CCSSM Curriculum Analysis Tool 3 (Overarching Considerations)

This tool should be used after reviewing mathematics curriculum materials using Tool 1 (Content Analysis) and Tool 2 (Mathematical Practices Analysis). After reviewing the curriculum materials carefully, answer the questions below reflecting important overarching considerations with regard to the materials. Overarching considerations are those that support the teaching of Mathematics Core Content and Practices. **Equity:** NCTM (1991) calls for teachers to build on how students’ linguistic, ethnic, racial, gender, and socioeconomic backgrounds influence their learning; to help students to become aware of the role of mathematics in society and culture; to expose students to the contributions of various cultures to the advancement of mathematics; and to show students how mathematics relates to other subjects; and to provide students with opportunities to apply mathematics to authentic contexts. CCSSM also notes that, “The Standards should be read as allowing for the widest possible range of students to participate fully from the outset, along with appropriate accommodations to ensure maximum participation of students with special education needs.” **Formative Assessment** is a critical part of classroom instruction, and curriculum materials can provide a variety of levels of support with regard to information to teachers about student learning. Finally, the increasing availability of technology offers opportunities to use technology mindfully in ways that enable students to explore and deepen their understanding of mathematical concepts.

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<th>Name of Curriculum Materials</th>
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**Rubric for answering questions about Overarching Considerations:**
- Not Found (N) - The curriculum materials do not support this element.
- Low (L) - The curriculum materials contain limited support for this element, but the support is not embedded or consistently present within or across grades.
- Medium (M) - The curriculum materials contain support for this element, but it is not always embedded or consistently present within or across grades.
- High (H) - The curriculum materials contain embedded support for this element so that it is consistently present within and across grades.

**Questions about Overarching Considerations**

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<th>See Rubric</th>
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**To what extent do the materials:**

1. **Provide teachers with strategies for meeting the needs of a range of learners?**

   A *Math Trailblazers®* classroom includes high-quality and interesting mathematics instruction for all learners based on the belief that all students deserve a rich and challenging math curriculum. High expectations and strong support for students and teachers allows a wide range of learners to access the rigorous mathematics in MTB4.

   The curriculum allows students to develop deep insights into important concepts instead of experiencing a more cursory treatment of a broader range of topics. It avoids instruction that forces over-reliance of memorization and instead emphasizes conceptual understanding.
understanding. Attention is drawn to tools within the curriculum that can assist learners to develop the needed conceptual understanding of the operations in order to gain fluency with the procedures. The lessons are intentionally designed and organized to clearly focus on the content, the process, and the products so students develop understanding of the key concepts, principles, skills, and facts of math. This intentional attention to conceptual development of mathematical concepts and careful attention to the sequence and organization of the curriculum supports all students as they learn.

The authentic tasks within Math Trailblazers® lessons are challenging, and involve problem solving and reasoning that is appropriate for all learners. Helping students access math in varied ways, building on prior math knowledge, making connections across math topics, moving from concrete to representational to abstract, using multiple representations, providing many examples, offering manipulatives, attempting new strategies, and communicating solution tasks can increase accessibility for some students, and motivate and challenge all learners.

Incorporated into the 4th Edition are new and even more explicit strategies and tools to address diverse learning and to assist teachers with the task of differentiating their instruction. One such tool is the point-of-use Meeting Individual Needs boxes within the lessons that offer ways of dealing with misconceptions and varying student needs, including challenges for students who are ready to advance. A variety of instructional approaches are used in each lesson including using multiple representations, a range of questions, models, sample student work, frequent embedded checks for understanding, flexible grouping, targeted practice, and differentiated practice in Workshops to reach a vast range of learners.

Math Trailblazers® 4th Edition helps teachers meet the needs of a range of learners by incorporating most of these features daily in lessons:

- Hands-on, concept-based instruction serves to provide access and motivation to all students.
- Rich problems add meaningful context that helps students make sense of the mathematics, build upon their prior knowledge, and judge the reasonableness of their answers.
- Challenging reasoning and problem-solving tasks are solved
using a range of strategies that allows more advanced thinkers to use more sophisticated strategies.

- Authentic tasks develop mathematical abstract reasoning, develop metacognitive skills, and increase motivation and interest in mathematics as students do the work of real mathematicians.
- Engaging student materials include clear tutorials, extensive glossaries, and helpful reference sections designed to support student learning.
- Strategies and representations are presented with clear and explanatory visuals in helpful ways that are not distracting to students.
- Interactive digital components have animated diagrams and examples, step-by-step problem-solving tutorials, and enhanced Adventure Stories with “read-to-me” options.
- Hands-on, concept-based instruction serves to provide access and motivation to all students.
- An engaging, problem-solving focus allows students to find alternative strategies and approaches that work best for them. Students are able to access problems differently, and use a variety of strategies for doing computation. The introduction of more than one valid procedure for each arithmetic operation offers students alternative options that align better with their learning strengths.
- Extensive and ongoing use of multiple representations of arithmetic operations such as manipulatives, pictures, models, and other visual representations support students by providing different entry points for understanding the operations.
- Communication of mathematical ideas using different representations helps students understand and retain concepts when they rephrase problems in their own words, communicate their solution strategies, and summarize what others have reported. Connections to literature, problems that involve everyday life, and opportunities to read, write, and communicate about problems provide meaningful access to rigorous mathematics.
- Carefully selected homework tasks with instructions to families, Letters Home, and access to online tools, reference sections, and glossaries provide support to students and families.
2. Provide instructional support to help teachers sequence or scaffold lessons so that students move from what they know to what they do not know?

Informed by more than 25 years of research about student learning, MTB4’s inquiry-based program provides students with the time and opportunities to study mathematics in a powerful way. The materials provide support for teachers through every phase of the instructional process: planning (e.g., Assessment in this Unit, Key Assessment Opportunities Chart), implementing (e.g., ongoing assessment, feedback, and meeting individual needs) and responding (e.g., targeted practice).

One of the goals of good instruction is for students to reveal what they know and what they need. MTB4 builds on students’ own conceptions and ideas, and allows teachers to observe students’ understanding and misconceptions so they can advance students in their learning. The importance of developing a strong conceptual foundation is emphasized in research that guided the development of Math Trailblazers®. There is a careful, deliberate, and progressive development of ideas within each grade. Major topics are linked between grades, and major content is developed over time.

Math Trailblazers® deliberate progression in conceptual development, purposeful use of representation, and explicit instruction about making connections among representations exists to help teachers analyze developing mathematicians. The carefully engineered structure and questioning in MTB4 lessons are designed to show teachers where students are and where they need to go. Lessons often start with a problem to assess students’ prior knowledge, and all lessons include a Summarizing the Lesson session to get a feel where students are in the learning process before the next lesson begins. Lessons are structured so that students are asked to grapple with, represent, and justify their own thinking and reasoning. This solid conceptual foundation gives students a deeper understanding of the mathematics, and the power to develop fluency with the procedures and think flexibly and strategically about mathematics. This structure enables teacher to observe how students are thinking, and to understand where they need support and where they need challenge to become mathematically proficient.

MTB4’s new formative assessment system helps teachers make instructional decisions to ensure that all students grasp important concepts and are challenged to move forward. Embedded assessment opportunities are regular and consistent so needed individualization can be implemented to support each child in his or her mathematical
Well-defined assessment tasks are frequently presented throughout the program within Check-In and Self-Check Questions to help teachers assess students’ knowledge and adjust instruction to meet their students’ needs. Summative assessments such as quizzes and tests are also included. Ongoing Assessment Boxes cue teachers to assessment opportunities, and include learning performance descriptors called Expectations. Teachers can use these Expectations to measure what students know and are able to do.

To help teachers move students advance in their learning, MTB4 provides useful tools for recording, monitoring, and assessing student progress. Assessment in this Unit documentation.

3. Provide opportunities for teachers to use a variety of grouping strategies?

MTB4 incorporates a balance of whole class instruction, varied small group work, and individual work to promote understanding through discourse with props, collaborative work, and communication. There is time for independent practice, group work in labs and activities, partner work for games, and both independent and collaborative work during Workshops. As students work collaboratively with a partner or in small groups, they have opportunities to communicate about mathematics. Students learn from and help each other as they struggle to find solution paths, explain solutions, critique the work of others, and settle differences—mirroring the work of real mathematicians. To help teachers provide effective working arrangements, there are suggestions for ways to effectively group students in the lessons:

- Small groups of 2, 3, or 4 students
- Pair sharing
- Names picked randomly
- Partners chosen by students
- Groups based on how students work best
- Groups assigned by ability

While whole-class instruction and working individually are not often considered grouping strategies, both are appropriate and essential in learning mathematics. Whole class instruction is generally used in MTB4 lessons when explaining the day’s problem, introducing a new manipulative or tool, correcting a common mistake, or summarizing a lesson. Whole-group instruction is brief, focused, and the information
applies to all students. There is time for students to work individually, too. Working alone is powerful and effective as well. Giving students time to reflect and record their strategies before joining the group increases participation and helps students assess their own needs.

A Math Trailblazers® classroom might use the following different student groupings for effective instruction:

- Students work independently, giving each child a chance to think through a question and come up with a way to problem solve.
- Students turn to a partner to rehearse their answers or to make their answers more complete.
- Students work in groups to complete a task. They share ideas, responsibilities, and materials. These tasks would be difficult to complete independently.
- Students work as a whole class evaluating peer problem-solving strategies or receiving direction from the teacher.

Teachers have many opportunities to use a variety of grouping strategies during Workshops. In these lessons, students identify their level of confidence with a particular concept and choose problems from a Workshop Menu. Teachers organize the class into partners, small groups, or stations based on the problems students choose from the menu. Students can check each other’s work and discuss solutions. The groups are flexible and students may work with different groups or partners as the Workshop progresses.

MTB4 excels at providing students with rich problems worth solving that involve both mathematical understanding and procedural skill. These high-quality tasks engage students in strategic problem solving, reasoning, modeling, and making sense of mathematics as core instructional activities rather than special features of a lesson. They are integrally interwoven throughout the lessons, in every grade, throughout the entire curriculum, and are not problems scattered here and there, or tacked onto a set of exercises as an afterthought. These interesting problems permit multiple entry points and approaches to address a variety of learners, allow multiple solution strategies, and effectively address the learning goals of the lessons.

Extensive and ongoing use of multiple representations of arithmetic operations such as manipulatives, pictures, models, and

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other visual representations support students by providing different entry points for understanding the operations. Students are explicitly asked to use tools and a variety of representations. Students learn when and how to use these tools to discover what’s most efficient for them and which tools and representations work for different problems. They are routinely asked to make connections between representations.

One particularly effective tool is MTB4’s Strategies Menus. Students design and routinely use addition, subtraction, multiplication, and division Strategy Menus. There are also menus for operations with fractions. This encourages and supports the use of a variety of solution strategies and representations.

5. Suggest accommodations and modifications for English language learners that will support their regular and active participation in learning mathematics?

Engaging, highly visual student materials include clear tutorials, extensive glossaries, and helpful reference sections designed to support student learning. Strategies and representations are presented with clear and explanatory visuals in helpful ways that are not distracting to students. Interactive digital components have animated diagrams and examples, step-by-step problem-solving tutorials with coaches, and enhanced Adventure Stories with “read-to-me” options.
MTB4’s hands-on, concept-based instruction serves to provide access and motivation to all students. Extensive and ongoing use of multiple representations of arithmetic operations such as manipulatives, pictures, models, and other visual representations support students by providing different entry points for understanding the operations.

**Example:**

\[
\begin{array}{c|c|c}
\text{Number sentence} & 67 & 88 \\
\hline
= \text{equal to} \\
< \text{less than} \\
> \text{greater than}
\end{array}
\]
6. Provide opportunities to use reading, writing, and speaking in mathematics lessons.

**Reading and Writing.** The print consumable *Student Activity Book* gives students the lesson text, opportunities for individual and group work, problems, examples, diagrams, assessment questions, targeted practice, references, and a glossary as well as space in which to record their written work. Students are regularly asked to *show their work and explain their thinking*. They also have opportunities to provide written feedback to each other in Student-to-Student Feedback Boxes.

The students' print text *Student Guide* contains opportunities for individual and group work, problems, examples, diagrams, assessment questions, targeted practice, references, and a glossary.

Interesting, illustrated *Adventure Stories* and children’s literature appear throughout the curriculum to introduce and highlight mathematical concepts. These stories are designed to captivate students’ interest and imaginations in a thought-provoking, entertaining medium students do not typically associate with learning mathematics while illuminating real-world (and some silly) mathematical contexts.

Math Trailblazers also includes a framework, the *Math Practices*, that set expectations for problem solving but also communicating their ideas in writing.

**Communication and Discussion.** In order to connect content and practices, students need opportunities to talk about their strategies as well as time to listen to the solution strategies of others. The discussions need to be strategic and purposeful. To increase participation during classroom discussions, *Math Trailblazers*® lessons create a balance between whole-class discussions, small-group discussions, and partner talk.

The extensive whole-class *discussion prompts* in *Math Trailblazers*® are not designed for simply delivering information or quizzing students. Rather, they help the teacher get students to share their thinking, explain their reasoning, and build on one another’s thoughts and strategies. Whole-class discussions give students the
opportunity to participate in sustained reasoning. The teacher's focus is not on providing answers, but on facilitating, guiding, and engaging students' thinking. Whole-class discussions provide students with the practice in mathematical reasoning that will further their mathematical learning.

In small-group discussions within the Math Trailblazers® classroom, the teacher typically poses a question or a problem that students discuss in a small group. In this format, the teacher circulates among the groups. The teacher does not guide or control the discussion, but listens to the discussion and at times asks clarifying questions or questions to extend the discussion.

Partner talk is similar to small-group discussion except that after a question is posed, students spend a short time sharing their thoughts with their neighbor or with a specific partner. These discussions are typically very short and very targeted. The goal is to provide opportunities for students who may be more hesitant to share their thinking. In a Math Trailblazers® classroom, partner talk is often used as a vehicle for getting ready for a whole-group discussion.

Classrooms are growing more diverse. Students have familial ties to other nations, speak different languages, carry different strengths and challenges, and have unique cultural traditions and family structures. The MTB4 classroom is one in which teachers are encouraged to draw upon students' home languages, cultures, and experiences to facilitate and enrich learning. Everyone has something to share in an MTB4 lesson.

In order to connect content and practices, students in an MTB4 classroom need opportunities to talk about their strategies as well as time to listen to the solution strategies of others. Multiple approaches, strategies, and methods of computation are encouraged. Discussion of a solution discovered “at the kitchen table” is embraced. Prompts help teachers establish and maintain a respectful, supportive environment focused on mathematics. There is time to provide equitable participation so that students can share their prior knowledge, understanding, and experiences.
8. Encourage teachers to draw on multiple resources such as objects, drawings, and graphs to facilitate learning?

MTB4 excels in encouraging the use of multiple representations to facilitate learning in meaningful ways. The authentic tasks within Math Trailblazers® lessons are challenging, and involve problem solving and reasoning that is appropriate for all learners. Helping students access math in varied ways, building on prior math knowledge, making connections across math topics, moving from concrete to representational to abstract, using multiple representations, providing many examples, offering manipulatives, attempting new strategies, and communicating solution tasks can increase accessibility for some students, and motivate and challenge all learners.

Students use **multiple representations** (e.g., objects, graphs, tables, pictures, and equations) to describe and analyze mathematical situations, allowing them to access the mathematics, apply conceptual understanding, and develop problem solving strategies. The contexts for solving problems help the students in Math Trailblazers® classrooms model real world situations and learn to use and apply mathematics in meaningful ways.

9. Draw upon students’ personal experiences to facilitate learning?

Based on meaningful, real-world, problem-centered exercises, the program is designed to create an educational experience resulting in students who think flexibly about mathematics, see connections between the mathematics they learn in school and their everyday life experiences, enjoy mathematics, and have the critical-thinking and problem-solving skills required for future success. Carefully designed lessons and prompts in the Teacher Guide were
Nicholas solved the problem in Question 8 by thinking about money.

0.75 is like 75¢. Adding 0.47 is like adding 50¢, only 3 pennies less. That comes out to $1.25 minus 3¢, or $1.22. The answer is 1.22.

A Math Trailblazers® classroom is filled with communication, activity, excitement, discovery, and engaged students. Lessons in a Math Trailblazers® classroom are engineered to give students the opportunity to reveal what they know and what they need to facilitate learning. MTB4 was written with students in mind – what is interesting, meaningful, powerful, engaging, and worthwhile to children? The problems are fun, memorable, and worth solving with real context that interests students. Students are regularly encouraged share their personal experiences, opinions, and ideas, communicate about solutions and strategies, apply the math they know to solve problems, practice skills and procedures, and critique and revise work as the fictional characters in the text do the same.

10. Provide opportunities for teacher and students to connect mathematics to other subject areas?

| Math Trailblazers® real-world contexts, laboratory method, and Adventure Stories give teachers and students the unique opportunity to connect mathematics to reading, social studies, language arts, and science. These supportive secondary stories provide other contexts for major clusters of mathematics, and are consciously placed to help young mathematicians access and understand these critical areas of study. Opportunities to connect mathematics to other subject areas helps to elicit prior knowledge and to better reveal students’ understanding.

A unique component of Math Trailblazers® is the use of a TIMS (Teaching Integrated Math and Science) laboratory method that helps students build and analyze mathematical models of authentic situations, providing opportunities to reason quantitatively, construct viable arguments, attend to precision, and persevere as problem solvers. Students use multiple representations (e.g., objects, graphs, tables, pictures, and equations) to describe and analyze the mathematical situation, allowing them to access the mathematics, apply conceptual understanding, and develop problem solving strategies. The contexts for solving
problems help the students learn to use mathematics in meaningful ways.

**Adventure Stories** often involve exciting contexts that include a variety of geographical regions and global cultures. Contributions from diverse societies, cultures, and civilizations are highlighted in these illustrated stories to introduce mathematical concepts. For example, students are introduced to ancient Chinese number puzzles called Magic Squares to develop problem-solving skills and addition strategies in *Yu the Great: A Chinese Legend*. In *Phil and Howard’s Excellent Egyptian Adventure*, two boys learn about an ancient Egyptian multiplication strategy. Students review representations and partitioning of numbers, place value, regrouping, and multidigit addition and subtraction strategies as they learn about the life and discoveries of the famous Italian mathematician, Leonardo Fibonacci, in the story *Leonardo the Traveler*. In *Peanut Soup*, George Washington Carver and his students plan a luncheon where they use fractions to convert recipes to the needed size. In the story *A Matter of Survival*, students are transported to the rain forest and introduced to population sampling. Later in fifth grade, students use connections between ratios, proportions, and graphing as they read *Bats*, set at Bandelier National Monument in New Mexico.

Essential and recommended literature lists also provide meaningful and interesting connections between math, reading, and language arts.

11. Provide both individual and collective opportunities for students to learn using mathematical tasks with a range of challenge?

Students have frequent opportunities to work both individually and collectively on tasks with a range of challenge. Some *Math Trailblazers®* activities are specifically designed to provide students with focused intervention, or targeted practice. Teachers are cued to these opportunities in the Teacher Guide. There is a list of **Targeted Practice** exercises in every unit and there are directions for this practice in Ongoing Assessment boxes. Workshop implementation is clearly described in Grades 1-5 Teacher Guides.

In **Workshops**, independent practice is individualized to
reteach, practice, or challenge individual students. Students and Teachers review student work from Self-Check Questions and previous lessons to guide instructional decisions about their progress toward specific Expectations. Students identify their level of confidence with a particular concept and choose problems from a Workshop Menu. Students in the class can be organized into partners, small groups, or stations based on the level of challenge in the problems they choose from the menu. Students can work collectively and check work and discuss solutions. The groups can be flexible if a student decides he or she needs to work on more or less challenging tasks. Some of the activities in the Workshops can be done individually, too.

Games and labs incorporate a variety of strategies to address varying needs and provide another source of motivation or practice that can be used effectively with all students. Variations of games help address a variety of players’ needs.

Work Stations for kindergarteners offer additional opportunities to gain independence and practice skills and concepts explored as a class. These targeted and differentiated practice activities are included in every unit. Targeted practice is described in Work Station boxes in the Teacher Resource Guides in Kindergarten.

To help guide instructional decisions, embedded assessment opportunities are regular, consistent, and clearly indicated so individualization can be easily implemented to support each child in his or her mathematical development.

Some Math Trailblazers® activities, such as Workshops, and Daily Practice and Problems Challenge problems are specifically designed to support students who are ready for a challenge. These opportunities are clearly pointed out to teachers in point-of-use Meeting Individual Needs boxes within the lessons, in Workshop Menus, and in DPPs. Games and labs incorporate a variety of strategies to address varying needs and provide another source of motivation or practice that can be used effectively with all students. Explicit variations for games are listed within the directions.
MTB4 lessons are comprised of rich problems that involve both mathematical understanding and procedural skill. These high-quality tasks engage students in strategic problem solving, reasoning, modeling, and making sense of mathematics. These interesting problems permit multiple entry points and approaches to address a variety of learners (including enrichment for advanced students), allow multiple solution strategies, and effectively address the learning goals of the lessons. Challenging reasoning and problem-solving tasks are solved using a range of strategies that allows more advanced thinkers to use more sophisticated strategies. Authentic tasks develop mathematical abstract reasoning, develop metacognitive skills, and increase motivation and interest in mathematics as students do the work of real mathematicians. MTB4 lessons and Workshops intentionally include more problems than the average students will complete so that teachers are not required to create extra work for high-achieving students.
13. Provide a balanced portrayal of various demographic and personal characteristics?

Math Trailblazers® curriculum has always placed importance on providing a balanced portrayal of various demographic and personal characteristics. The materials promote equity by portraying a diverse population of students in several fictional classrooms. Colorful and stimulating pages are filled with students of various demographics, personal characteristics, and special strengths. Math Trailblazers® students learn and grow with these characters. The characters share their unique experiences, struggles, strengths, insights, strategies, and solutions throughout the curriculum. Many of these characters are introduced in kindergarten. They reappear and grow as students grow throughout their elementary grades. These characters are not special. Rather they are all simply important members of an elementary classroom, with different opinions and perspectives to contribute, just as in real life. Math Trailblazers® succeeds in engaging and appealing to a multitude of students by incorporating interesting and varied contexts.

Assessment

14. Provide strategies for gathering information about students’ prior knowledge and background?

MTB4’s formative assessment system and lesson design helps teachers understand what students know and what they need to know. Since these assessment opportunities are close to instruction and provide a clear purpose and direction, the tasks can assess multiple expectations in more detail but also provide teachers with reliable and valid information needed to re-engage students and respond to their needs.

Check-In and Self-Check Questions are regularly included within assigned student work and help teachers answer questions about whole-class instruction: What do I do next? In the next minute? Next lesson? Next class? Next unit? Discussion prompts are engineered to help teachers ask the right questions to elicit prior knowledge so that they can then decide how to support individual students, including those who struggle with a concept and those who are ready to be challenged.

The explicit Expectations and assessment tasks in each unit describe what it means to “get it.” Providing feedback on these Expectations helps identify students who need to
15. Provide strategies for teachers to identify common student errors and misconceptions?

- **What do you notice about the denominators of these fractions?** (They are different from each other.)
- **What does it mean when two fractions have different denominators?** (Possible response: It means the unit whole is divided into different-sized pieces for each fraction.)
- **When fractions have unlike denominators, how does it affect the way you add or subtract them?** (We can’t just add or subtract the numerators since each fraction is made from different-sized divisions of the unit whole.)
- **Estimate about where each of these fractions is on the number line and explain why you think so.** (Possible response: \( \frac{7}{8} \) is the same as \( \frac{7}{2} \) and \( \frac{7}{4} \) is between \( \frac{1}{4} \) and \( \frac{1}{2} \); closer to \( \frac{1}{2} \).)
- **Is the difference going to be greater than or less than \( \frac{1}{2} \)?** (close to 0)
- **How can you use the number line to estimate the difference?** (Possible response: I consider the lengths of \( \frac{1}{4} \) and \( \frac{1}{2} \); I think \( \frac{1}{4} \) minus \( \frac{1}{2} \) with \( \frac{1}{2} \) being a little less than \( \frac{1}{2} \). So I have a difference that is close to 0.) [See Figure 2.]

The **discussion prompts** and in **Math Trailblazers®** include possible **student responses** and lines of questions designed to illustrate and draw teachers’ attention to common student errors and misconceptions. **Sample Dialog** boxes throughout the curriculum also explicitly attend to misconceptions. Within the student materials, students and teachers are given opportunities to explore and correct errors through the misconceptions teased-out by the fictional students and by evaluating sample student work. **Content Notes** offer teachers support and more in-depth descriptions of the content, often highlighting areas of misconception.
Assess students at a variety of knowledge levels (e.g., memorization, understanding, reasoning, problem solving)?

Math Trailblazers® assessment system is a complete and balanced program that assesses students at a variety of knowledge levels through a wide range of tasks. Each MTB4 unit is organized around a set of learning performance descriptors called Expectations that are aligned to the Common Core Standards for Mathematics. Opportunities for assessment are listed in each unit in the Key Assessment Opportunities Chart. Expectations related to mathematical Content, Math Practices, and Math Facts are described in the KAOC. Each lesson’s Assessment in this Lesson describes the assessments. There is minimally one assessment opportunity per lesson, and more often several assessment opportunities per lesson. These include a variety of embedded formative assessment and summative assessment tasks.

MTB4 problems and tasks assess students’ understanding of mathematical concepts. Many assess students’ abilities to reason and apply problem solving skills. Students use the Math Practices Expectations on the Math Practices page in the Student Guide Reference section to help them focus on practices related to both problem solving and communication. Students become more comfortable with these Expectations by reviewing them before, during, and after solving a problem and by deciding how well they are met in their work and the work of others. Students communicate their mathematical understanding through demonstration, discussion, and their writing. Students also self-assess, and critique and explain the work of others.

Students’ math facts proficiency is regularly assessed in short Daily Practice and Problem assessments. Quizzes are given on small sets of related facts.

Summative quizzes, and Mid-Year and End-of-Year cumulative tests are available and designed to evaluate progress and growth of the major work for the grade level.
17. Encourage students to monitor their own progress?

Self-Check Questions give students an opportunity to assess their own comfort-level with a topic. These are frequently accompanied by Workshops that include choices for practice opportunities and games, which are designed to help students reflect on their current level understanding and mastery.

Strategy Menus for all of the operations, math facts, and operations with fractions, help students pick strategies that are right for them. The consistent use and development of these menus within and between grades helps students track and reflect on their own growth as they progress to choosing more efficient strategies.

Students keep track of their own mastery of the Math Facts (addition, subtraction, multiplication, and division) with Facts I Know charts.
18. Provide opportunities for ongoing review and practice with feedback related to learning concepts, and skills?

Assessment in MTB4 is frequent and the tasks are carefully chosen so that teachers are able to see what kind of review and practice students need. There are more opportunities and time for practice within each unit. There has been substantial revision of the whole number strand in all grade levels, incorporating explicit instruction with mental math strategies and better support and rationale given for multiple strategies. There is more attention given to the development of flexible and strategic thinking, and helpful Strategy Menus in Grades 1–5 for students, teachers, and families to aid in this process. *Math Trailblazers® 4th Edition* includes both practice connected directly to the content of the lesson and distributive practice in the form of **Daily Practice and Problems** and **Home Practice**. There is more time allocated for **in-class practice** and there is **Homework** for Grades 1-5.

*Math Trailblazers®* approaches math facts in a conceptual and systematic way, and provides explicit support and instruction with the strategies that develop math facts and whole number operations. Students first approach basic facts as problems to be solved using and developing strategies. Students then practice these facts in small groups organized by strategy with **Daily Practice and Problems** in Grades K–5 and **Home Practice** in Grades 1–5. As students become proficient with these strategies, they become fluent with the math facts.
Feedback Boxes are provided with several activities in every unit to report progress toward the Expectations.

Every unit provides opportunities for additional targeted practice for some of the Expectations. These opportunities connect directly to assessment tasks so the practice can be tailored to the current level of student progress. For students who are struggling with the Expectation, practice is targeted toward the foundational concepts and skills involved and often provides a different way to access the content. For students who are making significant progress toward the Expectation, practice is designed to help move toward proficiency and autonomy. For students who are already meeting the Expectation, opportunities are provided to deepen or extend understanding.

Studies have shown that assessment is most valid closest to instruction. MTB4’s formative embedded assessment system is designed to reflect how students learn and inform the ongoing learning process (Shepard, 2000; Pellegrino, 2007). It is designed to give teachers better information about where they are going, what students know, and how to make instructional decisions to meet students’ needs at crucial times. In addition, MTB4’s assessment system clearly communicates the goals of instruction to parents and students, and provides feedback to students and parents about student progress. There are numerous opportunities for both formal and informal assessment of student learning so that the feedback provided can effectively guide instruction, engage learners in their own learning, and therefor improve learning. MTB4’s balanced assessment system of both formative and summative tasks develops a clear picture of students’ knowledge of standards-based concepts, skills, and practices.

Each MTB4 unit is organized around a set of learning performance descriptors called Expectations that are aligned to the Common Core Standards for Mathematics. These Expectations are also organized by a set of Key Ideas that are based on current thinking in the mathematics education community, e.g., Charles (2005), NCTM (2000), and Van de Walle (2006). Each unit’s assessment opportunities are
listed in the Key Assessment Opportunities Chart. There is minimally one assessment opportunity per lesson, and more often several assessment opportunities per lesson, including mid-year and end-of-year cumulative tests designed to evaluate progress and growth of the major work for the grade level. With 115 first grade, 104 second grade, 95 third grade, 97 fourth grade, and 92 fifth grade lessons, there are abundant assessment opportunities throughout the year. In addition to the regular formative assessment opportunities offered in each lesson, Grade 1 has an end-of-the-year test, and Grades 2–5 have both mid-year and end-of-year cumulative tests designed to evaluate progress and growth of the major work for the grade level.

Well-defined assessment tasks (designed to elicit direct, observable evidence of the degree to which a student can independently demonstrate the targeted Standard) are presented to students within Check-In and Self-Check Questions, quizzes, and mid-year and end-of-year tests. Check-In Questions are regularly included within assigned student work and help teachers answer questions about whole-class instruction. Self-Check Questions help students self-assess and choose individualized practice suited to their needs. Other more formal assessments may help teachers decide how to support individual students, including those who struggle with a concept and those who are ready to be challenged. Since these assessment opportunities are close to instruction and provide a clear purpose and direction, the tasks can assess multiple expectations in more detail but also provide teachers with reliable and valid information needed to re-engage students and respond to their needs.

Additionally, every unit provides opportunities for targeted practice for some of the Expectations. These opportunities connect directly to assessment tasks so the practice can be tailored to the current level of student progress. Much of the targeted practice is in Workshops, which provide a menu of activities that revisit key concepts and skills developed earlier in the unit. The menu describes practice tailored to the needs of individual students for specific Expectations.
Math Trailblazers® was designed to provide teachers with the training and built-in support they require to develop productive formative assessment practices (e.g., anticipation, observation and characterization, feedback, and response or reengagement). MTB4’s improved assessment program reflects these goals as it supports teachers as they transform their instruction to meet new expectations. The teacher materials provide support for teachers through every phase of the formative assessment process: planning (e.g., Assessment in this Unit, Key Assessment Opportunities Chart), implementing (e.g., ongoing assessment, feedback, and meeting individual needs) and responding (e.g., targeted practice).

There are also several tools designed to assist with gathering and organizing data from these assessments. Each assessment task is designed to provide information about student progress on a focused set of unit Expectations, and some tasks include a built in feedback box to provide a more detailed view of student understandings and proficiencies. The Unit Assessment Record, Individual Assessment Records, and Math Facts Class Records also provide teachers with a way to organize and monitor student progress over time.

At the lesson level, the CCSSM Content and Mathematical Practice Standards covered in the lesson are clearly highlighted. The information provided in the Assessment in this Lesson table shows the lesson’s various assessments and the exact Expectations assessed. Within the lesson, Ongoing Assessment Boxes cue teachers to these assessment opportunities and explicitly describe what is expected of students. The assessed Content, Math Facts, and Math Practices Expectations are clearly displayed in these boxes, as are Targeted Practice recommendations to ensure all students grasp important concepts. Information about easy-to-use Feedback Boxes can also be found here. These tools, along with complete and detailed answer keys, assist teachers to interpret student work and efficiently provide frequent and meaningful feedback on individual students' progress.
20. Integrate technology such as interactive tools, virtual manipulatives/objects, and dynamic mathematics software in ways that engage students in the Mathematical Practices?

The student components in Math Trailblazers® are designed to reach all learners and ensure mathematical fluency. A carefully developed combination of print and digital resources offers a flexible approach to learning that extends from the classroom to the home. The digital Student Guides include engaging interactive components such as animated tutorials, examples, and Adventure Stories. Virtual tools and interactive games are currently being developed.
<table>
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<th>21. Include or reference technology that provides opportunities for teachers and/or students to communicate with each other (e.g. websites, discussion groups, webinars)?</th>
<th>Teachers are invited to join the <em>Math Trailblazers</em> listserv to connect with other <em>Math Trailblazers</em> teachers and to communicate with other teachers and the author team through our Facebook.com/mathtrailblazers and our website (mathtrailblazers.uic.edu).</th>
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<td>22. Include opportunities to assess student mathematical understandings and knowledge of procedural skills using technology?</td>
<td>This is currently not available in the basic program though the <em>DPP Plus</em> program (a version of the basic DPPs) is an online platform for additional practice. In this platform, teachers can select sets of tasks for students or groups of students to complete. Students get three tries to answer the task correctly. As they proceed through the set of problems, students are awards “money” for their avatar to use.</td>
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<tr>
<td>23. Include or reference technology that provides teachers additional tasks for students?</td>
<td><em>Math Trailblazers</em> is intentionally designed to include more material than a teacher can cover in a school year. This allows teachers to listen to their students, make instructional choices, and choose the materials that will move their students forward. MTB4 has added practice so that teachers do not have to invent their own or seek additional tasks from other sources. MTB4’s materials allow teachers to make instructional decisions that meet the individual needs of their students and provide practice that helps advance all learners. One exception to this is the DPP plus program offered by Kendall Hunt through the online platform for additional practice. In this platform, teachers can select sets of tasks for students or groups of students to complete. Students get three tries to answer the task correctly. As they proceed through the set of problems, students are awards “money” for their avatar to use.</td>
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<td>24. Include teacher guidance for the mindful use of embedded technology to support and enhance student learning?</td>
<td>Extension opportunities at the end of some lessons include a combination of technology-based and other ideas for enhancing student learning. <em>Math Trailblazers</em> recognizes that districts and teachers have varying levels of access and support for technology use and believes that MTB4 supports all students’ abilities to learn math with or without embedded technology.</td>
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### Summary Discussion Questions

1. **Equity:** To what extent do the materials contain embedded support for elements of equity consistently within and across grades?
2. **Assessment:** To what extent do the materials contain embedded support for elements of assessment consistently within and across grades?
3. **Technology:** To what extent do the materials contain embedded support for elements of technology consistently within and across grades?
4. **Overall:** To what extent do the materials incorporate the Overarching Consideration elements to advance students’ learning of mathematical content and engagement in the mathematical practices?