ELEMENT 4.3

Domain 4 - Personalise and Connect Mathematics Learning

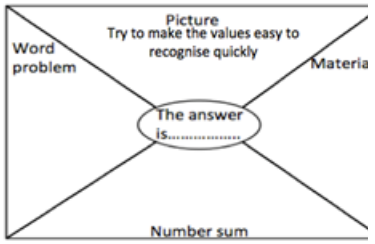
Element 4.3 - Apply and assess learning in authentic contexts

The following suggestions for practice are extracts from the 'Transforming Tasks' module on the Leading Learning resource:

Strategy From Information to Understanding

Technique Many ways of knowing: Ask students to construct general rules by identifying patterns.

Level	Before	After
Primary	1. 3 + 5 2. 4 + 7 3. 2 + 4 4. 9 + 5 5. 11 + 5 6. 4 + 9 etc	1. Three girls and five boys were at a party. How many children were at the party? 2. 4 + 7 3.  Represent each problem on the think board, in a picture, using materials, in a number sum and in a word problem, and write the answer in the middle. You may do the tasks in any order. *Reference:* This think board is from the 'Maths for Learning Inclusion' resource, but similar versions can be produced for any topic.
Secondary	Calculate: a. 2/5 + 3/7 b. 7/9 – 2/5 c. 3/4 x 1/3 d. 5/9 ÷ 1/3	2/5 + 3/7 7/9 – 2/5 3/4 x 1/3 5/9 ÷ 1/3 For each of the fraction questions above: • Use any appropriate numerical process to calculate solutions to the questions. • Create a diagram or a physical representation that would support you to calculate the solution or convince someone (or yourself) that your solution is correct. • Write a word problem/describe a situation in which this calculation could be relevant.



How do you think the technique Many ways of knowing might support *Element 4.3 - Apply and assess learning in authentic contexts?*

There are many ways to articulate this relationship. One response to this question has been provided on the next page.

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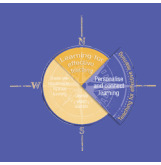

How does the technique Many ways of knowing support *Element 4.3 - Apply and assess learning in authentic contexts?*

In each of the examples, students are challenged to transfer between abstract mathematical representation and an authentic context. In this way the teacher supports students to apply their learning to an authentic context. Refer to 4.4 (multiple modes) to see why multiple representations, in multiple modes, assists authentic assessment.

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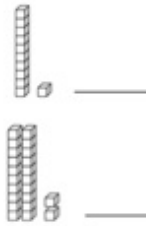
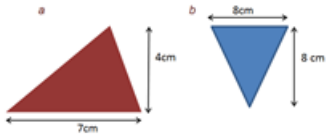
Domain 4 - Personalise and Connect Mathematics Learning

Element 4.3 - Apply and assess learning in authentic contexts

The following suggestions for practice are extracts from the 'Transforming Tasks' module on the Leading Learning resource:

Strategy From Information to Understanding

Technique Generalise: Ask students to construct general rules by identifying patterns.

Level	Before	After
Primary	Write each number and find it on your 100s chart:  Build each number using MAB blocks: 17 26	Choose one row (or part of a row) in your 100s chart, eg 23, 24, 25, 26. Make each of those numbers in that row using MAB blocks Make sure that you have exchanged as many ones blocks as you can for 10s rods. 1. Explain how the number 24 relates to the blocks representation? Further support: How does the '2' part of the number 24 relate to the blocks that you have used? How does the '4' part of the number 24 relate to the blocks that you have used? 2. Repeat for 25, then 26 etc. Does this connection work for the next number (25) and the next number (26)? 3. Look at another number on this row. Do you know how many 10s and how many ones blocks you will need to represent that number? Explain to a partner how you know. 4. Would your rule (explanation) work on the next row and the next row? Would your rule always work?
Secondary	Find the area of each of the following triangles: 	Leigh thinks that each of these triangles cover half the area of the rectangle that is drawn around it. What do you think? (You can cut and rearrange the pieces of copied versions of these triangles to test)  • Will a triangle always be half the area of the rectangle that's drawn around it, or do these pictures show special cases? • Could you describe a rule that would always work for calculating the area of a triangle? • How can the formula for the area of a rectangle be used to help you to write a formula for the area of a triangle?

How do you think the technique Generalise might support *Element 4.3 - Apply and assess learning in authentic contexts?*

There are many ways to articulate this relationship. One response to this question has been provided on the next page.

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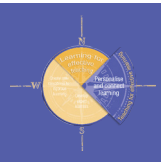

How does the technique Generalise support *Element 4.3 - Apply and assess learning in authentic contexts?*

When teachers provide students with the opportunity to generalise, they gain insight in to the depth of students' understanding.

Notice that the context for this problem is not 'real world', in the sense that it is not a problem that students would come across in their every day life. Indeed, the context is mathematics itself. However, the presentation of the problem makes the mathematics problem 'real in the students mind' and therefore this is an authentic context.

This notion of 'making it real in the students mind' comes from the Dutch research RME (Realistic Mathematics Education), which became known as 'Real-World Mathematics Education'. Marja van den Heuvel-Panhuizen states that, " The reason why the Dutch reform of mathematics education was called "realistic" is not just the connection with the real world, but is related to the emphasis that RME puts on offering the students problem situations which they can imagine. The Dutch translation of the verb "to imagine" is "zich REALISEren." It is this emphasis on making something real in your mind that gave RME its name. For the problems to be presented to the students this means that the context can be a real-world context but this is not always necessary. The fantasy world of fairy tales and even the formal world of mathematics can be very suitable contexts for a problem, as long as they are real in the student's mind."