# Against All Odds: Inside Statistics – Designing Experiments

**ABC ME screening details: Monday** 1 June, 2020 at 2:50pm

This episode can also be viewed on [ABC iView](https://iview.abc.net.au/show/against-all-odds-inside-statistics) after the scheduled screening time.

**Key learning areas:** Mathematics

**Level:** Secondary

**About: We move beyond observational studies – like one of marine life in the remote Line Islands – to designing experiments that manipulate various subject groups – as in the case of a medical study about osteoarthritis treatments.**

## Before the episode

Using a dictionary, write a definition for each of the following terms:

* Placebo
* Experiment
* Bias
* Variable
* Random

## During the episode

1. Why were the Line Islands perfect for the observational study?
2. What data did scientists collect during the study?
3. List at least one of the findings of the study.
4. List at least one feature of an observational study.
5. What is the difference between an observational study and an experiment?
6. What is a ‘Double Blind Experiment’?
7. List the features of a well-designed experiment.

## After the episode

1. If you were to determine the busiest street in your area would you conduct an Observational Study or an Experiment? Explain your reasoning.
2. You are to plan a well-designed experiment. Use the features of a well-designed experiment, outlined in the program, to help you. Your experiment might be designed to determine the most popular variety of coke or the most popular brand or flavour of chips.

**Follow-up activity:** Carry out the experiment you designed above. Record and display your results using suitable methods. Analyse your collected data to answer your design question.

# NSW teacher notes

This is an optional standalone resource that could supplement student learning. The activities align with syllabus outcomes across stages and can be modified to meet the needs of your students. Students can complete the activities while learning at home and in the classroom. All activities can be completed without access to the internet or a device. Teachers could collect student work to offer feedback and as evidence of learning.

## Learning intentions

* To understand the difference between an Observational Study and an Experiment
* To be able to list the features of a well-designed experiment
* To plan a well-designed experiment

## NSW Mathematics K-10 Syllabus outcomes

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| --- | --- | --- |
| Outcome | Stage 3 | Stage 4 |
| Data | **MA3-18SP** uses appropriate methods to collect data and constructs, interprets and evaluates data displays, including dot plots, line graphs and two-way tables | **MA4-19SP** collects, represents and interprets single sets of data, using appropriate statistical displays |
| Single variable data analysis |  | **MA4-20SP** analyses single sets of data using measures of location, and range |
| Working mathematically | **MA3-1WM** describes and represents mathematical situations in a variety of ways using mathematical terminology and some conventions**MA3-3WM** gives a valid reason for supporting one possible solution over another | **MA4-1WM** communicates and connects mathematical ideas using appropriate terminology, diagrams and symbols**MA4-3WM** recognises and explains mathematical relationships using reasoning |

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