Statistics, Data Science, Computational Thinking & AI: New Zealand Years 1–13

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NZ Curriculum & Assessment Landscape

Curriculum Refresh | Two stage process

- **Maths & Stats and English | The rest**

Mathematics & Statistics Refresh

- **Currently being taught Years 1-10 (K-9)**
- Statistics years 1-13 (K-12)
- Probability years 5-13 (4-12)
- Statistics and data science year 13 (12)

The Refreshed National Curriculum

2025	2026	2027	2028	2029	2030
English and Te Reo Rangatira 0–6 and Mathematics and Statistics and Pāngarau 0–8 required to be used	English and Te Reo Rangatira 0–10 and Mathematics and Statistics and Pāngarau 0–10 required to be used All learning areas, wāhanga ako and curriculum frameworks available. Encouraged use of all Year 9 content	Full curriculum required to be used for Years 9–10 For Years 0–8 use requirements are extended to include Science and Pūtaiao, Social Sciences and Te Ao Māori, Health & Physical Education and Waiora	All Years 0–11 learning areas, wāhanga ako and curriculum frameworks required to be used	All Years 0–12 learning areas, wāhanga ako and curriculum frameworks required to be used	All Years 0–13 learning areas, wāhanga ako and curriculum frameworks required to be used

Technology | in draft

- Computational thinking & future literacies (AI)

AI guidance MOE & NZQA | GenAI & Assessment

- Valid assessment evidence must be the student's own work
- Use of GenAI in assessment contexts are more limited than in teaching and learning contexts

NCEA Change Programme + proposal to change NCEA| from standards to a whole subject approach

Statistics & Probability in the New Zealand Curriculum (2025-)

Link

Years 1-3
- Working with categorical and discrete numerical data
- Create and describe data visualisations

Years 4-6
- Extended to working with continuous numerical data
- Create and describe data visualisations – looking at patterns, trends and variations
- Conduct repeated chance experiments or games (from year 5)

Years 7&8
- Planning and collecting data
- Measures of central tendency & spread
- Summarise findings in context and using evidence
- Carrying out chance experiments, law of large numbers

Ānō me he whare pūngāwerewere.

Behold, it is like the web of a spider.

This whakataukī celebrates intricacy, complexity, interconnectedness, and strength. The Learning Area of Mathematics and Statistics weaves together the effort and creativity of many cultures that over time have used mathematical and statistical ideas to understand their world.

Years 9&10
- Planning and collecting multivariate data to respond to a statistical [investigative] question | using samples
- Sometimes one variable is thought of as predictive of the other variable
- Informal inferences for comparison situations
- Carrying out chance experiments, including running simulations for a large number of trials using digital tools

Years 11-13
- Under creation

Computational thinking – proposed in the draft technology curriculum

The year-by-year teaching sequence lays out the knowledge and practices to be taught each year.

In Years 0 to 6, the teaching is structured as one strand:

Design, Make, and Innovate: Focuses on design processes and making simple outcomes. It develops students' understanding of how ideas are explored, tested, and refined to meet needs and how design choices affect people and environments.

In Years 7 and 8, the teaching is organised into the following four strands:

Design and Innovation: Focuses on ethical and sustainable design processes. It develops students' understanding of how ideas are generated, tested, and refined to solve problems and how design decisions impact people and environments.

Materials and Ingredients: Focuses on the properties, uses, and safe handling of materials and ingredients. It develops students' understanding of how materials are selected, processed, and combined to meet functional and aesthetic requirements, and how these choices affect people and environments.

Systems and Control: Focuses on mechanical, electrical, and digital components and how they interact. It develops students' understanding of inputs, outputs, and feedback and how systems are designed, tested, and improved to meet human and environmental needs.

Digital Technologies: Focuses on data, algorithms, and logic and how digital tools are designed and used. It develops students' understanding of how interfaces are created to meet user needs and how technology use can be responsible, ethical, and sustainable.

In Years 9 and 10, the teaching is organised into five strands. Students must be taught at least two of these five strands each year.

Spatial and Product Design: Focuses on form, function, and aesthetics in physical and digital design. It develops students' understanding of modelling, prototyping, and refining design ideas to meet user needs and environmental consideration.

Materials and Processing: Focuses on the safe and responsible use of materials, food, and biotechnology. It develops students' understanding of tools, techniques, and sustainable production processes that meet functional and aesthetic requirements.

Electronics and Mechatronics: Focuses on mechanical and electrical systems, integrating digital systems and components. It builds students' understanding of inputs, outputs, feedback, and control, using systems thinking to solve real-world and environmental challenges.

Digital Technologies: Focuses on systems, data, and design and how digital tools are developed, connected, and used. It builds students' understanding of how platforms, networks, and interfaces support secure, inclusive, and collaborative experiences and how technology use can be responsible, ethical, and sustainable.

Computer Science: Focuses on algorithms, data, and logic in digital systems and AI. It develops students' understanding of computational thinking, coding, and the ethical implications of intelligent technologies.

The year-by-year teaching sequence, organised through strands and elements, sets out what is to be taught. Its enactment is shaped by teachers, who design learning in response to their learners, adjusting the order and emphasis and adding appropriate contexts and content.

Technology is a human enterprise of innovation, problem-solving, and purposeful design, involving collaboration, creativity, and critical thinking. To celebrate this, we highlight some influential technologists, designers, and inventors throughout the teaching sequence. Emphasising the human stories, values, and impacts of technology enriches the teaching and learning of the knowledge and practices.

Link

Computational thinking & future literacies (AI) – draft ideas

Tukuna a whakaaro auaha kia rere kia whakaumutia ai te ao.

Through creativity and innovation, we intervene to transform the world.

Years 1-3 – Computational thinking

- Step-by-step instructions

Years 4-6 – Computational thinking

- Developing algorithms that use sequence, selection, and loops
- Test and improve algorithms

Years 7&8 – Computational thinking + programming + future literacies

- Creating programs using loops and conditions
- Manipulating data using binary and structured methods
- Collecting or selecting a small dataset, cleaning and transforming it and creating appropriate visualisations with clear labels
- Identify examples of AI in everyday tools…
- Evaluating when AI is suitable or unsuitable for a task, considering accuracy, fairness, and context

Years 9&10 – Computer science + programming + future literacies

- Constructing programs that use functions/procedures with parameters and return values
- Linear search and simple sort of collections
- Applying AI tools to create or adapt simple applications...
- Evaluating intelligent systems for fairness, reliability, and unintended consequences…

Challenges - CT & AI

In years 1-8 likely have the same teacher teaching mathematics & statistics and technology

- Taking the maths & stats focus to the technology curriculum (CT & AI)
- Teacher professional learning – regardless of what they teach in technology (and to some extent in maths & stats too)
- Materials need to be created with this focus in mind
- Not part of the expectation for the maths & stats curriculum materials developers
- What is the chance that technology curriculum material developers with talk with maths & stats folk?

Year 9 & 10 they are very unlikely to have the same teacher for mathematics & statistics and for computer science

- Secondary school subjects are still very siloed
- Action needs to be taken to have the conversations between the subject areas
- How can we support for creating ideas in CS & AI, and how can we support CS & AI in the maths & stats classrooms?
- Teacher professional learning – definitely from a maths & stats subject perspective, unsure but assume same for CS

In year 9&10 they only need to do two of the five strands

- Computer science is only one of five
- Potentially could miss even if they do two different ones in year 9 & 10 but would imagine nearly all schools would make sure they had had access to all five across the two years.

> In Years 9 and 10, the teaching is organised into five strands. Students must be taught at least two of these five strands each year.

Challenges – Statistics & data science

Teacher knowledge – we have a lot of maths teachers who also teach [senior] statistics

- For some this is a problem because
  - They are teaching concepts that they didn't learn in their schooling
  - Want the right answer

A lot of out-of-subject teachers teaching maths & stats

- E.g., Phys Ed, Science, Social Studies teachers who fill in for one or two maths & stats classes usually in junior secondary classes year 9 & 10

Moderation interferes with curriculum intentions

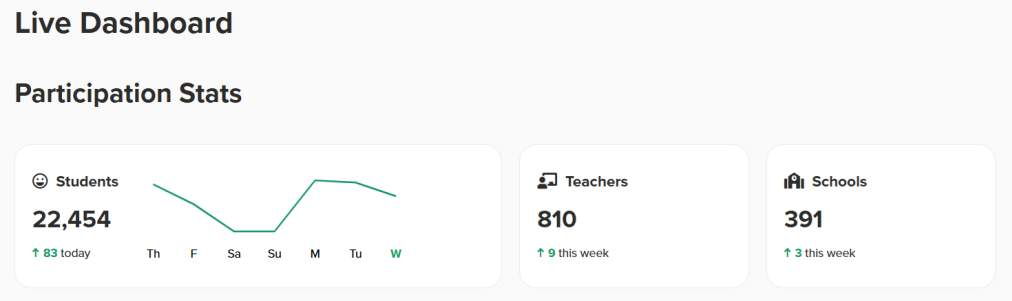
- Lots of internal standards where students get to do statistics & probability, undertaking investigations
- Moderation feedback has tended to drive some teachers to teaching rote responses

Primary and intermediate teachers (K-7) have less extensive knowledge of statistics

- Very little professional development in statistics, usually number focused

Good stuff - some undercover

CensusAtSchool – Link
- new questionnaire every two years – runs for two years
- 11 NZ databases | 13 US databases
- resources for teaching and learning



Focus on school-based research in statistics & data science
- TLRI projects - Link
- Multiple PhD & Masters Theses

Anna Fergusson
- Teaching statistics is awesome Link
- Learning statistics is awesome Link

Statistics teachers day
- An opportunity to share new ideas – we use this deliberately to promote new ideas/focuses/potential

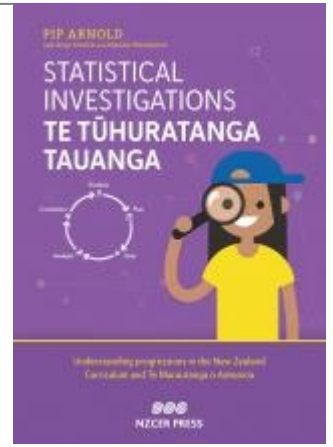
Other things to note

EXPECTATION: Statistics is in the curriculum from year 1

- Students are expected to be using technology from year 4 onwards
  - CODAP, iNZight [lite], spreadsheets, lots of other tools from Anna e.g., modelling tool, probability distribution tool

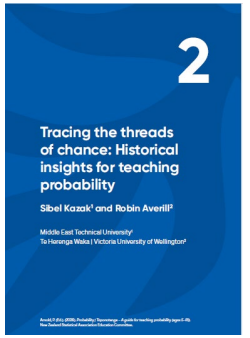
RESOURCES: Tāhūrangi – NZ teaching and learning resources (for statistics)

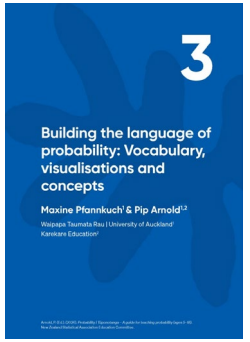
- Link - some of the activities for statistics (units of work)
- Figure It Out series, rich learning activities, problem solving tasks

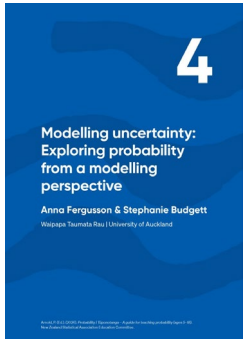


BOOKS: Statistical Investigations | Te Tūhuratanga Tauanga & Probability | Tūponotanga

- Statistics covers years 1-11 using the PPDAC cycle, probability - years 1-13







POTENTIAL: Towards data science

- Potential ideas from early years, but more likely from year 7-8 onwards
- Tried to get predictive modelling into the refreshed curriculum
  - but not in up to year 10
  - Hopefully something in years 11-13 still unknown
- Using different types of data now more common
- Foundational ideas are built through the statistics & probability strands in the curriculum from early years

Acknowledgements - drivers & shakers

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