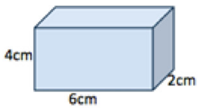
ELEMENT 2.4

Domain 2 - Create Safe Conditions for Rigorous Mathematics Learning

Element 2.4 - Challenge learners to achieve high standards with appropriate support

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

Strategy	From Closed to Open
Technique	**Many Entry Points:** Have students work backwards by providing the outcome first.

Level	Before	After
Primary	1. Use unifix cubes to measure the length of your book. 2. How many unifix cubes do you need to balance a packet of pencils? 3. How many unifix cubes can be stacked in this box?	The answer is: 'I used 20 unifix cubes to measure it.' 1. What might I be measuring? Think of more possibilities. What else? What else? .... 2. Are all your examples the same type (eg length)? Can unifix cubes be used to measure those same objects in a different way? How? …How else? What could an object be if it was measured using 20 cubes?
Secondary	**Calculate the volume of this rectangular prism** 	The volume of the object is 24cm³. What shape could the object be and what are its dimensions? OR The volume of a rectangular prism is 24cm³. What could its dimensions be?

How do you think the technique Many entry points might support *Element 2.4 - Challenge learners to achieve high standards with appropriate support*

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

How does the technique Many entry points support *Element 2.4 - Challenge learners to achieve high standards with appropriate support*

When there are multiple entry points to a problem, students will often enter at a level that most suits their current understanding. This provides teachers with the opportunity to notice and respond to students' thinking and design questions that challenge students to move to a higher level. For example, in the Secondary Years prism example, students could access this volume problem by:

- rearranging and recording the position of 24 centimetre cubes
- drawing images to support them to think about building layers of cubes to make a total of 24
- using an understanding of the formula for volume of a rectangular prism (_ x _ x _ = 24) and applying a 'trial and improvement' approach to generating three digits that multiply together to make 24
- as above, but applying a methodical process to identify all combinations
- applying an understanding of the formula, factors of 24 and a methodical process to establish combinations efficiently
- as above, but extending to include dimensions that are not integers etc.

The dot points reflect a progression of ways in which students could engage in this task. This range is sometimes referred to as providing 'a low floor for entry and a high ceiling for exit'. Learners are supported to achieve high standards when teachers can identify different ways to enter and develop the task and then challenge students to move beyond their initial response to the task.

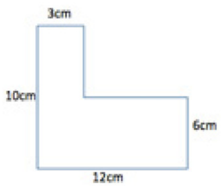
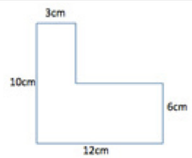
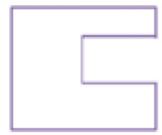
ELEMENT 2.4

Domain 2 - Create Safe Conditions for Rigorous Mathematics Learning

Element 2.4 - Challenge learners to achieve high standards with appropriate support

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

Strategy	From Closed to Open
Technique	**Many pathways:** Ask for one problem to be solved in **multiple ways**, rather than multiple problems in **one way**.

Level	Before	After
Primary	Calculate: 39 + 43	Find at least two different ways to do the calculation 39 + 43 Share your methods with another student. Together, try to identify at least three different methods. • Identify which method is the most efficient for this calculation. • Identify which methods are best for mental calculation? • Identify if some methods would be better than others for addition sums with larger values.
Secondary	**Calculate the area of this shape:**  	Calculate the area of this shape in at least two different ways.  • Share your methods with another pair of students. Work together to try to identify at least three different methods. • Do you they think that one method was easier or more effective than another method? Why? • Would one of your methods be more efficient than another if the shape was like this one? Why/why not? 

How do you think the technique Many pathways might support *Element 2.4 - Challenge learners to achieve high standards with appropriate support*

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

ELEMENT 2.4

Domain 2 - Create Safe Conditions for Rigorous Mathematics Learning

Element 2.4 - Challenge learners to achieve high standards with appropriate support

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

How does the technique Many pathways support *Element 2.4 - Challenge learners to achieve high standards with appropriate support*

When discussing conceptual understanding, the authors of, 'Adding It Up, 2001',commented; 'To find one's way around the mathematical terrain, it is important to see how the various representations connect with each other, how they are similar and how they are different'.

When teachers challenge students to generate many pathways to a solution, they challenge students to move beyond the method that comes most easily to them. The pathways necessarily have a connection to each other, as they are just different approaches to the one problem. This enables teachers to challenge students to evaluate different approaches, as shown in both the Primary and Secondary Years' examples.

Having multiple ways to approach a problem and understanding connections support students to 'navigate mathematical terrain successfully', hence achieving high standards.

ELEMENT 2.4

Domain 2 - Create Safe Conditions for Rigorous Mathematics Learning

Element 2.4 - Challenge learners to achieve high standards with appropriate support

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

Strategy	From Closed to Open
Technique	**Many solutions:** Ask questions which have many solutions. Stretch thinking by adding or removing constraints.

Level	Before	After
Primary	Work out: 4 + 6 =…… 5 + 7 = ………. 2 ½ + 4 ½ =……. 7 ¼ + 2 ¾ =………	The solution is 12. What could the question be? • Aim to find at least 20 different solutions. Add the following constraints: 1. You can only use addition. 2. You can only use two values in your calculation. 3. Flipped calculations don't count as different solutions in this problem.
Secondary	Write the linear equation which has: a. gradient of 6 and a y-intercept of 3 b. gradient of 3 and a y-intercept of 2 c. gradient of 5 and a y-intercept of -2	Write down some equations that have a y-intercept of 3. 1. If you sketched the graph of your equations, which direction would they slope? Are there any solutions that slope the other way? (Eg downwards left to right, rather than upwards) 2. What if each equation that you write down must have a steeper gradient than the previous one? 3. What if the coefficient of x cannot be a whole number? 4. What if the equation isn't linear?

How do you think the technique Many solutions might support *Element 2.4 - Challenge learners to achieve high standards with appropriate support*

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

Element 2.4 - Challenge learners to achieve high standards with appropriate support

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

How does the technique Many solutions support *Element 2.4 - Challenge learners to achieve high standards with appropriate support*

‘Adding or removing constraints’ is the part of this technique that drives the challenge of high standards. Adding constraints, in the Primary Years example, challenged students to work with fractions and decimals, rather than producing a greater amount of examples that rely only on addition of whole numbers. Adding constraints facilitates easy differentiation, as all students can work on the same problem, but with different constraints. To extend this example, the teacher could add the constraint of solutions being written as improper fractions, or as decimals with at least two decimal places etc.

The Secondary Years example, uses a combination of removing constraints initially, to promote creativity, then adding constraints to drive challenge. Teachers can be intentional about using constraints that support students to ‘see’ a new possibility. For example, if students have only identified positive gradient solutions the teacher could add the constraint that the gradient cannot be positive.

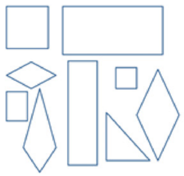
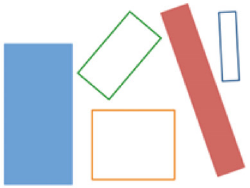
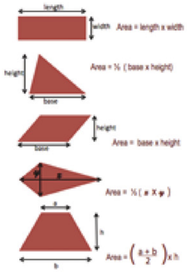
ELEMENT 2.4

Domain 2 - Create Safe Conditions for Rigorous Mathematics Learning

Element 2.4 - Challenge learners to achieve high standards with appropriate support

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

Strategy	**From Information to Understanding**
Technique	**Compare and contrast:** Ask students to identify similarities and differences.

Level	Before	After
Primary	Rectangles can look different. Can you recognise different types of rectangles? Colour all 5 rectangles: 	These shapes are all rectangles. What's the same about all of the rectangles? What's different about them? Would it help if you cut the shapes out and moved them around? Do rectangles need to be long and thin? Do rectangles need to have sides that are horizontal/vertical? 
Secondary	A review of area calculations: Using these formulae, find the area of the shaded regions. 	**A review of area calculations:** 1. Label the dimensions that you might measure to calculate the area of each of these polygons and write the formula that you would use. 2. Check with a partner to see if you have the same/ different ideas about: a. the dimensions that you would measure. b. how they would be used in the formula. 3. What's the same about each of the formulae? What's different about them? (Did you notice that all formulae involve multiplication of two lengths? The triangle and kite also involve a multiplication by ½) Why?) 4. What's the same about the dimensions that you have labelled? What's different about them? (Did you notice that the dimensions are always perpendicular to each other) Why? 

How do you think the technique Compare and contrast might support *Element 2.4 - Challenge learners to achieve high standards with appropriate support*

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

ELEMENT 2.4

Domain 2 - Create Safe Conditions for Rigorous Mathematics Learning

Element 2.4 - Challenge learners to achieve high standards with appropriate support

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

How does the technique Compare and contrast support *Element 2.4 - Challenge learners to achieve high standards with appropriate support*

Learning to compare and contrast supports students to make connections and see relationships. Once students can make connections and see relationships, they can be challenged to generalise. Being able to generalise is reflective of having deep conceptual understanding. Hence, challenging students to compare and contrast supports them to step closer to conceptual understanding.

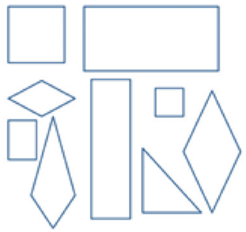
ELEMENT 2.4

Domain 2 - Create Safe Conditions for Rigorous Mathematics Learning

Element 2.4 - Challenge learners to achieve high standards with appropriate support

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

Strategy	**From Information to Understanding**
Technique	**Make connections and find relationships:** Have students make meaning by asking them to connect pieces of information.

Level	Before	After
Primary	Shapes worksheet Colour the squares blue and the rectangles red 	I’m thinking of a shape and it has 4 sides. What might it look like? Share your ideas. • What if it has 4 straight sides? Does that make you think differently about what you could have drawn before or what the shape might be now? Share your ideas. • What if I it has four straight sides and it’s a long thin shape. What do you think now? Could it be a square? This structure may help you to explain your thinking: • Because I know... I also know… • If … then...
Secondary	Scientific notation is a way of writing numbers when they are too big or too small to be written in decimal form. A number written in scientific notation is written as a number between 1 and 10 (inclusive) and multiplied by a power of 10. Eg: • 700 = 7 x 10^2 • 530 000 000 = 5.3 x 10^8 **Copy and complete:** a. 73 000 = …x 10^4 b. 25 300 000 = 2.53 x… c. etc	Use your smartphone calculator (or watch what happens on a shared device) when you calculate: 5,200,000 x 2,300,000. Now rotate your device. Can you see two different views? **Discuss** 1. What do you think happening here? 2. What connections can you see? 3. What do you think ‘ e+13’ might mean? Test out your ideas on some other values. 4. If ‘Screen 2’ was showing ‘530 000 000’, What might ‘Screen 1’ show? 5. If ‘Screen 1’ was showing ‘2.53e+7’, What might ‘Screen 2’ show? Find out about ‘Scientific notation’  Screen 1 Screen 2 A smartphone calculator has been used for these screenshots. (In screen 2 device has been rotated sideways)

How do you think the technique **Make connections and find relationships** **might support** ***Element 2.4 - Challenge learners to achieve high standards with appropriate support***

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

ELEMENT **2.4**

Domain 2 - Create Safe Conditions for Rigorous Mathematics Learning

Element 2.4 - Challenge learners to achieve high standards with appropriate support

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

How does the technique Make connections and find relationships support *Element 2.4 - Challenge learners to achieve high standards with appropriate support*

When teachers support students to think deeply, we also support them to achieve high standards. Using questions that focus on making connections and finding relationships is one technique that can support students to engage with challenging thinking.

The Primary Years example asks students to connect pieces of information to an appropriate visual representation. Notice that this example releases information in a manner that drives the students to make new connections and revise their visual representation several times.

The Secondary Years example asks students to identify the connection between two values that are evidently equal, but are represented in two different ways. In this case connecting the two different representations drives the new learning.

Another way to drive students to make connections and identify relationships is to ask, 'Which might be the odd one out', for a given collection of values/shapes/graphs etc. Further examples can be found in the 'Bringing it to Life' tool on the Leading Learning resource. (http://www.acleadersresource.sa.edu.au/index.php?page=bringing_it_to_life)

ELEMENT **2.4**

Domain 2 - Create Safe Conditions for Rigorous Mathematics Learning

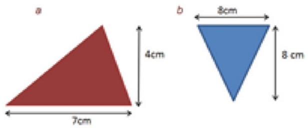
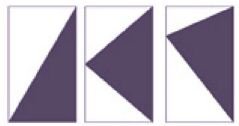
Element 2.4 - Challenge learners to achieve high standards with appropriate support

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.

<table>
<tr><th>Level</th><th>Before</th><th>After</th></tr>
<tr><td>Primary</td><td>Write each number and find it on your 100s chart:

Build each number using MAB blocks:

17
26</td><td>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?</td></tr>
<tr><td>Secondary</td><td>Find the area of each of the following triangles:

</td><td>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?</td></tr>
</table>

How do you think the technique Generalise might support *Element 2.4 - Challenge learners to achieve high standards with appropriate support*

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

ELEMENT 2.4

Domain 2 - Create Safe Conditions for Rigorous Mathematics Learning

Element 2.4 - Challenge learners to achieve high standards with appropriate support

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

How does the technique Generalise support *Element 2.4 - Challenge learners to achieve high standards with appropriate support*

Carefully constructed questions that support students to generalise, support development of conceptual understanding. 'Conceptual understanding frequently results in students having less to learn because they can see deeper similarities between superficially unrelated situations.' (Adding It Up) This deeper understanding supports learners to achieve high standards.

Mathematics is full of rules, so it offers a wealth of opportunities for teachers of Primary and Secondary Years curriculum, to challenge and support students to generalise.

The Secondary Years 'before' task delivers a rule to students, stealing from them the opportunity to establish the rule for themselves. The 'after' transformation task leaves intact the opportunity for students to practise generalisation and to experience for themselves that algebra is a powerful way to express relationships. Leaving 'intact' natural opportunities for students to establish rules for themselves, supports all students to achieve high standards.

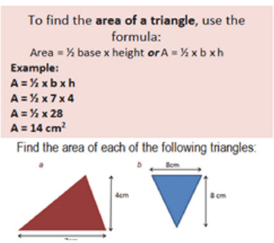
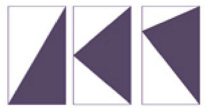
ELEMENT **2.4**

Domain 2 - Create Safe Conditions for Rigorous Mathematics Learning

Element 2.4 - Challenge learners to achieve high standards with appropriate support

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

Strategy	From Tell to Ask
Technique	**Socratic questioning:** Have students work backwards by providing the outcome first.

Level	Before	After
Primary	Multiplying by decimals is easy, just follow these two steps: 1. First, multiply the numbers normally, ignoring the decimal points. 2. Then, count the total number of decimal places in both numbers, and put that many decimal places in the answer.	Using a calculator, work out answers to questions a, b, c and d: a. 6 x 0.5 b. 3 x 0.5 c. 8 x 0.5 d. 5 x 0.5 Discuss 1. What do you notice about the solutions to these questions? Are the solutions larger or smaller than the value being multiplied by 0.5 Is that surprising? Will that always be the case? Could you test that out? 2. Why do you think that x 0.5 might be like finding half of the amount? 3. What do you think will happen if you multiply by 0.25? What makes you think that? How could you test that idea? 4. Do some more thinking about multiplying by decimals by asking your own 'what if?' questions 5. What ideas do you have now about multiplying by decimals? Do other people think the same or differently to you at the moment? 6. Look at the first questions that you tried (a, b, c, d). How do the questions (e, f, g, h) relate to them? What connections can you see between the answers to these two sets of questions? Use your observations to think of a way to make multiplying by decimals easier. Does your idea work if there are two decimal places in the question Eg 6 x 0.05? e. 6 x 5 f. 3 x 5 g. 8 x 5 h. 5 x 5
Secondary	Area of a Triangle: To find the area of a triangle, use the formula:  To find the **area of a triangle**, use the formula: Area = ½ base x height *or* A = ½ x b x h **Example:** **A = ½ x b x h** **A = ½ x 7 x 4** **A = ½ x 28** **A = 14 cm²** Find the area of each of the following triangles: 	**What do you notice about these three shapes?** Which triangle do you think coveres most/least of the area of the rectangle? Why do you think that? How sure do you feel at the moment? Look at the top picture - How much of the rectangle do you think the tirangle covers? What led you to that belief? How could you check that out/convince me?  How much of the rectable area do you think the triangles in the other two pictures cover? How could you check your thinking out/ convince yourself / convince me? Would it help if you could cut the pictures up and move pieces around? Try that if you think it will help you. How does the area of the triangle relate to the area of the rectangle in these three pictures? Would that always be the case with triangles? How could you check that thinking out? Examples of Socratic questions can be found online: http://courses.cs.vt.edu/cs2104/Summer2014/Notes/SocraticQ.pdf

How do you think the technique Socratic questioning might support *Element 2.4 - Challenge learners to achieve high standards with appropriate support*

ELEMENT 2.4

Domain 2 - Create Safe Conditions for Rigorous Mathematics Learning

Element 2.4 - Challenge learners to achieve high standards with appropriate support

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

How does the technique Socratic questioning support *Element 2.4 - Challenge learners to achieve high standards with appropriate support*

Carefully constructed Socratic questions that support students to look for and establish connections support the development of conceptual understanding. 'Conceptual understanding frequently results in students having less to learn because they can see deeper similarities between superficially unrelated situations'. (Adding It Up, 2001) This deeper understanding supports learners to achieve high standards. The 'before' tasks provide students with a method to use. Students are not challenged to engage in considering how/why the method works, nor are they challenged to connect that 'learning' to other topic areas. The 'after' tasks use Socratic questioning to support students to explore and identify connections to prior knowledge (eg decimals question) and/or intuition (eg triangle area question).

ELEMENT **2.4**

Domain 2 - Create Safe Conditions for Rigorous Mathematics Learning

Element 2.4 - Challenge learners to achieve high standards with appropriate support

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

Strategy	**From Procedural to Problem Based**
Technique	**Providing insufficient information (at first):** Give a perplexing problem and slowly provide information as needed.

Level	Before	After
Primary	This bucket holds 10 litres when filled to the top. The dotted line shows the water level in the bucket. How much water do you think is in the bucket? 	Roughly how much water do you think was poured over this man? What information do you need in order to find out? What else? 
Secondary	The radius of the London Eye is 60m. Calculate: a. The diameter of the wheel b. The circumference of the wheel c. The time taken for one revolution of the wheel if it travels at an average speed of 0.3m/s 	In the year 2000 the London Eye became the world's tallest Ferris wheel. Approximately how long do you think a journey on the London Eye might take? Convince me/ someone who thinks differently to you. What do you need to know to be sure of your accuracy? 

How do you think the technique Providing insufficient information (at first) might support *Element 2.4 - Challenge learners to achieve high standards with appropriate support*

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

ELEMENT 2.4

Domain 2 - Create Safe Conditions for Rigorous Mathematics Learning

Element 2.4 - Challenge learners to achieve high standards with appropriate support

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

How does the technique Providing insufficient information (at first) support *Element 2.4 - Challenge learners to achieve high standards with appropriate support*

When teachers pose a math's problem and identify all the information necessary to solve the problem, they remove the opportunity to challenge and for students to stop, think and consider which information they want/need to use. In contrast, when students identify the necessary information they are prompted to begin to plan the process they will use to solve the problem. When students are given the necessary information, they are often led towards a particular way to calculate the solution. Leading students, supports them in that moment, but does not empower them to choose to use their mathematics in the long run. Hence, when we challenge students to identify the necessary information, we challenge them to achieve high standards.

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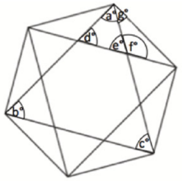
Domain 2 - Create Safe Conditions for Rigorous Mathematics Learning

Element 2.4 - Challenge learners to achieve high standards with appropriate support

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

Strategy	**From Procedural to Problem Based**
Technique	**Let students identify the steps:** Provide multi-step problems and do not state all the steps.

Level	Before	After
Primary	A movie ticket for one adult costs $12. A movie ticket for one child is three quarters of the cost for an adult. a. What's the cost for one child? b. What's the cost for four children? c. What's the cost for a family of two adults and four children?	A movie ticket for 1 adult costs $12. A movie ticket for a child is three quarters of the cost for an adult. What's the cost for a family of two adults and four children? This question is based on a NAPLAN question. Many NAPLAN questions are multi-step problems and do not state all the steps.
Secondary	This design is drawn inside a regular hexagon. Calculate the marked angles. 	This design is drawn inside a regular hexagon. What is the size of the angle marked a?  This question is from a NAPLAN paper. Many NAPLAN questions are multi-step problems and do not state all the steps.

How do you think the technique Let students identify the steps might support *Element 2.4 - Challenge learners to achieve high standards with appropriate support*

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

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Domain 2 - Create Safe Conditions for Rigorous Mathematics Learning

Element 2.4 - Challenge learners to achieve high standards with appropriate support

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

How does the technique Let students identify the steps support *Element 2.4 - Challenge learners to achieve high standards with appropriate support*

When teachers provide students with all of the steps they 'rescue' students from the possibility of grappling with the problem and identifying the steps for themselves. Dan Meyer, in this TED talk, refers to providing all of the steps, as paving the way for students and "…congratulating them for stepping over the small cracks". http://www.ted.com/talks/dan_meyer_math_curriculum_makeover?language=en

Having students identify the necessary steps challenges them to achieve high standards that will ultimately support them to be effective users of their mathematics understanding.

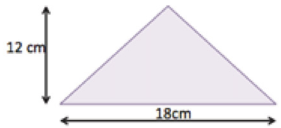
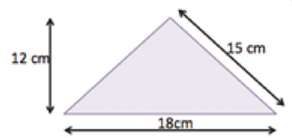
ELEMENT **2.4**

Domain 2 - Create Safe Conditions for Rigorous Mathematics Learning

Element 2.4 - Challenge learners to achieve high standards with appropriate support

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

Strategy	**From Procedural to Problem Based**
Technique	**Include some irrelevant information:** Give additional information that is not required to do the task.

Level	Before	After
Primary	What is the value of 500 + 60 + 4	Which of these is worth 564? Tick as many boxes as you need to. 5 + 6 + 4 ☐ 50 + 60 + 40 ☐ 500 + 40 + 6 ☐ 500 + 60 + 4 ☐
Secondary	Calculate the area of the triangle. 	Calculate the area of the triangle. 

How do you think the technique Include some irrelevant information might support *Element 2.4 - Challenge learners to achieve high standards with appropriate support*

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

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Domain 2 - Create Safe Conditions for Rigorous Mathematics Learning

Element 2.4 - Challenge learners to achieve high standards with appropriate support

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

How does the technique Include some irrelevant information support *Element 2.4 - Challenge learners to achieve high standards with appropriate support*

When teachers provide students with only the relevant information, they 'rescue' students from the possibility of grappling with identifying the useful information for themselves. Students can default to using the given information rather than being challenged to stop, think and consider which information is required. The challenge here is similar to asking students to identify which information is necessary to solve a problem, however adding irrelevant information lends itself to different contexts, such as the place value context in the primary school example, for which it is not possible to have students identify the necessary information.