystem
* Compare a wide range of biotic and abiotic factors and explain how they influence the size and distribution of the population of a particular species
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| Duration | 30-45 minutes |

Students look at how the strategies being used by Arid Recovery impact the first trophic level in the food web – the producers. They consider how they would compare grazing by rabbits with grazing by native mammals and hypothesise what they think would happen. After hearing from Dr Munro about her work, students work with some of her data and consider if this supports their hypothesis. They learn that the density and number of species of plants are determined by the number of animals that predate on them.

# Step 1

Students work through their worksheet, which includes a short video.

Teacher explanation:

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| 1. Imagine you’re an ecologist working at Arid Recovery. Remember you have a fenced reserve that keeps rabbits and other non-natives out. Small native mammals that eat plants have been reintroduced. Outside the reserve there are rabbits and few native mammals. You want to find out how rabbits and native mammals compare in terms of their impact on plants. What is your hypothesis?

*Students will likely hypothesise that plants outside the reserve (in the presence of rabbits) will be more severely impacted by grazing than areas inside the reserve. If their hypothesis is the other way around, or no difference, this is also fine. However, you could ask for their reasoning.*1. Ecologists use many different methods to test their ideas and gather data. How might you go about testing your hypothesis?

*There is no right answer, the purpose is to get students thinking about possible experimental designs.* 1. Ecologist Dr Nicki Munro also designed an experiment to explore this question. Watch this clip to learn how she designed her study and why. Clip found at [**https://youtu.be/lUBmvMcI0l0**](https://youtu.be/lUBmvMcI0l0)

Let’s explore some of Nicki’s results for Mulga.

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| **Year** | **Inside**  | **Outside** |
| 2001 | 31 | 3 |
| 2003 | 66 | 2 |
| 2006 | 87 | 2 |

Plot these results on a graph. Mulga is typical of all the plant species Dr Munro looked at. Does this match your hypothesis? *Graph should look like this.*1. The density and number of a prey species are determined by the density and number of a species that prey on them. In this case, which is the prey and which the predator?

*Mulga is the prey and rabbits are the predator. Students should understand that the density of the Mulga is directly affected by the density of rabbits.* |