

Learning Ladder – Posing questions in Mathematics

	6.2 Pose questions that invite critical reflection	<p>How can we be sure that ...?</p> <p>Tell me what is wrong with ...</p> <p>Is it ever false that ...? (always true that ...?)</p> <p>Why is the best solution?</p> <p>Can you convince me about ...?</p> <p>What connections did you make today that helped you to “get it”?</p> <p>Critically assess your growth in mathematics this term. What worked and what didn’t?</p> <p>What helped you to learn in mathematics this term?</p>
Level 6: At this level, students can pose questions to critically analyse complex issues and abstract ideas (Year 10)	6.1 Pose questions about concepts and generalisations that invite critical analysis and evaluation	<p>Of what is this an example?</p> <p>What happens in general?</p> <p>What happened here? And here? Can you see a pattern?</p> <p>Is it always, sometimes, never ...?</p> <p>What can change and what has to stay the same so that ... is still true?</p>
	5.2 Pose speculative and creative questions, for example, what if? what might?	<p>If this is the answer to a similar question, what was the question?</p> <p>What might happen if ...?</p> <p>What do think comes next? Why?</p> <p>What if ...?</p> <p>Have we found all the possibilities? How do we know?</p> <p>Have you thought of another way this could be done?</p> <p>If the data showed X how would you interpret it?</p> <p>Can you think of any time that our theory is not true?</p>
Level 5: At this level, students pose questions to probe assumptions and investigate complex issues (Year 8)	5.1 Pose questions that address propositions and invite an argument	<p>“Using a number line is more effective than using a hundreds chart.” Do you agree? Why? Why not?</p> <p>“We should always use an algorithm to solve number problems” Why? Why not?</p> <p>“It is essential to memorise our times tables” To what extent do you agree with this statement?</p>
	4.3 Pose evaluative questions, for example, To what extent? How far? that invite an argument	<p>How far can this pattern help you find an answer?</p> <p>Solve in two or more ways. Which was the most effective? Why, why not?</p> <p>Which was the most effective and why? Will this always be the case?</p> <p>What do you think is the most important idea from today’s mathematics lesson?</p>
	4.2 Pose analysis questions that compare information and perspectives, using primary and secondary sources	<p>In what way is addition different / similar to multiplication?</p> <p>In what way is sharing different / similar to grouping?</p> <p>How are six eighths, $\frac{3}{4}$, .75 and 75% similar and different?</p> <p>How does ... compare to ...</p> <p>How does contrast with ...</p> <p>Use a Venn Diagram to show how two topics are the same and different.</p>
Level 4: At this level, students pose questions to clarify and interpret information and probe for causes and consequences (Year 6)	4.1 Pose analytical questions, for example, opposites	<p>What strategy worked and what strategy didn’t?</p> <p>What problem solving approach was effective and what wasn’t?</p> <p>Formula for area – useful or useless?</p> <p>Counting on and back – helpful or hindrance?</p> <p>Pie chart – effective or ineffective?</p>

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		Addition – efficient strategy or inefficient strategy?
Level 3: At this level, students pose questions to expand their knowledge of the world (Year 4)	3.1 Pose inquiry/research questions with the emphasis on Why? and How?	How can this pattern help you ...? Why do you think this? Why did you choose this strategy? How might you solve this in a different way? How could you be more effective / efficient? How will this help you solve ...?
Level 2: At this level, students pose questions to identify and clarify issues, and compare information in their world (Year 2)	2.1 Pose questions that ask for identification of similarities or differences	What's the same about ...? What's different about ...? Can you sort or organise these in different ways ...? Is it or is it not ...?
	1.2 Pose questions that begin with Is, Did, Can, Would, Will, Might, Should	Can you tell me what's wrong with... What might you change so that...? How might you write/draw/ record what you are doing? Is there a way to record what you've found that might help us see more patterns?
Level 1: At this level, students pose factual and exploratory questions based on personal interests and experiences (F)	1.1 Pose questions that begin with What, When, Where, Why, Which, Who	What strategy did you choose? Why did you choose it? Is there another? Which strategy is the most efficient? What have we been working on that might help with this problem?
	Indicative Behaviour Please note that this is not prescriptive and it is not comprehensive. There are many more types of questions that can be asked at each level.	Mathematical context Questions apply across the Content Strands.

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References

NRICH Enriching Mathematics, University of Cambridge, 1997- 2017, <https://nrich.maths.org/10341>

Australian National Curriculum, Resources F-6, retrieved 17/8.2017, <http://australiancurriculumf-6resources.blogspot.com.au/2013/04/question-matrix.html>