

Teacher Guide to Implementing MC² Thinking Protocol for Comparing Different Student Strategies

Purpose	Activity	Materials
Part 1: Preparation	1. In a PLC or with a colleague, develop or select a	Rich math problems aligned
during Professional	formative assessment task to administer to students	to CCSS-M (Open-ended
Learning Community	(item should be based on instruction that students are	tasks)
(PLC)	currently engaged in or have previously experienced in	
	class). Curriculum resources or released PARCC test items	MC ² PARCC Practice Test
Why a rubric?	are good sources for tasks. Think about:	Item Packets
	 What is the math content in the problem? 	https://mc2.nmsu.edu/teach
Establishing the rubric	 What math practices could be highlighted? 	ers/preparing-for-parcc/
before implementing	 How does it connect to what students are learning in 	
the <i>Thinking Protocol</i> is	class?	PARCC Released Items
crucial because without		https://parcc-
first setting the criteria	2. Each member of the team should do the math problem	assessment.org/released-
we tend to skew our	showing how they would expect students to complete the	items/?fwp_subject_facet=m
evaluation and	task.	<u>athematics</u>
understanding of		
student work. For	3. As a team, agree on the mathematical goals of the task.	PARCC Math Practice Tests
example, we become		https://parcc.pearson.com/p
lenient and assume	4. Develop a rubric to be used to sort student work into	ractice-tests/math/
understanding when we	piles based on evidence.	
see how much effort a		PARCC Answer Keys/Rubrics
student exerts in solving	Following is an example of a PARCC-aligned scoring	https://parcc-
the problem.	rubric.	assessment.org/answer-
	Level 1: Did not yet meet expectations	keys/
	Level 2: Partially met expectations	
	Level 3: Approached expectations	Illustrative Mathematics
	Level 4: Met expectations	https://www.illustrativemath
	Level 5: Exceeded expectations	ematics.org/content-
	TIP: It is easiest to agree first on Level 4, then move up	standards
	and down to develop other indicators.	
	'	
	A more general rubric may also be used, such as:	
	Level 1: Strong Math Understanding	
	Level 2: Incomplete Math Understanding or	
	Misconception	
	Level 3: Little/Not Math Understanding	



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Part 2: Administration	Set aside at least 15-20 minutes of instructional time for	Copy of student task for each
of Task to Students	students to:	student
	1.Think individually (3+ Minutes)—Have students think	
Why a task?	about the problem alone, answer the questions below,	2 pencils and/or pen (each
The intention of	and write down their reasoning or problem-solving	with different color lead/ink)
The intention of	strategy using one of the pencils.	for each student
administering a task is to capture the journey of	 Think about and write about the problem by yourself. Explain why you chose your answer and your strategy. 	
mathematical thinking	Write in pencil and please don't erase!	
and build a stronger	Work individually for 3-5 minutes.	
understanding of	If you're not sure, explain where you're stuck or ask a	
mathematics through	question.	
conversations. This		
takes effort and thought	2.Think with a partner (5+ Minutes)—Have students share	
and doesn't always	their solutions and responses to the questions above with a partner. Using a different pencil, they can change or add	
come out perfect the	to their answer and/or add any new insights they learned.	
first time.	Remind students that no erasing is allowed. Make sure	
	both partners have a chance to share.	
	Explain your strategies and arguments.	
	Listen to your partner's strategies and arguments.	
	Discuss your ideas.	
	Write any new strategies and ideas you learned	
	from your partner in a different color.	
	 3. Think with the class (6+ Minutes) – Have students share and compare the different solution strategies with the whole class. Summarize and record the different strategies used. Discuss the following questions with the class to help the students make sense of the various strategies shared: What strategies did we use to solve the problem and find the answer? What ideas did we have? What questions did it make us think about? What are the similarities/differences among the strategies? What connections can be made between the strategies? 4. Reflect on the process (1+ Minutes) – Have students reflect and the task and identify: 	For additional student
	on the task and identify:	reflection questions, go to
	What was easy and what was hard when you had to	the link below:
	work by yourself?	https://mc2.nmsu.edu/teach ers/5-ways-to-implement/#3
	 What was easy and what was hard when you had to work together? 	ers/5-ways-to-implement/#3
	Did you add or change your paper after thinking with	
	your partner or the class? If so, what and why?	
	5.Collect and sort the student work based on the rubric developed in PLC. There is no need to score the work	
	(alpha/ numeric/percent), only complete an initial sort.	
	(aipiia) humenc/percenti, only complete an initial soft.	



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Part 3: Collaborative Reflection during PLC Why reflect?	 Review student work and analyze different solution strategies which students used to solve the problem. 	Student work (Sorted based on rubric developed/selected in PLC during Part 1)
High levels of reflection are a practice that is best fostered with colleagues. It provides a good sense of when teachers need to step back and think deeply and promotes better understanding of what is/isn't working.	 2. In a PLC, discuss what data this process/task provides. Consider what instructional strategies are needed to support students' development of Mathematical Practices and flexibility in problem solving. a. What do students understand? Where is the evidence in the student work? b. What were misconceptions/gaps in the students' knowledge? Where is the evidence in the student work? c. What were the instructional strategies or classroom experiences that can help move the learning forward? d. How can the protocol be used to build math confidence in students? e. How are the Common Core and Math Practice Standards advanced using the MC² Thinking Protocol as classroom warm-up problems? 	MC ² Thinking Protocol Data Collection & Analysis Tool https://mc2.nmsu.edu/teachers /5-ways-to-implement/#3