

Illustrative Mathematics

Program Overview
Grades 6–8



Authors, Research, and Certified Partnership

Illustrative Mathematics (IM) was authored by Dr. Bill McCallum and a team of math leaders focused on improving student outcomes in mathematics. The problem-based curriculum is built on best practices and research principles from NCTM, National Research Council, Smith & Stein, and others. The new IM K–5 Math completes the K–12 series.

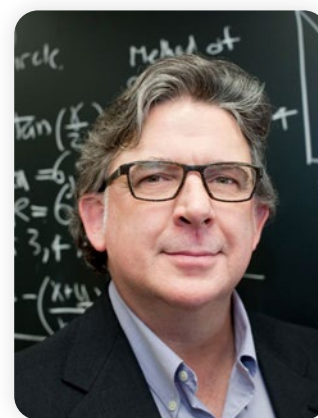
Certified Partnership

Imagine Learning is one of Illustrative Mathematics' Certified Partners. The IM Certified designation assures that the materials adhere to IM's philosophy and have been developed, reviewed, and approved by Illustrative Mathematics.



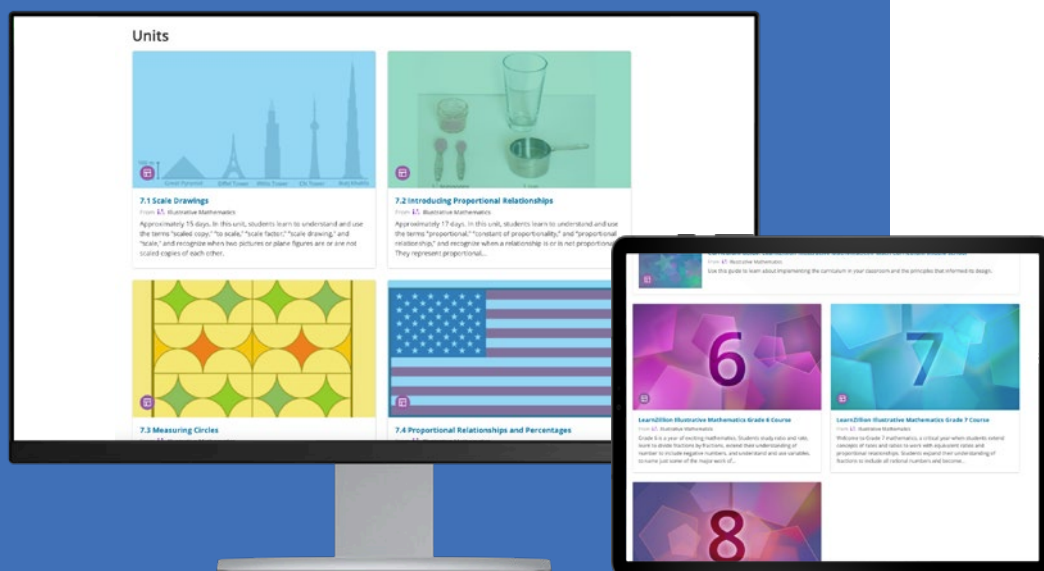
The Imagine Learning Illustrative Mathematics instructional experience aligns with the 2015 Every Student Succeed Act (ESSA) Theory of Change for effective evidence-based programs. The goal is to deliver an engaging and easy-to-implement instructional solution that leverages the power of high-quality curricula.

The result? Comprehensive support for teachers and positive learning outcomes for students.



“It’s important for students to attach meaning to their work, and IM 6–8 Math does just that. The curriculum is structured so learners have opportunities to make connections between mathematical ideas and relate them to real-world contexts for success in algebra and beyond.”

...
Dr. William McCallum



Imagine Learning Illustrative Mathematics



For Grades 6–8

A dynamic, engaging instructional experience
that leverages the power of high-quality curricula:



Students enjoy mathematics, make mathematical connections, and develop conceptual understanding.



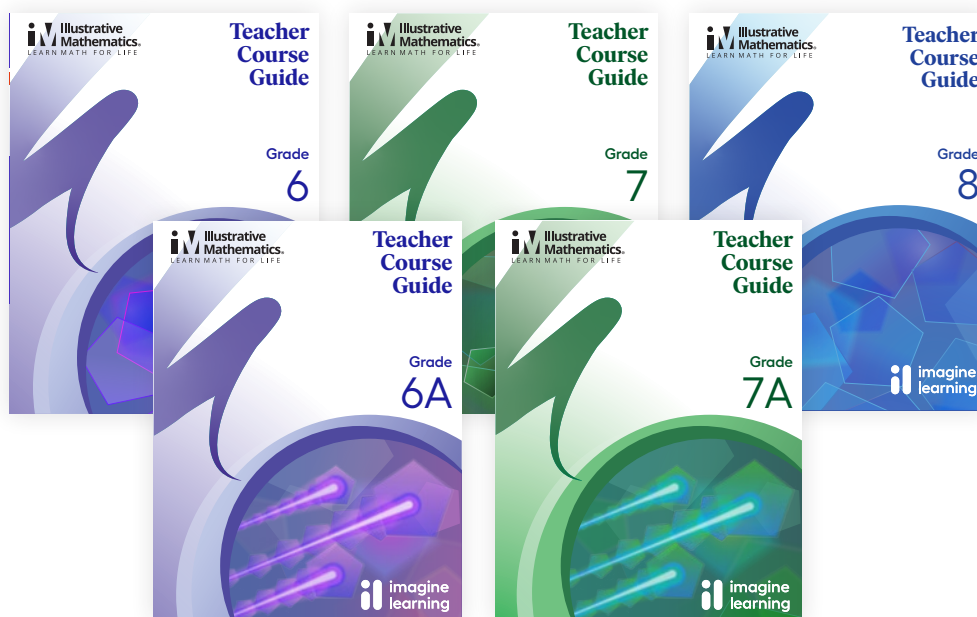
Teachers orchestrate discussions, synthesize understanding, and facilitate interactive lessons with confidence.



Imagine Learning partners with schools and districts for seamless integration and implementation.

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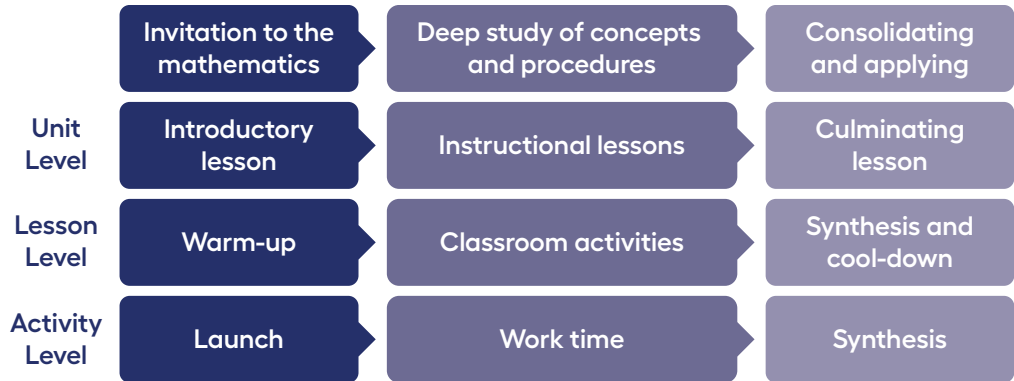
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Instructional Design

The grades 6–8 series offers two pathways: a traditional, three-year sequence comprised of Grades 6, 7, and 8 courses, and a 2-year accelerated sequence that compresses three years of mathematics into the Accelerated 6 and 7 courses, allowing students to begin high school mathematics in 8th grade. The instructional design of both pathways supports all students through a coherent progression of mathematics based on the standards and research-based learning trajectories.

Each activity and lesson is part of a mathematical story across the units. This articulation allows students to view mathematics as a connected set of ideas that makes sense.



The overarching design structure at each level is as follows:

Units

Each unit starts with an invitation to mathematics. The first few lessons provide an accessible entry point for all students and offer teachers the opportunity to observe students' prior understandings.

Card 4 of 21
1.1 Warm-up

Let's think about going to the movies!

- What do you know about the popcorn for sale?
- What sizes does it come in?
- About how much does it cost?

Teaching notes

Instructional routine: *Think Pair Share*

Launch

- Ask students to remember the last time they went to the movies.
- What do they know about the popcorn for sale? What sizes does it come in? About how much does it cost?
- The launch for this activity continues on the following card.

Lessons

Each lesson starts with a warm-up to set up the day's work or strengthen number sense and procedural fluency.

Card 4 of 24
2.1 Warm-up

1) What do you notice? What do you wonder?

C

$a + b$	$a + b$	$a + b$	$a + b$
---------	---------	---------	---------

Z

x	x	x	x	y
---	---	---	---	---

Teaching notes

Instructional routine: *Notice and Wonder*

Launch

- Arrange students in groups of 2.
- Tell students that they will look at an image, and their job is to think of at least one thing they notice and at least one thing they wonder.
- Display the image for all to see.
- Ask students to give a signal when they have noticed or wondered about something.
- Give students 1 minute of quiet think time, and then 1 minute to discuss the things they notice with their partner, followed by a whole-class discussion.
- This Launch continues on the following card.

Student response

- Answers vary. Sample responses:

Instructional Activities

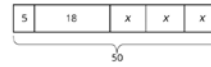
This is followed by instructional activities in which students are introduced to new concepts, procedures, contexts, or representations, or make connections between them.

Card 9 of 24

2.2 Activity: Every Picture Tells a Story

Here are three stories with a diagram that represents it. With your group, decide who will go first. That person explains why the diagram represents the story. Work together to find any unknown amounts in the story. Then, switch roles for the second diagram and switch again for the third.

- 1) Mai made 50 flyers for five volunteers in her club to hang up around school. She gave 5 flyers to the first volunteer, 18 flyers to the second volunteer, and divided the remaining flyers equally among the three remaining volunteers.



Student response

1. Answers vary. Unknown amounts that students may find include the remaining number of flyers (27) and the number of flyers given to each of the 3 remaining volunteers (9). The whole rectangle represents the 50 flyers that Mai made. She split them up into five parts: 5, 18, and 3 equal parts for the rest. The 3 equal parts are shown by 3 same-sized boxes. x represents the number of flyers for each of the 3 remaining volunteers. $3 \cdot x$ is the number of flyers remaining after Mai gave out 5 and 18. That part has to represent 27 flyers, since 23 of them ($5 + 18$) have already been given out. So each x represents 9 flyers.

Anticipated misconceptions

- Students may not realize that when a variable is assigned to represent a quantity in a situation, it has the same value each time it appears.
- Revisit what x and y represent in these problems and why each occurrence of a variable must represent the same value.

Synthesis and Cool-down

The lesson ends with a synthesis to consolidate understanding and make the learning goals of the lesson explicit, followed by a cool-down to apply what was learned.

Card 21 of 24

Lesson Synthesis

What are some ways that tape diagrams give information about a story?



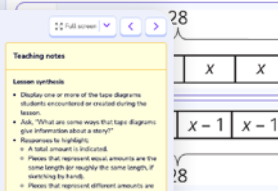
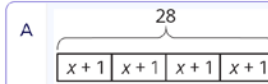
Card 3 of 2

2.4 Cool-down

Here is a story: Lin bought 4 bags of apples. Each bag had the same number of apples. After eating 1 apple from each bag, she had 28 apples left.

1. Which diagram best represents the story?

Select the correct choice.



Teaching notes

Lesson synthesis

- Display one or more of the tape diagrams. Students encountered or created during the lesson.
- Ask, "What are some ways that tape diagrams give information about a story?"
- Responses to highlight:
 - A total amount is indicated.
 - Pieces that represent equal amounts are the same length or roughly the same length, if working by hand.
 - Pieces that represent different amounts are not the same length.
 - Pieces are labeled with either their amount, a variable representing an unknown amount, or an expression like $x + 1$ to mean "1 more than the unknown amount."

Practice Problems

Each lesson includes a set of practice problems for independent work time. These can be used in class or as homework. Teachers have the option to assign via paper and pencil or digitally through Imagine Learning (IL) Classroom. There is also another digital set of problems that teachers can assign for additional practice opportunities.

Card 4 of 6

7.6.2 Practice 4

(from Unit 5, Lesson 13)

1. Without evaluating each expression, determine which value is the greatest.

☐ A. $7\frac{3}{4} - 9\frac{3}{4}$

☐ B. $(-7\frac{3}{4}) + (-9\frac{3}{4})$

7.1 Digital Practice sets

All of the digital practice sets for Grade 7, Unit 1, including the Additional Practice Problems. Practice sets can also be found in the Materials section of the corresponding lessons.

Lesson	Original	Additional
1	Practice Problems	Additional Practice Problems
2	Practice Problems	Additional Practice Problems
3	Practice Problems	Additional Practice Problems
4	Practice Problems	Additional Practice Problems
5	Practice Problems	Additional Practice Problems
6	Practice Problems	Additional Practice Problems
7	Practice Problems	Additional Practice Problems
8	Practice Problems	Additional Practice Problems
9	Practice Problems	Additional Practice Problems
10	Practice Problems	Additional Practice Problems
11	Practice Problems	Additional Practice Problems
12	Practice Problems	Additional Practice Problems

- The practice problem set includes a few questions about the content of that lesson, as well as distributed practice from earlier content to ensure fluency.

Guiding Principles Across Grades 6–8

Learning Mathematics by Doing Mathematics

A problem-based instructional framework supports teachers in structuring lessons, so students are the ones solving the problems and learning mathematics. The activities and routines are designed to give students a chance to demonstrate what they already know—and show what they can figure out—before having concepts and procedures explained to them.

Balancing Rigor

Three aspects of rigor are essential to mathematics: conceptual understanding, procedural fluency, and the ability to apply these concepts and skills to mathematical problems with and without real-world contexts. These aspects are developed together to support student understanding.

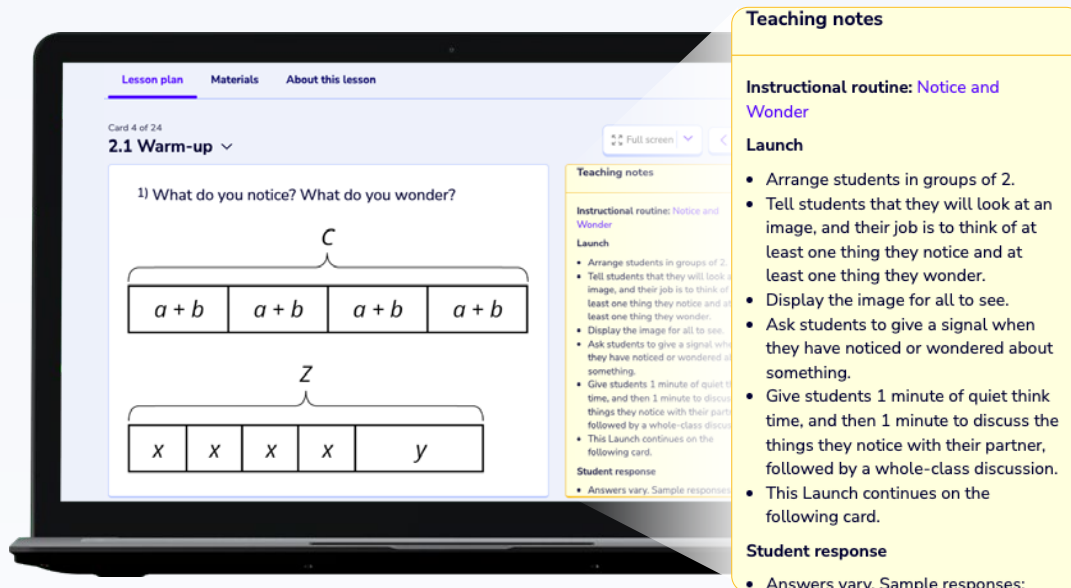
Establishing Norms

Structures around doing math together and sharing understandings play an important role in the success of a problem-based curriculum. Students must take risks, listen to each other, disagree respectfully, and honor equal time when working together in groups. Establishing norms helps teachers cultivate a community of learners where visible thinking is both expected and valued.



Instructional Routines

Instructional routines create structures so all students can engage and contribute to mathematical conversations. Throughout the curriculum, routines are introduced in a purposeful way to build a collective understanding of their structure.



The laptop screen shows a lesson plan interface. At the top, there are tabs for 'Lesson plan', 'Materials', and 'About this lesson'. Below the tabs, it says 'Card 4 of 24' and '2.1 Warm-up'. The main content area contains a diagram with two rows of boxes. The top row has four boxes, each containing $a + b$, with a bracket above them labeled 'C'. The bottom row has four boxes, each containing 'x', and one box containing 'y', with a bracket above them labeled 'Z'. To the right of the diagram, there is a 'Teaching notes' section. It includes the text 'Instructional routine: Notice and Wonder' and 'Launch'. Below this, there is a list of bullet points: 'Arrange students in groups of 2.', 'Tell students that they will look at an image, and their job is to think of at least one thing they notice and at least one thing they wonder.', 'Display the image for all to see.', 'Ask students to give a signal when they have noticed or wondered about something.', 'Give students 1 minute of quiet think time, and then 1 minute to discuss things they notice with their partner, followed by a whole-class discussion.', 'This Launch continues on the following card.', 'Student response', and 'Answers vary. Sample responses:'. Below the list, there is a section titled 'Student response' with the same text: 'Answers vary. Sample responses:'.

Teaching notes

Instructional routine: Notice and Wonder

Launch

- Arrange students in groups of 2.
- Tell students that they will look at an image, and their job is to think of at least one thing they notice and at least one thing they wonder.
- Display the image for all to see.
- Ask students to give a signal when they have noticed or wondered about something.
- Give students 1 minute of quiet think time, and then 1 minute to discuss things they notice with their partner, followed by a whole-class discussion.
- This Launch continues on the following card.

Student response

- Answers vary. Sample responses:

Use of Digital Tools

The curriculum empowers students to become fluent users of digital tools that produce representations, solve problems, and communicate their reasoning. Imagine Learning (IL) Classroom embeds Desmos, GeoGebra, and other interactive tools at the point of use to amplify understanding and engagement.



The laptop screen shows the Desmos graphing calculator interface. On the left, there is a cylinder with a height of 10 ml. Below it, the text reads: 'Volume = 117.8 ml', 'Height = 6 cm', and 'Diameter = 5 cm'. On the right, there is a scatter plot with a grid. The x-axis is labeled 'Volume in ml (v)' and the y-axis is labeled 'Height in cm'. A point is highlighted with a label '(51.2, 2.6)'. The tablet screen shows a '2.3 Activity Applet: Every Story Needs ...'. It has a 'Show Controls' checkbox checked. Below it, there are two input fields: 'How many equal parts?' with the value '1' and 'How many equal parts?' with the value '4'. There are also two input fields: 'Label: 24' and 'Label: x'. Below these, there is a diagram with two sections, 'Section 1' and 'Section 2'. Section 1 has a box with the value '24'. Section 2 has four boxes, each containing 'x'. Below the diagram, there is a 'Total:' label followed by an input field.

Teacher Experience

The program's resources are specially tuned to support teachers in planning and facilitating lessons across the various instructional models including face-to-face, hybrid, and distance learning.

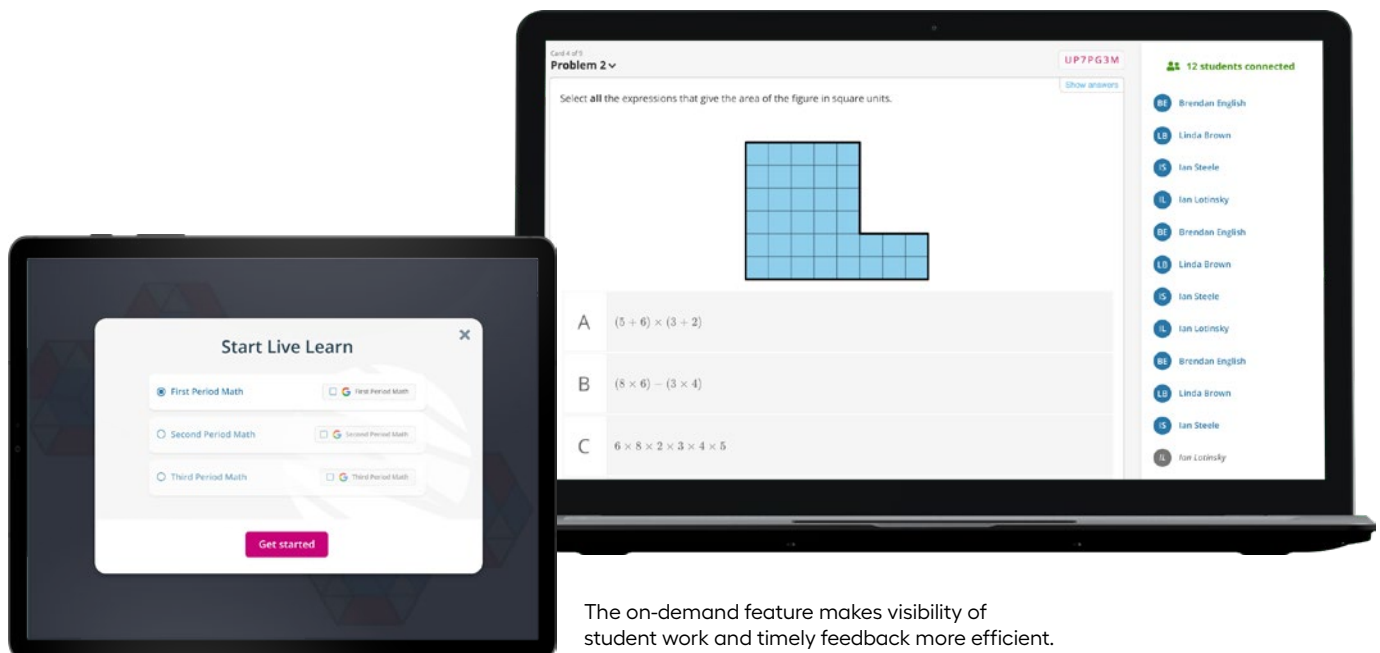
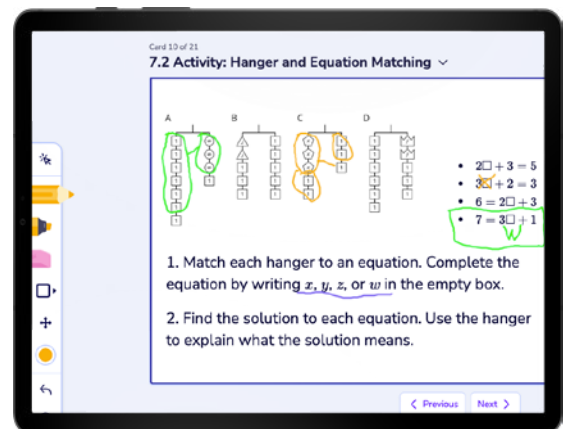
Print versions of Teacher's Editions and Student Workbooks mirror digital offerings, ensuring the integrity of the rich Illustrative Mathematics content is maintained in any environment or instructional model.

Flexibility and Personalization

Lesson cards can be projected or assigned to students, which allows flexibility for synchronous and asynchronous instruction. Lesson plans can be copied, edited, and customized as needed.

Daily instruction comes alive through the **annotation tool**, with the ability to write, draw, model, and share student work directly on the lesson cards. Teachers can annotate in lesson plan and fullscreen views.

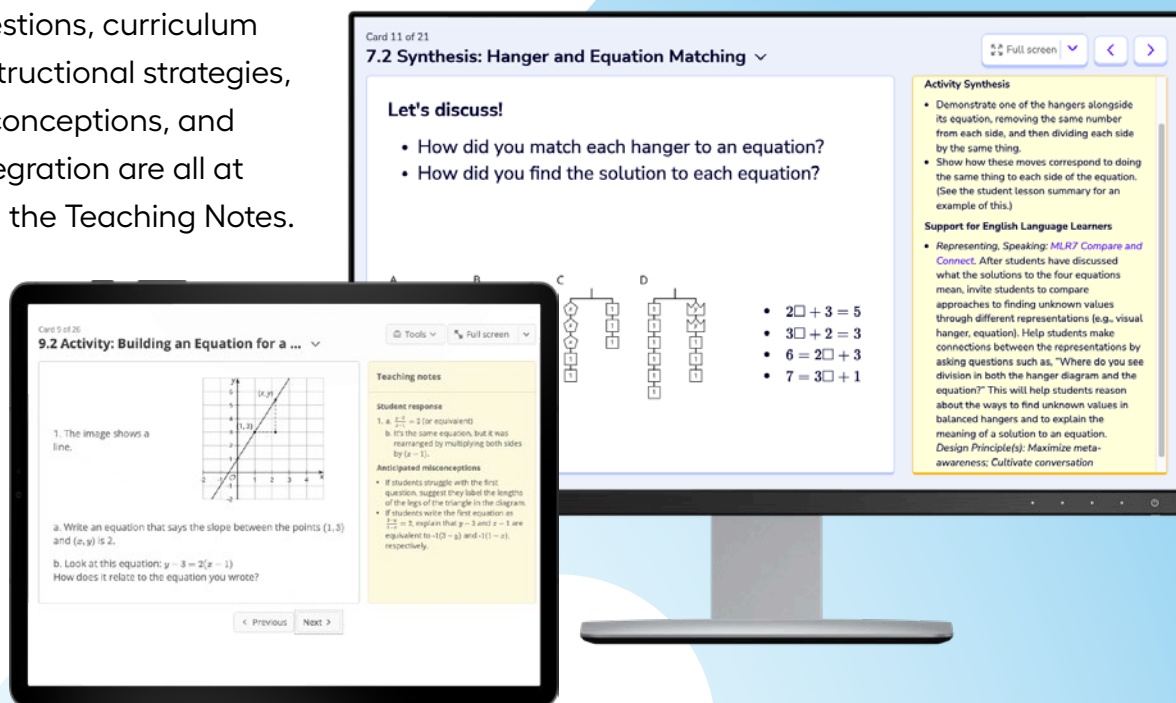
Live Learn allows for synchronous instruction virtually within the platform. Teachers can transition from asynchronous work time to a live session with one click.



The on-demand feature makes visibility of student work and timely feedback more efficient.

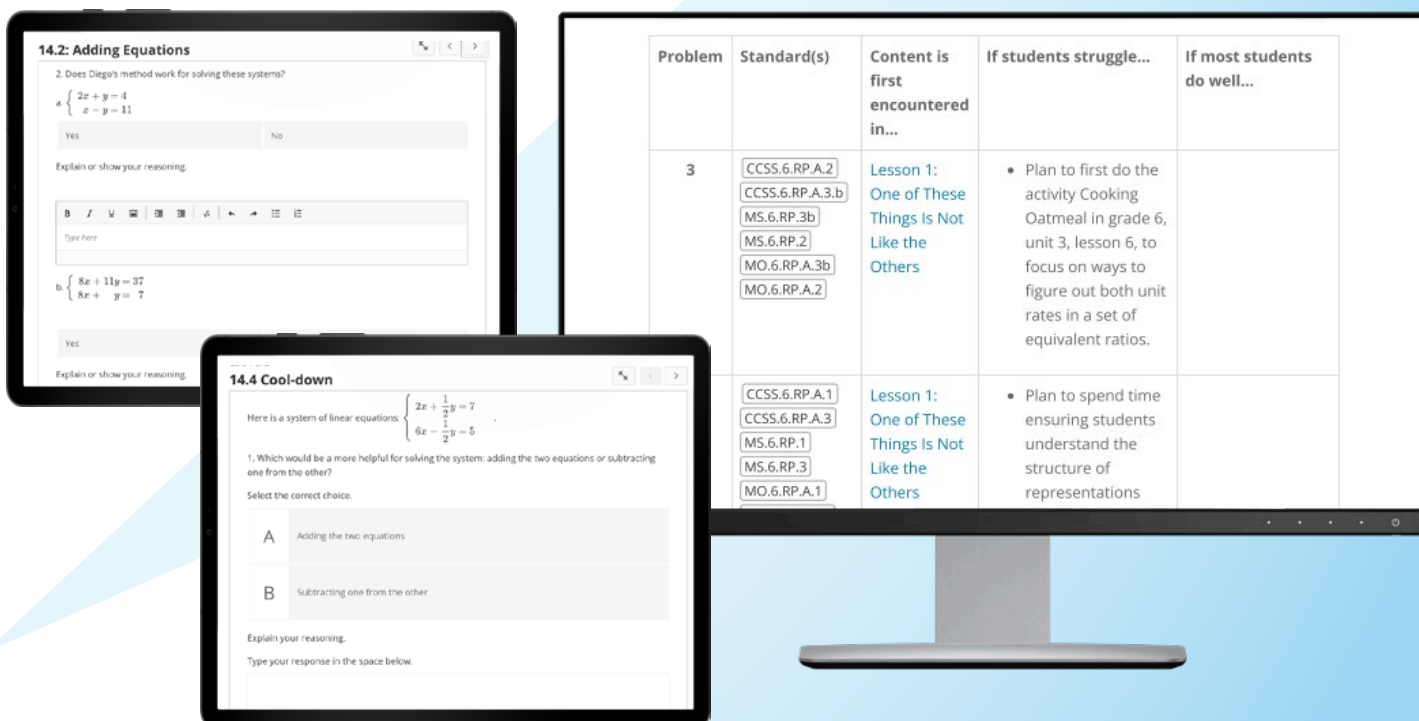
Embedded Teacher Support

Reflection questions, curriculum narratives, instructional strategies, common misconceptions, and digital tool integration are all at point-of-use in the Teaching Notes.



Formative Assessment Tools

Teachers are equipped to monitor student progress through diagnostic assessments, digital task statements, digital practice sets, cool-downs, and monitoring templates. These provide real-time feedback and data to inform instructional decisions.



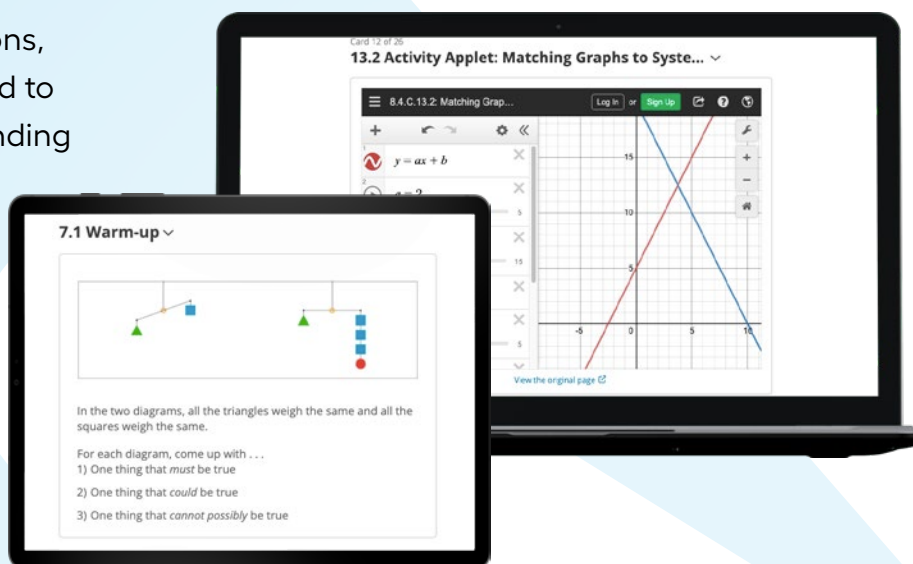
Student Experience

In Illustrative Mathematics, students enjoy mathematics, make mathematical connections, and develop conceptual understanding.

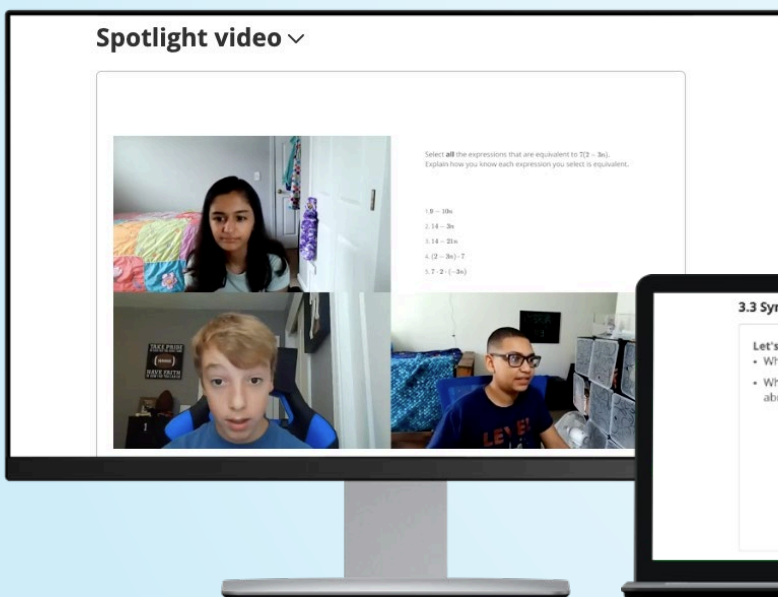
Students have print and interactive digital resources for optimal instruction and enrichment.

Deep Focus on Conceptual Understanding, Procedural Fluency, and Application

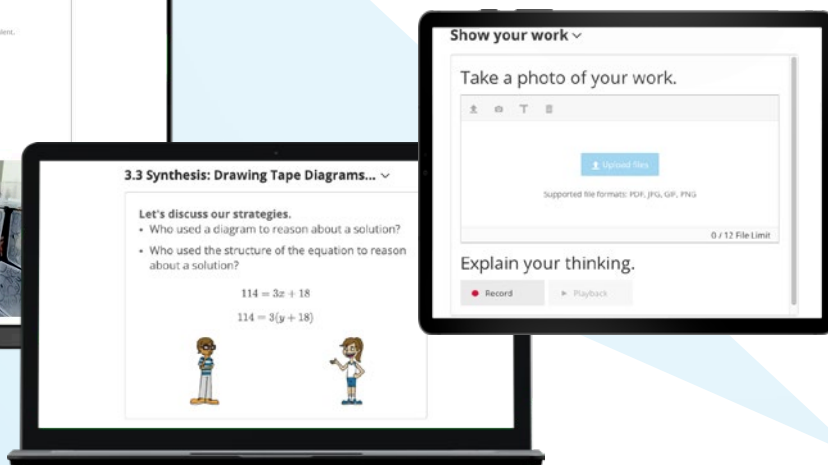
Instructional routines, representations, and digital tools are carefully utilized to help students develop an understanding of concepts and procedures.



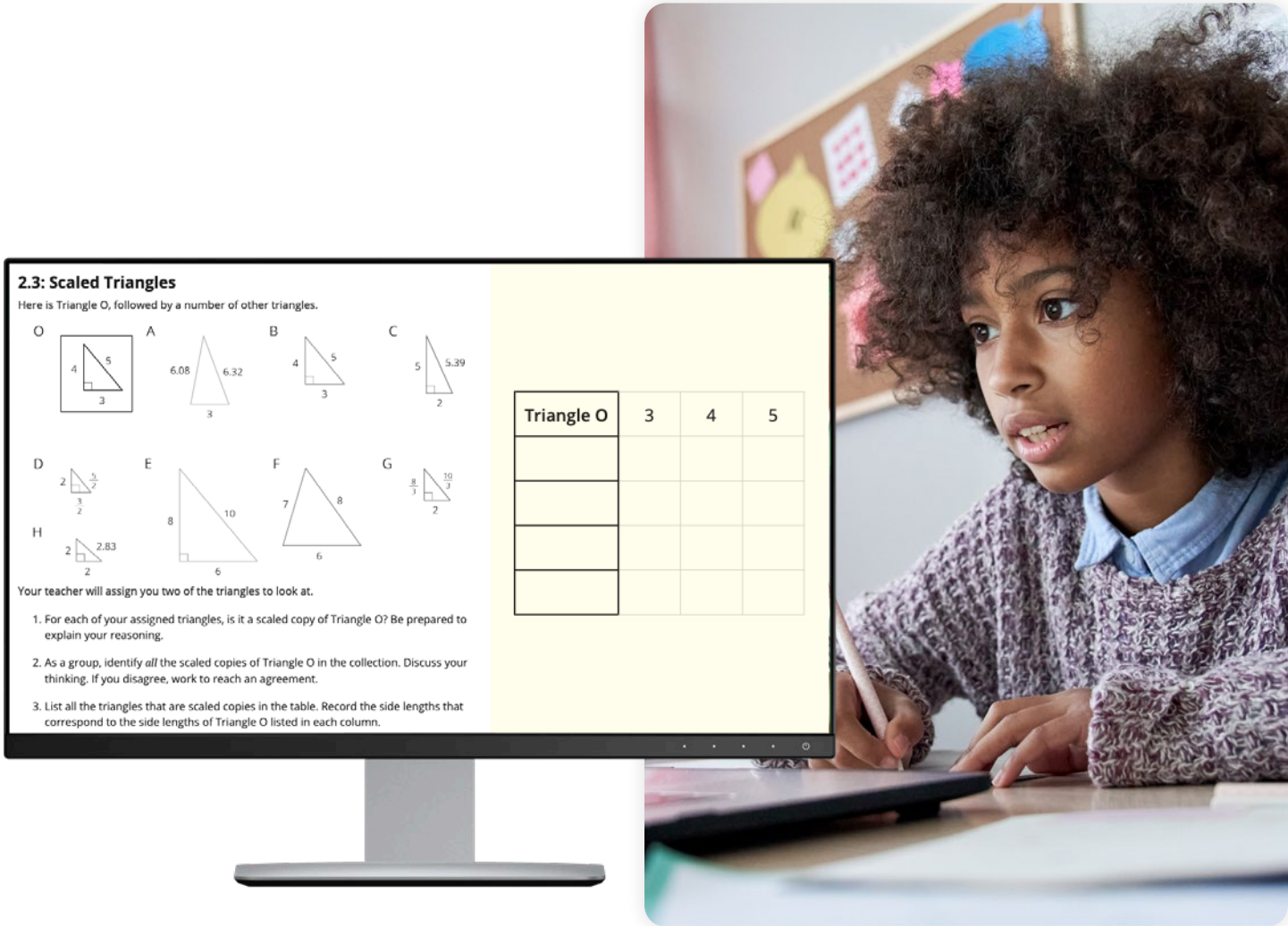
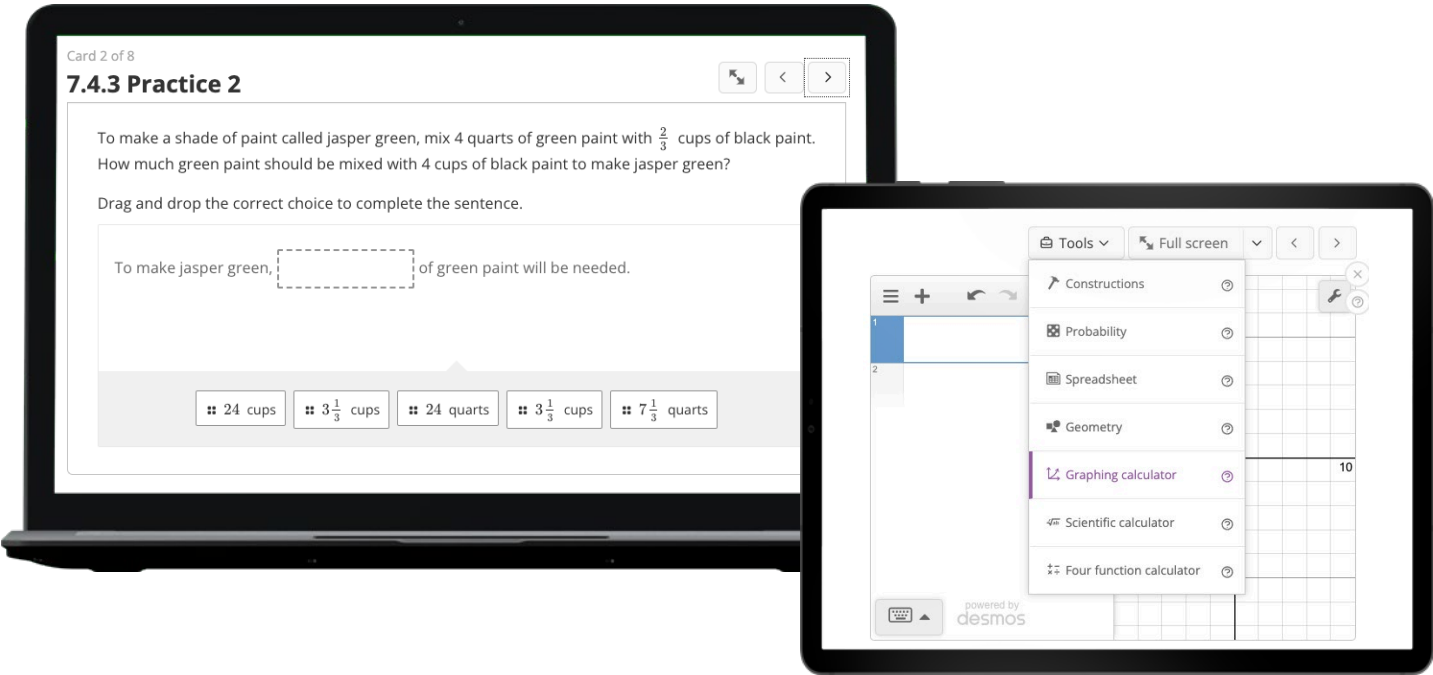
Embedded Opportunities For Active Discussion, Reflection, and Fostering Mathematical Practices



Spotlight lessons feature real students and their work, providing a social learning connection.



Students Engage with the Content through Digital, Print, and Interactive Resources



Equity and Access

There are three major design principles to support all learners:

Provide access
for all

.....

Presume
competence

.....

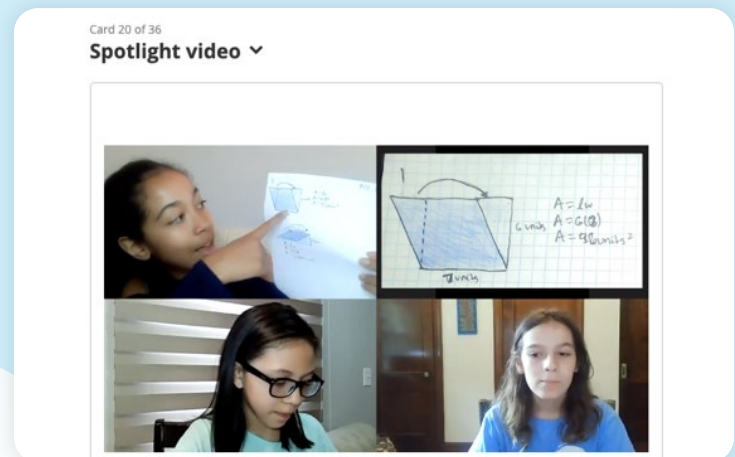
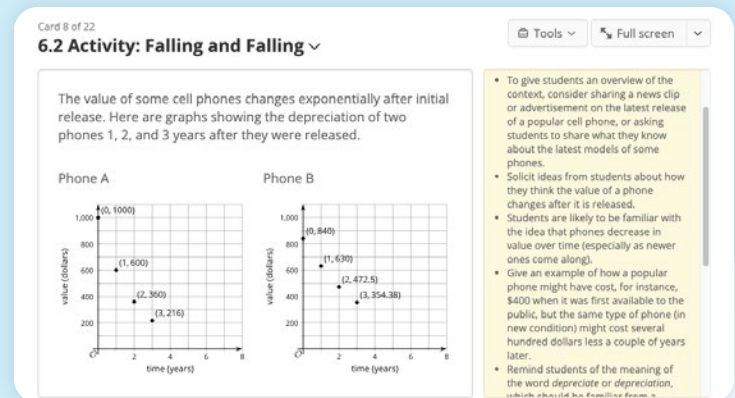
Provide a
strength-based
approach

Embedded structures to foster endurance and perseverance

In the curriculum, careful attention is given to the complexity of contexts, as well as to students' potential familiarity with given contexts and representations.

Peer modeled conversations

Student Spotlight Lessons are anchored by videos showing interactive discussions between groups of students, along with visuals of their individual approaches. The on-demand example conversations between peers foster engagement and collaboration.



Resources to mitigate unfinished learning

Adaptation Packs are designed to address unfinished or gaps in learning that students may have from previous experiences.

Modified plan

Check Your Readiness modified plan

Assessments	Recommended Items
Diagnostic assessment	7.2 Check Your Readiness Assessment

Note that the Check Your Readiness Assessment includes item-by-item guidance to inform just-in-time adjustments to instruction within the lessons in 7.2.

Day-by-day modified plan

This modified unit plan is provided to show how the recommended lesson additions could be blended into the unit to provide review as it is needed.

Day	IM lesson	Notes
1	6.3.5	If the initial assessment shows that students are not familiar with equivalent ratios, include this activity before continuing with grade-level content.
2	6.3.6	If the initial assessment shows that students are not familiar with unit rates associated with a ratio, include this activity before continuing with grade-level content.
3	6.3.7	If the initial assessment shows that students are not familiar with using tables to examine equivalent ratios, include this activity before continuing with grade-level content.
4	7.2.1	Focus on key ideas in proportional relationships.

7.2 Adaptation Pack: Introducing Proportional Relationships

Grade 7, Unit 2 Adaptation pack. Adaptation pack student supplement also included.

Relevant Unit(s) to review: Grade 6 Unit 3 Unit Rates and Percentages
Grade 6 Unit 4 Expressions and Equations

Essential prior concepts to engage with this unit

per hour, meters per second, dollars per pound, or cents per minute

proach

See rates and their relationship with unit rates (6.3.5-6.3.8), then introduce the concept of proportional relationships (7.2.1-7.2.11). Next, use representations to compare rates and consider how each of the representations (rate tables, unit rates, and equations) can be used to represent the same relationship. This leads to understanding that a proportional relationship can be represented by an equation of the form $y = kx$ where k is the constant of proportionality (7.2.8).

Lessons to Remove or Modify

Lesson 2	1. Remove 7.2.6 - additional practice that could be done outside of class
Lesson 2	2. Combine 7.2.7 and 7.2.8 - both lessons focus on comparing relationships (7.2.7 - activities 2 and 3, 7.2.8 - activities 2 and 3)
Lesson 2	3. Remove 7.2.15 - optional activity

Grade 7, Unit 2: Introducing Proportional Relationships

Please check our Distance and Unfinished Learning page for the overview of applying Section Planning Guides.

Lessons 1-9: Comparing Proportional and Nonproportional Relationships

Explore, Play, and Discuss

- I can write the constant of proportionality as an entry in a table

Suggested Activities

- Lesson 4: Students find missing values in tables and see if they can find the constant of proportionality (activities 2 and 3)
- Lesson 5: Students find patterns in images and describe the pattern using ratios (activity 1). Students complete tables finding a constant of proportionality (activities 2 and 3).

Suggested Assessments

- Check Your Readiness Assessment: Administer all 7 items within the first day or two of this section. Use the guidance provided with each problem to adjust instruction so that students can access the math in the unit.

Deep Dive

- I can decide if a relationship represented by a table could be proportional and when it is definitely not proportional.
- I can decide if a relationship represented by an equation is proportional or not.

Section Level Planning Guides identify essential lessons and activities that address major work of the grade or prerequisites, and provide guidance on distance learning activities to support each lesson or activity.

Cool-down support addresses newly discovered unfinished learning and identifies opportunities to revisit content in future lessons, without stopping to re-teach a concept.

Cool-down Guidance

Lesson	Support Level	Notes
7.2.5	2. Points to emphasize	If students struggle with variable representation in the cool-down, plan to revisit this when opportunities arise over the next several lessons. For example, in activity 2 of Lesson 6, make sure to invite multiple students to share their thinking about how they solved the problem. Examples are in the next lesson.
7.2.6	2. Points to emphasize	If students struggle with writing an equation of proportionality in the cool-down, plan to focus on how to use this equation when opportunities arise over the next several lessons. For example, in activities 2 and 4 of Lesson 8, use the tables in the lessons to help students see a pattern of constant change.
7.2.7	2. Points to emphasize	If students struggle with variable placement in the cool-down, plan to focus on how to use the equation $y = kx$ when opportunities arise over the next several lessons. For example, in activity 1 of Lesson 9, have students share their thinking about using the equation to show a proportional relationship.
7.2.8	2. Points to emphasize	If students struggle with setting up tables in the cool-down, plan to focus on how to do this when opportunities arise over the next several lessons.
7.2.9	3. Press pause	If students struggle with this cool-down, and possibly previous, related cool-downs, working with writing equations that represent given relationships, make time to revisit the work of Lessons 5-8. See the Course Guide for ideas to help students re-engage with earlier work.
7.2.10	1. More Chances	Students will have more opportunities to understand the mathematical ideas in this cool-down, so there is no need to slow down or add additional work to the next lessons. Instead, use the results of this cool-down to provide guidance for what to look for and emphasize over the next several lessons to support students in advancing their current understanding. Remind students that in order to be a proportional relationship on a graph, the line must pass through the origin.
7.2.11	2. Points to emphasize	If students struggle with finding the constant in the cool-down, plan to focus on this when opportunities arise over the next several lessons.

Equity and Access, continued

Access for Students with Disabilities

There are embedded supports for students with disabilities that can be found in the teaching notes. These supports were designed using the Universal Design for Learning (UDL) guidelines. These align to one of the three principles of UDL: engagement, representation, and action and expression.

Card 11 of 29

5.2 Synthesis: Meters and Centimeters

Full screen

Let's share our answers and strategies for this activity.

- How can we find an equation for each table?
- Where does the constant of proportionality occur in the table and equation?
- What is the relationship between the two constants of proportionality? How can you use the equations to see why this should be true?

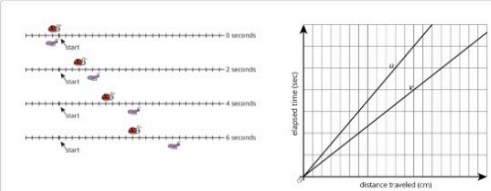
mathematical language use by restating a response as a question in order to clarify, and apply appropriate language.
Design Principle(s): Maximize linguistic and cognitive awareness

Support for students with disabilities

- Engagement:** Develop effort and persistence. Encourage and support opportunities for peer interactions. Prior to the whole-class discussion, invite students to share their work with a partner. Display sentence frames to support student conversation such as: "First, I _____ because..." "I noticed _____, so I..." "Why did you ...?" and "I agree/disagree because..."
Supports accessibility for: Language; Social-emotional skills

Card 2 of 3

1.2 Are you ready for more?



Use the graphs to answer the questions below.

- How fast is each bug traveling?
- Will there ever be a time when the ant is twice as far away from the start as the ladybug? Explain or show your reasoning.

Advanced Learners

Lessons include “Are you Ready for More?” extension problems to challenge students. These exercises go deeper into grade-level mathematics and often make connections between the topic at hand and other concepts.



English Language Learners

Embedded supports for English learners are found in the teaching notes. Mathematical language routines are based on the UL/SCALE framework developed at Stanford University. The eight consistent routines simultaneously support students' learning of mathematical practices, content, and language.

This lesson continues on the next card.

Support for English Language Learners

- Reading, Writing:** *MLR6 Three Reads*. Use this routine to support reading comprehension of this word problem, without solving it for students. In the first read, students read the problem with the goal of comprehending the situation (e.g., A car dealership bought a car. The dealership wants to make a profit. They need to decide what price the car should be.). If needed, discuss the meaning of unfamiliar terms this time (e.g., profit, wholesale, retail, commission, etc.). Use the second read to identify the important quantities by asking students what can be counted or measured (e.g., wholesale price, profit or mark-up, retail price). In the third read, ask students to brainstorm possible mathematical solution strategies to complete the task. This will help students connect the language in the word problem and the reasoning needed to solve the problem while keeping the intended level of cognitive demand in the task.
Design Principle(s): Support sense-making

Anticipated misconceptions

- If students don't know where to begin, encourage them to describe the diagrams and equations in words.
- For example, diagram E could be described “two groups of $x + 5$ equal 19,” and so could the equation $2(x + 5) = 19$.

Support for English Language Learners

- Speaking, Representing:** *MLR2 Collect and Display*. As students explain how the equation matches the diagram, listen for and collect students' descriptions of the equation (e.g., “two groups of $x + 5$ equal 19”). Display collected language next to the corresponding tape diagram and equation for all to see. Invite students to borrow language from the displayed examples while sorting into categories, after the matching is complete. This will help students make connection between language, diagrams, and equations.
Design Principle(s): Support sense-making; Maximize meta-awareness

Support for students with disabilities

- Representation:** *Internalize Comprehension*.

Culturally Responsive Teaching and Learning



The 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, religion, and people with disabilities.

Card 21 of 29
5.4 Activity: Feeding Shrimp

At an aquarium, a shrimp is fed $\frac{1}{5}$ gram of food each feeding and is fed 3 times each day.

1) How much food does a shrimp get fed in one day?
2) Complete the table to show how many grams of food the shrimp is fed over different numbers of days.

number of days	food in grams
1	
7	
30	

Shrimp in aquarium Copyrights Owner: iustitay License: Public Domain Via Pixabay

Student response

1. $\frac{1}{5}$ grams

2.

number of days	food in grams
1	$\frac{1}{5}$
7	$\frac{7}{5}$
30	$\frac{30}{5}$

See a larger version of this table.

Support for English Language Learners

- Speaking, Reading: *MLRS Co-Craft Questions*. Use this routine to help students interpret the language of proportional relationships, and to increase awareness of language used to talk about proportional relationships. Display only the first sentence of this problem ("At an aquarium, a shrimp is fed $\frac{1}{5}$ gram of food each feeding and is fed 3 times each day"), and ask students to write down possible mathematical questions that could be asked about

Card 9 of 32
4.2 Activity Prep

Let's write equations describing proportional relationships.

- In this activity, you will revisit a context that you worked on in an earlier lesson.
- First, you will study a table for a rice recipe.
- Then, you will complete the missing information in the table.
- Next, you will follow the same steps for considering a spring roll recipe.
- Finally, we will have a class discussion about our strategies for solving.

Card 10 of 24
6.2 Activity: Expressions with Altitude

A mountaineer is changing elevations. Write an expression that represents the difference between the final elevation and beginning elevation. Then write the value of the change. The first one is done for you.

beginning elevation (feet)	final elevation (feet)	difference between final and beginning	change
+400	+900	900-400	+500
+400	+50		

4.3 Are you ready for more?

Research subway fare and taxi fare in New York City to answer the question below:

While in New York City, is it a better deal for a group of friends to take a taxi or the subway to get from the Empire State Building to the Metropolitan Museum of Art? Explain your reasoning.

Home Connections



Each unit includes family support materials that explain the key ideas and concepts in family-friendly language. There are also tasks to create a stronger school-home connection and empower parents and caregivers to support students outside of the classroom.

The grade 6–8 series includes lesson summary videos for checking understanding and reviewing important concepts and vocabulary. Parents and caregivers can use these as a resource for homework help.

8.3 Family Material

Material to share with families to support student learning

This unit covers three big topics. Read about each topic and find a task or activity to complete with your student below.

Proportional Relationships

Representing Linear Relationships

Feeling Shapes

Proportional Relationships

This week your student will consider what it means to make a useful graph that represents a situation and use graphs, equations, tables, and descriptions to compare two different situations.

There are many successful ways to set up and add scale to a pair of axes in preparation for making a graph of a situation. Sometimes we choose specific ranges for the axes in order to see specific information. For example, if two large cylindrical water tanks are being filled at a constant rate, we could show the amount of water in them using a graph like this:

Here is a task to try with your student:

This table shows some lengths measured in inches and the equivalent length in centimeters.

length (inches)	length (centimeters)
1	2.54
2	
10	50.8

1. Complete the table.
2. Sketch a graph of the relationships between inches and centimeters. Scale the axes so that all the values in the table can be seen on the graph.

Video Lesson Summary 1

Representing a Proportional Relationship

$C = \frac{3}{2}P$

Stew Recipe
3 carrots for every 2 potatoes

number of potatoes	number of carrots
150	225
300	450
450	675
600	900

COMMON CORE STATE STANDARDS for MATH

Assessment

Measure understanding and meet learning goals

Illustrative Mathematics offers opportunities for both formative and summative assessment that empower teachers to measure student understanding and progress against learning goals.

Digital assessment resources include new generation item types including multiple choice, multiple select, and other tech-enhanced item types.

Formative Assessment

The Illustrative Mathematics instructional design offers regular, embedded options for monitoring student progress and providing constructive feedback.

Card 4 of 9
Problem 2 ▾

Blueberries cost \$4.00 per pound.

Enter the answer for each question in the box.

a. How many pounds of blueberries can you buy for \$1.00?

lbs

Explain your reasoning.

Show answers

Each unit begins with a **Check Your Readiness diagnostic assessment** of concepts and skills that are prerequisite to the unit. Teachers can use these to identify students with particular below-grade needs or topics to carefully address during the unit.

Card 31 of 31
Learning Targets ▾

Let's solve problems involving proportional relationships using tables.

I understand the terms proportional relationship and constant of proportionality.

I can use a table to reason about two quantities that are in a proportional relationship.

Pacing: ~3 minutes

- Share the learning target(s) with students.
- Ask students to reflect on whether or not they achieved the learning targets for today.
- You may want to use the "My Reflections" sheets for this unit to capture student responses.
- Questions to consider for this self-assessment:
 - Did you achieve today's learning target(s)?
 - Was anything easy for you?
 - What was challenging for you?
 - What else do you need in order to achieve the learning targets?

Learning Goals invite students into the work of that day.

Teachers and students can use **learning targets** as formative assessment prompts for a reflection or self-assessment as part of a lesson synthesis.

Card 31 of 32
4.5 Cool-down ▾

Snow is falling steadily in Syracuse, New York. After 2 hours, 4 inches of snow has fallen.

1) If it continues to snow at the same rate, how many inches of snow would you expect after 6.5 hours? If you get stuck, you can use the table to help.

2) Write an equation that gives the amount of snow that has fallen after x hours at this rate.

3) How many inches of snow will fall in 24 hours if it continues to snow at this rate?

time (hours)	snow (inches)
	1
1	
2	4
6.5	
x	

Teaching notes

Student response

1. 13 inches. Two inches fell in 1 hour, and 6.5 is $1 \cdot (6.5)$, and $2 \cdot (6.5) = 13$.
2. $y = 2x$ where x is the number of hours that have passed and y is the depth of the accumulated snow.
3. 48 inches. $24 \cdot 2 = 48$.

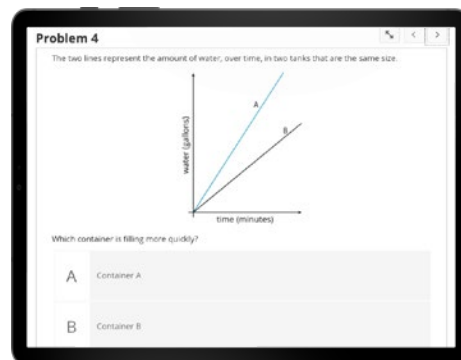
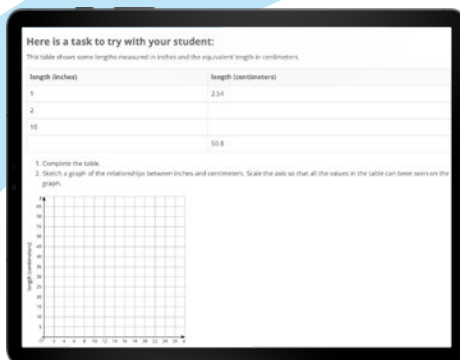
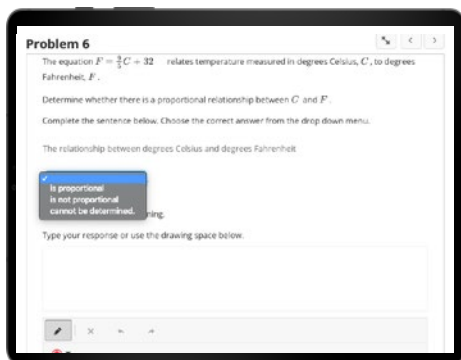
Response to student thinking

- **Points to emphasize:** If students struggle with using the unknown variable of x in the cool-down, ask students to use a chart to assist in understanding.

Each lesson includes a **Cool-Down** to assess that day's lesson.

Summative Assessment

Each unit includes an end-of-unit **written and digital assessment** to assess what students have learned at the conclusion of the unit. In longer units, a **mid-unit assessment** is also available.



Digital assessments allow students to access, record, and submit their questions and answers for a variety of technology-enhanced item types including multiple choice, multiple select, drag-and-drop, cloze, graphing, labeling, constructed response, short essay, and drawing types.

All **summative assessment** problems include a complete solution and standard alignment. Multiple-choice and multiple response problems often include a reason for potential errors.

Digital Practice

Additionally, a set of cumulative practice problems is provided for each lesson that can be used for homework or practice.

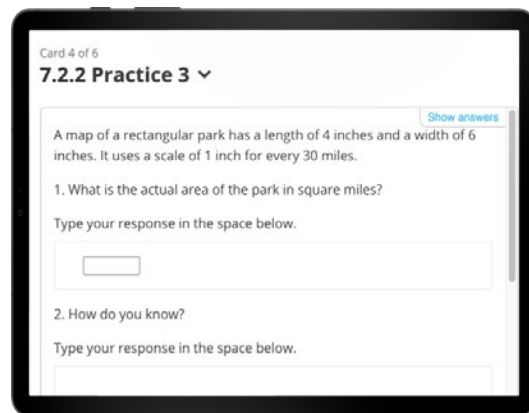
Performance Tasks

Most units have culminating lessons where students have an opportunity to show off their problem-solving skills or apply the mathematics they have learned to a real-world problem.

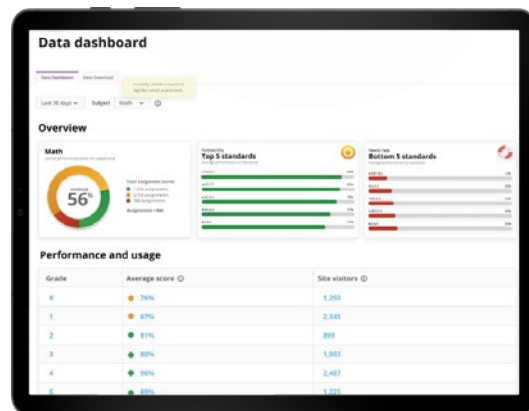
Data and Reporting

Real-time reporting is available for teachers to give them actionable data. Class Performance Reports show assignment scores and item analysis and year over year retention data.

Drill downs allow teachers to analyze student work for open-ended item type.



● Digital Practice



Program Components



LearnZillion Illustrative Mathematics Grade 6 Course

From  Illustrative Mathematics

Grade 6 is a year of exciting mathematics. Students study ratio and rate, learn to divide fractions by fractions, extend their understanding of number to include negative numbers, and understand and use variables, to name just some of the major work of...



LearnZillion Illustrative Mathematics Grade 7 Course

From  Illustrative Mathematics

Welcome to Grade 7 mathematics, a critical year when students extend concepts of rates and ratios to work with equivalent ratios and proportional relationships. Students expand their understanding of fractions to include all rational numbers and become...



LearnZillion Illustrative Mathematics Grade 8 Course

From  Illustrative Mathematics

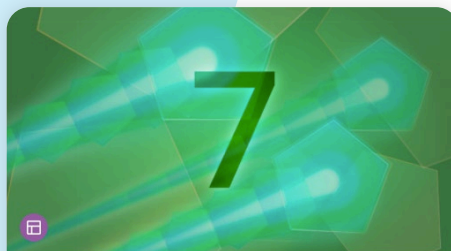
In this course, eighth graders tackle exciting new ideas and concepts in preparation for work in high school. They extend earlier understandings of proportional relationships to study linear relationships and work with linear equations in one and two v...



Accelerated Grade 6

From  Illustrative Mathematics

The Accelerated Grade 6 course introduces students to many of the big ideas that are a cornerstone of middle school mathematics and beyond. Students study ratio and rate, learn to divide fractions by fractions, extend their understanding of number to i...



Accelerated Grade 7

From  Illustrative Mathematics

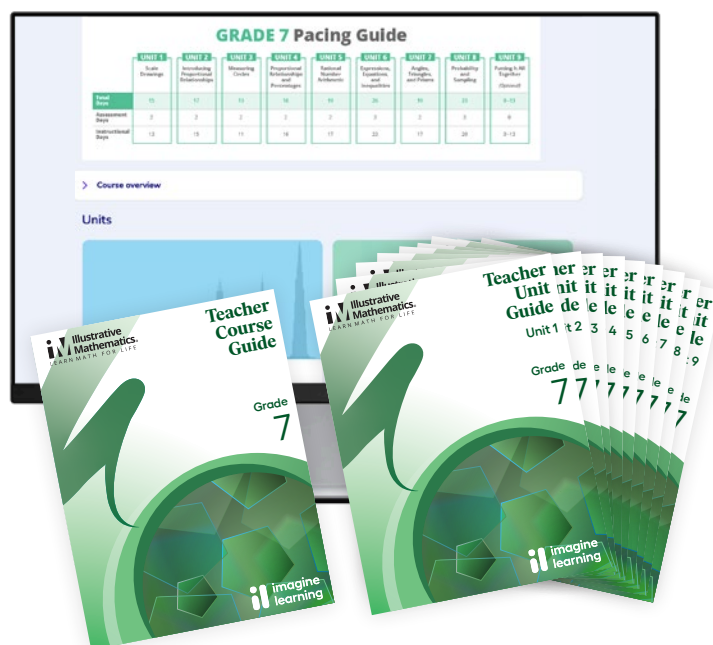
Students complete the work of middle school in this course. Students work with linear equations in one and two variables, deepen their understanding of proportional relationships and express linear relationships using equations, tables, and graphs. Stu...



Teacher Components*

- Teacher Course Guide (print)
- Teacher Unit Guides (units 1–9) (print)
- Imagine Learning (IL) Classroom teacher license (digital)

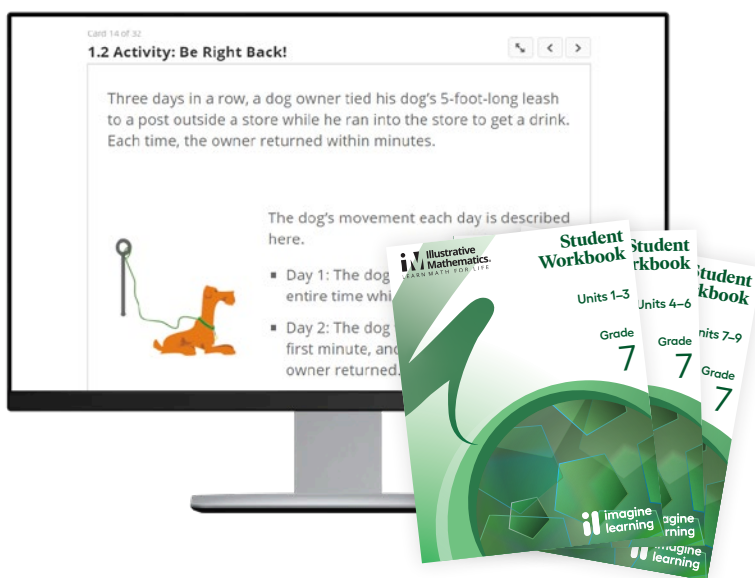
Imagine Learning (IL) Classroom includes access to all print components, teacher notes, pacing guides, materials lists, glossary, classroom and distance learning-ready lesson cards with annotation functionality, assignable lessons and assessments, **Student Spotlight** lessons, modeling prompts, family materials, extension problems, digital interactives (including Desmos and GeoGebra), videos, digital assessments, digital practice sets, **Live Learn**, adaptation packs, data dashboard, reports, and more.



Student Components*

- Student Workbooks (units 1–9) (print)
- Imagine Learning (IL) Classroom student license (digital)

Imagine Learning (IL) Classroom includes access to student workbook content, interactive lessons, Student Spotlight lessons, glossary, lesson summary videos, Digital interactives (including Desmos and GeoGebra), digital student task statements, digital assessments, digital practice sets, and more.



Professional Services

Imagine Learning Illustrative Mathematics Professional Development offerings support teachers, coaches, and administrators in effectively implementing the curriculum and platform with integrity throughout their program adoption.

Lesson example videos are embedded directly in the Imagine Learning Classroom digital experience for on-demand implementation support. These showcase authentic IL IM classrooms, teachers, and students in action.

There are virtual and in-person options to support the unique needs of your school or district. The workshop modules give participants the opportunity to learn, apply, and synthesize their understandings.





imaginelearning.com/illustrative-mathematics
877-725-4257 • solutions@imaginelearning.com