



VMATH ACCELERATES STUDENTS TO GRADE-LEVEL MATH ACHIEVEMENT

Foundational and Prerequisite Skills ■ Conceptual Development ■ Problem Solving ■ Representational, Abstract, and Concrete Models ■ Inquiry-Based Lesson Components ■ Student Collaboration ■ Writing Exercises ■ Connections to Real-World Math

Vmath[®]

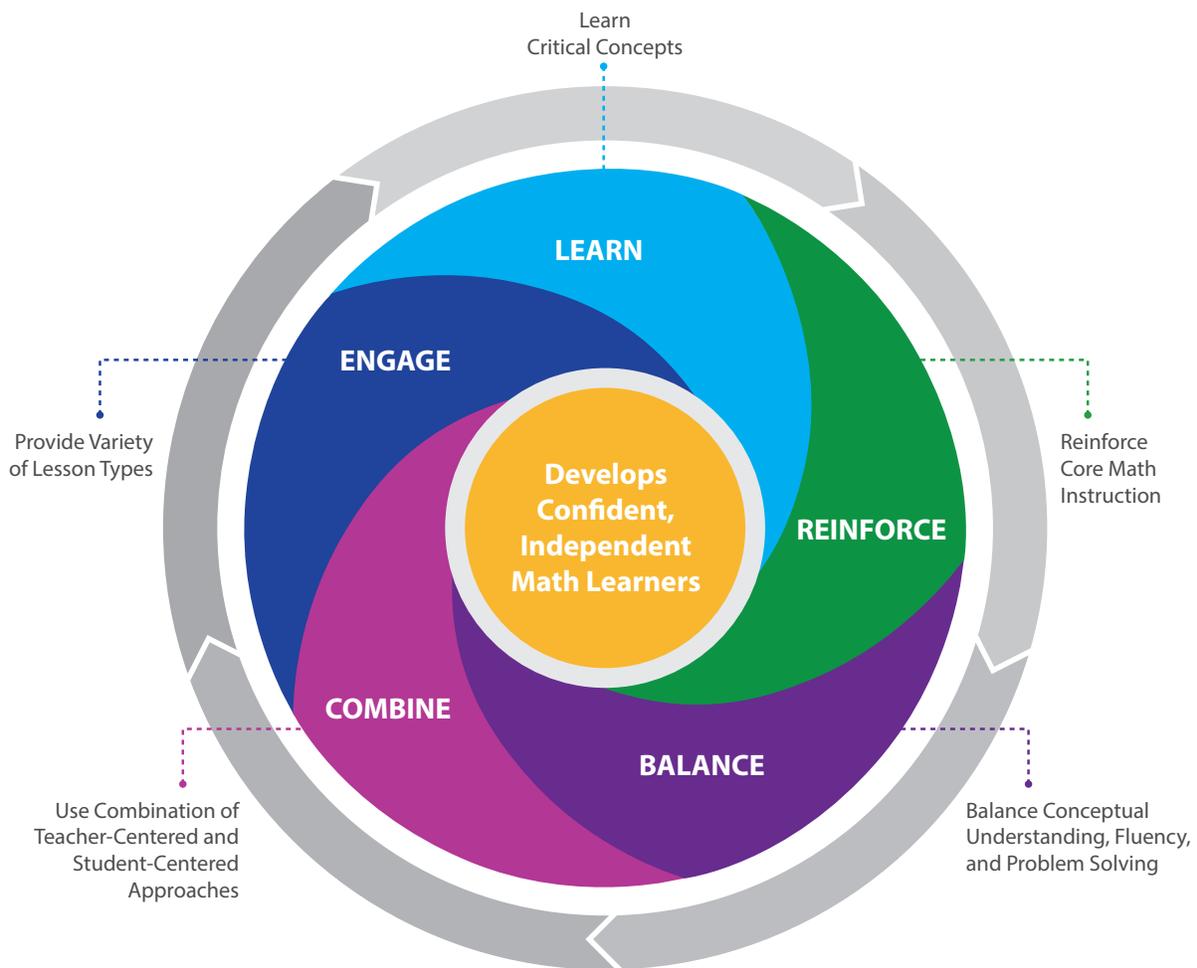
Third Edition

- › Delivers **focused, standards-based instruction**, while also providing foundational skills necessary for grade-level success
- › Wraps around any **core math program**
- › Provides **conceptual development, procedural skill and fluency practice, and application activities**
- › Delivers **explicit support** in the skills expected by new, more rigorous standards
- › Focuses on **grade-level content** and **reinforces skills** taught in the core curriculum
- › Provides an **easy implementation model**
- › Provides **foundational lessons** to scaffold the instruction
- › Provides instruction to support the **progression of skills** outlined in state and national standards
- › Includes **comprehensive, built-in assessment**



FOCUSED, STANDARDS-BASED INSTRUCTION THAT INCREASES MATH ACHIEVEMENT

Vmath[®] is a targeted math intervention program for struggling students in grades 2–8 that provides additional opportunities to master critical math concepts and skills. *Vmath* is specifically designed to reinforce grade-level expectations. Through a balanced, systematic approach, *Vmath* creates successful learning experiences for students and develops confident, independent learners of mathematics. With a blended print and technology solution, or a digital-only option, *Vmath* delivers essential content using strategies proven to accelerate and motivate at-risk students.



Since the implementation of *Vmath*, we have seen an increase in student performance on various assessments administered school-wide and ultimately produced significant increases on state and national assessments. We will continue to use *Vmath* because it is making a difference in the lives of our students.

—Tammy Brown, Reading and Math Coach
Aliceville Middle School, Aliceville, AL

8 REASONS VMATH WORKS

1 CONSISTENT LESSON FORMAT

The four-step *Vmath* lesson format aligns with the major components of explicit instruction:

- STEP 1** **GET STARTED**
Teacher Modeling
- STEP 2** **TRY IT TOGETHER**
Student and Teacher Interaction
- STEP 3** **WORK ON YOUR OWN**
Independent Work
- STEP 4** **CHECK UP**
Error Analysis

2 CONCEPTUAL UNDERSTANDING

Vmath integrates instruction in math concepts consistently in every module:



5 VOCABULARY

Vmath lessons reinforce the academic vocabulary critical for student understanding. Teachers introduce the words at the start of each lesson, reinforce throughout the lesson, and provide multiple exposures to new vocabulary.

Academic Vocabulary

Before the lesson, introduce and discuss the Academic Vocabulary. Refer to the Academic Vocabulary as needed during the lesson.

- **Commutative Property of Addition** states that the order of the addends can be changed without affecting the sum
- **Associative Property of Addition** states that the grouping of the addends can be changed without affecting the sum

6 ADVENTURES

Vmath includes exciting photographs and real-life math situations that pose relevant, project-like questions in which students read, use data, answer open-ended questions, or write short paragraphs. All Adventures are included in a separate eBook.



Vmath is a great instructional program that provides students with basic learning tools in a building, sequential order to be successful in math. I truly believe in the program. In fact, I have all my students doing it, not just as an intervention program.

—Sergio Baca, Bilingual Teacher, El Paso ISD, TX

3 APPLICATION OF SKILLS

Several components of *Vmath* are geared toward helping students apply their learning. Each daily lesson provides opportunities for students to communicate their thinking.

- Math Writing
- Algebraic Thinking
- Explaining Answers
- Talking about Math



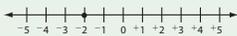
7 PROBLEM-SOLVING

Problem solving is introduced strategically throughout each *Vmath* module to help students: (1) formulate a plan, (2) implement the plan, and (3) explain their thinking.

Using a 4-Step Plan

The high temperature yesterday was $^{-2}$ °F. The forecast for today says the high temperature will be the opposite of the high temperature yesterday. What is the forecast for the high temperature today?

- Find:** the forecast for the high temperature today
- How?** Use a 4-step plan.
- Solve.** Find the opposite of $^{-2}$ °F.



high temperature yesterday: _____

opposite: _____

- Is the answer reasonable? Explain.** _____



4 PROCEDURAL UNDERSTANDING

WORK ON YOUR OWN

Recognize Multiplication and Division Fact Families

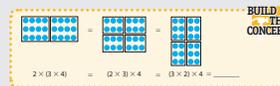
Using Symbols	Using Words
Multiplication Facts $6 \times 8 = 48$ $8 \times 6 = 48$ $4 \times 4 = 16$	Division Facts $48 \div 8 = 6$ $48 \div 6 = 8$ $16 \div 4 = 4$

HOW TO

Two different factors and their product make a fact family. Each fact in a fact family uses the same three numbers. The three numbers in a fact family make two multiplication facts and two division facts. If the two factors are the same, the three numbers make one multiplication fact and one division fact.

The “How To” box provides students with detailed steps so they can repeat procedures they learn.

“Build the Concept” boxes use visual models to help students develop a deeper understanding of targeted math concepts.



Extra Practice Pages reinforce automaticity. *VmathLive* hones computational fluency.

8 DIFFERENTIATION

Vmath offers multiple opportunities to assess, reinforce, and differentiate instruction.

English Language Learners

Use the *VmathLive* Animated Math Dictionary to review the terms *less than symbol* and *greater than symbol*. Demonstrate the vocabulary at the beginning of the lesson as students gather around the computer screen or through a projection system if possible.

To distinguish between the less than symbol, $<$, and the greater than symbol, $>$, show students that the less than symbol looks like a tilted 4 and the greater than symbol looks like a tilted 7 and that 4 is less than 7.

When working comparison problems, have students say the math sentences aloud, reinforcing the names for the symbols.

Students with Special Needs

Have students draw a number line for reference that shows -10 to 10 , labeling the left arrow with the words *Lesser*, *Less than*, and *Least*, all of which begin with the letter *L*. This will be a visual cue for students to remember that numbers farther to the left on a number line are less than numbers toward the right.

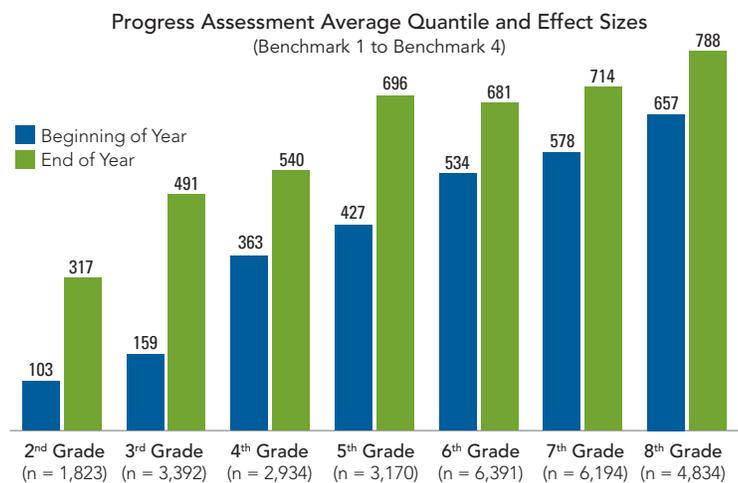
GROUNDING IN RESEARCH

Vmath Third Edition stems from a strong research foundation as well as the strong instructional approach of previous editions of *Vmath*, which have been validated in schools across the country. The three snapshots here show evidence of effectiveness for *Vmath* Second Edition.

42 States and 262 Districts: Grades 2–8; 3-Year Cohort—2009–2012

In a nationwide study, students enrolled in *Vmath* increased their overall proficiency as measured by the Progress Assessments. Administered four times a year in the Second Edition, the Progress Assessments indicate students' optimal learning range and monitor progress toward grade-level goals. The Progress Assessments yield a Quantile score based on the Quantile Framework® for Mathematics.

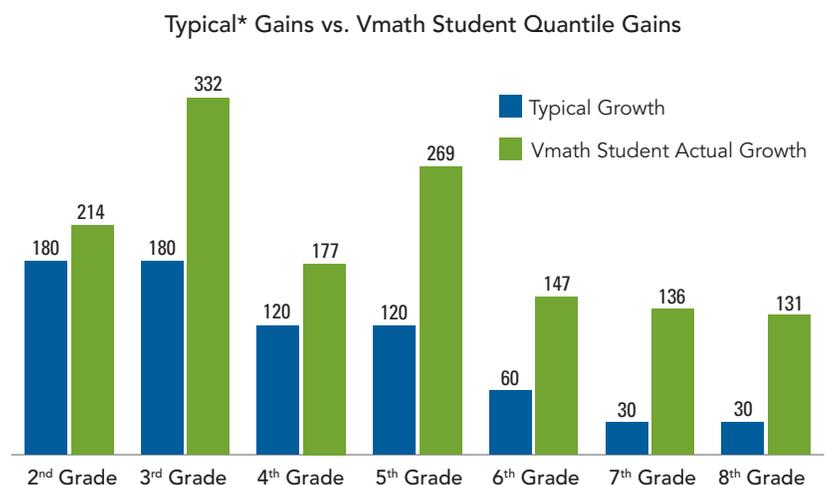
Vmath Students Make Significant Quantile Gains



QUANTILE GAINS

↑214Q ↑332Q ↑177Q ↑269Q ↑147Q ↑136Q ↑131Q

Vmath Students Exceed Typical* Quantile Growth to Close the Achievement Gap with Grade-Level Peers



*These are typical results for an average student at the 50th percentile over 30 weeks based on research from MetaMetrics®.

Oklahoma Statewide: Impact of Vmath on Student Math Performance

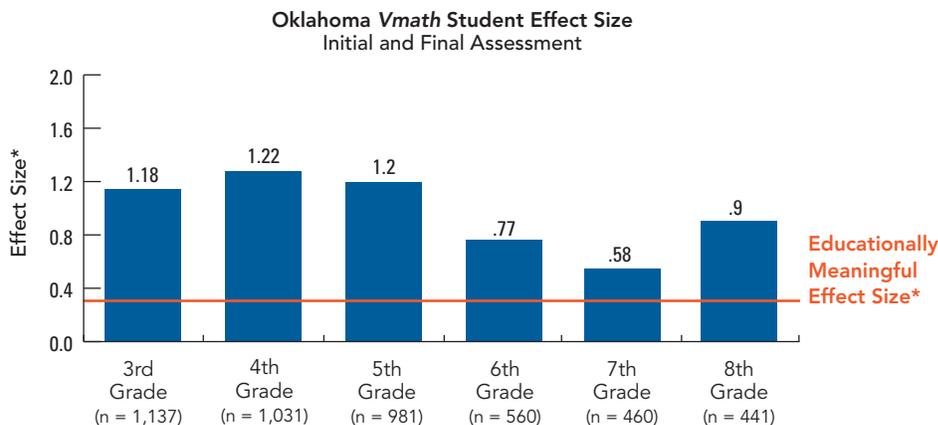
During the 2008–2009 school year, Oklahoma students in grades 3–8 demonstrated meaningful math gains after 26 weeks. Students rapidly accelerated their math skills and improved their overall math achievement.

Key Details

Grade Levels: 3–8

Instructional Period: 2008–2009

Measures: Initial and Final Assessment



El Paso ISD, TX: Performance Gain on TAKS Math Section

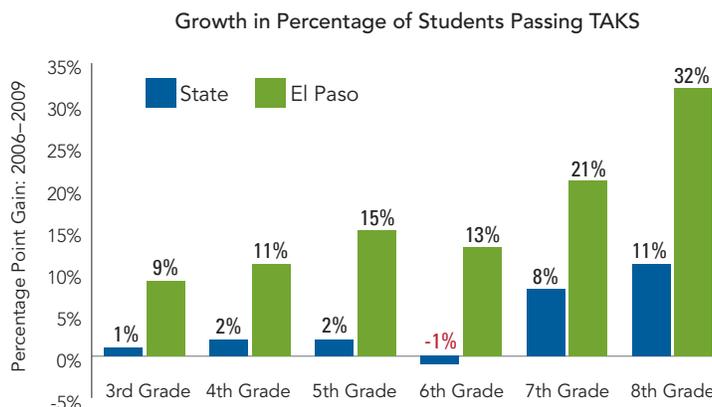
El Paso ISD began implementing Vmath in the 2005–2006 school year to boost student achievement in math. After four years with the program, each grade made substantial gains and has outperformed the state as measured by the percentage of students passing the state assessment between 2006 and 2009.

Key Details

Grade Levels: 3–8

Instructional Period: 2005–2009

Measure: Texas Assessment of Knowledge and Skills (TAKS)



For more results, visit the “Proven Success” page at www.voyagersopris.com/vmath

*Effect sizes were calculated using the Initial and Final Assessment scores. Effect sizes (for differences expressed as means) of 0.2 are considered small, 0.5 are medium, and 0.8 are large (Cohen, 1988). An effect size of 0.3 is considered to be educationally meaningful.

STREAMLINED APPROACH PROVIDES PROGRESSION TO GRADE-LEVEL MATH PERFORMANCE

- 7 levels
- 7 modules per level; first module in every level is a Foundational Module that reviews instruction from previous grade levels
- 10–15 lessons per module plus 2 preskills lessons
- Built-in time for differentiation and assessment
- Every module includes preskills, extra practice, and reteach activities

LEVEL C

1. Foundations
2. Addition
3. Subtraction
4. Measurement
5. Money and Geometry
6. Time, Graphing, and Data
7. Fractions and Concepts of Multiplying and Dividing

LEVEL D

1. Foundations
2. Whole Numbers
3. Whole Number Addition and Subtraction
4. Whole Number Multiplication
5. Whole Number Division
6. Fractions and Money
7. Data, Measurement, and Geometry

LEVEL E

1. Foundations
2. Addition and Subtraction
3. Multiplication and Division
4. Understanding Fractions and Equivalence
5. Operations on Fractions and Relationship to Decimals
6. Geometry
7. Measurement and Data

LEVEL F

1. Foundations
2. Whole Numbers and Decimals
3. Operations with Whole Numbers and Decimals
4. Fractions
5. Algebraic Reasoning
6. Data Analysis
7. Geometry and Measurement

LEVEL G

1. Foundations
2. Rational Numbers Part A
3. Rational Numbers Part B
4. Expressions, Equations, and Inequalities
5. Proportional Thinking
6. Geometry
7. Data

LEVEL H

1. Foundations
2. Rational Numbers Part A
3. Rational Numbers Part B
4. Expressions, Equations, and Inequalities
5. Proportionality
6. Geometry
7. Data, Probability, and Statistics

LEVEL I

1. Foundations
2. Real Numbers
3. Equations
4. Functions Part A
5. Functions Part B
6. Transforming Geometry
7. Geometry

Visit www.voyagersopris.com/vmath
for complimentary samples

Vmath breaks it down for kids who are having difficulty with math. I have seen the growth. It is a great program that definitely motivates the kids. I really appreciate *Vmath* and what it has brought to my class and the fact that it has helped so many of my kids do much better in math.

—Giovanni Amorante, *Vmath* Teacher
Country Club Middle School, Miami, FL

4 TYPES OF LESSONS

Engage Students, Scaffold Content, and Focus on Math Concepts



VMATH LESSONS (see page 10)

- Four-step lessons: Get Started, Try It Together, Work on Your Own, Check Up
- Explicit instruction that reinforces skills, concepts, or problem solving
- 40–45 minutes (with implementation options for 20–30 minutes)

MATH FLASH LESSONS (see page 12)

- Reinforce concepts and skills most frequently tested
- 20-minute lessons



HANDS-ON LESSONS (see page 13)

- Four-step lessons: Get Ready, Discover, Discover Box, Explore More
- Develop deeper conceptual understanding through the use of common manipulatives
- 40–45 minutes; included in Levels D–I

GIZMOS LESSONS (see page 14)

- Four-step lessons: Get Ready, Discover, Discover Box, Explore More
- Reinforce conceptual understanding with online digital manipulatives and interactive simulations
- Infuse fun, easy-to-navigate activities for diverse learners



VMATH LESSONS PROVIDE A CONSISTENT CLASSROOM ROUTINE

Focus on Academic Vocabulary

Review and Model

Teachers review prerequisite skills and model new skills

Emphasis on Conceptual Development

Lesson 7
CCSS Objective: 4.NF.A.1

Objective
To write an equivalent fraction

Academic Vocabulary
Before the lesson, introduce and discuss the Academic Vocabulary. Refer to the Academic Vocabulary as needed during the lesson.

- equivalent fractions** fractions that represent or name the same number

GET STARTED

Model the following skills for students.

REVIEW PRESKILLS

Problem 1
The rectangle in problem 1 is divided into equal parts. How many parts are shaded orange? (4) What fractional part of the rectangle is shaded orange? ($\frac{4}{8}$) Write the fraction using words by writing the numerator in words, writing a hyphen, then writing the denominator as an ordinal number. How is the fraction written using words? (four-eighths)

NEW SKILLS

Look at the picture in problem 2. What fractional part of the rectangle is shaded orange? ($\frac{8}{16}$) Look at the rectangle in problem 1 that is shaded orange and compare it with the part of the rectangle in problem 2 that is shaded orange. What can be said about the shaded parts of the rectangles? (They represent the same amount.) What fractions are fractions that represent the same part of a whole. The fractions $\frac{4}{8}$ and $\frac{8}{16}$ are equivalent fractions.

Problem 3
Look at the picture in problem 3. What fractional part of the rectangle is shaded orange? ($\frac{8}{24}$) Look at the parts of the rectangles in problems 1 and 2 that are shaded orange and compare them with the part of the rectangle in problem 3 that is shaded orange. What can be said about the fractional parts? (They represent the same amount.) The fractions $\frac{4}{8}$ and $\frac{8}{16}$ and $\frac{8}{24}$ are all equivalent; they name the same number.

Another way to show that $\frac{2}{4}$ is equivalent to $\frac{4}{8}$ is to use division. Start with the fraction $\frac{4}{8}$. Divide both the numerator and denominator by the number 2. What is 4 divided by 2? (2) What is 8 divided by 2? (4) So, $\frac{4}{8}$ is equivalent to $\frac{2}{4}$.

Lesson 7
Lesson 7

TRY IT TOGETHER

Write an equivalent fraction for each fraction.

1. $\frac{10}{12} = \frac{5}{6}$ $\frac{20}{24}$

2. $\frac{6}{9} = \frac{2}{3}$ $\frac{12}{18}$

3. $\frac{4}{10} = \frac{2}{5}$ $\frac{8}{20}$

4. $\frac{3}{4} = \frac{6}{8}$ $\frac{9}{12}$

WORK ON YOUR OWN

Using Symbols
 $\frac{2}{3} = \frac{2 \times 4}{3 \times 4} = \frac{8}{12}$

Using Words
Multiply both the numerator and denominator of the given fraction by the same number.

HOW TO
 $\frac{2}{3} = \frac{2 \div 2}{3 \div 2} = \frac{1}{1.5}$
Divide both the numerator and denominator of the given fraction by the same number.

Problem 4
In this problem, a fraction equivalent to $\frac{7}{9}$ will be found. The denominator of $\frac{7}{9}$ is 9. The denominator in the equivalent fraction is 36. The equivalent fraction has a denominator that is greater than 9. Multiplication was used to find the denominator of the equivalent fraction. Nine times what number equals 36? (4) The same operation must be applied to the numerator of the fraction $\frac{7}{9}$ to get the equivalent fraction. What is 7 times 4? (28) The fraction $\frac{28}{36}$ is equivalent to $\frac{7}{9}$.

BUILD THE CONCEPT
Model how to use a picture to write equivalent fractions.
How much of Barry's pizza is left? ($\frac{1}{4}$) How many equal parts is Wayne's pizza cut in to? (8) Shade an amount of Wayne's pizza that is equal to the amount of Barry's pizza that is left. How many sections of Wayne's pizza are shaded? (2) How much of Wayne's pizza is left? ($\frac{2}{8}$) The fractions $\frac{1}{4}$ and $\frac{2}{8}$ are equivalent

Consistent Application of Skills

Students apply learning to answer skill-building and problem-solving questions

Carefully Crafted Teacher Dialogue

Online Math Practice Builds Fluency
VmathLive engages students with online learning and math games

Daily Informal Assessments
Allow teachers to check for understanding and intervene with targeted corrective feedback

Error Analysis—If/Then Support
Helps teachers provide corrective feedback, review, and reteach

Lesson 7

WORK ON YOUR OWN

MONITOR INDEPENDENT WORK
Before students begin independent work, review the **HOW TO** process example. As you review, emphasize the words of mathematics by having students read aloud the words shown at the right for each process step.

Problems 9–21
Have students work independently. Check work and have students total the number correct and record results. Instruct students to record a 6 if they got 12 or 13 correct, a 5 for 11 correct, a 4 for 10 correct, a 3 for 8 or 9 correct, a 2 for 7 correct, and a 1 for 6 correct. Use Additional Resources as needed.

Problem 19 Reminder
First, write a fraction with the number of people who prefer pink lemonade as the numerator and the total number of people surveyed as the denominator. Then review how to find equivalent fractions by dividing the numerator and denominator by the same number.

SKILL BUILDING: NEW AND REVIEW
Write an equivalent fraction for each fraction.

PROBLEM-SOLVING: NEW AND REVIEW
Solve each problem.

CHECK UP

ASSESS INFORMALLY
Error Analysis
Check work and record results. Use the error analysis to determine which skills need review, reteaching, or extra practice.

If student answered problems 1 or 2 incorrectly: Remind the student that the numerator and denominator of the original fraction must be either multiplied by the same number or divided by the same number to obtain an equivalent fraction. Use Additional Resources in E.4.7 to reteach how to find equivalent fractions.

If student answered problem 3 incorrectly: While students work together, review the steps for writing equivalent fractions with the student. Then have the student identify how the fractions $\frac{4}{5}$, $\frac{80}{100}$, and $\frac{24}{30}$ were obtained from $\frac{4}{5}$.

Lesson 7

DIFFERENTIATION

Additional Resources
VmathLive
Module: Understanding Fractions and Equivalence
Activity: Equivalent Fractions
Vmath Reteach
Reteach Student Book page XX
Reteach Teacher Edition page XX
Extra Practice
Student Book page XX

English Language Learners
Use the Vmath Interactive Glossary to review the term *equivalent fractions*. Integrate the vocabulary at the beginning of the lesson. Have students gather around the computer screen through a projection system if possible.

Have students work with a partner to name synonyms for *equivalent*. Possible answers include *equal to*, *the same as*, *identical*. Write several fractions on the board. Have pairs work together to find at least one equivalent fraction for each fraction on the board.

Students with Special Needs
When solving word problems involving equivalent fractions, students may find it helpful to draw models of the fractions given in the problem. A common error that occurs when drawing these models is using unequal whole models. Emphasize to students how important it is to draw the models so that they are the same size and the same shape. If they are not, the shaded fractions may show an incorrect answer.

EXPLAIN IT
As you review the Explain It problem together, understand that the correct answer is only part of the solution. Appropriate math vocabulary, a logical method for solving the problem, and the justification of a reasonable answer complete the student response. Explain It problem answers can be used as part of a daily math journal.

Technology
Have students practice math fluency while competing against one another online in VmathLive activities.

Lesson 7 • Equivalent Fractions 195

Module 4 • Understanding Fractions and Equivalence

Peer Collaboration

Built-in Differentiation

Explain It
Builds students' ability to reason and communicate their mathematical thinking

MATH FLASH LESSONS REINFORCE CONCEPTS AND SKILLS MOST FREQUENTLY TESTED

MATHflash

Lesson 1

Objective

To use a protractor to measure angles and to find missing measures of angles

Model the following skills for students.

Look at the angle Elise is measuring. Angle $\angle RST$ is shown on a protractor. What type of angle is $\angle RST$?

(acute angle) Is the measure of an acute angle

greater than or less than the measure of a right angle? (less than)

A protractor has two scales, an inner scale and an outer scale. Both scales go from 0° to 180° in opposite directions. Look at the ray SR . Between what two numbers is it pointing on the inner scale? (70 and 80) Between what two numbers is it pointing on the outer scale? (100 and 110) Because $\angle RST$ is an acute angle, use the inner scale. Count the tick marks from 70. How many tick marks is it to where ray SR is pointing? (4) What is the measure of $\angle RST$? (74°)

Work with students to complete the following skills.

You can find the measure of an unknown angle using given angles. Look at the diagram. You know the measure of $\angle RST$ and the measure of a right angle. What is the measure of $\angle RST$? (74°) What is the measure of a right angle? (90°)

To find the measure of the unknown angle, first write an equation. Which two angles equal the measure of a right angle? ($\angle RST$ and the unknown angle) So, to find the measure of the unknown angle, use the equation $74^\circ + ? = 90^\circ$. Solve by using the opposite operation, subtraction. What is the measure of the unknown angle? (16°)

Rigorous Content
Content reflects new standards

Explicit Instruction

CCSS Objectives: 4.MD.C.5a; 4.MD.C.5b; 4.MD.C.6; 4.MD.C.7

MATHflash

Lesson 1

Measuring Angles and Finding Unknown Angles

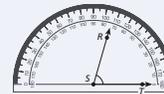
Name _____ Class _____ Date _____

Elise is using a protractor to measure $\angle RST$.

$\angle RST$ is an acute angle.

Use the inner scale to find the measure of $\angle RST$.

The measure of $\angle RST$ is 74° .



Use the following steps to find the measure of an unknown angle.

1. Write an equation using the given angles.

$$74^\circ + ? = 90^\circ$$

2. Subtract to find the unknown angle.

$$90^\circ - 74^\circ = 16^\circ$$

The measure of the unknown angle is 16° .



Find the measure of each angle.

1. $\angle JKL$ 125°

2. $\angle ABC$ 36°



Find the measure of each unknown angle.

3. $\angle FGE$ 52°

4. $\angle PQR$ 25°



Multiple Question Types

Questions reinforce the concepts and skills needed for success

HANDS-ON LESSONS DEVELOP DEEPER CONCEPTUAL UNDERSTANDING THROUGH USE OF COMMON MANIPULATIVES

Background Information for Teachers

Getting Students Ready to Learn
Teachers review prerequisite skills before modeling new concepts



Lesson 8

CCSS Objective: 4.NF.A.1

Lesson 8

Objective
To use fraction strips to find the simplest form of a fraction

Materials

- Copy Master: Fraction Strips on Teacher page XX
- scissors
- envelopes or small plastic bags

Lesson Notes

Before beginning the lesson, be sure each student has a Student Book, a pair of scissors, a copy of Copy Master: Fraction Strips, and an envelope or small plastic bag.

This conceptual lesson is designed to give students a visual method of understanding the meaning of simplest form of a fraction. When using fraction strips, remind students that the denominator of the fraction tells the total number of parts and the numerator tells how many parts to use.

Remind students that when the entire fraction strip is used, it is called a fraction strip. When just one or a few parts of the entire fraction strip are used, each separate piece is called a fraction bar.

Have students use scissors to cut apart the fraction strips on their copy of Copy Master: Fraction Strips. Have students save the fraction strips in an envelope or small plastic bag.

GET READY

1.  and 

DISCOVER

1. 

fraction: $\frac{6}{8}$

equivalent fractions: $\frac{3}{4}$ and $\frac{3}{2}$

The simplest form of $\frac{6}{8}$ is $\frac{3}{4}$

Problem 2
In problem 2, the rectangles are the same size. The first rectangle is divided into how many equal parts? (9) How many parts are shaded? (6) What fractional part of the rectangle is shaded? ($\frac{6}{9}$) The second rectangle is divided into 3 parts instead of 9 parts. What part of the rectangle is shaded? ($\frac{2}{3}$) What do you notice about the amount of shading on these? (It is the same.) The fractions $\frac{6}{9}$ and $\frac{2}{3}$ are equivalent fractions.

Problem 3
What fraction is modeled by the fraction bars in problem 3? ($\frac{6}{8}$) To use fraction bars to find another fraction that is equivalent to $\frac{6}{8}$, place the fraction bars in the space below $\frac{6}{8}$. Be sure to line up the left fraction bars. Can you find a fraction equivalent to $\frac{6}{8}$ using $\frac{1}{2}$ -fraction bars? (no) Why not? (One $\frac{1}{2}$ -fraction bar is too short, and two $\frac{1}{2}$ -fraction bars are too long.) Can you find a fraction equivalent to $\frac{6}{8}$ using $\frac{1}{3}$ -fraction bars? (no) Why not? (Two $\frac{1}{3}$ -fraction bars are too short, and three $\frac{1}{3}$ -fraction bars are too long.) Try other bars to see if you can find an exact fit. (Give students time to rearrange the fraction bars.) What bars can you use?

Students Discover Key Math Concepts

As students use manipulatives to discover key math concepts, teachers guide student learning through the use of effective questioning strategies



Lesson 8

Lesson 8

Problem 5
Look at problem 5. Along the edge of your desk, model the fraction $\frac{6}{10}$. Can you find a fraction equivalent to $\frac{6}{10}$ using $\frac{1}{2}$ -fraction bars? (no) Why not? (One $\frac{1}{2}$ -fraction bar is too short, and two $\frac{1}{2}$ -fraction bars are too long.) Can you use $\frac{1}{4}$ -fraction bars? (no) Why not? (One $\frac{1}{4}$ -fraction bar is too short, and two $\frac{1}{4}$ -fraction bars are too long.) Can you use $\frac{1}{3}$ -fraction bars? (no) Why not? (Two $\frac{1}{3}$ -fraction bars are too short, and three $\frac{1}{3}$ -fraction bars are too long.) Can you use $\frac{1}{6}$ -fraction bars? (yes) Why? (Three $\frac{1}{6}$ -fraction bars are equivalent to $\frac{6}{10}$.) Do you have any other fraction bars that could use? (no) What is the equivalent fraction $\frac{6}{10}$ written in simplest form? ($\frac{3}{5}$)

DISCOVER BOX

Can you model a fraction using $\frac{1}{2}$ -fraction bars that is equivalent to $\frac{6}{10}$? (no) Can you model a fraction using $\frac{1}{3}$ -fraction bars that is equivalent to $\frac{6}{10}$? (no) How many $\frac{1}{2}$ -fraction bars do you need? (2) Can you use $\frac{1}{3}$ -fraction bars? (no) Can you use $\frac{1}{4}$ -fraction bars? (no) How many $\frac{1}{4}$ -fraction bars do you need? (3) Can you use $\frac{1}{6}$ -fraction bars? (yes) How many $\frac{1}{6}$ -fraction bars do you need? (4) Can you use $\frac{1}{8}$ -fraction bars? (yes) How many $\frac{1}{8}$ -fraction bars do you need? (5) Can you use $\frac{1}{10}$ -fraction bars? (yes) How many $\frac{1}{10}$ -fraction bars do you need? (6) What is true about $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{4}{5}$, and $\frac{5}{6}$? (They are equivalent fractions.) Why is $\frac{1}{2}$ the simplest form? (The model of the fraction that uses the fewest fraction bars represents the simplest form.)

EXPLORE MORE

Use fraction strips to find the simplest form of each fraction.

1. $\frac{4}{8}$ 2. $\frac{2}{4}$ 3. $\frac{1}{4}$

4. $\frac{6}{8}$ 5. $\frac{4}{6}$ 6. $\frac{10}{10}$

Problem 4
Look at problem 4. Along the edge of your desk, model the fraction $\frac{8}{12}$. To use fraction bars to find another fraction that is equivalent to $\frac{8}{12}$, find another set of fraction bars that is exactly the same length. Then carefully place them below the $\frac{8}{12}$ modeled on your desk. Can you find a fraction equivalent to $\frac{8}{12}$ using $\frac{1}{2}$ -fraction bars? (no) Why not? (One $\frac{1}{2}$ -fraction bar is too short, and two $\frac{1}{2}$ -fraction bars are too long.) Can you find a fraction equivalent to $\frac{8}{12}$ using $\frac{1}{3}$ -fraction bars? (yes) Why? (Two $\frac{1}{3}$ -fraction bars are an

Students Reason, Write, and Justify
Asks students to explain what they have observed, apply critical-thinking skills, and use deductive reasoning

Students Explore on Their Own
Students apply their learning to solve additional problems independently

GIZMOS LESSONS REINFORCE CONCEPTUAL UNDERSTANDING WITH ONLINE DIGITAL MANIPULATIVES AND INTERACTIVE SIMULATIONS

Making Connections

Students work independently using the Gizmos to solve problems by applying concepts they have discovered

Engaging Content

Supporting Teachers as They Teach
Specific step-by-step instructions take the guesswork out of how Gizmos work

Review Prerequisite Skills
Teachers and students review prerequisite skills needed to discover concepts

Lesson 12

Objective
To model division with remainders

Materials
• Gizmo: No Alien Left Behind (Division with Remainders)

Gizmos Log In Instructions

- Log in to www.voyagersopris.com using your Username and Password provided in VPORT™.
- Select the Gizmos poster.
- Click on the No Alien Left Behind (Division with Remainders) Gizmo link.

Lesson Notes

Before beginning the lesson, be sure students have their Student Books and are ready to work at the computers.

Students will need to log in to the No Alien Left Behind (Division with Remainders) Gizmo to complete problem 1.

Students can type the number of aliens and the bus size directly into each box and press Enter rather than using the sliders to record the numbers. Note that the aliens can also be dragged into place, either in line or back to the school.

The Recall button moves the buses back in place at the depot.

If students have additional time, have them answer Assessment Questions 1–5 in the Gizmo. They can click on the Check Your Answers button to see how well they did on the assessment.

GET READY

Problem 1
Have students log in to the No Alien Left Behind (Division with Remainders) Gizmo using the instructions in the box. Orient them to the Gizmo by reading aloud the description:
The alien school children from the planet Zigma travel to distant planets on a field trip. The goal is to select bus sizes so that all buses are full and no aliens are left behind. This is a nice illustration of division with remainders.

In the lower left, click Show: As division to check the box. Use the green slider to set the number of alien children to 12. Slide the knob to show 12 in the display box.

Use the yellow slider to set the bus size to 4. Slide the knob to show 4 in the display box.

To complete the division sentence, drag buses to the lined up alien children. When the bus is in place, the children will enter and fill the bus. Continue until all the alien children are on buses. How many buses does it take to carry all the alien children? (3 buses) What is 12 divided by 4? (3)

Lesson 12

DISCOVER

Problem 3
Click Recall. Set the number of aliens to 17. Set the bus size to 4. Drag buses to load the alien children. Complete the diagram.
There are 17 aliens. $17 \div 4 = 4 \text{ R}1$. There are 4 groups. 1 alien remains.
Each bus holds a group of 4 aliens.

DISCOVER BOX

You have 24 aliens. Which of the following bus sizes could you use so that no alien would be left behind? Explain how you decided.
Bus size: 2 Bus size: 3 Bus size: 4 Bus size: 5
Bus size: 6 Bus size: 7 Bus size: 8 Bus size: 9
Bus size: 10 Bus size: 11 Bus size: 12
2, 3, 4, 6, 8, and 12. Possible answer: I used the Gizmo and tried each division problem. These bus sizes had no remainders.

EXPLORE MORE

Use the Gizmo to model each division problem. Then fill in the statements below the problem.

20 \div 6 = 3 R2 There are 20 aliens. Each bus holds a group of 6 aliens. There are 3 groups. 2 aliens remain.

19 \div 9 = 2 R1 There are 19 aliens. Each bus holds a group of 9 aliens. There are 2 groups. 1 alien remains.

Lesson 12 • Gizmo: No Alien Left Behind (Division with Remainders)

DISCOVER

Use the green slider to set the number of alien children to 23. Use the yellow slider to set the bus size to 5. Drag buses to the alien children. How many buses of that size are needed so no alien child is left behind? (9) Write the division sentence that represents the situation. $23 \div 5 = 4 \text{ R}3$

DISCOVER BOX

Look at problems 2–4, which you have completed. Think about when there were no aliens left behind. You have 24 aliens. Use the Gizmo to determine which of the following bus sizes could be used so that no alien would be left behind. Which bus sizes work? (2, 3, 4, 6, 8, 12)

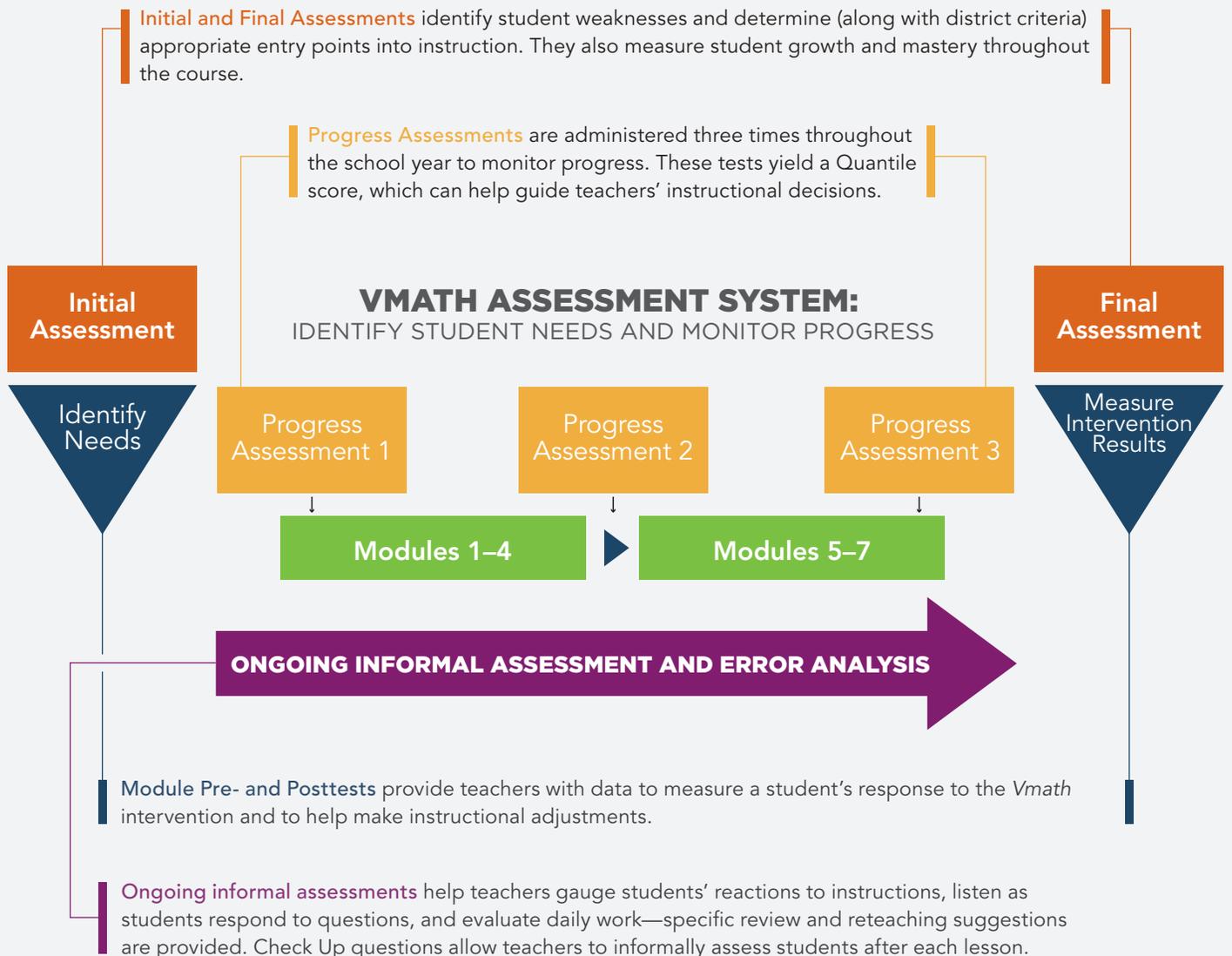
EXPLORE MORE

Problems 5 and 6
Have students work independently. Remind students that the dividend, or the first number in the division sentence, is the number of aliens, and that the second number, or the divisor, is the number of aliens that fit on each bus.

POWERFUL ASSESSMENT INFORMS INSTRUCTION

The *Vmath* assessments help teachers identify student needs, differentiate instruction to accelerate learning, and monitor progress to ensure mastery.

The *Vmath* assessment system evaluates student learning and monitors progress throughout the intervention:



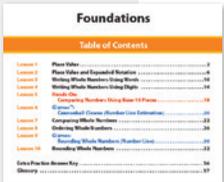
Vmath was easy to implement. The materials were self-contained and ready to go. I loved the pre- and posttests because they enabled me to see what the children knew or didn't know.

—Bernice Friesenhahn, Compensatory Education Teacher
Olympia Elementary School, Universal City, TX

DIFFERENTIATION INFORMED BY DATA

Responding to Data

Vmath has built-in opportunities to ensure instruction meets specific student needs based on performance data.

	ASSESSMENT	IF...	THEN...	RESOURCES
ENTERING THE CURRICULUM	Initial Assessment	Students score below 60%	They would benefit from the Foundations Module at the beginning of each level	Foundations Module 
	BEGINNING OF EACH MODULE	Pretest	Students score above 70%	They are ready for the lessons in the module
Students score below 70%			They would benefit from additional skill acquisition in the Preskills Lessons	Preskills Lessons 
WITHIN EACH MODULE	Lesson Check Ups or Planned Differentiation Days	Students do not demonstrate understanding of lesson content	They would benefit from Extra Practice, Reteach Lessons, or <i>VmathLive</i>	Extra Practice Activity  <i>VmathLive</i> 
		AFTER EACH MODULE	Post-Test	Students score above 70%
Students score below 70%	They would benefit from Reteach or <i>VmathLive</i> assignments			Reteach Lessons <i>VmathLive</i>  

“Since using *Vmath* with the *VmathLive* component, we have seen a huge difference in our students from last year to this year. This year’s sixth graders are so much further ahead.”

—Claudia Askew, Special Education Teacher
Russellville Middle School, Russellville, AL

Integrated Support for Students with Special Needs

To enhance instruction for students with special needs, lesson-specific teaching strategies are included in the Teacher Editions. The teaching strategies for students with special needs provide teachers with adaptations to meet the learning challenges of these students.

Example

In this example, the teacher is reminded to reinforce the vocabulary being used in the lesson and to provide a visual model.

Students with Special Needs

Have students draw a number line for reference that shows -10 to 10 , labeling the left arrow with the words *Lesser*, *Less than*, and *Least*, all of which begin with the letter *L*. This will be a visual cue for students to remember that numbers farther to the left on a number line are less than numbers toward the right.

Integrated Support for English Language Learners

To enhance instruction for English language learners, lesson-specific teaching strategies are included in the Teacher Editions. ELL strategies suggest detailed activities that focus on increasing student understanding of the language of mathematics.

English Language Learners

Use the VmathLive Animated Math Dictionary to review the terms *less than symbol* and *greater than symbol*. Demonstrate the vocabulary at the beginning of the lesson as students gather around the computer screen or through a projection system if possible.

To distinguish between the less than symbol, $<$, and the greater than symbol, $>$, show students that the less than symbol looks like a tilted 4 and the greater than symbol looks like a tilted 7 and that 4 is less than 7.

When working comparison problems, have students say the math sentences aloud, reinforcing the names for the symbols.

Example

In this example, the teacher is reminded of ways to build practice opportunities with mathematical language used in the lesson.



PACING GUIDE FOR MODULES PROVIDES FLEXIBILITY

The pacing models below reflect the implementation flexibility offered by *Vmath*. The lessons are designed for 45-minute sessions (recommended) or 20–30 minutes as a flexible option. The implementation plans designate time for differentiation and assessment.

45-Minute Implementation*

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Activity	+	Lessons 1–5					Lessons 6–10					D	+	

Example based on students scoring above 70 percent on Module Pretest

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Activity	+	Preskills Lesson 1 & 2		Lessons 1–5					Lessons 6–10					D	+	

Example based on students scoring below 70 percent on Module Pretest

20–30-Minute Implementation*

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Activity	+	Lessons 1–5									D	Lessons 6–10									+

Example based on students scoring above 70 percent on Module Pretest

KEY + = Pre- and Posttest D = Differentiation

* All models are approximations.

PACING AT THE LESSON LEVEL

Each of the different lessons included within *Vmath* has a predictable lesson structure and can be adjusted to a 20–30-minute implementation or a 45-minute implementation. They can also be adjusted to fit multiple scheduling options. The following charts outline some pacing suggestions at the lesson level based on various implementation models.

20–30-Minute Implementation

Vmath Lesson—2-Day Lesson Cycle

Day One	
Lesson Structure	
Get Started	6–8 minutes
Try It Together	6–12 minutes
Work On Your Own	8–10 minutes
Day Two	
Lesson Structure	
Get Started	2–3 minutes
Work On Your Own	6–10 minutes
Check Up	12–17 minutes

Math Flash Lessons (Levels D–I)

Taught entirely in one 20–30 minute block

Hands-on and *Gizmos* Lessons (Levels D–I)

Day One	
Lesson Structure	
Get Ready	5–10 minutes
Discover	15–20 minutes
Day Two	
Lesson Structure	
Get Ready and Discover Box	3–4 minutes
Discover Box	6–12 minutes
Explore More	11–14 minutes

45-Minute Implementation

Vmath Lessons—1 Per Day

Lesson Structure	
Get Started	5 minutes
Try It Together	10 minutes
Work On Your Own	15 minutes
Check Up	15 minutes

Lesson Structure (Levels D–I)	
Math Flash	20–30 minutes
<i>Vmath</i> Live or Reteach	15–20 minutes

Hands-on and *Gizmos* Lessons (Levels D–I)

Lesson Structure	
Get Ready	5 minutes
Discover	15 minutes
Discover Box	10 minutes
Explore More	15 minutes

Each level in *Vmath* contains:

- 6 core modules
- 1 Foundational Module; used when students score below 70 percent on Initial Assessment

Each module contains

- 10 or 15 lessons
- 2 Preskills Lessons; used if students score below 70 percent on the module Pretest
- Built-in assessment and differentiation

**IMPLEMENTATION
SPECIALISTS WORK
WITH DISTRICTS TO
DEVELOP CUSTOM
IMPLEMENTATION PLANS**

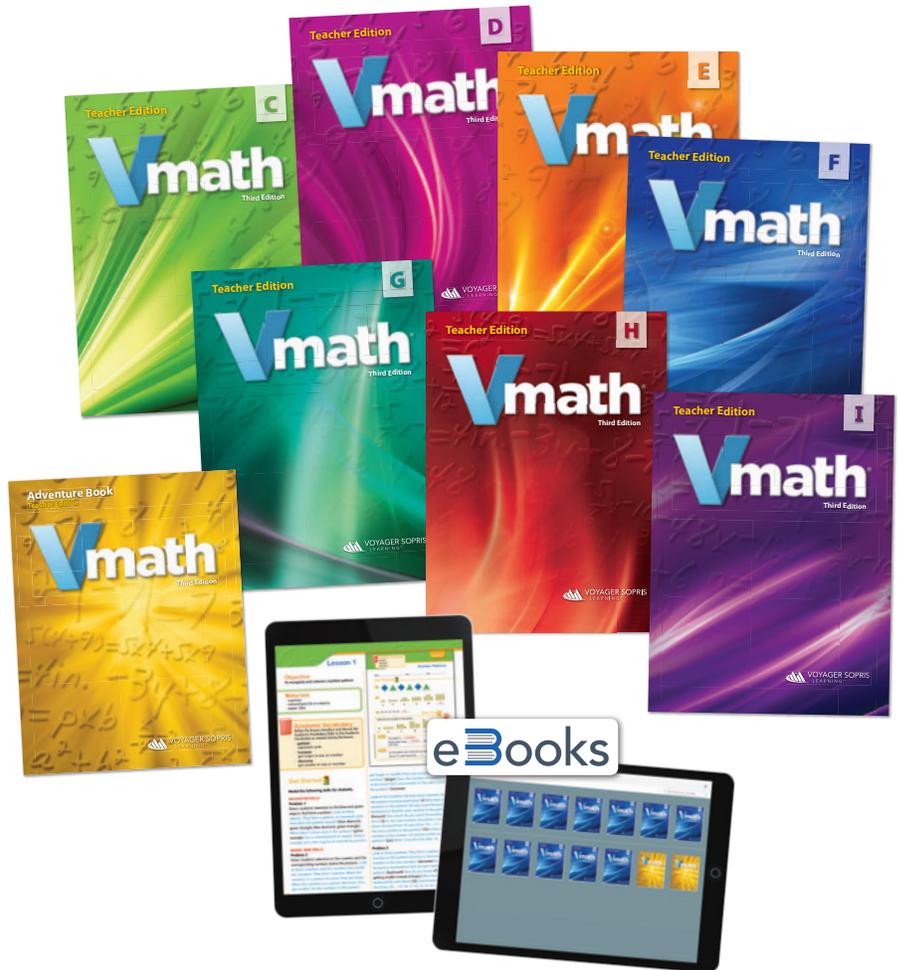
STREAMLINED TEACHER MATERIALS

Teacher Edition—includes all modules

Teacher Edition eBook

Assessment Guide eBook

Vmath Teacher Center



TEACHER CENTER Everything in One Place

Access
to eBooks

Access to online
learning tools



Interactive
whiteboard activities

Access to assessment
and reporting tools

ENGAGING STUDENT MATERIALS

Student Math Pack—7 modules

- Student Math Pack eBook
- Reteach eBook
- Adventure eBook

Vmath Student Center—includes:

- VmathLive
- Gizmos
- Vmath Testing Center



STUDENT CENTER

Easy to Navigate

Access to assessments

Access to eBooks

Access to online learning support

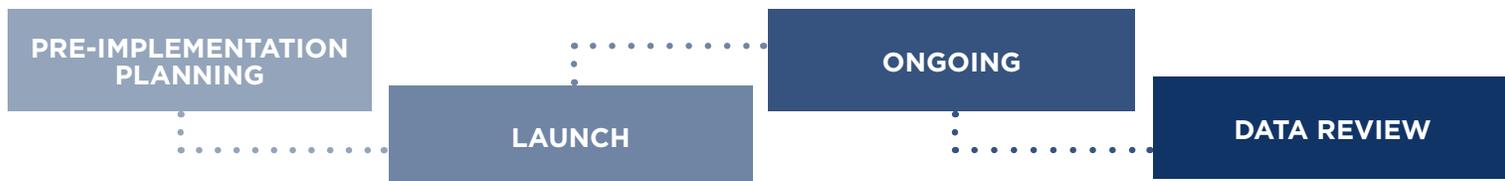


OUR GOAL: PROVIDE THE HIGHEST LEVEL OF EDUCATOR SUPPORT TO INCREASE STUDENT ACHIEVEMENT

Service does not come in a box; it must be custom-built to meet the specific needs of districts, schools, administrators, and teachers. Firmly grounded in research, the Voyager Sopris Learning approach is built around the “Five Keys to Success,” which form the foundation for a personalized strategy for planning, training, and ongoing support.



Our team specializes in partnering with schools and districts to build custom *Vmath* implementation support plans—including planning, training, and ongoing support—to ensure all stakeholders are prepared to implement and sustain *Vmath* implementation. **Key stages of *Vmath* implementation include:**



Visit www.voyagersopris.com/vmath to review training options and a comprehensive menu of services.

INSTRUCTIONAL PRINCIPLES SUPPORTED BY RESEARCH

Vmath uses widely accepted principles of effective intervention instruction for struggling students and provides a balance of conceptual understanding, fluency, and problem solving.

Vmath Instructional Principles

- Explicit Instruction
- Visual Models
- Conceptual Understanding
- Problem Solving
- Procedural Skill and Fluency
- Error Analysis
- Use of Assessments

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SUPPORT STUDENTS IN REACHING RIGOROUS MATHEMATICS STANDARDS

Visit www.voyagersopris.com/vmath to access:

- Complimentary samples
- Video tour of technology components
- CCSS and state-specific standards correlations
- Flexible implementation options



Implement digitally, with print components,
or with a combination of print and digital.

