

Maths at Girraween

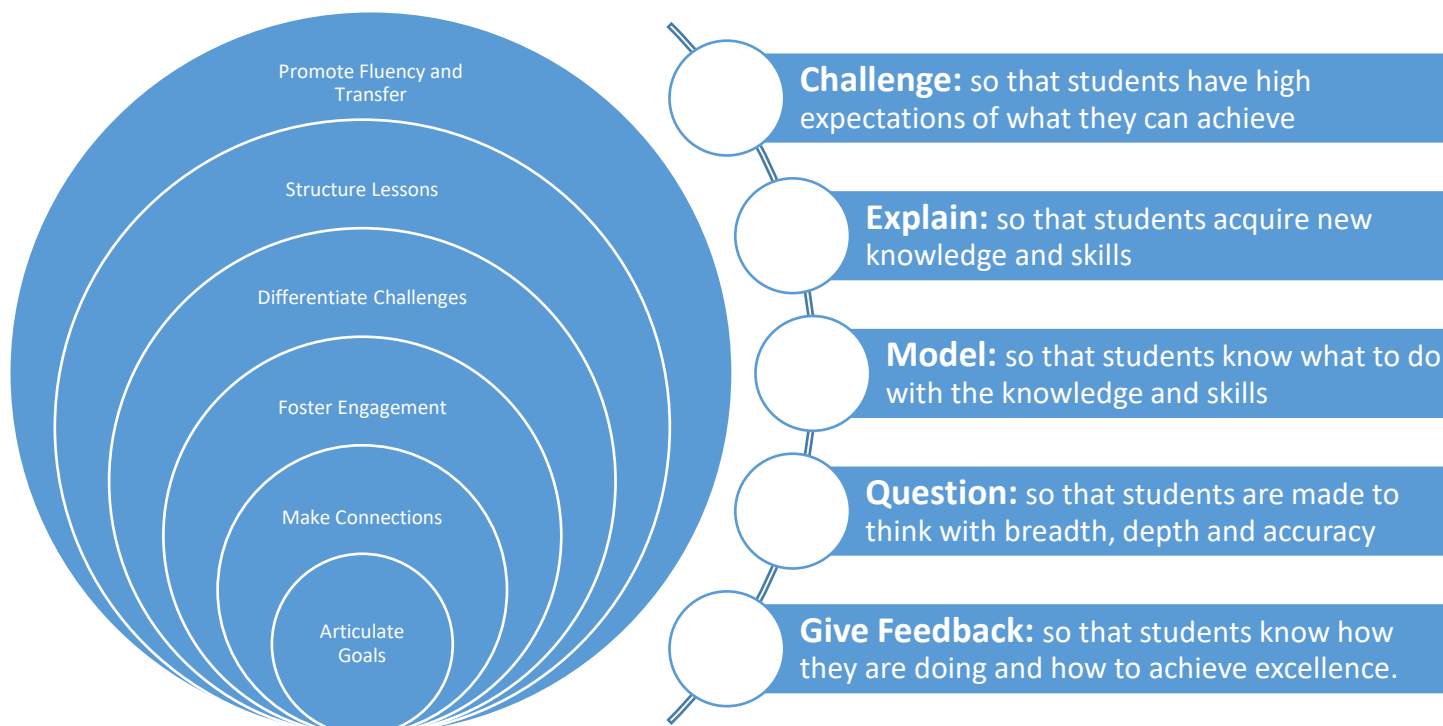


This document gives an overview of Maths at Girraween outlining aims, our principles and practices that underpin our pedagogical approach, programming expectations and opportunities across the school to enrich and support the teaching and learning of mathematics as well as assessment, moderation and reporting requirements. \

At Girraween we aim to:

- Improve student achievement by adopting a coordinated and consistent pedagogical approach to the teaching of Maths throughout the school
- Make learning visible through sharing learning intentions and success criteria with students
- Develop the understanding that Maths is integral to everyday experience and provide children with the confidence and strategies to apply mathematical thinking to practical situations and real life contexts
- Develop mathematical concepts through language, concrete, representative and symbolic experiences at all levels, appropriate to individuals and their zone of proximal development, to ensure that individual needs and differences are met and that each student is challenged and experiences the 'zone of confusion'
- In each lesson give students the opportunity to reflect on what they have learnt
- Develop speed and accuracy in computational skills appropriate to the child's developmental stage
- Embed the proficiencies in teaching and learning of mathematics, ensuring students can problem solve, reason and have a deep understanding of what is being taught/learnt as well as be fluent.
- Improve student achievement by ensuring teachers have strong content knowledge and use worthwhile mathematical tasks to assist students in making sense of mathematics.
- Create and use quality assessment tasks that assess the learning of mathematics and use these as a platform for effective forward feedback to impact learning
- Support parents so that they are confident to engage in the learning process in the area of mathematics
- Use technology appropriately and effectively to support the learning of mathematics
- Provide enrichment and intervention programs to support student mathematical learning

Principles and practices that underpin our pedagogical approach




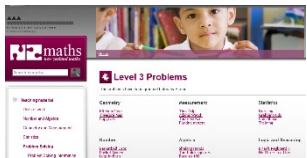



Recommended Resources that Support our Approach

- Each Teacher has a maths curriculum box containing teacher resources along with a maths tool box with materials that support our overarching pedagogical approach.

	Early Years – Transition	Early Years – Yr 1-2	Primary Years – Year 3-6
Tool Box	<ul style="list-style-type: none"> Pattern blocks Counters Clocks Jumbo pocket dice Coins and notes Sorting rings Play based math equipment 	<ul style="list-style-type: none"> Counters of various sorts Play money MAB blocks 0-100 turn around chart (continual order) Clock set 	<ul style="list-style-type: none"> Calculators Protractors Hundred boards Compass 2 D shapes Measuring tapes
Curriculum Box	<ul style="list-style-type: none"> Open Ended Maths Mathematics Through Play in the Early Years 	<ul style="list-style-type: none"> Open Ended Maths (Peter Sullivan) First Steps Maths DENS 	<ul style="list-style-type: none"> Open Ended Maths (Peter Sullivan)

- Recommended Online Sites that we have subscription for

Maths 300 – http://www.maths300.com <ul style="list-style-type: none"> An extremely good resource for connecting maths with real life learning and problem solving, especially involving ALL different types of problem solving strategies. 	
IXL – https://au.ixl.com <ul style="list-style-type: none"> A website that can be accessed by teacher and students to build understanding and automaticity in mathematics. This can be used for home use as well as in the class. 	
Scootle – http://www.scootle.edu.au/ec/p/home <ul style="list-style-type: none"> Provides digital resources for teachers and students mapped to the Australian Curriculum 	
NZ Maths - http://nzmaths.co.nz/ <ul style="list-style-type: none"> A free resource with problem solving lessons covering the three strands of the curriculum as well as units. Level 1 =yr 3 Early childhood maths – supporting early learning progression across the strands 	
The Maths Shed – Inquiry http://www.mathematicshed.com/maths-inquiry-shed.html	

FirstSteps -

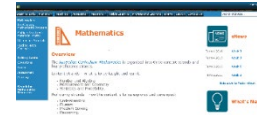
<http://det.wa.edu.au/stepsresources/detcms/navigation/first-steps-mathematics/>

- First Steps Mathematics is a series of teacher resource books that is organised around sets of mathematics outcomes for Number, Measurement, Space, and Chance and Data. The series will help teachers to diagnose, plan, implement and judge the effectiveness of the learning experiences they provide for students.

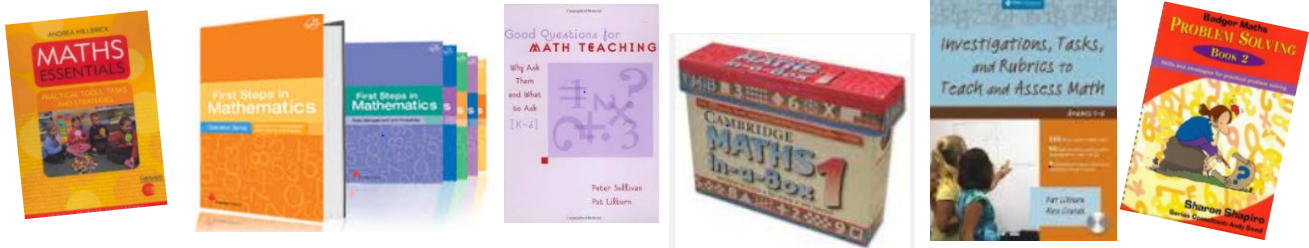


Learning links:

<http://ed.ntschoools.net/ll/teach/maths/Pages/default.aspx#jumpassess>



- Other Kits to borrow in the library include:
 - Capacity and Volume
 - Statistics and Probability
 - Time
 - Shapes and Objects
- Other valuable resources in the library include:



- There is also a range of maths literacy books that can be used as a springboard or connect learning in maths



- Consumables such as playing cards and paddle pop sticks, table cloths, washing lines are to be taken out of class budget

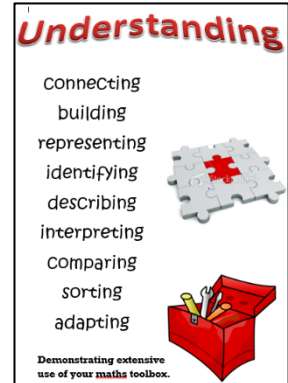
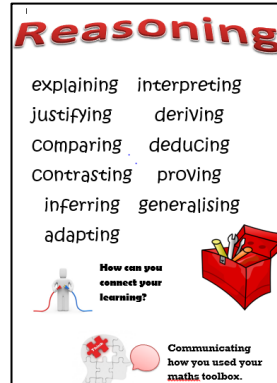
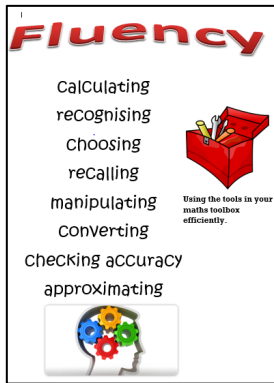


Programming

Term 2, 2020

Agreed Beliefs

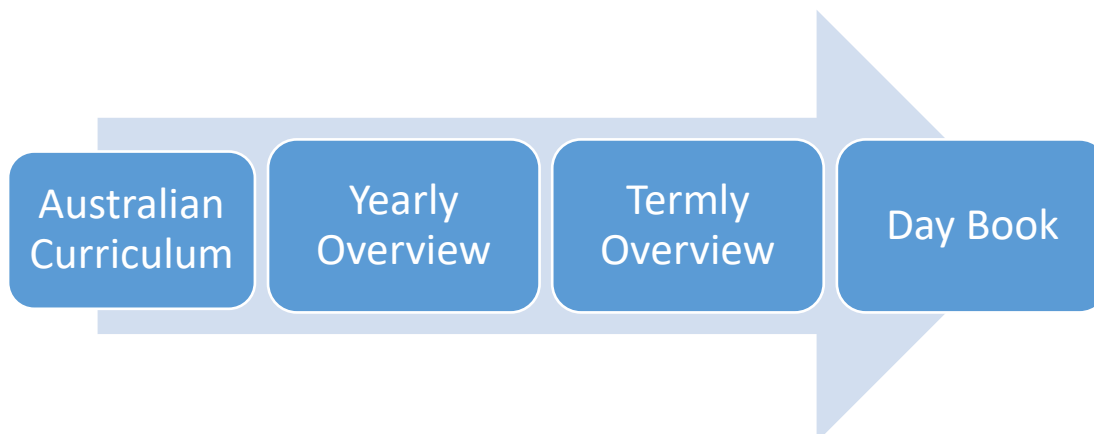
- At Girraween, mathematics is a tool and a way of thinking that can be used to address problems in the real world. Students will develop a deep understanding of the four key **mathematical proficiencies** (Fluency, Problem Solving, Understanding and Reasoning) that underpin numeracy.



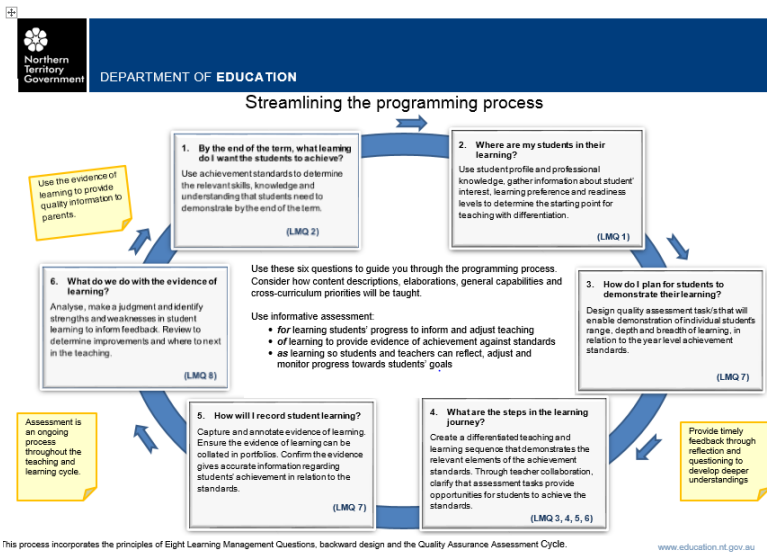
[Hyperlink to proficiency readings](#)

[Hyperlink to proficiency rubrics](#)

- All students will engage in 1hour of explicit mathematics and at least 15 minutes of tools session (mental maths).
- **Teachers use the Australian Curriculum** as an overarching document to plan flexibly in teaching teams to construct a consistent termly and weekly teaching and learning sequence overview for maths, integrating with general capabilities, (especially critical and creative thinking) and other key learning areas where possible to meet the needs of their cohort.



- **At Girraween, we use Backward Mapping** to design for learning. Programs are data driven and as such, teachers will ascertain achievement levels of their specific student cohort through informal and formal **pre-assessment** to plan for the scope of teaching within the concept to be covered.



[Link to programming process:](#)

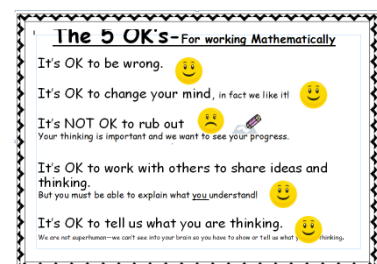
- **Differentiation must be evident** in the teaching and learning program as well as in practice. Differentiation can be through content, process, product as well as the environment.



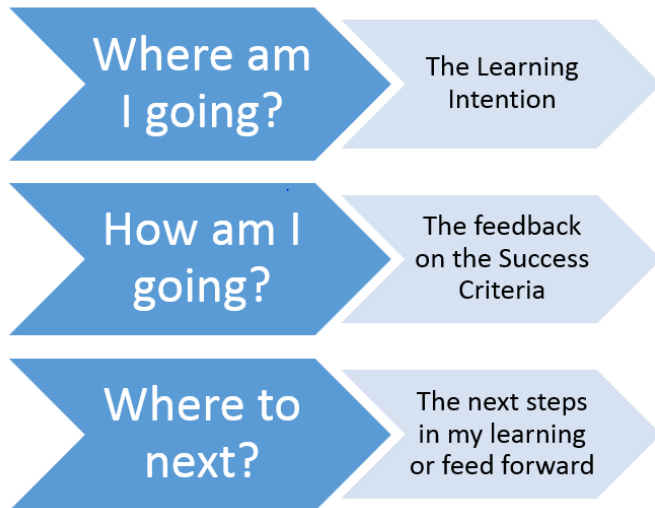
[Link to quality readings on differentiation:](#)

- **Concepts should be revisited** through the teaching and learning cycles across the year. Students are taught and exposed to concepts within content descriptors, working towards the achievement standard throughout the year. Warm Ups and maths mental will help to ensure concepts are constantly revised.
- **Learning must be visible to the students.** This does not mean that learning intentions need to be set at the beginning of every lesson, however students should:

1. See themselves as teachers through sharing their learning and strategies with others during the lesson
2. Be encouraged to take risks in their learning, setting themselves up for success in an environment steeped in yet and one that values and looks to develop growth mindsets.
3. Reflect on their learning and how they are progressing towards their goals and the big ideas



The Big 3 to building assessment capable learners



- **Maths lessons should be rich in language, building vocabulary to communicate.**

Some examples of working towards this include

- Building the maths vocab into your class word wall
- Having anchor charts with the vocabulary relevant to that particular concept that students can draw on
- Students having their own maths journal/dictionary where they can record words and their meaning

Instructional Lesson Approaches

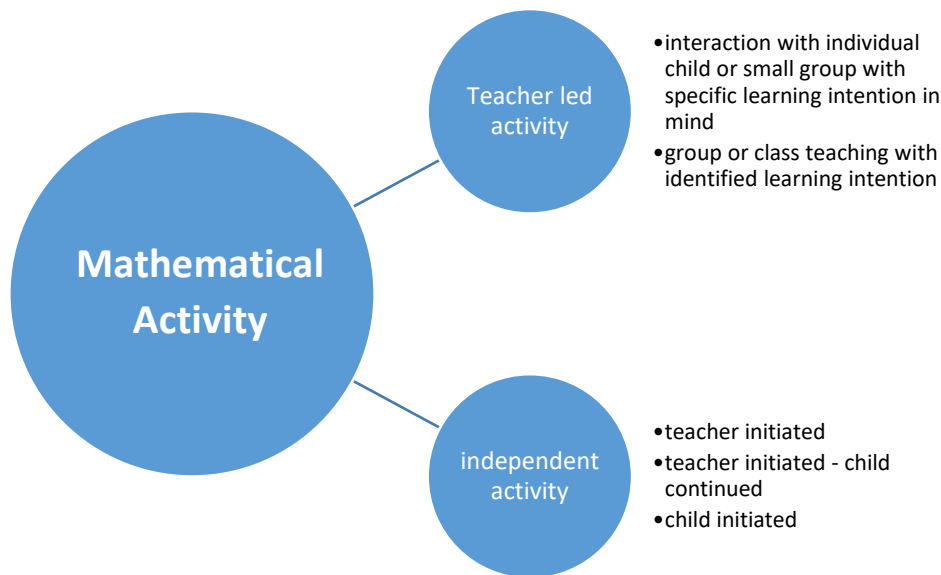
- **Mathematics Through Play (Pre-2)**
- **Problem Solving approach**
- **Number Talks and mental maths strategies (separate document, same folder)**

○ **Mathematics Through Play**

Beliefs

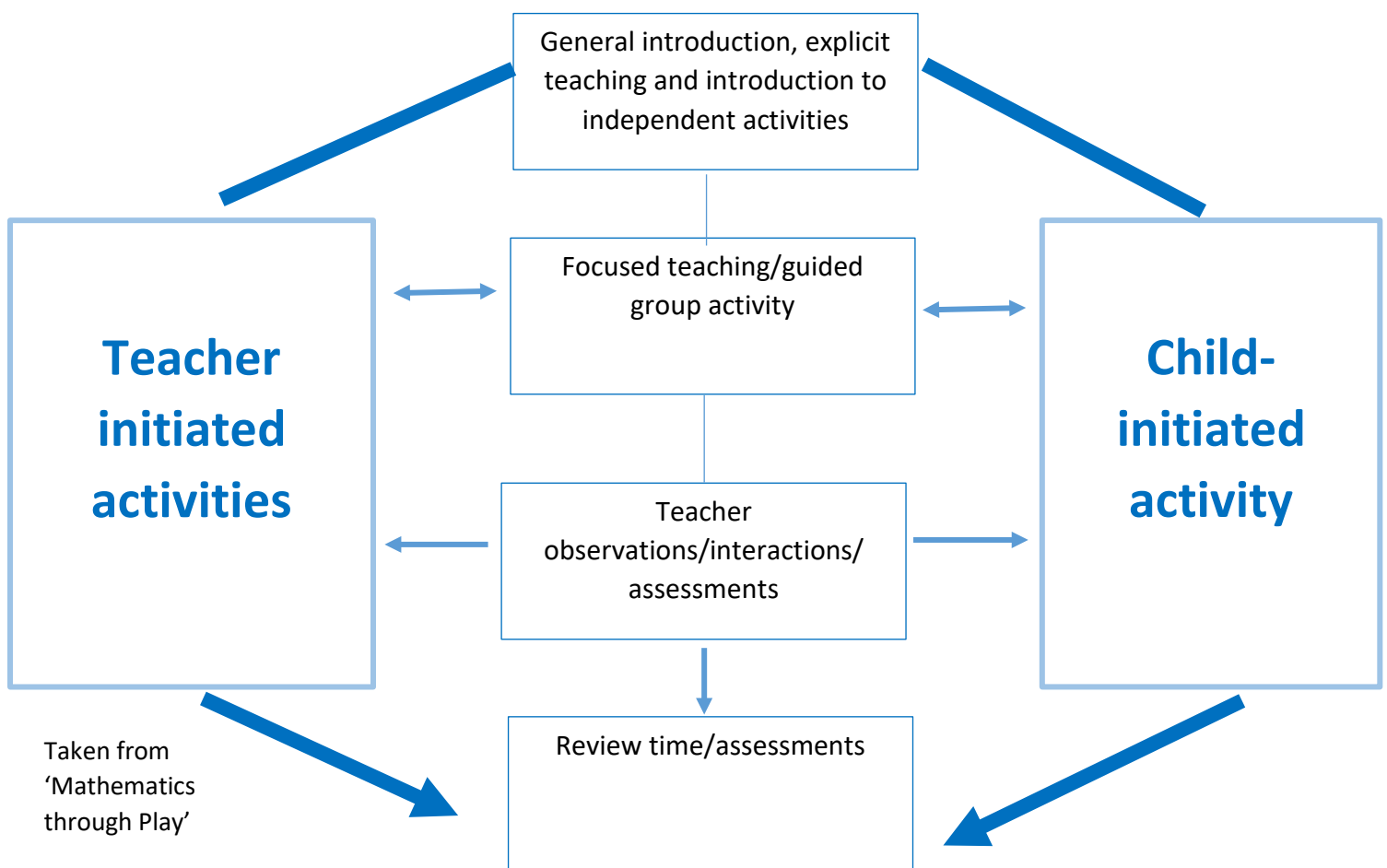
- Theories of play influence early years mathematics education
- Play is an appropriate context for problem solving
- There are strong links between creativity and mathematical development
- All students in Pre-2 engage in playful mathematical experiences

From transition, young children are generally taught maths in a maths time. By incorporating teacher-led activity in playful and meaningful contexts, with teacher-initiated play and child-initiated play into a 'maths session', the session can provide a continuum between 'work' and 'play' in the following ways.



Summary of a mathematical activity in the early years

A typical structure for a playful teaching session.



In the math's session:

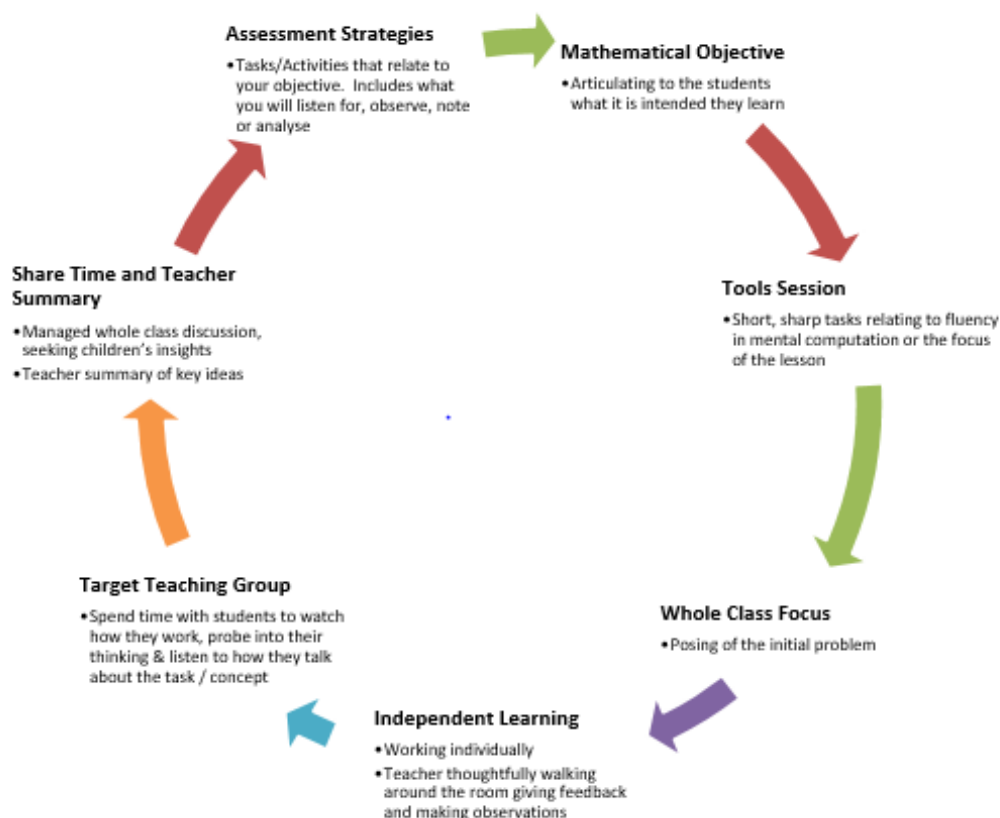
- Ensure mathematics occurs in a meaningful and stimulating context, such as linking it to the current inquiry unit or the interests of the children. Use mathematical literacy within your session.

- Link all learning contexts – play trays, role play, small worlds with your content so it can be assessed and experienced in different ways.
- **Include a review time for children to evaluate both their directed and self-initiated activity**
Review time gives opportunities for the teacher to:
 - raise the profile of independent activities
 - assess levels of learning and engagement with the characteristics of effective learning
 - model language for learning and problem solving
 - assist the child to show that there is more than one way to tackle a problem
 - give precise feedback about the child's learning processes and thinking

○ Structured Problem Solving Approach

This is a student centered instruction approach which uses problem solving as a foundation. This follows the 6 effective teaching practices of maths.

A typical structure for a maths lesson

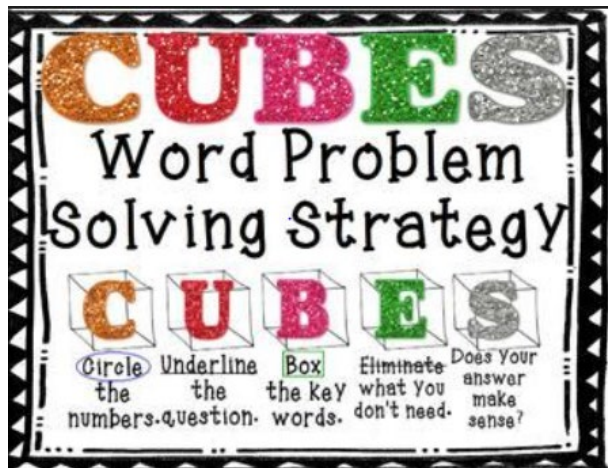


In a lesson, student discussion is promoted and welcomed (dialogue V monologue). All strategies are considered through the discussion as students arrive at their answer. This is a strong strategy used in number talks and investigative maths.



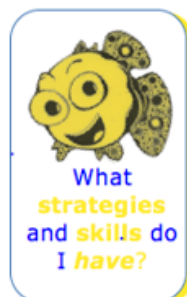
Problem Solving

Build children's ability to solve word problems by generating a strategy to assist

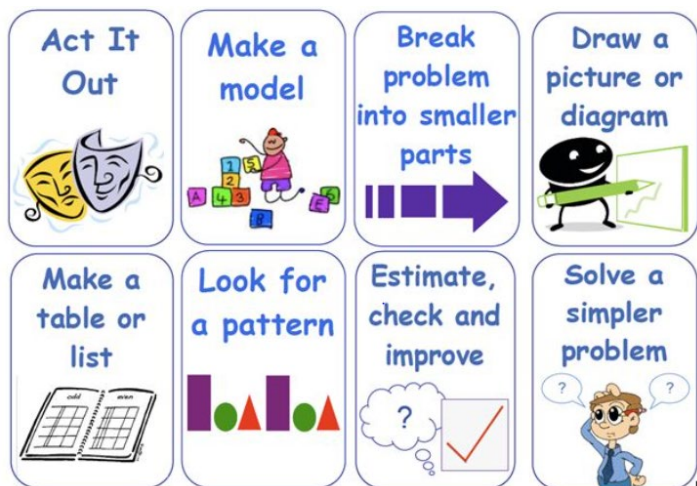


[Links to solving word problems: strategies](#)

The Fish Strategy



Explore the different strategies to solve mathematical problems, making them explicit and allowing students to build their toolbox to draw from.



Build students capabilities to mentally solve mathematical problems.

Girraween have created a mental computation continuum. This is to be used to explicitly teach students mental maths strategies necessary to build fluency and flexibility to compute with numbers.

Some Examples of programs and proformas might be:

TRANSITION LIDBETTER MATHEMATICS PLANNER								[Pick the date]
Week		Term						
Mathematical Focus for the week				Vocabulary				
• Use direct and indirect comparisons to decide which is longer, heavier or holds more, and explain reasoning in everyday language(ACMMG006)				• Longer, shorter, same • Tall, short, high		• Closer, further • Heavier, lighter		•
	Mathematical Objective	Resources	Tools Session	Whole Class Focus	Independent Learning	Target Teaching Group	Share Time and Teacher Summary	Assessment Strategies
	What you want the students to come to know and understand	The digital content / software, concrete materials & teacher resources you will need	A short, sharp task relating to fluency in mental computation or the focus of the lesson	Set the scene / context for what the students do in the independent aspect	Extended opportunity for students to work in pairs or small groups or individually. Time for the teacher to probe students' thinking or work with a small for part of the time including using enabling and extending prompts as appropriate.	The students you need to spend time with to watch how they work, probe into their thinking and listen to how they talk about the task / concept	Focused questions and summary you use to draw out the mathematics & assist students to make links	Tasks / Activities that relate to your objective. Includes what you will listen for, observe, note or analyse (rubric, anecdotal record, checklist etc)
LESSON ONE	• Indirect and Direct Measurement of Length	Tape measures Paddle pop sticks Hands/feet Sticks/blocks/counters	-What is there in this room that is three hand spans long? Encourage the use of length language; much longer, almost as long as, exactly the same as. Identifying using chart (confused, working towards and achieved) how they feel after and before lesson.	Investigating length and how to measure different objects	How many objects can you find that are longer than three hand spaces but shorter than four? Encourage the use of length language; much longer, almost as long as, exactly the same as. Make two different towers that are the same height? Ask the children to say how they know their towers are the same height. They can use the same or different materials. -Portfolio Piece- Using string/blocks/paddle pop sticks/etc. measure the length of your body. Trace around your body then measure your different body parts. As a group identify who is the shortest and the tallest in the class. Make a guess first.	Give children a container of linking cubes. Ask them to use the cubes to make; a) a tall building b) a short fence around something c) something that is long. As children complete each task look at their efforts to see if they understand the language of length. Children should dismantle each structure before making the next.	Discussing what made this skill hard and what made it easy? For students that found it easy; explain why/how/their strategies? Identifying using chart (confused, working towards and achieved) how they feel after and before lesson.	-Portfolio Piece- Using string/blocks/paddle pop sticks/etc. measure the length of your body.

Links to examples 1, 2, 3 On the portal, you will find many more proformas used by Girraween staff to program effectively for their student cohort. Likewise, if you are willing to share, please upload any examples you have shared with your line manager.

Special Programs

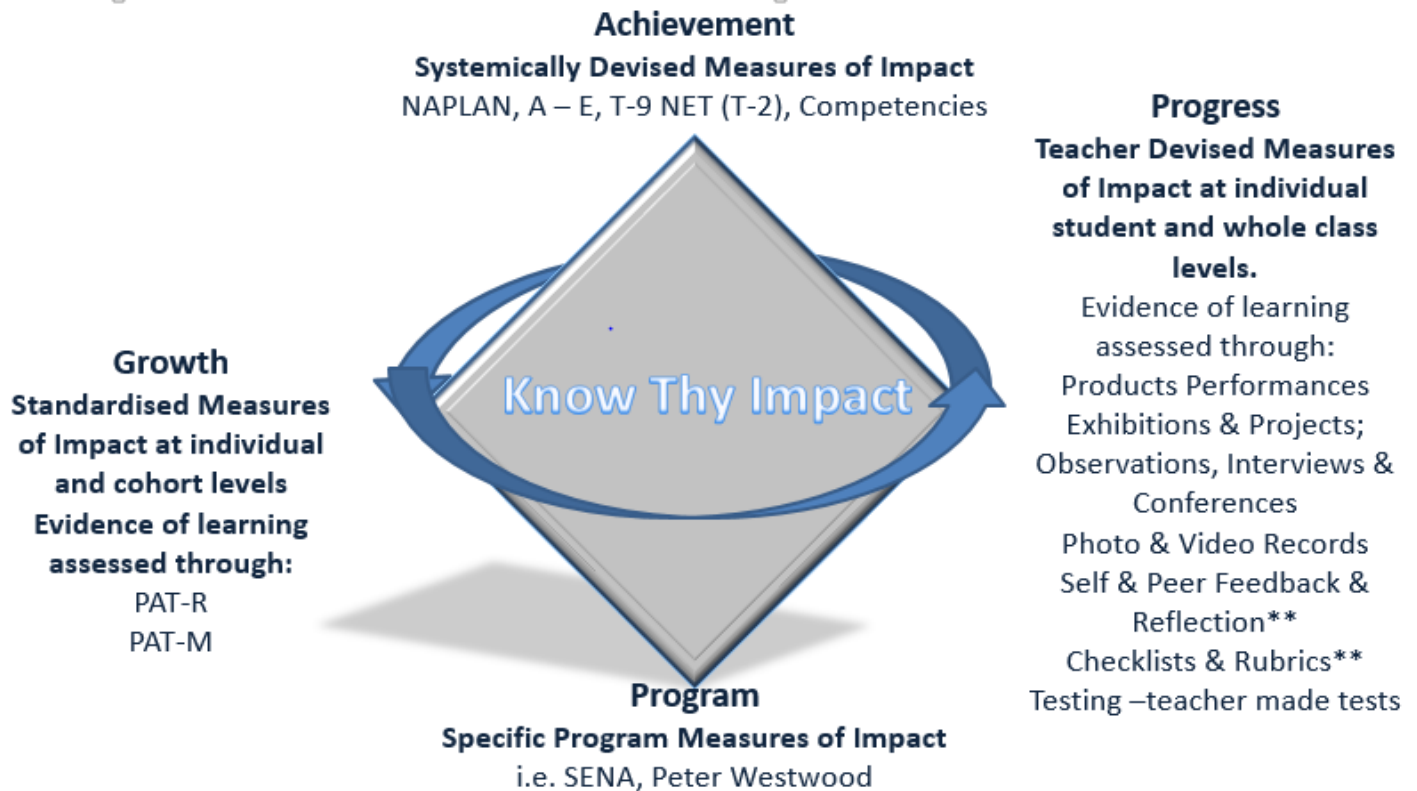
Enrichment and intervention programs are an important part of maths at Girraween. The following are supported practices and initiatives. Please ask your line manager more information if you feel this may suit your cohort.

- REACh
- Australian Maths Competition/Challenge
- Interventions - SESA

Currently at Girraween, we have a Maths Coach

- At Girraween the Math Coach's role is one of support in all areas of mathematics, from curriculum planning and programming, implementation and differentiation. They are available for in class modelling and support. See your line manager for extra information.

Assessment, Moderation and Reporting



Assessment is an integral part of teaching and learning. It is the purposeful collection of evidence about students' achievements. Teachers use achievement standards to assess student's current achievement levels and plan assessments that cater for different abilities, prior learning experiences, cultural and linguistic backgrounds and the varying rates at which students learn. Assessment needs to allow students to apply their knowledge and demonstrate the breadth of their understanding and the development of the proficiencies strands through range of quality assessment tasks.

During the teaching and learning cycle assessment tasks need to be checked to ensure they align with what is taught to what is assessed and also allow students to demonstrate attainment of the Mathematics achievement standards.

Key messages

Planning assessment ensures that teachers:

- Identify the purpose of assessment – of/as/for
- identify the intended learning that will be assessed
- use a range of assessment techniques and sources of evidence.

Effective assessment in Mathematics should:

- be both formative and summative and include a variety of tasks so students have multiple opportunities to demonstrate the depth of their learning
- show students' abilities through open-ended tasks that allow answers of increasing complexity
- be comprehensive and give due recognition to all valued learning experiences that reflect the full range of the curriculum
- enhance student motivation and commitment to learning while recording what the student can do rather than what they cannot do

- have clear, stated purposes and ensure that learners understand how work is to be assessed
- include a folio of evidence of learning incorporating the different assessment tasks
- consider applying knowledge of higher-order thinking skills and not be limited to isolated concepts.

Assessment Schedule: Maths assessments are outlined in the **Evidence of Learning Overview Schedule.**

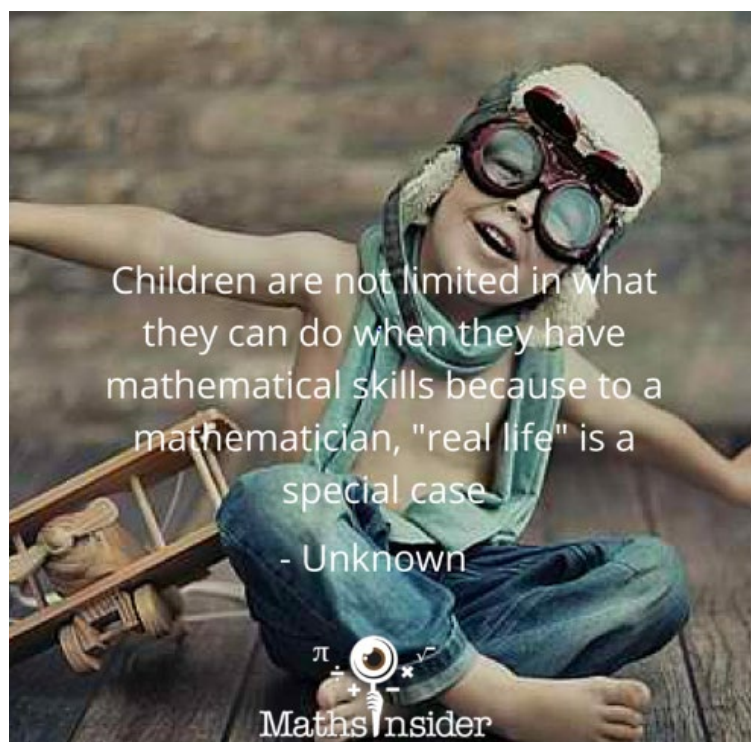
	Transition	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Term One	-Number recognition and counting assessment. -Sena 1 used as a pre assessment aligned with program	-PAT for catch up or new kids -Three maths moderation samples	-PAT for catch up or new kids -Three maths moderation samples	-PAT for catch up or new kids -Three maths moderation samples	-PAT for catch up or new kids -Three maths moderation samples	-PAT for catch up or new kids -Three maths moderation samples	-PAT for catch up or new kids - Three maths moderation samples
Term Two			-Peter Westwood Fluency (+, - only)	-Peter Westwood (all)	-Peter Westwood (all)	-Peter Westwood (all)	-Peter Westwood (all)
Term Three		-Peter Westwood (+, - only)	-Peter Westwood (all)	-Peter Westwood (all)	-Peter Westwood (all)	-Peter Westwood (all)	-Peter Westwood (all)
Term Four		-PAT Maths -Three math moderation/ samples	-Peter Westwood (all) -PAT Maths -Three math moderation/ samples	-Peter Westwood (all) -PAT Maths -Three math moderation/ samples	-Peter Westwood (all) -PAT Maths -Three math moderation/ samples	-Peter Westwood (all) -PAT Maths -Three math moderation/ samples	-Peter Westwood (all) -PAT Maths -Three math moderation/ samples

Confirming

Collaborative teams will identify and agree on the assessment tasks that will be used across each term. These also need to be added to the template to ensure documentation for future use.

In Taching PLCs (Professional Learning Communities)

- Develop common assessment tasks related to the skills and numeracy focuses to be used for Confirming **each term** to assist with consistency across grades across all three strands. Please see Reporting Overview for more detail.



Compiled by
Girraween Maths PLT
2015/16.