



Numeracy

Numeracy

Lifelong Confidence
with Mathematics



Framework for Action
2007–2010

Minister's Foreword

Our Government wants every child to develop numeracy skills during their time at school.

We recognise that numeracy, like literacy, is a key pillar of learning and an essential component of our school curriculum.

Our Government has committed \$1.5 million in this year's State Budget to drive our numeracy initiatives and give our schools and teachers the skills and resources they need to improve numeracy levels.

This document, *Numeracy: Lifelong Confidence with Mathematics – Framework for Action 2007–2010*, is an action plan to improve numeracy education in Queensland state schools.

It sets out a range of actions that will improve numeracy education and give our students an even better start in life.

Numeracy is about students having the confidence to choose and use mathematics skills they learn at school in everyday life, as well as the classroom.

Numeracy is used in science class when students interpret a graph, in woodwork when they confidently measure a piece of wood, or in cooking when a student halves a recipe without being given specific instructions on what to do.

So every classroom teacher has a role to play in helping students develop numeracy skills.

Our Government is committed to implementing the 32 actions in the framework to support all teachers in Queensland state schools to develop students' numeracy skills.

We want all students to have the confidence to apply mathematics in their everyday lives.



Rod Welford MP
Minister for Education and Training and
Minister for the Arts

To be numerate is to use mathematics effectively to meet the general demands of life at home, in paid work, and for participation in community and civic life.

In school education, numeracy is a fundamental component of learning ... across all areas of the curriculum. It involves the disposition to use, in context, a combination of:

- underpinning mathematical concepts and skills from across the discipline (numerical, spatial, graphical, statistical and algebraic);
- mathematical thinking and strategies;
- general thinking skills; and
- grounded appreciation of context.

Report of the Numeracy Education Strategy Development Conference, Numeracy = Everyone's Business (October 1997) adopted by Australian Association of Mathematics Teachers

Numeracy is integral to effective learning in all years of schooling and in all areas of learning. This central role is reflected in its identification as a cross-curriculum priority in each of the key learning area syllabuses. Numeracy is an often misunderstood concept, and this is one of the significant challenges that this Framework for Action seeks to address.

Education Queensland is committed to ensuring that:

- every teacher of mathematics is supported to offer high quality mathematics programs to help all students to develop the capabilities to lead numerate lives
- every teacher has the support needed to offer high quality numeracy programs for all students so that they are able to access and meet the numeracy demands of all learning areas of the curriculum.

Queensland State Education – 2010 describes rapid changes in our economy, the world of work, communities, and civic and family life that have significant implications for teaching and learning and the way schools operate. These changes create particular challenges in implementing effective numeracy programs.

The *Numeracy: Lifelong Confidence with Mathematics – Framework for Action 2007–2010* identifies key priorities and areas for focused action. These are:

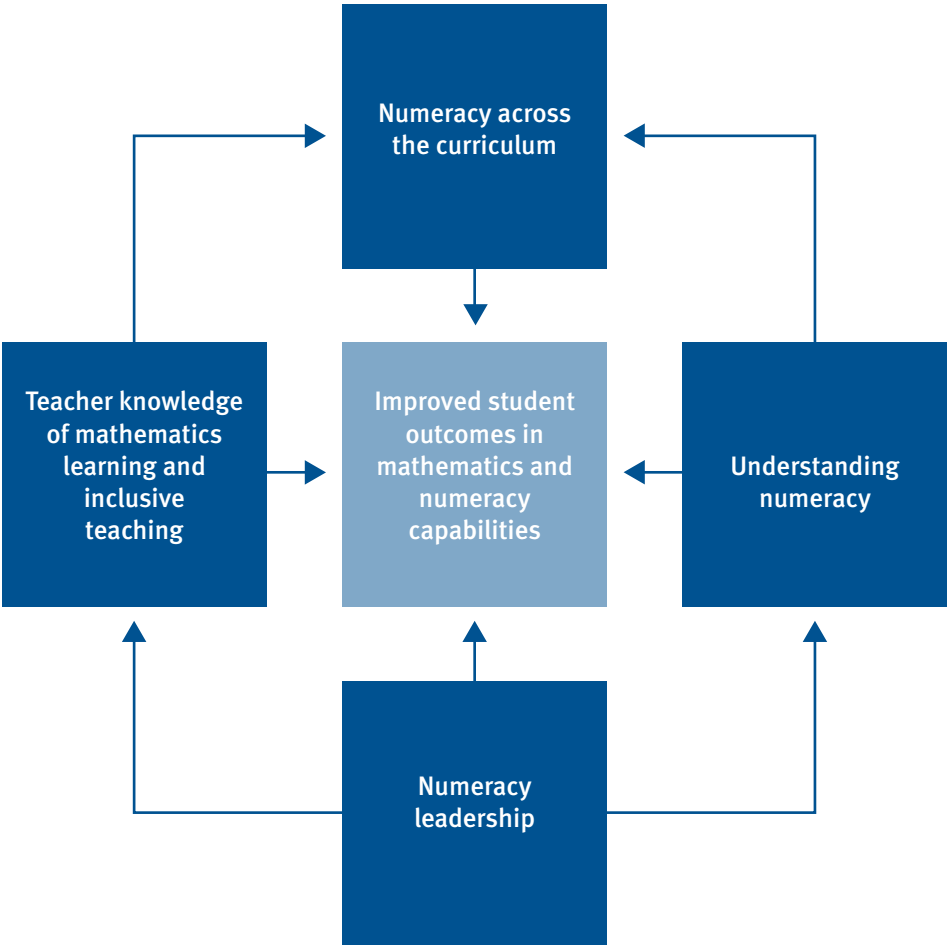
- understanding numeracy
- teacher knowledge and pedagogy
- numeracy across the curriculum
- numeracy leadership.

This framework complements the *Literacy framework for action 2006–2008: Literacy the key to learning*.

Elements that inform the Numeracy Framework for Action

The Numeracy Framework for Action focuses on addressing identified elements for improving outcomes for all students. These include understanding numeracy, teacher knowledge and pedagogy, numeracy across the curriculum and numeracy leadership. The elements are interrelated and not mutually exclusive or hierarchical (see Figure 1). They serve as entry points for considering and acting on the issues that affect students' numeracy learning.

Figure 1: Elements informing the Numeracy Framework for Action





Understanding numeracy

AIM: To establish a common language and basis for discussion of numeracy in the educational and wider school communities.

Adopt and support an agreed definition of numeracy.

Reach a shared understanding and position on how numeracy is related to:

- mathematics and other key learning areas
- literacy and other cross-curriculum priorities
- current and emerging technologies.

Broaden the community's awareness of the importance of students' numeracy achievements beyond the definitions used in the national testing program.

Help parents to understand the purpose of numeracy skills in students' long-term success and everyday contexts.

Educate the broader community about the nature of teaching and learning programs in numeracy and mathematics.

Challenge myths concerning the role of school mathematics and the impact of current and emerging technologies.

Enhance classroom-based numeracy programs.

Teacher knowledge and pedagogy

AIM: To improve teacher knowledge of mathematics, how students learn and transfer mathematical knowledge and skills and how teaching impacts on student use of numeracy.

Establish the following fundamental principles:

- All students can succeed in mathematics and develop a positive attitude and confidence in using mathematics.
- Teachers must meet learners at their current point of understanding.
- Students' enjoyment in classroom mathematics influences their confidence with numeracy outside the classroom.

Develop teacher understanding of mathematics content with respect to:

- the nature of mathematics as a discipline
- the mathematics topics they teach
- the relationship of those topics to further learning and everyday life
- the impact of information and communication technologies on the teaching and learning of mathematics.

Improve teacher knowledge of how students construct their own mathematical concepts.

Improve teacher use of technologies to enhance mathematical understandings.

Improve teacher use of assessment data to inform planning for teaching and learning.

Improve teaching practices in mathematics, with particular emphasis on understanding the learner, having high expectations for all students, employing productive pedagogies and assessment for learning.

Support teachers' professional development in mathematics to improve teacher confidence and the use of pedagogies that foster positive attitudes to mathematics in their students.

Numeracy across the curriculum

AIM: To improve teacher understanding of numeracy across the curriculum to enhance student knowledge.

Develop critical thinking and foster behaviours that enable students to make sense of numerical information in their world (e.g. consumer and financial literacy).

Identify the numeracy demands and opportunities in all learning areas across the curriculum.

Support teachers in all learning areas to use appropriate pedagogies to encourage the development of student numeracy.

Numeracy leadership

AIM: To enhance curriculum leadership for numeracy.

Build positive cultures and high expectations in schools so all students can succeed in mathematics and be numerate.

Build curriculum leaders' capacity to support professional development for teachers and themselves.

Create structures and cultures that focus on: professional development; resources, time and space for teachers to reflect on and be effective in their practices; and appreciation of the significance of their role in preparing numerate citizens.

Develop leadership capacity in using data to inform planning and target setting.

Manage curriculum change and pedagogical reform by building teacher capacities.

Disseminate examples of effective classroom practices in:

- mathematics lessons
- meeting numeracy demands in other areas of the curriculum
- developing and supporting numeracy in the school community.

Promote and support strong partnerships with universities and professional associations in their pre-service and in-service education roles to include:

- quality and focused teaching and understanding of mathematics
- appropriate pedagogies that enable students to use mathematics effectively in all curriculum areas
- identifying numeracy demands and using numeracy opportunities across the curriculum.

Engage in research partnerships and disseminate the findings to inform systemic and classroom planning.



Departures		
Flight	Time	
2340	8:42	
470	6:10	
396	8:41	
2024	9:05	
476	9:28	
2864	9:55	



Ways forward

Actions have been developed to respond to each of the identified elements.

The responsibility for these actions has been divided between the system, individual regions and schools.

The obligations and accountabilities of principals with respect to this Numeracy Framework for Action will continue to be documented in *Destination 2010* and the *School Improvement and Accountability Framework*.

Numeracy Reference Group

Implementation of the Numeracy Framework for Action will be informed by a departmental reference group including representatives from Education Queensland, professional associations and universities.

The Numeracy Reference Group will support, facilitate, monitor and evaluate the implementation of the Numeracy Framework for Action and report outcomes of the framework to the Minister for Education and Training and Minister for the Arts.



Understanding numeracy

Aim: To establish a common language and basis for discussion of numeracy in the educational and wider school communities.

System responsibility and support

- 1. Develop a communication strategy.**
 - Devise a coherent and consistent message around the agreed definition for a range of purposes and audiences.
 - Select appropriate media (including digital, web-based, print and video) to meet the needs of diverse audiences (including schools, school communities, parents, pre-service teachers and the broader Queensland community).
 - Develop and disseminate materials to promote and support the implementation of common language and shared understandings.
- 2. Review use of the term numeracy in system accountability documents to reflect its broad definition.**
 - Ministerial Portfolio Statement.
 - *Destination 2010*.
 - *School Improvement and Accountability Framework*.
- 3. Ensure consistency of the representation of numeracy in state and national curriculum initiatives.**
 - Participate in, and contribute to, initiatives such as the Year 2 Diagnostic Net support materials, National Assessment Program, National Numeracy Review, and the Queensland Curriculum, Assessment and Reporting Framework (QCAR Framework).

Regional accountability

- 4. Disseminate the communication messages.**
 - Promote numeracy as a goal of schooling when communicating with parents and communities.
 - Support and encourage school-based professional development conducted by school leaders and teachers across the school community.
 - Publicise and support National Literacy and Numeracy Week activities.
- 5. Support schools to align mathematics and numeracy initiatives with consistent definitions.**
 - Interpret school performance data reported to the community.
 - Ensure students acquire numeracy knowledge and practices relevant to the general demands of life.

School role

- 6. Ensure professional development around the definitions and distinctions between *mathematics* and *numeracy*.**
 - Engage the school community, including teaching staff, in discussions about the definitions and their relationship.
 - Work with regional and district support structures to identify specific support needs.
-





Teacher knowledge and pedagogy

Aim: To improve teacher knowledge of mathematics, how students learn and transfer mathematical knowledge and skills, and how teaching impacts on student use of numeracy.

System responsibility and support

7. **Coordinate consistent system-wide implementation of mathematics syllabuses and QCAR Framework.**
 - Allocate curriculum implementation professional development funds.
 - Facilitate collaborative activity across regions.
 - Set targets and monitor progress.
 - Develop and disseminate information showing how mathematics syllabuses promote numeracy.
 - Provide advice on how mathematics and numeracy are situated in the elements of QCAR Framework.
 8. **Develop a focused professional development strategy and support materials for teachers to enhance their knowledge and skills.**
 - Knowledge of mathematics.
 - Pedagogical content knowledge (how students learn mathematics using the appropriate pedagogy).
 - Use of numeracy data to inform planning.
 - Ability to write valid and rigorous assessment tasks.
 - Ability to use technology to support teaching and learning.
 - Capacity to align assessment with curriculum, teaching and reporting as a tool for promoting learning.
 - Ability to develop inclusive teaching strategies in mathematics.
 - Ability to use pedagogies that promote positive attitudes to mathematics and numerate dispositions in their students.
 9. **Audit relevant resources.**
 - Year 2 Diagnostic Net support materials.
 - Syllabus support materials.
 10. **Identify and promote ready access by teachers to quality resource and research materials.**
 - *The Learning Place* and Curriculum Exchange gateways.
 - Numeracy learning objects including those developed by the Learning Federation.
 - Outcomes of action research programs.
 - Australian Government numeracy reports.
-

Regional accountability

- 11. Manage implementation of mathematics syllabuses and QCAR Framework across all schools.**
- Support the work of Professional Development Coordinators, regional and district key contacts or cluster coordinators and curriculum leaders.
 - Monitor the achievement of expectations set in the Professional Development Agenda.
- 12. Implement professional development for teachers.**
- Include mathematics-focused professional development as part of the agenda.
 - Work with districts and schools to build capacity for professional development delivery within schools.
- 13. Undertake a regional audit of current numeracy funding allocations.**
- Re-allocate and redirect funds, where appropriate, to assist with funding professional development programs.

School role

- 14. Facilitate teacher professional development in mathematics and numeracy.**
- Encourage and support attendance at mathematics and numeracy professional development activities.
 - Ensure teacher access to quality and relevant resources.
- 15. Build a strong teaching and learning culture.**
- Reflect the spirit and intent of the syllabuses and QCAR Framework.
 - Take account of the needs of all students.
-





Numeracy across the curriculum

Aim: To improve teacher understanding of numeracy across the curriculum to enhance student knowledge.

System responsibility and support	<p>16. Undertake a numeracy audit of the curriculum across all key learning areas and phases of learning.</p> <ul style="list-style-type: none"> Identify the numeracy skills required to achieve success. Identify numeracy learning opportunities. Disseminate research findings. <p>17. Use representation on committees and working parties to embed numeracy capabilities in formal curriculum documents.</p> <ul style="list-style-type: none"> Key learning area syllabuses. Essential Learnings and Standards within the QCAR Framework. Key Senior syllabuses. <p>18. Collaborate with other government agencies and community groups to demonstrate the role of building numerate capabilities in students for everyday life.</p> <ul style="list-style-type: none"> Consumer and financial literacy. Information and communication technologies. <p>19. Develop professional development programs and materials to build teacher capacity.</p> <ul style="list-style-type: none"> Identify numeracy demands and opportunities in all key learning areas. Adopt teaching practices that explicitly incorporate the opportunity to develop numeracy requirements relevant to the task. Assess the learner's current understanding of numeracy and extend and develop the student's ability. Use pedagogies that promote positive attitudes and confidence in choosing and using mathematics.
Regional accountability	<p>20. Incorporate numeracy demands and opportunities when supporting school collaborative planning activities.</p> <ul style="list-style-type: none"> In all phases of learning. Within and across schools. <p>21. Implement professional development for teachers.</p> <ul style="list-style-type: none"> Regions work with districts and schools to build capacity of teachers to improve numeracy outcomes for students.
School role	<p>22. Build capacity in staff to recognise numeracy demands and opportunities within the curriculum.</p> <ul style="list-style-type: none"> Undertake collaborative planning around numeracy demands and opportunities within the curriculum. Support and encourage teacher attendance at professional development opportunities.

Numeracy leadership

Aim: To enhance curriculum leadership for numeracy.

System responsibility and support

23. **Emphasise the status of numeracy as a system priority.**
 - Appropriate recognition in planning instruments including:
 - Education Strategic Plan
 - *Destination 2010*
 - *School Improvement and Accountability Framework*
 - school reporting requirements.
 - Explicit inclusion or recognition in activities such as:
 - Showcase Awards for Excellence in Schools
 - New Professionalism program
 - Smart Classrooms initiatives.
 24. **Develop specific materials, tools, guidelines and professional development modules for school leaders to develop school capacity.**
 - Use data to inform planning and target setting.
 - Implement early intervention strategies for students identified as being at risk.
 - Manage curriculum change in the context of building teacher capacities.
 - Support whole-school planning around numeracy.
 25. **Ensure the continued availability of appropriately skilled and knowledgeable leaders.**
 - Support and promote the Professional Standards for Teachers.
 - Support professional development opportunities for teachers whose role involves numeracy leadership.
 - Work with pre-service and in-service education providers to enhance the preparedness and willingness of beginning and practising teachers.
 - Incorporate a numeracy focus in the professional development opportunities offered to teacher aides and other support staff.
 - Support regional capacity building.
 26. **Maximise value of partnerships with research institutions.**
 - Seek new opportunities for collaboration in ongoing research activities.
 - Target data to inform systemic planning and target setting to enhance learning in mathematics.
 - Develop strategies to disseminate research findings to relevant audiences.
 27. **Strengthen and promote partnerships with external agencies that have the interest and capacity to build numeracy leadership in schools.**
 - Professional associations.
 - Industry groups.
 28. **Build and maintain strong partnerships with principals and other school leader professional associations.**
 - Support school leader groups to identify professional development needs and to develop programs.
-



Departures		
Flight	Time	
2340	8:42	
470	6:10	
396	8:41	
2024	9:05	
476	9:28P	
2864	9:55P	





Regional accountability

29. Support schools to enhance school-based numeracy leadership.

- Heads of department, heads of special education services, heads of curriculum and/or other curriculum leaders.
- Support teachers: learning difficulties.
- Year 2 Diagnostic Net key teachers.

30. Develop strong regional and district strategic leadership in numeracy.

- Promote principal professional development opportunities that incorporate numeracy learning.

31. Implement professional development for school leaders.

- Regions work with districts and schools to build capacity of school leaders to improve numeracy outcomes for students through evidence-based school planning.

School role

32. Prioritise professional development for curriculum leaders.

- Schools commit to and plan for school leaders attending professional development opportunities that incorporate numeracy learning.
 - Prioritise budget allocations to enable attendance for school leaders at numeracy-related programs.
-

