

HOUGHTON MIFFLIN HARCOURT MATH IN FOCUS® © 2015 3-5

I. Alignment to the CCSS Mathematical Content

4. **Conceptual Understanding:** Develops understanding through conceptual problems and questions, multiple representations, and opportunities for students to write and speak mathematically.

Reviewer's Comments: The instructional materials reviewed for grades 3-5 sometimes adhere to the criteria for developing conceptual understanding. Most conceptual understanding is presented through teacher directed strategies. Conceptual understanding could be strengthened if students were given more opportunities to develop and discuss their own strategies when solving problems.

MIF Response: *Math in Focus*® follows a student-centered pedagogical framework which emphasizes a concrete–pictorial–abstract approach, metacognitive reasoning, and the use of model drawing to solve and justify solution strategies. It develops student understanding through conceptual problems and questions, multiple representations, and daily opportunities for students to write and speak mathematically about their solution strategies.

Through activities such as classroom discussions, *Math Journal*, *Hands-On Activities*, *Let's Explore* and *Put On Your Thinking Cap!* activities in the program, students have regular opportunities to write and speak about their mathematical strategies.

- During the *Guided Learning* part of the lesson, students are arranged in pairs and small groups and encouraged to share and think out loud about the strategies they use to find solutions.
- *Hands-On Activities* and *Games* help students develop concepts and explore connections as they use manipulatives, models, and technology to practice skills and communicate their thinking.
- *Let's Explore* activities provide opportunities for students to carry out investigative activities and to discuss alternate solutions to open-ended questions.
- *Math Journal* activities offer opportunities for students to communicate their thinking with each other and reflect on mathematical learning.

Examples

- Grade 3: TE 3A Chapter 9, Lesson 9.2, p. 252 (Math Journal)
- Grade 3: Workbook 3A Chapter 9, Lesson 9.4, p. 186
- Grade 5: TE 5B Chapter 14, Lesson 14.3, pp. 272-273 (Hands-On Activity & Math Journal)
- Implementation Guide, Lesson Planning, pp. 14-16 (Teach/Learn and Guided Practice)
- Grade 3: TE 3A, Chapter 3, Lesson 3.1, p. 78; Chapter 4, Lesson 4.3 (Best Practices)
- Grade 3: TE 3A, Chapter 6, Chapter Opener
- Grade 4: TE 4A, Chapter 1, Lesson 1.3, p. 31, (Math Journal)

II. Alignment to the CCSS Mathematical Practices

6. The Mathematical Practices are explicit and central to the lessons, handled in a grade-appropriate way, and well-connected to the content being addressed.

Reviewer's Comments: The materials for grades 3-5 sometimes adhere to the criteria for math practices. There are multiple points of access present with ELL differentiation, hands on activities, and games. The practice standards could be more evident in the teacher's guide with direct connection to the lesson. One area that could be improved is providing more opportunities for students to justify their work.

MIF Response: In *Math in Focus*®, the Mathematical Practice Standards are explicit and central to the lessons and are connected to the content being addressed. These Mathematical Practices Standards are identified in many ways in the teacher's guide:

- The Mathematical Practice Standards are described in great detail in the front-matter of each TE (T56) with lesson examples identified for each standard.
- In the *Chapter Planning Guide*, the Mathematical Practice Standards are identified and correlated with each lesson of the chapter. Additionally, a direct clarification for how the practices standard should be used in the lesson is found in the Mathematical Practice bubbles following the title of each lesson.
- Each lesson clearly lists the focal Mathematical Practice Standards, and the lesson description leads the learner to the specified outcomes.

Metacognition is a foundational part of the *Math on Focus*® curriculum. Students are continually engaged in activities that require students to self-monitor their thinking in order to determine and justify solutions:

- *Math Journal* activities are opportunities for students to justify and explain their thinking and are found throughout each chapter.
- Students are taught to use visual diagrams not only to represent mathematical relationships, but also as a way to justify their solution strategies.
- *Put On Your Thinking Cap* activities allow students to apply concepts and present viable arguments when determining and justifying solutions.
- *Games, Let's Explore, and Hands-On Activities* provide collaborative experiences where students interact with one another to construct viable arguments, critique the reasoning of others, and justify their own thinking.

Examples

- Grade 3: TE 3A Common Core State Standards Correlation, pp. T51-T59
- Grade 4: TE 4A Common Core State Standards Correlation, pp. T51-T59
- Grade 5: TE 5A Common Core State Standards Correlation, pp. T53-T62
- Grade 5: TE 5B Chapter 5, Lesson 5.2, pp. 224-234
- Implementation Guide, Lesson Planning, p. 21 (Putting on Your Thinking Cap! and Math Journal)
- Grades 3 – 5, TE A-B Chapter Planning Guide for all chapters.
- Grade 4: TE 4A Chapter 2, Lesson 2.1, p. 48 (Guided Learning)
- Grade 3: TE 3A Chapter 2, Lesson 2.5 p. 69 (Math Journal)



7. Overarching habits of mind of a productive mathematical thinker: Engages students in productive struggle through relevant, thought-provoking questions, problems, and tasks that stimulate interest and elicit mathematical thinking. Uses and encourages precise and accurate mathematics, academic language, terminology, and concrete or abstract representations.

Reviewer's Comments: The materials reviewed for grades 3-5 sometimes adhere to the criteria for creating productive math thinkers. There are multitude of problems, but the problems could provide more of productive struggle for students. Also, vocabulary is present at the start of each chapter, but students need opportunities to engage with the vocabulary.

MIF Response: *Math in Focus®* is based on the premise that in order for students to persevere and solve routine and non-routine problems, they need to be given tools that they can use consistently and successfully while understanding both the how and the why of math. Students have daily opportunities to engage in challenging problems and become empowered problem solvers in components such as the *Problem of the Lesson*, *Let's Explore*, *Math Journal*, *Put On Your Thinking Cap*, *Test Prep*, *Enrichment*, and *Online Resources*.

The *Math in Focus®* program focuses on ensuring understanding of the specialized language of mathematics. Activities such as classroom discussions, *Guided Learning*, *Math Journal*, *Hands-On Activities*, *Let's Explore*, and *Put On Your Thinking Cap*, give students regular opportunities to write and explain thinking using precise mathematical vocabulary and are found throughout the program.

- A table in the *Chapter Introduction* shows new vocabulary terms and definitions, and terms appear again at the start of each lesson.
- Students are systematically taught to use visual diagrams to accurately solve problems and to explain their thinking, thereby continually engaging with academic vocabulary.
- During classroom discussions, students share their reasoning and critique the reasoning of others, while encouraging the use of content-specific vocabulary.
- “Thought bubbles” guide students like a tutor throughout the entire Student Edition. These scaffolded dialogues help students articulate concepts using mathematical vocabulary, check for understanding, analyze, justify conclusions, and self-regulate understanding.
- *Hands-On Activities* and *Games* help students develop concepts and explore connections as they use manipulatives, models, and technology to practice skills and communicate their thinking using mathematical vocabulary.
- *Let's Explore* activities provide opportunities for students to carry out investigative activities and to discuss alternate solutions to open-ended questions using mathematical vocabulary.
- *Math Journal* activities offer opportunities for students to communicate their thinking using mathematical vocabulary and reflect on mathematical learning.
- During the Chapter Wrap-Up, students are encouraged to use the chapter vocabulary in reviewing examples from the concept map.

Examples

- Implementation Guide, Lesson Planning, p. 21 (Putting on Your Thinking Cap! and Math Journal)
- Grade 3, TE 3A, Chapter 9, Lesson 9.4, pp. 257-260 (Learn and Guided Learning)
- Grade 4, TE 4A Chapter 3 p. 136 (Chapter Wrap Up)
- Grade 5: TE 5A, Chapter 4, Lesson 4.1 p 172 (Learn – Vocabulary)
- Grade 5: TE 5A, Chapter 4, Lesson 3.7 p 161 (Putting on Your Thinking Cap!) Workbook A P.137-138 (Putting on Your Thinking Cap!)
- Grade 3: TE 3A Chapter 8, Chapter Planning Guide, pp. 241D-214I
- Grade 4: TE 4A Chapter 5, Lesson 5.4, pp. 211-216
- Grade 4: TE 4B Chapter 13, Lesson 13.1 pp. 206-207 (Guided Learning)
- Grade 5: TE 5A Chapter 4, Lesson 4.7, pp. 210-211A
- Grade 5: TE 5B *Glossary*, pp. 322-337



8. Reasoning and explaining: Provides sufficient opportunities for students to reason mathematically and express reasoning through classroom discussion, written work, and independent thinking.

Reviewer's Comments: The materials reviewed for grades 3-5 sometimes adhere to the criteria for reasoning and explaining. The lesson structure often asks for students to find solutions, but students should also be explaining their reasoning, an answering questions about their reasoning. Students could be given more opportunities to construct viable arguments.

MIF Response: *Math in Focus*[®] provides opportunities for students to reason mathematically and express reasoning through classroom discussion, written work, and independent thinking. Throughout *Math in Focus*[®], students are expected to engage in mathematical reasoning and to express that reasoning verbally and in writing. Each chapter delivers a series of features that support mathematical reasoning, including:

- *Guided Learning* shows an example of mathematical reasoning to solve key problems.
- *Hands-On Activities* and *Games* reinforce learning and encourage the expression and peer critique of reasoning in small groups.
- *Let's Explore!* activities provide students opportunities to investigate applications and consider and discuss alternate solutions.
- *Math Journal* requires students to reflect and express mathematical reasoning.
- *Put On Your Thinking Cap!* requires students to reason mathematically, think critically, and strategically solve problems.
- Question prompts found throughout the program promote discussion and deepen understanding of the Common Core Standards for Mathematical Practice.
- *Student Workbook* activities include a variety of application situations.

Examples

- Grade 3: TE 3A Chapter 3, Lesson 3.3, p. 88 (Math Journal)
- Grade 3: TE 3B Chapter 15, Lesson 15.3, p. 213 (Put On Your Thinking Cap!)
- Grade 4: TE 4A Chapter 5, Lesson 5.1, pp. 185 & 189 (Hands-On Activity)
- Grade 4: TE 4B Chapter 13, Lesson 13.4, pp. 236 (Math Journal & POYTC!)
- Grade 5: TE 5A Chapter 5, Lesson 5.5, pp. 256A-257 (Math Journal & POYTC!)
- Grade 5: TE 5B Chapter 9, Lesson 9.4, p. 69A (Student Workbook)

9. Modeling and using tools: Encourages the strategic use of concrete or abstract representations (e.g., pictures, symbols, expressions, equations, graphics, models, technology-based tools) in the discipline.

Reviewer's Comments The instructional materials reviewed for grades 3-5 sometimes adhere to modeling and using tools. There are many opportunities for students to draw visual representations, but few clearly identified concrete models are used. Students have minimal opportunities to make strategic decisions about what tools to use or how to use them when problem solving.

MIF Response: In *Math in Focus*®, students are encouraged to use modeling and authentic and virtual tools to represent their thinking. The program includes concrete and abstract representations of problems, routine, and non-routine, to ensure mastery and higher-level thinking. Instruction leads students to make lasting connections between concrete materials, visual representations, and abstract algorithms, while helping students develop mastery of the concepts.

Students are continually encouraged to use manipulatives and draw pictures to enhance their visual comprehension of the concepts. *Manipulative Kits*, student whiteboards, and place value mats are included in *Math in Focus*®.

Digital materials and tools further enhance learning by providing engaging and interactive representations of the mathematical concepts and skills. *Virtual Manipulatives*, *Interactive Whiteboard Lessons*, and the *Singapore Math Bar Models App* allow teachers and students to select and represent *Math in Focus*® content through 21st century tools.

Examples

- Implementation Guide, Lesson Planning, p. 23 (Concrete to Pictorial to Abstract Pedagogy)
- Grade 3: TE 3A Chapter 6, Lesson 6.1, p. 141 (Learning and Guided Learning)
- Grade 3: TE 3B Chapter 14 Lesson 14.2, p. 121-124 (Learn and Guided Learning)
- Grade 4: TE 4A Chapter 3, Lesson 3.3, pp. 111 & 112 (Learn)
- Grade 4: TE 4A Chapter 6, Lesson 6.1, pp. 245 & 246 (Learn)
- Grade 5: TE 5B Chapter 8, Lesson 8.1, p.10 (Learn and Guided Learning)
- Grade 3: TE 3A Chapter 9, Lesson 9.1, p. 245 (Let's Practice)
- Grade 3: TE 3B Chapter 19, Lesson 19.1, p. 354 (Let's Explore!)
- Grade 4: TE 4A Chapter 3, Lesson 3.1, pp. 92 & 94 (Learn)
- Grade 4: TE 4B Chapter 7, Lesson 7.1, pp. 5-6 (Guided Learning)
- Grade 5: TE 5A Chapter 4, Lesson 4.1, pp. 172 & 174 (Learn & Hands-On Activity)
- Grade 5: TE 5B Chapter 9, Lesson 9.1, pp. 42-42A (Student Workbook)

