



| NSW Department of Education

NSW Mathematics Strategy 2025

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Message from the NSW Government

Strengthening the focus on mathematics in our education system is about preparing young people for life and work in the 21st century. Today's students need to be supported to develop the problem-solving and critical thinking skills that will empower them to build the capacity to overcome challenges, realise opportunities and be successful in an ever-changing workplace.

The development of mathematical skills such as reasoning, analytical thinking, communicating and problem-solving will provide today's younger generation with solid foundations to succeed in an evolving world.

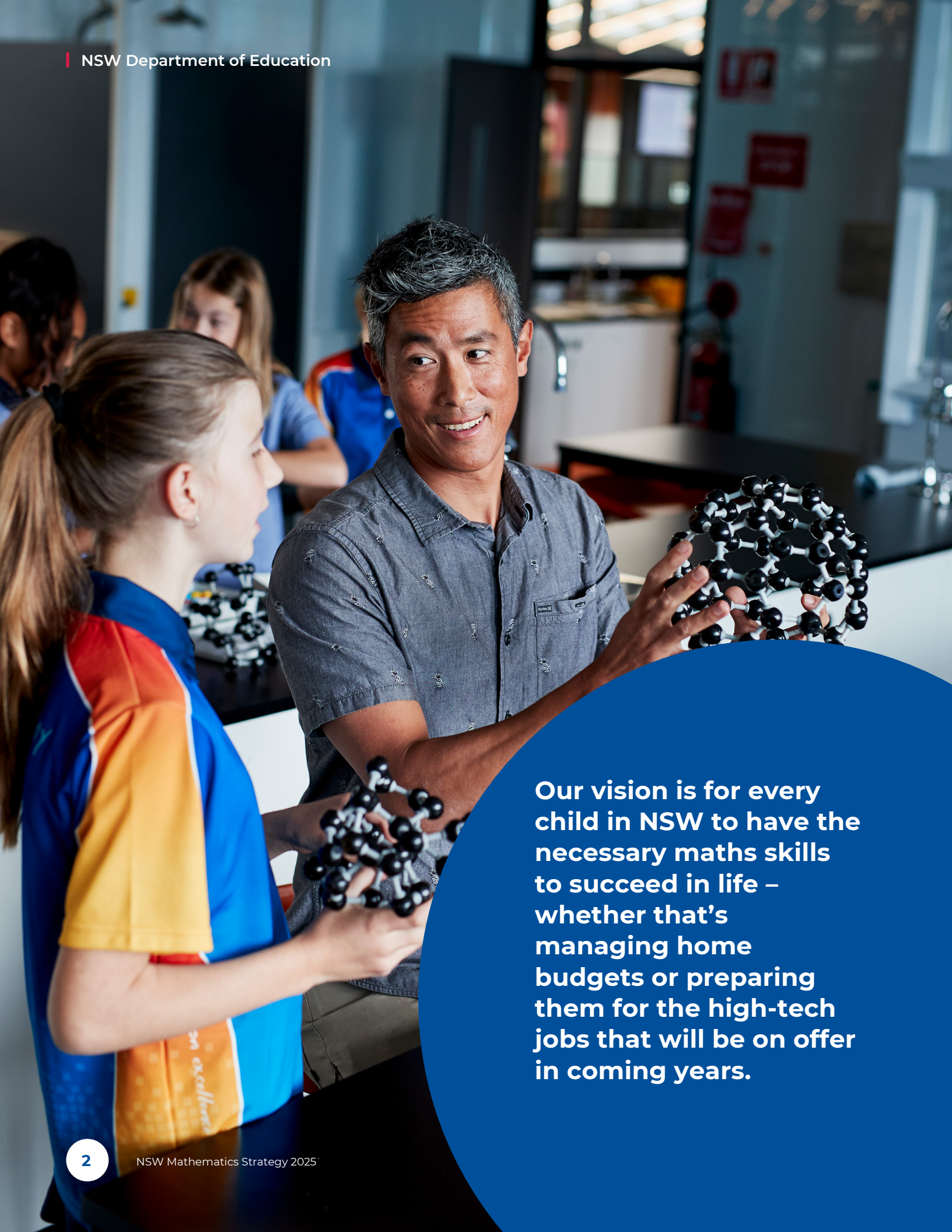
The NSW Mathematics Strategy supports the NSW Government's strong commitment to building excellence in the teaching profession. The strategy incorporates priorities to employ 100 specialist primary school mathematics teachers over five years and award up to 320 scholarships valued at up to \$50,000 each to STEM undergraduates, career changers and HSC students to fund the cost of completing an initial teacher education qualification in mathematics. These actions complement statewide access to quality professional learning, as well as the introduction of additional Mathematics Ambassadors to foster a love for mathematics, following the success of mathematics educator Eddie Woo.

As part of the NSW Curriculum Reform, the NSW Department of Education will work with the NSW Education Standards Authority and Skills and Higher Education to design and develop mathematics courses for students in Kindergarten to Year 12. Students will have the opportunity to study mathematics in every year of their schooling, increasing their post-school pathways and life options.

We want students to understand and use the power of mathematics, no matter their numerical ability. This will be possible with the strategy's new mathematics-based HSC course, currently being piloted, which focuses on practical applications of mathematics.

Arming students with mathematics will help them succeed in tertiary education, including those in STEM, and apply mathematical thinking and skills in a wide range of careers. Many of these jobs will play a transformative role in our future economy and society.

The combined initiatives of the strategy will enable us to strengthen mathematics teaching so that students across NSW develop the mathematical skills as a companion to succeed in life.



Our vision is for every child in NSW to have the necessary maths skills to succeed in life – whether that’s managing home budgets or preparing them for the high-tech jobs that will be on offer in coming years.

Introduction

The NSW Mathematics Strategy supports teaching and learning in NSW public schools, helping students develop the mathematical skills and understanding they need to succeed in life.

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Mathematics plays a critical role in a student's education. As established in a paper by the Organisation for Economic Co-operation and Development (OECD):

"Proficiency in mathematics is a strong predictor of positive outcomes for young adults, influencing their ability to participate in post-secondary education and their expected future earnings."¹

To help grow students' proficiency in mathematics, it is necessary to foster positive attitudes towards mathematics, which are shown to be a key factor in students' achievement.² Research has found that student confidence, feelings of success, and perceived relevancy of learning experiences are influential factors in student engagement.³ Research evidence like this has informed the observation that:

"Not only do teachers and government need to convey the usefulness of mathematics generally through the curriculum, but they also need to make sure it is experienced as useful in the classroom."⁴

Learning of mathematics "depends fundamentally on what happens inside the classroom as teachers and learners interact over the curriculum".⁵ As such, the skilful teaching of mathematics requires specialised skills, knowledge and understanding. Evidence suggests that coherent system support and ongoing professional learning for teachers and leaders are key factors in supporting the skilful and equitable teaching of mathematics at scale.⁶

The strategy aims to:

- **strengthen mathematics teaching in NSW public schools.** This will be achieved by: providing evidence-based professional learning to support quality teaching of mathematics Kindergarten to Year 12; enriching expertise in mathematics teaching among primary teachers; providing mentorship for secondary teachers; and providing access to high-quality teaching resources for teachers of mathematics.
- **enable NSW public students to experience high-quality mathematical experiences and develop an understanding of the usefulness of mathematics.** This includes opportunities for students to consider, apply and develop mathematical skills in ways that reinforce the everyday, lifelong usefulness of mathematical thinking.
- **build and nurture positive perceptions of mathematics in the broader community.** This would include supporting parents and carers to feel more confident in talking with their child about mathematics.

The NSW Department of Education recognises that consultation and collaboration with various stakeholders – such as students, teachers, school leaders, parents and carers, academic partners, professional organisations, the NSW Education Standards Authority (NESA), and other partners – is critical to the successful implementation of the strategy.

¹ OECD, 'PISA 2012 Results in Focus: What 15-year-olds know and what they can do with what they know', 2014, accessed [13 October 2020].

² L Chen, SR Bae, C Battista, S Qin, T Chen, TM Evans, and V Menon, 'Positive Attitude Toward Math Supports Early Academic Success: Behavioral Evidence and Neurocognitive Mechanisms', *Psychological Science*, 2018; J Bobis, J Anderson, A Martin and J Way, 'A Model for Mathematics Instruction to Enhance Student Motivation and Engagement', *Motivation and Disposition: Pathways to Learning Mathematics*, (2011); CS Dweck Mindset: *The New Psychology of Success*, New York: Ballantine Books, 2006.

³ G Munns, W Sawyer and B Cole (Eds.), *Exemplary Teachers of Students in Poverty*, Routledge, 2013.

⁴ M Brown, P Brown and T Bibby, "I would rather die": Reasons given by 16-year-olds for not continuing their study of mathematics', *Research in Mathematics Education*, March 2008.

⁵ D Ball and F Forzani, 'Teaching Skillful Teaching', *Educational Leadership*, December 2010/January 2011.

⁶ P Cobb, K Jackson, E Henrick and TM Smith, *Systems for Instructional Improvement: Creating Coherence from the Classroom to the District Office*, Harvard Education Press, 2018.



NSW Mathematics Strategy at a glance

Key initiatives



Pilot a new mathematics-based HSC course for students who have not typically chosen mathematics, focused on numeracy and applications for everyday life.



Recruit primary mathematics specialist teachers over five years.



Award scholarships to STEM undergraduates, career changers and HSC students.



Increase enrolments and improve student outcomes in higher-level HSC mathematics.



Grow a NSW mathematics ambassador network to positively engage students, teachers, parents and carers, and the wider community.

Underpinning initiatives



Establish a mathematics growth team to lead the strengthening of mathematics teaching expertise.



Improve initial teacher preparation of primary teachers to teach mathematics in targeted schools and networks.



Provide high-quality, evidence-based professional learning that supports and builds the mathematics knowledge of teachers and school leaders.



Deliver evidence-based practice to support quality teaching and develop students' mathematical thinking.



Develop a digital solution for teachers to access high-quality teaching resources.



Implement communications initiatives to engage students, parents and carers, and teachers.



Evaluate initiatives including assessing improvements in key outcomes of the strategy over time.

Outcomes framework

Our vision

Every student in NSW public schools develops the mathematics skills they need to succeed in life.

What we aim to achieve



Higher-quality teaching of mathematics in NSW public schools

Higher-level mathematics courses are more widely available in NSW public schools.

Teachers of mathematics feel more confident in teaching mathematics.

Teachers of mathematics use effective practice.

NSW public schools have more specialist mathematics teachers.

Teachers of mathematics have improved access to high-quality resources.

Teachers of mathematics have improved access to and participate in quality professional learning opportunities for teaching mathematics.



Student engagement and outcomes in mathematics

All Stage 6 students choose to do mathematics.

More Stage 6 students choose higher-level mathematics.

Student achievement in mathematics increases (K-12).



More positive attitudes towards mathematics

Students, teachers, parents and carers, and social influencers have more positive attitudes towards mathematics.

Parents and carers feel more confident to support students in learning mathematics.

Parents and carers access high-quality resources that support effective student learning of mathematics.

Initiatives of the NSW Mathematics Strategy



1. New HSC mathematics course

Pilot a new HSC course for students who have not typically chosen to study mathematics.

What we are doing

The NSW Education Standards Authority (NESA) is piloting a Stage 6 course for students who need further opportunities to develop numeracy skills. It builds these skills using real-life scenarios.

What this will achieve

All students have the opportunity to develop numeracy skills. Teachers are equipped to support a range of student learning needs.

Link to outcomes

This initiative contributes to **Student engagement and outcomes in mathematics** and **Higher-quality teaching of mathematics in NSW public schools** through the specific outcomes:

- All Stage 6 students choose to do mathematics.
- Teachers of mathematics have improved access to and participate in quality professional learning opportunities for teaching mathematics.



2. Primary mathematics specialist teachers

Recruit specialist mathematics primary teachers to enhance mathematics teaching expertise in NSW.

What we are doing

This initiative will develop existing primary teachers with expertise in teaching mathematics and will support new graduate teachers with a specialisation in mathematics to develop their capability in the teaching of mathematics. This will support students to build strong mathematical foundations in primary school.

What this will achieve

NSW experiences sustained, continued improvement in teaching capability and student outcomes in mathematics.

Link to outcomes

This initiative contributes to **Higher-quality teaching of mathematics in NSW public schools** through the specific outcomes:

- Teachers of mathematics feel more confident in teaching mathematics.
- NSW public schools have more specialist mathematics teachers.
- Teachers of mathematics have improved access to and participate in quality professional learning opportunities for teaching mathematics.



3. Secondary teach.MathsNOW scholarships

320 scholarships to support STEM undergraduates, HSC students and career changers to retrain to teach mathematics.

What we are doing

The teach.MathsNOW scholarship program is designed to attract the mathematics teachers of tomorrow and strengthen the mathematics teaching workforce.

What this will achieve

New mathematics-trained secondary teachers support improvement in student learning outcomes in mathematics.

Link to outcomes

The initiative contributes to **Higher-quality teaching of mathematics in NSW public schools** through the specific outcome:

- NSW public schools have more specialist mathematics teachers.



4. Higher-level HSC mathematics

Increase enrolments and improve student outcomes in higher-level HSC mathematics.

What we are doing

This initiative seeks to confirm key influences to increase enrolments and improve student outcomes in higher-level HSC mathematics. The results of the research will guide the focus of project activities including acting on the most powerful influences on HSC subject choice.

What this will achieve

An increased number of students completing higher-level mathematics subjects, resulting in students who are better equipped to employ the range of mathematical skills required in their chosen careers.

Link to outcomes

This initiative contributes to **Student engagement and outcomes in mathematics** through the specific outcome:

- More Stage 6 students choose higher-level mathematics.



5. Ambassadors and mathematics perceptions

Deliver communications initiatives – including a NSW mathematics ambassador network and a digital resource – to improve perceptions of and engagement with mathematics among students, parents and carers, and teachers.

What we are doing

A collection of communications initiatives will promote the relevance and lifelong benefits of mathematics for students. A key aim is to help parents and carers to support their children's mathematics education. A new digital experience for parents and carers will feature online resources for children from Kindergarten to Year 10. The department is also identifying mathematics ambassadors across a range of professions who will highlight the uses of mathematics for everyone, in everyday life and work.

What this will achieve

Students will experience increased engagement with mathematics and a deepened understanding of its relevance in school and beyond as a problem-solving skill for life.

Link to outcomes

The initiative contributes to **More positive attitudes to mathematics** through the specific outcomes:

- Students, teachers, parents and carers, and social influencers have more positive attitudes towards mathematics.
- Parents and carers feel more confident to support students in learning mathematics.
- Parents and carers access high-quality resources that support effective student learning of mathematics.



6. Consolidated tools and procurement platform

Deliver a digital solution for schools and teachers to easily access high-quality mathematics teaching resources.

What we are doing

This initiative responds to teachers' need for a consolidated platform for accessing digital teaching and learning resources related to mathematics that are research-based, high-quality, and aligned to the syllabus and curriculum. Additionally the establishment of an Online Learning Tools catalogue will ensure schools have access to quality, curriculum aligned, evidence-based, third-party resources that are compliant with department's standards.

What this will achieve

Improved access for schools and teachers to high-quality teaching resources, software and tools aligned to the syllabus and curriculum.

Link to outcomes

The initiative contributes to **Higher-quality teaching of mathematics in NSW public schools** through the specific outcome:

- Teachers of mathematics have improved access to high-quality resources.



7. Evidence-based practice

Promote and support the use of high-leverage, research-based practices for teachers and school leaders.

What we are doing

This initiative supports the work of other projects by equipping teachers and leaders with access to a broad range of high-quality research to support quality teaching and the development of students' mathematical thinking. It will use robust frameworks and evidence-based tools and resources to support the adoption and use of high-impact learning strategies.

What this will achieve

This initiative will embed evidence-based practices in the teaching of mathematics. It will empower teachers and leaders to make informed decisions about the teaching and learning of mathematics.

Link to outcomes

This initiative contributes to **Higher-quality teaching of mathematics in NSW public schools** through the specific outcomes:

- Teachers of mathematics use effective practice.
- Teachers of mathematics have improved access to high-quality resources.
- Teachers of mathematics have improved access to and participate in quality professional learning opportunities for teaching mathematics.



8. Mathematics professional learning

Provide high-quality, evidence-based professional learning that supports and builds the mathematical knowledge of teaching.

What we are doing

This initiative will lead mathematics professional learning for NSW public school teachers and leaders. It will expand the use of evidence-based materials, tools and practices in the teaching of mathematics. This project stream is a cornerstone to the success and long-term viability of other NSW Mathematics Strategy initiatives, designing and leading the professional learning needed for successful implementation.

What this will achieve

NSW will experience improvements in teaching quality at primary and secondary school levels, supported by leadership.

Link to outcomes

This initiative contributes to **Higher-quality teaching of mathematics in NSW public schools** through the specific outcomes:

- Teachers of mathematics use effective practice.
- Teachers of mathematics have improved access to and participate in quality professional learning opportunities for teaching mathematics.



9. Initial teacher education

Improve the initial teacher preparation in mathematics of primary teachers in consultation with NSW universities.

What we are doing

The NSW Education Standards Authority (NESA) will implement significant improvements in the initial teacher preparation of primary teachers to teach mathematics. It will investigate the effectiveness of standalone mathematics and STEM specialisation courses offered at universities in NSW. It will also implement the announcement that students who want to teach mathematics in NSW primary schools will require at least a Band 4 in HSC mathematics or equivalent course standard from 2021.

Link to outcomes

The initiative contributes to **Higher-quality teaching of mathematics in NSW public schools** through the specific outcomes:

- Teachers of mathematics feel more confident in teaching mathematics.
- Teachers of mathematics have improved access to and participate in quality professional learning opportunities for teaching mathematics.

What this will achieve

Primary teachers will be more prepared to teach mathematics in consultation with NSW universities.



10. Mathematics growth team

Develop a mathematics growth team to lead the strengthening of mathematics teaching expertise in targeted schools and networks.

What we are doing

The mathematics growth team, a part of the Best In Class Teaching Unit, amplifies the impact of expert mathematics teaching at targeted schools to:

- strengthen mathematics leaders and build a new generation of mathematics teachers across NSW public schools
- support the use of evidence-based, best-practice assessment and teaching practices among mathematics educators.

What this will achieve

Teaching quality and student learning outcomes in mathematics will improve.

Link to outcomes

This initiative contributes to **Higher-quality teaching of mathematics in NSW public schools** through the specific outcomes:

- Teachers of mathematics use effective practice.
- Teachers of mathematics have improved access to and participate in quality professional learning opportunities for teaching mathematics.

Evaluation

The Centre for Education Statistics and Evaluation (CESE) will evaluate the NSW Mathematics Strategy to explore the effectiveness and impact of its components and inform decision-making processes. CESE will conduct two levels of evaluation to review the strategy's aims as outlined in the outcomes framework:

1. evaluations of individual initiatives
2. evaluation of the strategy as a whole.

Evaluations of individual initiatives

Evaluations will collect evidence of the effectiveness of each initiative and measure its impact. The evaluation will assess the extent to which the resources invested in particular areas are leading to improvements in the engagement and learning outcomes of students. These evaluations will inform future planning, process improvements and evidence-based decision-making as the initiatives progress.

Evaluation of the strategy

The overall evaluation of the strategy will examine the extent to which the outcomes are being achieved. This evaluation will seek to inform decisions that could be taken to support initiatives in meeting the strategy's outcomes.



This NSW Mathematics Strategy spans to 2025. The NSW Department of Education will provide progress updates on initiatives and key milestones relating the development, implementation and evaluation of the strategy.

For updates visit education.nsw.gov.au/nsw-mathematics-strategy.

We acknowledge the homelands of all Aboriginal people and pay our respect to Country.

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