The Wilkie Way
Newsletter June 2023

www.wilkieway.co.nz

More information on the Curriculum refresh

The mathematics and statistics learning area is now available to be explored and used in schools and kura.
To download a copy go to **https://curriculumrefresh.education.govt.nz/whats-changing** and follow the link on the words Mathematics and statistics about half way down the page.

There is a significant difference between this final version and what we saw in the draft document so they have taken on board much of the feedback given on the draft.

The Learning area uses the **Know Understand Do** structure (as will be for all learning areas)

Understand - Big Ideas
- The world is full of patterns and structures that we use mathematics and statistics to understand.
- The world is characterised by change and variation that we use mathematics and statistics to understand.
- Mathematical and statistical logic and reasoning enable us to identify and explain relationships and to justify conclusions
- The interface between matauranga Maori and matauranga mathematics and statistics offers opportunities for insights that uphold the integrety of each knowledge systems.
- Mathematics and statistics have a continuous, evolving human history.

Do - practices
- Investigating situations
- Representing situations
- Connecting situations
- Generalising findings
- Explaining and justifying findings

The common practice model - phase 1 focusing on the Principals and Pedagogical Approaches as outlined in the May newsletter should be understood and woven into an understanding of this section of the curriculum.

Know - I know that: I know how to: is described for each phases of the refreshed curriculum.

Phase 1 Years 1 - 3   Progress outcomes for end of year 3 with "essential" progress steps for during first 6 months, during the first year and during the second year.

Phase 2 Years 4 - 6   Progress outcomes for end of year 6 with progress steps for during year 4 and during year 5

Progress steps alert teachers to specific aspects of learning that are essential and time sensitive as students work towards the progress outcomes for the phase.

Phase 3 Years 7 - 8   Progress outcomes for end of year 8
Phase 4 Years 9 - 10   Progress outcomes for end of year 10
Phase 5 Years 11 - 13   Progress outcomes for end of year 13

The progress outcomes for each phase are organised into 6 strands:

Number:
Cultures use number to represent, describe and compare quantities. We operate on these quantities and use them to estimate, calculate, reason and quantify

Algebra:
Algebra focuses on making and using generalisations to reason mathematically, and on identifying patterns and underlying mathematical relationships. These generalisations, patterns and relationships can be represented and communicated using diagrams, graphs, and symbols (including variables).

Measurement:
Measurement provides the tools and concepts for quantifying phenomena in the world by estimating, measuring accurately, and using appropriate units, including those from Maori and Pacific, and metric systems of measurement. Many cultures use both standard and non standard units to measure tangible and intangible quantities.

Space: *(formally Geometry)*
Space focuses on visualising, representing, and reasoning about the shape, position, orientation, and transformation of objects. It takes account of tools and techniques from the natural world used by many cultures.

Statistics:
Statistics focuses on tools, concepts and systematic process for interpreting situations, using data and its context to understand uncertainty and make predictions. Every piece of data is a taonga to be kept safe and treated ethically and respectfully.

Probability:
Probability focuses on tools and concepts for quantifying chance, dealing with expectation, and using evidence to identify how likely events are to occur, Probabilistic thinking is evident throughout tikanga and matauranga Maori.

Progress steps are not organsied by strand but are organised under 11 headings in phase 1 and 7 heading in phase 2.
See the accompanying attachments to this newsletter or go to the Maths News and Information at wilkieway.co.nz

I have a concern that teachers in years 1 and 2 and years 4 and 5 will take these progress steps and use them as a proxy curriculum. These steps are not the only learning opportunities you need to be providing for students.

These progress steps have the potential to narrow the curriculum for our most vulnerable learners and continue the inequitable access to a rich programme of learning for all students . The whole purpose of the curriculum refresh was to provide all students with equitable opportunites. Without significant professional learning and supported engagement with the new curriculum I can predict what is likely to happen.
                    Do not narrow the curriculum into the essential items.
We need knowledgeable and confident teachers in every classroom for this refreshed curriculum to make any difference in the classroom.

Already profesional development funding is contestable, not available for all and so far no decision has been made as to whether you will be able to access any funding at all in terms 3 and 4.

For using central funding you can no longer select a facilitator of your choice - the facilitator must be local (within 50km of your school or possibly 100km)
Subject specialism is not recognised (specialist is only relevant to the national priorities).
An established relationship with a school is not recognised.

Student Resources: Place Value
Understanding teens numbers using Te reo Maori
(Progress Outcome for during year 1)

tekau	10
tekau mā tahi	11
tekau mā whitu	17
tekau mā waru	18
tekau mā iwa	19
rua tekau	20

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10 + 0	10 + 1	10 + 2	10 + 3	10 + 4
10 + 5	10 + 6	10 + 7	10 + 8	10 + 9
10 + 10				

Cut out each section and students match the picture, the words, the addition expression and the numeral

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Common Practice Model Pedagogical Approach
Communicating pedagogies

Communicating in maths is used to develop students understanding of maths and to explain and justify their mathematical thinking. Through interactions between teacher and students, and students and their peers, students build understanding of maths concepts, facts, and procedures. Teachers need to explicitly encourage and teach communicating in maths so that students can articulate and describe their thinking. This gives them access to a wider range of mathematical ideas. Maths has a specific language and a range of tools that represent and express thinking.

This is not something new but in my experience often overlooked so it is good to see it made more explicit.

In the 2007 curriculum I often referred teachers to page 16 Learning areas and language:

Each learning area has its own language or languages.
For each area, students need specific help from their teachers as they learn:
- the specialist vocabulary associated with that area;
- how to read and interpret its texts;
- how to communicate knowledge and ideas in appropriate ways;
- how to listen and read critically assessing the value of what they hear and read. *(this statement has its own pedagogical heading "critical pedagogies" in the common practice model)*

As students discover how to use these different languages, they find they are able to think in different ways, access new areas of knowledge, and see their world from different perspectives.
(I would consider this the goal of education.)

Communicating mathematically and doing maths are inseparable. In mathematical communication, students use their everyday language as well as unique mathematical terminologies, syntax, representations, and meanings. Communicating in maths involves using and transitioning between multimodal aspects of maths. Communicating also involves students reflecting upon, clarifying, and expanding their ideas of mathematical relationships, arguments, and concepts. Access to a variety of ways of communicating allows all students to access mathematical thinking and concept development.

The learning progression for symbols and expressions is a helpful tool for recording mathematical thinking but while communicating includes symbols it does not exclude other modes - hence the term multi - modal. Words are required to support meaning and the use of physical equipment is important for representing concepts and supporting solution methods.
An equation has little meaning on its own. It represents a situation. Students need to be able to eventually communicate a situation using the mathematical signs and symbols.

There were 12 seats on the bus and two children on each seat. How many children were on the bus?

Record as many different ways you could communicate a solution to this problem.

Think about the knowledge you need to be able to use for each of the models.

What physical materials could you use to model this problem?

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Teacher Professional Resources
Common Practice Model
I have started adding professional learning support for teachers to work through collectively at staff/syndicate meetings to reflect on their current practice and how they may expand and improve their current practice by looking closely at each of the identified pedagogies.
Currently available:
Student relationship with maths
Communicating (as pertaining to the teaching of mathematics, this a shared pedagogy with literacy.)

June Featured Resource

I am getting alot of feedback on how useful the **Graduated Problems on a Theme** are for use with the whole class. Giving teachers a clear idea of where their s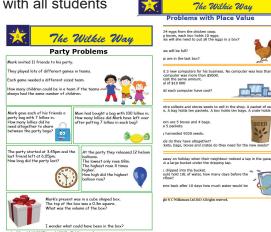tudents are working, the gaps they identify and the opportunities for just in time learning. While not all students may be able to complete all the problems, sharing how solutions are reached with all students has led to many lightbulb moments for students. Younger classes may only use the first two problems, older classes three or four problems, depending on the range in your class.
The problems promote discussion, used well they promote justification and mathematical argumentation.

There are currently 34 different sets of graduated problems in the members area of my website. (Answers and teacher notes also on the site)
A new set of problems is attached to this newsletter.

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Party Problems

Mark invited 11 friends to his party.
They played lots of different games in teams.
Each game needed a different sized team.
How many children could be in a team if the teams always had the same number of children.

Mark gave each of his friends a party bag with 7 lollies in. How many lollies did he need altogether to share between the party bags?

Mum had bought a bag with 100 lollies in. How many lollies did Mark have left over after putting 7 lollies in each bag?

The party started at 3.45pm and the last friend left at 6.05pm. How long did the party last?

At the party they released 12 helium balloons. The lowest only rose 68m. The highest rose 4 times higher. How high did the highest balloon rise?

Mark's present was in a cube shaped box. The top of the box was a 0.3m square. What was the volume of the box?

I wonder what could have been in the box?

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Problems with Place Value

24 eggs from the chicken coop.
g boxes, each box holds 10 eggs.
es will she need to put all the eggs in a box?

es will be full?

gs are in the last box?

t 3 new computers for his business. No computer was less than cost the same amount. more than $5000.
al of $10 000
ild each computer have cost?

ntre collects and stores seeds to sell in the shop. A packet of seeds s. A bag holds ten packets. A box holds ten bags. A crate holds ten

om are 5 boxes and 4 bags.
e 5 packets.
y harvested 9320 seeds.

ds do they have altogether?
kets, bags, boxes and crates do they need for the new seeds?

away on holiday when their neighbour noticed a tap in the garage was at a large bucket under the dripping tap.

L dripped into the bucket.
could hold 10L of water, how many days before the rflow?

me back after 10 days how much water would be

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Problems with Place Value

Mari collected 24 eggs from the chicken coop.
She fills up egg boxes, each box holds 10 eggs.
How many boxes will she need to put all the eggs in a box?

How many boxes will be full?
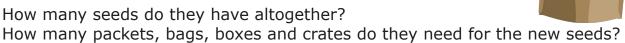
How many eggs are in the last box?

Mr Tanit bought 3 new computers for his business. No computer was less than $1000 and no computer was more than $6000.
None of them cost the same amount.
He spent a total of $10 000

How much could each computer have cost?

The garden centre collects and stores seeds to sell in the shop. A packet of seeds holds ten seeds. A bag holds ten packets. A box holds ten bags. A crate holds ten boxes.

In the store room are 5 boxes and 4 bags.
In the shop are 5 packets.

Last week they harvested 9320 seeds.

How many seeds do they have altogether?
How many packets, bags, boxes and crates do they need for the new seeds?

A family were away on holiday when their neighbour noticed a tap in the garage was dripping. He put a large bucket under the dripping tap.

Each day 1.35L dripped into the bucket.
If the bucket could hold 10L of water, how many days before the bucket will overflow?

If the family came back after 10 days how much water would be on the floor?