Amplify Desmos Math

GRADE 5

Ancillary Sampler

About Amplify

Amplify is dedicated to collaborating with educators to create learning experiences that are rigorous and riveting for all students. Amplify creates K–12 core and supplemental curriculum, assessment, and intervention programs for today's students.

A pioneer in K–12 education since 2000, Amplify is leading the way in next-generation curriculum and assessment. All of our programs provide teachers with powerful tools that help them understand and respond to the needs of every student.

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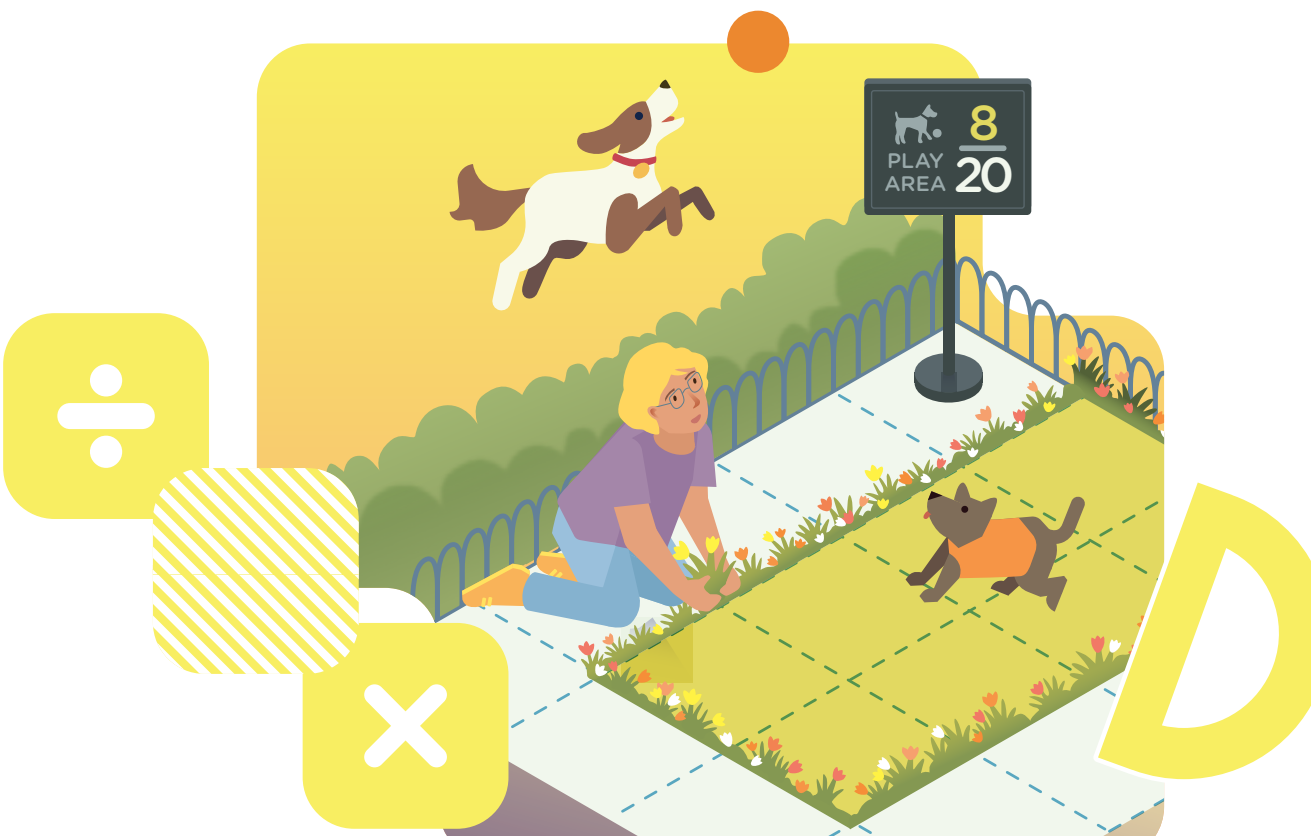
55 Washington Street, Suite 800,
Brooklyn, NY 11201
www.amplify.com

Overview information



Welcome to your Amplify Desmos Math ancillary sampler!

One of the core tenets of the program's design is that students can catch up while keeping up with grade-level math. To ensure all students access grade-level math, Amplify Desmos Math includes core instruction, a suite of assessments, and tailored practice resources that adjust to student learning.

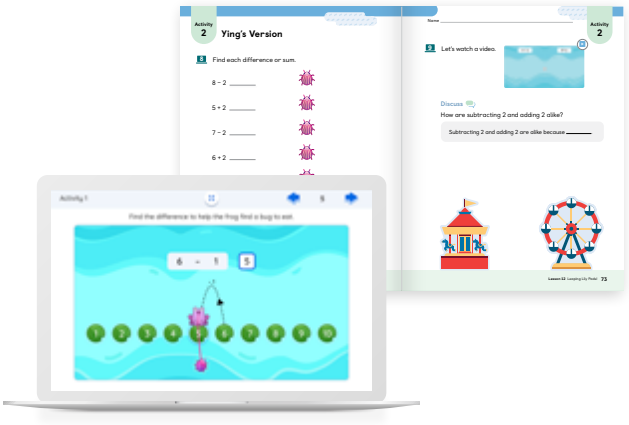
Multiple points of entry to lesson content and Responsive Feedback enable every student to be challenged, yet successful. Cohesive differentiation and intervention resources provide the necessary support to prevent students from falling behind or allow them to extend their thinking.

Amplify Desmos Math includes print blackline master ancillaries for Assessment, and Intervention. On the pages that follow, you'll find examples of Amplify Desmos Math Mini-Lessons, assessment resources from a sample unit, centers, and more.

Sample resources

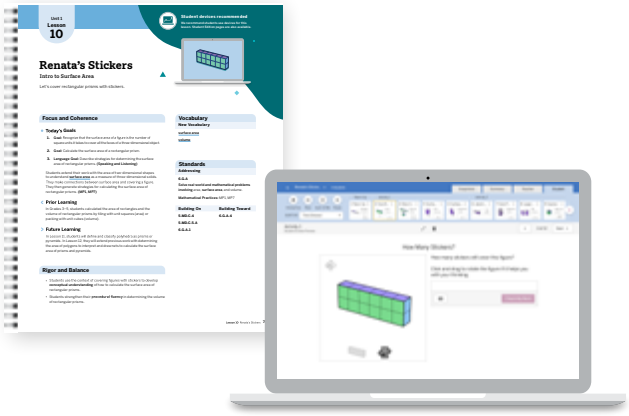
Program Resources

For Students



- Student Edition (two volumes)
- Digital access to lesson resources and practice
- Interactive student activity screens
- Responsive Feedback
- Collaboration tools
- Personalized practice

For Teachers



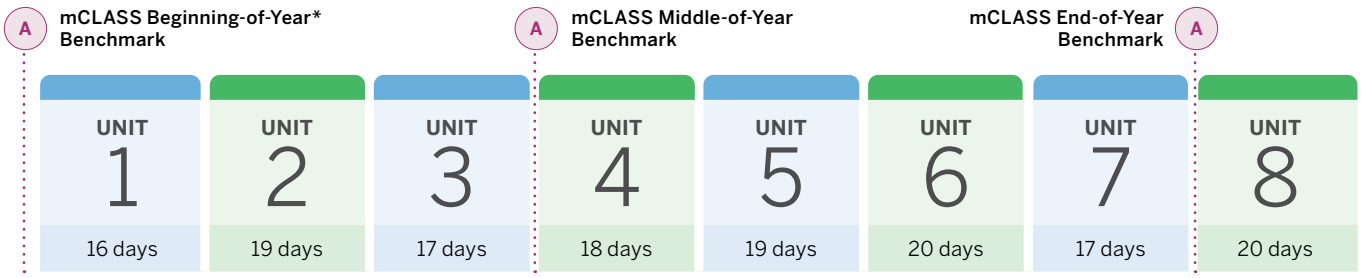
- Teacher Edition (two volumes)
- Digital access to planning and instruction resources
- Presentation Screens
- Facilitation and progress-monitoring tools
- Assessment and reporting suite, including mCLASS® Assessments

Optional: Manipulative Kits

Assessment Resources, Center Resources, Intervention and Extension Resources

Program Architecture

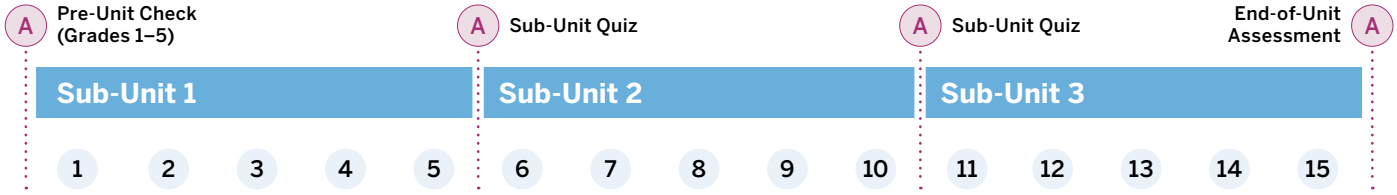
Course



Note: The number of lessons varies from unit to unit. See Scope and Sequence for the full program scope.

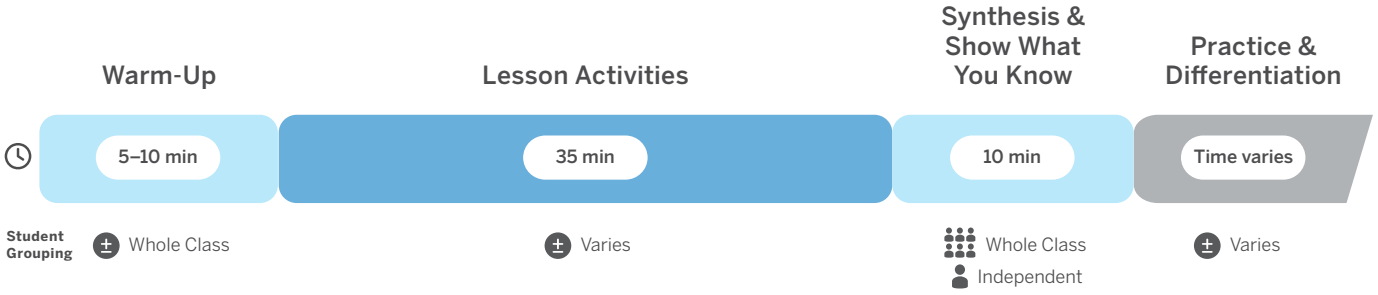
*A brief, but powerful, mCLASS Beginning-of-Year Screener is provided when mCLASS Benchmark is not included.

Unit



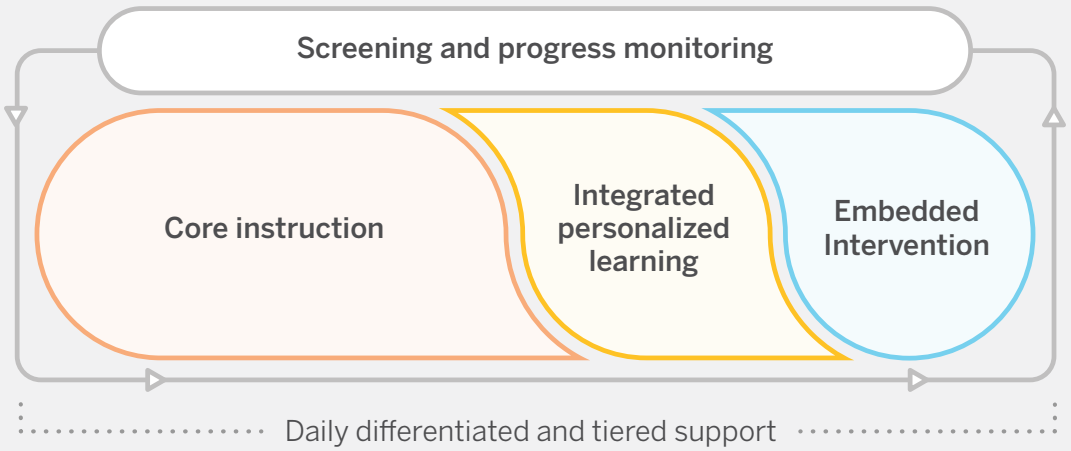
Note: The number of sub-units per unit and lessons within each sub-unit varies. This depiction shows the general structure of a unit. See the course Table of Contents in the print Teacher Edition for more details.

Lesson



Support math classrooms with one integrated, data-driven solution.

In Amplify Desmos Math, data informs instruction within integrated resources. Cohesive differentiation and intervention resources support and challenge students toward a deeper understanding of the learning goals, ensuring all students can keep up with or stretch beyond grade-level math.



Screening and progress monitoring

mCLASS® Assessments, along with daily formative checks, measure what students know and how they think. The asset-based assessment system provides teachers with targeted, actionable insights, linked to core instruction and intervention resources.

Core instruction

Amplify Desmos Math lessons provide a structured approach to problem-based learning, helping teachers create a collaborative math community with students at its center. Each lesson systematically builds on students' curiosity to develop lasting grade-level understandings for all students.

Integrated personalized learning

Boost Personalized Learning activities help students access grade-level math through engaging, independent digital practice. Responsive Feedback adjusts to students' work, providing item-level adaptivity to further support their learning.

Embedded intervention

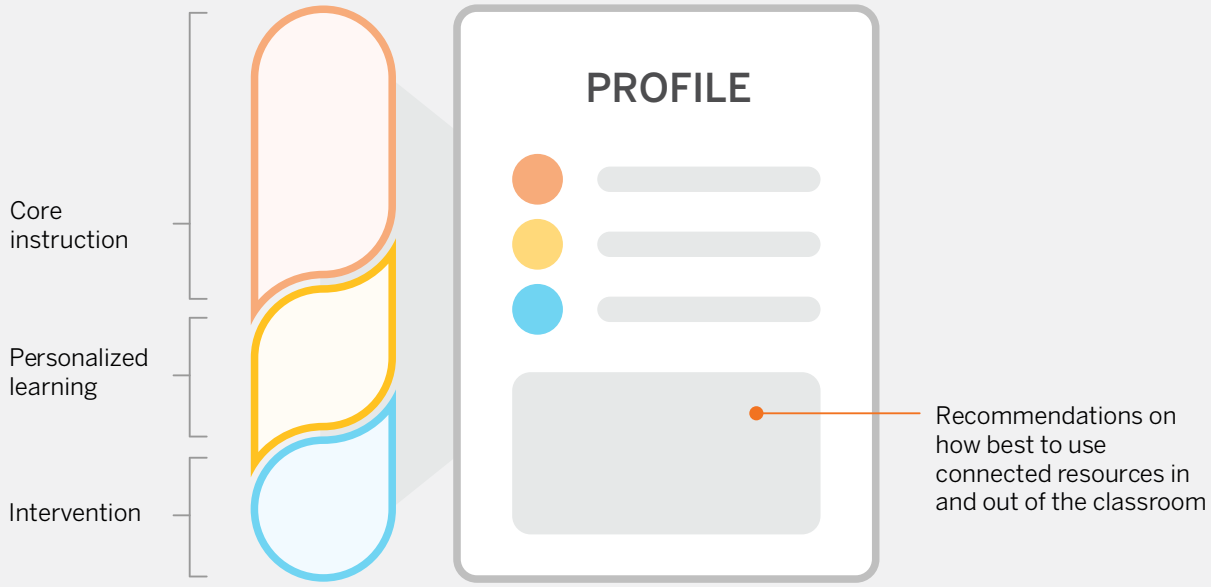
Integrated resources like Mini-Lessons, Math Fluency, Math Adventures, and Extensions provide targeted intervention on a specific concept or skill. This intervention is directly connected to daily content and offer students the individualized supports they need.

Tailored to what students think and know

Every time students demonstrate what they know, we analyze their work to create an accurate and up-to-date picture of how students think and what they know.

We've charted how mathematical thinking skills are linked, influence learning, and connect to mathematical standard mastery. Our model uses this information to tailor Personalized Learning supports to instructional areas that directly build toward grade-level concepts or skills.

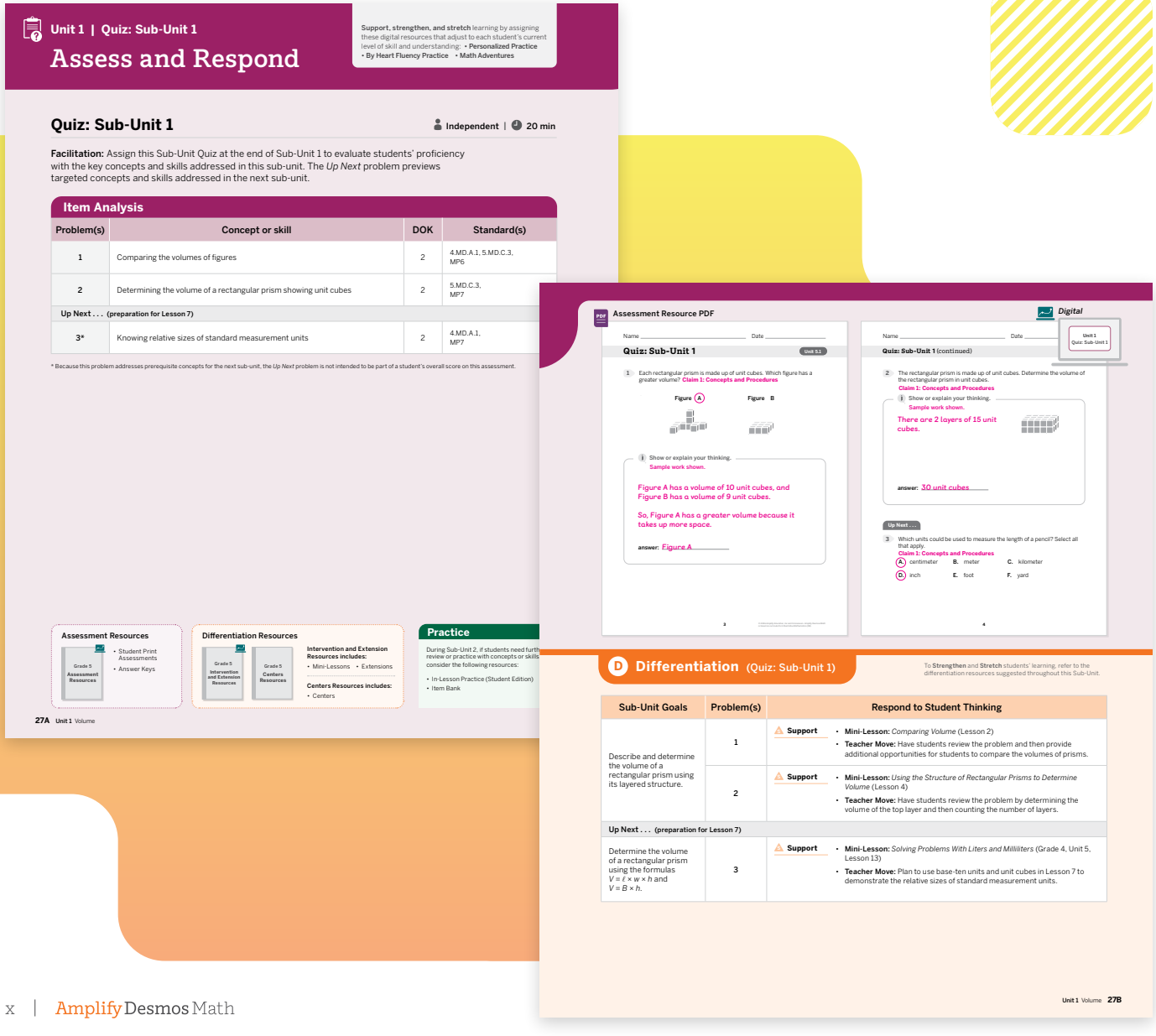
Comprehensive Student Profiles provide full data on students' assets and skills, empowering teachers to provide just-in-time scaffolds throughout core instruction and targeted intervention when needed.



Robust assessments drive learning and inform instruction.

A variety of performance data in Amplify Desmos Math provides evidence of student learning while helping students bolster their skills and understanding.

Throughout lessons, units, and the entire program, you'll find summative and formative assessments meant to provide insights into students' conceptual understandings. Student learning is never a surprise at the end of a unit—with Amplify Desmos Math, understanding is made continually visible.



Unit 1 | Quiz: Sub-Unit 1

Assess and Respond

Support, strengthen, and stretch learning by assigning these digital resources that adjust to each student's current level of skill and understanding: • **Personalized Practice** • **By Heart Fluency Practice** • **Math Adventures**

Quiz: Sub-Unit 1

Independent | 20 min

Facilitation: Assign this Sub-Unit Quiz at the end of Sub-Unit 1 to evaluate students' proficiency with the key concepts and skills addressed in this sub-unit. The *Up Next* problem previews targeted concepts and skills addressed in the next sub-unit.

Item Analysis

Problem(s)	Concept or skill	DOK	Standard(s)
1	Comparing the volumes of figures	2	4.MD.A.1, 5.MD.C.3, MP6
2	Determining the volume of a rectangular prism showing unit cubes	2	5.MD.C.3, MP7
Up Next . . . (preparation for Lesson 7)			
3*	Knowing relative sizes of standard measurement units	2	4.MD.A.1, MP7

* Because this problem addresses prerequisite concepts for the next sub-unit, the *Up Next* problem is not intended to be part of a student's overall score on this assessment.

Assessment Resources

- Student Print Assessments
- Answer Keys

Differentiation Resources

Intervention and Extension Resources includes:
- Mini-Lessons
- Extensions

Centers Resources includes:
- Centers

Practice

During Sub-Unit 2, if students need further review or practice with concepts or skills, consider the following resources:

- In-Lesson Practice (Student Edition)
- Item Bank

27A Unit 1 Volume

Assessment Resource PDF

Digital

Name _____ Date _____

Quiz: Sub-Unit 1 Unit 1.1

1 Each rectangular prism is made up of unit cubes. Which figure has a greater volume? Claim 1: Concepts and Procedures

Figure A Figure B

Show or explain your thinking. Sample work shown.

Figure A has a volume of 10 unit cubes, and Figure B has a volume of 9 unit cubes.

So, Figure A has a greater volume because it takes up more space.

answer: Figure A

3

Quiz: Sub-Unit 1 (continued)

2 The rectangular prism is made up of unit cubes. Determine the volume of the rectangular prism in unit cubes.
Claim 1: Concepts and Procedures

Show or explain your thinking. Sample work shown.

There are 2 layers of 15 unit cubes.

answer: 30 unit cubes

Up Next . . .

3 Which units could be used to measure the length of a pencil? Select all that apply.
Claim 1: Concepts and Procedures

A. centimeter B. meter C. kilometer
D. inch E. foot F. yard

4

D Differentiation (Quiz: Sub-Unit 1)

To **Strengthen** and **Stretch** students' learning, refer to the differentiation resources suggested throughout this Sub-Unit.

Sub-Unit Goals	Problem(s)	Respond to Student Thinking
Describe and determine the volume of a rectangular prism using its layered structure.	1	Support • **Mini-Lesson:** *Comparing Volume* (Lesson 2) • **Teacher Move:** Have students review the problem and then provide additional opportunities for students to compare the volumes of prisms.
	2	Support • **Mini-Lesson:** *Using the Structure of Rectangular Prisms to Determine Volume* (Lesson 4) • **Teacher Move:** Have students review the problem by determining the volume of the top layer and then counting the number of layers.
Up Next . . . (preparation for Lesson 7)		
Determine the volume of a rectangular prism using the formulas $V = \ell \times w \times h$ and $V = B \times h$.	3	Support • **Mini-Lesson:** *Solving Problems With Liters and Milliliters* (Grade 4, Unit 5, Lesson 13) • **Teacher Move:** Plan to use base-ten units and unit cubes in Lesson 7 to demonstrate the relative sizes of standard measurement units.

Unit 1 Volume 27B

Unit-level assessments

Our embedded unit assessments offer key insights into students' conceptual understanding of math. These assessments provide regular, actionable information about how students are thinking about and processing math, with both auto-scoring and in-depth rubrics that help teachers anticipate and respond to students' learning needs.

Pre-Unit Check (grades 2–A1)

Each unit begins with an assessment designed to identify the student skills that will be particularly relevant to the upcoming unit. This check is agnostic to the standards covered in the following unit and serves not as a deficit-based acknowledgment of what students do not know, but rather as an affirmation of the knowledge and skills with which students come in.

End-of-Unit Assessment

Students engage with rigorous grade-level mathematics through a variety of formats and tasks in the End-of-Unit Assessment. A combination of autoscored and rubric-scored items provide deep insights into student thinking. All Amplify Desmos Math End-of-Unit Assessments include two forms.

Sub-Unit Quizzes (grades 1–A1)

With regular Sub-Unit Quizzes, student understanding never comes as an end-of-unit surprise. In these checks, students are assessed on a subset of conceptual understandings from the unit, with rubrics that help illuminate students' current understanding and provide guidance for responding to student thinking.

Sub-Unit Checklists (grades K–1)

These checklists enable teachers to observe key skills and concepts that cannot be assessed on a pencil-and-paper assessment. The checklists outline the supports students need to get where they need to go.

Lesson-level assessments

Amplify Desmos Math lessons are centered around sense-making and in-the-moment feedback. Daily moments of assessment provide valuable evidence of learning for both the teacher and student.

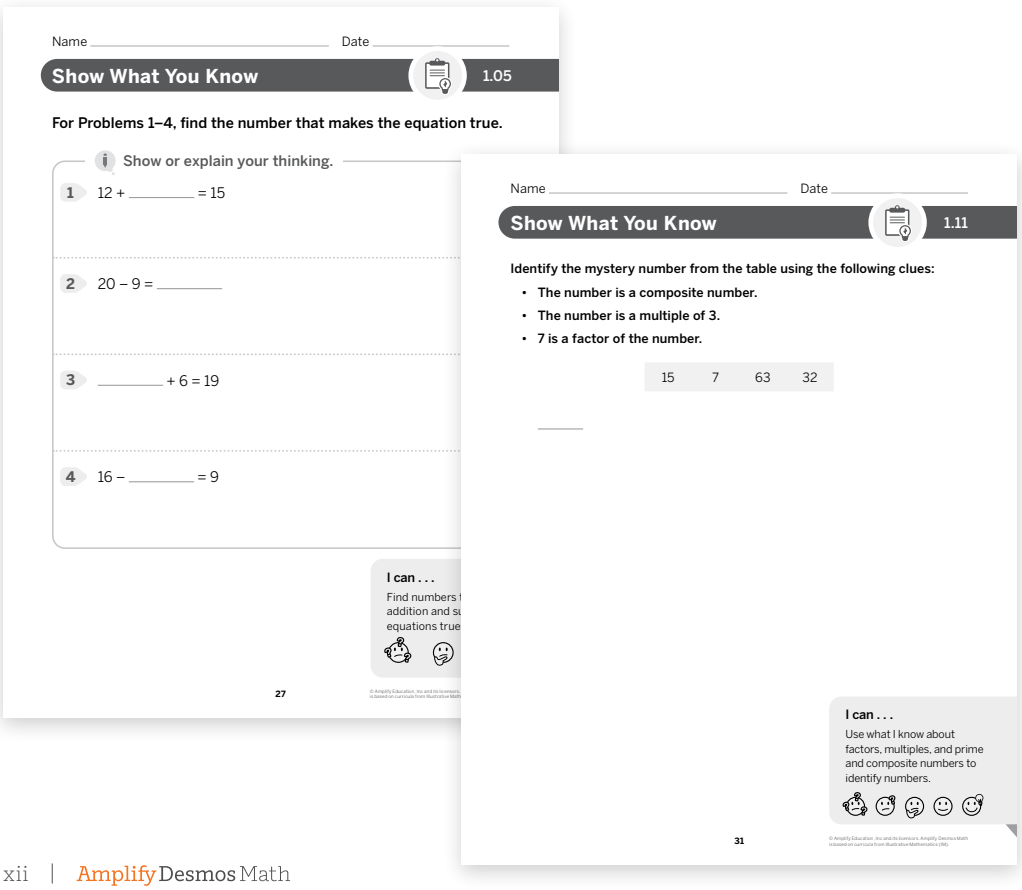
Responsive Feedback

We harness the power of digital math and graphing tools to show students the meaning of their thinking in context. Teachers have the ability to see and provide in-the-moment feedback as students progress through a lesson. Responsive Feedback motivates students and engages them in the learning process.

Show What You Know

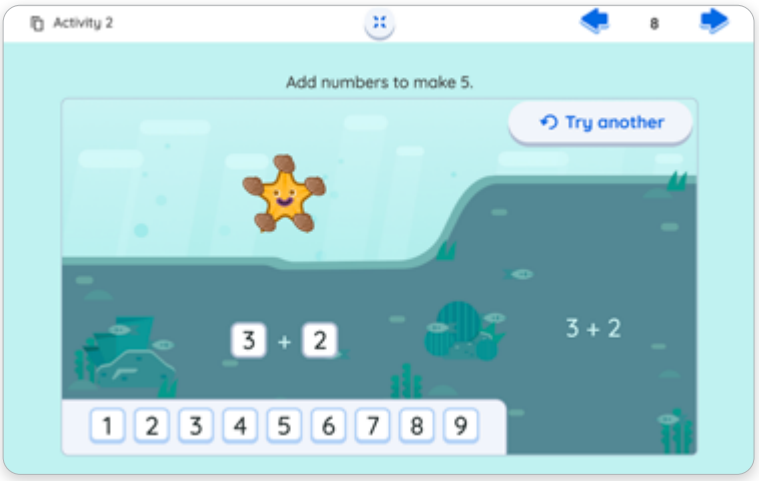
Each lesson has a daily formative assessment focused on one of the key concepts in the lesson. Show What You Know moments are carefully designed to minimize the time students take to complete while maximizing the insight the teacher receives on a daily basis to attend to student needs during the following class. *Show What You Know is optional in grades K–1.*

Beginning in grade 2, all unit-level and lesson-level assessments can be completed digitally.



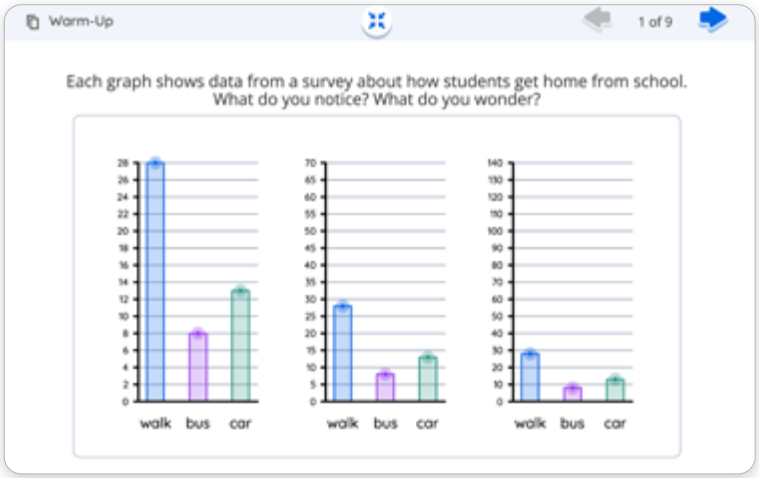
Show What You Know example pages for grades 2 and 4.

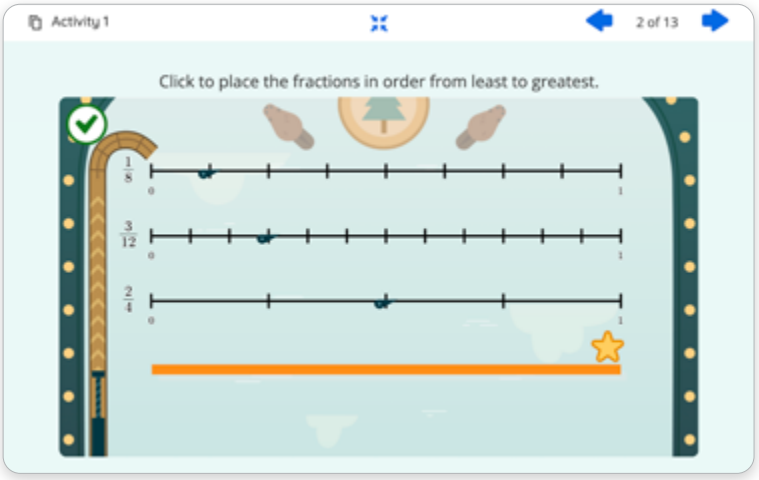
- **Celebrate student thinking with Responsive Feedback.** We harness the power of digital math and graphing tools to show students the meaning of their thinking in context. Responsive Feedback motivates students and engages them in the learning process.



In the Kindergarten lesson Harry Explores the Ocean, students receive immediate feedback on whether their addition equation equals five through an animation of a starfish collecting seashells.

In the grade 3 lesson: 2, 5, or 10?, teachers use interactive bar graphs on a Presentation Screen to help students consider how the same data is represented on graphs with three different scales—2, 5, and 10.





In the grade 4 lesson Getting in Order, students compare and order sets of fractions from least to greatest to control the locations of flippers in a pinball game. When the fractions are in order, a ball will fall through all of the flippers and roll to the star.

Benchmark and progress monitoring assessments identify students' skills and knowledge.

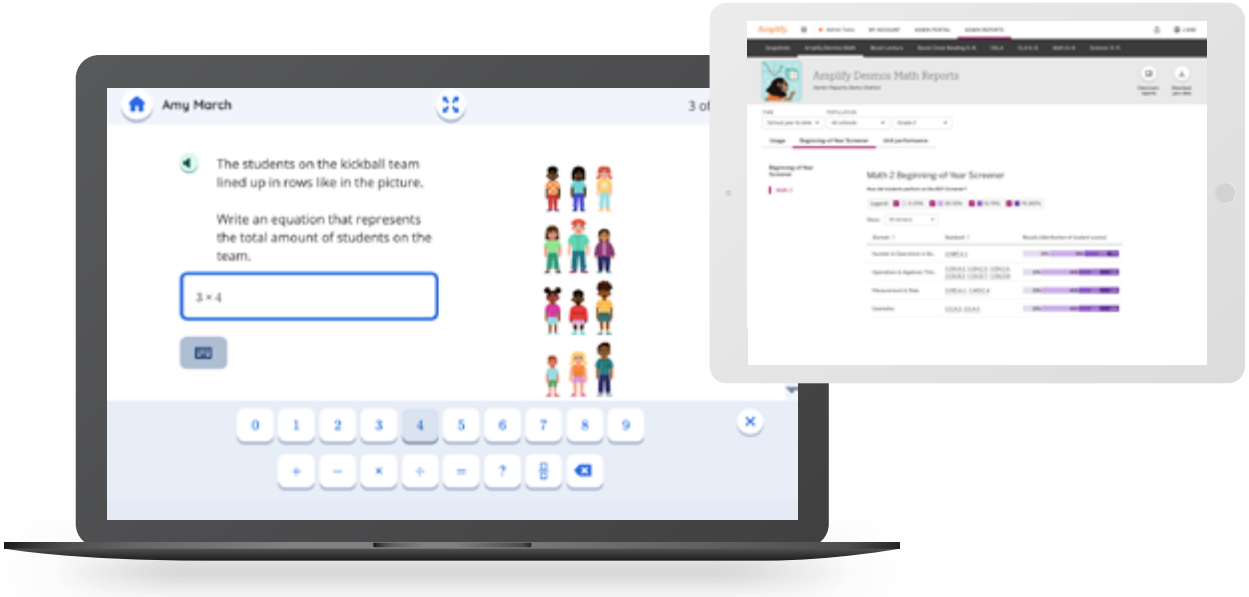
Assessments from mCLASS® surface students' math thinking with an asset-based approach, providing better insights into what students know, where they need support, and which assets to leverage.

mCLASS Benchmark

This powerful digital benchmark assessment system is administered to the whole class three times a year, at the beginning, middle, and end of the year. The assessments are designed to analyze student responses with a focus on revealing underlying math thinking, evaluating student knowledge of grade-level math, and informing instructional decisions.

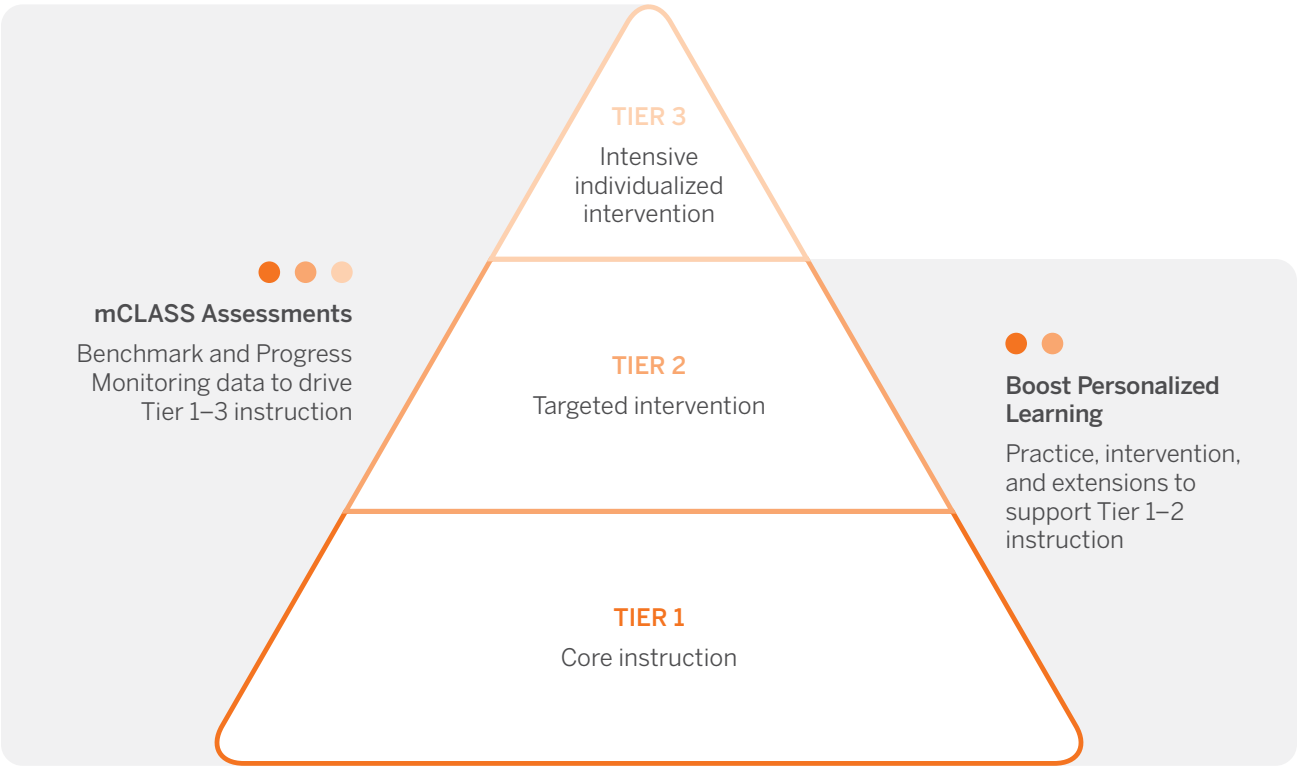
The comprehensive system of assessments also:

- Evaluates student progress toward grade-level expectations for growth measure.
- Identifies specific areas of strength and developmental need for each student to inform differentiation in Amplify Desmos Math and Boost Personalized Learning.
- Benchmark also includes an adaptive diagnostic module that can be optionally administered to collect additional information for Tier 1 and Tier 2 intervention targeting.



mCLASS Progress Monitoring

Progress Monitoring helps teachers chart students' progression between assessment periods. For students receiving targeted support, progress monitoring informs whether intervention is working or whether adjustments are needed to improve student learning.



As an essential part of a school's MTSS or Response to Intervention (RTI) framework, these assessments can be used to track student progress in specific areas as part of targeted instructional support towards benchmark goals.

Progress Monitoring is designed to be brief and easily administered every two weeks, although teachers are encouraged to use these in ways that best meet their instructional needs and goals for the student.

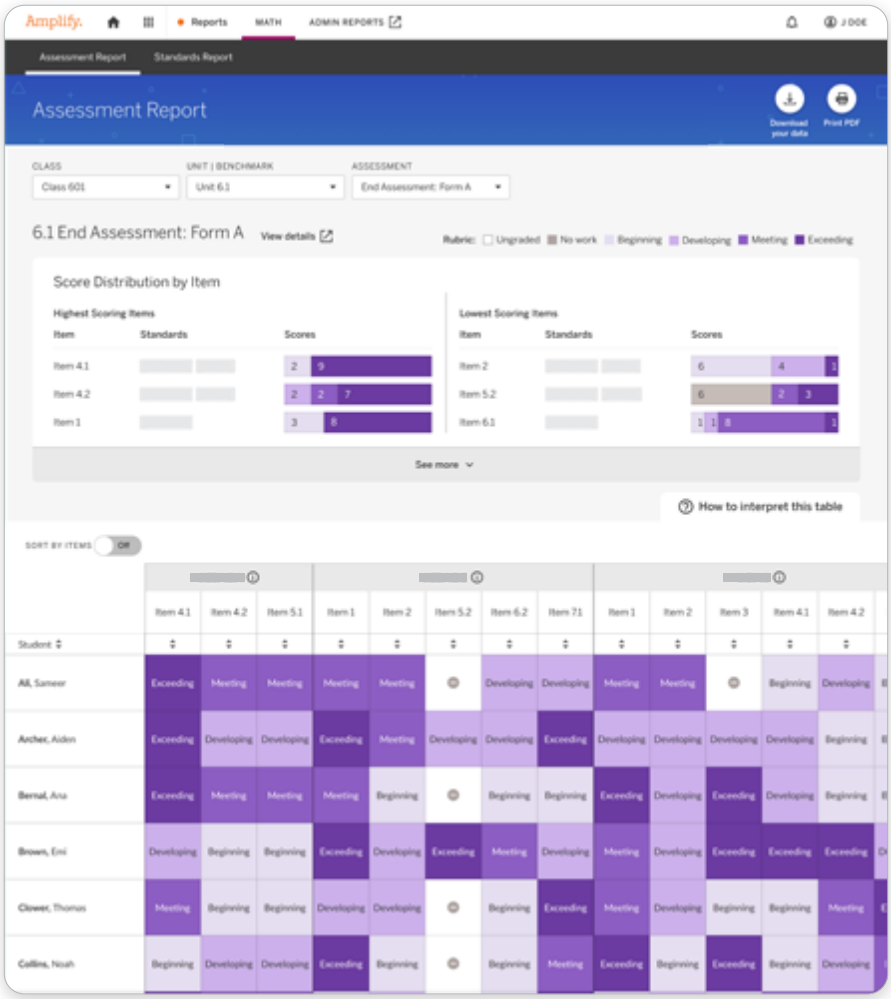
Reporting tools provide integrated insight into learning.

Amplify Desmos Math provides teachers and administrators with unified reporting and insights so that educators have visibility into what students know about grade-level math—and can plan instruction accordingly for the whole class, small groups, and individual students.

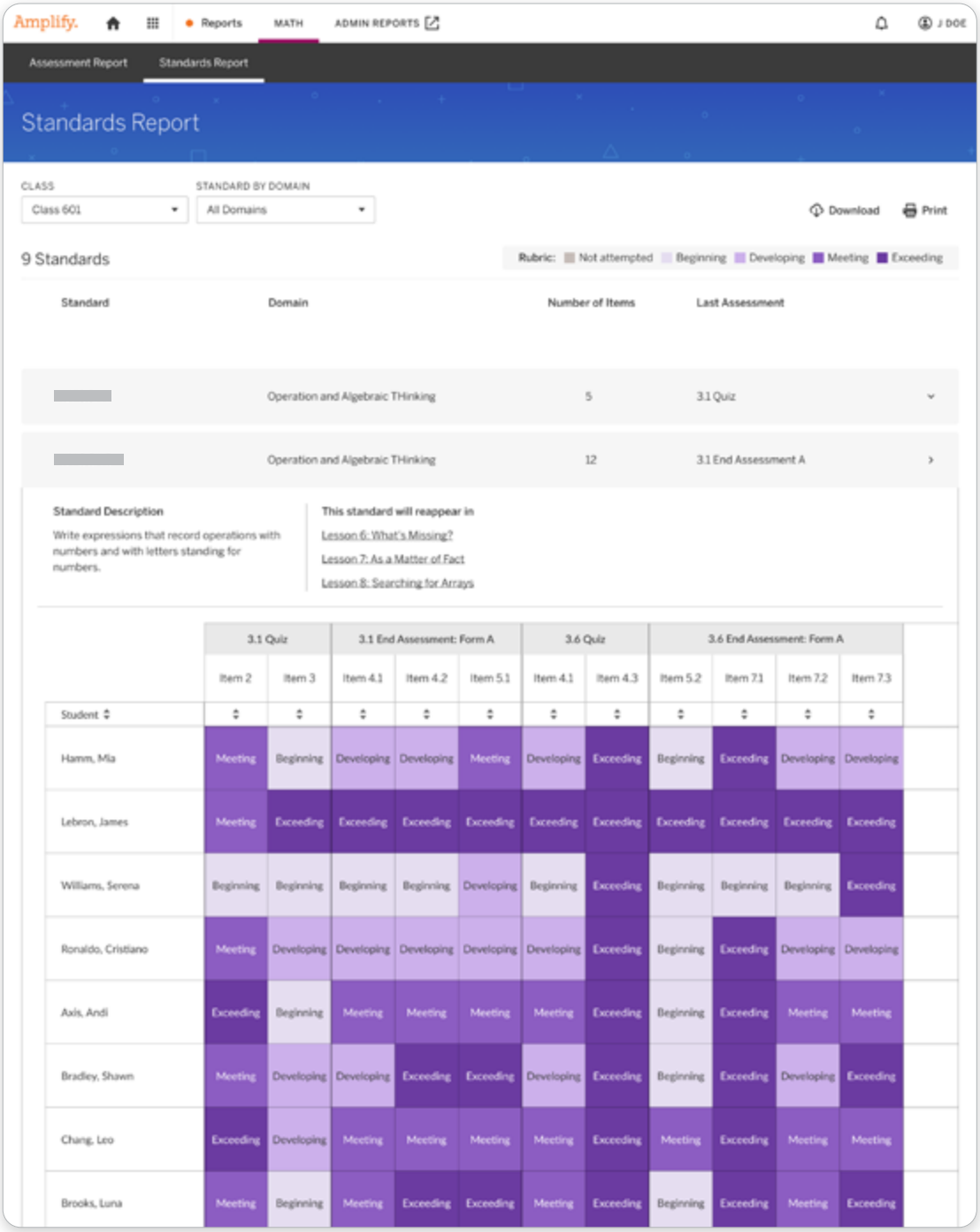
Reporting functionality integrates unit assessments, lesson assessments, personalized learning, benchmark assessments, and progress monitoring for a comprehensive look at student learning.

Amplify Desmos Math is designed to fit your specific data and reporting needs. Reporting functionality integrates unit assessments and lesson assessments for a comprehensive look at student learning.

At-a-glance views of unit-level assessment results inform instructional planning, and you can also drill down to item-level analysis



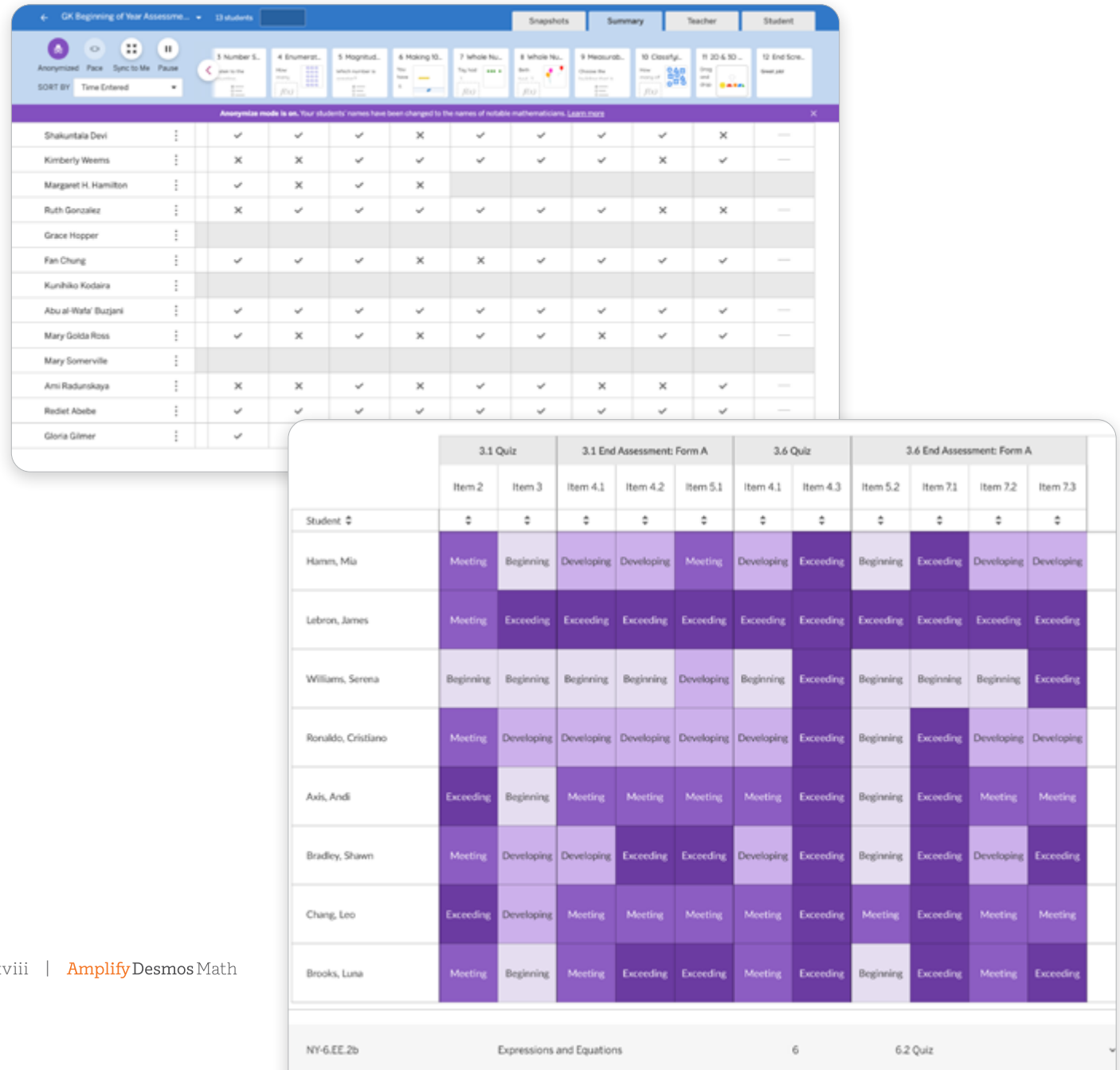
Our standards report allows you to monitor proficiency at the class and individual student levels.



Teachers have data at their fingertips to guide and differentiate instruction.

A variety of performance data in Amplify Desmos Math provides evidence of student learning while helping students bolster their skills and understanding.

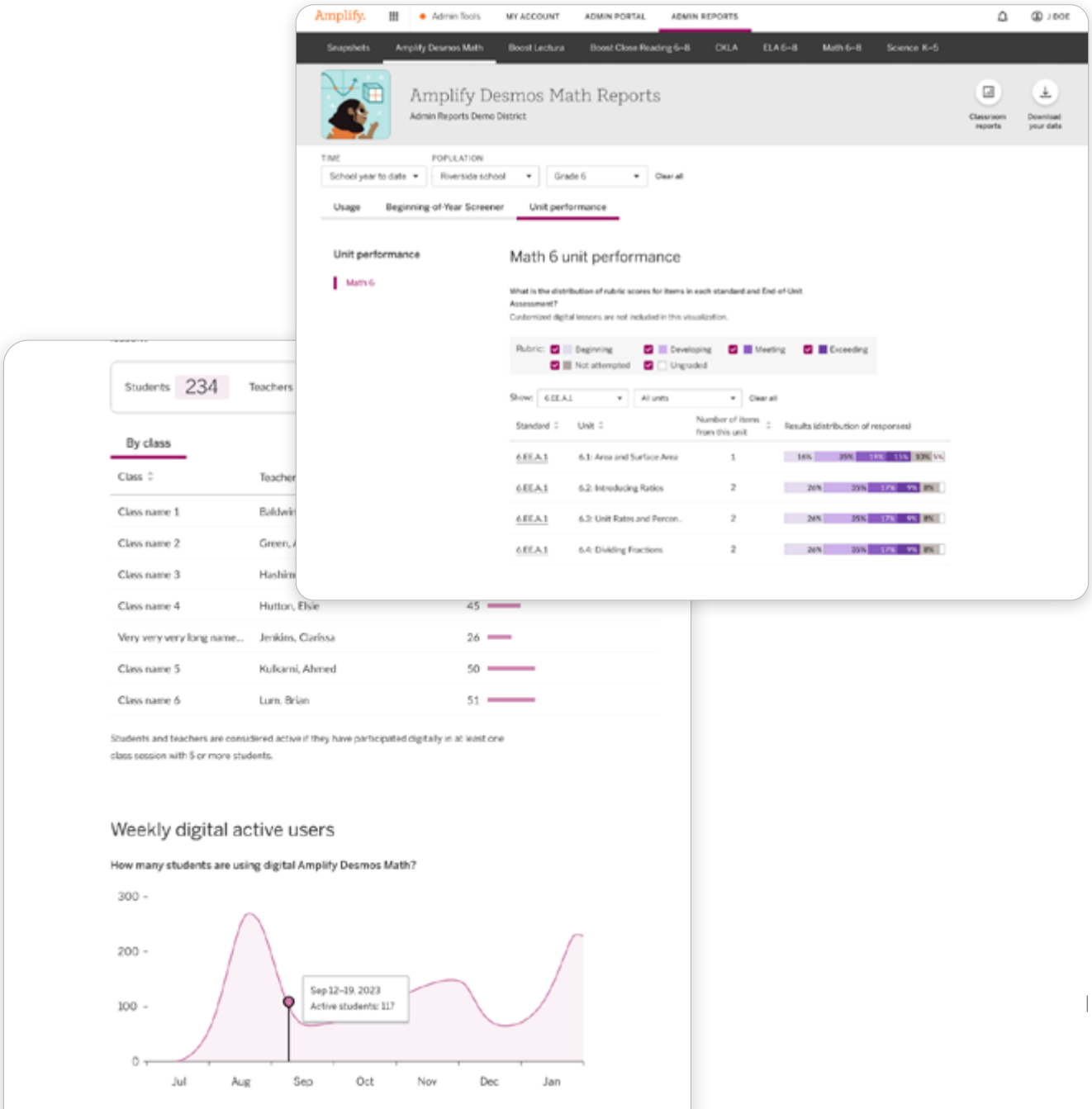
- Proficiency and growth is shown by domain, cluster, standard, and priority concepts. Areas of potential student need are highlighted to allow teachers to modify their instruction and target differentiated support.
- With actionable insights provided by mCLASS Benchmark and Progress Monitoring assessments, teachers are given the data they need to inform Tier 2 and Tier 3 intervention.
- Caregiver-friendly visuals and language enable educators to easily share and celebrate growth with families.



Administrator Reporting

Amplify Desmos Math provides a complete picture of student, class, and district performance, allowing administrators to implement instructional and intervention plans.

- Track student, class, and district performance with usage, completion, and assessment data.
- Accurately group students and classes with the Benchmark and Progress Monitoring data of mCLASS Math and allow teachers to reliably implement and track the progress of Tier 2 and Tier 3 intervention.
- Provide one data-driven solution that educators can rely on for high-quality math instruction.



Boost Personalized Learning

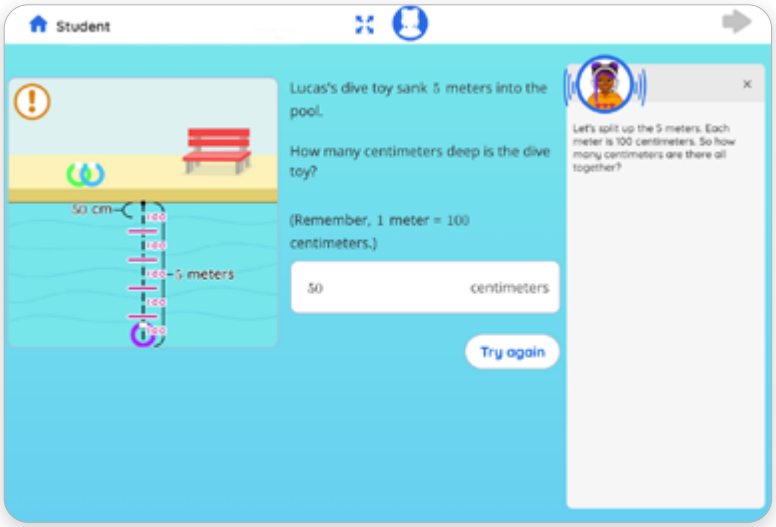
Amplify Desmos Math includes digital, adaptive practice that provides the personalized support a student needs to access grade-level math every day. Boost Personalized Learning activities target a skill or concept aligned to the day's core lesson, with each student receiving personalized scaffolds based on what they already know.

This adaptive technology complements daily learning and provides another layer of support to the in-lesson differentiation and instructional guidance provided to teachers.

Personalized feedback, scaffolds, and supports

Activities adapt to each student's unique needs based on prior assessment data and student responses. Tailored, differentiated support includes:

- **Responsive Feedback**: Visual, mathematical representation of the student's response
- **Guidance and tips**: Adaptive suggestions to help get students unstuck
- **Strategy modeling**: Moments of explicit instruction to summarize key concepts and support sensemaking
- **Precursor skill support**: Instruction and practice on skills and concepts that highly influence the development of grade-level understanding



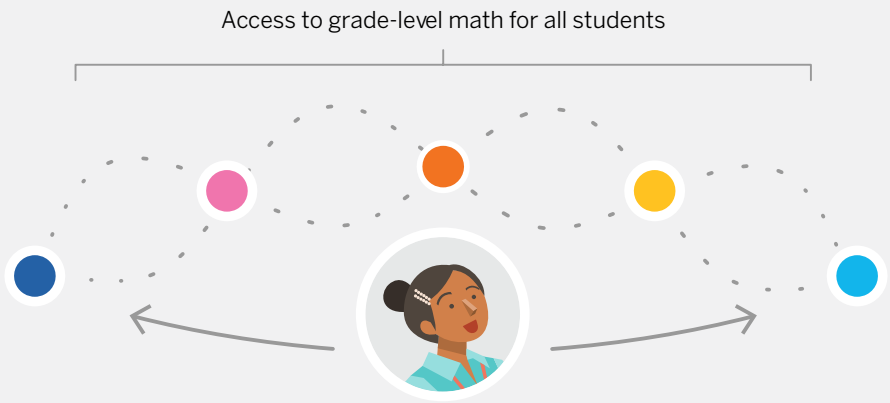
TRY IT!

Go to **amplify.com/admsample** to access sample activities

All students can access grade-level math, every day.

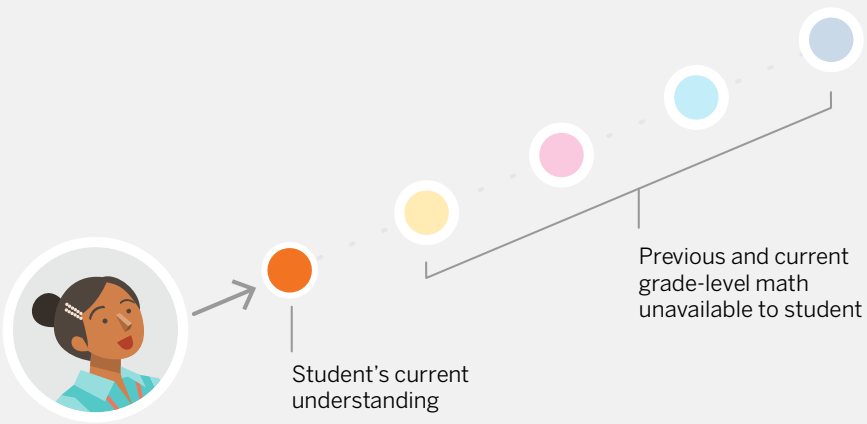
Boost Personalized Learning enables all students to access grade-level math in each activity with tailored supports based on what they already know. This eliminates the long path where students receive interventions that slowly build understanding unrelated to daily instruction.

The asset-based approach of Boost Personalized Learning



Daily personalized differentiation and support enable all students to develop grade-level understanding within every activity.

The traditional, deficit-based approach to intervention



Long, personalized learning paths only focus on prior skills by practicing content disconnected from daily instruction.

More opportunities for personalized practice

Math Adventures

Math Adventures are strategy-based digital math games that offer students a fun, engaging and low-stakes way of practicing math skills. Unlike simple, repetitive math games, students navigate through various levels of complex worlds with Responsive Feedback along the way.

Math Adventures are perfect for times when teachers need students to be independent after finishing classwork, an assessment, or group work.

Twelve a Dozen

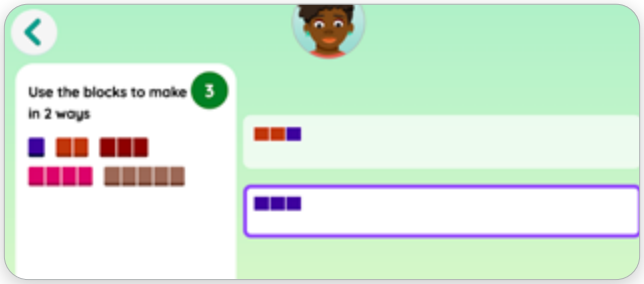
A story-rich puzzle platform game that integrates algebraic math into core game mechanics. Players must use their factoring skills and solve order-of-operations puzzles to save the world.

Formula Won

A racing game in which players advance around different game board race tracks, competing against an AI opponent by picking sets of cards and operations. Requires players to operate with integers, mixed numbers, or decimals.

Number Jumper

Take an adventure across different lands. Students practice addition and subtraction facts by jumping from platform to platform as they travel through swamps, caves, forests, pillow forts, and many more settings.



Connect the Blocks

Students use blocks to compose different combinations of target numbers. Students see equations that match their builds and receive feedback in the form of a length bar. Students develop their fluency through repeated opportunities to flexibly build and recognize different parts of a whole.

Fluency Practice

Fact fluency frees up brainpower and working memory for students to do more complex mathematical work. When basic facts and procedures are second nature, it's easier to figure out how to structure a multi-step word problem, model a solution, or puzzle out systems of equations.

We've partnered with Math for Love to iterate on the popular Multiplication by Heart for the other basic operations, such as Addition and Subtraction by Heart, Division by Heart, and fluency of other math procedures.

The Fluency Practice of Amplify Desmos Math uses an evidence-based approach to memory retention—spaced repetition—for the basic facts. The focus is conceptual understanding, not just "drill and kill" focused on rote memorization. The adaptive nature of the practice allows students to focus less and less on the facts they already know. This approach builds fluency without the anxiety that timed tests can cause.

TRY IT!

Go to **fluency.amplify.com** to access sample activities

About Mini-Lessons

Intervention Mini-Lessons aligned to core instruction

Amplify Desmos Math Mini-Lessons are 15-minute lessons aligned to the most critical topics throughout a unit. Teacher-led Mini-Lessons are used to provide targeted intervention to small groups of students who need additional support or to re-engage students with content that they may need more time on.

Amplify Desmos Math Mini-Lessons are the perfect complement to our problem-based approach, because they provide more explicit instruction opportunities and leverage a consistent instructional routine (Modeled Review, Guided Practice, Check for Understanding).

A minds-on experience to support your students' curiosity and thinking beyond the core lesson

Rather than serving as simple solo drills or worksheets, Mini-Lessons tie directly into critical topics to keep students thinking and exploring the grade-level math they need more time with.

Differentiation where and when it matters most, to help all students access grade-level math

Mini-Lessons are used to address critical prerequisite skills for upcoming lessons or to engage students in grade-level math immediately after a core lesson, when they need more time to think about a concept or skill. Mini-Lessons reinforce the same topics and content students see in core instruction.

Faded worked examples build proficiency

The design of Amplify Desmos Math Mini-Lessons is informed by the extensive research around worked examples, in particular faded worked examples. Because novice learners benefit more from worked examples than more experienced learners (Kalyuga, Ayres, Chandler, & Sweller, 2003), one pedagogical approach involves scaffolding, or fading away, the support given in the worked examples as practice goes on and students become more proficient (Atkinson et al., 2003; van Merrienboer, Kirschner, & Kester, 2003).

In essence, the worked examples get less "worked out" over time. Studies on the use of faded worked examples have found benefits for problem solving, both in terms of better performance on difficult problems (Atkinson et al., 2003) and less time taken to achieve the same level of performance (Flores & Inan, 2014). Students working with faded worked examples have also been shown to have fewer unproductive moments during their practice sessions (Renkl et al., 2004).

Structure of a Mini-Lesson

Structure of a Mini-Lesson

Easy as one, two, three:

1 **Modeled review**

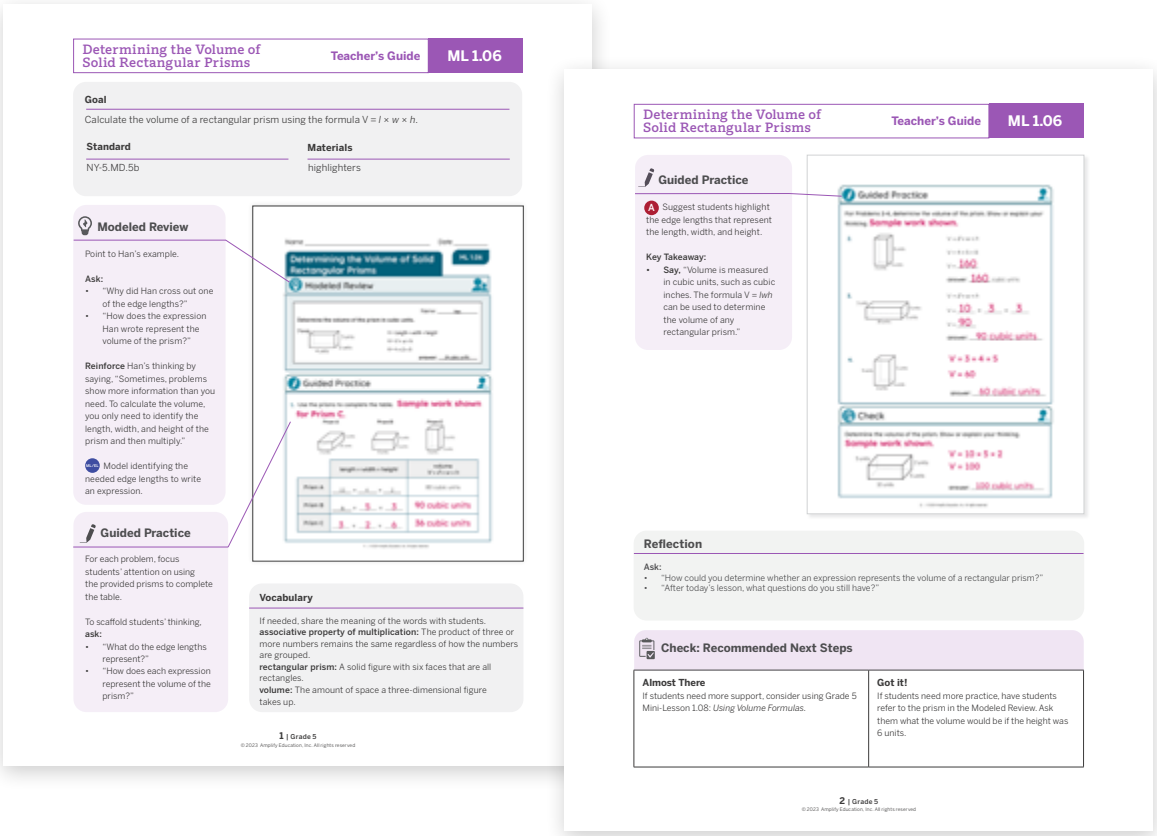
Teachers work through an example with students.

2 **Guided practice**

Teachers guide students through faded examples, where scaffolds are heavier early on and are gradually removed.

3 **Check for understanding**

Teachers provide students an opportunity to show what they have learned.



Determining the Volume of Solid Rectangular Prisms — Teacher's Guide — ML 1.06

Goal

Calculate the volume of a rectangular prism using the formula $V = l \times w \times h$.

Standard

NY-5.MD.5b

Materials

highlighters

Modeled Review

Point to Han's example.

Ask:

- "Why did Han cross out one of the edge lengths?"
- "How does the expression Han wrote represent the volume of the prism?"

Reinforce Han's thinking by saying, "Sometimes, problems show more information than you need. To calculate the volume, you only need to identify the length, width, and height of the prism and then multiply."

Model identifying the needed edge lengths to write an expression.

Guided Practice

For each problem, focus students' attention on using the provided prisms to complete the table.

To scaffold students' thinking, **ask:**

- "What do the edge lengths represent?"
- "How does each expression represent the volume of the prism?"

Vocabulary

If needed, share the meaning of the words with students.
associative property of multiplication: The product of three or more numbers remains the same regardless of how the numbers are grouped.
rectangular prism: A solid figure with six faces that are all rectangles.
volume: The amount of space a three-dimensional figure takes up.

1 | Grade 5

Determining the Volume of Solid Rectangular Prisms — Teacher's Guide — ML 1.06

Guided Practice

Suggest students highlight the edge lengths that represent the length, width, and height.

Key Takeaway:

- **Say,** "Volume is measured in cubic units, such as cubic inches. The formula $V = lwh$ can be used to determine the volume of any rectangular prism."

Reflection

Ask:

- "How could you determine whether an expression represents the volume of a rectangular prism?"
- "After today's lesson, what questions do you still have?"

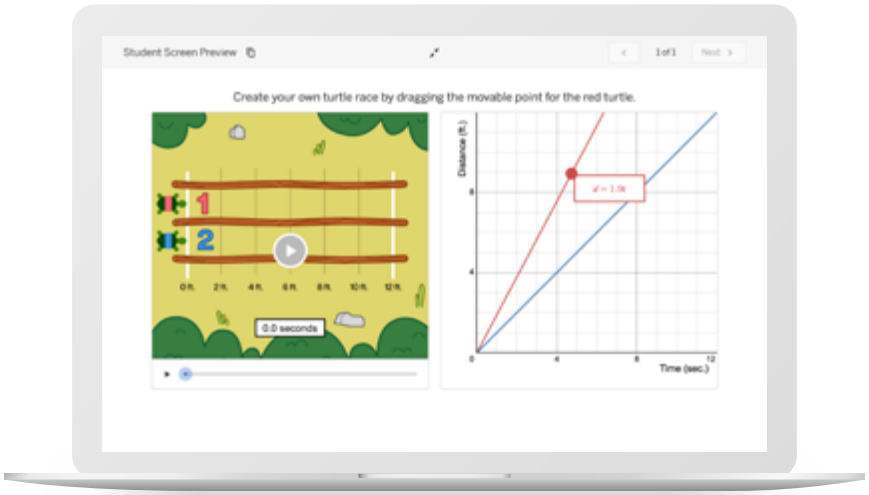
Check: Recommended Next Steps

Almost There	Got it!
If students need more support, consider using Grade 5 Mini-Lesson 1.08: *Using Volume Formulas*.	If students need more practice, have students refer to the prism in the Modeled Review. Ask them what the volume would be if the height was 6 units.

2 | Grade 5

Accessing Mini-Lessons in Amplify Desmos Math

Amplify Desmos Math Mini-Lessons are easily accessible at point-of-use for teachers.

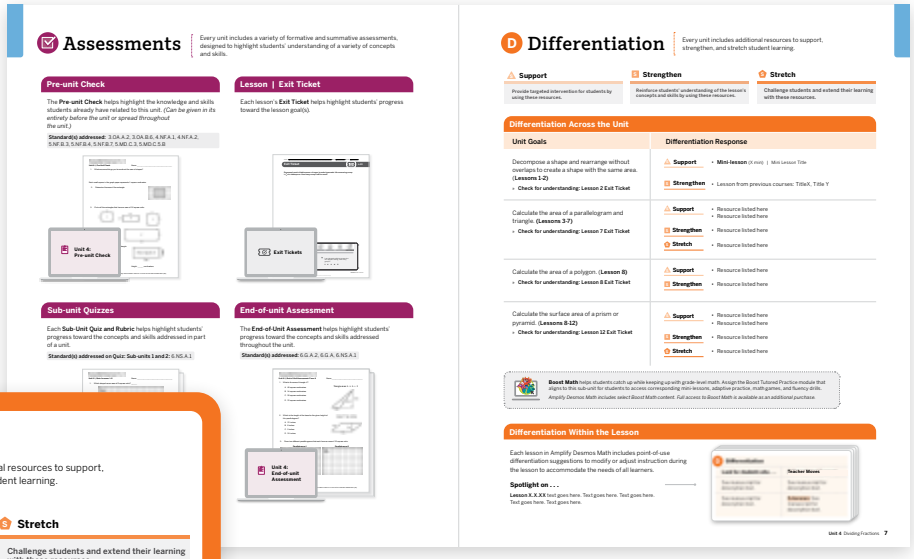


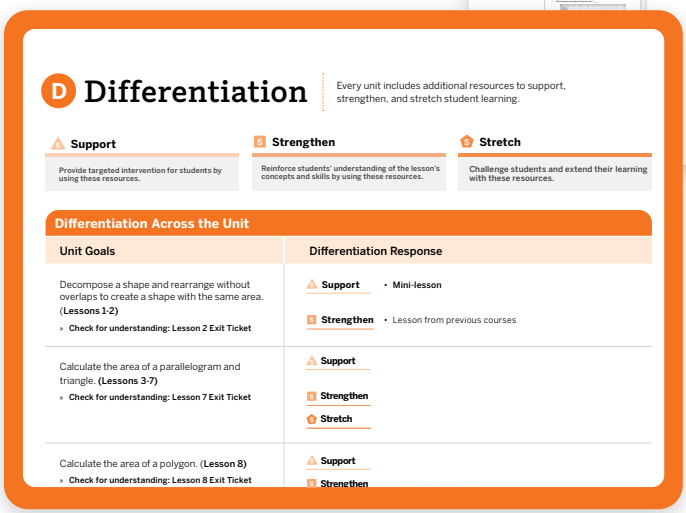
In the digital experience

Online, Teacher Edition PDF pages for each Mini-Lesson, along with the Teacher Presentation Screens, can be accessed within sub-unit resources.

In the print Teacher Edition

In the Amplify Desmos Math Teacher Edition, Mini-Lessons will be referenced in the differentiation table at the sub-unit level.





Centers

Game-based Centers strengthen student engagement and reinforce key skills and concepts

Centers are engaging, hands-on games for students to play collaboratively to strengthen their understanding of key skills and concepts.

Centers are designed so that students engage in them with minimal teacher direction and support. Each Center has multiple stages so that students return to the same Center game repeatedly within and across grade levels, with the content of the Center growing in complexity to align with grade-level standards in a scaffolded manner.

Daily Center Time (Grades K–1)

The last 15 minutes of the daily lesson is always Center Time. Depending on where the lesson falls in the learning trajectory, students will either:

- Be introduced together to a new Center
- Engage in Center Choice Time, choosing previously introduced Centers to revisit

Centers as Activities

New Centers are strategically introduced to the whole class as one of the Lesson Activities.

- Students return to these Centers in future Center Choice Times
- Teachers can also engage students in Centers as a Differentiation activity

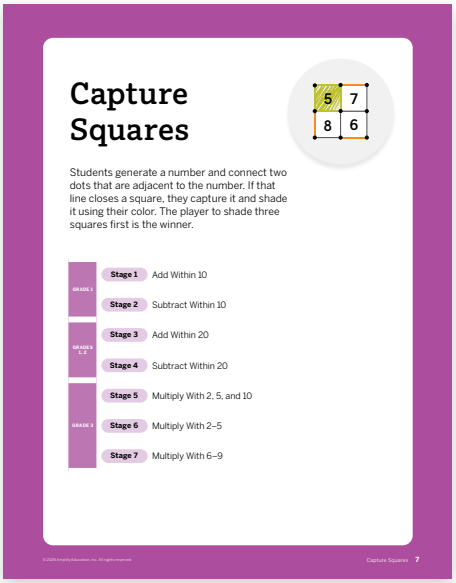
Differentiation

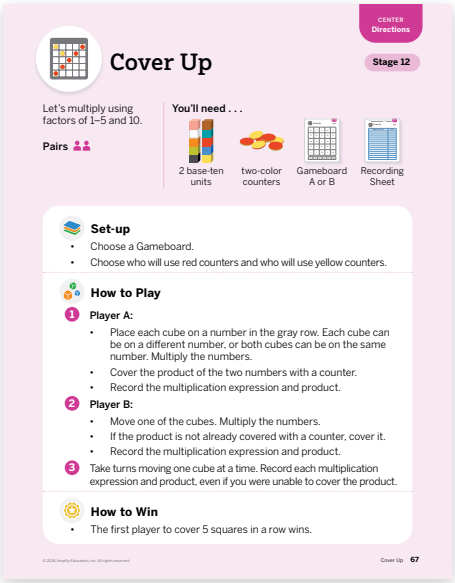
Each lesson lists specific Centers that teachers can use with small groups to strengthen their understanding of key learning goals.

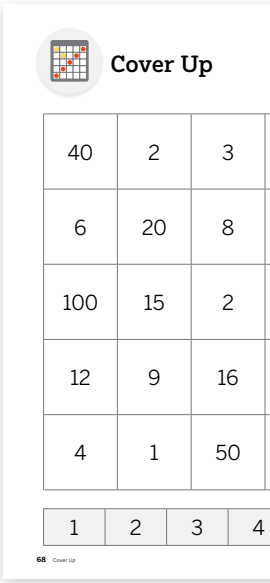
- Students usually have previously been introduced to at least an earlier stage of these Centers
- Teachers can also use Centers after Assessment points

The materials required to utilize Centers are included in program materials.

- Work mats and instruction cards are included in the Centers Resource book
- The required manipulatives are included in the Manipulative Kit







Stretch student mathematical thinking with Extensions.

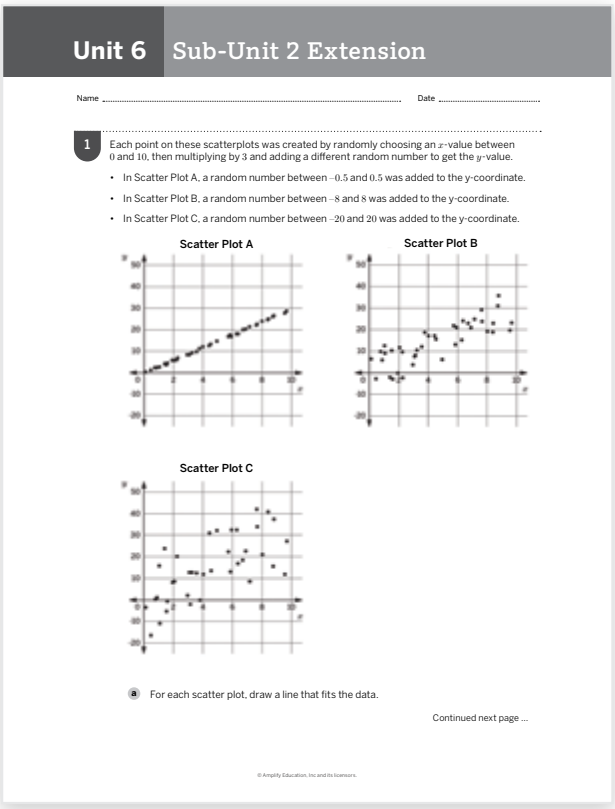
All students should have access to fun and challenging problems. Amplify Desmos Math extensions are 10–15-minute activities aligned to the most critical topics in a sub-unit. Extensions can provide targeted intervention to small groups of students ready for an extra challenge or whole-class.

Amplify Desmos Math extensions build on our student-led, problem-based approach, providing more opportunities for students to engage in creative and rigorous problems that can be approached with different strategies.

These low-lift activities give teachers flexibility and provide students with open-ended, hands-on problems they can choose from.

Challenge Extension Activities

These activities focus on student choice and provide open-ended problem-solving questions to discuss together. They are hands-on and require only a pencil and paper.



Unit 6 Sub-Unit 2 Extension

Name ..... Date .....

1 Each point on these scatterplots was created by randomly choosing an x-value between 0 and 10, then multiplying by 3 and adding a different random number to get the y-value.

- In Scatter Plot A, a random number between -0.5 and 0.5 was added to the y-coordinate.
- In Scatter Plot B, a random number between -8 and 8 was added to the y-coordinate.
- In Scatter Plot C, a random number between -20 and 20 was added to the y-coordinate.

Scatter Plot A

Scatter Plot B

Scatter Plot C

a. For each scatter plot, draw a line that fits the data.

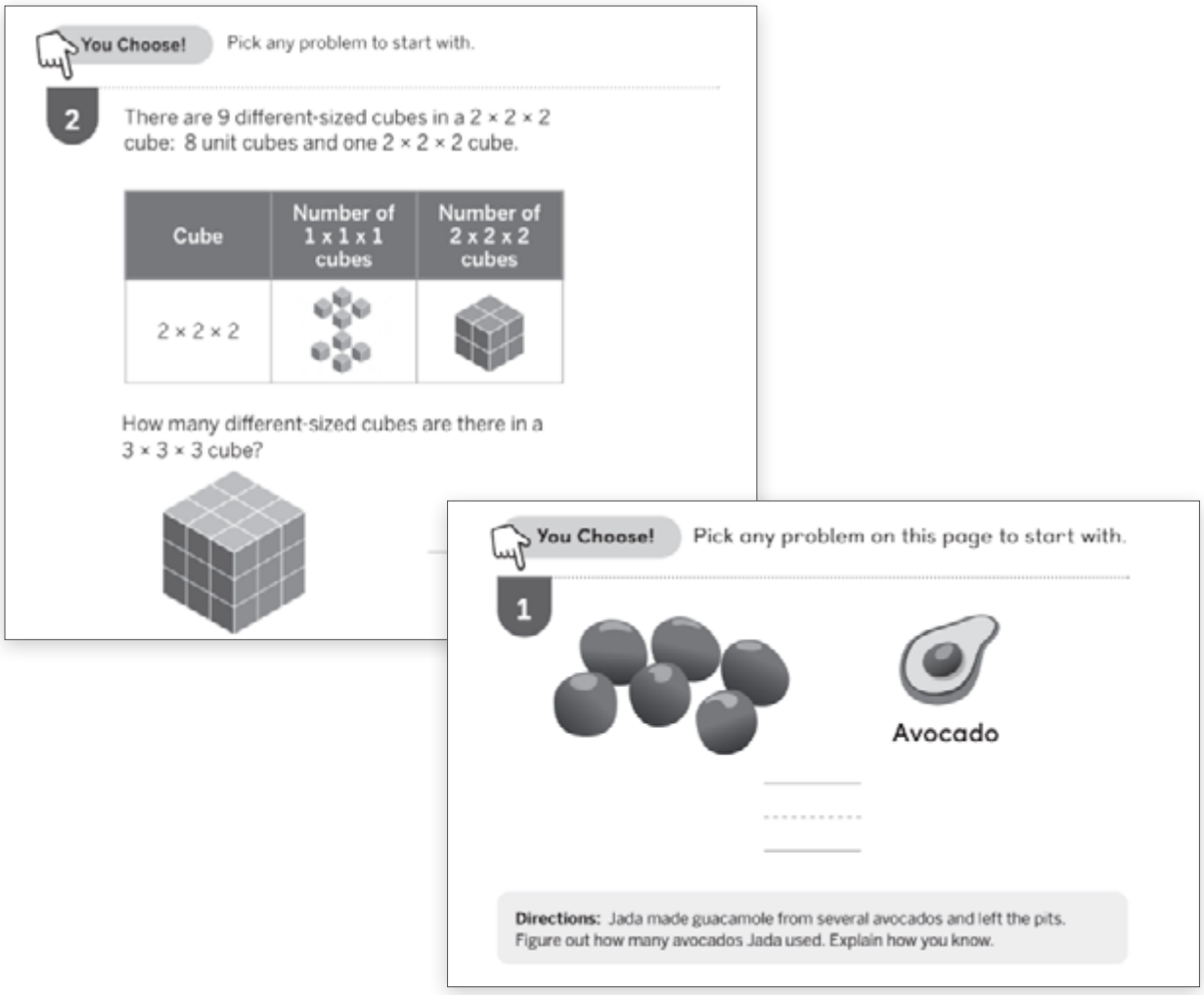
Continued next page ...

Extensions are structured on the principle of student choice and designed to be student-led. Every sub-unit comes with an Extension problem set.

Extension Activities will be referenced in the differentiation table at the lesson-level. You will also find the sub-unit extensions recommended for each lesson digitally on the differentiation tab.

Teachers are provided with:

- Key background information about the math in the problem
- Sample responses
- Hints to share with students (when needed)
- Suggestions for which problems to share with the whole class



GRADE 5

Assessments and Rubrics

The following section includes one full unit of unit-level assessments. These include the Pre-Unit Check, Sub-Unit Quizzes, and End-of-Unit Assessment. These assessments will also be available for students to complete digitally in Grades 2–5.

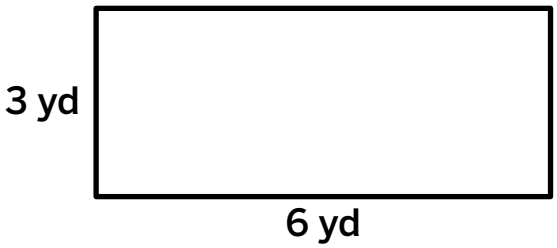
Name _____ Date _____

Pre-Unit Check

Unit 5.1

1 This diagram shows the floor in a room. Determine the area of the floor.

Show or explain your thinking. Sample work shown.



I multiplied the length and width, 3 × 6 = 18.

answer: 18 square yards

Name _____ Date _____

Quiz: Sub-Unit 1

Unit 5.1

1 Each rectangular prism is made up of unit cubes. Which figure has a greater volume?

Figure A

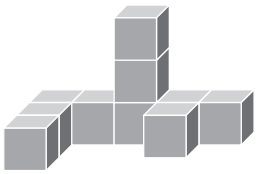


Figure B

Show or explain your thinking.

Sample work shown.

Figure A has a volume of 10 unit cubes, and Figure B has a volume of 9 unit cubes. So, Figure A has a greater volume because it takes up more space.

answer: Figure A

Name _____ Date _____

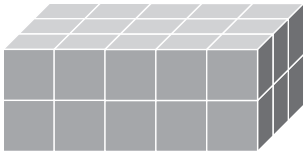
Quiz: Sub-Unit 1 (continued)

Unit 5.1

2 The rectangular prism is made up of unit cubes. Determine the volume of the rectangular prism in unit cubes.

Show or explain your thinking.

Sample work shown.



There are 2 layers of 15 unit cubes.

answer: 30 unit cubes

Up Next . . .

3 Which units could be used to measure the length of a pencil? Select *all* that apply.

A. centimeter **B.** meter **C.** kilometer

D. inch **E.** foot **F.** yard

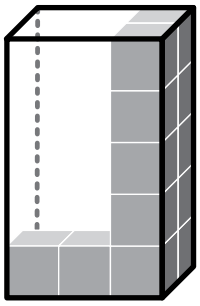
Name _____ Date _____

Quiz: Sub-Unit 2

Unit 5.1

1 Write 2 different expressions that represent the volume of the rectangular prism. Then determine the volume.

Show or explain your thinking. Sample expressions shown.



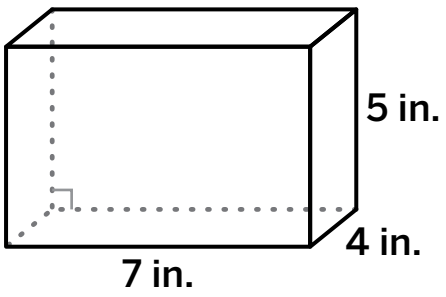
expression 1: 6 × 5

expression 2: 3 × 2 × 5

volume: 30 unit cubes

2 Determine the volume of the rectangular prism, in cubic inches.

Show or explain your thinking. Sample work shown.



The base is 7 × 4 or 28 square inches. I multiplied that by the height, 28 × 5 = 140.

answer: 140 cubic inches

Name _____ Date _____

Quiz: Sub-Unit 2 (continued)

Unit 5.1

3 A box is shaped like a rectangular prism. Its measurements are 6 centimeters by 2 centimeters by 15 centimeters. Select *all* the expressions that represent the volume, in cubic centimeters, of the box.

A. $6 \times 2 \times 15$ **B.** $(6 \times 15) \times 2$ **C.** 12×30

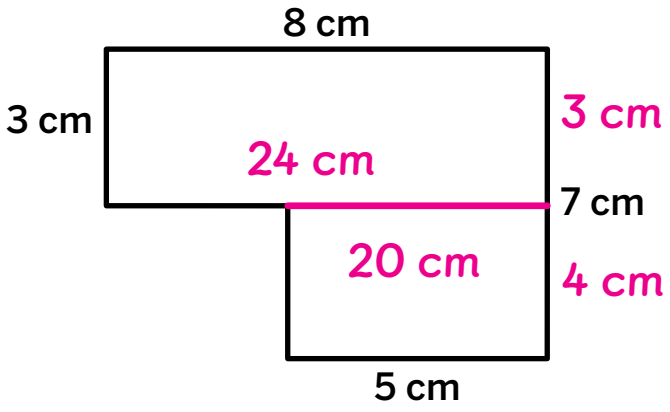
D. 2×75 **E.** 15×12

Up Next . . .

4 Determine the area of this figure, in square centimeters.

Show or explain your thinking.

Sample work shown.



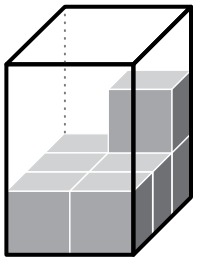
answer: 44 square centimeters

Name _____ Date _____

End-of-Unit Assessment

Unit 5.1

1 Which statement describes the volume of the rectangular prism, in cubic units?



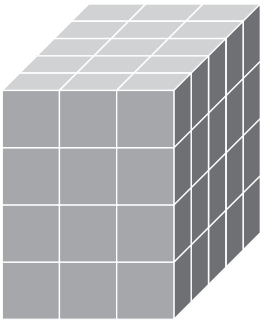
A. The volume is 7 cubic units.

B. The volume is less than 12 cubic units.

C. The volume is 12 cubic units.

D. The volume is greater than 12 cubic units.

2 Select *all* the expressions that represent the volume of the rectangular prism.



A. $3 \times 4 \times 5$

B. $(3 + 4) \times 5$

C. $15 + 15 + 15 + 15$

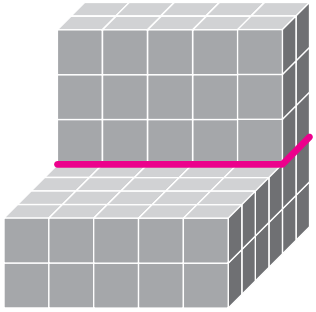
D. $15 \times 15 \times 15 \times 15$

E. 5×12

3 Determine the volume of the figure.

Show or explain your thinking.

Sample work shown.



$5 \times 2 \times 3$
$10 \times 3 = 30$

$5 \times 6 \times 2$
$30 \times 2 = 60$

$30 + 60 = 90$

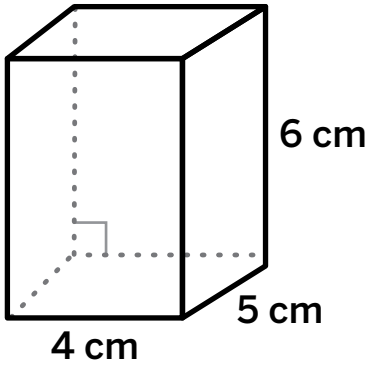
answer: 90 unit cubes

Name _____ Date _____

End-of-Unit Assessment (continued)

Unit 5.1

4 Select *all* the expressions that represent how many centimeter cubes would fill the rectangular prism.



A. 5×24 **B.** 6×24 **C.** 5×30

D. 6×20 **E.** $4 \times (5 \times 6)$

For Problems 5 and 6, determine the volume of a rectangular prism with the given measurements.

5 The length is 2 units, the width is 5 units, and the height is 7 units.

70 cubic units

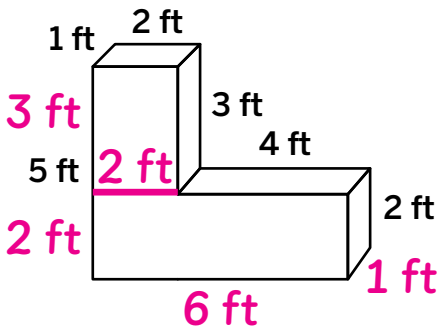
6 The base has an area of 200 square inches and the height is 6 inches.

1,200 cubic inches

7 Determine the volume of the prism, in cubic feet.

Show or explain your thinking.

Sample work shown.

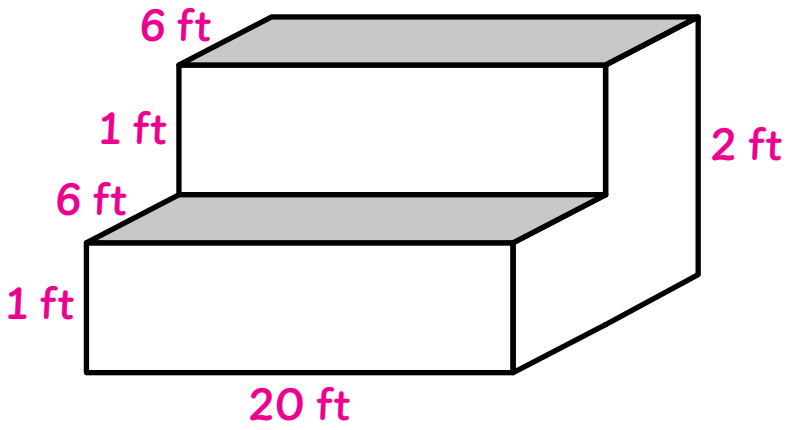


$2 \times 3 \times 1 = 6$
$2 \times 6 \times 1 = 12$
$6 + 12 = 18$

answer: 18 cubic feet

Name _____ Date _____

Use this information for Problems 8 and 9.
Clare's class is designing a garden with 2 levels and this general shape.



The garden should meet these criteria:

- **The garden should have at least 200 square feet for the plants.**
- **The volume should be less than 500 cubic feet.**

8 Label the diagram to show your choices for the side lengths.
Sample side lengths shown on the diagram.

9 Recommend side lengths for the tiered garden that fit the needs of Clare's class. Explain your thinking. **Sample explanation shown.**

I decided to make each level 6 feet wide and 20 feet long. So, that makes 240 square feet total for the plants. The lower section is 1 foot deep, so that means that it uses 120 cubic feet of soil. The upper section is 2 feet deep, so it uses 240 cubic feet of soil, and that is 360 cubic feet altogether.

Standard	5.MD.C.4	5.OA.A.2	5.MD.C.5.A	5.MD.C.5.B	5.MD.C.5.C
Problem(s)	1	2, 4	2, 4	5–6	3, 7–9

Problem 1

Standards: 5.MD.C.4, MP6

4 Exceeding	3 Meeting	2 Approaching	1 Beginning
Correct response: D. The volume is greater than 12 cubic units.	Some responses may show more understanding than others. Consider assigning Meeting or Approaching based on what you can determine about the student's understanding when applicable.		Response shows **limited understanding.**

Problem 2

Standards: 5.MD.C.5.A, 5.OA.A.2, MP7

4 Exceeding	3 Meeting	2 Approaching	1 Beginning
All correct choices and **no incorrect** choices. A. 3 × 4 × 5 C. 15 + 15 + 15 + 15 E. 5 × 12	**Two correct** choices and **no incorrect** choices. **All correct** choices and **one incorrect** choice.	**One or two correct** choices and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with some correct choices.

Problem 3

Standards: 5.MD.C.5.C, MP6

4 Exceeding	3 Meeting	2 Approaching	1 Beginning
Correct response: 90 unit cubes Accurate and complete explanation or showing of thinking.	Response shows **conceptual understanding** with minor errors and/or incomplete reasoning. Student annotates the rectangular prism to show decomposition and/or a part missing from the whole, and writes an expression for each part. Student finds the volume in layers.	Response shows **incomplete understanding** with significant errors. Student attempts to count each cube.	Response shows **limited understanding.**

Problem 4

Standards: 5.MD.C.5.A, 5.OA.A.2, MP7

4 Exceeding	3 Meeting	2 Approaching	1 Beginning
All correct choices and **no incorrect** choices. A. 5×24 D. 6×20 E. $4 \times (5 \times 6)$	**Two correct** choices and **no incorrect** choices. **All correct** choices and **one incorrect** choice.	**One or two correct** choices and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with some correct choices.

Problem 5

Standards: 5.MD.C.5.B, MP6

4 Exceeding	3 Meeting	2 Approaching	1 Beginning
Correct response: 70 cubic units	Some responses may show more understanding than others. Consider assigning Meeting or Approaching based on what you can determine about the student's understanding when applicable.		Response shows **limited understanding.**

Problem 6

Standards: 5.MD.C.5.B, MP6

4 Exceeding	3 Meeting	2 Approaching	1 Beginning
Correct response: 1,200 cubic inches	Some responses may show more understanding than others. Consider assigning Meeting or Approaching based on what you can determine about the student's understanding when applicable.		Response shows **limited understanding.**

Problem 7

Standards: 5.MD.C.5.C, MP6

4 Exceeding	3 Meeting	2 Approaching	1 Beginning
Correct response: 18 cubic feet	Response shows **conceptual understanding** with minor errors and/or incomplete reasoning. Student annotates the rectangular prism to show decomposition and/or a part missing from the whole, and writes an expression for each part. Student finds the volume in layers.	Response shows **incomplete understanding** with significant errors. Student attempts to count each cube.	Response shows **limited understanding.**

Problem 8			**Standards:** 5.MD.C.5.C, MP7
4 Exceeding	**3 Meeting**	**2 Approaching**	**1 Beginning**
The labels are included on the garden. The length, 2 widths, and 2 heights fulfill the area and volume constraints given. See answer key.	Response shows **conceptual understanding** with minor errors and/or incomplete reasoning. The side lengths fulfill either the area or the volume of the garden.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding.**

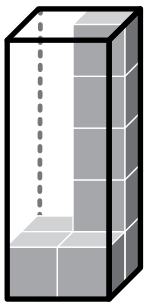
Problem 9			**Standards:** 5.MD.C.5.C, MP7
4 Exceeding	**3 Meeting**	**2 Approaching**	**1 Beginning**
The length, 2 widths, and 2 heights fulfill the area and volume constraints given. A sufficiently detailed and accurate explanation is included. Sample response: I decided to make each level 6 feet wide and 20 feet long. So, that makes 240 square feet total for the plants. The lower section is 1 foot deep, so that means that it uses 120 cubic feet of soil. The upper section is 2 feet deep, so it uses 240 cubic feet of soil, and that is 360 cubic feet altogether.	Response shows **conceptual understanding** with minor errors and/or incomplete reasoning. The length, 2 widths, and 2 heights fulfill the area and volume constraints given. However, the student's explanation lacks important details.	Response shows **incomplete understanding** with significant errors. The side lengths fulfill either the area or the volume of the garden.	Response shows **limited understanding.** The side lengths given demonstrate a significant lack of understanding of the area and volume of the garden.

Name _____ Date _____

End-of-Unit Assessment

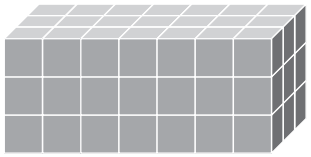
Unit 5.1

1 Which statement describes the volume of the rectangular prism, in cubic units?



- **A.** The volume is 8 cubic units.
- **B.** The volume is greater than 18 cubic units.
- **C.** The volume is 18 cubic units.
- **D.** The volume is less than 18 cubic units.

2 Select *all* the expressions that represent the volume of the rectangular prism in cubic units.

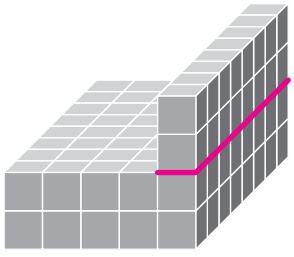


- **A.** $21 \times 21 \times 21$
- **B.** 7×9
- **C.** $(7 + 3) \times 3$
- **D.** $7 \times 3 \times 3$
- **E.** $21 + 21 + 21$

3 Determine the volume of the figure.

Show or explain your thinking.

Sample work shown.



$2 \times 5 \times 8$
$10 \times 8 = 80$

$1 \times 8 \times 2$
$8 \times 2 = 16$

$80 + 16 = 96$

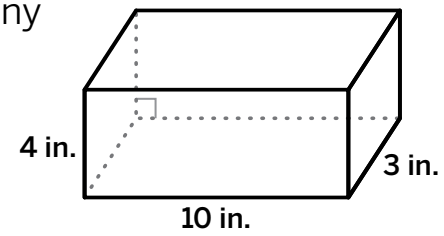
answer: 96 unit cubes

Name _____ Date _____

End-of-Unit Assessment (continued)

Unit 5.1

4 Select *all* the expressions that represent how many inch cubes would fill the rectangular prism.



- **A.** 3 × 40
- **B.** 3 × 30
- **C.** 10 × 12
- **D.** 10 × 40
- **E.** 4 × (3 × 10)

For Problems 5 and 6, determine the volume of a rectangular prism with the given measurements.

5 The length is 3 units, the width is 6 units, and the height is 5 units.

90 cubic units

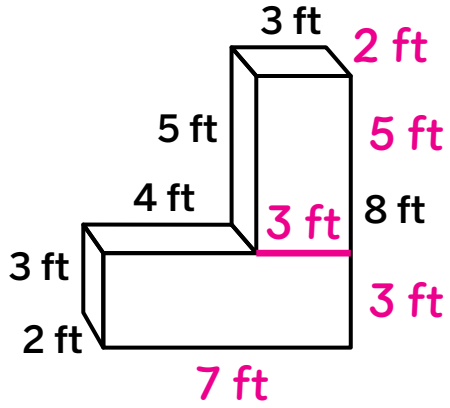
6 The base has an area of 300 square inches and the height is 5 inches.

1,500 cubic inches

7 Determine the volume of the prism.

Show or explain your thinking.

Sample work shown.



3 × 7 × 2 = 42
3 × 2 × 5 = 30

42 + 30 = 72

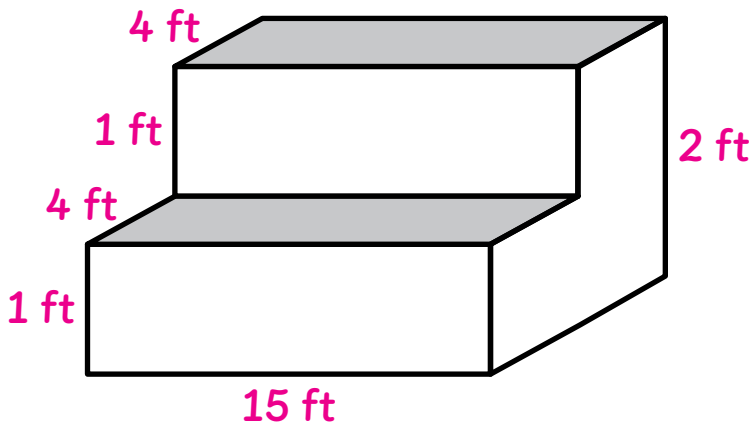
answer: 72 cubic feet

Name _____ Date _____

End-of-Unit Assessment (continued)

Unit 5.1

Use the information for Problems 8 and 9.
Diego's class is designing a garden with 2 levels and this general shape.



The garden should meet these criteria:

- **The garden should have at least 100 square feet for the plants.**
- **The volume should be less than 200 cubic feet.**

8 Label the diagram to show your choices for the side lengths.
Sample side lengths shown on the diagram.

9 Recommend side lengths for the tiered garden that fit the needs of Diego's class. Explain your thinking. **Sample explanation shown.**

I decided to make each level 4 feet wide and 15 feet long. So, that makes 120 square feet total for the plants. The lower section is 1 foot deep, so that means that it uses 60 cubic feet of soil. The upper section is 2 feet deep, so it uses 120 cubic feet of soil, and that is 180 cubic feet altogether.

Standard	5.MD.C.4	5.OA.A.2	5.MD.C.5.A	5.MD.C.5.B	5.MD.C.5.C
Problem(s)	1	2, 4	2, 4	5–6	3, 7–9

Problem 1

Standards: 5.MD.C.4, MP6

4 Exceeding	3 Meeting	2 Approaching	1 Beginning
Correct response: B. The volume is greater than 18 cubic units.	Some responses may show more understanding than others. Consider assigning Meeting or Approaching based on what you can determine about the student's understanding when applicable.		Response shows **limited understanding.**

Problem 2

Standards: 5.MD.C.5.A, 5.OA.A.2, MP7

4 Exceeding	3 Meeting	2 Approaching	1 Beginning
All correct choices and **no incorrect** choices. B. 7 × 9 D. 7 × 3 × 3 E. 21 + 21 + 21	**Two correct** choices and **no incorrect** choices. **All correct** choices and **one incorrect** choice.	**One or two correct** choices and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with some correct choices.

Problem 3

Standards: 5.MD.C.5.C, MP6

4 Exceeding	3 Meeting	2 Approaching	1 Beginning
Correct response: 96 unit cubes Accurate and complete explanation or showing of thinking.	Response shows **conceptual understanding** with minor errors and/or incomplete reasoning. Student annotates the rectangular prism to show decomposition and/or a part missing from the whole, and writes an expression for each part. Student finds the volume in layers.	Response shows **incomplete understanding** with significant errors. Student attempts to count each cube.	Response shows **limited understanding.**

Problem 4

Standards: 5.MD.C.5.A, 5.OA.A.2, MP7

4 Exceeding	3 Meeting	2 Approaching	1 Beginning
All correct choices and **no incorrect** choices. A. 3×40 C. 10×12 E. $4 \times (3 \times 10)$	**Two correct** choices and **no incorrect** choices. **All correct** choices and **one incorrect** choice.	**One or two correct** choices and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with some correct choices.

Problem 5

Standards: 5.MD.C.5.B, MP6

4 Exceeding	3 Meeting	2 Approaching	1 Beginning
Correct response: 90 cubic units	Some responses may show more understanding than others. Consider assigning Meeting or Approaching based on what you can determine about the student's understanding when applicable.		Response shows **limited understanding.**

Problem 6

Standards: 5.MD.C.5.B, MP6

4 Exceeding	3 Meeting	2 Approaching	1 Beginning
Correct response: 1,500 cubic inches	Some responses may show more understanding than others. Consider assigning Meeting or Approaching based on what you can determine about the student's understanding when applicable.		Response shows **limited understanding.**

Problem 7

Standards: 5.MD.C.5.C, MP6

4 Exceeding	3 Meeting	2 Approaching	1 Beginning
Correct response: 72 cubic feet	Response shows **conceptual understanding** with minor errors and/or incomplete reasoning. Student annotates the rectangular prism to show decomposition and/or a part missing from the whole, and writes an expression for each part. Student finds the volume in layers.	Response shows **incomplete understanding** with significant errors. Student attempts to count each cube.	Response shows **limited understanding.**

Problem 8			**Standards:** 5.MD.C.5.C, MP7
4 Exceeding	**3 Meeting**	**2 Approaching**	**1 Beginning**
The labels are included on the garden. The length, 2 widths, and 2 heights fulfill the area and volume constraints given. See answer key.	Response shows **conceptual understanding** with minor errors and/or incomplete reasoning. The side lengths fulfill either the area or the volume of the garden.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding.**

Problem 9			**Standards:** 5.MD.C.5.C, MP7
4 Exceeding	**3 Meeting**	**2 Approaching**	**1 Beginning**
The length, 2 widths, and 2 heights fulfill the area and volume constraints given. **A sufficiently detailed and accurate explanation is included.** **Sample response:** **I decided to make each level 4 feet wide and 15 feet long. So, that makes 120 square feet total for the plants. The lower section is 1 foot deep, so that means that it uses 60 cubic feet of soil. The upper section is 2 feet deep, so it uses 120 cubic feet of soil, and that is 180 cubic feet altogether.**	Response shows **conceptual understanding** with minor errors and/or incomplete reasoning. The length, 2 widths, and 2 heights fulfill the area and volume constraints given. However, the student's explanation lacks important details.	Response shows **incomplete understanding** with significant errors. The side lengths fulfill either the area or the volume of the garden.	Response shows **limited understanding.**

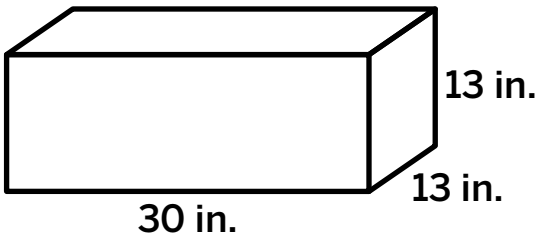
Name _____ Date _____

Performance Task

Unit 5.1

An animal supply store sells different sized aquariums, crates, and enclosures for a variety of animal sizes.

1 A small aquarium shaped like a rectangular prism is the perfect size for a hermit crab. Write 3 different expressions that represent the volume of this small aquarium.



Sample response shown.

30 × 13 × 13, 30 × 169, 13 × 390

2 Determine the volume of the small aquarium, in cubic inches.

Show or explain your thinking.

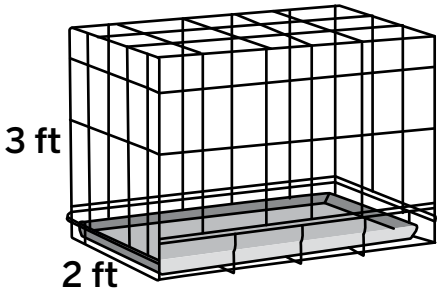
Sample work shown.

30 × 13 × 13
30 × 169 = 5,070

answer: 5,070 cubic inches

3 A large crate has a volume of 24 cubic feet. What is the length of the crate, in feet? Sample work shown.

Show or explain your thinking.



2 × 3 = 6
24 ÷ 6 = 4

answer: 4 feet

Name _____ Date _____

4 A fish aquarium is 4 feet wide, 8 feet long, and 5 feet high. What is the volume of the fish aquarium, in cubic feet?

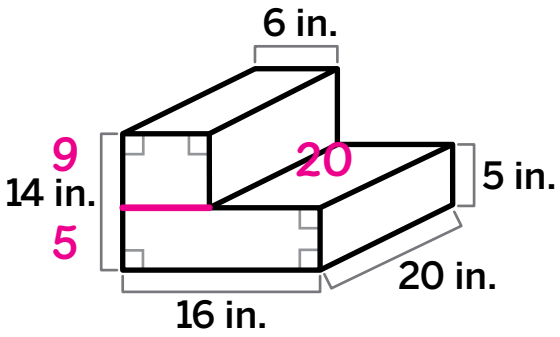
Show or explain your thinking.
Sample work shown.

$4 \times 8 \times 5$
$4 \times 40 = 160$

answer: 160 cubic feet

5 A small hamster cage has the dimensions shown. Determine the volume of the cage, in cubic inches.

Show or explain your thinking.
Sample work shown.



$9 \times 6 \times 20$
$54 \times 20 = 1{,}080$

$5 \times 16 \times 20$
$80 \times 20 = 1{,}600$

$1{,}080 + 1{,}600 = 2{,}680$

answer: 2,680 cubic inches

6 A store owner wants to create boxes shaped like a rectangular prism to ship store items. The largest box can have a volume of 240 cubic feet. Determine 3 different ways the box can be built.

Show or explain your thinking.

Sample response shown.

Box 1: 10 feet wide, 4 feet long, 6 feet tall

Box 2: 6 feet wide, 8 feet long, 5 feet tall

Box 3: 5 feet wide, 4 feet long, 12 feet tall

Assess and Respond

Support, strengthen, and **stretch** learning by assigning these digital resources that adjust to each student's current level of skill and understanding: • **Personalized Practice** • **By Heart Fluency Practice** • **Math Adventures**

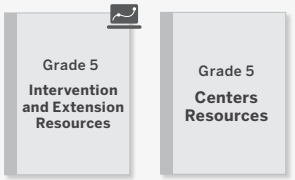
Performance Task

Facilitation: Assign this summative assessment performance task at the end of the unit to evaluate students' proficiency with the concepts and skills addressed in the unit.

Item Analysis

Problem(s)	Concept or skill	Addressed in	DOK	Standard(s)
1	Identifying expressions representing the volume of a rectangular prism	Lesson 8	2	5.MD.C.5.A, 5.OA.A.2, MP7
2	Determining the volume of a rectangular prism showing edge lengths only	Lesson 6	2	5.MD.C.5.A, 5.MD.C.5.B, MP6
3	Determining a missing edge length of a rectangular prism when given the volume	Lesson 12	2	5.MD.C.5.C, 5.OA.A.1, MP6
4	Solving problems involving the volume of right rectangular prisms	Lesson 10	2	5.MD.C.5.B, MP6
5	Determining volume of a solid figure composed of two non-overlapping right rectangular prisms	Lesson 12	2	5.MD.C.5.C, MP6
6	Solving problems involving the volume of right rectangular prisms	Lesson 13	2	5.MD.C.5.B, MP6

Differentiation Resources



Intervention and Extension Resources includes:

- Mini-Lessons
- Extensions

Centers Resources includes:

- Centers

Practice

If students need further review or practice with concepts or skills from Unit 1, consider the following resources:

- In-Lesson Practice (Student Edition)
- Item Bank

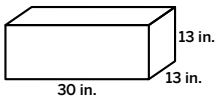
Name _____ Date _____

Performance Task

Unit 5.1

An animal supply store sells different sized aquariums, crates, and enclosures for a variety of animal sizes.

1 A small aquarium shaped like a rectangular prism is the perfect size for a hermit crab. Write 3 different expressions that represent the volume of this small aquarium.



Sample response shown.

30 × 13 × 13, 30 × 169, 13 × 390

2 Determine the volume of the small aquarium, in cubic inches.

Show or explain your thinking.
Sample work shown.

30 × 13 × 13
30 × 169 = 5,070

answer: 5,070 cubic inches

3 A large crate has a volume of 24 cubic feet. What is the length of the crate, in feet? Sample work shown.

Show or explain your thinking.

2 × 3 = 6
24 ÷ 6 = 4

answer: 4 feet

Name _____ Date _____

Performance Task (continued)

Unit 5.1

4 A fish aquarium is 4 feet wide, 8 feet long, and 5 feet high. What is the volume of the fish aquarium, in cubic feet?

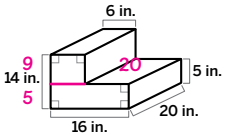
Show or explain your thinking.
Sample work shown.

4 × 8 × 5
4 × 40 = 160

answer: 160 cubic feet

5 A small hamster cage has the dimensions shown. Determine the volume of the cage, in cubic inches.

Show or explain your thinking.
Sample work shown.



9 × 6 × 20
54 × 20 = 1,080

5 × 16 × 20
80 × 20 = 1,600

1,080 + 1,600 = 2,680

answer: 2,680 cubic inches

D Differentiation (Performance Task)

To **Strengthen** and **Stretch** students' learning, refer to the differentiation resources suggested throughout this Sub-Unit.

Sub-Unit Goals	Problem(s)	Respond to Student Thinking	
Determine the volume of a rectangular prism using the formulas $V = l \times w \times h$ and $V = B \times h$.	1	**Support**	• **Mini-Lesson:** *Using Volume Formulas* (Lesson 8) • **Teacher Move:** Have students review the problem then compile all the possible expressions.
	2	**Support**	• **Mini-Lesson:** *Determining the Volume of Solid Rectangular Prisms* (Lesson 6)
Determine the volume of a figure composed of rectangular prisms.	3	**Support**	• **Mini-Lesson:** *Determining Unknown Edge Lengths of a Figure* (Lesson 12)
	4	**Support**	• **Mini-Lesson:** *Determining the Volumes of Figures Made of Prisms* (Lesson 10) • **Teacher Move:** Have students review the problem by drawing a rectangular prism and labeling known side lengths.
	5	**Support**	• **Teacher Move:** Have students review the problem by describing to a partner how they decomposed the figure, then writing an equation to show their calculation.
	6	**Support**	• **Mini-Lesson:** *Writing Expressions to Determine the Volume of a Figure* (Lesson 13) • **Teacher Move:** Have students review the problem by justifying 1 way the box could be built.

GRADE 5

Show-What-You-Know Assessments

The following includes all lesson-level Show What You Know assessments from one full unit. These daily formative assessments focus on the key concept of the lesson. Show What You Know assessments will also be available for students to complete digitally in Grades 2–5.

Name _____ Date _____

Show What You Know

1.02

Select *all* the statements that are true about volume.

A. Volume is the same as area.

B. Volume is the amount of space a three-dimensional figure takes up.

C. A figure composed of fewer unit cubes has a lesser volume.

D. 2 figures that look different *always* have different volumes.

E. Volume is the number of unit cubes needed to build a figure.

I can . . .

Describe the volume of a three-dimensional figure.

Name _____ Date _____

Show What You Know

1.03

Select *all* the true statements about a rectangular prism.

A. A rectangular prism is a solid figure with 6 rectangular faces.

B. A rectangular prism is composed of layers that look different.

C. Each layer in a rectangular prism is made up of rows and columns.

D. The volume of a rectangular prism can *only* be determined by counting every unit cube.

E. Rectangular prisms that look different may have the same volume.

I can . . .

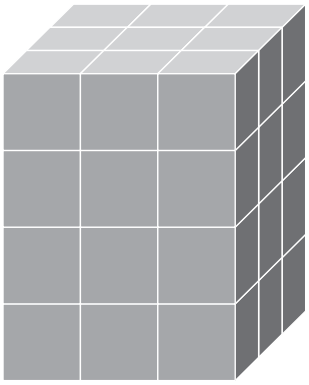
Describe the layered structure of a rectangular prism.

Name _____ Date _____

Show What You Know

1.04

Determine the volume of the rectangular prism.



Show or explain your thinking.

Sample work shown.

4 layers of 9 cubes is 9 + 9 + 9 + 9 = 36.

or

3 layers of 12 cubes is 12 + 12 + 12 = 36.

answer: 36 unit cubes

I can . . .

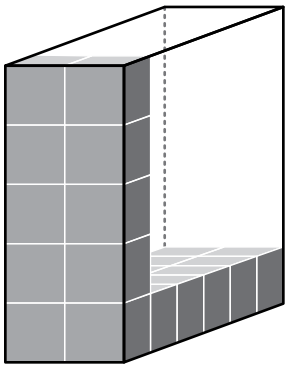
Determine the volume of a rectangular prism.

Name _____ Date _____

Show What You Know

1.05

Here is a rectangular prism that is partially packed with unit cubes. Use the prism for Problems 1 and 2.



1 Write 2 different multiplication expressions to represent the volume of the rectangular prism. **The factors may be in any order.**

Expression 1: 12 × 5 or 10 × 6

Expression 2: (6 × 2) × 5 (5 × 2) × 6

2 What is the volume of the prism?

60 unit cubes

I can . . .

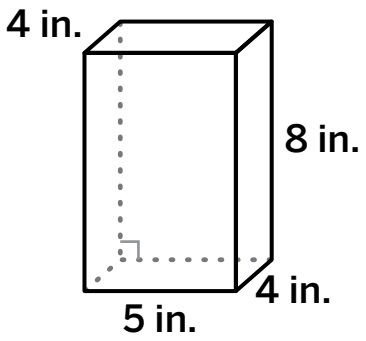
Represent the volume of rectangular prisms with expressions and determine the volume.

Name _____ Date _____

Show What You Know

1.06

Which expressions represent the volume of the rectangular prism? Select *all* that apply.



A. $4 \times 5 \times 8 \times 4$

B. 20×8

C. $(4 \times 5) \times 8$

D. 4×40

I can . . .

Determine and interpret expressions that represent the volume of a rectangular prism that is not composed of unit cubes.

Name _____ Date _____

Show What You Know

1.07

Clare is measuring the volume of her closet, which is shaped like a rectangular prism. Which unit of measure is the best for Clare to use? Explain your thinking. Sample explanation shown.

A. cubic centimeters **B.** cubic inches **C.** cubic feet

Cubic feet is the best unit of measure. A closet's side lengths are much longer than 1 centimeter or 1 inch. Cubic centimeters and cubic inches would both result in very large measurements of volume and would not help others understand the size of the closet.

I can . . .

Determine and explain the best standard unit of measure for the volume of a real-world object.

Name _____ Date _____

Show What You Know

1.08

Priya's family rented a moving truck. The space inside the back of the moving truck is a rectangular prism that is 15 feet long, 5 feet wide, and 8 feet tall. What is the volume of the back of the moving truck in cubic feet?

Show or explain your thinking.

Sample work shown.

$15 \times 5 \times 8 = 15 \times 40$

$= 600$

answer: 600 cubic feet

I can . . .

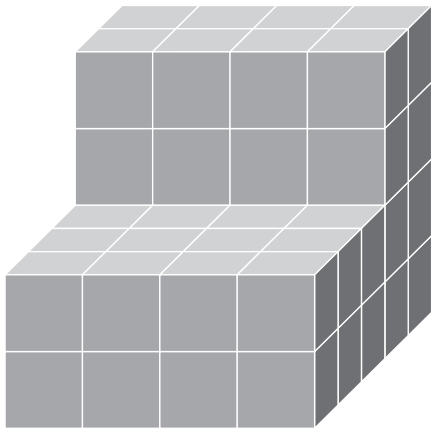
Determine the volumes of rectangular prisms with standard units of measure.

Name _____ Date _____

Show What You Know

1.09

Select *all* the statements that are true about the figure.



A. The figure can be built by making a 4 × 5 × 2 rectangular prism and a 4 × 2 × 2 rectangular prism.

B. The figure can be built by making a 2 × 2 × 5 rectangular prism and a 5 × 4 × 4 rectangular prism.

C. The figure can be built by making a 4 × 3 × 2 rectangular prism and a 4 × 2 × 4 rectangular prism.

D. The volume of the figure can be determined by adding the volume of each prism that was built.

I can . . .

Explain how to build and determine the volumes of figures composed of rectangular prisms.

Name _____ Date _____

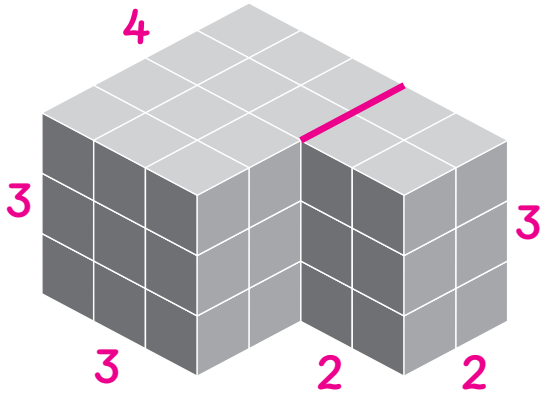
Show What You Know

1.10

Determine the volume of the figure.

Show or explain your thinking.

Sample work shown.



$3 \times 3 \times 4 = 36$
$2 \times 2 \times 3 = 12$
$36 + 12 = 48$

answer: 48 cubic units

I can . . .

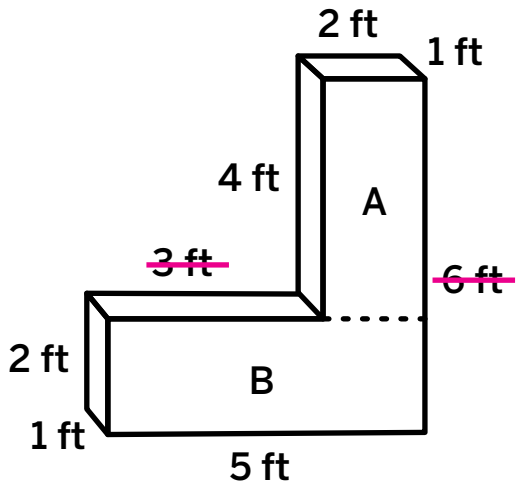
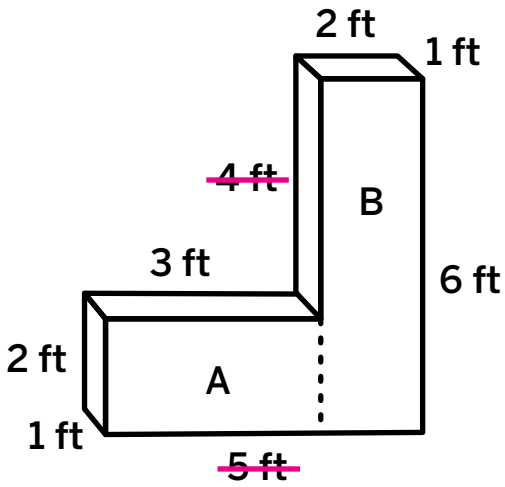
Decompose a figure into prisms, or compose the figure into a full prism, to determine the figure's volume.

Name _____ Date _____

Show What You Know

1.11

Here are 2 different ways to determine the volume of the same figure.

Strategy A	Strategy B
	

Select *all* the expressions or equations that represent the volume of the figure.

A. $(5 \times 1 \times 2) + (2 \times 1 \times 4)$

B. $(3 \times 1 \times 2) + (2 \times 1 \times 6) = 18$

C. $(5 \times 1 \times 2) + (6 \times 1 \times 2) = 22$

D. $10 + 8 = 18$

E. $(5 \times 1 \times 6) + (3 \times 1 \times 4)$

F. $(3 \times 1 \times 2) + (2 \times 1 \times 4)$

I can . . .

Use an expression or equation to represent the volume of a figure composed of prisms.

Name _____ Date _____

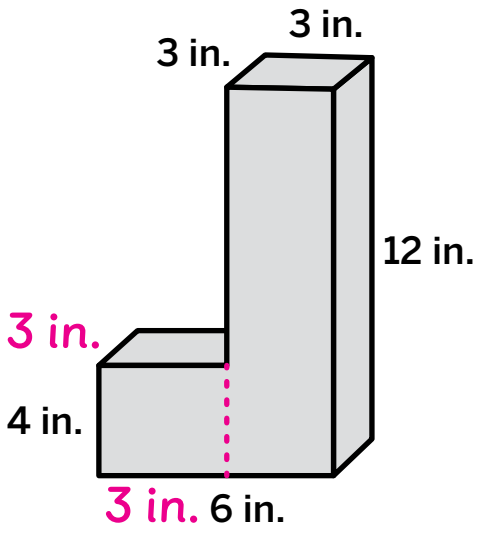
Show What You Know

1.12

Determine the volume of the figure in cubic inches.

Show or explain your thinking.

Sample work shown.



left prism: $3 \times 3 \times 4 = 36$
right prism: $3 \times 3 \times 12 = 108$
volume: $36 + 108 = 144$

answer: 144 cubic inches

I can . . .

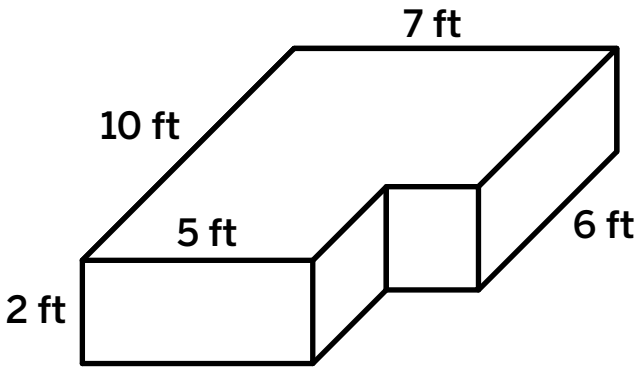
Determine the volumes of figures when some edge lengths are unknown.

Name _____ Date _____

Show What You Know

1.13

A preschool is building a sandbox as shown.



Select the expression that does *not* represent the volume of the sandbox.

A. $(6 \times 7 \times 2) + (4 \times 5 \times 2)$

B. $(7 \times 10 \times 2) - (4 \times 2 \times 2)$

C. $(10 \times 5 \times 2) + (6 \times 7 \times 2)$

D. $(10 \times 5 \times 2) + (6 \times 2 \times 2)$

I can . . .

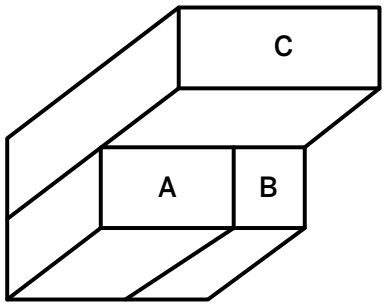
Represent the volume of a solid figure using different expressions.

Name _____ Date _____

Show What You Know

1.14

Use the clues to determine the volume of the figure in cubic inches.



Clues
• Prism A has a length of 6 inches, a width of 5 inches, and a height of 4 inches. • The area of the base of Prism B is 18 square inches. • The height of each prism is the same. • The volume of Prism C is 2 times the volume of Prisms A and B combined.

Show or explain your thinking.

Sample work shown.

Prism A: $6 \times 5 \times 4 = 120$

Prism B: $18 \times 4 = 72$

Prism C: $2 \times (120 + 72) = 384$

total volume: $120 + 72 + 384 = 576$

answer: 576 cubic inches

I can . . .

Use known information to determine the volume of a solid figure.

Show What You Know **Lesson 2**

Name _____ Date _____

Show What You Know 1.02

Select *all* the statements that are true about volume.

A. Volume is the same as area.

B. Volume is the amount of space a three-dimensional figure takes up.

C. A figure composed of fewer unit cubes has a lesser volume.

D. 2 figures that look different *always* have different volumes.

E. Volume is the number of unit cubes needed to build a figure.

I can . . .
Describe the volume of a three-dimensional figure.

Show What You Know **Lesson 3**

Name _____ Date _____

Show What You Know 1.03

Select *all* the true statements about a rectangular prism.

A. A rectangular prism is a solid figure with 6 rectangular faces.

B. A rectangular prism is composed of layers that look different.

C. Each layer in a rectangular prism is made up of rows and columns.

D. The volume of a rectangular prism can *only* be determined by counting every unit cube.

E. Rectangular prisms that look different may have the same volume.

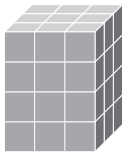
I can . . .
Describe the layered structure of a rectangular prism.

Show What You Know **Lesson 4**

Name _____ Date _____

Show What You Know 1.04

Determine the volume of the rectangular prism.



Show or explain your thinking.
Sample work shown.

4 layers of 9 cubes is 9 + 9 + 9 + 9 = 36.
or
3 layers of 12 cubes is 12 + 12 + 12 = 36.

answer: 36 unit cubes

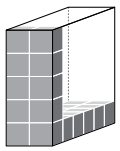
I can . . .
Determine the volume of a rectangular prism.

Show What You Know **Lesson 5**

Name _____ Date _____

Show What You Know 1.05

Here is a rectangular prism that is partially packed with unit cubes. Use the prism for Problems 1 and 2.



1 Write 2 different multiplication expressions to represent the volume of the rectangular prism. **The factors may be in any order.**

Expression 1: 12 × 5 or 10 × 6

Expression 2: (6 × 2) × 5 (5 × 2) × 6

2 What is the volume of the prism?

60 unit cubes

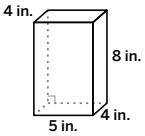
I can . . .
Represent the volume of rectangular prisms with expressions and determine the volume.

Show What You Know **Lesson 6**

Name _____ Date _____

Show What You Know 1.06

Which expressions represent the volume of the rectangular prism? Select *all* that apply.



A. $4 \times 5 \times 8 \times 4$

B. 20×8

C. $(4 \times 5) \times 8$

D. 4×40

I can . . .
Determine and interpret expressions that represent the volume of a rectangular prism that is not composed of unit cubes.

Show What You Know **Lesson 7**

Name _____ Date _____

Show What You Know 1.07

Clare is measuring the volume of her closet, which is shaped like a rectangular prism. Which unit of measure is the best for Clare to use? Explain your thinking. Sample explanation shown.

A. cubic centimeters **B.** cubic inches **C.** cubic feet

Cubic feet is the best unit of measure. A closet's side lengths are much longer than 1 centimeter or 1 inch. Cubic centimeters and cubic inches would both result in very large measurements of volume and would not help others understand the size of the closet.

I can . . .
Determine and explain the best standard unit of measure for the volume of a real-world object.

Show What You Know **Lesson 8**

Name _____ Date _____

Show What You Know 1.08

Priya's family rented a moving truck. The space inside the back of the moving truck is a rectangular prism that is 15 feet long, 5 feet wide, and 8 feet tall. What is the volume of the back of the moving truck in cubic feet?

Show or explain your thinking.
Sample work shown.

$15 \times 5 \times 8 = 15 \times 40$
$= 600$

answer: 600 cubic feet

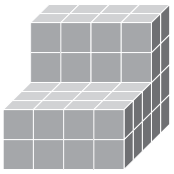
I can . . .
Determine the volumes of rectangular prisms with standard units of measure.

Show What You Know **Lesson 9**

Name _____ Date _____

Show What You Know 1.09

Select *all* the statements that are true about the figure.



A. The figure can be built by making a $4 \times 5 \times 2$ rectangular prism and a $4 \times 2 \times 2$ rectangular prism.

B. The figure can be built by making a $2 \times 2 \times 5$ rectangular prism and a $5 \times 4 \times 4$ rectangular prism.

C. The figure can be built by making a $4 \times 3 \times 2$ rectangular prism and a $4 \times 2 \times 4$ rectangular prism.

D. The volume of the figure can be determined by adding the volume of each prism that was built.

I can . . .
Explain how to build and determine the volumes of figures composed of rectangular prisms.

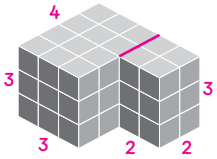
Show What You Know **Lesson 10**

Name _____ Date _____

Show What You Know 1.10

Determine the volume of the figure.

Show or explain your thinking.
Sample work shown.



$3 \times 3 \times 4 = 36$
$2 \times 2 \times 3 = 12$
$36 + 12 = 48$

answer: 48 cubic units

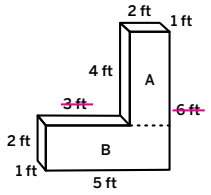
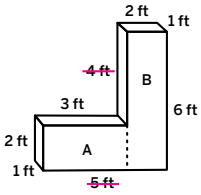
I can . . .
Decompose a figure into prisms, or compose the figure into a full prism, to determine the figure's volume.

Show What You Know **Lesson 11**

Name _____ Date _____

Show What You Know 1.11

Here are 2 different ways to determine the volume of the same figure.

Strategy A	Strategy B
	

Select *all* the expressions or equations that represent the volume of the figure.

- (A.) $(5 \times 1 \times 2) + (2 \times 1 \times 4)$
- (B.) $(3 \times 1 \times 2) + (2 \times 1 \times 6) = 18$
- C. $(5 \times 1 \times 2) + (6 \times 1 \times 2) = 22$
- (D.) $10 + 8 = 18$
- E. $(5 \times 1 \times 6) + (3 \times 1 \times 4)$
- F. $(3 \times 1 \times 2) + (2 \times 1 \times 4)$

I can . . .
Use an expression or equation to represent the volume of a figure composed of prisms.

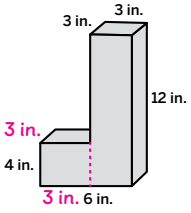
Show What You Know **Lesson 12**

Name _____ Date _____

Show What You Know 1.12

Determine the volume of the figure in cubic inches.

Show or explain your thinking.
Sample work shown.



left prism: $3 \times 3 \times 4 = 36$
right prism: $3 \times 3 \times 12 = 108$
volume: $36 + 108 = 144$

answer: 144 cubic inches

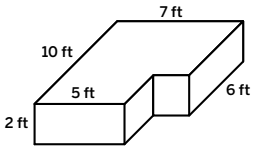
I can . . .
Determine the volumes of figures when some edge lengths are unknown.

Show What You Know **Lesson 13**

Name _____ Date _____

Show What You Know 1.13

A preschool is building a sandbox as shown.



Select the expression that does *not* represent the volume of the sandbox.

- A. $(6 \times 7 \times 2) + (4 \times 5 \times 2)$
- B. $(7 \times 10 \times 2) - (4 \times 2 \times 2)$
- (C.) $(10 \times 5 \times 2) + (6 \times 7 \times 2)$
- D. $(10 \times 5 \times 2) + (6 \times 2 \times 2)$

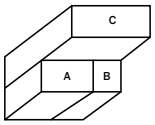
I can . . .
Represent the volume of a solid figure using different expressions.

Show What You Know **Lesson 14**

Name _____ Date _____

Show What You Know 1.14

Use the clues to determine the volume of the figure in cubic inches.



Clues
• Prism A has a length of 6 inches, a width of 5 inches, and a height of 4 inches. • The area of the base of Prism B is 18 square inches. • The height of each prism is the same. • The volume of Prism C is 2 times the volume of Prisms A and B combined.

Show or explain your thinking.

Sample work shown.

Prism A: $6 \times 5 \times 4 = 120$
Prism B: $18 \times 4 = 72$
Prism C: $2 \times (120 + 72) = 384$
total volume: $120 + 72 + 384 = 576$

answer: 576 cubic inches

I can . . .

Use known information to determine the volume of a solid figure.

GRADE 5

Mini-Lessons

The following section includes a selection of Mini-Lessons that support core instruction. These 15-minute lessons are aligned to the most critical topics throughout a unit to provide targeted intervention to small groups who need additional support. Mini-Lessons appear as a support activity in the differentiation options supporting each lesson.

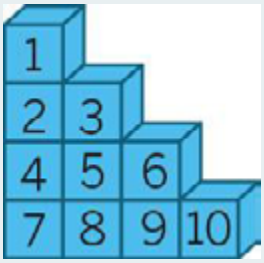
Name _____ Date _____

Comparing Volume

ML 1.02

Modeled Review

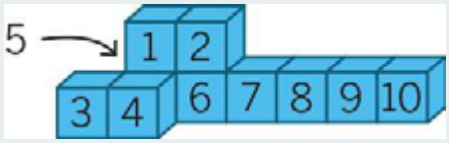
Shawn's figure



number of cubes used: 10

volume: 10 unit cubes

Clare's figure

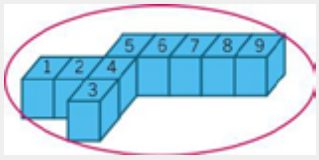
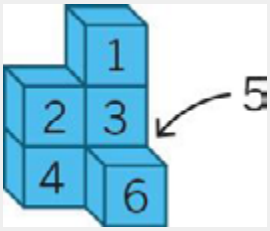


number of cubes used: 10

volume: 10 unit cubes

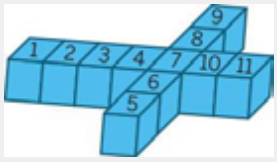
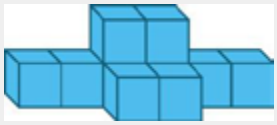
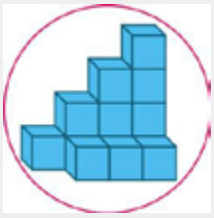
Guided Practice

Complete the table. Circle the figure with the greater volume. Use unit cubes if it is helpful.

Figure	Number of cubes used	Volume
	9	9 unit cubes
	6	6 unit cubes

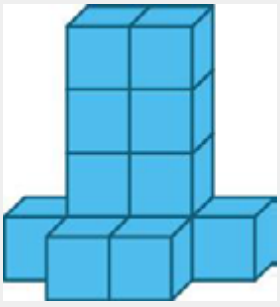
Guided Practice

Complete the table. Circle the figure with the greatest volume. Use unit cubes if it is helpful.

Figure	Number of cubes used	Volume
	11	11 unit cubes
	10	10 unit cubes
	13	13 unit cubes

Check

Complete the table. Use unit cubes if it is helpful.

Figure	Number of cubes used	Volume
	12	12 unit cubes

Comparing Volume

Teacher's Guide **ML 1.02**

Goal

Recognize volume as the number of unit cubes in a figure.

Standard

5.MD.C.3

Materials

unit cubes

Modeled Review

Point to the problem in the Modeled Review and **ask:**

- "What do you notice about the two figures? How are they the same? How are they different?"
- "How is the number of cubes related to the volume of the figure?"
- "In Clare's figure, why is there an arrow with the number 5?"

Reinforce the goal by saying, "Volume is the amount of space a three-dimensional figure takes up. You could describe the volume of a figure by counting the number of unit cubes it takes to build the figure."

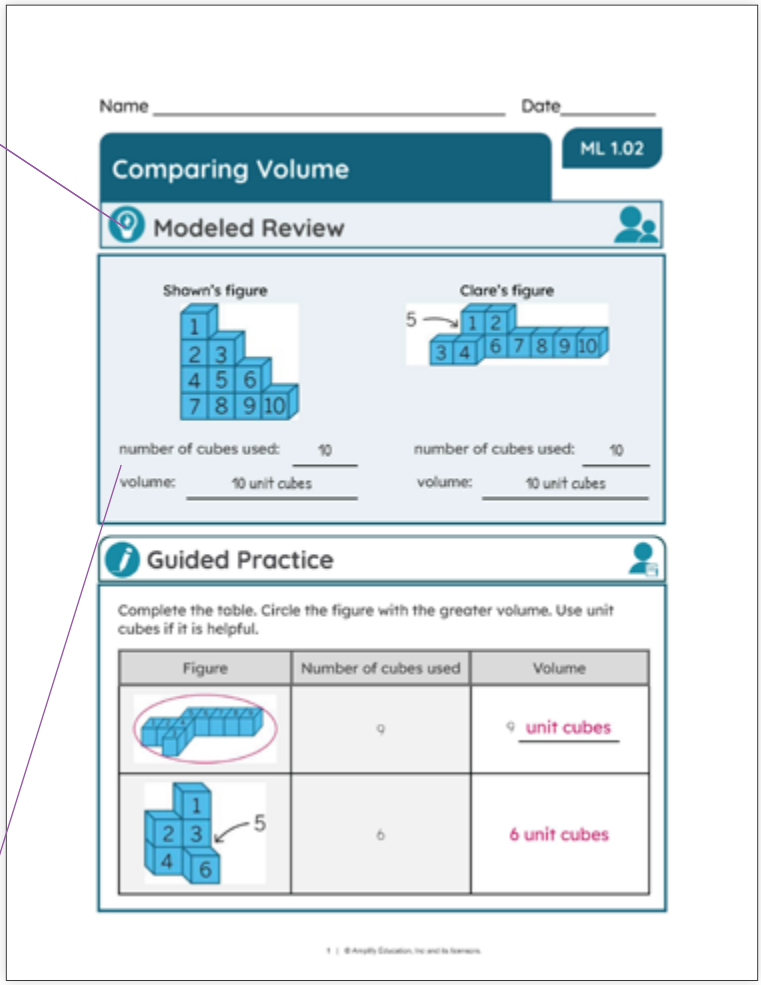
ML/EL Demonstrate building the second figure using unit cubes to help students visualize the hidden unit cubes.

Guided Practice

For each problem, focus students' attention on the number of unit cubes in the figure, including hidden cubes.

To scaffold their thinking, **say:**

- "Count the number of cubes in the figure."
- "Sometimes you cannot see all of the unit cubes in a figure but they still are included in the volume."


Name _____ Date _____

Comparing Volume ML 1.02

Modeled Review

Shawn's figure

Clare's figure

number of cubes used: 10
volume: 10 unit cubes

number of cubes used: 10
volume: 10 unit cubes

Guided Practice

Complete the table. Circle the figure with the greater volume. Use unit cubes if it is helpful.

Figure	Number of cubes used	Volume
	9	9 unit cubes
	6	6 unit cubes

Vocabulary

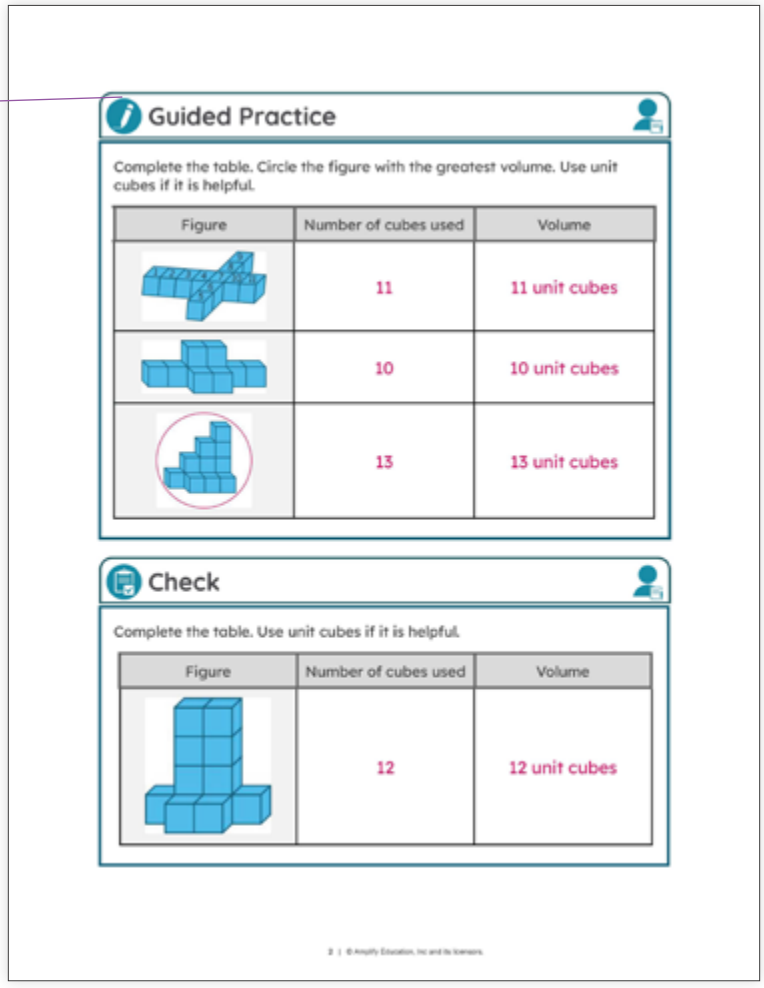
If needed, share the meaning of the words with students:

unit cube: A cube, whose sides are 1 unit long, used to measure volume.
volume: The amount of space a three-dimensional figure takes up.

Guided Practice

A Check for understanding by inviting students to re-phrase the directions in their own words. Clarify as needed.

Key Takeaway:
Say, "You can measure the volume of a three-dimensional object by counting the number of unit cubes it takes to build it. The more unit cubes used, the more space the object takes up and the greater the volume."



Guided Practice

Complete the table. Circle the figure with the greatest volume. Use unit cubes if it is helpful.

Figure	Number of cubes used	Volume
	11	11 unit cubes
	10	10 unit cubes
	13	13 unit cubes

Check

Complete the table. Use unit cubes if it is helpful.

Figure	Number of cubes used	Volume
	12	12 unit cubes

Reflection

Ask:
- "How does volume help you describe three-dimensional objects?"
- "What questions do you still have?"

Check: Recommended Next Steps

Almost there	**Got it!**
If students need more support, provide them with 10 unit cubes and ask them to build a figure. Have students count the number of unit cubes used to determine the volume. Then have them add a unit cube to their figure and ask them how the volume changed.	If students need more practice, consider having them grab a handful of unit cubes, build a figure, and determine its volume. Repeat as needed.

Name _____ Date _____

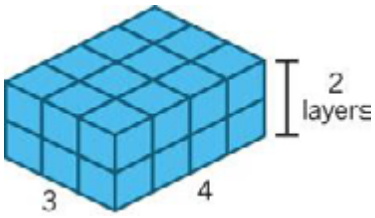
Building and Describing Rectangular Prisms

ML 1.03.A

Modeled Review

Name: Han

Build a rectangular prism using unit cubes. Then describe your rectangular prism.

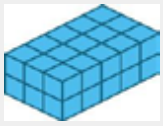
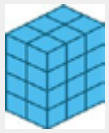


One layer is 3 × 4 or 12 cubes.

There are 2 layers of 12 cubes.

Guided Practice

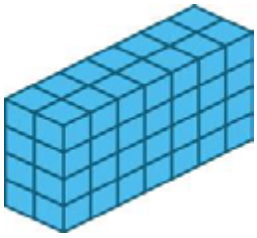
1. Complete the table. Use unit cubes if it is helpful. **Sample responses shown.**

Prism	Number of cubes in 1 layer	Number of layers
	2 × 3 = 6	3
	3 × 5 = 15	2
	2 × 3 = 6	4

Guided Practice

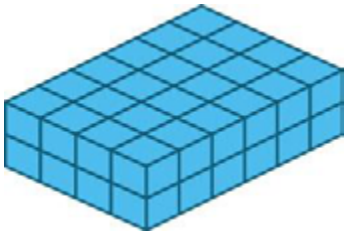
For Problems 1 and 2, describe the rectangular prism. Use unit cubes if it is helpful. Sample responses shown for Problem 3.

2.



One layer is 2 × 7 or 14 cubes. There are 4 layers of 14 cubes.

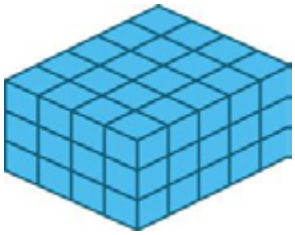
3.



There are 4 × 6 or 24 cubes in 1 layer. There are 2 layers of 24 cubes.

Check

Describe the rectangular prism. Use unit cubes if it is helpful. Sample response shown.



There are 4 × 5 or 20 cubes in 1 layer. There are 3 layers of 20 cubes.

Goal

Build and describe the structure of rectangular prisms.

Standard

5.MD.C.4

Materials

unit cubes

Modeled Review

Point to Han's work and **ask:**

- "What do you know about rectangular prisms?"
- "How are the cubes arranged in each layer?"
- "If the prism is turned, how might that change the way the prism is described?"

Reinforce the goal by saying, "A rectangular prism is composed of one or more identical layers."

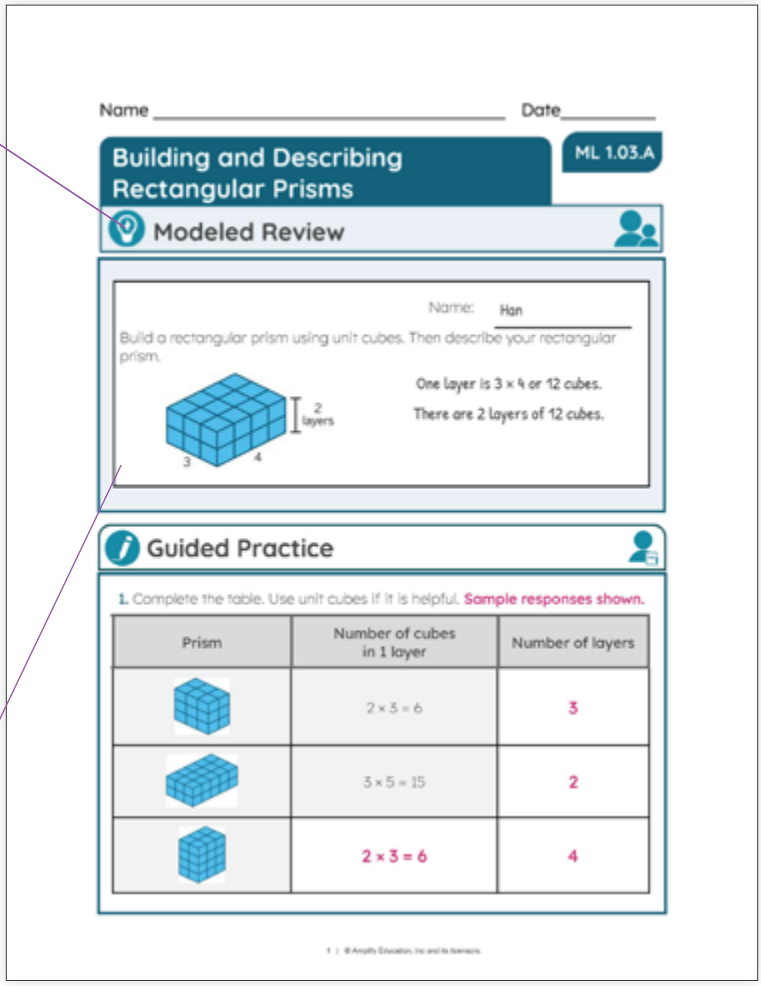
ML/EL Model by building the prism and pointing out the number of cubes in one layer and the number of layers.

Guided Practice

For each problem, focus students' attention on using the layers to describe a rectangular prism.

To scaffold their thinking, **say:**

- "First, look at one layer of the prism."
- "Identify the total number of cubes in that layer."
- "Then, determine the number of layers."



Name _____ Date_____

Building and Describing Rectangular Prisms

ML 1.03.A

Modeled Review

Name: Han

Build a rectangular prism using unit cubes. Then describe your rectangular prism.

One layer is 3 × 4 or 12 cubes.

There are 2 layers of 12 cubes.

Guided Practice

1. Complete the table. Use unit cubes if it is helpful. Sample responses shown.

Prism	Number of cubes in 1 layer	Number of layers
	2 × 3 = 6	3
	3 × 5 = 15	2
	2 × 3 = 6	4

Vocabulary

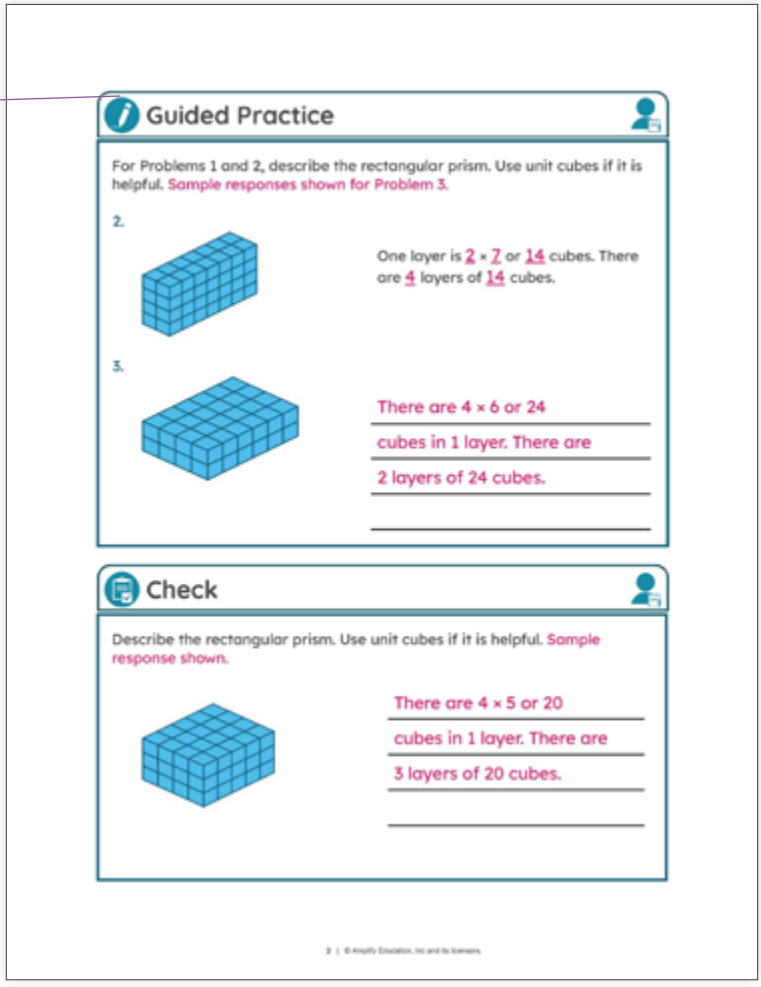
If needed, share the meaning of the words with students:

rectangular prism: A solid figure with 6 faces that are all rectangles.
unit cube: A cube, whose sides are 1 unit long, used to measure volume.
volume: The amount of space a three-dimensional figure takes up.

Guided Practice

A Chunk this task into smaller, more manageable parts by having students first describe the number of cubes in a layer and then describe the number of layers in the prism.

Key Takeaway:
Say, "A rectangular prism is composed of identical layers, which can be used to determine its volume without counting every cube. Prisms that look different may have the same volume."



Guided Practice

For Problems 1 and 2, describe the rectangular prism. Use unit cubes if it is helpful. Sample responses shown for Problem 3.

2.

One layer is 2 × 7 or 14 cubes. There are 4 layers of 14 cubes.

3.

There are 4 × 6 or 24 cubes in 1 layer. There are 2 layers of 24 cubes.

Check

Describe the rectangular prism. Use unit cubes if it is helpful. Sample response shown.

There are 4 × 5 or 20 cubes in 1 layer. There are 3 layers of 20 cubes.

Reflection

Ask:
- "How can layers help you describe a rectangular prism?"
- "What questions do you still have?"

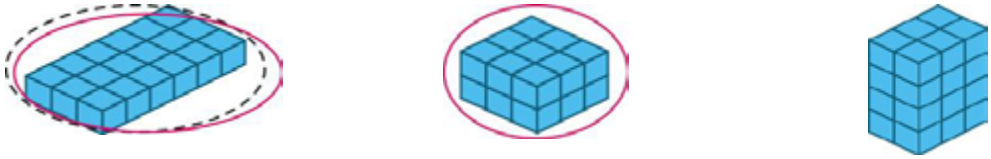
Check: Recommended Next Steps

Almost there	**Got it!**
If students need more support, have them use unit cubes to compose, decompose, and describe the structure of rectangular prisms.	If students need more practice, ask them to describe how their response would change to the problem in the Check if the rectangular prism had 2 additional layers.

Guided Practice

For Problems 2 and 3, circle the prism(s) that have the given number of unit cubes.

2. 20 unit cubes



3. 11 unit cubes

4. Priya used 30 unit cubes to build a rectangular prism. What could the prism look like? Select *2* that apply. Use unit cubes if it is helpful.

A. There are 3 layers. Each layer is 3 × 4 unit cubes.

B. There are 15 unit cubes in 1 layer. There are 2 layers.

C. There are 3 identical layers. In each layer, there are 5 × 2 unit cubes.

D. There are 10 unit cubes in 1 layer. There are 4 layers.

Check

Shawn used 24 unit cubes to build a rectangular prism. What could the prism look like? Select *3* that apply. Use unit cubes if it is helpful.

A. There are 12 unit cubes in 1 layer. There are 2 layers.

B. There are 3 layers. Each layer is 2 × 3 unit cubes.

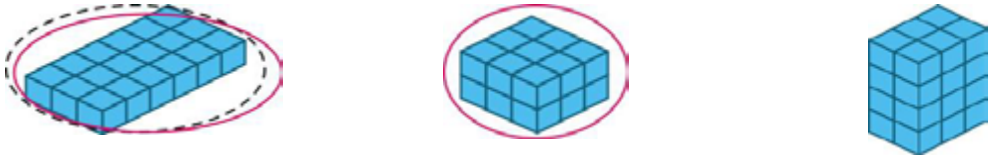
C. There are 3 identical layers. In each layer, there are 2 × 4 unit cubes.

D. There are 4 layers of 3 × 2 unit cubes.

Guided Practice

For Problems 2 and 3, circle the prism(s) that have the given number of unit cubes.

2. 20 unit cubes



3. 11 unit cubes

4. Priya used 30 unit cubes to build a rectangular prism. What could the prism look like? Select *2* that apply. Use unit cubes if it is helpful.

A. There are 3 layers. Each layer is 3 × 4 unit cubes.

B. There are 15 unit cubes in 1 layer. There are 2 layers.

C. There are 3 identical layers. In each layer, there are 5 × 2 unit cubes.

D. There are 10 unit cubes in 1 layer. There are 4 layers.

Check

Shawn used 24 unit cubes to build a rectangular prism. What could the prism look like? Select *3* that apply. Use unit cubes if it is helpful.

A. There are 12 unit cubes in 1 layer. There are 2 layers.

B. There are 3 layers. Each layer is 2 × 3 unit cubes.

C. There are 3 identical layers. In each layer, there are 2 × 4 unit cubes.

D. There are 4 layers of 3 × 2 unit cubes.

Goal

Build different rectangular prisms with the same volume.

Standard

5.MD.C.4

Materials

unit cubes

Modeled Review

Point to the problem in the Modeled Review and **ask:**

- "How are Jada's and Clare's prisms similar? Different?"
- "Where do you see factors of 32 in the answers?"
- "Are there any other ways to build a rectangular prism using 32 cubes?"

Reinforce the goal by saying, "Prisms can look different and have the same volume."

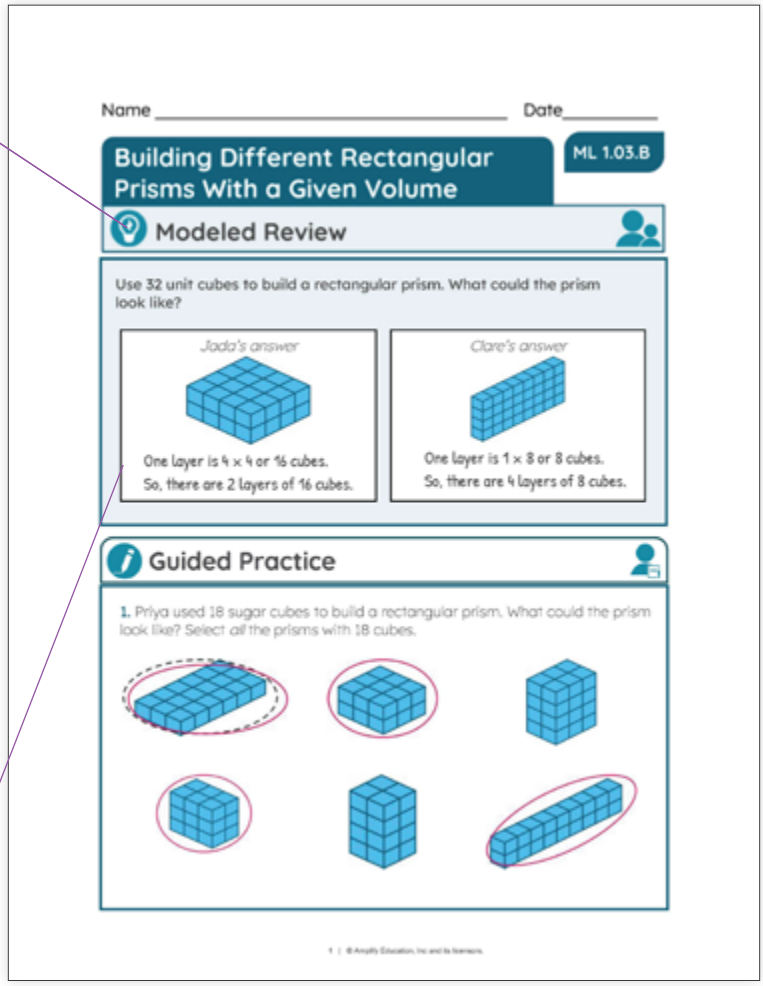
ML/EL Model decomposing Jada's prism and thinking aloud about the structure. For example, point to the number of layers and the number of cubes in each layer.

Guided Practice

Focus students' attention on using the structure of each prism to determine the number of cubes.

To scaffold their thinking, **ask:**

- "How many layers are there?"
- "How many cubes are in each layer?"
- "How many total cubes are there?"


Name _____ Date_____

Building Different Rectangular Prisms With a Given Volume

ML 1.03.B

Modeled Review

Use 32 unit cubes to build a rectangular prism. What could the prism look like?

Jada's answer

One layer is 4 × 4 or 16 cubes.
So, there are 2 layers of 16 cubes.

Clare's answer

One layer is 1 × 8 or 8 cubes.
So, there are 4 layers of 8 cubes.

Guided Practice

1. Priya used 18 sugar cubes to build a rectangular prism. What could the prism look like? Select all the prisms with 18 cubes.

Vocabulary

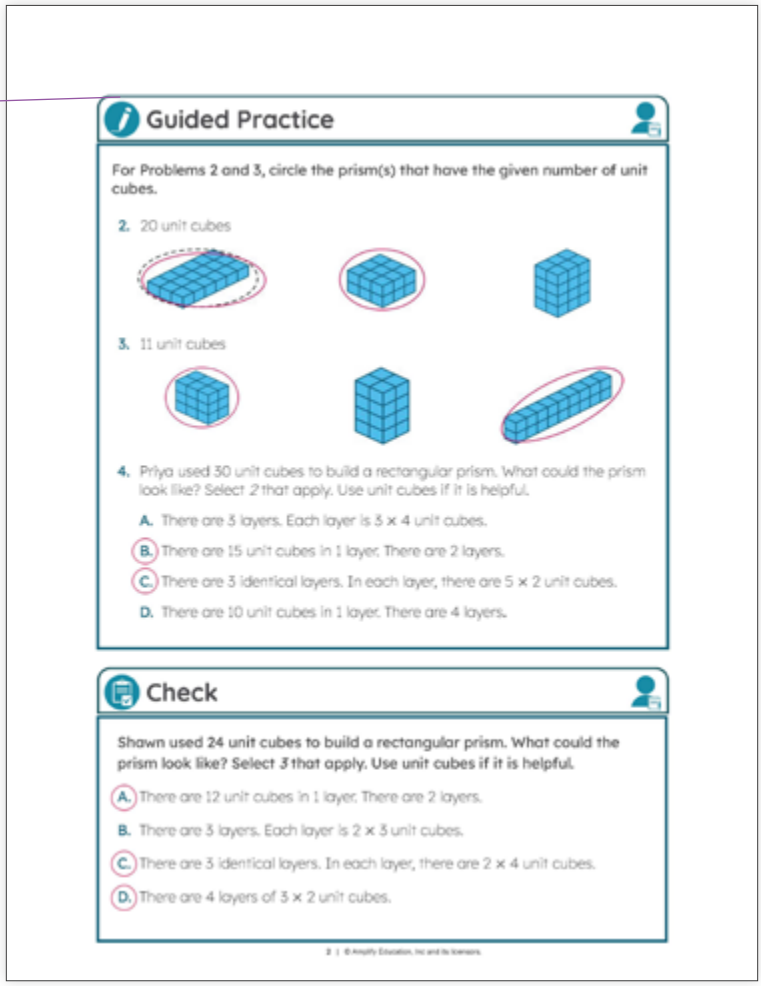
If needed, share the meaning of the words with students:

rectangular prism: A solid figure with 6 faces that are all rectangles.
unit cube: A cube, whose sides are 1 unit long, used to measure volume.
volume: The amount of space a three-dimensional figure takes up.

Guided Practice

A Have students cover the problems they aren't yet working on to prevent the problems from becoming visually overwhelming.

Key Takeaway:
Say, "Prisms that look different may have the same volume. Even though they look different, they take up the same amount of space."



Guided Practice

For Problems 2 and 3, circle the prism(s) that have the given number of unit cubes.

2. 20 unit cubes

3. 11 unit cubes

4. Priya used 30 unit cubes to build a rectangular prism. What could the prism look like? Select *2* that apply. Use unit cubes if it is helpful.

A. There are 3 layers. Each layer is 5 × 4 unit cubes.
B. There are 15 unit cubes in 1 layer. There are 2 layers.
C. There are 3 identical layers. In each layer, there are 5 × 2 unit cubes.
D. There are 10 unit cubes in 1 layer. There are 4 layers.

Check

Shawn used 24 unit cubes to build a rectangular prism. What could the prism look like? Select *3* that apply. Use unit cubes if it is helpful.

A. There are 12 unit cubes in 1 layer. There are 2 layers.
B. There are 3 layers. Each layer is 2 × 3 unit cubes.
C. There are 3 identical layers. In each layer, there are 2 × 4 unit cubes.
D. There are 4 layers of 3 × 2 unit cubes.

Reflection

Ask:
- "What is something you weren't sure about at the start of the lesson but understand now?"
- "What questions do you still have?"

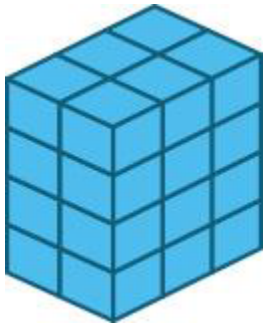
Check: Recommended Next Steps

Almost there	**Got it!**
If students need more support, consider using Mini-Lesson 1.03A: *Building and Describing Rectangular Prisms*.	If students need more practice, ask them to build a rectangular prism with a given volume. Then, have students compare with a partner and discuss what makes the prisms different.

Guided Practice

Determine the volume of each prism. Sample work shown.

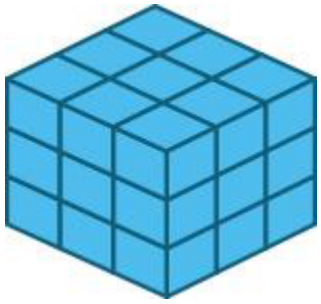
2.



$6 \times 4 = 24$

answer: 24 cubic units

3.

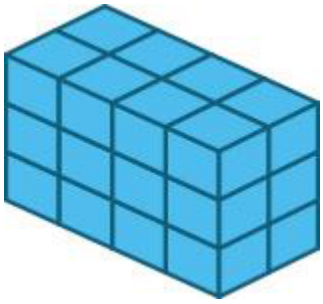


$9 \times 3 = 27$

answer: 27 cubic units

Check

Determine the volume of the prism. Sample work shown.



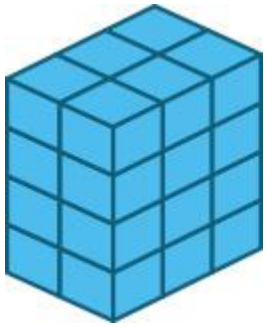
$8 \times 3 = 24$

answer: 24 cubic units

Guided Practice

Determine the volume of each prism. Sample work shown.

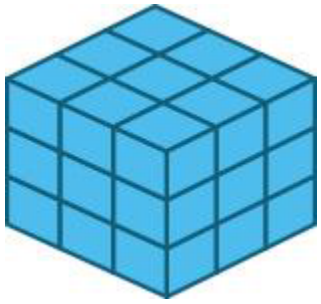
2.



6 × 4 = 24

answer: 24 cubic units

3.

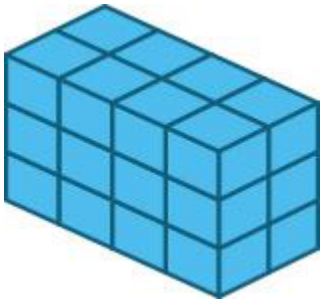


9 × 3 = 27

answer: 27 cubic units

Check

Determine the volume of the prism. Sample work shown.



8 × 3 = 24

answer: 24 cubic units

Goal

Use the layered structure of a rectangular prism to explain how to determine volume.

Standard

5.MD.C.4

Materials

unit cubes

Modeled Review

Point to Gabriela's work and **ask:**

- "How did Gabriela know the bottom layer has 6 cubes?"
- "How did Gabriela know there are 2 layers?"
- "How would Gabriela's thinking change if the prism had 4 more layers?"
- "What steps did Gabriela take to determine the volume?"

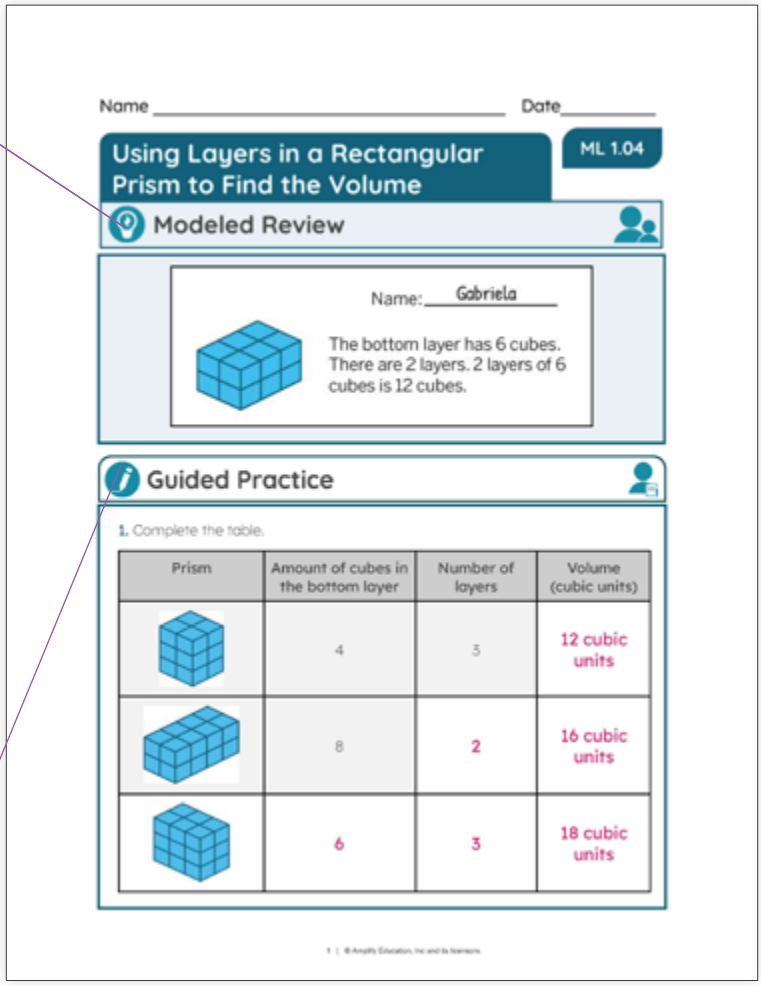
Reinforce the goal by saying, "You can determine the volume of a rectangular prism shown in a two-dimensional image by using your understanding of layers composed of equal groups of unit cubes."

Guided Practice

For each problem, focus students' attention on the number of cubes in a layer and how they can use multiplication to find the volume.

To scaffold their thinking, **ask:**

- "How does the top layer help you to know the amount of cubes in the bottom layer?"
- "How can you use multiplication to find the volume?"



Name _____ Date _____

Using Layers in a Rectangular Prism to Find the Volume

ML 1.04

Modeled Review

Name: Gabriela

The bottom layer has 6 cubes. There are 2 layers. 2 layers of 6 cubes is 12 cubes.

Guided Practice

1. Complete the table.

Prism	Amount of cubes in the bottom layer	Number of layers	Volume (cubic units)
	4	3	12 cubic units
	8	2	16 cubic units
	6	3	18 cubic units

Vocabulary

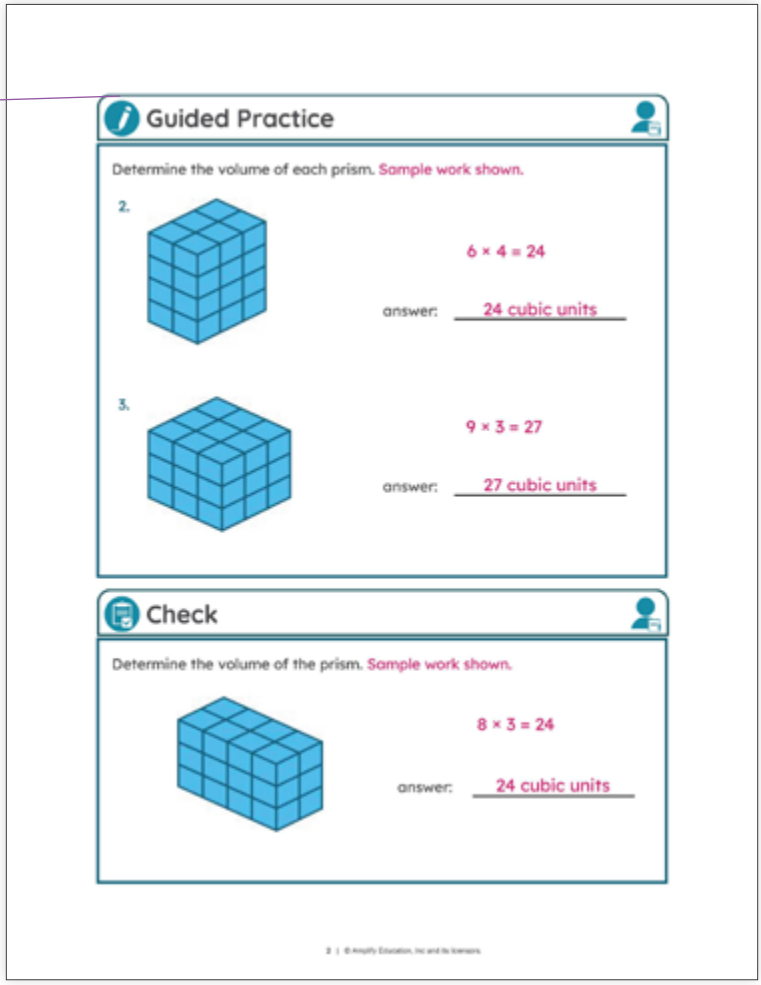
If needed, share the meaning of the words with students:

rectangular prism: A solid figure with 6 faces that are all rectangles.
unit cube: A cube, whose sides are 1 unit long, used to measure volume.
volume: The amount of space a three-dimensional figure takes up.

Guided Practice

A Provide unit cubes for students to use to build prisms from the images in the Student Edition.

Key Takeaway:
Say, "The volume of a rectangular prism can be determined by counting equal groups of any one layer. No matter which layer you use, the volume will be the same."



Reflection

Ask:
- "Does the volume of a prism change depending on which side of the prism you are viewing? Why or why not?"
- "How was the lesson helpful to you today?"

Check: Recommended Next Steps

Almost there	**Got it!**
If students need more support, consider using Mini-Lesson 1.03A: *Building and Describing Rectangular Prisms*.	If students need more practice, consider having them determine the volume of each prism. • A prism with 5 layers and 10 cubes on the bottom layer. • A prism with 8 layers and 5 cubes on the bottom layer.

Name _____ Date _____

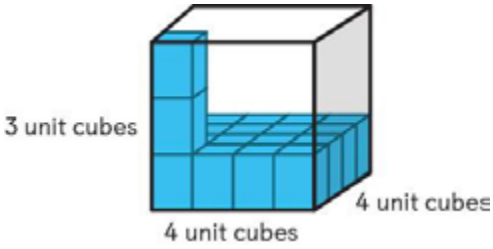
Finding the Volume of Partially Packed Rectangular Prisms

ML 1.05.A

Modeled Review

Name: Diego

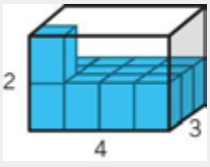
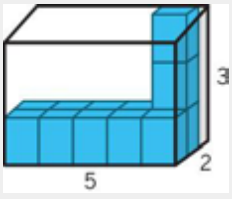
Determine the volume of the rectangular prism. Show or explain your thinking.



The bottom layer has 4 × 4, or 16, unit cubes. The prism has 3 layers of 16, so the volume is 48 unit cubes because 3 × 16 = 48.

Guided Practice

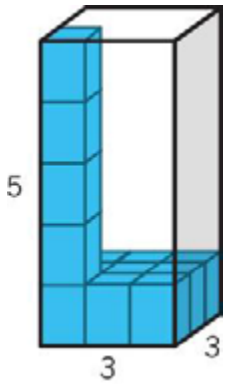
1. Complete the table. Use unit cubes if it is helpful.

Prism	Number of cubes in bottom layer	Number of layers	Volume
	4 × 3 = 12	2	24 unit cubes
	5 × 2 = 10 or 10	3	30 unit cubes

Guided Practice

Determine the volume of the rectangular prism. Show or explain your thinking. Sample work shown.

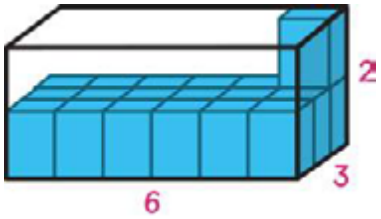
2.



3 × 3 = 9 cubes in each layer
9 × 5 = 45

answer: 45 unit cubes

3.

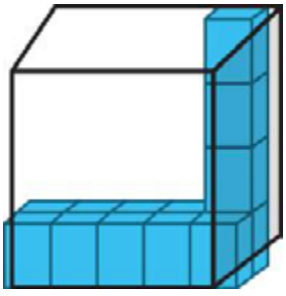


The bottom layer has 6 x 3 or 18 cubes. There are 2 layers of 18 cubes, and 18 × 2 = 36.

answer: 36 unit cubes

Check

Determine the volume of the rectangular prism. Show or explain your thinking. Sample work shown.



The bottom layer has 10 unit cubes. There are 4 layers of 10 cubes, and 4 × 10 = 40.

answer: 40 unit cubes

Goal

Determine the volume of partially filled rectangular prisms.

Standard

5.MD.C.5.A

Materials

unit cubes

Modeled Review

Point to Diego's work and **ask:**

- "How many cubes are in the bottom layer? How do you know?"
- "How many layers will be stacked on top of each other to completely fill the container? How do you know?"

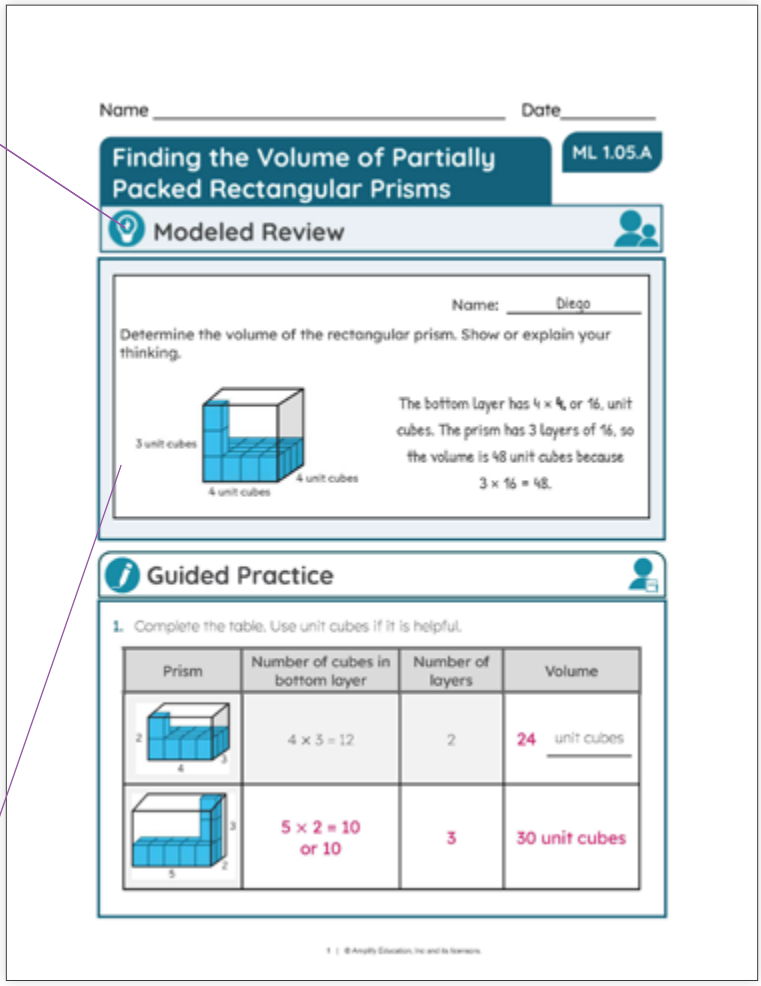
Reinforce the goal by saying, "The volume of the rectangular prism refers to the number of unit cubes needed to completely fill it. All the layers will have the same number of cubes, even if they are not shown."

ML/EL Model counting unit cubes to label the length and width of the bottom layer and the number of layers.

Guided Practice

For each problem, focus students' attention on using the product of the number of unit cubes in 1 layer and the number of layers to determine the volume.

Encourage students to determine the length and width and multiply them to find the number of cubes in the bottom layer. Then multiply by the number of layers to calculate the volume.



Name _____ Date_____

Finding the Volume of Partially Packed Rectangular Prisms ML 1.05.A

Modeled Review

Name: Diego

Determine the volume of the rectangular prism. Show or explain your thinking.

3 unit cubes, 4 unit cubes, 4 unit cubes

The bottom layer has 4 × 4, or 16, unit cubes. The prism has 3 layers of 16, so the volume is 48 unit cubes because 3 × 16 = 48.

Guided Practice

1. Complete the table. Use unit cubes if it is helpful.

Prism	Number of cubes in bottom layer	Number of layers	Volume
2, 4, 3	4 × 3 = 12	2	24 unit cubes
3, 5, 2	5 × 2 = 10 or 10	3	30 unit cubes

Vocabulary

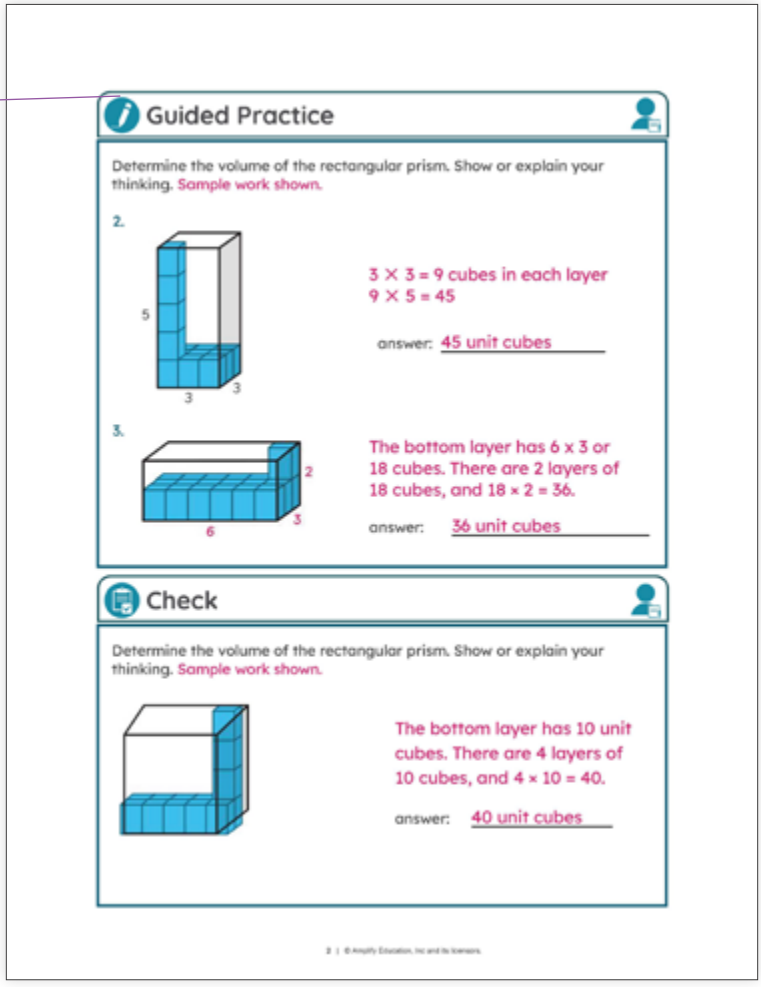
If needed, share the meaning of the words with students:

rectangular prism: A solid figure with 6 faces that are all rectangles.
volume: The amount of space a three-dimensional figure takes up.

Guided Practice

A Provide access to unit cubes and have students build the figures they see in the images.

Key Takeaway:
Say, "The volume of a rectangular prism is the product of the number of unit cubes in 1 layer and the number of layers."



Guided Practice

Determine the volume of the rectangular prism. Show or explain your thinking. Sample work shown.

2.

3 × 3 = 9 cubes in each layer
9 × 5 = 45

answer: 45 unit cubes

3.

The bottom layer has 6 x 3 or 18 cubes. There are 2 layers of 18 cubes, and 18 × 2 = 36.

answer: 36 unit cubes

Check

Determine the volume of the rectangular prism. Show or explain your thinking. Sample work shown.

The bottom layer has 10 unit cubes. There are 4 layers of 10 cubes, and 4 × 10 = 40.

answer: 40 unit cubes

Reflection

Ask:
- "Did you use the same strategy to determine the volume of each prism? Why or why not?"
- "Reflect on your learning today. What were you most proud of?"

Check: Recommended Next Steps

Almost there	**Got it!**
If students need more support, consider filling the bottom of a small box with a layer of unit cubes. Stack cubes in one corner up to the top of the box. Have students determine the volume.	If students need more practice, have them refer to the prism in the Modeled Review and ask, "How would the volume change if there were an additional layer?"

Name _____ Date _____

Writing Volume Expressions

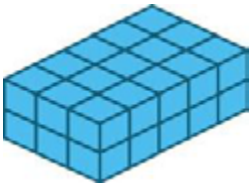
ML 1.05.B

Modeled Review

Name: Jada

Write two multiplication expressions to represent the volume of the rectangular prism.

15 cubes in a layer with 2 layers



3 cubes by 5 cubes in a layer with 2 layers

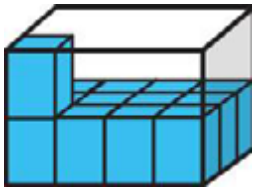
15 × 2

3 × 5 × 2

Guided Practice

For each prism, circle two expressions that represent the volume of the figure.

1.

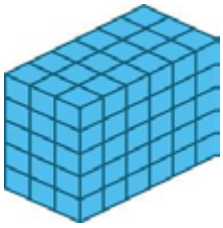


12 × 2

4 × 2 × 2

4 × 3 × 2

2.



3 × 6 × 5

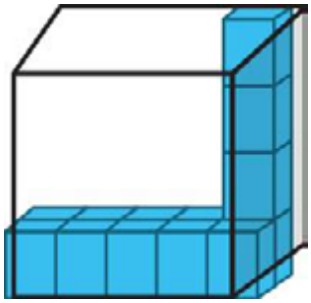
18 × 5

15 × 5

Guided Practice

Write two multiplication expressions to represent the volume of the rectangular prism. Sample responses shown.

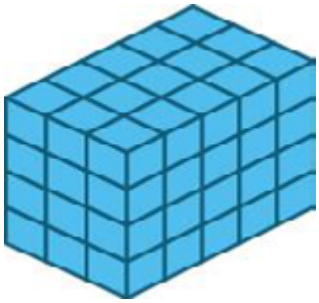
3.



Expression 1: 10 × 4

Expression 2: 5 × 2 × 4

4.

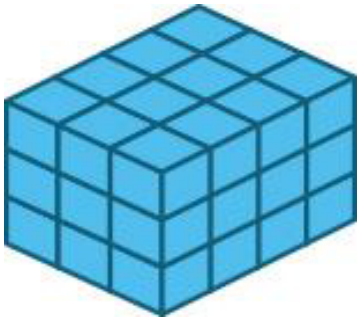


Expression 1: 12 × 5

Expression 2: 3 × 4 × 5

Check

Write two multiplication expressions to represent the volume of the rectangular prism. Sample response shown.



Expression 1: 9 × 4

Expression 2: 3 × 3 × 4

Goal

Write expressions to represent the volume of rectangular prisms.

Standard

5.MD.C.5.A

Materials

unit cubes (optional)

Modeled Review

Point to Jada's work and **ask:**

- "How do Jada's expressions represent the volume?"
- "What does 2 represent in Jada's expressions?"
- "Why does one expression have 2 factors and the other expression has 3 factors?"

Reinforce the goal by saying, "The expressions show different ways to multiply to determine the volume."

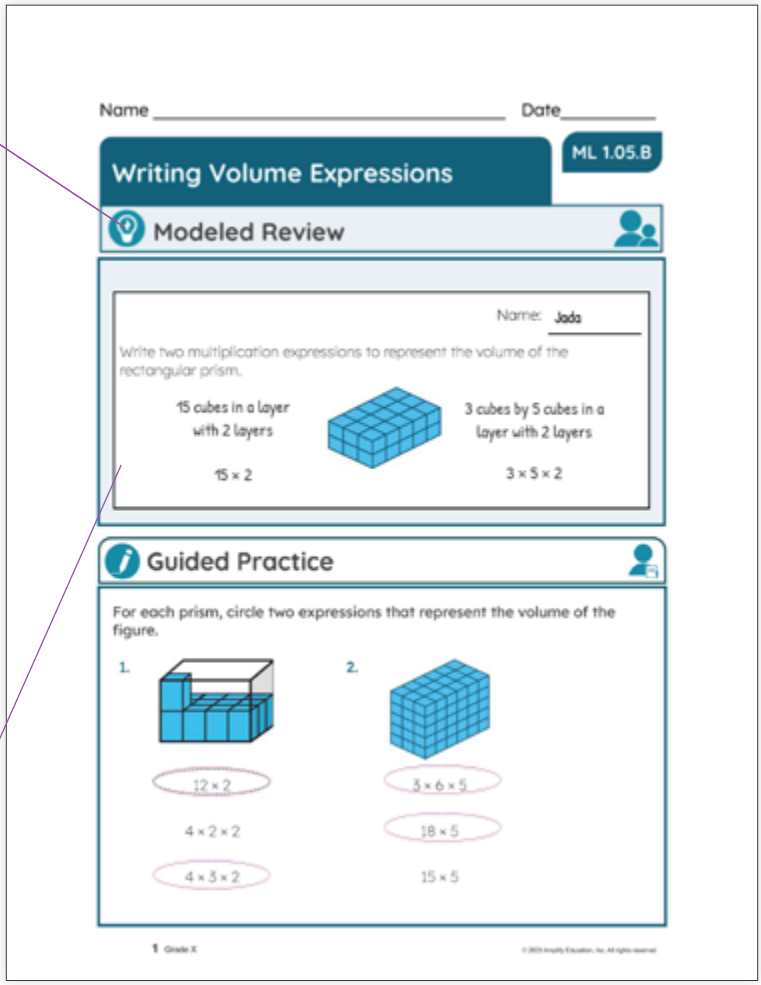
ML/EL Model adding labels and annotations to the image, such as *layers, base, length, and width*.

Guided Practice

For each problem, focus students' attention on how the expressions represent the prism's volume.

To scaffold their thinking, **ask:**

- "What is the length, width, and height of the prism? Use those to find one expression for the volume of the figure."
- "How many cubes are in one layer? How many layers? Use those numbers to find another expression."


Name _____ Date_____

Writing Volume Expressions ML 1.05.B

Modeled Review

Name: Jada

Write two multiplication expressions to represent the volume of the rectangular prism.

15 cubes in a layer with 2 layers

15 × 2

3 cubes by 5 cubes in a layer with 2 layers

3 × 5 × 2

Guided Practice

For each prism, circle two expressions that represent the volume of the figure.

1.

12 × 2

4 × 2 × 2

4 × 3 × 2

2.

3 × 6 × 5

18 × 5

15 × 5

Vocabulary

If needed, share the meaning of the words with students:

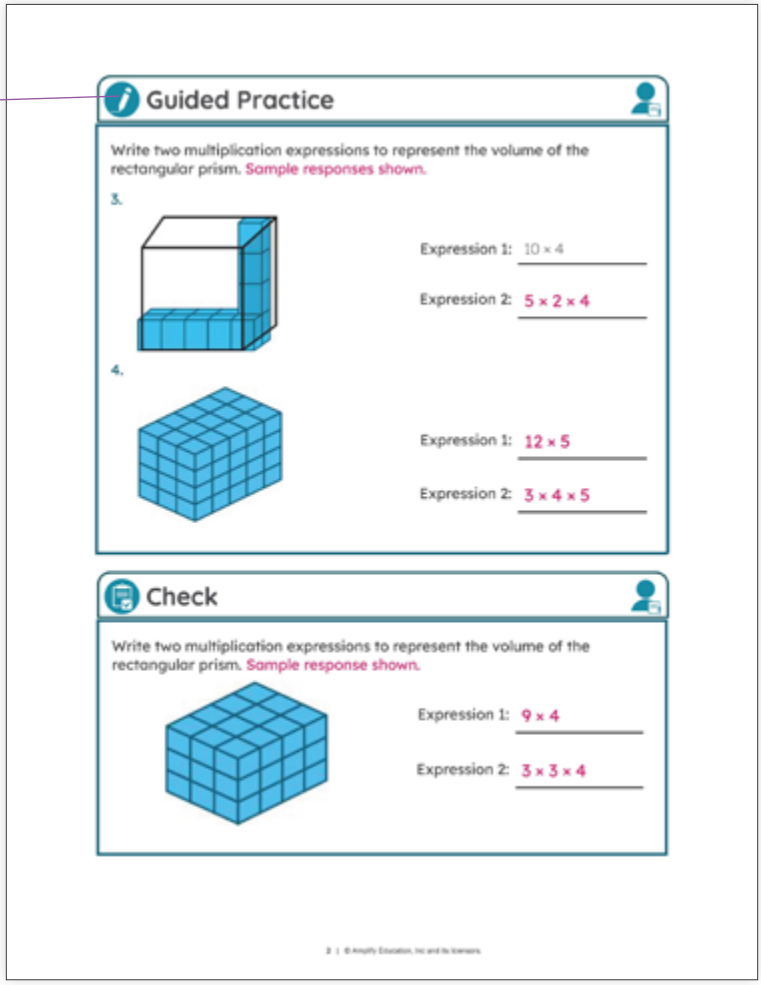
Associative Property of Multiplication: The product of three or more numbers remains the same regardless of how the numbers are grouped.
rectangular prism: A solid figure with 6 faces that are all rectangles.
volume: The amount of space a three-dimensional figure takes up.

Guided Practice

A Provide access to unit cubes and have students build the figures they see in the images.

Note: A variety of expressions are acceptable as long as they represent the volume.

Key Takeaway:
Say, "The volume of a rectangular prism can be represented by different multiplication expressions. The expressions show different ways to multiply the number of unit cubes in 1 layer, or the area of the base, and the number of layers."



Guided Practice

Write two multiplication expressions to represent the volume of the rectangular prism. Sample responses shown.

3.

Expression 1: 10 × 4

Expression 2: 5 × 2 × 4

4.

Expression 1: 12 × 5

Expression 2: 3 × 4 × 5

Check

Write two multiplication expressions to represent the volume of the rectangular prism. Sample response shown.

Expression 1: 9 × 4

Expression 2: 3 × 3 × 4

Reflection

Ask:
- "What makes sense? What is still confusing?"
- "Why can different multiplication expressions represent the volume of the same rectangular prism?"

Check: Recommended Next Steps

Almost there	**Got it!**
If students need more support, consider using Mini-Lesson 1.05A: *Finding the Volume of Partially Packed Rectangular Prisms*.	If students need more practice, have them build a rectangular prism using unit cubes. Then have them write two multiplication expressions to represent the volume.

Name _____ Date _____

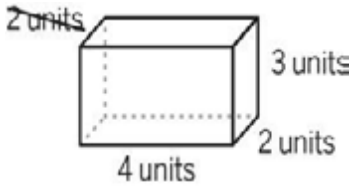
Determining the Volume of Solid Rectangular Prisms

ML 1.06

Modeled Review

Name: Han

Determine the volume of the prism in cubic units.



V = length × width × height

V = l × w × h

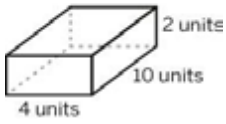
V = 4 × 2 × 3

answer: 24 cubic units

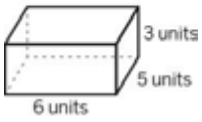
Guided Practice

1. Use the prisms to complete the table. **Sample equation shown for Prism C.**

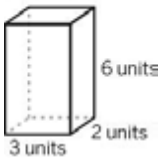
Prism A



Prism B



Prism C

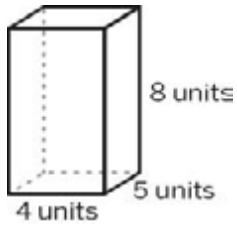


	length × width × height	volume (cubic units) $V = l \times w \times h$
Prism A	10 × 4 × 2	80 cubic units
Prism B	6 × 5 × 3	90 cubic units
Prism C	3 × 2 × 6	36 cubic units

Guided Practice

Determine the volume of each prism. Show or explain your thinking. Sample work shown.

2.



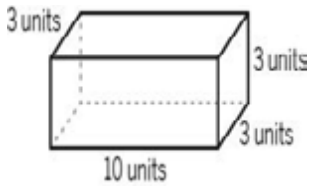
$V = l \times w \times h$

$V = 4 \times 5 \times 8$

$V = 160$

answer: 160 cubic units

3.



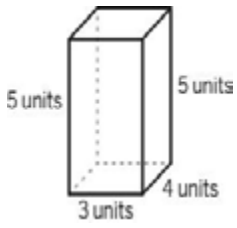
$V = l \times w \times h$

$V = 10 \times 3 \times 3$

$V = 90$

answer: 90 cubic units

4.



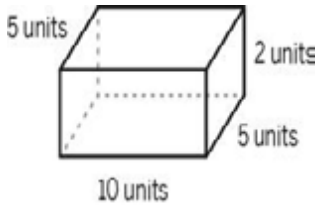
$V = 3 \times 4 \times 5$

$V = 60$

answer: 60 cubic units

Check

Determine the volume of the prism. Show or explain your thinking. Sample work shown.



$V = 10 \times 5 \times 2$

$V = 100$

answer: 100 cubic units

Goal

Calculate the volume of a rectangular prism using the formula $V = \ell \times w \times h$.

Standard

5.MD.C.5.B

Materials

unit cubes (optional)

Modeled Review

Point to Han's work and **ask:**

- "Why did Han cross out one of the edge lengths?"
- "How does the expression Han wrote represent the volume of the prism?"

Reinforce the goal by saying, "The formula, length times width times height, can be used to determine the volume of a rectangular prism."

ML/EL If needed, model identifying the needed edge lengths to write an expression.

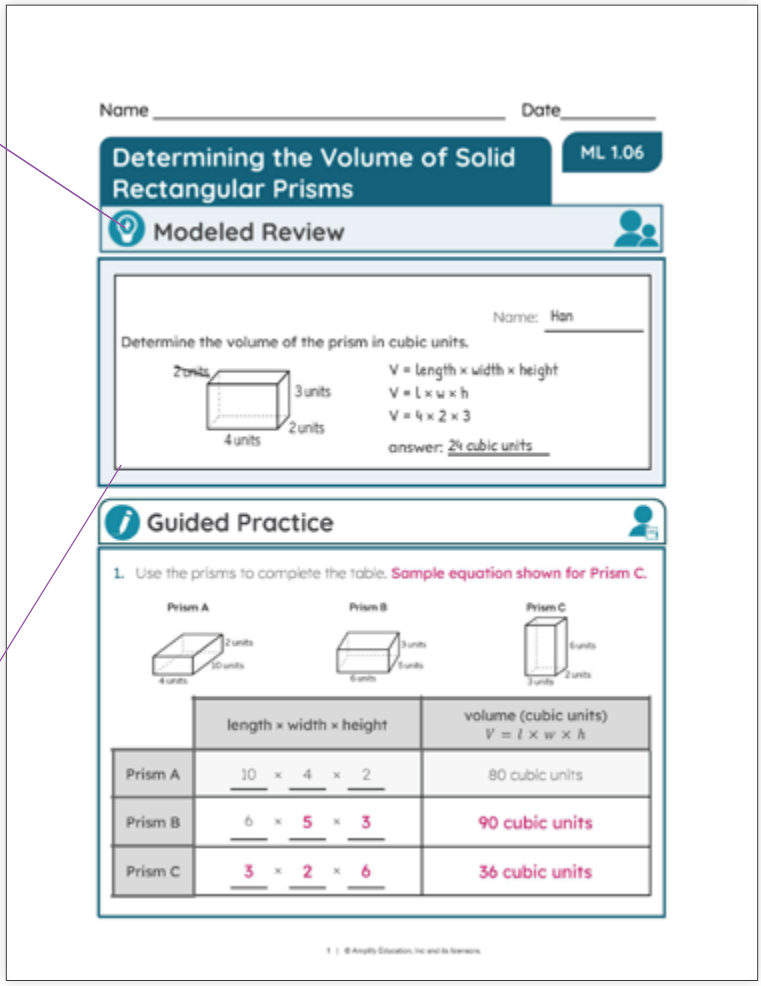
Guided Practice

For each problem, focus students' attention on using the dimensions of a rectangular prism to determine the volume.

To scaffold their thinking, **say:**

- "A rectangular prism has three dimensions, length, width, and height."
- "The product of these dimensions is the volume of the prism."

Note: The order students record the dimensions does not matter for correctness.



Name _____ Date_____

Determining the Volume of Solid Rectangular Prisms — ML 1.06

Modeled Review

Name: Han

Determine the volume of the prism in cubic units.

V = length × width × height
V = l × w × h
V = 4 × 2 × 3
answer: 24 cubic units

Guided Practice

1. Use the prisms to complete the table. Sample equation shown for Prism C.

	length × width × height	volume (cubic units) $V = l \times w \times h$
Prism A	10 × 4 × 2	80 cubic units
Prism B	6 × 5 × 3	90 cubic units
Prism C	3 × 2 × 6	36 cubic units

Vocabulary

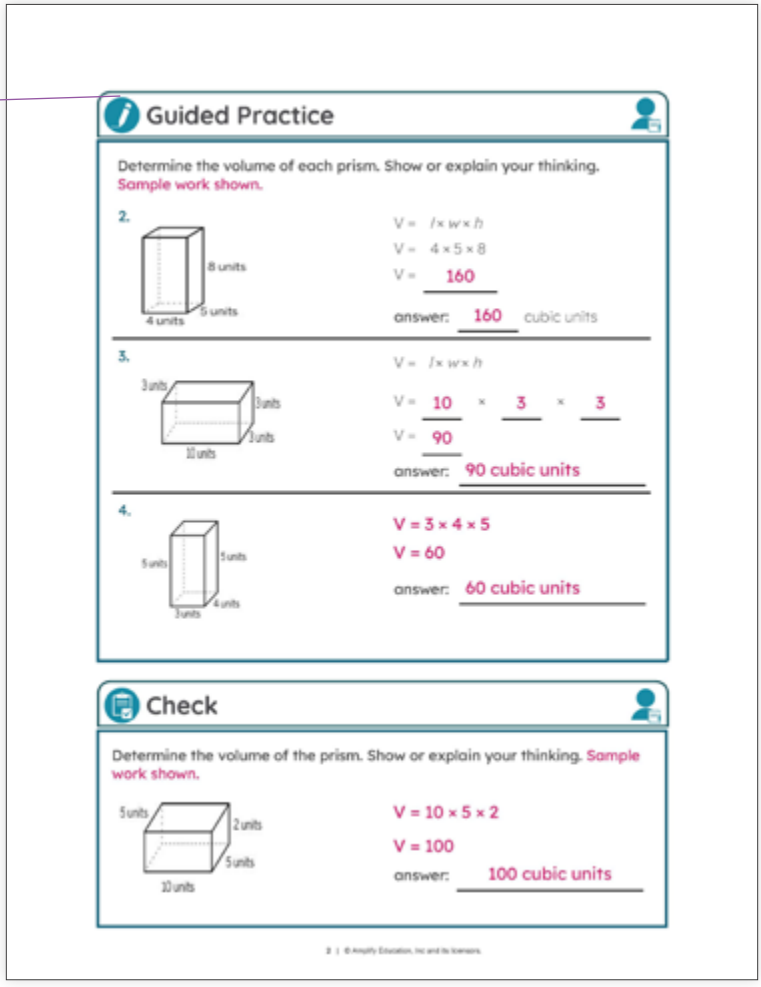
If needed, share the meaning of the words with students:

Associative Property of Multiplication: The product of three or more numbers remains the same regardless of how the numbers are grouped.
rectangular prism: A solid figure with 6 faces that are all rectangles.
volume: The amount of space a three-dimensional figure takes up.

Guided Practice

A Remind students that sometimes more information may be given than is needed to calculate the volume. Invite students to circle or highlight the length, width, and height of each prism and cross out any edge lengths that are not needed.

Key Takeaway:
Say, "One way you can determine the volume of any rectangular prism is by using the formula $V = \ell \times w \times h$. The volume is measured in cubic units, such as cubic inches."



Guided Practice

Determine the volume of each prism. Show or explain your thinking. Sample work shown.

2. 8 units, 4 units, 5 units
V = $\ell \times w \times h$
V = 4 × 5 × 8
V = 160
answer: 160 cubic units

3. 3 units, 3 units, 3 units, 10 units
V = $\ell \times w \times h$
V = 10 × 3 × 3
V = 90
answer: 90 cubic units

4. 5 units, 5 units, 3 units, 4 units
V = 3 × 4 × 5
V = 60
answer: 60 cubic units

Check

Determine the volume of the prism. Show or explain your thinking. Sample work shown.

5 units, 2 units, 5 units, 10 units
V = 10 × 5 × 2
V = 100
answer: 100 cubic units

Reflection

Ask:
- "How can you determine whether an expression represents the volume of a rectangular prism?"
- "What strategy was helpful today?"

Check: Recommended Next Steps

Almost there	**Got it!**
If students need more support, have them build a prism with cubes and connect the length, width, and height of the model with the formula.	If students need more practice, have them refer to the prism in the Modeled Review. Ask them what the volume would be if the height was 6 units.

Name _____ Date _____

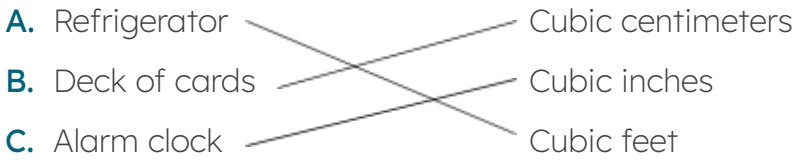
Measuring Volume With Different Units

ML 1.07

Modeled Review

Name: Clare

1. Draw lines to match the object with the most appropriate unit of measure for its volume.



2. Choose one of the above objects. Why did you select the unit of measure that you did?
I would use cubic feet to measure the volume of a refrigerator because the side lengths of a refrigerator are much longer than an inch or centimeter.

Guided Practice

1. Determine the most appropriate unit of measure for the volume of each object. Place a check mark in the correct column.

	Cubic centimeters	Cubic inches	Cubic feet
fish tank		✔	
ice cube	✔		
bathtub			✔
cereal box		✔	
pink eraser	✔		
freezer			✔

Guided Practice

2. Choose an object from the table in Problem 1. Why did you select the unit of measure that you did? **Sample response shown.**

Cubic inches are the most appropriate unit of measure for the volume of a cereal box because the side lengths are longer than a centimeter and most of them are shorter than a foot.

3. Which unit of measure would you use to measure the volume of a swimming pool? Explain your thinking.

A. cubic centimeters **B.** cubic inches **C.** cubic feet

Sample response: Cubic feet are the most appropriate unit of measure for the volume of a swimming pool because the side lengths of a pool are much longer than an inch or centimeter.

Check

Which unit of measure would you use to measure the volume of a lunch box? Explain your thinking.

A. cubic centimeters **B.** cubic inches **C.** cubic feet

Sample response: I would use cubic inches to measure the volume of a lunch box. A lunch box's side lengths are shorter than 1 foot but longer than 1 centimeter. Cubic inches would help others understand the size of the lunch box.

Goal

Select and justify a unit of measure for the volume of real-world objects.

Standard

5.MD.C.4

Materials

rulers (inch, centimeter) (optional), unit cubes

Modeled Review

Point to Clare's work and **ask:**

- "Which object is the largest in real life?"
- "Can you show with your hands about how long a centimeter is? An inch? A foot?"
- "Why is cubic feet an appropriate unit of measure for the volume of a refrigerator?"

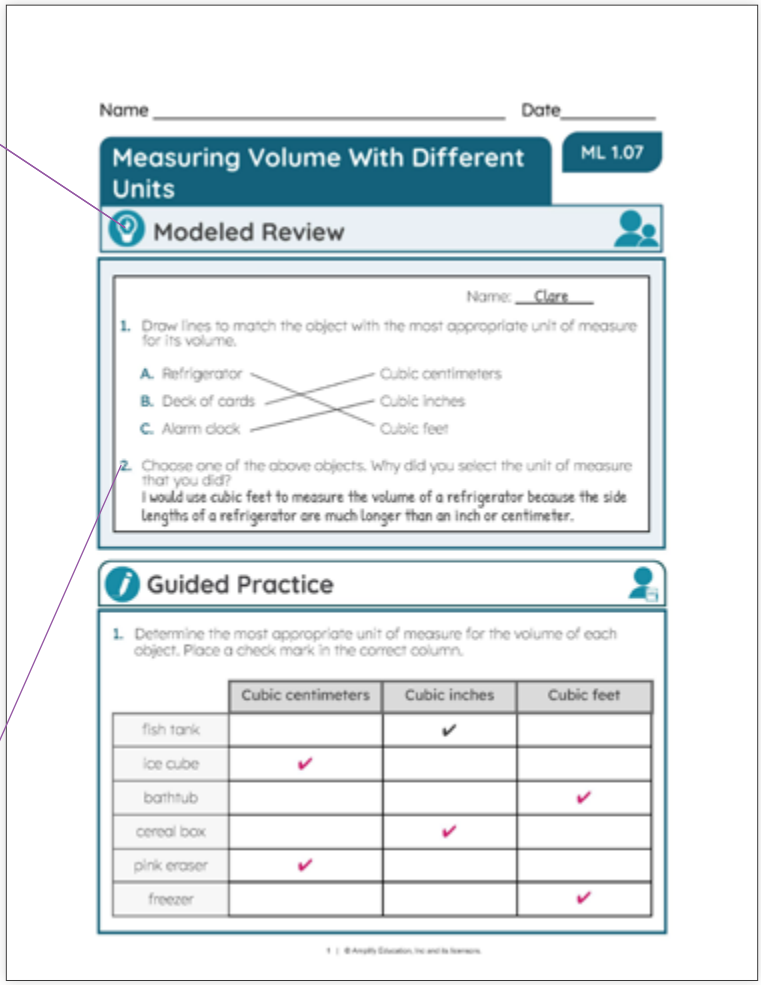
Reinforce the goal by saying, "Cubic centimeters are commonly used for measuring the volume of small objects, cubic inches for objects longer than an inch but shorter than a foot, and cubic feet for larger objects or spaces."

Guided Practice

For each problem, focus students' attention on the difference in size between a centimeter, an inch, and a foot.

To scaffold their thinking, **ask:**

- "What do you know about each object that could help you determine which unit of measure to use to find its volume?"
- "When might you want to use a larger unit of measure? A smaller unit of measure?"



Name _____ Date_____

Measuring Volume With Different Units — ML 1.07

Modeled Review

Name: Clare

1. Draw lines to match the object with the most appropriate unit of measure for its volume.

A. Refrigerator — Cubic feet
B. Deck of cards — Cubic centimeters
C. Alarm clock — Cubic inches

2. Choose one of the above objects. Why did you select the unit of measure that you did?
I would use cubic feet to measure the volume of a refrigerator because the side lengths of a refrigerator are much longer than an inch or centimeter.

Guided Practice

1. Determine the most appropriate unit of measure for the volume of each object. Place a check mark in the correct column.

	Cubic centimeters	Cubic inches	Cubic feet
fish tank		✔	
ice cube	✔		
bathtub			✔
cereal box		✔	
pink eraser	✔		
freezer			✔

Vocabulary

If needed, share the meaning of the words with students:

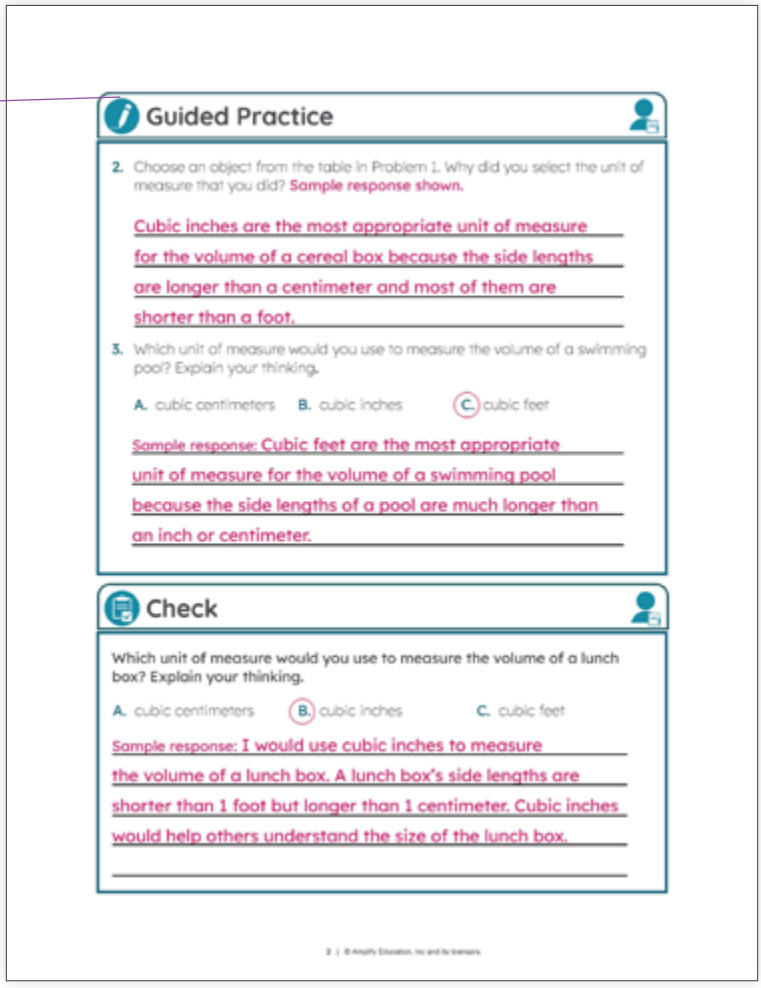
cubic unit: Any three-dimensional measure of volume that represents a number of cubes that have a defined side length.
volume: The amount of space a three-dimensional figure takes up.

Guided Practice

A Demonstrate with unit cubes to show that more of a smaller unit of measure would be needed to measure the volume of the same object.

ML/EL If needed, model by showing the size of a centimeter, inch, and foot on a ruler. Then measure an object in the room and think aloud to determine the best unit of measure.

Key Takeaway:
Say, "The volume of an object can be determined using different-sized units of measure. While the measurement may be a different value, the amount of space an object takes up is the same."



Guided Practice

2. Choose an object from the table in Problem 1. Why did you select the unit of measure that you did? Sample response shown.

Cubic inches are the most appropriate unit of measure for the volume of a cereal box because the side lengths are longer than a centimeter and most of them are shorter than a foot.

3. Which unit of measure would you use to measure the volume of a swimming pool? Explain your thinking.

A. cubic centimeters B. cubic inches (C.) cubic feet

Sample response: Cubic feet are the most appropriate unit of measure for the volume of a swimming pool because the side lengths of a pool are much longer than an inch or centimeter.

Check

Which unit of measure would you use to measure the volume of a lunch box? Explain your thinking.

A. cubic centimeters (B.) cubic inches C. cubic feet

Sample response: I would use cubic inches to measure the volume of a lunch box. A lunch box's side lengths are shorter than 1 foot but longer than 1 centimeter. Cubic inches would help others understand the size of the lunch box.

Reflection

Ask:
- "What makes sense? What is still confusing?"
- "How do you know whether you have chosen the best unit of measure to determine the volume of an object?"

Check: Recommended Next Steps

Almost there	**Got it!**
If students need more support, consider using Grade 4 Mini-Lesson 5.17: *Comparing Measurement Units*.	If students need more practice, provide them with various objects and rulers. Encourage them to choose and justify the best unit of measure for volume.

Name _____ Date _____

Using Volume Formulas

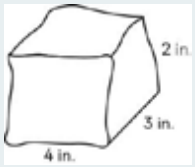
ML 1.08

Modeled Review

Name: Diego

1. Determine the volume of a storage container that measures 4 inches by 3 inches by 2 inches.

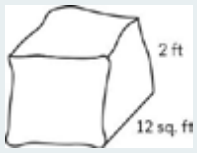
$V = l \times w \times h$
$V = 4 \times 3 \times 2$
$V = 24$



answer: 24 cubic inches

2. Determine the volume of a storage container with a base that measures 12 square feet and a height that measures 2 feet.

$V = B \times h$
$V = 12 \times 2$
$V = 24$



answer: 24 cubic feet

Guided Practice

Determine the volume of the object.

1.

$V = l \times w \times h$
$V = 7 \times 4 \times$ 10
$V =$ 280 cubic centimeter

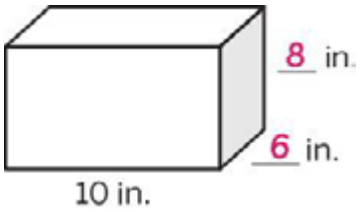
2.

$V = B \times h$
$V = 4 \times$ 4
$V =$ 16 cubic feet

Guided Practice

Determine the volume of the object. Show or explain your thinking.

3. Jada has a fish tank that measures 10 inches long, 6 inches wide, and 8 inches tall. What is the volume of the fish tank?

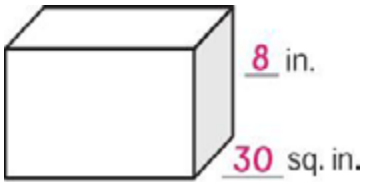


$V = l \times w \times h$

$V = 10 \times$ 6 $\times$ 8

$V =$ 480 cubic inches

4. Priya has a basket with a base that measures 30 square inches and a height that measures 8 inches. What is the volume of the basket?



$V = B \times h$

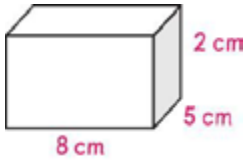
$V =$ 30 $\times$ 8

$V =$ 240 cubic inches

5. Clare has a box that is 8 centimeters long, 5 centimeters wide, and 2 centimeters tall. What is the volume of the box? Sample work shown.

8 x 5 x 2 = 80

answer: 80 cubic centimeters

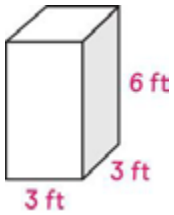


Check

Shawn's refrigerator is 3 feet long, 3 feet wide, and 6 feet tall. Determine the volume of the refrigerator. Show or explain your thinking. Sample work shown.

3 x 3 x 6 = 54

answer: 54 cubic feet



Goal

Determine the volume of rectangular prisms, given the dimensions, by using the formulas $V = \ell \times w \times h$ and $V = B \times h$.

Standard

5.MD.C.5.B

Modeled Review

Point to Diego's work and **ask:**

- "How are the measurements of the containers in Problems 1 and 2 similar? Different?"
- "Why did Diego use different formulas to solve each problem?"
- "Why are the labels different?"

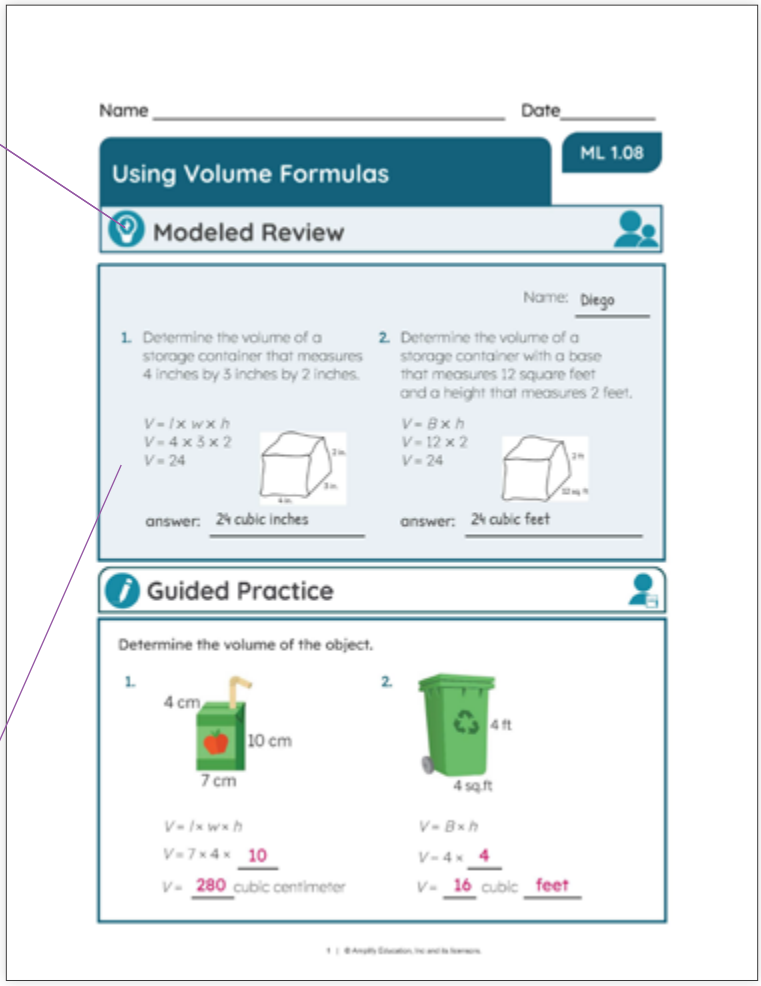
Reinforce the goal by saying, "Depending on the information given in a problem, you can use either formula to calculate the volume: $V = \ell \times w \times h$ or $V = B \times h$. In Problem 2, the area of the base was given, so Diego used $V = B \times h$."

Guided Practice

For each problem, focus students' attention on how the given information can help them decide which formula to use to determine the volume.

To scaffold their thinking, **say:**

- "Before deciding which formula to use, determine what information is given."
- "In Problem 1, the length, width, and height are all given, so you can use $V = \ell \times w \times h$."
- "In Problem 2, the area of the base, 4 sq. ft, and the height are given, so you can use $V = B \times h$."


Name _____ Date_____

Using Volume Formulas — ML 1.08

Modeled Review

Name: Diego

1. Determine the volume of a storage container that measures 4 inches by 3 inches by 2 inches.

$V = l \times w \times h$
$V = 4 \times 3 \times 2$
$V = 24$

answer: 24 cubic inches

2. Determine the volume of a storage container with a base that measures 12 square feet and a height that measures 2 feet.

$V = B \times h$
$V = 12 \times 2$
$V = 24$

answer: 24 cubic feet

Guided Practice

Determine the volume of the object.

1. 4 cm, 10 cm, 7 cm

$V = l \times w \times h$
$V = 7 \times 4 \times 10$
$V = 280$ cubic centimeter

2. 4 ft, 4 sq.ft

$V = B \times h$
$V = 4 \times 4$
$V = 16$ cubic feet

Vocabulary

If needed, share the meaning of the words with students:

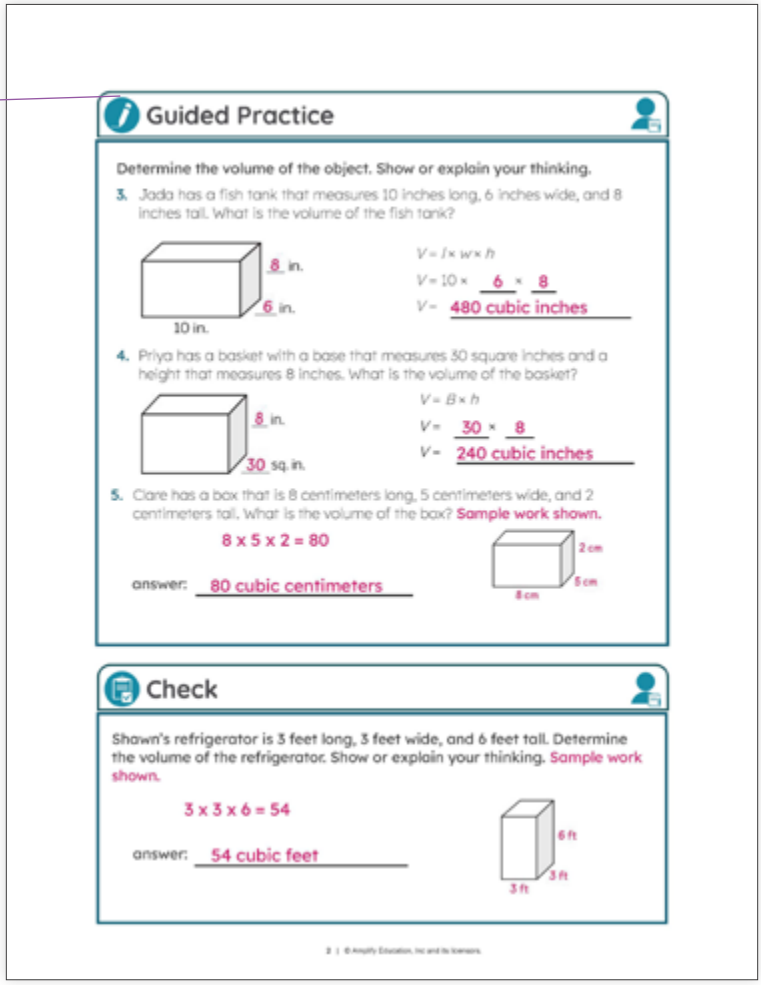
cubic unit: Any three-dimensional measure of volume that represents a number of cubes that have a defined side length.
volume: The amount of space a three-dimensional figure takes up.

Guided Practice

A Chunk this task into smaller, more manageable parts by having students first label the edge lengths on the drawing then use the edge lengths to write a formula and solve.

ML/EL Consider sharing pictures of a fish tank, basket, and box to increase access to the task. Invite students to share what the items are called in their primary language.

Key Takeaway:
Say, "The formulas for the volume of rectangular prisms can be used to solve or estimate solutions to real-world problems."



Guided Practice

Determine the volume of the object. Show or explain your thinking.

3. Jada has a fish tank that measures 10 inches long, 6 inches wide, and 8 inches tall. What is the volume of the fish tank?

8 in., 6 in., 10 in.

$V = l \times w \times h$
$V = 10 \times 6 \times 8$
$V =$ 480 cubic inches

4. Priya has a basket with a base that measures 30 square inches and a height that measures 8 inches. What is the volume of the basket?

8 in., 30 sq. in.

$V = B \times h$
$V = 30 \times 8$
$V =$ 240 cubic inches

5. Clare has a box that is 8 centimeters long, 5 centimeters wide, and 2 centimeters tall. What is the volume of the box? Sample work shown.

8 x 5 x 2 = 80

answer: 80 cubic centimeters

2 cm, 5 cm, 8 cm

Check

Shawn's refrigerator is 3 feet long, 3 feet wide, and 6 feet tall. Determine the volume of the refrigerator. Show or explain your thinking. Sample work shown.

3 x 3 x 6 = 54

answer: 54 cubic feet

6 ft, 3 ft, 3 ft

Reflection

Ask:
- "What other real-world problems involving rectangular prisms could be solved using volume?"
- "How was the lesson helpful to you today?"

Check: Recommended Next Steps

Almost there	**Got it!**
If students need more support, consider using Mini-Lesson 1.06: *Determining the Volume of Solid Rectangular Prisms*.	If students need more practice, have them use a formula to determine the volume of a container with given dimensions: • 4 cm, 6 cm, 2 cm • 100 sq. in., 8 in. • 5 ft, 3 ft, 2 ft.

Name _____ Date _____

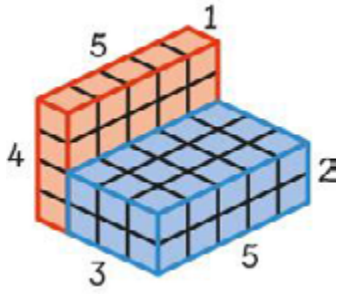
Decomposing Figures Into Rectangular Prisms

ML 1.09

Modeled Review

Name: Shawn

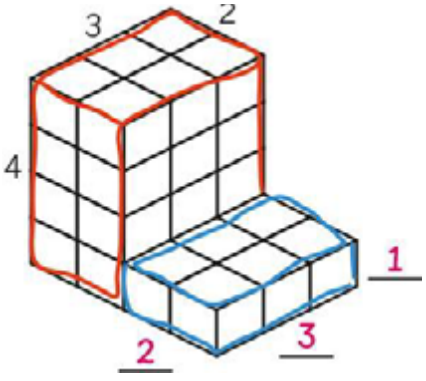
Show how you would decompose the figure into prisms. Label the dimensions of the prisms.



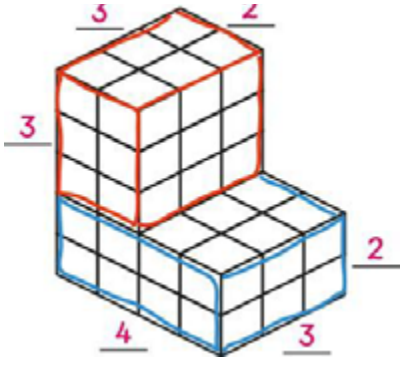
Guided Practice

Two rectangular prisms were put together to make one figure. Label the dimensions of each prism. Use unit cubes if it is helpful.

1.



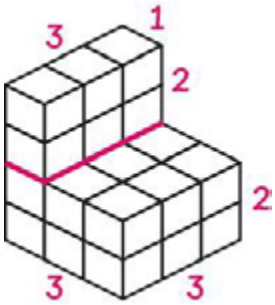
2.



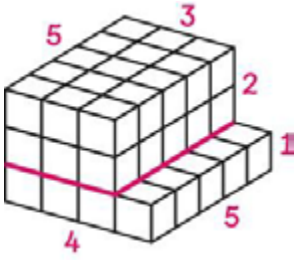
Guided Practice

Draw lines to decompose the figure into prisms. Then label the dimensions of each prism. Use unit cubes if it is helpful. Sample responses shown.

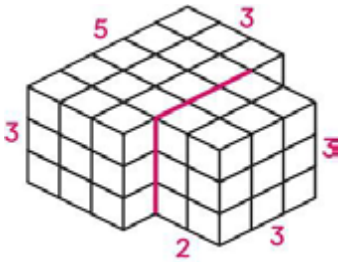
3.



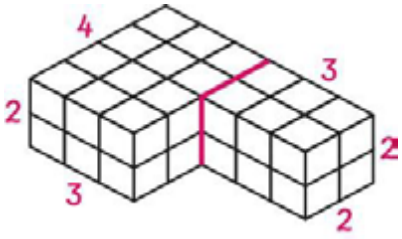
4.



5.

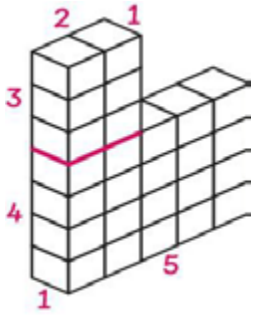


6.



Check

Draw lines to decompose the figure into prisms. Then label the dimensions of each prism. Sample response shown.



Goal

Decompose figures composed of rectangular prisms in which unit cubes are visible.

Standard

5.MD.C.5.C

Materials

unit cubes

Modeled Review

Point to Shawn's work and **ask:**

- "How did Shawn decompose the figure into rectangular prisms?"
- "What is another way the figure could have been decomposed into rectangular prisms?"

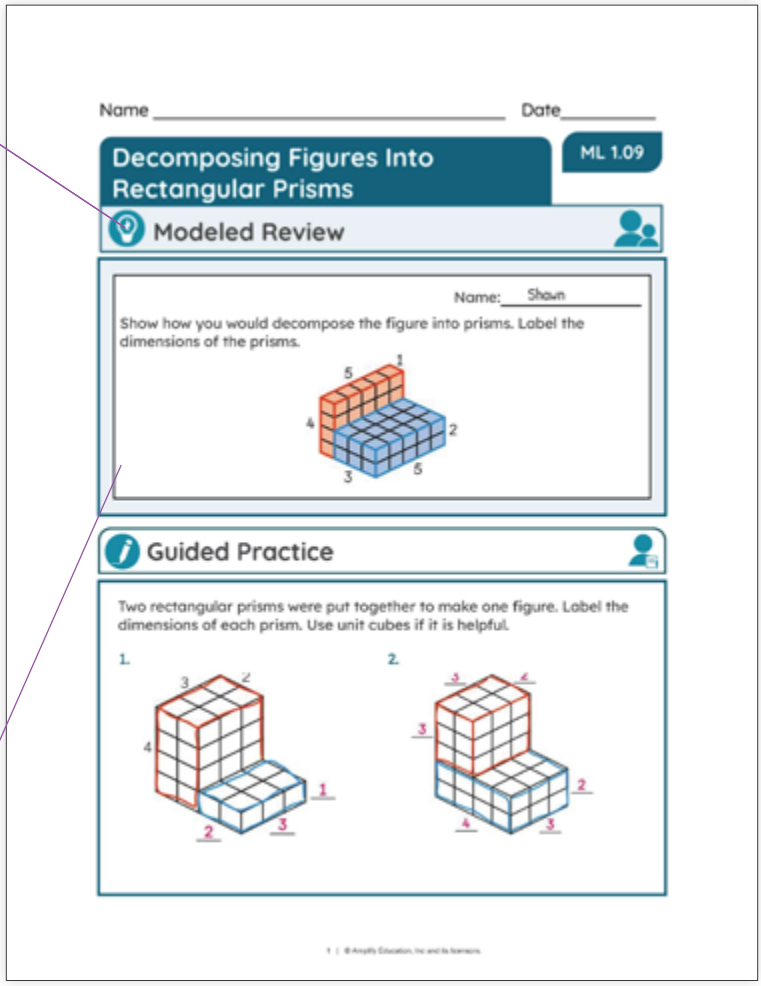
Reinforce Shawn's thinking by saying, "The red prism on the left has a length of five unit cubes, a width of one unit cube, and a height of four unit cubes. The blue prism on the right has a length of five unit cubes, a width of three unit cubes, and a height of two unit cubes."

Guided Practice

For each problem, focus students' attention on how the figure is decomposed into two rectangular prisms.

To scaffold their thinking, **ask:**

- "Where do you see rectangular prisms in the figure?"
- "What are the dimensions of each prism?"
- "What is another way you could decompose the figure into two rectangular prisms?"


Name _____ Date_____

Decomposing Figures Into Rectangular Prisms

ML 1.09

Modeled Review

Name: Shawn

Show how you would decompose the figure into prisms. Label the dimensions of the prisms.

Guided Practice

Two rectangular prisms were put together to make one figure. Label the dimensions of each prism. Use unit cubes if it is helpful.

1.

2.

Vocabulary

If needed, share the meaning of the words with students:

cubic unit: Any three-dimensional measure of volume that represents a number of cubes that have a defined side length.
rectangular prism: A solid figure with 6 faces that are all rectangles.

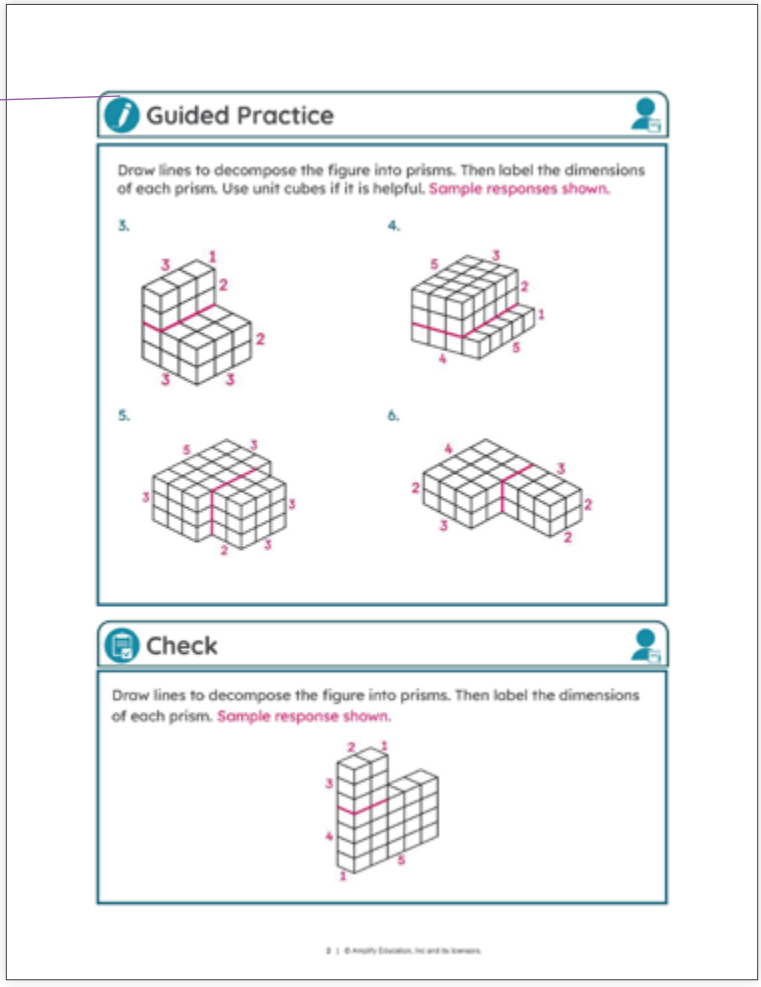
Guided Practice

A Have students use two different colored pencils to draw lines around or color each rectangular prism.

ML/EL Invite students to use math language to share their own way of decomposing each figure.

Note: Each figure has at least two ways it can be decomposed.

Key Takeaway:
Say, "Today, you decomposed figures made of more than one rectangular prism. You then determined the dimensions of each rectangular prism. This strategy can help you determine the volumes of figures composed of rectangular prisms."



Reflection

Ask:
- "When might decomposing a figure into rectangular prisms be helpful?"
- "What is something you weren't sure about at the start of the lesson but understand now?"

Check: Recommended Next Steps

Almost there	**Got it!**
If students need more support, ask them to build two prisms, determine the dimensions of each, and then put them together to make a figure.	If students need more practice, consider having them decompose the figures in Problems 3 and 4 another way and determine the dimensions.

Name _____ Date _____

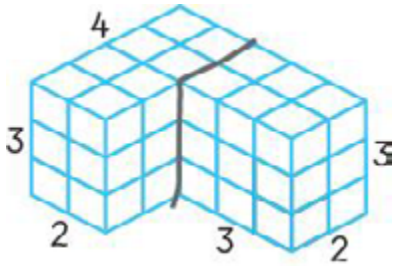
Determining the Volumes of Figures Made of Prisms

ML 1.10

Modeled Review

Name: Priya

Determine the volume of the figure. Show or explain your thinking.



$2 \times 4 \times 3 = 24$

$2 \times 3 \times 3 = 18$

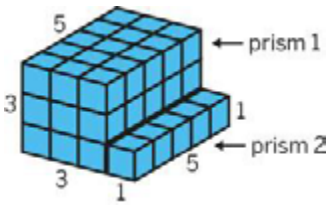
$24 + 18 = 24$

answer: 42 cubic units

Guided Practice

Determine the volume of each figure. Show your thinking. Sample work shown for Problem 2.

1.

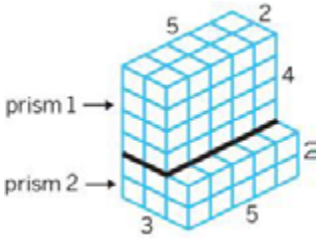


prism 1: $3 \times 5 \times 3 = 45$

prism 2: $1 \times 5 \times 1 = 5$

volume: $45 + 5 =$ 50 cubic units

2.



prism 1: $5 \times 2 \times 4 = 40$

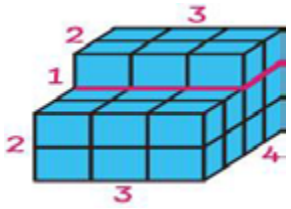
prism 2: 3 × 5 × 2 = 30

volume: 40 + 30 = 70 cubic units

Guided Practice

Draw lines to show how you would decompose the figure. Then determine the volume. Show your thinking. Sample work shown.

3.

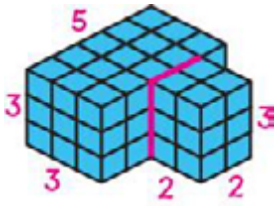


prism 1: 2 × 3 × 1 = 6

prism 2: 3 × 4 × 2 = 24

volume: 6 + 24 = 30 cubic units

4.

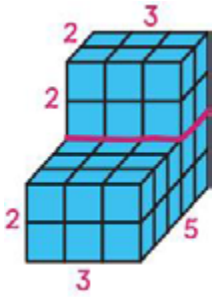


prism 1: 3 × 5 × 3 = 45

prism 2: 2 × 2 × 3 = 12

volume: 45 + 12 = 57 cubic units

5.



3 × 2 × 2 = 12

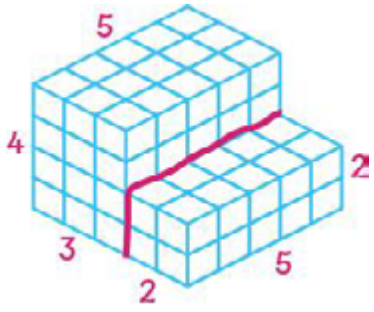
3 × 5 × 2 = 30

12 + 30 = 42

answer: 42 cubic units

Check

Determine the volume of the figure. Show or explain your thinking. Sample work shown.



3 × 5 × 4 = 60

2 × 5 × 2 = 20

60 + 20 = 80

answer: 80 cubic units

Goal

Determine the volumes of figures composed of rectangular prisms in which unit cubes are visible.

Standard

5.MD.C.5.C

Modeled Review

Point to Priya's work and **ask:**

- "How did Priya decompose the figure and determine the volume?"
- "How was determining the dimensions of each prism helpful in finding the volume?"

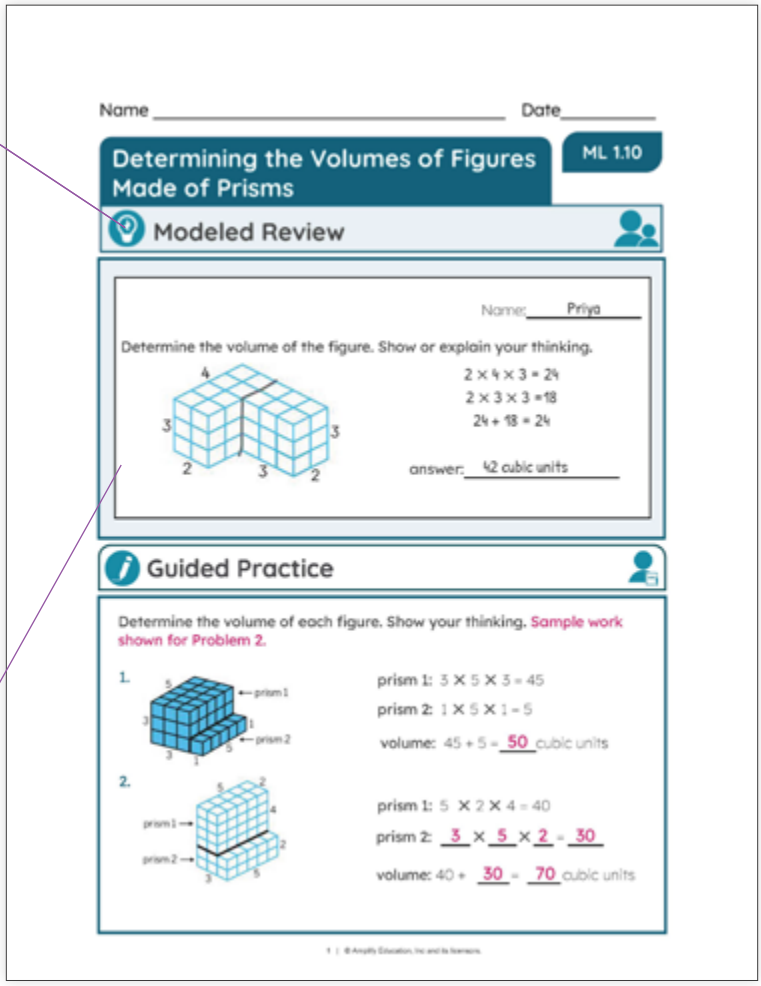
Reinforce the goal by saying, "When a figure is composed of rectangular prisms, you can decompose it into at least two prisms. Then you can add the volumes of the individual prisms to determine the total volume of the figure."

Guided Practice

For each problem, focus students' attention on how the figure is decomposed and the steps used to determine the volume.

To scaffold their thinking, **say:**

- "It can be helpful to decompose the figure into two rectangular prisms and determine the dimensions of each prism."
- "Then you can use $V = \ell \times w \times h$ to determine the volume of each prism and add to determine the total volume."



Name _____ Date_____

Determining the Volumes of Figures Made of Prisms ML 1.10

Modeled Review

Name: Priya

Determine the volume of the figure. Show or explain your thinking.

$2 \times 4 \times 3 = 24$
$2 \times 3 \times 3 = 18$
$24 + 18 = 24$

answer: 42 cubic units

Guided Practice

Determine the volume of each figure. Show your thinking. Sample work shown for Problem 2.

1. prism 1: $3 \times 5 \times 3 = 45$
prism 2: $1 \times 5 \times 1 = 5$
volume: $45 + 5 =$ 50 cubic units

2. prism 1: $5 \times 2 \times 4 = 40$
prism 2: 3 × 5 × 2 = 30
volume: 40 + 30 = 70 cubic units

Vocabulary

If needed, share the meaning of the words with students:

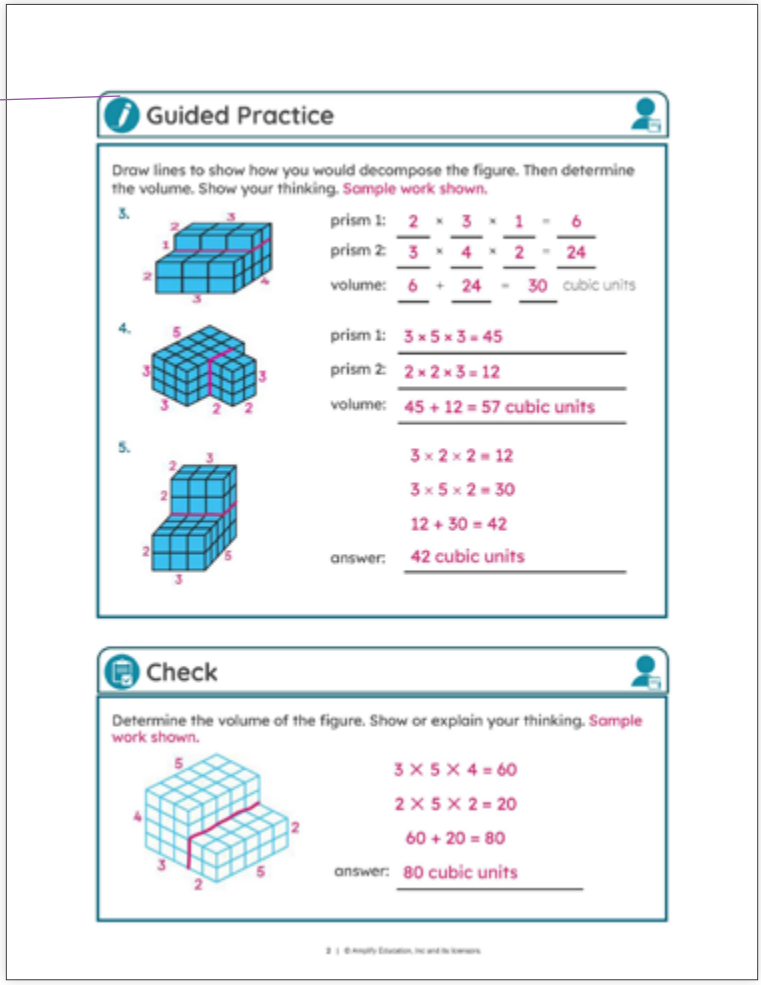
cubic unit: Any three-dimensional measure of volume that represents a number of cubes that have a defined side length.
rectangular prism: A solid figure with 6 faces that are all rectangles.
volume: The amount of space a three-dimensional figure takes up.

Guided Practice

A If students are unsure of how to calculate the volume of the first figure, ask, "Is there a different figure that you can use to see how to calculate the volume more clearly?" Give the option to start with a different problem.

Note: Each figure has at least two ways it can be decomposed.

Key Takeaway:
Say, "You can decompose a figure to determine its volume. If you decompose, you will add to determine the total volume."



Guided Practice

Draw lines to show how you would decompose the figure. Then determine the volume. Show your thinking. Sample work shown.

3.

prism 1: 2 × 3 × 1 = 6
prism 2: 3 × 4 × 2 = 24
volume: 6 + 24 = 30 cubic units

4.

prism 1: 3 × 5 × 3 = 45
prism 2: 2 × 2 × 3 = 12
volume: 45 + 12 = 57 cubic units

5.

3 × 2 × 2 = 12
3 × 5 × 2 = 30
12 + 30 = 42
answer: 42 cubic units

Check

Determine the volume of the figure. Show or explain your thinking. Sample work shown.

3 × 5 × 4 = 60
2 × 5 × 2 = 20
60 + 20 = 80
answer: 80 cubic units

Reflection

Ask:
- "When might decomposing a figure into rectangular prisms be helpful?"
- "What is something you weren't sure about at the start of the lesson but understand now?"

Check: Recommended Next Steps

Almost there	**Got it!**
If students need more support, consider using Mini-Lesson 1.09: *Decomposing Figures into Rectangular Prisms*.	If students need more practice, consider asking them to decompose the figures in Problems 3 and 5 a different way and have them compare the result when calculating the volume.

Name _____ Date _____

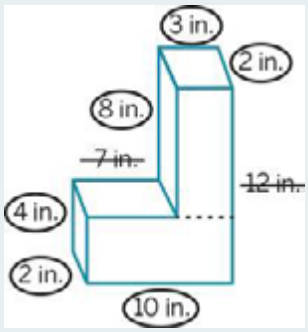
Writing Expressions to Represent the Volume of a Figure

ML 1.11

Modeled Review

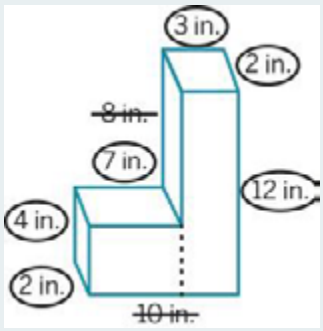
Write an expression that represents the volume of the figure.

Jada's answer



$(3 \times 2 \times 8) + (10 \times 2 \times 4)$

Clare's answer

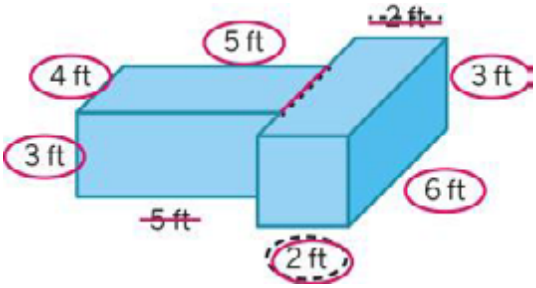


$(3 \times 2 \times 12) + (2 \times 7 \times 4)$

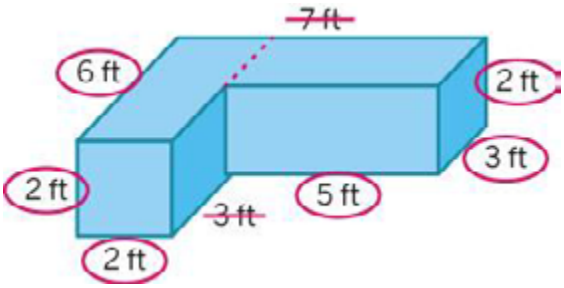
Guided Practice

How does each expression represent the volume of the figure? Show or explain your thinking. Sample responses shown.

1. $(5 \times 4 \times 3) + (6 \times 2 \times 3)$



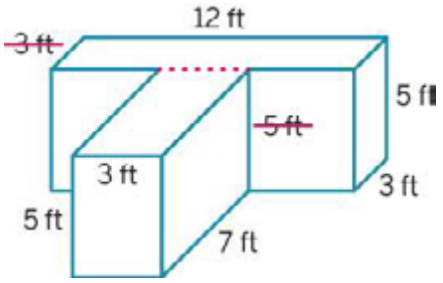
2. $(6 \times 2 \times 2) + (5 \times 3 \times 2)$



Guided Practice

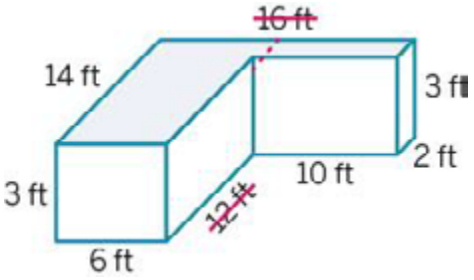
Write an expression that represents the volume of the figure. Sample responses shown.

3.



(3 × 7 × 5) + (3 × 12 × 5)

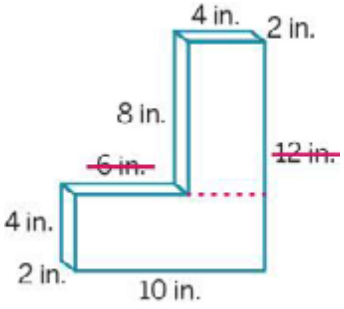
4.



(6 × 14 × 3) + (10 × 2 × 3)

Check

Write an expression that represents the volume of the figure. Sample response shown.



(2 × 10 × 4) + (4 × 2 × 8)

Goal

Write expressions to represent the volume of a figure composed of rectangular prisms in which unit cubes are not shown.

Standard

5.MD.C.5.C

Materials

colored pencils

Modeled Review

Point to the problem in the Modeled Review and **ask:**

- "How did Jada and Clare each decompose the figure into two prisms?"
- "Why did both Jada and Clare cross off some edge lengths?"
- "How does each expression represent two prisms in the figure and the total volume?"

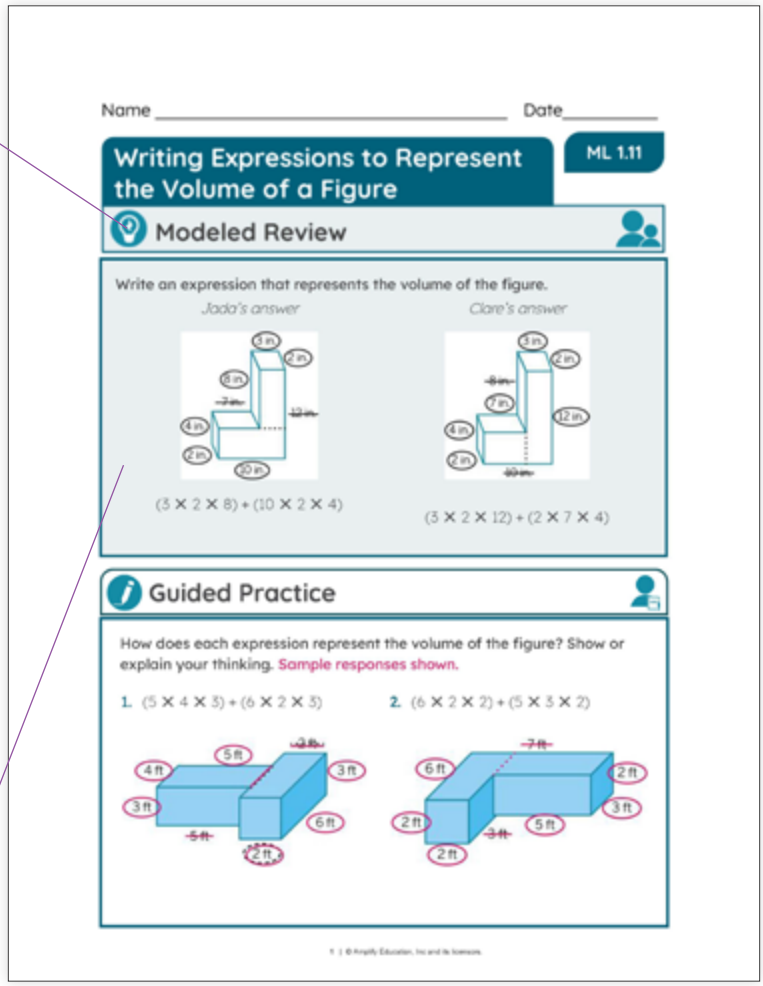
Reinforce the goal by saying, "You can use different expressions to represent how to determine the volume of a figure composed of rectangular prisms. The volumes of the individual prisms may be different, but the total volume of the figure will be the same."

Guided Practice

For each problem, focus students' attention on decomposing the figure into two prisms; circling the length, width, and height of each prism; and crossing out edge lengths that provide extraneous information.

To scaffold their thinking, **ask:**

- "Where do you see the length, width, and height of one prism?" The other prism?"
- "Which edge lengths are not needed?"


Name _____ Date _____

Writing Expressions to Represent the Volume of a Figure

ML 1.11

Modeled Review

Write an expression that represents the volume of the figure.

Jada's answer

Clare's answer

(3 × 2 × 8) + (10 × 2 × 4)

(3 × 2 × 12) + (2 × 7 × 4)

Guided Practice

How does each expression represent the volume of the figure? Show or explain your thinking. Sample responses shown.

1. (5 × 4 × 3) + (6 × 2 × 3)

2. (6 × 2 × 2) + (5 × 3 × 2)

Vocabulary

If needed, share the meaning of the words with students:

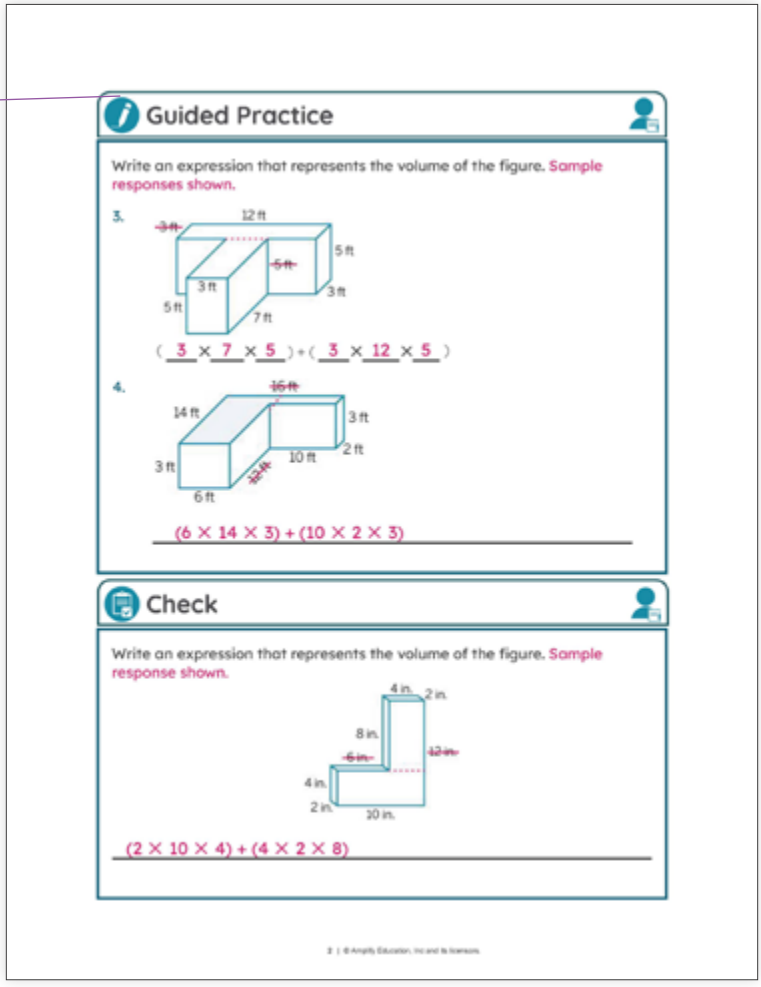
expression: A mathematical sentence with a minimum of two numbers and at least one math operation.
rectangular prism: A solid figure with 6 faces that are all rectangles.

Guided Practice

A Suggest students use different colored pencils to circle the dimensions of each prism.

Note: The factors in the expressions may be in any order.

Key Takeaway:
Say, "You can use the strategy of decomposing a figure into rectangular prisms to solve problems with volume whether you are given an image of a figure with or without unit cubes. Different expressions can represent the volume of the figure composed of prisms, depending on how the figure is decomposed."


Guided Practice

Write an expression that represents the volume of the figure. Sample responses shown.

3.

(3 × 7 × 5) + (3 × 12 × 5)

4.

(6 × 14 × 3) + (10 × 2 × 3)

Check

Write an expression that represents the volume of the figure. Sample response shown.

(2 × 10 × 4) + (4 × 2 × 8)

Reflection

Ask:
- "What makes sense? What is still confusing?"
- "What strategy was helpful today?"

Check: Recommended Next Steps

Almost there	**Got it!**
If students need more support, consider using Mini-Lesson 1.10: *Determining the Volumes of Figures Made of Prisms*.	If students need more practice, consider having students come up with different expressions for volume by decomposing the figures in Problems 2 and 4 in different ways.

Name _____ Date _____

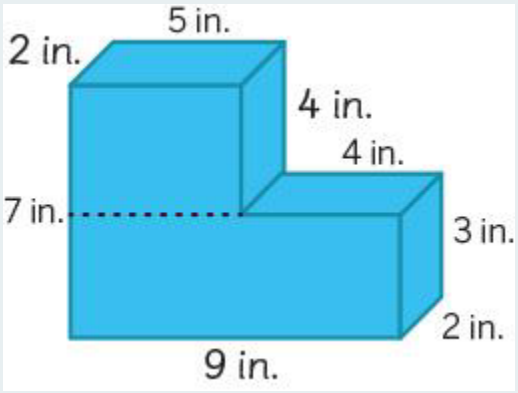
Determining Unknown Edge Lengths of a Figure

ML 1.12

Modeled Review

Name: Priya

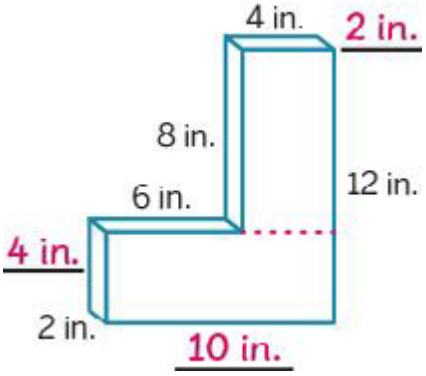
Show how you would split the figure into two prisms. Then determine the unknown edge lengths.



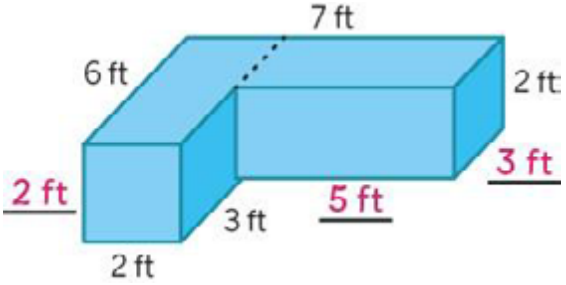
Guided Practice

A dotted line shows how the figure could be split into two prisms. Determine the unknown edge lengths.

1.



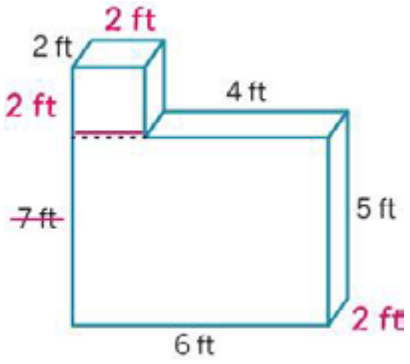
2.



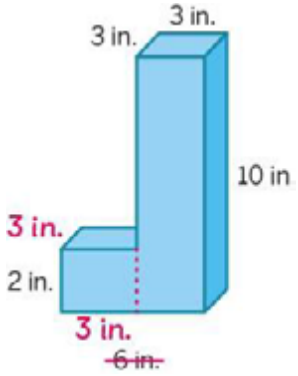
Guided Practice

Show how you could split the figure into two prisms. Then determine the unknown edge lengths. Sample responses shown.

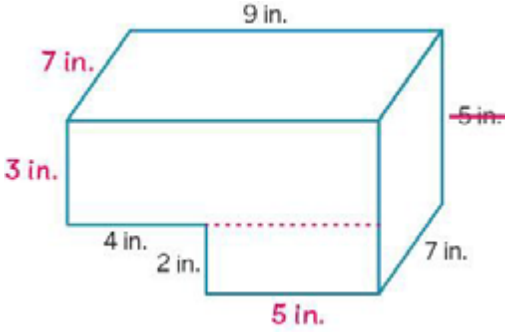
3.



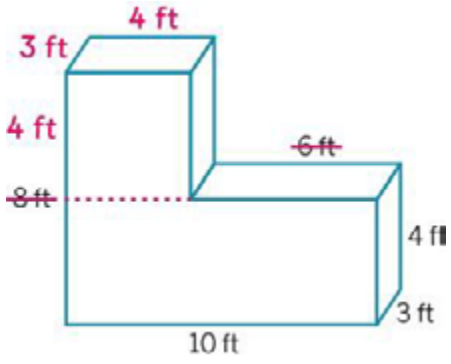
4.



5.

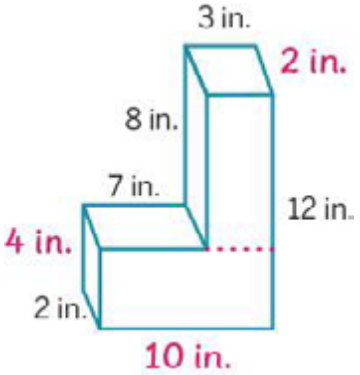


6.



Check

Show how you could split the figure into two prisms. Then determine the unknown edge lengths. Sample response shown.



Goal

Determine unknown edge lengths of a figure composed of rectangular prisms in which unit cubes are not shown.

Standard

5.MD.C.5.C

Materials

coloring tools, unit cubes

Modeled Review

Point to Priya's work and **ask:**

- "How did Priya decompose the figure?"
- "What edge lengths were missing and how did she determine their measurements?"

Reinforce Priya's thinking by saying "You may need to use parallel edges to determine the length of unlabeled edges."

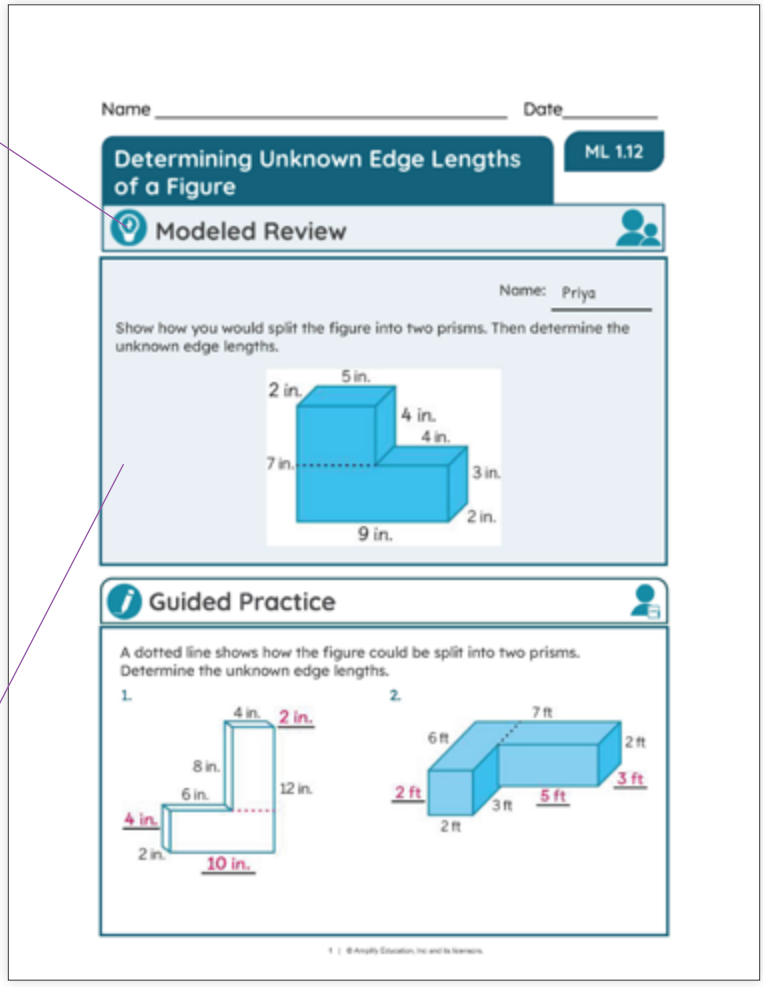
ML/EL Model thinking aloud to decompose a figure and determine missing edge lengths.

Guided Practice

For each problem, focus students' attention on determining the unknown edge lengths.

To scaffold their thinking, **say:**

- While pointing to an unknown edge length, "How long is this edge? How do you know?"



Vocabulary

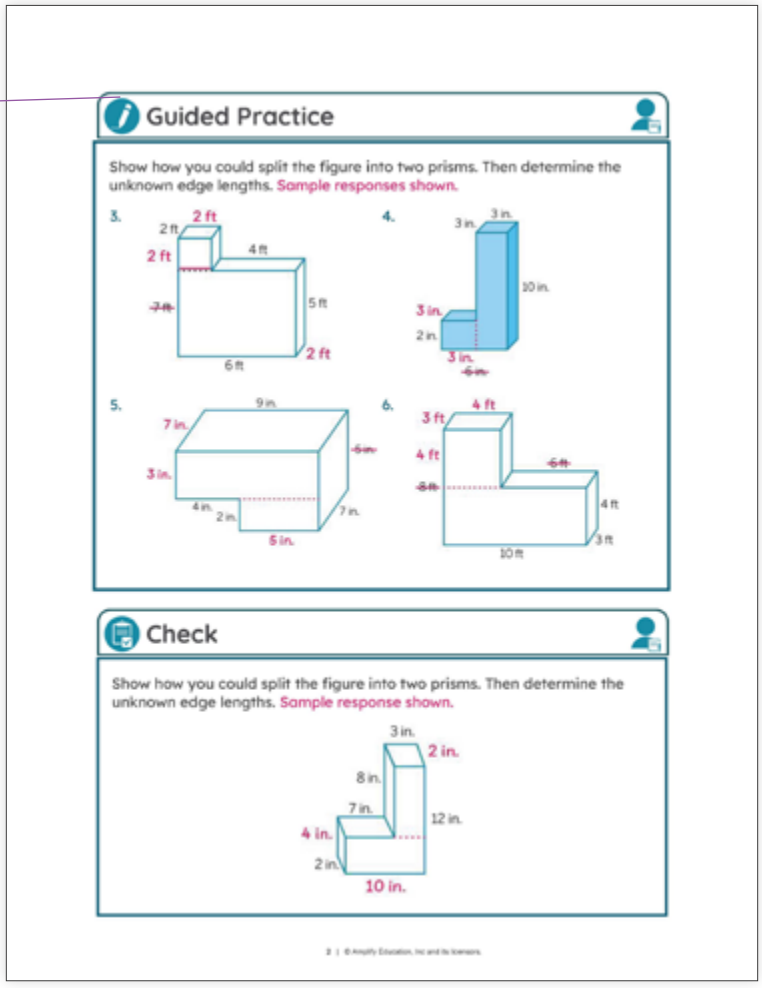
If needed, share the meaning of the words with students:

parallel: Lines that never cross or intersect.
volume: The amount of space a three-dimensional figure takes up.

Guided Practice

A Provide access to coloring tools for students to use to annotate the figure by showing the decomposition. Remind students that when decomposing, there may be edge lengths that you can cross out because they are split across the prisms.

Key Takeaway:
Say, "When determining the volume of a solid figure, you may need to determine some edge lengths. You can calculate the volume of the figure when you have the dimensions of your prisms."



Guided Practice

Show how you could split the figure into two prisms. Then determine the unknown edge lengths. Sample responses shown.

3. 2 ft, 2 ft, 4 ft, 7 ft, 5 ft, 6 ft, 2 ft

4. 3 in., 3 in., 10 in., 3 in., 2 in., 3 in., 6 in.

5. 9 in., 7 in., 6 in., 3 in., 4 in., 2 in., 7 in., 5 in.

6. 4 ft, 3 ft, 4 ft, 6 ft, 8 ft, 4 ft, 10 ft, 3 ft

Check

Show how you could split the figure into two prisms. Then determine the unknown edge lengths. Sample response shown.

3 in., 2 in., 8 in., 7 in., 12 in., 4 in., 2 in., 10 in.

Reflection

Ask:
- "How is determining missing edge lengths in a three-dimensional shape similar to determining missing side lengths in a two-dimensional shape? Different?"
- "What questions do you still have?"

Check: Recommended Next Steps

Almost there	**Got it!**
If students need more support, have students build the figure in the Check with unit cubes. Have students decompose it into two prisms and find the unknown edge lengths.	If students need more practice, have students decompose the figures in Problems 4-6 in a different way and determine the unknown edge lengths.

Name _____ Date _____

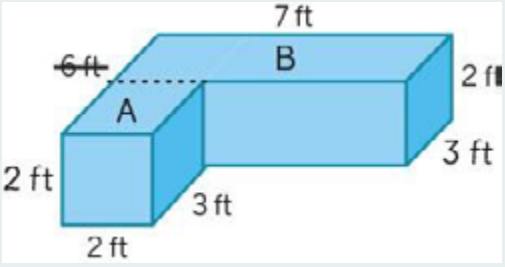
Writing Expressions to Determine the Volume of a Figure

ML 1.13

Modeled Review

Name: Han

Write an expression to represent the volume of the figure. Then determine the volume. Show or explain your thinking.



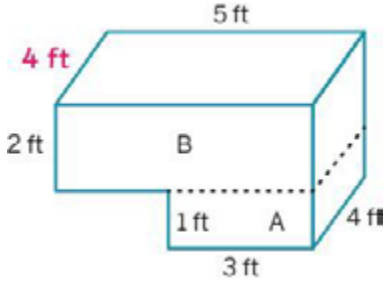
Prism A: (2 × 3 × 2)
Prism B: (7 × 3 × 2)

expression: (2 × 3 × 2) + (7 × 3 × 2)
volume: 54 cubic feet

Guided Practice

Complete the expression that represents the volume of the figure. Then determine the volume. Show or explain your thinking.

1.



Prism A: (3 × 4 × 1)

Prism B: (5 × 4 × 2)

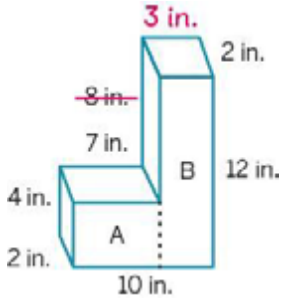
expression: (3 × 4 × 1) + (5 × 4 × 2)

volume: 52 cubic feet

Guided Practice

Write an expression that represents the volume of the figure. Then determine the volume. Show or explain your thinking. Sample work shown.

2.



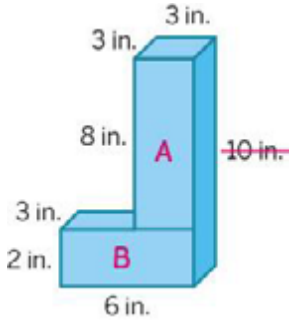
Prism A: (2 × 7 × 4)

Prism B: (3 × 2 × 12)

expression: (2 × 7 × 4) + (3 × 2 × 12)

volume: 128 cubic inches

3.



Prism A: (3 × 3 × 8)

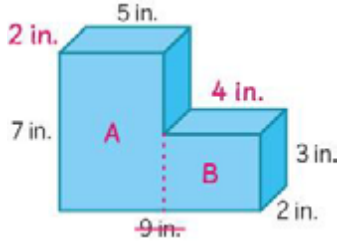
Prism B: (6 × 3 × 2)

expression: (3 × 3 × 8) + (6 × 3 × 2)

volume: 108 cubic inches

Check

Write an expression that represents the volume of the figure. Then determine the volume. Show or explain your thinking. Sample work shown.



Prism A: (5 × 2 × 7)

Prism B: (2 × 4 × 3)

expression: (5 × 2 × 7) + (2 × 4 × 3)

volume: 94 cubic inches

Goal

Write expressions to represent the volume of a figure composed of rectangular prisms with some unknown edge lengths.

Standard

5.MD.C.5.C

Materials

coloring tools, unit cubes

Modeled Review

Point to Han's work and **ask:**

- "Why did Han split the figure into two prisms and draw the line where he did?"
- "What does each factor in the expressions represent? Where do you see each of those dimensions?"

Reinforce Han's thinking by saying, "You can use the formulas for the volume of a rectangular prism to explain how different expressions represent the volume of a figure composed of rectangular prisms."

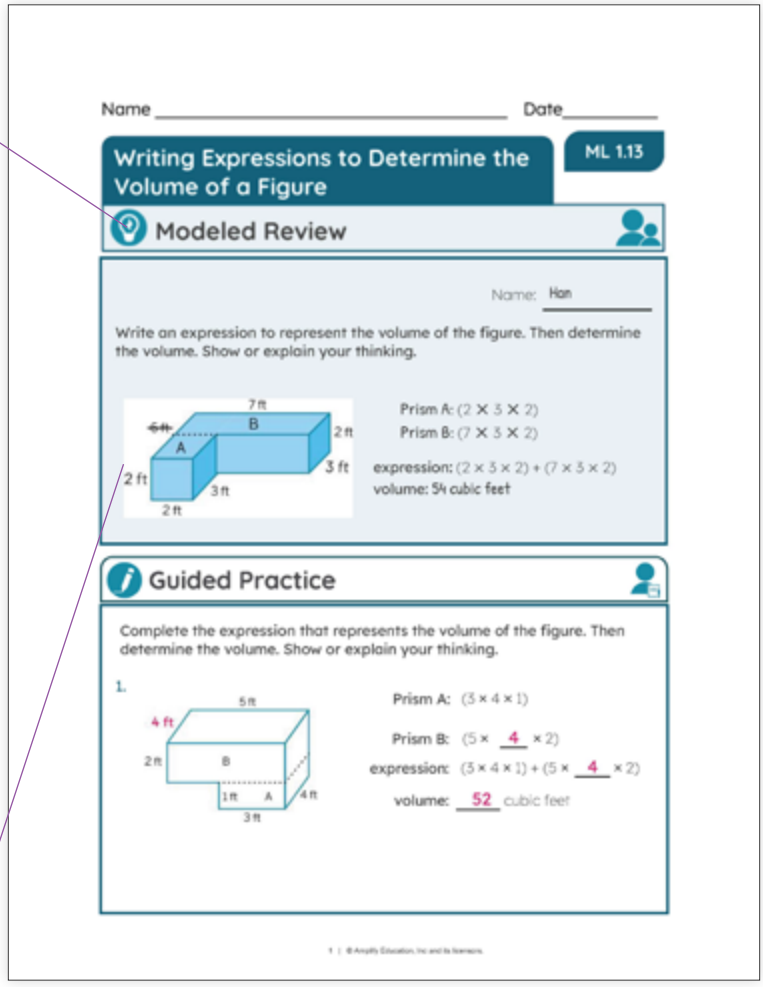
ML/EL Model thinking aloud to decompose a figure, determine missing edge lengths, and identify the volume of the figure.

Guided Practice

For each problem, focus students' attention on determining the volume of the figure.

To scaffold their thinking, **ask:**

- "How is the figure split into two prisms?"
- "How do you represent the volume of the two prisms?"



Name _____ Date _____

Writing Expressions to Determine the Volume of a Figure — ML 1.13

Modeled Review

Name: Han

Write an expression to represent the volume of the figure. Then determine the volume. Show or explain your thinking.

Prism A: (2 × 3 × 2)
Prism B: (7 × 3 × 2)
expression: (2 × 3 × 2) + (7 × 3 × 2)
volume: 54 cubic feet

Guided Practice

Complete the expression that represents the volume of the figure. Then determine the volume. Show or explain your thinking.

1.

Prism A: (3 × 4 × 1)
Prism B: (5 × 4 × 2)
expression: (3 × 4 × 1) + (5 × 4 × 2)
volume: 52 cubic feet

Vocabulary

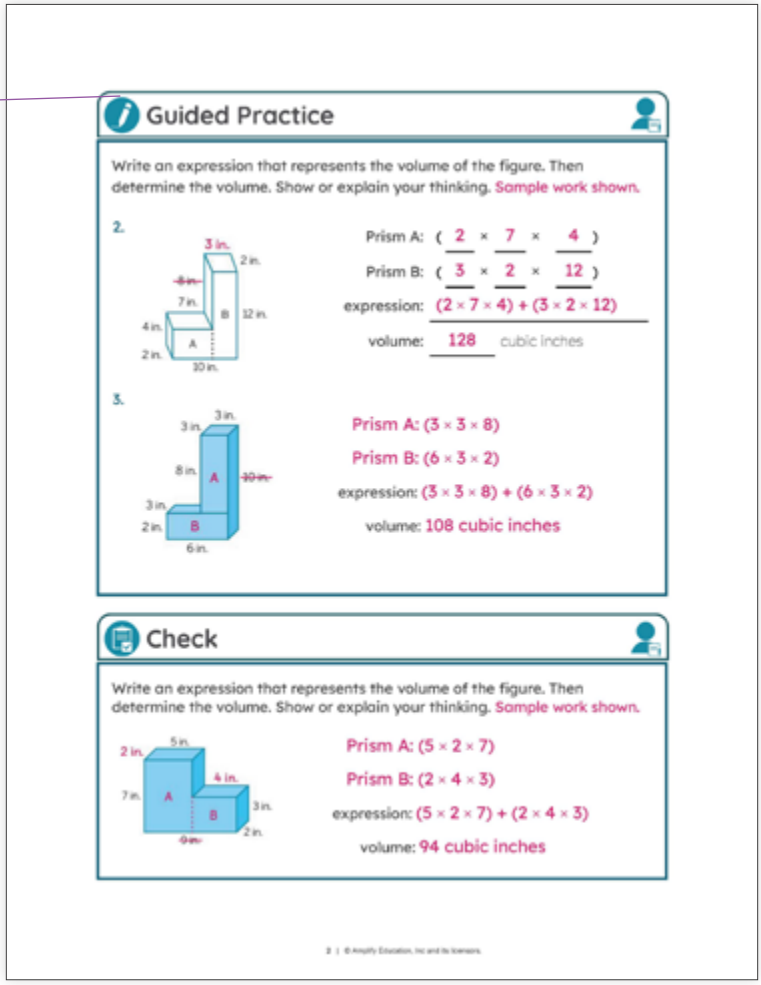
If needed, share the meaning of the words with students:

expression: A mathematical sentence with a minimum of two numbers and at least one math operation.
factor: A number that is multiplied with another number to give a product.
volume: The amount of space a three-dimensional figure takes up.

Guided Practice

A Provide access to coloring tools for students to use to annotate the figure by showing the decomposition. Remind students that when decomposing, there may be edge lengths that you can cross out because they are split across the prisms.

Key Takeaway:
Say, "Different expressions can represent the volume of a solid figure composed of rectangular prisms depending on the composition or decomposition strategy used."



Reflection

Ask:
- "How does using the formula $V = \ell \times w \times h$ help determine the volume of a solid figure?"
- "What is something you weren't sure about at the start of the lesson but understand now?"

Check: Recommended Next Steps

Almost there	**Got it!**
If students need more support, consider using Mini-Lesson 1.12: *Determining Unknown Edge Lengths of a Figure*.	If students need more practice, provide students with two prisms made of unit cubes. Ask them to write an expression that represents the volume of each prism. Then have them put the prisms together to make a figure and write an expression to represent the total volume of the figure.

Name _____ Date _____

Using Clues to Determine the Volumes of Figures

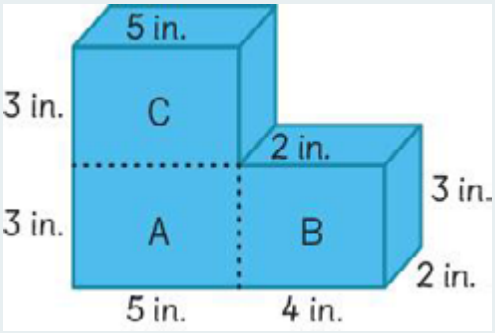
ML 1.14

Modeled Review

Name: Clare

Use the clues to determine the volume of the figure. Show or explain your thinking.

- Prism A has a length of 5 inches, a width of 2 inches, and a height of 3 inches.
- The base of Prism B has an area of 8 square inches.
- The height of each prism is the same.



Prism A: $5 \times 2 \times 3 = 30$

Prism B: $8 \times 3 = 24$

Prism C: $5 \times 2 \times 3 = 30$

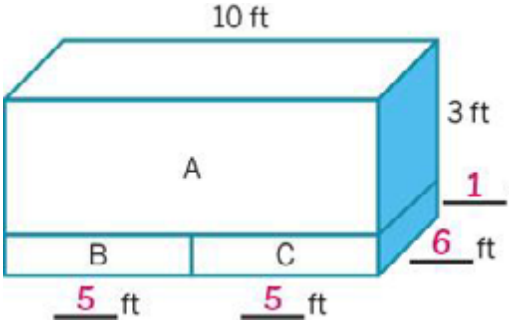
total volume: $30 + 24 + 30 = 84$

answer: 84 cubic inches

Guided Practice

1. Use the clues to determine the dimensions of Prism A, Prism B, and Prism C.

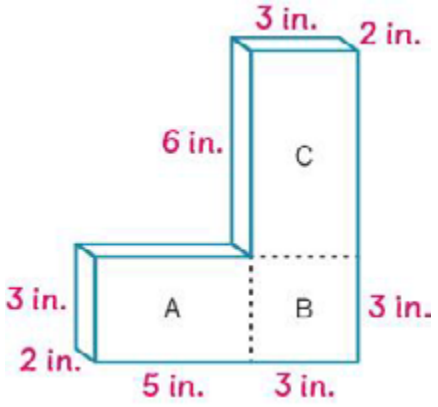
   - Prism A has a length of 10 feet and a height of 3 feet.
   - Prism C has a height of 1 foot.
   - Prisms B and C have the same length.
   - The width of each prism is twice the height of Prism A.



Guided Practice

2. Use the clues to determine the volume of the figure. Show or explain your thinking. **Sample work shown.**

- Prism B has a length of 3 inches, a width of 2 inches, and a height of 3 inches.
- The width of each prism is the same.
- The area of the base of Prism A is 10 square inches.
- The height of Prism C is twice the height of Prism B.



Prism A: $10 \times 3 = 30$

Prism B: $3 \times 2 \times 3 = 18$

Prism C: $3 \times 2 \times 6 = 36$

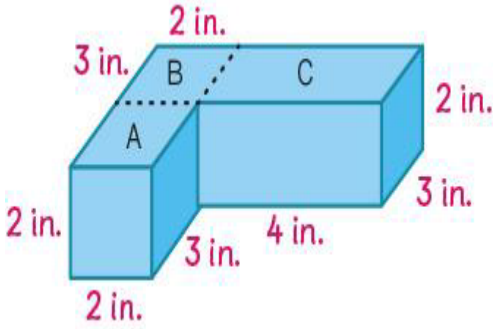
total volume: $30 + 18 + 36 = 84$

answer: 84 cubic inches

Check

Use the clues to determine the volume of the figure. Show or explain your thinking. Sample work shown.

- Prism A has a length of 2 inches, a width of 3 inches, and height of 2 inches.
- The area of the base of Prism B is 6 square inches.
- The height of each prism is the same.
- The length of Prism C is twice the length of Prism A.



Prism A: $2 \times 3 \times 2 = 12$

Prism B: $6 \times 2 = 12$

Prism C: $4 \times 3 \times 2 = 24$

total volume: $12 + 12 + 24 = 48$

answer: 48 cubic inches

Goal

Determine the volume of a figure composed of rectangular prisms when given clues about the figure's attributes.

Standard

5.MD.C.5.C

Modeled Review

Point to Clare's work and **ask:**

- "What did Clare record from the first clue? What other information could Clare have recorded?"
- "What did Clare record from the second clue? How did she know what to record?"

Reinforce Clare's thinking by saying, "After using the clues to label the diagram, Clare determined the volume of each prism and then added to determine the total volume."

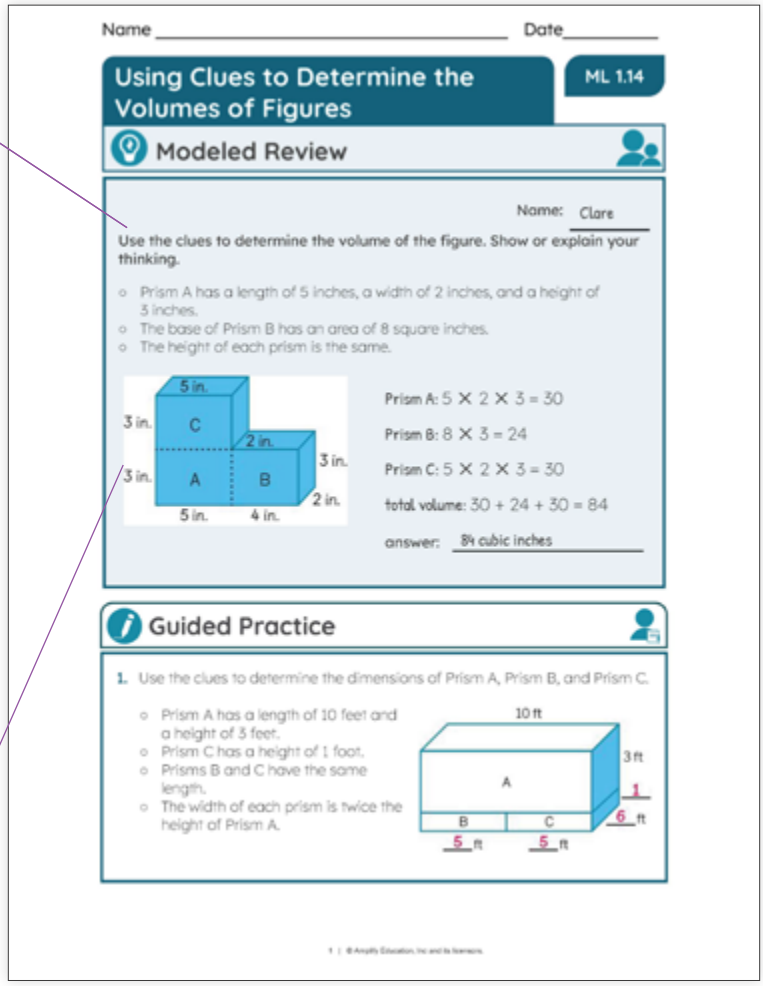
ML/EL Read each clue aloud one at a time and guide students through annotating the figure.

Guided Practice

For each problem, focus students' attention on using clues to determine the volume.

To scaffold their thinking, **say:**

- "$V = \ell \times w \times h$ or $V = b \times h$ can be used to determine the volume of each prism which is then added together to calculate the total volume of the figure."



Name _____ Date_____

Using Clues to Determine the Volumes of Figures — ML 1.14

Modeled Review

Name: Clare

Use the clues to determine the volume of the figure. Show or explain your thinking.

- Prism A has a length of 5 inches, a width of 2 inches, and a height of 3 inches.
- The base of Prism B has an area of 8 square inches.
- The height of each prism is the same.

Prism A: 5 × 2 × 3 = 30

Prism B: 8 × 3 = 24

Prism C: 5 × 2 × 3 = 30

total volume: 30 + 24 + 30 = 84

answer: 84 cubic inches

Guided Practice

1. Use the clues to determine the dimensions of Prism A, Prism B, and Prism C.

- Prism A has a length of 10 feet and a height of 3 feet.
- Prism C has a height of 1 foot.
- Prisms B and C have the same length.
- The width of each prism is twice the height of Prism A.

Vocabulary

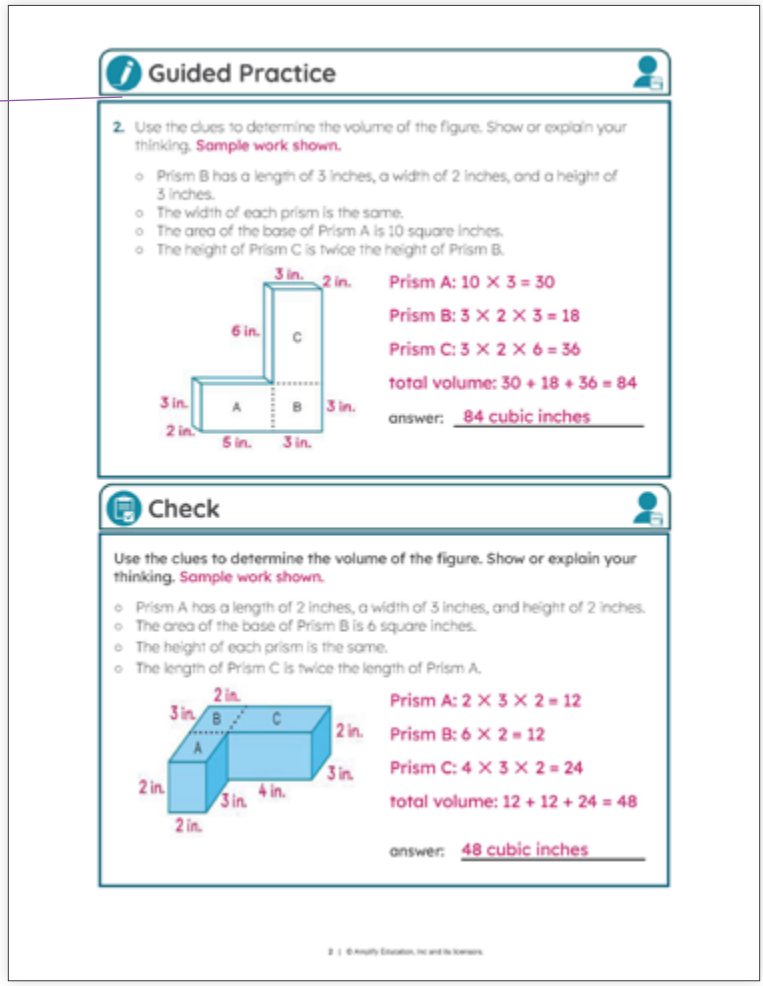
If needed, share the meaning of the words with students:

volume: The amount of space a three-dimensional figure takes up.

Guided Practice

A Direct students to take note of each clue, labeling the figure before the next clue is read.

Key Takeaway:
Say, "You can use what you know about the structure and volume of rectangular prisms to determine the volumes of figures composed of rectangular prisms, even when limited information is known."



Guided Practice

2. Use the clues to determine the volume of the figure. Show or explain your thinking. Sample work shown.

- Prism B has a length of 3 inches, a width of 2 inches, and a height of 3 inches.
- The width of each prism is the same.
- The area of the base of Prism A is 10 square inches.
- The height of Prism C is twice the height of Prism B.

Prism A: 10 × 3 = 30
Prism B: 3 × 2 × 3 = 18
Prism C: 3 × 2 × 6 = 36
total volume: 30 + 18 + 36 = 84
answer: 84 cubic inches

Check

Use the clues to determine the volume of the figure. Show or explain your thinking. Sample work shown.

- Prism A has a length of 2 inches, a width of 3 inches, and height of 2 inches.
- The area of the base of Prism B is 6 square inches.
- The height of each prism is the same.
- The length of Prism C is twice the length of Prism A.

Prism A: 2 × 3 × 2 = 12
Prism B: 6 × 2 = 12
Prism C: 4 × 3 × 2 = 24
total volume: 12 + 12 + 24 = 48
answer: 48 cubic inches

Reflection

Ask:
- "What did you learn about volume in this lesson? What would you like to know more about?"
- "What makes sense? What is still confusing?"

Check: Recommended Next Steps

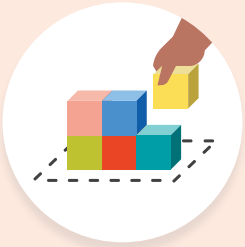
Almost there	**Got it!**
If students need more support, consider using Mini-Lesson 1.12: *Determining Unknown Edge Lengths of a Figure*.	If students need more practice, have students determine the total volume of the figure in Guided Practice Problem 1.

GRADE 5

Centers

The following section includes a selection of Center Resources. Centers are engaging hands-on, 15-minute games for students to play collaboratively to strengthen their understanding of key skills and concepts. Centers appear in instruction as part of instructional activities, lesson differentiation, and daily Centers time (K–1 only).

CENTER
Directions



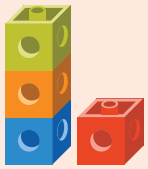
Can You Build It?

Stage 2

Let's build multiple rectangular prisms with a given volume.

Pairs

You'll need . . .


connecting cubes


folders

Number Cards, 0–5


Recording Sheet

Set-up

- Draw two Number Cards and make a two-digit number. If you draw a 0, it must be the second digit. This is the target volume for this round.

How to Play

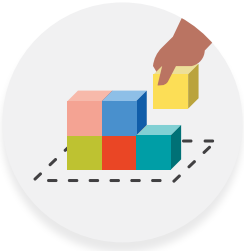
1. Each player secretly builds a rectangular prism with the target volume.
2. Record and compare the dimensions of your prisms.
3. If both prisms have the same dimensions, you earn 1 point. If both prisms have different dimensions, you earn 2 points.
4. Repeat for the same target volume until one or both players cannot build another prism.

How to Win

- Keep playing, trying to earn at least 5 points.

Name _____ Date _____

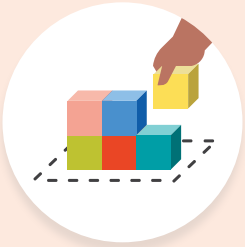
CENTER
Recording Sheet



Can You Build It?

Stage 2

Target volume	My dimensions	My partner's dimensions	Score



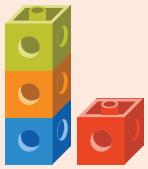
Can You Build It?

Stage 2

Let's build multiple rectangular prisms with a given volume.

Pairs

You'll need . . .


connecting cubes


folders

Number Cards, 0–5


Recording Sheet

Set-up

- Draw two Number Cards and make a two-digit number. If you draw a 0, it must be the second digit. This is the target volume for this round.

How to Play

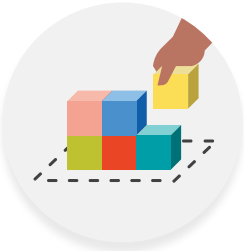
1. Each player secretly builds a rectangular prism with the target volume.
2. Record and compare the dimensions of your prisms.
3. If both prisms have the same dimensions, you earn 1 point. If both prisms have different dimensions, you earn 2 points.
4. Repeat for the same target volume until one or both players cannot build another prism.

How to Win

- Keep playing, trying to earn at least 5 points.

Name _____ Date _____

CENTER
Recording Sheet



Can You Build It?

Stage 2

Target volume	My dimensions	My partner's dimensions	Score

Capture Squares

Students generate a number and connect two dots that are adjacent to the number. If that line closes a square, they capture it and shade it using their color. The player to shade three squares first is the winner.

GRADE 1	**Stage 1**	Add Within 10
	Stage 2	Subtract Within 10
GRADES 1, 2	**Stage 3**	Add Within 20
	Stage 4	Subtract Within 20
GRADE 3	**Stage 5**	Multiply With 2, 5, and 10
	Stage 6	Multiply With 2–5
	Stage 7	Multiply With 6–9

Capture Squares

Stage	Materials	Differentiation
Stage 1 Add Within 10 **(GRADE 1)**	• Directions, Gameboard (Centers Resources) • number cubes (Manipulative Kit) • crayons or colored pencils (Classroom materials)	**Support** Provide students with access to 10-frames and either counters or cubes to represent the expressions. **Stretch** Have students continue playing until all lines are drawn on the board. The player with more squares colored wins.
Stage 2 Subtract Within 10 **(GRADE 1)**	• Directions, Gameboard, Number Cards, 0–10 (Centers Resources) • crayons or colored pencils (Classroom materials)	**Support** • Provide students with access to 10-frames and either counters or cubes to represent the expressions. • Remind students to use the greater number as the minuend, even if the greater number was not drawn first. **Stretch** Have students continue playing until all lines are drawn on the board. The player with more squares colored wins.
Stage 3 Add Within 20 **(GRADES 1, 2)**	• Directions, Gameboard, Spinner, Number Cards, 0–10 (Centers Resources) • crayons or colored pencils, paper clips (Classroom materials)	**Support** Provide students with access to 10-frames and either counters or cubes to represent the expressions. **Stretch** • Encourage students to use the Wild to help them be strategic with their game play. • Have students continue playing until all lines are drawn on the board. The player with more squares colored wins.

Capture Squares (continued)

Stage	Materials	Differentiation
Stage 4 Subtract Within 20 **(GRADES 1, 2)**	• Directions, Gameboard, Spinner, Number Cards, 0–10 (Centers Resources) • crayons or colored pencils, paper clips (Classroom materials)	**Support** • Provide students with access to 10-frames and either counters or cubes to represent the expressions. • Remind students to use the number from the Spinner as the minuend. **Stretch** • Encourage students to use the Wild to help them be strategic with their game play. • Have students continue playing until all lines are drawn on the board. The player with more squares colored wins.
Stage 5 Multiply With 2, 5, and 10 **(GRADE 3)**	• Directions, Gameboard, Spinner (Centers Resources) • number cubes (Manipulative Kit) • crayons or colored pencils, paper clips (Classroom materials)	**Support** • Encourage students to use different multiplication strategies, such as repeated addition or equal groups, to find the product. • Provide students with access to a multiplication chart. **Stretch** • Encourage students to use the Wild to help them be strategic with their game play. • Have students continue playing until all lines are drawn on the board. The player with more squares colored wins.
Stage 6 Multiply With 2–5 **(GRADE 3)**	• Directions, Gameboard, Spinner (Centers Resources) • number cubes (Manipulative Kit) • crayons or colored pencils, paper clips (Classroom materials)	**Support** • Encourage students to use different multiplication strategies, such as repeated addition or equal groups, to find the product. • Provide students with access to a multiplication chart. **Stretch** • Encourage students to use the Wild to help them be strategic with their game play. • Have students continue playing until all lines are drawn on the board. The player with more squares colored wins.

Capture Squares (continued)

Stage	Materials	Differentiation
Stage 7 Multiply With 6–9 **(GRADE 3)**	• Directions, Gameboard, Spinner **(Centers Resources)** • number cubes **(Manipulative Kit)** • crayons or colored pencils **(Classroom materials)**	**Support** • Encourage students to use different multiplication strategies, such as repeated addition or equal groups, to find the product. • Provide students with access to a multiplication chart. **Stretch** • Encourage students to use the Wild to help them be strategic with their game play. • Have students continue playing until all lines are drawn on the board. The player with more squares colored wins.

CENTER
Directions

Capture Squares

Stage 7

Let's multiply numbers (6–9).

Pairs

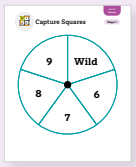
You'll need . . .


2 crayons or colored pencils


number cube


paper clip


Gameboard



Spinner

How to Play

1. Roll the number cube and spin the Spinner. Determine the product.
2. Draw 1 line connecting any 2 dots around the product. If you cannot draw a line, roll the number cube and spin again.
3. If you complete a square, shade the box with your color.
4. Take turns.

How to Win

- The first player to shade 3 boxes wins.

CENTER
Gameboard

Capture Squares

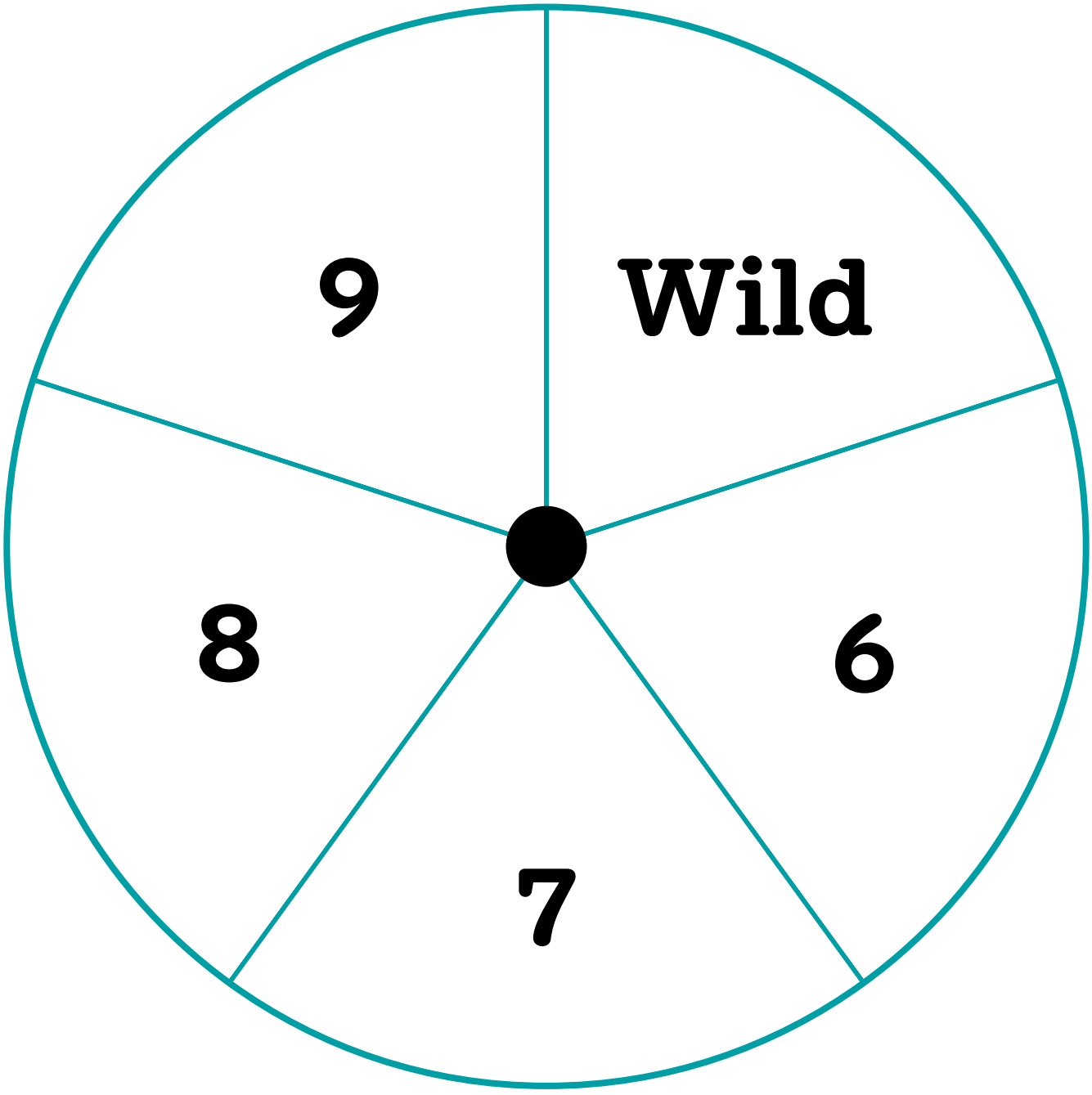
Stage 7

24	32	36	9	14
42	18	35	54	30
7	28	multiple of 9	6	16
24	12	8	27	48
36	45	21	40	18

CENTER
Spinner

Capture Squares

Stage 7



GRADE 5

Extensions

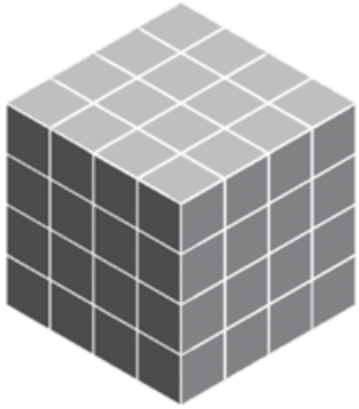
The following section includes a selection of Extensions. Extensions are 10–15-minute activities aligned to the most critical topics in a sub-unit. These are print-based, hands-on activities, structured on the principle of student choice and designed to be student-led. Extensions appear as part of lesson differentiation.

Name ..... Date .....

You Choose! Pick any problem to start with.

1

A 4 x 4 x 4 cube made from unit cubes is spray painted on all its outer faces.



How many of the unit cubes have exactly 3 faces painted?

_____

How many of the unit cubes have exactly 2 faces painted?

_____

How many of the unit cubes have exacxtly 1 face painted?

_____

How many of the unit cubes do *not* have any paint on them?

_____

Determine the number of unit cubes with exactly 0, 1, 2, and 3 painted faces for a 5 x 5 x 5 and 6 x 6 x 6 cubes.

	Number of unit cubes with exactly ...			
Painted Cube	3 painted faces	2 painted faces	1 painted face	0 painted faces
5 x 5 x 5				
6 x 6 x 6				

Name ..... Date .....

You Choose! Pick any problem to start with.

2

There are 9 different-sized cubes in a 2 × 2 × 2 cube: 8 unit cubes and one 2 × 2 × 2 cube.

Cube	Number of 1 x 1 x 1 cubes	Number of 2 x 2 x 2 cubes
2 × 2 × 2		

How many different-sized cubes are there in a 3 × 3 × 3 cube?

_____

How many different-sized cubes are there in a 4 × 4 × 4 cube?

_____

Unit 1 Sub-Unit 3 Extension

Assign problems to students who want to extend their thinking.
Consider assigning Problem 2 to students who have solved Problem 1.

Materials
- Centimeter Cubes

Additional Prep
- Problem 1 PDF
- Problem 2 PDF

Problem 1

Students will extend their understanding of the properties of the solids build up of unit cubes by solving painted cube puzzle.

Provide students with the following hints if additional scaffolding is needed.

- **Hint 1:** Ask, "How many painted faces does 1 corner unit cube have? How many corner unit cubes does the 4 by 4 by 4 cube have?" Provide students with Problem 1, PDF.
- **Hint 2:** Ask, "Which unit cubes have two faces painted? How many such unit cubes does the 4 by 4 by 4 cube have?"
- **Hint 3:** Ask, "Which unit cubes have only one face painted? How many such unit cubes does the 4 by 4 by 4 cube have?"
- **Hint 3:** Ask, "What is the total number of unit cubes in a 4 by 4 by 4 cube? How does the answer to this question help you find the number of unit cubes without any paint on them?"

Sample response shown.

8 of the unit cubes which are the corners of the original cube have exactly 3 of their faces painted.

24 of the unit cubes have exactly 2 of their faces painted.

24 of the unit cubes have only 1 of their faces painted.

8 of the unit cubes have none of their faces painted.

Problem 2

Students will extend their understanding of volume by decomposing cubes into smaller cubes.

Provide students with the following hints if additional scaffolding is needed.

- **Hint 1:** Ask, "How can you place a 2 by 2 by 2 cube into a 3 by 3 by 3 cube?" Provide students with Problem 2, PDF.

Sample responses shown.

There are 27 unit cubes, eight 2 by 2 by 2 cubes, and one 3 by 3 by 3 cube. Total number of different cubes is 36.

There are 64 unit cubes, Twenty-seven 2 by 2 by 2 cubes, eight 3 by 3 by 3 cubes, and one 4 by 4 by 4 cube. Total number of different cubes is 100.

Notes

Notes

Visit us online for more information on Amplify Desmos Math.

amplify.com/math

Amplify.

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