

Identifying opportunities to build data literacy in Years 7–10 Science

P–10 Australian Curriculum

Key messages

Students in Years 7–10 Science work with increasingly complex data concepts that underpin the data literacy required to be ‘intelligent consumers’ (NCTM 2018) and producers of data.

This factsheet focuses on:

- data collection and analysis within the scientific method as an inquiry cycle
- data literacy opportunities within the Australian Curriculum: Science
- key teaching and learning strategies for engaging students in data literacy.

Data collection and analysis cycle

Collecting and analysing primary data and evidence plays a major role in science investigations. This can involve collecting or extracting information and reorganising data using tables, graphs, flow charts, diagrams, prose, keys, spreadsheets and databases. Students also develop their understandings by collecting and analysing secondary data and information. Communicating data requires students to select the most appropriate data representation for the purpose and audience.



Data literacy opportunities — Australian Curriculum: Science

An achievement standard states what students should know and be able to do at the end of a specific year. The standards provide explicit opportunities for students to employ their data literacy understanding and skills.

In Years 7–10, the strand Science Inquiry Skills includes explicit opportunities for students to:

- focus on data collection techniques
- effectively represent data
- describe, analyse and interpret data.

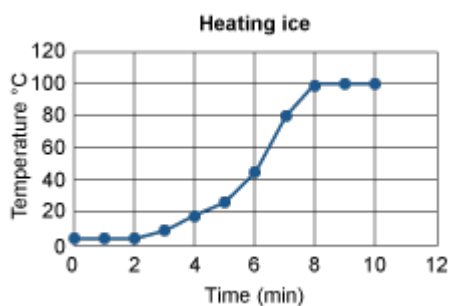
Implicit opportunities also occur in curriculum content where students require data literacies to understand and engage with that content. For example, in Year 7 the concept of ‘changes to an object’s motion due to unbalanced forces’ provides many opportunities for students to measure, collect and display data from experiments and analyse this data to draw conclusions.

Strategies for building data literacy

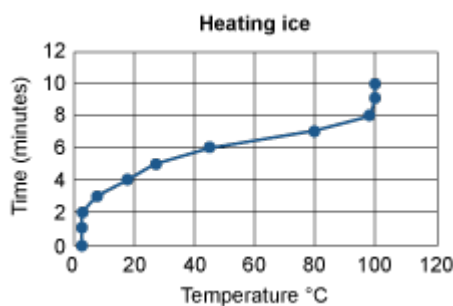
Two key teaching and learning strategies for engaging students in data literacy are using graphs to represent and analyse patterns in data and using directed activities related to text.

Using graphs to represent and analyse patterns in data

One strategy to enhance students' skills in comparing data collection and representation techniques is to reduce scaffolding provided for data collection and display. Discussions on why data collection and graphing conventions are important are more memorable when students reflect on their own practice, e.g. a comparison of Graph 1 and Graph 2 clearly demonstrates the need to place variables on the correct axes.



Graph 1: Independent variable on x-axis



Graph 2: Independent variable on y-axis

Directed activities related to text

Directed activities related to texts (DARTs) are activities designed to encourage critical analysis of representations. They may be used to get students to interact with any text, including visual text commonly used in science. DARTs are employed as a strategy for enhancing understanding of conventions and improving data comprehension, e.g.

- reconstruction activities, where students complete information that has been intentionally omitted from a graphical representation (title, labels, key, frequencies) and discuss their decisions
- questioning activities, which encourage a more critical examination of the data, its source and the type of questions that could be answered by the data. Students can consider
 - Where was the sample drawn from?
 - Who wanted this data, and why did they want it?
 - Is this a big enough sample size to draw a valid conclusion?

References

Australian Curriculum, Assessment and Reporting Authority (ACARA), Australian Curriculum Version 8, www.australiancurriculum.edu.au/f-10-curriculum/mathematics.

National Council of Teachers of Mathematics (NCTM) 2018, *Catalyzing Change in High School Mathematics: Initiating critical conversations*, NCTM, Reston, ISBN 978-1-68054-014-7.

Verster, C, n.d. 'Interacting with Texts: Directed activities related to texts (DARTs)', *Teaching English*, www.teachingenglish.org.uk/article/interacting-texts-directed-activities-related-texts-darts.



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