

Just-in-Time Maths



Vignette

2

A rich balance- plans

A balance of teaching methods

A good curriculum, in any country, shouldn't mandate pedagogy but instead promote good practice

It is not a case of competing, extreme view points (inquiry versus traditional)

Problem solving should be embedded into the curriculum but,

- there is a place for explicit teaching
- there is a place for ākongā to work collaboratively
- there is a place for ākongā to work individually
- there is a place to think about the social context of our ākongā, schools, and community

We need to think about a balance and not be influenced by binary view points

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Nau mai **haere mai**

Zoom Hui 6 – September 16th

A balanced approach

THE LEARNER FIRST

Working hard

Thinking hard

Feeling good

Operative

Cognitive

Affective

Catherine Attard

NZ Maths supports a balanced plan









































Planning space

Manage and create teaching plans.

[Long-term plans.](#)

Long-term plans

These long-term plans provide a starting point for planning a mathematics teaching programme for a year.

	Full-year plans	Plans, by term, in the Planning Space			
		Term 1	Term 2	Term 3	Term 4
Early level 1					
Late level 1					
Early level 2					
Late level 2					
Early level 3					
Late level 3					
Early level 4					
Late level 4					

A central stem of learning experiences

Early Level 4

Term One	Term Two	Term Three	Term Four
Figure me out (Thematic Unit)	Getting partial to decimals Addition and Subtraction of decimals to three places)	Areas and volumes (Areas of quadrilaterals, and triangles, volumes of cuboids)	Representing 3D objects in 2D drawings (Geometry of 3D shapes, drawing 3D shapes in 2D)
Cuisenaire rod fractions: Level 4 (Ordering and comparing fractions)	Fitness or Tessellating art (Two dimensional shapes, angles, properties, tessellation)	Equivalent fractions (Equivalent fractions as numbers, fractions of sets, equal sharing)	Balancing Acts (Expressing relationships using algebraic symbols)
Cool times with heat (Measuring temperature)	What are the chances? (Probability)	Travel to school (Statistical inquiry cycle with category data)	Getting partial to fractions (Fractional numbers)
What's going on? Properties of multiplication and division. (Multiplication and division of whole numbers)	Down on the farm (Linear relationships, tables, graphs, equations, word rules)	Getting partial: Fractions of sets (Fractions as operators)	Oranges or Weighty Problems (Measurement of length, area, volume, capacity, mass)
Measuring up (Statistical Inquiry Cycle)	Matariki - Level 4 (Thematic Unit)	Marble roll (Measurement of length and time, relationships between variables)	Map It (Co-ordinates, Maps)

Late Level 4

Term One	Term Two	Term Three	Term Four
Whakataukī (Thematic Unit)	All about angles (Measuring angles, reasoning with angles as measures of turn)	Integers (Integers)	Time Zones (Measuring time, calculating with 24-hour time)
Multiplication and Division Pick n' Mix 1 (Multiplication and division with whole numbers)	You can count on squares! (Area of rectangles and triangles)	Getting partial to percentages (Percentages)	X marks the spot (Cartesian co-ordinates, representing location)
Transformations (Symmetry)	How much bullying? (Statistical inquiry cycle, conducting surveys)	Solid Understanding (Properties of 3-D solids, nets of polyhedral, symmetry)	Flip and Roll (Probability)
Solving linear equations (Linear relationships)	Spaced out (Volume of cuboids, metric units of volume and capacity)	Getting partial: Multiplying decimals (Multiplication of decimals)	What's going on? Fractions (Ordering, adding, and subtracting fractions, mixed numbers)
Addition, subtraction, and equivalent fractions (Adding and subtracting fractional numbers, equivalent fractions)	Matariki – level 4 (Thematic unit)	Cubic Conundrums (Probability, growing patterns, drawing 3D models, volume of cuboids)	Choices (Representing linear relationships)

Resource Finder- a second option

Choose filters to find resources

Use Curriculum Levels

Use Numeracy Stages

Use LPF Aspects

Select which resource type(s) you are looking for

- Units of Work ?
- Rich learning activities ?
- Problem solving activities ?
- Numeracy activities ?
- Picture book activities ?
- Figure It Out activities ?
- Secondary activities ?

Select a level

Level Four



Select a strand

-Shape



Select an Achievement Objective

GM4-5: Identify classes of two- and three-dimensional shapes by their geometric properties.



- Include resources where this is a supplementary Achievement Objective ?

All paths lead to a series of balanced units

🔍 Search

GM

Fitness

Level Four | Geometry and Measurement | Units of Work

This unit examines regular tessellations, that is, tessellations that can be made using only one type of regular polygon, and semi-regular tessellations, where more than one type of regular polygon is involved. Students are required to investigate what properties tessellating shapes must have in...



GM

Quadrilaterals

Level Four | Geometry and Measurement | Units of Work

In this unit we conduct a couple of investigations looking at the relationship between the angle between two diagonals of a quadrilateral, the sides of the quadrilateral, and the type of quadrilateral. The main emphasis is on rectangles.



GM

Solid Understanding

Level Four | Geometry and Measurement | Units of Work

In this unit students make and investigate various solids, including regular and semi-regular polyhedra, and cylinders and cones. They look for patterns in the numbers of faces, edges and vertices they see whether they can “discover” Euler’s famous formula. By truncating the vertices of the Platonic...



Each unit supports clear objectives

Quadrilaterals

Purpose

In this unit we conduct a couple of investigations looking at the relationship between the angle between two diagonals of a quadrilateral, the sides of the quadrilateral, and the type of quadrilateral. The main emphasis is on rectangles.

Achievement Objectives

GM4-5: Identify classes of two- and three-dimensional shapes by their geometric properties.

[AO elaboration and other teaching resources](#)

Specific Learning Outcomes

- Investigate the relationship between the diagonals and lengths of a rectangle.
- Investigate the relationship between the angle of the diagonal and length of rectangles sides.
- Use rulers, compasses and protractors accurately.

Elaborations help us visualise all the success criteria

GM4-5: Identify classes of two- and three-dimensional shapes by their geometric properties.

Elaboration on this Achievement Objective

This means students will use geometric properties to identify classes of shapes. Classes are categories of two or three-dimensional shapes. Shapes are sorted into classes according to defined geometric properties, such as number and relationship of sides (for example equal and parallel); number and nature of angles (for example four right angles); symmetry, number, nature, and shape of faces and surfaces (for 3-dimensional shapes). Classes can be included within other classes, can intersect or be disjoint, for example all squares are rectangles or no triangles are pentagons. At Level Four students should be familiar with:

1. classes of polygons defined by the number of sides; triangles (3 sides), quadrilaterals (4 sides), pentagons (5 sides), hexagons (6 sides)...octagons (8 sides)...
2. classes of 3-dimensional shapes defined by the nature of faces and surfaces; prisms (constant cross-section) and cylinders, pyramids and cones, regular polyhedral (identical faces)
3. classes of 2-dimensional closed curves and their 3-dimensional equivalents by rotation; circles and spheres, ellipses and ellipsoids
4. sub-classes that are included within classes: squares within rectangles, rectangles within parallelograms, parallelograms within quadrilaterals, circles within ellipses, cubes within rectangular prisms
5. classes that are disjoint, scalene and isosceles triangles, prisms and pyramids.



A series of sequenced sessions are provided

Session 4

In this session we tackle the reverse problem to Session 3 – given the angle between two diagonals, what are the lengths of the sides.

1. Remind the class of what has happened in the last session.
2. Let them investigate the problem: given the angle between two diagonals, what are the lengths of the sides of the rectangle?
3. From session 3 they should realise that, at best, they will only be to find the ratio between the two side lengths. They should also tackle the problem by taking specific angles and determining the ratio by measurement. The best that they will be able to do will be to find approximate ratios for each angle (say from 10° to 90° in tens). The actual result is that $\tan \theta/2 = a/b$, where a and b are the lengths of the sides with $a < b$, but this will be a little beyond this level.
4. They might also like to find out which angles come from rectangles where the sides have a ratio of 1, 2 and 3.
5. Let the class agree on the various ratios and angles and make posters to illustrate what they have done. You might want to talk about the tan of an angle as an introduction to the work of the next level.

Session 5

Here we fix the angle between the diagonals of a quadrilateral and see what properties of sides give what quadrilaterals when their diagonals intersect at 90° .

1. Recall the problems of the previous sessions and the methods used to solve them.
2. Now look at quadrilaterals more generally. Ask and discuss each of the following in turn. Allow different students the chance to show (i) their answers, and (ii) their methods of construction, on the board to help the discussion:
Is it possible to find a quadrilateral all of whose sides are different and whose diagonals intersect at right angles?
Is it possible to find a quadrilateral all of whose sides are different and whose diagonals intersect at 60° ?
3. Send them away in their pairs to discuss the following questions. Tell them that in each case if their answer is 'yes' they will need to be able to construct one of the quadrilaterals. If the answer is 'no' they will need to be able to explain why. (However, all of these can be constructed. Some can be constructed in more than one way.)

Strategic warm ups complement a balance of concepts

NZMaths Unit Plans

5 lessons
over 2 weeks

Warm Ups Rapid routines

3 x 10 min
each week

	Concept	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10
Number & Algebra	Number Strategies	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
	Number Knowledge (place value)	Green	Green	Yellow						Yellow	
	Number Knowledge (frac%/ratios)	Yellow			Yellow		Yellow	Green	Green		Yellow
	Equations and expressions		Yellow	Green	Green						
	Patterns and relationships			Green	Green			Yellow			
Measurement and Geometry	Measurement (conversions)								Yellow		
	Measurement (length, mass)		Yellow								
	Measurement (angles)								Yellow		
	Measurement (time)					Yellow					
	Measurement (perimeter & area)									Yellow	
	Measurement (volume)						Yellow				
	Shape	Yellow				Yellow					
	Position and direction				Yellow						
	Transformation							Yellow			
Statistics	Statistical Investigations					Green	Green			Yellow	
	Statistical literacy				Yellow	Green	Green				
	Probability			Yellow							



Kaiako our exploring balanced approaches

Monday	Tuesday		Wednesday		Thursday	Friday
Rapid routine	Ākonga work independently with rich, open tasks	Kaiako works with targeted group explicitly	Ākonga work to consolidate PF + CU	Kaiako works with group on rich inquiry	Rapid routine	Rapid routine
Rich inquiry to assess entry knowledge					Whole class rich tasks	Independent consolidation (online or traditional)
	Rapid routine		Whole class discuss & defend			Kaiako assessment through structured activities

Monday	Tuesday		Wednesday		Thursday	Friday
Rapid routine	Group A Inquiry Problem 1	Group B Consolidate	Group A Consolidate	Group B Inquiry Problem 1	Rapid routine	
Open Tasks Rich investigation					Consolidate	Teacher with targeted support
	Rapid routine		Grp A and B connect			



The right plan leads to the right engagement

