



### Using Tools and Representations

Effective teachers draw on a range of representations and tools to support their students mathematical development.

For a tool to assist student thinking, to organise their mathematical reasoning and support their sense making, teachers must ensure that the tools they select are appropriate for the mathematical situation and used effectively.

NZ Maths has a section on equipment animations: My suggestion is for you to look at a particular piece of equipment and look at all the animations for that piece of equipment as a starting point and consider could you do more to support students thinking than the animation shows.

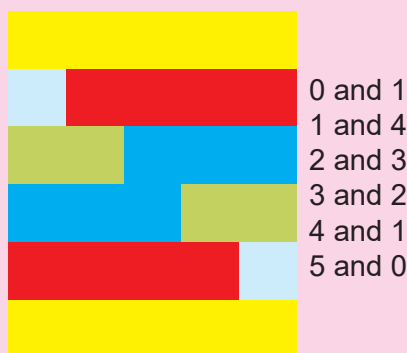
For example:

#### Animal strips

1. Used to develop part whole thinking for adding over ten (Adding a single digit to a double digit number)

Consider when adding  $17 + 5$  WHY do you need to add 5 as  $3 + 2$ . Key knowledge students need to have place value knowledge  $20 + 3 = 23$  and patterning knowledge  $7 + 3 = 10$  so  $17 + 3 = 20$ . Could animal strips have been used to support the development of this prior knowledge.

I also use them to explore patterns in basic addition facts



Recording systematically assists students to see the patterns in the numbers supported by the visual patterns from the animal strips.

From the visual pattern and the number pattern students can identify the commutative property of addition.

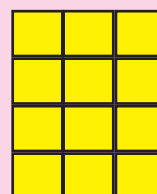
The visual patterns shows a stair case (Carefully pulling apart the display emphasises the steps). The number patterns show increasing and decreasing numbers by one.

2. Used to solve multiplication problems - building arrays

Moving students from repeated addition (a linear additive model) could you model the problem as a linear model and THEN rebuild the additive model as an array (a multiplicative model). It is important to build on from what students already know and you are trying to force a change in thinking from additive to multiplicative.



$$3 + 3 + 3 + 3$$



$$3 \times 4 = 4 \times 3$$

3. To introduce addition facts to 10 (this animation could go further and show the relationship between addition and subtraction facts - family of facts)



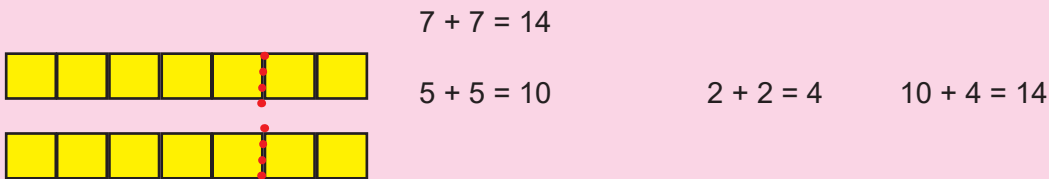
$$6 + 4 = 10$$

$$4 + 6 = 10$$

$$10 - 4 = 6$$

$$10 - 6 = 4$$

4. Used to support learning doubles to 20 - the animation could emphasise the strips show 5 +



$$7 + 7 = 14$$

$$5 + 5 = 10$$

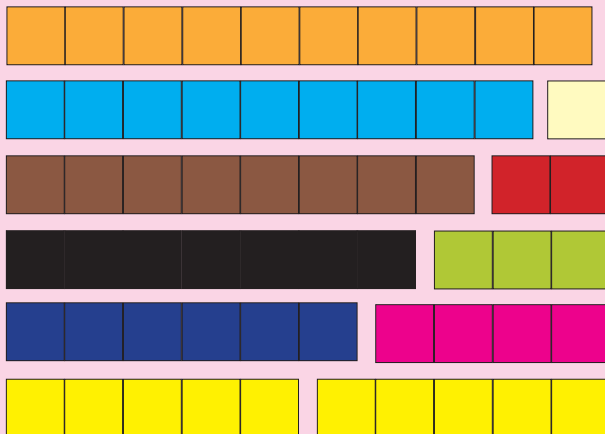
$$2 + 2 = 4$$

$$10 + 4 = 14$$

When using these pre made “concrete” materials it is important that teachers ensure that all students make the intended mathematical sense of them.

Cuisenaire rods were used in much the same way as the animal strips but for many students they only saw colours and not the number the coloured rods represented.

If you do not have animal strips then you can make multiple sets of number strips. A master is available under equipment resources on the membership site.



Technology also can provide manipulatives and are especially useful when working with older students as a teacher demonstration or for students to use themselves via their digital devices.

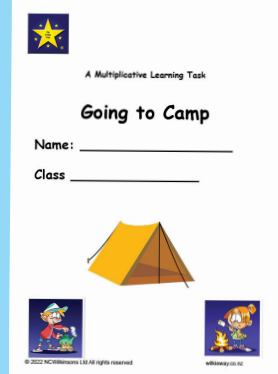
Maths Bot.com is a secondary UK site with many of the concrete manipulatives in a digital format

<https://mathsbot.com/manipulativeMenu>

The tools section as well as the manipulative section on the site also has some very useful tools for primary and intermediate age students.

# New Resources for Wilkie Way Members

Subscriptions purchased at the online store at [www.wilkieWAY.co.nz](http://www.wilkieWAY.co.nz)  
 Individual \$45 - paid via paypal  
 NZ School paid via invoice - complete form at online store  
 Up to 100 students \$150+GST  
 101 - 300 students \$250 + GST  
 300+ students \$350 + GST  
 Non NZ School \$400 - paid via paypal



A whole class Multiplicative Learning Task for a whole class covering late level 1 to level 3 - Multiplicative thinking signposts 3 - 5  
 find the student booklet and the teacher booklet (including answers) in Rich Learning Tasks and in Multiplication & Division under student resources in the directory.

## March Featured Resources Equipment

Equipment resources (Under heading student resources)

Digit Cards (0 - 9)

Number Charts (1 - 10)

Number Cards 0 - 100

Number strips

Place value houses

Place value trains

Counting Words & Symbols

Doubles tens frames

Twenties Frames

Decimats

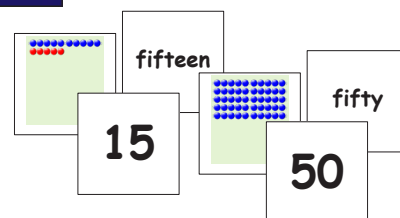
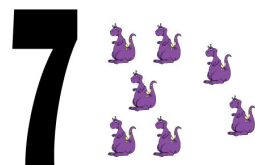
Bead frame cards (for building large numbers)

Function machines Add/Sub and Mult/Div operations cards

Fractions Posters

Fraction Cards unit fractions, non unit fractions, improper fractions, halves, quarters, thirds, fifths, sixths, sevenths, eighths, ninths, tenths

### Seven



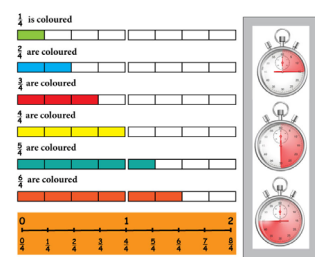
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### Understanding Fractions

One Quarter  $\frac{1}{4}$   
 $\frac{1}{4}$  is coloured

Two Quarters  $\frac{2}{4}$   
 $\frac{2}{4}$  are coloured

Three Quarters  $\frac{3}{4}$   
 $\frac{3}{4}$  are coloured



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# The Wilkie Way Teacher Challenge



## Don't be scared of fractions!

I drank  $\frac{1}{3}$  of a container of juice.

Then I spilled  $\frac{1}{4}$  of the remainder and drank the last 120mL.

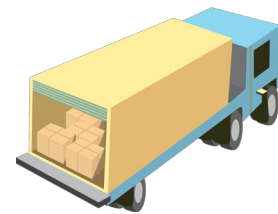
How much was in the container to start with?



The total mass of a truck and its load is 2964kg.

After delivering half the load, the mass of the truck and the remaining half load is 2712kg.

What was the mass of the full load?



## Are you thinking about Mathematics Professional development at your school?

What options do you have?

Applying for regionally allocated funding you will need to be clear what you want to achieve when you write your proposal.

You might find you are offered a programme called "Just in Time" This is already available on NZMaths. MOE are in the process of thinking about training for facilitators (from the current pool of facilitators who have put their hand up and said yes they can do maths)

I can tell you no more as I have no further information on how this programme will be delivered or look.

Meanwhile working from your teachers and students needs Learning Adventures has a number of very experienced (totalling many hundreds of years!) Mathematics specialist facilitators dotted around the country.

Check out the website: [learningadventures.nz](http://learningadventures.nz)

I am fully booked for 2022 but new to the team and also based in Rotorua is Shirley Collins who has space for new schools

Contact Shirley at: [shirleycollinsmaths@icloud.com](mailto:shirleycollinsmaths@icloud.com)