# Water storage levels across Australia

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| Year level  Strand(s)  Lesson length  CD Code: | * Year 6 * Statistics * 50–60 mins * [AC9M6ST01](https://v9.australiancurriculum.edu.au/f-10-curriculum/learning-areas/mathematics/year-6/content-description?subject-identifier=MATMATY6&content-description-code=AC9M6ST01&load-extra-subject=MATMATY6&detailed-content-descriptions=0&hide-ccp=0&hide-gc=0&achievement-standard=af52e7b6-c158-4405-b80a-8b705dc5bc1f&side-by-side=1&strands-start-index=2&subjects-start-index=0&view=quick) |
| Lesson summary | In this lesson, students engage with megalitres in a real-world context by exploring dam water storage capacities across Australia.  They interpret and compare real-world data sets and analyse graphs in terms of their range and shape.  This lesson is the third of a series of five lessons that connect the cross-curriculum priority of Sustainability with Number, Measurement and Statistics. It can also complement the science content description [AC9S6U04](https://v9.australiancurriculum.edu.au/f-10-curriculum.html/learning-areas/science/year-6/content-description?subject-identifier=SCISCIY6&content-description-code=AC9S6U04&detailed-content-descriptions=0&hide-ccp=0&hide-gc=0&side-by-side=1&strands-start-index=0&subjects-start-index=0&view=quick). |
| Learning intention | * We are learning to interpret and work with megalitres in a real-world context. * We are learning to interpret and compare real-world data sets and analyse graphs in terms of their range and shape. |
| Success criteria | By the end of this lesson, students can:   * interpret megalitres in a real-world context * determine the range for a data set * interpret and compare real-world data sets * describe the changes in shape of a graph over time. |
| Why are we learning about this? | Learning about megalitres and water storage shows us not only how much water is available but also the need to use it wisely since there's only a limited supply.  By examining water levels in different cities, we discover that water isn't equally available everywhere, which can be due to varying rainfall or how we use our water locally.  Information is increasingly being shared through data and visual displays, making the ability to understand and interpreting them an increasingly important skill to master. |
| Prerequisite student knowledge and language | **Prerequisite student knowledge and language**   * Familiarity with units of measure for capacity * Interpret numbers beyond a million * Familiarity with line graphs   **Language**   * litres, kilolitre, megalitre * water storage levels * capacity * line graph * range * shape of graph |
| **Resources** | * Lesson plan (Word) * Teacher’s slides (PowerPoint) * 10 cm × 10 cm × 10 cm MAB cube and an empty 1 litre container, for example, a milk carton * At least 1 device per group of 2–3 students with access to BOM Australia water storage dashboard |

Curriculum information

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| Achievement standard | Students compare distributions of discrete and continuous numerical and ordinal categorical data sets as part of their statistical investigations, using digital tools. |
| Content description(s) | Students interpret and compare data sets for ordinal and nominal categorical, discrete and continuous numerical variables using comparative displays or visualisations and digital tools; compare distributions in terms of mode, range and shape. [AC9M6ST01](https://v9.australiancurriculum.edu.au/f-10-curriculum/learning-areas/mathematics/year-6/content-description?subject-identifier=MATMATY6&content-description-code=AC9M6ST01&load-extra-subject=MATMATY6&detailed-content-descriptions=0&hide-ccp=0&hide-gc=0&achievement-standard=af52e7b6-c158-4405-b80a-8b705dc5bc1f&side-by-side=1&strands-start-index=2&subjects-start-index=0&view=quick) |
| General capabilities  Cross-curriculum priority | Numeracy   * Number and place value ([Level 9](https://v9.australiancurriculum.edu.au/f-10-curriculum/learning-areas/mathematics/year-6/general-capability-snapshot?subject-identifier=MATMATY6&content-description-code=AC9M6N06&general-capability-code=N&element-code=NN&sub-element-index=1&sub-element-code=NNNPV&load-extra-subject=MATMATY6&detailed-content-descriptions=0&hide-ccp=0&hide-gc=0&achievement-standard=204b4e36-dafd-4b68-9974-1703f28ab395&side-by-side=1&strands-start-index=0&subjects-start-index=0&view=quick)) * Understanding units of measurement ([Level 8](https://v9.australiancurriculum.edu.au/f-10-curriculum/learning-areas/mathematics/year-6/general-capability-snapshot?subject-identifier=MATMATY6&content-description-code=AC9M6M01&general-capability-code=N&element-code=NM&sub-element-index=0&sub-element-code=NMUuM&load-extra-subject=MATMATY6&detailed-content-descriptions=0&hide-ccp=0&hide-gc=0&achievement-standard=204b4e36-dafd-4b68-9974-1703f28ab395&side-by-side=1&strands-start-index=0&subjects-start-index=0&view=quick)) * Interpreting and representing data ([Level 4](https://v9.australiancurriculum.edu.au/f-10-curriculum/learning-areas/mathematics/year-6/general-capability-snapshot?subject-identifier=MATMATY6&content-description-code=AC9M6ST01&general-capability-code=N&element-code=NS&sub-element-index=0&sub-element-code=NSIRD&load-extra-subject=MATMATY6&detailed-content-descriptions=0&hide-ccp=0&hide-gc=0&achievement-standard=af52e7b6-c158-4405-b80a-8b705dc5bc1f&side-by-side=1&strands-start-index=2&subjects-start-index=0&view=quick))   Sustainability   * World views ([SW2](https://v9.australiancurriculum.edu.au/f-10-curriculum/cross-curriculum-priorities/sustainability/slideout?code=SW2&organising-idea=0)) * Futures ([SF2](https://v9.australiancurriculum.edu.au/f-10-curriculum/cross-curriculum-priorities/sustainability/slideout?code=SF2&organising-idea=3)) |
| Areas of challenge | Some students may:   * have difficulty working with numbers beyond 1 million * find it challenging to identify and interpret real-world data. |
| Strategies | * Mathematics investigation * Classroom talks * Questioning |

Lesson structure

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| Learning hook  5 -10 mins | * Project slide 4 of the teacher’s slides.   How many litres of water are in an Olympic sized swimming pool?  The dimensions of an Olympic swimming pool are 50 m × 25 m × 2 m (2 metres is the minimum depth, can go up to 3 metres).  Where possible, bring an empty 1-litre container to show students the size, as this might help them with their estimation. Additionally, also consider bringing a 10 cm × 10 cm × 10 cm MAB cube and highlight that 1 litre of water takes up the same amount of space as the MAB cube, that is, 1 litre of water can fit exactly into the MAB cube.  Collect students’ estimates by asking them to write their estimates on a mini whiteboard, enter them directly into an Excel spreadsheet for easy sorting, or by sharing a link to a survey for them to respond to.   * Project the results and have students analyse the class estimates and discuss as a whole class:   + the lowest/highest estimate   + the difference between the lowest and highest estimates.   Have calculators available to enable all students to find the difference readily.   * Display slide 5 to reveal how many litres are in an Olympic swimming pool and ask students to consider the size of the number. *What units of measure could we use to make this measurement easier to read?*   Note that 50 m × 25 m × 2 m = 2500 cubic metres and there are 1000 litres in 1 cubic metre. Therefore, the total number of litres is 2500 × 1000 = 2,500,000 litres, which is the same as 2,500 kilolitres or 2.5 megalitres.  Show slide 6 to help students appreciate the physical size of 1 kilolitre and 1 megalitre. |
| Explore  40-45 mins | **Introduction** (10 mins)   * Pose the question ‘Where does our water come from?’ to lead the conversation to water storages and water storage levels. * Display information about from your state or territory water authority or search ‘BOM Australia water storage dashboard’ and give students a moment to consider the information.   Spend some time exploring the information with the students as a whole class:   * discuss the units used to measure water storage, focusing on the megalitre (ML) unit and its significance * discuss the maximum capacity of water storage and current of water storage percentage * encourage students to draw conclusions about water usage patterns and climate conditions.   **Lesson activity**  Organise students in groups of 2–3, to select a capital city and compare its current and past water storage levels.  Introduce the lesson activity: comparing water storage levels (slide 7). The activity assumes that students will be able to access the BOM Australia - water storage level dashboard or similar website.  Check to see if students have any additional clarifying questions before starting the activity.  Observe how students are approaching the activity, supporting them with language and enabling and extending prompts as required*.*  **Differentiation (support)**  Have students use a calculator so that their focus remains on interpreting the data and graphs in a real-world context, rather than on performing the subtracting large numbers accurately.  Check to see that students can interpret the data.   * *What does percentage full tell us about the water storage level for that city? Is that more or less than last year’s water level? How do you know?* * *Where can we find out how much water is in the dam right now?* * *Refer to the* dam’s capacity. *What do you think this number represents?*   **Differentiation (extend)**   * Which of the two locations has the highest water storage level? Does that location also have the highest percentage full? Explain your reasoning. * Which city has the greatest variation in its water storage levels from previous year to current? Can you think of some reasons as to why? |
| Summary and reflection  10 -15 mins | Give each group 1–2 minutes to share their 3 points of interest and why they found them interesting. Ideally, each group member should present at least 1 point of interest. |
| Assessment  5 mins | Refer to the Exit ticket on slide 8.  List one thing that you:   * found interesting or surprising in today’s lesson * are wondering about from today’s lesson. |