

## Planning Assessment

Multiple kinds of assessment are included in CMP4 to help teachers see assessment and evaluation as a way to inform students of their progress, apprise families of students' progress, and guide the decisions a teacher makes about lesson plans and classroom interactions.

Formative assessment suggestions are provided throughout the Launch, Explore, and Summarize phases. See Part 2, What's in CMP, Guide Aid 2.L Framework for Formative Assessment Across the Instructional Sequence of CMP and Guide Aid 2.M Student Self-Assessment Example. Diverse kinds of summative assessments are included that mirror classroom practices as well as highlight important concepts, skills, techniques, and problem-solving strategies. The following summative assessments are provided in the Teacher Edition:

- **Checkup.** Short, individual assessments provide insight into student understanding of the baseline mathematical concepts and skills of the unit.
- **Partner Quiz.** These are more complex than Checkup assessments and more closely resemble the work the students do during class, which prepares them for the work done by STEM professionals. The Partner Quiz includes extensions of ideas students explored in class and provides insight into how students work together to apply the ideas from the unit to new situations. They are done with pairs of students and generally take more time.
- **Unit Test.** Individual assessments that provide information on a student's ability to apply, refine, modify, and possibly extend the mathematical knowledge and skills acquired in the unit.

CMP4 provides some unique opportunities to assess students' understanding. The first problem in each unit is designed as a "preassessment." It provides information on what prior understandings students bring to the unit. For example, in the sixth grade *Number Connections* unit, which explores students' understanding of the multiplicative and additive structure of numbers, the first problem is the *Factor Game*. It provides teachers an opportunity to assess students' prior understanding of the multiplicative structure of number at the same time it begins to deepen students' understanding of number. The first problem in the eighth grade *Thinking with Mathematical Models* is designed to assess students' prior understanding of linear relationships and at the same time expand the understanding by contrasting linear to nonlinear relationships. The last problem in most units provides a summary of the conceptual and procedural knowledge of the unit.

Some CMP teachers have used additional strategies for pre- and post assessment:

- *Shapes and Designs* seventh grade unit: Display sets of photographs from nature, art, and architecture in the real world. Ask students to describe the shapes and designs that they see. In addition, ask students to predict what they will learn in the unit. At the close of the unit, the open question can be posed again so students can add to their responses about what they know about shapes and designs.
- *Looking for Pythagoras* eighth grade unit: Preassessment single question: What do think you know about right triangles? Post assessment single question: Now what do you know about right triangles?

**Assessing What We Value: Partner Quizzes** The Partner Quizzes provided in the *Connected Mathematics* assessment package are a feature unique to the curriculum. They provide an opportunity for teachers to assess students in situations that more closely resemble the work of STEM professionals—that is, there is a problem, students work collaboratively to solve the problem, and they communicate their findings to a wider audience.

The assumptions under which the quizzes were created are the following:

- Students work in pairs.
- Students are permitted to use their notebooks, calculators, and any other appropriate materials.
- Pairs submit a draft of the quiz for teacher input, revise their work, and turn in the finished product for assessment.

Partner Quizzes are designed for students working in pairs. There are several ways to choose student pairs for a quiz. Most teachers use one or more of the following:

- Students choose their own partners.
- Partners are chosen in some random way.
- The teacher picks the pairs to work together.
- Seating assignment determines partners.

It is assumed that each pair of students will have one opportunity to revise their work on the quiz based on teacher feedback before submitting it for a grade. When a pair has completed the quiz, they can submit separate papers or one paper with both names on it.

Giving feedback generally involves telling students which questions they have answered incorrectly or how many of the possible points they would receive for a question. It should be seen as an opportunity to let students know if they are on track or if they need to rethink a problem. Giving feedback should not mean reteaching or leading students to the correct solution. Here are some methods CMP teachers have used for giving feedback to students.

- Check the quizzes, and write the number of points achieved next to each question. Then allow the pair to revise all the questions.
- Check the quizzes, and write the number of points achieved next to each question. Then allow the pair to revise one question of their choice. (If they write in a different color, you need to check only the new information.)
- While students take the quiz, allow each pair to confer with you once about one question.

Partner Quiz questions are richer and more challenging than Checkup questions. Many quiz questions are extensions of ideas students explored in class. These questions provide insight into how students apply the ideas from the unit to new situations. The nature of the Partner Quizzes provides a grading situation in which rubrics can assist in the evaluation of the students' knowledge.

Here are some instructions for individual students during Partner Quizzes:

- Solve the exercise yourself.
- Ask yourself, "Does my answer make sense?"
- Compare your work to your partner's work.
- Discuss how your work is the same and how it is different.
- If you and your partner are not sure about your answers or you disagree, go to your notes, and see if you have anything to help you think about this problem.
- Make sure you agree on what the problem is asking you to do and what you have to answer.
- Check your vocabulary to see if you have understood all the words.
- Think about how this problem is like another one that you did in class or as homework. Check your notes for that problem.
- If you still disagree, each of you should write a different answer to the problem.

CMP provides a rich collection of assessment tools and the assessment tools assist in monitoring and assessing students' understanding and reasoning during class.

## Framework for Formative Assessment Across the Instructional Sequence of CMP

Formative assessment is the very essence of teaching. This framework highlights how formative assessment is ongoing in *Connected Mathematics* during planning, teaching, and reflecting. This view of formative assessment extends beyond traditional paper and pencil formative tasks, such as check-ins, warm-ups, or exit cards, in that it also includes ongoing assessment as part of the enactment of a lesson. Teachers engage in three components of formative assessment, supported by current research and best practices in mathematics education: (a) **anticipate** student thinking, (b) **gather and analyze evidence** of student learning, and (c) **adapt their teaching** to meet students' needs and to help students develop their own reflective habits of mind. These three components of formative assessment are an integral part of the instructional model of the Launch—Explore—Summarize phases of CMP's curriculum, *Connected Mathematics*. These components occur both as a daily and periodic practice.

### Components of Formative Assessment Across the Instructional Sequence

#### Anticipating Student Thinking

During planning, the teacher uses the mathematical goal, the mathematical challenge embedded in the problem context, and the needs of their students to develop the lesson. The teacher goes into the classroom with an anticipation of how students will engage with the problem, what strategies might emerge, what topics might be challenging, what scaffolding might be provided, what evidence might show students' understandings, and how students can support one another during group work. Anticipating student strategies and difficulties requires the teacher to be open to new approaches to the mathematics that students may explore.

#### Gathering and Analyzing Evidence

During the enactment of the lesson, the teacher monitors student engagement and understanding. The teacher approaches the lesson with some anticipation of students' progress toward the mathematical goal of the lesson and then gathers evidence to make decisions about students' actual progress. A teacher carefully listens, taking an observer role, quietly watching students' interactions with each other and with the mathematics. Other times, the teacher asks questions to learn more about what students are thinking and then guides students' thinking toward the mathematical goal, using appropriate representations/notations.

#### Adapting Based on Student Thinking

During the enactment of the lesson, the teacher uses the mathematical goal and the data gathered about students' understanding to make necessary adjustments, such as providing more time on certain topics during the lesson, assisting struggling students to connect their emerging understanding to prior knowledge, or providing more challenging questions as needed. The teacher uses the data to adjust parts of the current lesson or in forthcoming lessons.

A Framework for Formative Assessment Across the Instructional Sequence of CMP

	<b>Anticipating Student Thinking</b> <i>Setting Up a Plan</i>	<b>Gathering and Analyzing Evidence</b> <i>Making Sense of What Students Know</i>	<b>Adapting Based on Student Thinking</b> <i>Acting on the Evidence</i>
<b>Launch</b>	<p>Using the mathematical goal, anticipate</p> <p><i>Connecting to Prior Knowledge</i></p> <ul style="list-style-type: none"> <li>• Students' familiarity with the problem context</li> <li>• Connections students can make between prior experiences and current task</li> <li>• Connections to prior mathematical understandings</li> <li>• Struggles students may encounter with the context or embedded mathematics</li> <li>• Questions to reveal potential struggles</li> </ul> <p><i>Presenting the Challenge</i></p> <ul style="list-style-type: none"> <li>• Ways to engage students in the problem</li> <li>• Strategies to maintain the challenge</li> </ul>	<p>Using the mathematical goal and your plan,</p> <ul style="list-style-type: none"> <li>• Observe student strategies</li> <li>• Solicit feedback from students using a variety of ways</li> <li>• Make sense of students' initial thinking about the new situation and how it connects to prior experiences</li> <li>• Access additional resources for assessing students, if needed</li> <li>• Gain a general idea of student thinking based on enactment of the Launch</li> </ul>	<p>Using the mathematical goal and the emerging evidence from the Launch</p> <p><i>Connecting to Prior Knowledge</i></p> <ul style="list-style-type: none"> <li>• Use ideas gained about student understanding to tailor the amount of information or feedback provided for students</li> <li>• Decide which questions/struggles should be addressed now or could be postponed because it will be discussed in a future lesson</li> </ul> <p><i>Presenting the Challenge</i></p> <ul style="list-style-type: none"> <li>• Use responses and evidence from students to adapt the problem based on the class and individual student needs</li> <li>• Spend more or less time on the Launch depending on students' readiness</li> <li>• Encourage students to question each other for clarification, etc.</li> <li>• Be explicit about the learning goal</li> <li>• Engage the students in the challenge</li> </ul>
<b>Explore</b>	<p>Using the mathematical goal and the anticipated information from the Launch, plan</p> <p><i>Providing for Individual Needs</i></p> <ul style="list-style-type: none"> <li>• Appropriate questions to accommodate students' emerging understandings.</li> <li>• Strategies for helping struggling students connect to prior knowledge</li> </ul>	<p>Using the mathematical goal, your plans, and the evidence from the Launch,</p> <ul style="list-style-type: none"> <li>• Use evidence from launch to monitor students' struggles and understandings</li> <li>• Gather evidence related to students' progress toward understanding the goal</li> <li>• Question students on their thinking</li> </ul>	<p>Using the mathematical goal and the emerging evidence from the Explore,</p> <p><i>Providing for Individual Needs</i></p> <ul style="list-style-type: none"> <li>• Provide opportunities for students to spend more or less time on certain questions, topics, or problems</li> <li>• Encourage students to monitor their progress toward the mathematical goal of the lesson</li> </ul>

	<b>Anticipating Student Thinking</b> <i>Setting Up a Plan</i>	<b>Gathering and Analyzing Evidence</b> <i>Making Sense of What Students Know</i>	<b>Adapting Based on Student Thinking</b> <i>Acting on the Evidence</i>
	<ul style="list-style-type: none"> <li>• Appropriate feedback as needed to accommodate both struggling and accelerated students</li> <li>• Strategies to support student interactions</li> <li>• Prompts to promote students sharing and challenging each others' thinking.</li> <li>• Group arrangements and the materials needed</li> </ul> <p><i>Planning for the Summarize</i></p> <ul style="list-style-type: none"> <li>• Methods to use student strategies, both anticipated and unanticipated, in the summary</li> <li>• Alternative plans to use if anticipated strategies did not surface and promote the mathematical goals</li> </ul>	<ul style="list-style-type: none"> <li>• Note the level of participation of each student</li> <li>• Observe student interactions with each other</li> <li>• Listen carefully to what students are saying</li> </ul>	<ul style="list-style-type: none"> <li>• Encourage students to share thinking with each other and strategies to expand their understandings</li> <li>• Increase the demand of the questions by extending student thinking</li> </ul> <p><i>Planning for the Summarize</i></p> <ul style="list-style-type: none"> <li>• Prepare discussion topics and questions for the summary based on information gathered from students</li> <li>• Decide which strategies will be discussed and in what order and the purpose for each</li> <li>• Anticipate what understandings you want to surface during the summarize and struggles that need to be addressed</li> <li>• Plan strategies to surface the understandings and to address students' struggles</li> </ul>
<b>Summarize</b>	<p>Using the mathematical goal and anticipated information from the Launch and Explore, plan strategies to</p> <p><i>Orchestrating a Discussion</i></p> <ul style="list-style-type: none"> <li>• Sequence student thinking that will promote the mathematical goal</li> <li>• Make connections that occur across and among strategies and mathematical ideas</li> <li>• Connect students new understandings to prior understandings</li> <li>• Gather the status of students' understanding</li> </ul>	<p>Using the mathematical goal, your plans, and the evidence from the Explore,</p> <ul style="list-style-type: none"> <li>• Encourage students to share their thinking and solution strategies that they used to make sense of the problem</li> <li>• Challenge students to justify their solution strategies</li> <li>• Promote students to question and make sense of other ideas</li> <li>• Determine how individual students are making sense of the mathematics and progress toward the mathematical goals</li> </ul>	<p>Using the mathematical goal and the emerging evidence from the Summarize</p> <p><i>Orchestrating a Discussion</i></p> <ul style="list-style-type: none"> <li>• Question students or provide additional tasks to check for understanding</li> <li>• Challenge students to make connections between their strategies and thinking</li> <li>• Encourage students to question each other and to summarize other students' thinking</li> <li>• Use student thinking to draw conclusions about the mathematical understandings</li> </ul>

(continued from page P2-109)

	<b>Anticipating Student Thinking</b> <i>Setting Up a Plan</i>	<b>Gathering and Analyzing Evidence</b> <i>Making Sense of What Students Know</i>	<b>Adapting Based on Student Thinking</b> <i>Acting on the Evidence</i>
	<i>Reflecting on Student Learning</i> <ul style="list-style-type: none"><li>• Decide what evidence is needed that shows students have understood the mathematical goal of the lesson</li></ul>		<ul style="list-style-type: none"><li>• Insert methods to surface important strategies and representations that did not surface during the Explore or Summarize</li><li>• Make decisions about pacing</li><li>• Determine which students may need additional support moving forward</li><li>• Promote students' self awareness of their learning progress</li><li>• Connect the problem to past and future problems and investigations</li></ul> <i>Reflecting on Student Learning</i> <ul style="list-style-type: none"><li>• What evidence is there that students understand the goal(s) of the lesson?</li><li>• Where did they struggle?</li><li>• What strategies did they use?</li><li>• What level of abstraction did each student obtain?</li><li>• How will the outcomes of the student discussion inform my plans for tomorrow? Or the next time I teach this lesson?</li><li>• Where will these ideas be reinforced in the remainder of the unit? The next unit?</li></ul>

# Examples of Grading from CMP Classroom Teachers

The multidimensional assessment in CMP provides opportunities to collect broad and rich information about students' knowledge. Teachers face the challenge of converting some of this information into a grade to communicate a level of achievement to both students and families. The daily problems should be seen as the time to learn and practice mathematical concepts and skills. The following assessment items offer teachers an opportunity to assign grades: ACE, Checkups, Partner Quizzes, Unit Tests, and Self-Assessments. The use of these assessments for grading and the value assigned to them vary from teacher to teacher. Some teachers also choose to grade class participation.

Two teachers' grading schemes for their CMP mathematics classes follow. These are given as examples of possible grading schemes. Note that each of these teachers has made independent decisions about how best to use the assessment tools in CMP for grading purposes.

## Example 1: Ms. Jones's Grading System

- **Participation** I try to take several things into account when grading students in mathematics class. I work to build a learning community where everyone feels free to voice their thoughts so that we can make sense of the mathematics together. I try very hard to assess and grade only those things that we value in the classroom.

Because participating in discussions and activities is so important in helping the students make sense of the mathematics, this is one part of the students' grades. They rate themselves at the end of each week on how well they participated throughout the week. Below is a sample of the grading sheet they fill out. The participation grade counts as 10% of their total mathematics grade.

### Participation Grading Sheet

Name \_\_\_\_\_  
Week of \_\_\_\_\_

We have completed almost a full week of math class. Think about how well you participated in class this week.

1. Answer the following questions; they will help you give yourself a fair participation grade for this week.

- |  |  |
|--|--|
| <input type="checkbox"/> Did you participate in the discussion?  | <input type="checkbox"/> Did you ask questions when you didn't understand? |
| <input type="checkbox"/> Did you come prepared to class, having done your ACE, so that you could ask question? | <input type="checkbox"/> Did you LISTEN carefully to others?               |

2. Now count your "yes" responses.

If you answered "yes" to all of them, HOORAY for you!  
You are doing a great job. Give yourself a 5.

If you answered "yes" to most of them, give yourself a 4.

If you answered "yes" to a couple of them, give yourself a 3.

If you answered "no" several of these, give yourself a 2,  
and rethink your role in this class or talk to your teacher.

3. I grade myself a \_\_\_\_\_ for this week. Signature \_\_\_\_\_



- Student notebook ideas become clear when we talk about them and when we write about them. Because I feel it is very important to be able to communicate mathematically in writing, students' journals also figure into their grade. We use the journals for problem solving, communicating what they do and do not understand, and reflecting on each investigation to summarize the ideas. I try to collect them at least once every two weeks so I remain in constant communication with each student. The journal grade counts as 10% of their total grade. I use the following rubric to grade journals.

### Notebook Grading Sheet

#### You will earn a 5, if:

- You effectively communicate your thoughts.
- You use appropriate vocabulary.
- You use a variety of strategies to solve problems.
- You write as if you are talking about mathematics.
- Your notebook is well organized, and entries are labeled and dated.

#### You will earn a 4, if:

- You are effective in communicating your thoughts most of the time.
- You use some appropriate vocabulary.
- You use some different strategies when solving problems.
- Your notebook is fairly well organized, and most entries are labeled and dated.

#### You will earn a 3, if:

- You attempt to communicate your thoughts but your entries are hard to follow at times; be sure to write ALL that you know.
- You use some appropriate vocabulary but need to use more.
- You need to work on using a variety of strategies to solve problems.
- Your notebook is not organized with the entries labeled and dated.

#### You will earn a 2, if:

- Please see me.

#### Dated Graded

#### Grade Recieved

---

---

---



---

---

---

- **ACE** The curriculum is problem-centered. This means that the students will investigate mathematical ideas within the context of a realistic problem, as opposed to looking only at numbers. Students spend much of each class period working with a partner or in a small group trying to make sense of a problem. We then summarize the investigation with a whole-class discussion. The ACE assigned offer students an opportunity to practice those ideas alone and to think about them in more depth. They provide students the opportunity to assess their own understanding. It also allows me to see what students are struggling with and making sense of. Homework assignment grades count as 10% of their total grade.
- **Checkups** Checkups are completed independently. These offer an opportunity for me to get an idea of what students understand about the big ideas of the unit so far. Checkup grades will count as 20%
- **Partner Quizzes** All of the quizzes from CMP are done with a partner. Because a lot of what we do in class is done with others, I want to assess students "putting their heads together," as well. Again, I try to grade what I value, which is working together. Quiz grades count as 20% of their total grade.



**Unit Test (final assessments)** At the end of each unit, an individual Unit Test assessment is given. These serve as an opportunity for students to show what they, as individuals, have learned from the whole unit. Test grades count as 30% of their total grade, as they are a culmination of the whole unit.

- Grading Summary
  - o Participation ..... 10%
  - o Notebook ..... 10%
  - o ACE ..... 10%
  - o Checkups ..... 20%
  - o Partner Quizzes ..... 20%
  - o Tests ..... 30%

### Example 2: Mr. Smith's Grading Scheme

#### NOTEBOOK (Part of the Notebook)

Collect student journals once a week.

##### Scoring Rubric for JOURNALS

- 5** Work for all Investigation problems (done in class, to date) and Reflections (well labeled and easy to find/follow)
- 4** Most class work and Reflections (well labeled and easy to find/follow)
- 3** Some missing class work or Reflections (not well labeled or easy to find/follow)

**Below a 3** is not acceptable. Students have to come in at lunch or after school and meet with me and work on their journal until it is at least level 3.

#### Participation

Participation means questioning, listening, and offering ideas. Students are given a participation grading sheet every Monday, to be handed in on Friday. Students fill these out throughout the week, giving evidence of their participation in the class. On the sheets they are to note when and how they contribute to class discussion and when they use an idea from class discussion to revise their work or their thinking.

##### Scoring Rubric for PARTICIPATION

- 5** Student has made an extra effort to participate and help others in the class to understand the mathematics. Student gave evidence of participating all 5 days of the week.
- 4** Student made an effort to participate, giving evidence of at least 4 days of participation for the week.
- 3** Student made some effort to participate, giving evidence of at least 3 days of class participation for the week.

**Below a 3** is not acceptable. I talk with student about his or her lack of effort. If no improvement is seen in the next week, a parent or guardian is called and informed of the problem.

#### ACE (selected ACE exercises)

In class, before homework is checked or collected, students are given the opportunity to ask questions about the assignment. I do not give answers or tell how to solve the exercise but, with the class's help, work with students to help them understand what the exercise is asking. Students have the right to revise any of their work while this conversation is going on and not be marked down. Grading is strict on this work because students have the opportunity to take care of it themselves and get help.

##### Scoring Rubric for HOMEWORK

- ✓+ Close to perfect
- ✓ All problems attempted, most work done correctly
- ✓- Most problems attempted, some given answers wrong or incomplete
- ✓-- Not much work, most work wrong or incomplete
- 0 No work

#### Checkups, Partner Quizzes, and Unit Tests

With partner quizzes, only the revised paper (the one turned in the second time) is scored for a grade.

##### Scoring Rubric for Checkups, Partner Quizzes, and Unit Tests

Each assessment has its own point-marking scheme devised by me. Points are determined by the amount of work asked for to solve each problem. Not all problems are awarded the same number of points.

#### Assigning grades to numbers and checks

- 5's and ✓+ = A
- 4's and ✓ = B
- 3's and ✓- = C
- 2's and ✓-- = D
- 1's and 0's = E