Wooroolin State School

MATHS PROGRAMME

2012- 2014
WOOROOLIN STATE SCHOOL
STATEMENT OF BELIEFS

Working together to ensure that every day, in every classroom, every student is learning and achieving

At Wooroolin State School we believe that today’s students face complex social, environmental and economic futures. Within this context however, we believe that every student is capable of learning and is expected to demonstrate ongoing progress. To ensure progress, we believe there should be close alignment with systemic curriculum intent. We believe that skills and knowledge must be explicitly taught across the curriculum and in increasing sophistication as students progress through their schooling.

At Wooroolin State School we believe that we should establish ambitious but realistic goals that promote high expectations for every student in the school. To meet these goals, we believe that student progress should be monitored regularly. Planning should be sequenced and occur with reference to agreed standards and targets which align to system, school and individual priorities and needs.

We believe that assessment is an ongoing process. By using a range of assessment tools and data we believe we can create a picture of a student’s achievement and learning needs in order to determine priorities and planning for the next step in learning.

We believe that teachers should provide specific, ongoing and quality feedback to guide student learning and so that students can take an active role in reflecting their own learning and identifying steps they can take to improve.

These beliefs are acknowledged and reflected in the five Dimensions of Teaching and Learning illustrated overleaf.

2008
Melbourne Declaration on Educational Goals for Young Australians.
The Melbourne Declaration commits to supporting all young Australians to become successful learners, confident and creative individuals and active and informed citizens, and promotes equity and excellence in education.
THE DIMENSIONS OF TEACHING AND LEARNING

Our students
working together to ensure that every day, in every classroom, every student is learning and achieving
CURRICULUM INTENT – WHAT DO WE WANT OUR STUDENTS TO KNOW?

What we want our students to know about Maths and what we want them to do to achieve deep understanding about what they are learning is outlined in departmental documents including the Australian Curriculum, Essential Learnings and Standards, Education Queensland Roadmap including the Scope and Sequence: Years 1-9 and the P-9 Numeracy Indicators. These curriculum documents reflect what we are expecting all students at Wooroolin State School to achieve at appropriate year levels.

SEQUENCING TEACHING AND LEARNING - HOW DO WE TEACH THEM WELL?

In order to teach our students well, we believe teachers should:

- have a sound knowledge of what we want our students to learn
- have a sound knowledge of the theories of maths teaching and learning
- are able to combine those knowledges
- translate those knowledges into teaching strategies.

ASSESSMENT - HOW DO WE KNOW WHAT THEY KNOW?

At Wooroolin State School, assessment in mathematics will consist of more than supervised tests. A variety of assessment techniques are described below.

Investigations or inquiry task
Format  Investigations may be presented as a problem to be solved, a question to be answered, a significant task to be completed or an issue to be explored.

Conditions  Individually and/or in groups
Prepared in class time and/or in the students’ own time
Typically in written form, or a combination of written, oral and multimedia forms
Supervised tests
Format Short and extended response items, multiple choice, matching/true/false/classification or practical tasks.
Conditions Under supervised conditions
Individual

Diaries, journals, learning logs, blogs
Format A diary of relevant, significant tasks carried out by the student; documentation of planning, thinking, justifying and evaluating; evidence of decision-making processes.
Conditions Does not need to be a single document
May consist of documentation pertaining to major tasks, investigations or learning activities.

Peer and self reflections
Format Feedback from small or large group discussions or responses to evaluation questions.
Conditions Individually and/or in groups
Prepared in class time and/or in the students’ own time

Reports
Format Extended responses, mathematical investigation/experiment, field activity, project, case study, proposal to a person/company/organisation, feasibility study, posters.
Conditions Individually and/or in groups
Prepared in class time and/or in the students’ own time
Typically in written form, or a combination of written, oral and multimedia forms

Other non-written methods
Format Simple diagrams, sketches, flowcharts, concept maps, digital photographs or videos, making 2D or 3D models, virtual models using computer software.
Conditions Individually and/or in groups
Prepared in class time and/or in the students’ own time

Whole-class testing at particular junctures is also useful to track progress from year to year. The Wooroolin State School Assessment, Standards and Targets document sets out this cycle and is available as a separate document.
FEEDBACK - HOW DO WE RESPOND IF THEY DON’T KNOW?

We believe students should receive regular feedback on how well their knowledge, skills and understanding are developing. Our feedback will enable them to recognise their own strengths and areas for further development in mathematics, and allow us and them to plan the next steps in their learning.

Feedback in our classrooms will take many forms: discussion with the whole class, with groups and individuals; written annotations; modelled responses; and peer and self-reflection. The feedback will:

• focus on the activity and what is expected
• be constructive
• provide meaningful information to students about their learning
• correct misunderstandings
• identify and reinforce students’ strengths
• state clearly how students can improve.

Teachers at Wooroolin State School analyse records, observation checklists and authentic assessment data to gives them the exact information needed to pinpoint where students are experiencing difficulty with any of the concepts or strategies that have been taught. Daily feedback is provided verbally and by checking written work through marking and written feedback. Formal feedback is provided to parents and carers twice a year through the Report Card, parent teacher interviews and 3-way conferences. Specific feedback is provided to students after each assessment piece and students are encouraged to take an active role in formal feedback sessions with their teacher. This is an opportunity to set individual goals for learning and completes the feedback cycle.

MAKING JUDGEMENTS - HOW DO WE RESPOND IF THEY ALREADY KNOW?

Pre-testing student knowledge means that we can refrain from teaching those students who already know what we are planning to teach. At the earliest stage of learning about number for example, this would mean that students who already know numbers from 0-10 would not need to participate in the lessons involving recognition and recall of these. These students may be engaged in, for example, number sorts which enable them to apply the knowledge that they already have.

In this way we are fulfilling our purpose as teachers, which is to maximise the learning for all students.
THE AUSTRALIAN CURRICULUM - MATHS
Please refer to the ACARA website for information on Maths and the Australian Curriculum  www.australiancurriculum.edu.au

HOW DOES THIS RELATE TO WOOROOLIN STATE SCHOOL?

OUR SCHOOL VISION

Wooroolin State School’s vision is to provide quality education in a safe and supportive learning environment so that each student strives for and achieves his or her best every day.

Wooroolin State School has at its core a set of values that we hope all who are part of our community will acknowledge and model. These values, our PROUD values, are set around our motto, Make Wooroolin Proud. Staff, students and our community believe these values can be expressed in many ways.

Our school purpose is set out in the Annual School Operational Plan which is a product of self-reflection by our school community and is a strategic planning and accountability document. It details the way in which the school will improve student learning, how it will monitor performance as it works towards the achievement of:

- Systemic planning priorities outlined in the Education Queensland Strategic Plan
- School-based developmental priorities
- School purpose and vision statement

The plan is monitored and reviewed annually to ensure flexibility and continuity of purpose.

A copy of the current Operational Plan is available on our website or on request.

Students undertake simple questionnaires on personality traits and preferences to help with teaching and learning strategies. Once profiled, a student’s personality is given an animal totem according to AUS IDentities. Howard Gardner’s Multiple Intelligences (or SMARTS) are used to understand a student’s preferred learning style. More information on these are outlined in our Gifted and Talented Framework.
AN INFORMING FRAME FOR NUMERACY AT WOOROOLIN STATE SCHOOL

Mathematics and numeracy are not the same thing.

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
- mathematical thinking and strategies
- general thinking skills
- grounded appreciation of context.


Numeracy within the mathematics classroom is identifying the mathematics in a context relevant to the student. The teacher’s role is to provide students with the skills and confidence to use the mathematics they have identified. In applying and using this mathematics, independently and outside the mathematics ‘lesson’, students demonstrate numerate behaviour. In the early phase, numeracy is primarily about teaching children the skills they need to give them confidence in using mathematics — an essential ingredient if students are to be numerate. Teachers should also model this confidence at every opportunity.

It is also essential for classroom teachers to teach mathematics in ways that instil the confidence and attitudes needed to choose and use mathematics outside the mathematics lesson. They do this by creating an environment that encourages risk-taking, doesn’t solely focus on right and wrong answers (tick-cross approaches), and engages students in activities, discussions, explorations and investigations where deep learning is promoted and where children have fun. Where this doesn’t occur, children might know a lot of mathematics — or procedures to ‘get sums right’ — but might not be numerate because they don’t have the confidence to draw on this knowledge when not directed to by a teacher.

HOW CHILDREN LEARN MATHEMATICS

To learn mathematics, children must construct concepts and relationships among concepts in their own minds. To do this, children need to explore and investigate, to discuss and justify. A quality teaching program in mathematics has this tenet central to the processes of learning and teaching.
The language of school mathematics by its nature is full of symbols and abstractions. It is critical that the apparent complexities of the discipline do not impede the basic need of children to create and recreate their own meanings. We must provide experiences that allow for students’ concrete interactions with mathematical ideas. This view of learning is termed constructivism. Learning is an internal process — a gradual refinement of ideas, understandings and processes, best nurtured through the provision of meaningful contexts, planned experiences, high-quality resources and a supportive environment. Our acceptance of a constructivist approach to teaching and learning assumes a de-emphasis of the traditional textbook approach to teaching mathematics as the main way for children to learn.

The Maths Classroom

What does a Wooroolin State School maths classroom look like?

• It has active and engaged learners.
• It has involved and supportive teachers.
• Students are learning independently, in small groups and whole class.
• High-quality resources are in use to support learning.
• Samples of students’ learning and investigation are on display.
• There will be evidence of ICT use in mathematics.
• Students are learning and investigating in different ways.
• There is purposeful discussion and movement.
• There is evidence of higher order thinking being valued through the embedding of the Ways of working.
• The four resources model is used to address the literacy demands of maths.

What does a Wooroolin State School maths classroom sound like?

• Purposeful discussions can be heard between students and between students and teachers.
• Passionate justifications can be heard.
• Insightful, provocative questions are being asked.
• Collaboration and sharing of ideas is valued.
• Clicking dice, snapping blocks, clapping hands.
• Laughter and excited, confident voices.
• Aaaha!
• Words of encouragement, praise and support are common.

What does a Wooroolin State School maths classroom feel like?

• Supportive and SAFE (confidence).
• Valuing different ideas and strategies (collaboration).
• Success is achievable for everyone.
• Maths is FUN and exciting!
• Students take responsibility for their own learning.
• Challenging. Not all solutions come easily.
INTERVENTION

At Wooroolin State School, intervention processes are designed to make the most effective use of school resources to improve student learning. These processes operate at three levels:

- explicit teaching for all students — focused and explicit classroom teaching in response to the analysis of mathematics and numeracy data
- targeted teaching — additional teaching for students whose results are not improving as a result of the focused and explicit classroom teaching
- intensive collaborative teaching — intensive teaching for the small proportion of students who do not respond to targeted teaching.

Students who require intervention or extension will be identified using a range of diagnostic and testing tools:

- Year 2 Diagnostic Net validation tasks
- Year 3, 5, 7 and 9 NAPLAN results
- School reporting at the end of Semester 1 and 2
- QCATs in Years 4, 6 and 9
- Standardised tests
BELIEFS ABOUT NUMERACY AT WOOROOLIN SS

We believe there are five areas which can impact a student’s development and attitude towards Mathematics. These are discussed below.

Beliefs about the Student
We believe that students:
• Come to school with a unique set of prior experiences/strengths about Numeracy and different knowledge
• Have the potential to improve their Numeracy skills and knowledge with continual support and sufficient time
• Develop the skills needed to be a confident student in Numeracy at their own pace

Beliefs about Learning
We believe that the learning of Numeracy
• Builds from early mathematical experiences
• Is enhanced through a whole school approach to Numeracy
• Should occur frequently in the classroom and at home
• Is developmental and best practice would take into account individual strengths, weaknesses and interests
• Is an important component of the teaching of the eight Key Learning Areas

Beliefs about Leadership
We believe that the role of the Principal is to:
• Lead curriculum change
• Motivate and engage staff in change
• Provide adequate resources to fulfil the school’s responsibilities to students, staff and the community
• Maintain focus and momentum to improve student outcomes
• Take an active role in curriculum planning
• Encourage collaboration

The Role of Staff and the School Environment
We believe that the role of staff is to:
• Create a numeracy-rich environment that is safe, varied, enhanced and supported
• Scaffold student’s learning experiences to meet their developmental needs and build upon their strengths so that each student reaches their potential
• Set high expectations for each student’s learning and target teaching to the student’s levels of readiness and need
• Provide resources suitable for the needs of the individual
• Be a positive role model for readers by exhibiting high expectations, deep knowledge, targeted teaching and continuous monitoring
• Integrate Information Communication Technologies into the teaching of Numeracy
• Participate in professional development to enhance knowledge of the teaching of Mathematics
• Understand individual differences including those of Aboriginal and Torres Strait Islander students, gifted and talented students, students who have English as a second language (ESL) and students with additional learning needs

Productive Healthy Partnerships
We believe:
• Families, teachers and students are active partners in the learning of writing
• People must feel comfortable to actively participate in writing at our school
• Active participation by all will produce better Numeracy outcomes for the every student
THE TEACHING AND LEARNING OF MATHEMATICS AT WOOROOLIN STATE SCHOOL

At Wooroolin State School, mathematics is an integral and highly valued component of the curriculum. Students identify and explore mathematics concepts through active investigation of real-life situations involving mathematics. They understand that mathematics can help them to make meaning of their world.

When learning about mathematics, students recognise that there are particular ways of working with concepts in mathematics. Students also recognise that there are particular facts and procedures required for knowing and understanding in mathematics. Students and teachers value mathematics as a way of investigating, thinking, reasoning and relating to real-life situations.

Mathematics is a way of making sense of the world. The mathematics Key Learning Area helps students to know about mathematics, know how to do mathematics, and know when and where to use it. All people need the capacity to make sense of and be critical about numerical information. To achieve this they need a disposition to think and act mathematically, and the confidence and intuition to apply mathematical concepts to explore and solve everyday problems that confront them.

Skills needed for mathematics include mental computation and deep understandings of how numbers work. They also require meta-cognitive/higher order skills such as reflection, analysis, estimation, justification, synthesis and communication skills. These skills are needed to describe each of these in appropriate language and format, and are learned through working mathematically. The ways of working will be used to provide guidance of what students will be expected to do.

At Wooroolin State School mathematics is seen as a dynamic field of study. Students from our Prep Year to students in Year 7 will be led to discover the power and place of mathematics, both as a discipline, as it relates to learning in each of the other Key Learning Areas, and in our everyday encounters at work and play outside school.

At Wooroolin State School we believe that the teaching of Mathematics must be taught in uninterrupted block times. These are 12pm-1pm on Mondays to Fridays: a total of 5 hours per week. Sample timetables are attached.
WHAT ASSUMPTIONS CAN WE MAKE ABOUT MATHS LEARNERS?

- Maths learners bring with them prior experiences which teachers consider, and to which students make connections.
- Maths learners benefit from immersion in maths environments which recognise the importance and interdependence of all aspects of mathematics.
- Maths learners require explicit instruction in mathematics.
- Maths learners respond to quality modelling and scaffolding experiences.
- Maths learners benefit from social interaction.
- Maths learners need to perceive maths learning as adding value to their lives.
- Maths learners need to engage with authentic purposes for using maths.
- Maths learners need practice and frequent opportunities to practice maths in order to become competent and confident maths learners.
- Maths learners are more willing to risk-take and share their understandings where a safe, secure and accepting learning environment has been established.
- Maths learners are more likely to demonstrate commitment and continued interest in maths tasks when they are provided with a range of choices.
- Maths learners have varied learning styles and capabilities which teachers are cognisant of and cater for.

WHAT DO GOOD MATHS LEARNERS DO?

- Display positive attitudes to maths including self-motivation, confidence and a love of maths.
- Connect prior knowledge and experiences to the concepts presented.
- Use prior knowledge to prepare for new learning.
- Participate in setting goals for maths.
- Identify their purpose for engaging in maths tasks.
- Bring a broad prior knowledge to their maths learning.
- Employ effective number sense and calculate number facts efficiently.
WHAT HAPPENS IN EFFECTIVE MATHEMATICS CLASSROOMS?

- A very high level of academic engagement is evident.
- A varied and well-crafted range of investigations are available in the classroom.
- An environment of rich interaction is evident.
- Number facts practice occurs daily.
- There is a high level of social interaction and cognitive collaboration.
- Learning purposes are clearly stated and connections are made between lesson purposes, lesson tasks and lesson conclusions.
- Explicit teaching of skills occurs.
- Deliberate and explicit approaches to the teaching of mathematics are evident.
- Students are given ample opportunities to independently and cooperatively practise skills and strategies.
- In place is effective informal and formal assessment program which is analysed and directly related to pedagogy at a class and individual level.
- Differentiated instruction occurs (grouping students and relating teaching to specific needs) based on deep understanding of student needs arising from assessment.
- Reading is purposeful and authentic.
- Reading, writing and oral language instruction is integrated.
- The questioning techniques used, promote greater understanding of texts and challenge students to think deeply, critically and creatively about texts.
- There is evidence of higher order questioning and an acceptance of divergent answers.
- Students are learning to process information in text at a deeper level because of the problem solving conditions that are created.
- Students are generating insightful questions about texts.
- Rich discussion and instructional conversations occur and students contribute ideas that shape conversations around texts.
- Summary reflection on texts occurs after engagement in reading experiences.
- There is a balance of sharing across all students.

- There is a consistent approach to reading instruction and assessment across the whole school.

- Ongoing professional development in the teaching of reading is provided for all teachers and paraprofessionals.

- There is planned parental involvement in the reading program and there are strong links between home/school understandings about reading.