Teacher Guide to Implementing MC² Thinking Protocol for Student Self-Assessment

Purpose	Activity	Materials
Part 1: Preparation during Professional Learning Community (PLC) **Why a rubric?** Establishing the rubric before implementing the *Thinking Protocol* is crucial because without first setting the criteria we tend to skew our evaluation and understanding of student work. For example, we become lenient and assume understanding when we see how much effort a student exerts in solving the problem.	**1.** In a PLC or with a colleague, **develop or select a formative assessment task** to administer to students (item should be based on instruction that students are currently engaged in or have previously experienced in class). Curriculum resources or released PARCC test items are good sources for tasks. Think about: • What is the math content in the problem? • What math practices could be highlighted? • How does it connect to what students are learning in class? **2.** Each member of the team should **do the math** problem showing how they would expect students to complete the task. **3.** As a team, **agree on** the mathematical **goals** of the task. **4.** **Develop** a rubric to be used to sort student work into piles based on evidence. Following is an example of a PARCC-aligned **scoring rubric**. **Level 1:** Did not yet meet expectations **Level 2:** Partially met expectations **Level 3:** Approached expectations **Level 4:** Met expectations **Level 5:** Exceeded expectations **TIP:** It is easiest to agree first on Level 4, then move up 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	**Rich math problems** aligned to CCSS-M (Open-ended tasks) **MC² PARCC Practice Test Item Packets** https://mc2.nmsu.edu/teachers/preparing-for-parcc/ **PARCC Released Items** https://parcc-assessment.org/released-items/?fwp_subject_facet=mathematics **PARCC Math Practice Tests** https://parcc.pearson.com/practice-tests/math/ **PARCC Answer Keys/Rubrics** https://parcc-assessment.org/answer-keys/ **Illustrative Mathematics** https://www.illustrativemathematics.org/content-standards

Teacher Guide to Implementing MC² Thinking Protocol for Student Self-Assessment

Purpose	Activity	Materials
Part 2: Administration of Task to Students **Why a task?** The intention of administering a task is to capture the journey of mathematical thinking and build a stronger understanding of mathematics through conversations. This takes effort and thought and doesn't always come out perfect the first time.	Set aside **at least 15-20 minutes of instructional time** for students to: 1. **Think individually (3+ Minutes)**–Have students think about the problem alone, answer the questions below, and write down their reasoning or problem-solving strategy using one of the pencils. • What do I know about the problem? • What questions do I have? • Explain my reasoning or thinking in solving the problem. Then ask students to self-asses and write the word **Green**, **Yellow** or **Red** on the top of their paper (or place a colored dot) which corresponds with what they are feeling about their thinking. **Green** - *"I am confident in my answer and my thinking and need no more time to think alone."* **Yellow** - *"I am not sure with my answer or thinking and need a little time to talk with somebody about my ideas."* **Red** - **"***I am not confident in my answer or reasoning and need to do some more learning about the math."* 2. **Think with a partner (5+ Minutes)**–Have students share their solutions and responses to the questions above with a partner. Using a different pencil, they can change or add to their answer and/or add any new insights they learned. Remind students that no erasing is allowed. Make sure both partners have a chance to share. 3. **Think with the class (6+ Minutes)**–Have students share different solution strategies with the whole class. Summarize and record different strategies used. 4. **Reflect on the process (1+ Minute)**–Have students reflect on the task and identify: • What was easy/hard about the problem? • How did the Thinking Protocol support your math understanding? 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.	**Copy of student task** for each student **2 pencils and/or pen** (each with different color lead/ink) for each student **Colored dots (**Green, Yellow, Red) for each student **For additional student reflection questions, go to the link below:** https://mc2.nmsu.edu/teachers/5-ways-to-implement/#2

Teacher Guide to Implementing MC² Thinking Protocol for Student Self-Assessment

Purpose	Activity	Materials
Part 3: Collaborative Reflection during PLC **Why reflect?** 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.	**1. Review student work and analyze** the different solution strategies which students used to solve the problem. **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. **3. Pay attention to the students' self-assessment:** • **Students who self-assessed as Green but were wrong in their answer and/or reasoning:** This may indicate a student misconception which needs to be clarified. • **Students who self-assessed as Red and their answer and/or reasoning was correct OR had a correct answer and changed it after talking to a partner:** This could be that the student lacks confidence in their thinking and communicating/defending their ideas to others. **4. Reflect about:** • What do students understand? Where is the evidence in the student work? • What were misconceptions/gaps in the students' knowledge? Where is the evidence in the student work? • What were the instructional strategies or classroom experiences that can help move the learning forward? • How can the protocol be used to build math confidence in students? • How are the Common Core and Math Practice Standards advanced using the MC² Thinking Protocol as classroom warm-up problems?	**Student work** (Sorted based on rubric developed/selected in PLC during Part 1) **MC² Thinking Protocol Data Collection & Analysis Tool** https://mc2.nmsu.edu/teachers/5-ways-to-implement/#2