Numeracy Statement

Guidelines for implementing numeracy initiatives
In Diocesan schools K—12

2001 - 2003
This document has been prepared by the Catholic Education Office, Diocese of Wollongong. It has been designed to assist school communities in supporting the numeracy development of students.

The Project Committee is to be acknowledged for its contribution to the preparation of this Statement.

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Forward

We owe to our students the very best in Numeracy Education. I am pleased therefore to present this Numeracy Statement: Guidelines for Implementing Numeracy Initiatives in Diocesan Schools, which has been developed in response to the National Literacy and Numeracy Plan and to support the numeracy development of students in Diocesan schools. The purpose of this Statement is to provide an outline of system expectations and to provide schools with guidelines for implementing numeracy initiatives.

The content of this document encourages teachers to explore their understanding of numeracy and challenges their beliefs about numeracy learning. It considers the pedagogy of numeracy teaching and the range of assessment and reporting options within the framework of continuity.

Further to the significant Diocesan focus on literacy development, our commitment to numeracy is consistent with identified Government priorities for the future and strives to extend the work on numeracy development already being undertaken in our schools. This Statement clearly outlines system requirements in terms of whole school planning, the identification of professional development, implementation strategies and assessment and reporting procedures.

I am aware of the already considerable progress being made in this area and believe that this Numeracy Statement will enable us to further strengthen the programs we offer and better meet our accountability requirements.

In commending this Statement to you, I acknowledge that it has been developed as a joint initiative with the Catholic Schools Office, Diocese of Broken Bay, through the Quality Teacher Program.

Gregory B Whitby
Director of Schools
Diocese of Wollongong
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Rationale for Numeracy in the Catholic School

A Catholic perspective on numeracy recognises that the promotion of the human person is at the heart of the nature of a Catholic school. The Catholic school is committed to the development of the whole person and endeavours to form persons in both their spiritual and material needs.

Catholic schools aim to highlight the relevance of faith to life and contemporary culture. As proficiency in numeracy is key to accessing the culture, developing numeracy skills must be a priority in Catholic schooling. Numeracy opens doorways and enables a person to participate fully in society. Numeracy allows a person to engage in the culture and become an active member of the community. The gift of numeracy, then, makes it possible for a person to integrate their faith and life and potentially work for the transformation of society.

A Catholic perspective on numeracy recognises that liberation is a key gospel value. The gift of numeracy liberates a person so that they are free from the bounds of ignorance. The attainment of intellectual skills and the development of knowledge liberates people and contributes towards them having life to the full.

Numeracy development also has the potential to nurture the self esteem and personal confidence of a student. These are important pastoral aims of Catholic schooling and should not be undervalued. Such confidence enables a person to make judgements and decisions in everyday living and be better able to make sense of their lives.

When developing numeracy the Catholic educator has the potential to nurture a sense of wonder and mystery in a student as together they pursue an understanding of the world around them. The beauty of mathematics and the various discoveries that will gradually be revealed to the student are all indicators of the mystery and power of God’s creation. In this way numeracy development is truly consistent with a Catholic philosophy of education.
The Numeracy Statement aims to provide school personnel with a clear statement of system beliefs and expectations about the learning of numeracy by all students in Catholic schools in the Diocese of Wollongong.

Numeracy provides key enabling skills for individuals to participate successfully in schooling. Numeracy is fundamental to learning at all stages of school and across curriculum areas. As is the case with literacy, numeracy requires significant emphasis, focus and leadership. Effective teaching and learning practices and effective home, school and community partnerships are critical. In the early years of schooling the development of numeracy skills provides a crucial foundation for future learning at school, in the workplace and in everyday life. Within the school context, numeracy is needed to support learning in all curriculum areas. Interpreting data in graphs or tables, using a scale on a map or making critical judgements based on text containing quantitative information are examples of where students are required to be numerate.

In March 1997 the Commonwealth, State and Territory Education Ministers agreed to a National Literacy and Numeracy goal:

“that every child leaving Primary school should be numerate and able to read, write and spell at an appropriate level.”

and the sub-goal:

“that every child commencing school from 1998 will achieve a minimum acceptable Literacy and Numeracy standard within four years.”

while recognising that a very small percentage of students suffer from severe educational disabilities. The Commonwealth’s National Literacy and Numeracy Plan requires all schools K-12 to support students with high numeracy needs.

(Literacy for All: The Challenge for Australian Schools, p9, 1998)
The Diocesan Numeracy Statement is a response to the National Numeracy Plan. It requires each school system to outline its intended process of diagnosis, intervention and assessment of student numeracy learning and proposed professional development activities.

The Diocesan Numeracy Statement provides a framework to:

* assist with the implementation of Diocesan policy on numeracy development for students K-12 in Catholic systemic schools in the Diocese
* provide guidance and direction to schools in the implementation of quality numeracy programs for all students
* inform Diocesan decision-making and planning
Defining Numeracy

The concept of numeracy is interpreted with many meanings and contexts. A definition for numeracy framed in the Starting with Assessment materials states that:

\[ \text{Numeracy is the ability to use mathematical ideas efficiently to make sense of the world. It makes use of number and spatial sense combined with critical mathematical thinking involving measurement, chance and data.} \]

(Starting with Assessment: Support Materials for Parents, p17, 2000)

The Australian Association of Mathematical Teachers Inc. has expanded this description and proposed the following:

\[ \text{To be numerate is to use mathematics effectively to meet the general demands of life at home, in paid work, and for participation in community and civil life.} \]

\[ \text{In school education, numeracy is a fundamental component of learning, performance, discourse and critique across all areas of curriculum. It involves the disposition to use, in context, combination of:} \]

\[ * \text{underpinning mathematical concepts and skills from across the disciplines [numerical, spatial, graphical, statistical and algebraic]} \]

\[ * \text{mathematical thinking and strategies} \]

\[ * \text{general thinking skills and} \]

\[ * \text{grounded appreciation of context.} \]

(AAMT, 1997: 1,5, cited in ‘Numeracy a Priority for All: Challenges for Australian Schools’)

Students need to know how to compute, measure, estimate and interpret data, know when to apply these skills and techniques and understand why these particular processes apply. Numeracy involves having the confidence to know what to use, when to use it and when to access other resources.
Mathematics is one of the identified Key Learning Areas in the curriculum for schools. Learning in this key area is essential to the development of students’ numeracy and also extends learning beyond foundational numeracy learning. It plays an important role in laying the foundations for the professional and technical uses of mathematics, in fostering an appreciation of the role of mathematics in the functioning of society and in developing an understanding of the nature of mathematical investigation and thinking. These broad mathematical understandings support and strengthen students’ numeracy.

The Mathematics K-12 Statement of Principles outlines the aims of mathematics education as being inclusive of developing students’:

* confidence and enjoyment in doing mathematical activities
* knowledge, skills and understanding in certain specified areas
* awareness of the place of mathematics in solving problems of everyday life and in contributing to the development of our society.

(Mathematics 4 Unit Syllabus, Board of Studies, 1989)

Numeracy involves abilities which include interpreting, applying and communicating mathematical information in commonly encountered situations to enable full critical and effective participation in a wide range of life roles

(cited www.ec.tased.edu.au/numeracy)

Mathematics involves using more abstract skills than day-to-day skills required for being numerate. Whilst mathematics involves dealing with an increasing large body of content at a more and more abstract level, numeracy on the whole requires the use of less abstract skills and the application of these skills in practical contexts. The skills of numeracy are a subset of the skills of mathematics, but they are applied in a wider context than just mathematics.

NSW Department of School Education, 1997

Curriculum Support for the Teaching of Mathematics 7-12, 2:1
Therefore, teachers of mathematics will continue to play a vital leading role in developing a common understanding of mathematical concepts, rules, principles, relationships and procedures. The provision of high quality effective mathematics teaching, which promotes a depth of understanding, is vital. Numeracy, however, must be supported in all subject areas. All subjects must include meaningful opportunities for students to apply the knowledge and skills required to promote numeracy development.
Numeracy and Language

The development of numeracy skills is promoted by the appropriate use of language. Language, including symbols and diagrams, plays an important part in the formulation and expression of numerical ideas and serves as a bridge between concrete and abstract representations. It is important that we provide opportunities for students to talk about mathematical concepts and processes using words, phrases and language structures appropriate to their level of sophistication. Teachers can assist students to investigate different approaches in order to clarify ideas and re-focus their thinking.

Through structured interaction, teachers can gauge the student’s level of understanding in applying mathematical knowledge and skill, acquiring and using appropriate numerical vocabulary and their confidence as a learner. Feedback obtained through observation will assist in evaluation of teaching style and inform future planning.

Reading for numerical meaning should occur in a variety of contexts, including teacher generated material, written work involving calculations, explanations, stories, solutions to problems, descriptions of investigations, interpreting graphs, tables and maps.

By encouraging students to write, teachers may gain information, not only about student learning and understanding, but about their feelings and attitudes to numeracy. Writing in numeracy processes may include reports of practical activities and investigations, reports of their thinking process, practical exercises to consolidate skills, descriptions and explanations of mathematical properties and processes, applications of numeracy in everyday situations.
Diocesan Expectations

Expected outcomes of the implementation of the Diocesan Numeracy Plan are that:

* schools deliver programs that enable students to develop their numeracy skills in a wide range of contexts and achieve their optimum competence
* schools develop a whole-school plan
* schools utilise the Diocesan school review processes K-12 to monitor and improve numeracy programs
* schools use a variety of strategies to ensure the early identification of student numeracy strengths and areas of need
* schools use data from *Starting with Assessment* for Early Stage 1, Stage 1, Stage 2 and Stage 3, the *Basic Skills Numeracy Test* and *Secondary Numeracy Assessment Program*
* schools use a range of assessment data to identify student achievement and inform learning and teaching
* schools implement effective intervention strategies, that are challenging and purposeful
* schools monitor procedures to provide evidence of the success of intervention strategies
* primary schools allocate uninterrupted blocks of time daily to the teaching of mathematics
* teachers utilise opportunities across the curriculum for numeracy development
* teachers of all Key Learning Areas in schools take responsibility for the on-going integration and development of numeracy skills, K-12
* teachers (including specialist teachers) form collaborative partnerships to meet student numeracy needs
* teachers’ programs and classroom practice reflect explicit strategies for the development of numeracy
* school-based professional development addresses the needs identified in each school plan
* Diocesan professional development responds to common needs and is on-going, systematic and planned
Implementation Strategies

Successful implementation of the Diocesan Numeracy Plan will depend on developing cooperative partnerships between systemic schools and community so that a common vision is formed which values numeracy development.

DIOCESAN

In response to the Diocesan Numeracy Plan:

A Diocesan Numeracy Reference Group will be formed to:
- respond to needs expressed by schools
- monitor and evaluate initiatives that promote the achievement of numeracy
- implement initiatives that meet goals K-12 identified in "Agenda 2001"

Diocesan numeracy initiatives will be provided to support the professional development of staff.

Monitoring of student performance using state-based assessment procedures will be carried out as follows:
- Year 3: Basic Skills Test
- Year 5: Basic Skills Test
- Year 7: Secondary Numeracy Assessment Program
- Year 10: School Certificate Mathematics Test

SCHOOL

The school, in response to the Diocesan Numeracy Plan K – 12, will:

* develop a whole school numeracy plan by the end of 2001 which will be monitored as part of the school review and development process
* develop policy and practice to reflect the expectations of the Diocesan Numeracy Plan by the end of 2003
* assess students entering primary school from 2001 onwards in order that they achieve the benchmark standard of numeracy within four years
* use BST or SNAP to identify students with high numeracy needs and to inform teaching and learning practices

* nominate and support appropriate staff to attend Diocesan initiatives and in turn lead professional development of staff within their school

* inform the parent body of developments in numeracy learning to increase understanding and promote shared goals and practices

TEACHER

The teacher, in response to the School Numeracy Plan will:

* Participate in appropriate professional development activities

* Develop classroom practice which ensures learning and teaching programs will reflect Diocesan and school expectations by 2003

* Assess student performance and evaluate teaching practice in order to further enhance numeracy development
Wider Community

The Diocesan Numeracy Statement recognises the essential role of home and school partnerships in students’ learning and numeracy development. A school culture that welcomes parents, values them as partners in the education enterprise and demonstrates mutual engagement will provide improved learning outcomes for students. Widespread engagement of parents in their children’s learning is crucial to the realisation of the National Literacy and Numeracy goals.

Home-school partnerships are about teachers and parents working together to:

* develop a shared view of numeracy
* demonstrate mutual respect
* value numeracy learning in the home
* develop a coordinated supportive approach to numeracy learning
* increase understandings about numeracy development
* develop a variety of opportunities for participation
* affirm the promotion of shared goals and practices
Whole School Approach

A major purpose of the School Numeracy Plan is the implementation of a cohesive approach to the on-going development of students’ numeracy. Numeracy goals can be met only if schools pursue a whole school, comprehensive strategy.

Effective planning and implementation requires the involvement of the whole school community. Staff need to be aware of the purpose behind any whole school planning to enable them to identify the external factors involved, the strengths and weaknesses in the current situations and the opportunities for success.

Appropriate support needs to be provided in a planned, systematic and explicit way to all students but particularly those students with high numeracy needs. The role of whole school strategic planning, stage/grade planning and KLA planning will be crucial in ensuring success. The establishment of priorities, goals and a vision for the future as well as setting high expectations for all students and teachers will ensure that the numeracy needs of students are met.

School leaders play a key role in the success of numeracy planning. Effective educational leaders are those who are immersed in the teaching and learning process. They are in a position to build the commitment of staff and establish the kind of organisational climate and conditions that are needed for success.

The administration of the School Numeracy Plan is the responsibility of the Principal and those charged with curriculum management within the stages of the primary school and Key Learning Areas in the secondary school. This plan will:

* recognise the value of numeracy as fundamental to the achievement of educational outcomes and the imparting of Catholic values
* outline the process of collecting and analysing data on student achievement in numeracy to inform teaching and learning
* provide a framework for implementing initiatives for the development of numeracy
* specify the school's aims in numeracy with reference to the organisation, management and strategies employed

An effective School Numeracy Plan will articulate whole-school decisions about numeracy including details of:

* beliefs and shared understandings about teaching and learning
* a whole-school approach to numeracy, inclusive of different needs, backgrounds and skills
* the role of school leaders in supporting effective implementation
* identification procedures designed to ensure that all students at risk are recognised
* intervention procedures designed to support students with particular needs
* subject-specific skills which must be taught in order to become numerate
* explicit teaching for numeracy development
* classroom and school monitoring and assessment practices
* the roles of specialist personnel in partnership with classroom teachers in students’ numeracy development
* the numeracy assessment, evaluation and reporting approaches used throughout the school
* effective communication of student achievement of numeracy outcomes
* the provision for professional development for new and existing staff
* the school’s approach to home-school partnerships designed to promote numeracy
Assessment and Reporting

The purpose of assessment is to gather data that contributes to the formation of judgements by teachers in regard to student development of numeracy skills. Assessment practices should improve the quality of learning for all students by effectively focusing on individual achievements and needs in a standards referenced framework.

Assessment and evaluation procedures determine the nature of the student learning provided in classrooms to achieve the competencies outlined by the Board of Studies syllabus outcomes. Assessment is, therefore, primarily school-based and teacher-developed and should involve a wide range of strategies. Teachers engage in on-going monitoring of student development through the application of formal and informal methods, including observation, conferencing, discussion, questioning, analysis of work samples, student self-assessment, interaction with parents/caregivers and the application of test instruments.

Monitoring of students’ numeracy levels is carried out at all stages of their education and provides the school with diagnostic information on which continuing teaching can be based. Assessment information, when shared at a diocesan level, provides valuable data for the design and provision of teacher professional development and support services. The use of external measures for this purpose also provides schools with a comparative measure against state means.

Effective and informative assessment and reporting:
* is integral to the learning and teaching program
* focuses clearly on syllabus outcomes
* is linked to standards
* is appropriate to the outcomes being assessed
* is valid, reliable, equitable and feasible
* is inclusive of varying contexts
* is planned and efficient
* values consistent teacher judgements
* recognises individual student’s achievement
* makes meaningful and formative recommendations for improvement
* actively involves parents in the communication process
* involves a whole-school approach

The Diocese has the responsibility to collect data on student numeracy performance that is consistent from school to school. All schools will use the following state-based assessment procedures:

* Year 3: Basic Skills Test
* Year 5: Basic Skills Test
* Year 7: Secondary Numeracy Assessment Programme
* Year 10: As part of the School Certificate

In addition, school-based assessment will include details of:
* the monitoring of student progress and achievements
* plans for students with high numeracy needs

As a result of on-going assessment and evaluation procedures, the school has the responsibility to report on the student’s achievements in numeracy to students and parents/care givers. Each school will describe the reporting procedures in their School Numeracy Plan. The Diocese has the responsibility to report student achievements against the National Numeracy Benchmarks.
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<th>Year</th>
<th>Development of a Diocesan Numeracy Plan</th>
<th>Implementation of Diocesan Numeracy Plan</th>
<th>Monitoring of Diocesan Numeracy Plan</th>
<th>Evaluation of Diocesan Numeracy Plan</th>
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<td>2000</td>
<td>Implications of the National Plan</td>
<td>Launch Diocesan Numeracy Statement outlining expectations for schools</td>
<td>Implementation of the Diocesan Plan Supporting and monitoring the development of school numeracy plans</td>
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**Related Activities on Diocesan Numeracy Plan**
- Numeracy Project K-6 to raise awareness and build enthusiasm
- Participation in BST (numeracy) and SNAP (pilot)
- “Starting with Assessment” activities
- Consultation of the development of Diocesan Numeracy Statement
- Nomination of school Numeracy contacts

**K – 6 Initiatives**
- Assessment of numeracy skills to identify numeracy needs
- Examining theory, implications and strategies to support numeracy development
- Providing best-practice models of classroom management and organisation to support numeracy development
- Interpreting BST results to inform numeracy development

**7 – 12 Initiatives**
- Assessment of numeracy achievement to identify areas of numeracy support
- SNAP Information activities – what does it test?
- Unpacking SNAP results packages to inform numeracy development
- SNAP marking initiatives on extended response questions

**Formation of Diocesan Numeracy Reference Group**
- Represent Diocesan schools in planning and consultation activities
- Develop and support numeracy initiatives as key numeracy contacts in schools and professional development activities

**Development of Diocesan Numeracy Reference Group**
- Represent Diocesan schools in planning and consultation activities
- Develop and support numeracy initiatives as key numeracy contacts in schools and PD activities

**Monitoring of Diocesan Numeracy Reference Group**
- Represent Diocesan schools in planning and consultation activities
- Develop and support numeracy initiatives as key numeracy contacts in schools and PD activities

**Evaluation of Diocesan Numeracy Reference Group**
- Represent Diocesan schools in consultation and evaluation activities
- Support, evaluate and set future directions for numeracy initiatives as key numeracy contacts in schools and PD activities
References

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Mathematics 4 Unit Syllabus, 1989
NSW Board of Studies

National Initiatives in Literacy and Numeracy: The Challenge for Parents

Numeracy: A Priority for All: Challenges for Australian Schools, 2000
DETYA Canberra

Starting With Assessment: Support Materials for Teachers, 2000
DETYA Canberra

Starting with Assessment: Support Materials for Parents, 2000
DETYA Canberra

Electronic Sources available on line:
http://www.ec.tased.edu.au/numeracy