# **Assessing Working mathematically**

Participant workbook

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## About this workbook

This workbook is designed to guide your thinking, reflections and plans for future action. In the workbook, you will find **note-taking** **pages** that complement the presentation and **activity templates** to help you engage with the content.

The note-taking pages feature focus questions specific to the content of the presentation. They also provide you with the opportunity to record your key take-aways and ideas.

The activity pages support you to collaborate with colleagues and consider how you can apply the content in your school context. Your facilitator will guide you through the activities.

This workbook can be printed double-sided or used digitally.

If you have questions about the presentation, please connect with your [Statewide staffroom](https://education.nsw.gov.au/teaching-and-learning/curriculum/statewide-staffrooms) or email mathematics7-12@det.nsw.edu.au.

## Presentation overview

This session will guide you through practical strategies and best practices for assessing Working mathematically. You will:

* discover how to design and implement formative and summative assessments that authentically capture students’ problem-solving skills and mathematical reasoning abilities
* explore what the new overarching Working mathematically outcome can look like in a classroom.

### Learning intentions and success criteria

By the end of the presentation, participants will:

* understand NESA’s assessment information
* be able to create assessment opportunities that best allow students to demonstrate their learning.

To demonstrate learning, participants will:

* be able to choose the best assessment tools to suit their students’ needs
* be able to explain how their assessment tools allow students to demonstrate Working mathematically processes.

### Alignment to the Australian Professional Standards for Teachers

This presentation aligns with the following standards:

* 5.1.2 Develop, select and use informal and formal, diagnostic, formative and summative assessment strategies to assess student learning.
* 6.3.2 Contribute to collegial discussions and apply constructive feedback from colleagues to improve professional knowledge and practice.

## Presentation notes

**Focus questions**

* How can we improve summative assessment to provide opportunities for students to demonstrate Working mathematically skills and processes?
* How can we best plan formative assessment strategies to gather evidence of students Working mathematically throughout the teaching and learning cycle?

| **Key points** | **Notes** |
| --- | --- |

| **Key points** | **Notes** |
| --- | --- |

**Summary**

The 3 key ideas that I would like to apply to my practice:

1.

2.

3.

## Activity 1

Select an assessment task that you use currently in your school. This does not need to be a test; it could be any summative task that asks students to respond to a prompt or question. If you do not have a task, consider selecting questions from the examples in the 7–10 section of the Mathematics K–10 Syllabus ([bit.ly/MathK-10Syl](https://bit.ly/MathK-10Syl)), similar to the process shown in the presentation.

1. Select a question or set of questions from your chosen task.
2. Highlight any existing opportunities to demonstrate the course performance descriptors ([bit.ly/MathCPD](https://bit.ly/MathCPD)).
3. Modify the question to allow more opportunities for students to demonstrate the course performance descriptors ([bit.ly/MathCPD](https://bit.ly/MathCPD)).
4. Consider how likely it is that a student would respond in a way that takes advantage of the opportunities you have created. Does this require any modifications to how the mathematics is taught?

Record your answers in the table below.

|  |  |
| --- | --- |
| Assessment task breakdown | Responses |
| Original question |  |
| Existing opportunities to demonstrate the course performance descriptors |  |
| Modified question |  |
| Teaching considerations |  |

## Activity 2

1. Select a formative assessment strategy from the table below or another strategy that you are familiar with.
2. Select a lesson that you are planning to teach this week to incorporate your formative assessment strategy.
3. Plan how you will implement your formative assessment strategy, including how you might modify future teaching based on possible responses.

Table – formative assessment strategies

|  |  |  |
| --- | --- | --- |
| Strategy | Description | Link to strategy |
| Finger vote | Students respond to a multiple-choice question by raising a number of fingers. A is 1 finger, B is 2 fingers, and so on. | [*On Formative Assessment in Math: How Diagnostic Questions Can Help*](https://bit.ly/fingervotestrategy) [PDF 429 KB] ([bit.ly/fingervotestrategy](https://bit.ly/fingervotestrategy)) |
| Mini whiteboards | Students respond to a question by writing their answer on an individual whiteboard. The teacher can ask all students to raise their whiteboards at the same time. | [bit.ly/miniwbstrategy](https://bit.ly/miniwbstrategy) |
| Vertical non-permanent surfaces | Students work in groups of 3 at vertical non-permanent surfaces such as plastic pockets stuck to a wall, with one whiteboard marker per group. The teacher can observe all students working at once and prompt students to justify their answers. | [bit.ly/VNPSstrategy](https://bit.ly/VNPSstrategy) |
| Think-Pair-Share | Students think independently about a prompt or problem, pairing up and discussing their ideas with a classmate, and then sharing their combined knowledge with the class. | [bit.ly/thinkpairsharestrategy](https://bit.ly/thinkpairsharestrategy) |
| Exit tickets | Students respond to a few key questions or prompts at the end of a lesson. | [bit.ly/exitticketstrategy](https://bit.ly/exitticketstrategy) |

## Where to next?

Would you like to learn more? The links below provide additional learning and resources.

* Planning programming and assessing mathematics 7–10 ([bit.ly/departmentresources](https://bit.ly/departmentresources)) – resources developed and published by the NSW Department of Education to support the implementation of the 7–10 section of the Mathematics K–10 Syllabus. Participants could review the provided assessment tasks in both Stage 4 and 5 as examples of the summative assessment strategies described in this presentation. Additionally, formative assessment strategies are highlighted throughout the lessons provided at this link.
* Professional Learning ([bit.ly/MathMicrolearn](https://myplsso.education.nsw.gov.au/mylearning/catalogue/details/86572d44-d40b-ee11-ba76-0003ffd026a7)) – short, flexible and available on demand professional learning modules to support you with the implementation of the 7–10 section of the Mathematics K–10 Syllabus.

## Evaluation

We value your feedback. Please complete the [Assessing Working mathematically evaluation](https://forms.office.com/r/c98CnXUQkD) to help us provide further support.



## References

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[Mathematics K–10 Syllabus](https://curriculum.nsw.edu.au/learning-areas/mathematics/mathematics-k-10-2022/overview) © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales, 2022.

NESA (NSW Education Standards Authority) (2021) ‘[Proficient Teacher: Standard descriptors](https://educationstandards.nsw.edu.au/wps/portal/nesa/teacher-accreditation/meeting-requirements/the-standards/proficient-teacher)’, *The Standards*, NESA website, accessed 8 December 2023.

Organization for Economic Cooperation and Development (OECD) (2019) ‘[PISA 2018 Assessment and Analytical Framework: PISA 2018 Mathematics Framework’](https://www.oecd-ilibrary.org/docserver/13c8a22c-en.pdf?expires=1702264552&id=id&accname=guest&checksum=D41A2981BACD1FFFBE040332F23ACC4B), OECD iLibrary, accessed 8 December 2023.

OECD (2022) [*Description of the PISA mathematics literacy proficiency levels: 2022*](https://nces.ed.gov/surveys/pisa/pisa2022/docs/DescriptionsOf2022ProficiencyLevels-TableI31.pdf) [PDF 106 KB], OECD iLibrary, accessed 8 December 2023.

Wiliam D (2011) *Embedded Formative Assessment*, Solution Tree Press, Bloomington.

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