

Illustrative Mathematics

KENDALL HUNT, 2021

PUBLICATION DATE: OCTOBER 2024



*Illustrative Mathematics is an online mathematics curriculum for Grades K-5. Please see the [Kendall Hunt website](#) and the publisher-provided information later in this report for product specifications. **Grades reviewed: K-5***

This report concerns the review of the Kendall Hunt certified version of Illustrative Mathematics (2021), which is an open educational resource (OER). Illustrative Mathematics (the publisher) has partnered with [other distributors](#) who provide access to the materials through flexible digital formats and/or print resources to meet diverse school and district needs. The content of the student and teacher materials are the same across certified versions and do not impact the indicators evaluated by the CURATE rubric in Standards Alignment. When considering Classroom Application in their evaluation and selection of Illustrative Mathematics (2021), local education agencies should consider their local assets, needs, and priorities and explore each distribution partner's website for product specifications and other information that might impact user experience during implementation of the specific adopted materials.

Note: The CURATE panel did not have access to survey or interview data when conducting this review.

Illustrative Mathematics

Kendall Hunt, 2021

Mathematics, Grades K-5

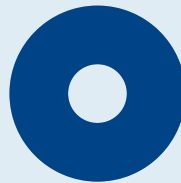
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**Content Standards
and Organization**



**Grade-Appropriate
Practices**



**Standards
Alignment**



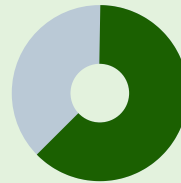
**Accessibility
for Students**



**Usability for
Teachers**



**Impact on
Learning**



**Classroom
Application**



Overall



Meets Expectations - Most or all evidence indicates high quality; little to none indicates low quality. Materials may not be perfect, but Massachusetts teachers and students would be well served and strongly supported by them.



Partially Meets Expectations - Some evidence indicates high quality, while some indicates low quality. Teachers in Massachusetts would benefit from having these materials but need to supplement or adapt them substantively to serve their students well.



Does Not Meet Expectations - Little to no evidence indicates high quality; most or all evidence indicates low quality. Materials would not substantively help Massachusetts teachers and students meet the state's expectations for teaching and learning.



No Rating - Evidence is insufficient to generate rating.



Overall

The Bottom Line

materials include lessons and activities to advance students' conceptual understanding while providing opportunities to build procedural fluency and apply learning to real world problems. Materials include varied means for demonstrating learning through collaboration and multiple modes of assessment. Teachers will need to supplement materials to ensure students working below grade level and English learners (ELs) are able to access content. Although formal and informal assessments with multileveled assessment answers are included across units, materials lack rubrics and guidance on how teachers should address student misconceptions.

Standards Alignment

Content Standards and Organization

Strengths

- Materials are well-aligned with Massachusetts curriculum standards and progress in a coherent manner, with lessons including a list of standards that will be addressed, built on, and built towards as teachers and students navigate through content. Pacing and dependency guides also show the grade-to-grade and coherence of standards across K-5. However, select topic areas, such as 1.MD.D.5, which clarifies that students are able to work with money, and 2.MD.C.7.a, which incorporates the expectation that students know the number of weeks in a month and year, do not align with Massachusetts-specific standards.
- Materials intentionally build students' conceptual understanding, while providing opportunities to build procedural fluency and apply learning to real-world problems. For example, in Grade 5, Unit 4, Section A, students begin by estimating multiplication to partial products using diagrams, which later leads them to use the standard algorithm to build multiplication fluency and apply learnings to real world scenarios. Warm up exercises, practice problems, and built-in routines also contribute to rigor which develops over time (EdReports, 2B).

Challenges

None identified

The Bottom Line

Materials are well-aligned with the MA curriculum framework and progress in a coherent manner, although select topic areas with Massachusetts-specific standards require supplementation. Content progresses coherently while building procedural fluency and rigor.



Grade Appropriate Practices

Strengths

- Materials encourage students to use multiple representations when solving problems and prompt students to think about different possible audiences when speaking about math concepts across different contexts. In Grade 1, Unit 3, Section A, Lesson 1, “My Favorite Sum,” the Mathematical Language Routine (MLR), MLR8 Discussion Supports explain that the lesson activity invites student participation, conversation, and meta-awareness of language. The Teacher Guide also includes directions on how to support students in moving among multiple representations. For example, in Grade 5, Unit 4, Lesson 2, “Partial Products in Diagrams,” when students decompose multi-digit numbers in diagrams in multiple ways, teachers are provided with questions on how to connect these multiple strategies and identify any advantages and disadvantages.
- Materials encourage students to justify solutions to problems using clear oral and written communication. For example, in Grade 5, Unit 7, Lesson 5, students discuss in pairs after five minutes of individual work to justify their reasoning to each other: “Which statements go with the first definition? Which statements go with the second definition? Explain or show your reasoning.” This approach to developing language proficiency begins in the younger grades. In Kindergarten, Unit 3, Lesson 12, the Notice & Wonder Instructional Routine invites students into a mathematical task with two low stakes prompts: “What do you notice? What do you wonder?” This allows students entry into the context, piques curiosity, and allows for more than one correct answer.
- Materials encourage students to solve problems through strategic selection and the use of a range of appropriate tools. For example, in Grade 4, Unit 3 Lesson 18, Activity 1, students solve problems involving tenths and hundredths in a context about coins, more specifically, the Mexican peso. Given information about the thickness of the coins, students compare the heights of different coin combinations. Students then write equivalent fractions, add tenths and hundredths, and compare fractions; some choosing to use multiplication to reason about the problems. Students are also invited to model the situation using sticky notes or scrap paper to represent the coins.
- Materials encourage students to explain their thinking to others and evaluate others’ thinking, with MLR1 and MLR3 embedded in lessons throughout the curriculum. In Grade 3, Unit 4, Lesson 10, Teacher Slide 7, students complete an activity titled “From Expressions to Diagrams.” This activity includes three different rectangles that are presented along with corresponding expressions that describe their areas. Students then need to name the two factors that can be multiplied to find the area of each rectangle, shade each rectangle to illustrate the area, and explain their reasoning and that of other students. In Grade 4, Unit 2, Lesson 15, Activity 1, students review the thinking of two other students when asked to

determine which fraction is greater. They are then asked to critique their thinking and explain how they might solve the problem instead.

- Materials provide opportunities for students to participate in regular conversation and collaboration with peers focused on lesson content. Throughout materials, lessons begin with Warm-Up Routines that encourage discussions around the mathematical goal of the lesson. Lesson Activity Routines support students in engaging with the content and in the development of language precision. MLRs are included within each lesson, either in the structure of an activity or as suggested optional support for ELs. Materials also support the intentional development of MP3: Construct viable arguments and critique the reasoning of others, for students, in connection to the grade level content standards, as expected by the mathematical practice standards (EdReports, 2F).

Challenges

None identified

Bottom Line

Materials encourage students to make connections between multiple representations of problem solving. Lessons encourage students to solve problems by using a variety of appropriate tools, with opportunities for students to exercise choice in their approach. Select materials include different cultural and historical representations of math content knowledge, as well as opportunities to explain and evaluate thinking through peer collaboration.



Classroom Application



Accessibility for Students

Strengths

- Materials provide varied means of demonstrating learning, such as through collaboration and conversations between partners as exemplified in the Grade 3, Unit 7, Lesson 2 Student Book. In this lesson, students are instructed to work with partners to sort triangles into categories that they create themselves. Materials also include multiple modes of assessment to demonstrate learning, such as through End-of-Unit Assessments. These assessments include the following problem types: multiple choice, multiple response, short answer, restricted constructed response, and extended response. However, support to advance student thinking and meet the needs of those working above grade level is limited.
- Materials include questions and tasks that affirm and value diverse identities, backgrounds, and perspectives. For example, family engagement materials in Kindergarten provide access to learning in a variety of modalities, such as routines that build community and collective-oriented learning. Another example is illustrated in Grade 2, Unit 4, Lesson 12, students are introduced to the origin and geographic variations of the board game *Mancala*. Teachers will need to supplement materials to draw upon students' diverse backgrounds and make real-life connections. This could be done in Grade 4, Unit 1, Lesson 8, when students are examining Mondrian's artistic style as it relates to math, by incorporating the work of artists that share students' backgrounds.

Challenges

- While materials provide varied means for accessing content and opportunities for teachers to target students' understanding and adjust instruction, robust guidelines on how to support students working above or below grade level as well as English learners are limited. For example, in Grades 3 and 4, general Universal Design for Learning (UDL) practices are included to support students but lack explicit connection to the lesson content. Other generic supports, such as those in Grade 3, Unit 3, Lesson 4, Activity 2, consisting of encouraging students and chunking lessons, lack specificity.
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- Materials help teachers ensure that students at various levels of English proficiency have access to grade level content through flexible routines and a strong focus on vocabulary across units. However, MLRs are not included in all lessons and are

not built into the curriculum's pacing. Materials include challenging activities that require cognitive skills and opportunities to practice academic English (EdReports, 3Q). While open-ended sentence frames promote English learner participation, there are limited materials that make connections from students' home language to the curriculum.

The Bottom Line

Materials include varied means for demonstrating learning through collaborative learning and multiple modes of assessment. However, teachers will need to supplement materials to support students working below and above grade level and English learners. Materials elevate diverse backgrounds, though additional emphasis on real-life connections to students' backgrounds to advance equity could be included.

Usability for Teachers

Strengths

- Lessons and tasks advance student learning with clear purpose. Each lesson describes specific learning goals for both teachers and students, and provides a detailed description of the purpose of each lesson. Additionally, narrative sections about previously learned materials as well as a rationale for activities are included. For example, Grade 3, Unit 1, Lesson 3, Activity 1 states that in previous lessons, students reviewed how to create and interpret single-unit scale picture graphs to lay a foundation of background knowledge. In this lesson, students learn that a scaled picture graph is a picture graph where each picture represents an amount other than one. They then read, interpret, and answer questions about scaled picture graphs with a scale of two and five before generating questions that can be answered by these graphs.
- Materials support teachers with suggested classroom routines and structures. Materials provide explanations of the instructional approaches of the program and identification of research-based strategies. For example, the Grade 4 Curriculum Guide explains that “In lessons in which there are opportunities for students to make connections between representations, strategies, concepts, and procedures, the lesson and activity narratives provide support for teachers to also use the practices of sequencing and connecting, and the lesson is tagged so teachers can easily identify these opportunities” (EdReports, 3E). Additionally, the Teaching Moves to Support Math Community components of the materials provide clear and actionable strategies that are responsive to the students and classroom. These strategies include identifying patterns between participation and prior achievement or social groups (like ELs, race/ethnicity, or gender).
- Pacing is reasonable and flexible; the curriculum can be implemented effectively within a typical school year. Each grade has a Pacing Guide and Dependency Diagram found under the Read More section when looking at the unit overview. The Pacing Guide indicates how many weeks should be spent on each unit. For example, the Grade 2 Pacing Guide projects 163 days to complete the curriculum. However, not all lessons include pacing for centers, and those that do describe them as optional. This implies that teachers have to modify their pacing to build in time for centers.
- Materials include guidance and resources designed specifically to build teachers’ knowledge. Materials include supplementary readings written by notable researchers in the field to support teachers in developing their understanding of the standards, in addition to learning progression videos. Although every lesson contains narratives that connect to previous learnings and touch on upcoming learnings as well as annotation boxes for students with disabilities and ELs, common student misconceptions are not listed, which hinders teachers’ ability to plan to meet the diverse learning needs of all students.

Challenges

- Materials provide a range of materials for formative and summative assessment, including Pre-Unit Practice Problems, End-of-Unit Assessments and the End-of-Course Assessments. However, suggestions for how to adjust instruction and follow up with students based on assessment results are insufficient. Materials do not provide teachers with detailed guidance for progress monitoring beyond checkpoints and pre-unit questions. Teachers will need to supplement materials to adjust instruction based on learning measurements.
- While materials work towards helping teachers set clear expectations for students, such as through lesson checkpoints and cool-downs, sample solutions are not leveled. For instance, in the End of Unit Assessment Teacher Guide for Grade 5, Unit 2, there are sample responses for each question, but examples of student work at various levels or student work at different levels of English development are not included. Checklists for students, self-assessments, and peer assessments are also lacking. Although materials include clearly marked problems and protocol-framed reviews that can be discussed in Professional Learning Communities, there is minimal guidance for teachers to avoid bias in setting expectations for students.

The Bottom Line

Lessons and tasks serve their intended purposes effectively and include structures that can be adapted to fit the needs of the classroom and student population. Materials can be implemented within a typical school year, though centers need to be built into the pacing. Teacher resources feature actionable strategies that are responsive to the students and classroom, including directions to identify patterns between participation and prior achievement or social groups (like ELs, race/ethnicity, or gender). While materials include informal and formal assessments, guidance for how to adjust instruction and follow up with students is generic. Finally, materials provide a range of supports that build teacher knowledge and practice; however, teachers will need to supplement lessons to address student misconceptions.



Impact on Learning

The Bottom Line

A [DESE-commissioned policy brief](#) found in 2018 that “research has yet to catch up to recent developments in curriculum materials.” As with many comprehensive curriculum products currently in use, high-quality studies of student learning impacts are not yet available for *Illustrative Mathematics* K-5 (2021). This is a promising and important area for further study.



Looking for more information? Read the full EdReports review for [Kendall Hunt](#), or [find a Massachusetts district](#) using this product.



What the Publisher Says....

We asked the publisher for information on product specifications and technological requirements, professional learning opportunities for Massachusetts educators, and diversity of representation in their materials. See what Kendall Hunt had to say about *Illustrative Mathematics* K-5 (2021).

Diverse Representation

Describe how you ensure that students of diverse races, ethnicities, nationalities, socioeconomic classes, family experiences, linguistic backgrounds, abilities, cultures, religions, genders, gender identities, sexual orientations, and other identities see themselves fully reflected and respected in your curriculum.

The problem-based design of IM K-5, along with the consistent lesson structure of each lesson, the development of concepts from concrete to abstract, and the individual, partner, small group and whole class activities are a few of the things that make it equitable and accessible to all students.

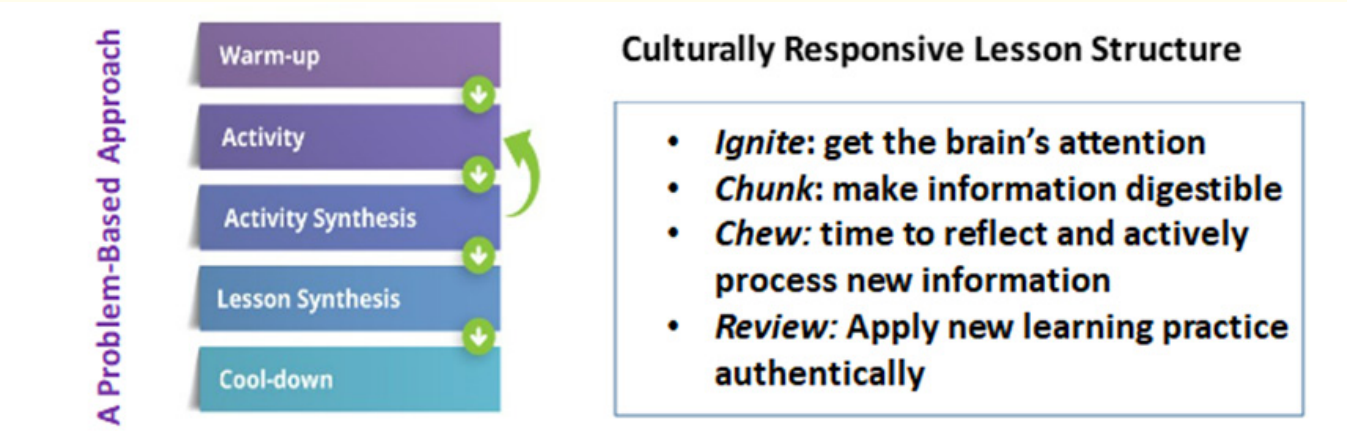
When designing and writing this curriculum, Illustrative Mathematics followed recommendations from a variety of respected sources to support access and equity. These sources included:

- Culturally Responsive Curriculum Scorecard from NYU Steinhardt Metropolitan Center for Research on Equity and the Transformation of Schools
- Social Content Sheet from California Department of Education
- A Framework for Re-envisioning Mathematics Instruction for English Language Learners from Council of Great City Schools
- Principles to Actions: Ensuring Mathematical Success for All from NCTM

Internally, they also set requirements to ensure that the curriculum is accessible, free of bias, provides windows and mirrors, has low barriers to entry, maintains high standards for rigorous grade-level mathematics, and supports teachers to develop classroom norms and environments that disrupt stereotypes and bias.

The use of authentic contexts and adaptations provide students opportunities to bring their own experiences to the lesson activities and see themselves in the materials and mathematics. When academic knowledge and skills are taught within the lived experiences and students' frames of reference, "they are more personally meaningful, have higher interest appeal, and are learned more easily and thoroughly" (Gay, 2010). By design, lessons include contexts that provide opportunities for students to see themselves in the activities or learn more about others' cultures and experiences. In places where there are opportunities to adapt a context to be more relevant for students, we have provided suggested prompts to elicit these ideas.

In IM K–12 Math’s problem-based instructional model, where students learn math by doing math, there are significant opportunities to build engagement as defined below:



Professional Learning

Describe any professional learning opportunities (materials or experiences, publisher-provided or otherwise) available for Massachusetts educators that are designed to support high-quality implementation of your curriculum.

IM Certified™ Professional Learning is designed by the IM authors to be deeply integrated with the curriculum. The program provides teachers and leaders long-term, sustainable support for improving instruction and boosting student achievement. Shifting to a problem-based mathematics curriculum can be a difficult transition for many educators. Professional Learning combined with the digital and print IM math curriculum presents an avenue for teachers to grow and watch their students, in turn, mature into better mathematicians. Professional Learning certified by Illustrative Mathematics is delivered through our IM Certified Facilitators, who undergo a rigorous qualification and training process to gain mastery in delivering impactful professional learning experiences based on the author's intent. IM Certified Facilitators deliver learning educators need, in a variety of formats, including onsite academies and live virtual classrooms.

The certified training provides support and clarity to educators and administrators while creating an avenue of engagement and deeper understanding. This isn't your typical professional learning opportunity. Your professional learning plan starts with a conversation with a curriculum consultant about district goals, experience and approach to problem-based learning. Districts will select the professional learning experiences that best meet their needs—from an introductory session, year-long support, to a three-year development package that builds teacher, coach, and leader capacity.

A full catalog of implementation and ongoing professional is available.



Product Specifications

Describe what a school or district needs to implement your curriculum successfully, including instructional hours and technological infrastructure. Provide basic information about what products are associated with the curriculum (e.g., what texts a typical purchase includes, what tools are openly available online).

- These materials were created by Illustrative Mathematics. They were piloted and revised in the 2019-2020 and 2020-2021 school years.
- Each grade level contains 8 or 9 units. Units contain between 8 and 28 lesson plans. Each unit, depending on the grade level, has pre-unit practice problems in the first section, checkpoints or checklists after each section, and an end-of-unit assessment. In addition to lessons and assessments, units have aligned center activities to support the unit content and ongoing procedural fluency.
- The time estimates in these materials refer to instructional time. Each lesson plan is designed to fit within a class period that is at least 60 minutes long. Some units contain optional lessons and some lessons contain optional activities that provide additional student practice for teachers to use at their discretion.
- Teachers can access the teacher materials either in print or in a browser as a digital PDF. When possible, lesson materials should be projected so all students can see them. All content available in English and Spanish. Materials can be downloaded as PDF or Word Doc to provide editing needed to support all learners.

Kendall Hunt provides print materials for both student and teachers, with a significant price savings over self-printed materials.

IM K-5 Print and Manipulative Kits

Student Workbooks:
 Consumable, 4-color printed on high quality paper with durable covers
 4 volumes/2 units each
 K-5 - Spanish available

Teacher Guide:
 Color, Spiral-bound, 4 Volumes
 coupled units per book
 K-5 - Spanish available



Grade Level / Course Manipulative Kits
K-5 Teacher Copy Resource Masters– K-5 includes all blackline masters, assessments, center materials, checklists.
K-5 grade level specific kits – supports 30 students/1 classroom



Kendall Hunt Publishing is the only free certified provider of *Illustrative Mathematics* through the website: im.kendallhunt.com. This is a free digital tool, that includes teacher materials to support full curriculum instruction and planning, as well as resources for families. IM K-5 Math™ certified by Illustrative Mathematics are available as open educational resources (OER) and free to access by anyone.

For more information visit: <https://creativecommons.org/licenses/by/4.0/>

Use link to access FREE Open Resource Curriculum – Illustrative Mathematics K-12

Visit <https://www.im.kendallhunt.com> --- upper right corner “Educators Register/Log In”

Response to Report

Thank you to the members of the Massachusetts CURATE for the review of Kendall Hunt's *Illustrative Mathematics* K–5 curriculum. We are also thankful for the partnership with Illustrative Mathematics to further their mission to create a world where learners know, use, and enjoy mathematics. The ultimate purpose of this program is to impact student learning and achievement.

ABOUT THE CURRICULUM

- **Spark discussion, perseverance, and enjoyment of mathematics.**

Kendall Hunt's IM K–5 Math is a problem-based core curriculum rooted in content and practice standards to foster learning and achievement for all. Students learn by doing math, solving problems in mathematical and real-world contexts, and constructing arguments using precise language. Teachers can shift their instruction and facilitate student learning with high-leverage routines that guide them in understanding and making connections between concepts and procedures.

- **Intentional lesson design that promotes mathematical growth.**

Kendall Hunt's IM K–5 Math lessons are designed with a focus on independent, group, and whole-class instruction. This format builds mathematical understanding and fluency for all students. Teachers will also use Warm-ups, Cool-downs and Centers to help guide lesson pacing and planning.

Driven by student discourse, Kendall Hunt's IM K–5 Math is a rich, engaging core program built around focus, coherence, and rigor. These trusted, expert-authored materials were developed to equip all students with the skills they need to thrive in mathematics and are delivered by Kendall Hunt.