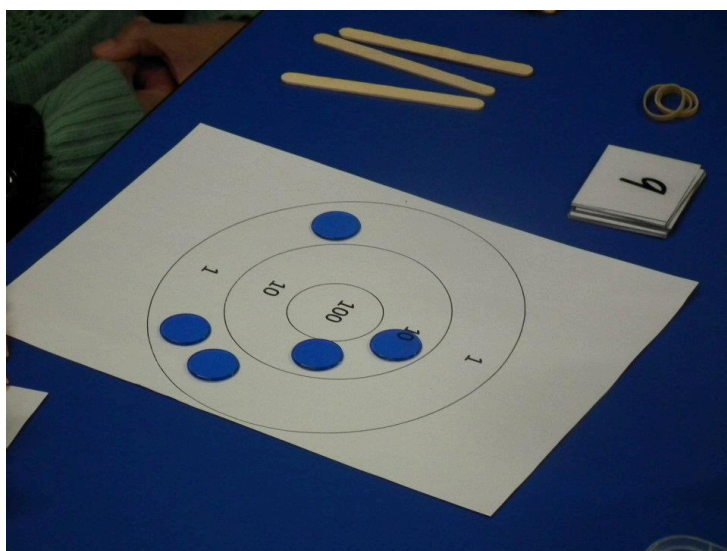


Mathematics Policy

Implemented: April 2013

Review: March 2015



RATIONALE

Our mission at St Anthony's is to provide our students with an education that prepares them to meet the challenges of a changing society.

Mathematical ideas have evolved across all cultures over thousands of years and are constantly developing. Digital technologies facilitate this expansion of ideas, providing access to new tools for continuing mathematical exploration and invention. Mathematics is integral to scientific and technological advances in many fields of endeavour. In addition to its practical applications, the study of mathematics is a valuable pursuit in its own right, providing opportunities for originality, challenge and leisure.

Mathematics in K–10 provides students with knowledge, skills and understanding in Number and Algebra, Measurement and Geometry, and Statistics and Probability. It focuses on developing increasingly sophisticated and refined mathematical understanding, fluency, communication, logical reasoning, analytical thought and problem-solving skills. These capabilities enable students to respond to familiar and unfamiliar situations by employing strategies to make informed decisions and solve problems relevant to their further education and everyday lives.

The ability to make informed decisions and to interpret and apply mathematics in a variety of contexts is an essential component of students' preparation for life in the 21st century. To participate fully in society, students need to develop the capacity to critically evaluate ideas and arguments that involve mathematical concepts or that are presented in mathematical form.

Mathematics K-10 Syllabus (Board of Studies NSW)

AIM

We at St Anthony's aim to provide a comprehensive Mathematics program where students will:

- be confident, creative users and communicators of mathematics, able to investigate, represent and interpret situations in their personal and work lives and as active citizens
- develop an increasingly sophisticated understanding of mathematical concepts and fluency with mathematical processes, and be able to pose and solve problems and reason in Number and Algebra, Measurement and Geometry, and Statistics and Probability
- recognise connections between the areas of mathematics and other disciplines and appreciate mathematics as an accessible, enjoyable discipline to study, and an important aspect of lifelong learning.

Mathematics K-10 Syllabus (Board of Studies NSW)

IMPLEMENTATION

- A school goal is determined for numeracy each year
 - This goal is developed by the Numeracy Coordinator and leadership team in consultation with staff
 - An implementation plan is developed to outline how the learning of students, teachers, school leaders and families will be structured to improve an aspect of numeracy within the school
 - Action plans are developed each term to name the specific strategies to be implemented, monitored and evaluated
- Learning in Mathematics will be led and supported by the Numeracy Coordinator and the Leadership Team, as well as staff selected and trained as Extending Mathematical Understanding (EMU) Lead Teachers and Specialist Teachers
- Timetabling of Mathematics lessons meets the following requirements:
 - A minimum of 1 hour each day allocated to Mathematics
 - Majority of lessons in the week taught before lunch

- The daily Mathematics lesson will follow a set structure, in accordance with the principles of EMU (EMU, refer to Appendix 1)
- Teachers will work to ensure that students achieve the learning outcomes of the NSW Mathematics K-10 Syllabus
 - In organising the content that will be taught in each grade:
 - Each content strand and substrand will be addressed each year
 - For each substrand, the first unit for the applicable Stage (eg Stage 2, Whole Numbers 1) will be the focus for the first year of the Stage (eg Year 3), while the second unit (eg Whole Numbers 2) will be the focus for the second year of the Stage (eg Year 4)
 - While the applicable unit will be the content focus for the grade, teachers will still differentiate the content to be taught, as stated below
 - The learning intention for each lesson will be explicitly named by the teacher and displayed in the classroom
- Teachers will ensure that learning experiences meet individual students' points of need
 - Teachers will use individualised goal setting and communicate goals with students
 - In addition, specialist EMU lessons will be conducted with Year 1 students who are identified as needing early intervention
- School-based assessment in Mathematics is ongoing and in accordance with the school's Assessment and Reporting Policy
 - Samples of student work are kept throughout the year, both as evidence of learning, and as assessment and reporting material
- Diocesan assessment of numeracy skills is undertaken through the Mathematics Assessment Interview (MAI) for all students at the beginning of each year

BUDGET

A budget is provided for the professional learning of staff and the acquisition of resources. This budget is the responsibility of the Numeracy Coordinator.

EVALUATION

The Numeracy Coordinator, in collaboration with staff, will review this policy every two years.

ASSOCIATED DOCUMENTS

School Documentation

- [Mission and Vision Statement](#)
- [Learner Profile](#)
- Numeracy Implementation and Action Plans (Annual)

System Documentation

- [Focus 160: Diocesan K-2 Literacy and Numeracy Strategy](#)
- [Numeracy Now](#) Ning
- Extending Mathematical Understanding Teacher Resource Folder
- Mathematics Assessment Interview (ACU Ballarat)

Government Documentation

- [Mathematics K-10 Syllabus](#)

Structure of a Quality Numeracy Block

A quality Numeracy Block consists of three sections:

1. Number Warm Up
2. Rich Task
3. Reflection Time/Main teaching time

Number Warm Up (10 – 15 minutes)

Why?

It's important to have a time in each maths lesson that allows children to deepen their understanding of number and provide an opportunity for students to share mathematical thinking.

What?

There is no need to search for lots of different warm up activities. Using the same quality warm ups all year is OK because these warm ups are so rich and open that they can easily be adapted based on regular formative assessment.

Rich Task (30 – 40 minutes)

Why?

Children learn best when they are engaged in learning and involved in mathematical tasks that are rich, real and relevant.

It is therefore important to have learning time in which children are actively involved in doing and thinking maths. The Rich Task section of the Numeracy Block involves children in working with open ended tasks, rich mathematical games and maths investigations that allow the tasks to be differentiated to cater for all learners.

What?

It is not a 'teaching to' time, a copying off the board time, interactive whiteboard time, worksheet time or a textbook time. It is not a time for rotational groups with children doing a different activity every day. It is hands on learning in which the children are engaged in a rich open-ended maths task or rich open-ended maths game in a class environment that encourages different ideas and different strategies. Because the task or game is rich and open-ended it is easily differentiated so that all children are able to work within their Zone of Proximal Development (ZPD).

For the Rich Task to be a powerful learning time for everyone, it needs to be closely linked to data, ongoing formative assessment and quality feedback. Assessment for learning "becomes formative assessment when the evidence is actually used to adapt the teaching work to meet learning needs." (Black et al. 2002) It is the constant use of data to change and adapt tasks, and to help determine what questions to ask individual students that makes the difference. According to Dylan William

the research shows that the kind of formative assessment that has the biggest impact on student learning is short cycle formative assessment. Basically, if you're not using information to make a difference to your teaching within a day or two then it's unlikely to make a difference to student achievement. It's the short cycle formative assessment that really matters, minute by minute, and day by day.

Assessment for Learning: why, what and how (edited transcript of a talk given by Dylan William at the Cambridge Assessment Network Conference 2006)

Quality feedback is also essential. Maths should not be about right or wrong. Being correct is important, but more important, are the strategies that children are using and the deep maths understanding that they are developing. Hattie and Timperley's 3 feedback questions should be a part of each maths lesson as much as possible:

- Feed up – Where am I going?
- Feed back – How am I going?

- Feed forward – Where to next?

Children should move from the 'Warm Up' to the 'Rich Task' section of the Numeracy Block quickly, with a simple introduction from the teacher. For example, the teacher might say something like, "Today we are continuing to explore place value by playing the target game. The maths learning that I want you to focus on today is ...". They might also direct individual children specifically, "John and Luke, can you work together today and explore 4 – digit numbers. Your learning goal today is to get better at ..."

Children then move away and begin working.

Reflection Time (10 – 15 minutes)

Why?

Reflection time is the main teaching time of the Numeracy Block. This is different thinking for most teachers but research supports that children learn more deeply if the mathematical experiences have come first. It is a time to 'tune in' to the maths that has been learnt.

What?

A powerful reflection time at the end of a maths block is a fine art. It is always hard to master because so much of the reflection time cannot be totally planned ahead of time but is instead based on observations of children's learning and the using of these observations as teachable moments.

It is important that there is a balance of teacher talk, student talk, partner talk and quiet reflective moments. It is important that the focus is learning and the focus is on deep mathematical understandings rather than mathematical procedures.

All this is hard to master but worth mastering. Research over the past few decades indicates that making connections between prior knowledge and new learning helps to construct schema in long-term memory. Schema frees working memory capacity to allow more learning to take place without unnecessary cognitive load.

Sources: *Numeracy Now*. <http://numeracynow.ning.com/page/structure-numeracy-block>,
and *Focus 160*. <http://oscar.parra.catholic.edu.au/confluence/display/pss/Focus+160+-+Structure+of+Quality+Numeracy+Block>