

Illustrative Mathematics

IMAGINE LEARNING, 2021

PUBLICATION DATE: OCTOBER 2024



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

This report concerns the review of the Imagine Learning 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

Imagine Learning, 2021

Mathematics, Grades K-5

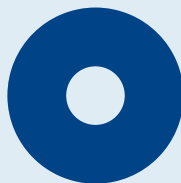
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**Content Standards
and Organization**



**Grade-Appropriate
Practices**



**Standards
Alignment**



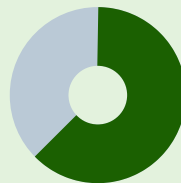
**Accessibility
for Students**



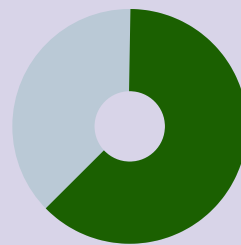
**Usability for
Teachers**



**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

Illustrative Mathematics 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.
- 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*. This is a promising and important area for further study.



Looking for more information? Read the [full EdReports review](#) 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 Imagine Learning 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. For example, describe any bias or inclusivity review procedures you have in place and provide evidence of their efficacy. Describe also how your curriculum challenges existing narratives about historically marginalized and historically centered or normed cultures, including challenges rooted in systemic oppression.

New mathematical ideas are built on what students already know about mathematics and the world, and as they learn new ideas, students need to make connections between them. To do this, teachers need to understand what knowledge students bring to the classroom and monitor what they do and do not understand as they are learning. Teachers must themselves know how the mathematical ideas connect in order to mediate students' learning. The Illustrative math curriculum builds this into every level of the curriculum, at activity, lesson, unit, and grade through a Launch-Work-Synthesize structure. The launch is designed as an invitation to the mathematics, where students can demonstrate the knowledge they already have and bring their experience forward. This effort is often supported directly through instructional routines such as "Notice and Wonder," where students have the opportunity, through a very open prompt, to respond through their lens of experience. In addition, the real-world contexts contained within Illustrative Mathematics draw from cultures and communities around the world. The provides many students with an opportunity to identify with and see themselves in the contexts, while providing ample opportunities for other students to experience something new.

Imagine Learning Illustrative Mathematics curriculum includes culturally relevant materials and culturally responsive teaching and instructional practices. Materials are inclusive of a variety of cultures and ethnicities and are free from bias in the portrayal of ethnic groups, gender, age, class, cultures, religions, and people with disabilities.

We address racial, cultural, and religious bias in the following ways:

- The materials contain racial/ethnic balance in the main characters and illustrations.

- Minorities are represented as central figures in text and illustrations.
- Minority figures reflect qualities such as leadership, intelligence, imagination, and courage.
- The materials provide an opportunity for a variety of racial, ethnic, and cultural `s.
- The vocabulary or depiction of racism is avoided (i.e., insulting overtones).
- Race/Culture stereotyping language is avoided.

Professional Learning

Describe any professional learning opportunities available for Massachusetts educators that are designed to support high-quality implementation of your curriculum.

The Imagine Learning Illustrative Mathematics Professional Development offerings support teachers, coaches, and administrators in effectively implementing the program with integrity throughout their program adoption. In this advanced learning series, teachers choose the topics they would like to master and can be repeated as many times as desired with the support of an IM Certified Facilitator. The facilitator identifies a practice problem the session will focus on and lead the teachers into a deep dive to collaboratively plan and problem-solve around the problem of practice.

Year 0 and 1 Teacher Professional Learning Community Modules

These modules focus on building knowledge and best practices for

- lesson planning
- instructional routines
- facilitating problem-based instruction
- math language routines for ELLs
- formative assessments

Year 2 Teacher Professional Learning Community Modules

Year 2 offerings are more specialized around effective math discourse, student work, curriculum representations, and vertical curriculum alignment. There is also a session designed for special ed teachers that is focused on supporting students with disabilities in a problem-based instructional model. The workshop modules allow participants to learn, apply, and synthesize their understandings.

Specific professional development needs are discussed in the implementation planning phase. The experienced Imagine Learning project team will work with appropriate stakeholders to define goals and expectations, set milestone dates, and make recommendations to ensure initial and ongoing success.

Required Session Descriptions

- Getting Started with Illustrative Mathematics (IM) in the Imagine Learning Classroom): K–2 / 3–5: This virtual session is designed to successfully support teachers in the launch of Imagine Learning Illustrative Mathematics (IM) in the Imagine Learning Classroom (ILC). Participants will be introduced to the digital resources and functionality available on the Imagine Learning Classroom (ILC) platform through hands-on activities while reinforcing a higher-level understanding of the core principles of the Illustrative Mathematics Curriculum.
**Highly recommended for New Teachers at the start of each school year.*

- Teach & Learn Parts 1 & 2: K–2 / 3–5: Teachers will experience a lesson, investigate and reflect on content and language routines, explore various supports, understand assessment materials, and begin to use student thinking as a vehicle for productive planning. They will gain experience navigating the IL Classroom website and learn how to find teacher and student materials. After this training, teachers will be ready to begin using IM K-5 in their classrooms.

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).

Student digital licenses and consumable student workbooks are required each year of program implementation. Teacher print materials are required in Year 1 only. Replenishments can be purchased as needed. Teacher digital licenses are included with the purchase of student digital licenses. Kits are provided in Year 1, kit replenishment and/or new kits can be purchased as needed.

Instructional Resources

Imagine Learning Illustrative Mathematics K-5, resources include the following:
K-5 Teacher Resources:

- Teacher Course Guide (Print)
- Teacher Unit Guides (Units 1-8 or 9 depending on grade level) (Print)
- Teacher Resource Packs (Print)
- Imagine Learning Classroom Teacher License (Digital)
- Class Manipulative Kits

Imagine Learning Classroom includes digital access to all print components, teacher notes, classroom and distance-ready lesson cards with teacher annotation, assignable lessons and assessments, family materials, extension problems, digital interactives, digital assessments, digital practice sets, centers activities including data from digital centers, PLC's, reports, and more.

K-5 Student Resources:

- Student Workbook (Units 1-8 or 9 depending on grade level) (Print) - available in English and Spanish
- Imagine Learning Classroom Student License (Digital): Imagine Learning Classroom includes access to student workbook content, interactive lessons, videos, virtual manipulatives, digital assessments, digital practice sets, and more.

Implementation Support

Directly following contract signing, a Customer Success Manager (CSM) will be assigned to the district to serve as a main point of contact. The CSM will ensure that the kickoff meeting, site set up, and onboarding occur within the first few weeks of closing. In addition, you will have access to our 24-hour customer support for technical issues via email. The key milestones for the successful implementation plan will include kickoff, onboarding, launch/sustaining support, and wrap up/end of year.

Technical Requirements

Imagine Learning is a modern, HTML5, web-based platform hosted on Amazon Web Services (AWS). All our software and digital materials are responsive, compatible with standard internet browsers, operating systems, tablets, and other mobile devices.

Response to Report

Imagine Learning is thankful for the MA CURATE review of Imagine Learning Illustrative Mathematics (ILIM) K-5. ILIM is a comprehensive math program that helps students develop deep conceptual understanding through problem-solving and real-world application.

While the review found that ILIM partially meets expectations in the areas of Classroom Application and Accessibility for Students, it is important to note that ILIM is designed to reach learners at all levels of understanding. The program includes embedded supports to help teachers address the needs of diverse learners, including:

- **Advancing Student Thinking:** This support, embedded in the Teaching Notes, provides questions for addressing student misconceptions.
- **Response to Student Thinking:** Included in Cool-Downs, this offers just-in-time and next-day support, as well as connections to prior units, to address misconceptions and support students working below grade level.
- **Mathematical Language Routines (MLRs):** These routines provide structure for students to develop math and academic language.
- **Learning Narrative Videos:** These unit-specific videos highlight possible misconceptions and offer actionable responses for teachers.
- **Learning Support Videos:** Part of the Unit Launch, these videos outline tools and representations students can use.
- **Centers:** Developed in non-grade-specific stages, centers can meet students at their learning level.
- **End of Unit Assessment Guidance:** Suggestions for supporting students during assessments and interpreting misconceptions.

Imagine Learning is committed to providing a high-quality math program that is accessible to all learners. The supports included in the ILIM, combined with the robust professional development, help ensure that all students have the opportunity to succeed in math.