



# FOUNDATIONS for Algebra

S A M P L E R

BUILDING THE FOUNDATIONS FOR ALGEBRA SUCCESS

## Moving with Math® Foundations for Algebra Series

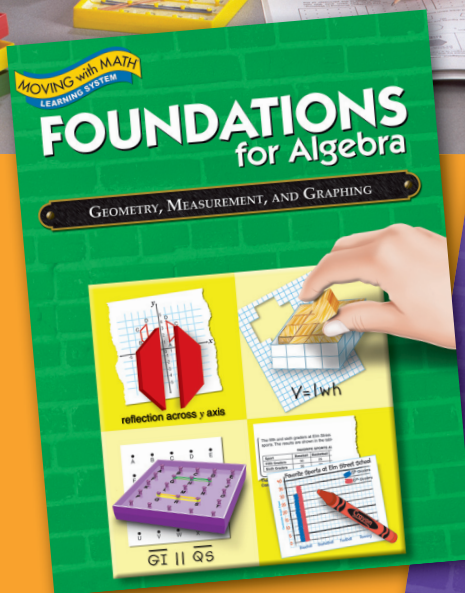
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## Foundations for Algebra Level IM (Grades 5–6)

- ▶ Number, Reasoning, & Data 26
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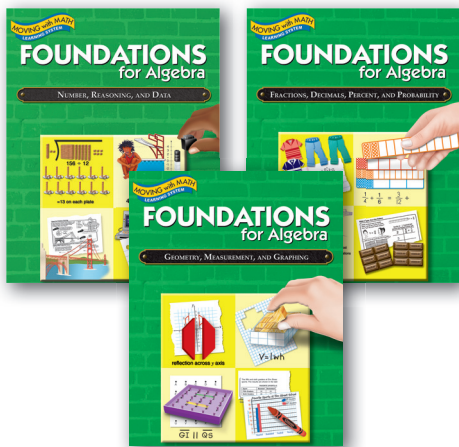


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## Foundations for Algebra Overview of Topics

### Moving with Math Foundations for Algebra Level IM1, IM2, IM3



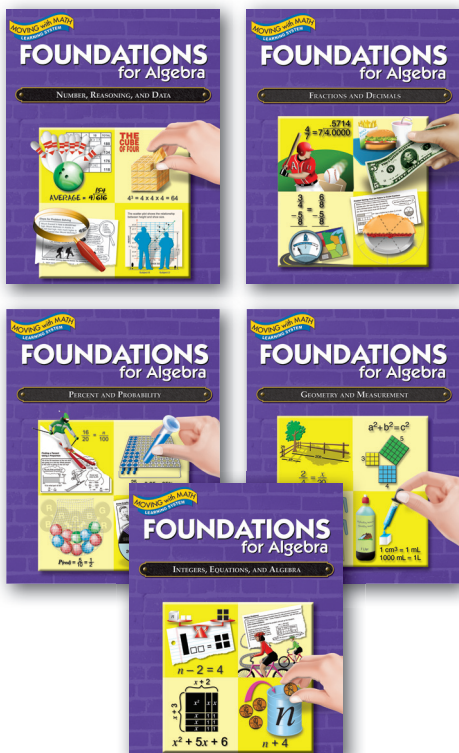
*Moving with Math® Foundations for Algebra* is a topic-focused, standards-based curriculum designed to build critical math concepts in three important ways: **(1)** by employing a **standards-based assessment and learning system**, **(2)** by using **conceptually based instruction**, and **(3)** by delivering **proven results** using **research-based** instructional strategies.

The set of books within a level provide **100% correlation to CCSS**.

#### Foundations for Algebra IM: for Grades 5 and 6

- ✓ *Foundations for Algebra IM1 Number, Reasoning, & Data:*
  - ▶ place value, order, and compare
  - ▶ factors, prime numbers, and averages
- ✓ *Foundations for Algebra IM2 Fractions, Decimals, Percent, & Probability:*
  - ▶ fractions, decimals, and percents
  - ▶ ratios and proportions
- ✓ *Foundations for Algebra IM3 Geometry, Measurement, & Graphing:*
  - ▶ lines, angles, polygons, and solids
  - ▶ metric and customary measurement, perimeter, area, and volume
  - ▶ tables and graphs

### Moving with Math Foundations for Algebra Level MH1, MH2, MH3, MH4, MH5



#### Foundations for Algebra MH: for Grades 7 and 8+

- ✓ *Foundations for Algebra MH1 Number, Reasoning, & Data:*
  - ▶ number properties, prime and composite
  - ▶ scientific notation, graphs, and solving equations
  - ▶ mean, median, and mode
- ✓ *Foundations for Algebra MH2 Fractions & Decimals:*
  - ▶ fractions and operations, decimals and operations
  - ▶ ratio and proportions
- ✓ *Foundations for Algebra MH3 Percent & Probability:*
  - ▶ relating fractions, decimals, and percent
  - ▶ ratios and proportions using percent
  - ▶ word problems, probability of simple and compound events
- ✓ *Foundations for Algebra MH4 Geometry & Measurement:*
  - ▶ geometric shapes, angles, and Pythagorean Theorem
  - ▶ perimeter, area, volume, measurement conversions
  - ▶ nets/surface area, tangent
- ✓ *Foundations for Algebra MH5 Integers, Equations, & Algebra:*
  - ▶ absolute value, coordinate points
  - ▶ solving and graphing 1- and 2-step equations and inequalities
  - ▶ graphing linear and quadratic equations, slope, operations with monomials

## Organization of Materials

*Moving with Math® Foundations for Algebra* is available in class sets for 20 to 30 students. Pick a combination set of all topics or a book on a specific topic(s). Student manipulatives and overhead manipulatives are sold separately. Spanish Resource Packs in all levels provide matching pages in Spanish (reproducible).

### Teacher Manual

#### Foreword

- ▶ Correlations to Objectives
- ▶ Pacing Plan Calendar
- ▶ Read to Me Activities

#### Lesson Plans Section

- ▶ Concrete–Representational–Abstract (C–R–A) methodology for every lesson
  - Lightly scripted, manipulative-based lesson plans
  - Instructions for transitioning to Representational and Abstract stages
- ▶ Follow-up activities: games and suggested *Skill Builders* for reteaching
- ▶ Thumbnails of student pages (with answers)
- ▶ Ongoing assessments

#### Assessment Section (black-line reproducibles)

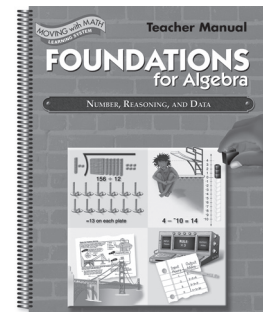
- ▶ Formative Pre-Tests and Summative Post-Tests for each topic
- ▶ Student Progress Report and Class Record Sheet with objectives
- ▶ Daily Reviews and weekly Check Points
- ▶ Answer keys

#### Masters and Skill Builders Section (black-line reproducibles)

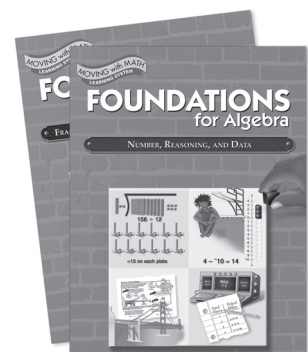
- ▶ Masters for lesson activities including a Student Math Glossary
- ▶ *Skill Builders* pages matched to standards for reteaching and extra practice
- ▶ Answer keys to *Skill Builders* pages
- ▶ Glossary with definitions

### Student Activity Book

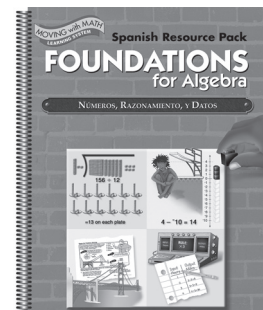
- ▶ 80 student activity pages for each topic book
- ▶ Pictorial representations of manipulative activities connected to practice
- ▶ Informal assessments: Journal Prompts, Sum It Ups, and Test Preps
- ▶ End of Book Review
- ▶ Progress monitoring using 22 Daily Reviews and 5 weekly Check Points
- ▶ Daily Review Record Sheet with assigned *Skill Builders* recommended for reteaching (found on inside back cover of student book)
  
- ▶ Classroom manipulative kits and overhead manipulative kits—essential components of the curriculum. *Sold separately.*



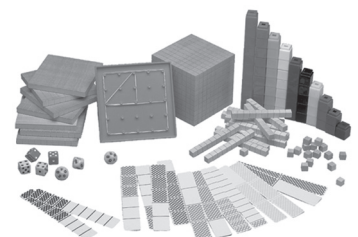
Teacher Manual



Student Activity Books



Spanish Resource Pack



Manipulative Kit

# Formative Assessment for Differentiated Instruction

Moving with Math® Foundations for Algebra incorporates a Learning Management System that links objectives/standards to assessment and instruction throughout the learning process. Formative assessment with periodic monitoring help teachers differentiate instruction, manage small-group learning, and effectively align classroom instruction to student needs and district goals.

**Standards-based assessment, alignment, and learning to differentiate instruction.**

### Correlation to Objectives

Use this table to match objectives to pages in the Lesson Plans, Student Book and Skill Builders.

Objective # and Description	Lesson Plan/ Student Book Pages	Skill Builders
IM-1 Identify the place value in a 7- to 12-digit number; include writing a whole number in expanded notation. Write standard numerals as Roman numerals and vice versa.	2-5	1-1, 1-2, 1-3, 1-4, 1-5
IM-2 Read, write, order and compare numbers < 12 digits	6-8	2-1, 2-2, 2-3, 2-4
IM-3 Round large numbers to the nearest thousand or to the indicated place value.	9-12	2-1, 2-2, 2-3, 2-4
IM-4 Identify prime numbers and the factors of composite numbers up to 100. Express a whole number as a	13-18	4-1, 4-2, 4-3, 4-4, 4-5, 4-6
IM-7 Subtract numbers up to 6 digits including regrouping across zero. Identify terms: difference, minuend, subtrahend. Check subtraction by addition. Select operation or strategy to estimate, solve and justify the solution to a word problem.	25-26	7-1, 7-2
IM-8 Multiply a 2-, 3- or 4-digit number by a 1-, 2- or 3-digit number. Identify terms: product, factors. Multiply by powers of ten and multiples of 10 and 100.	31-38	9-1, 9-2, 9-3, 9-4, 9-5, 9-6, 9-7
IM-9 Divide a 5-digit number by a 1-digit number. Identify terms: quotient, dividend, divisor and the three symbols for division. Solve multiplication and division as opposites.	39-43	9-1, 9-2, 9-3, 9-4, 9-5

**Math Content Standards**  
Math content standards matched to instructional pages.

### Number, Reasoning and Data Pre-Test

Name: \_\_\_\_\_ Score: \_\_\_\_\_

1. What digit is in the ten millions place in the number 257,314,699? (Obj. 1)

A 1 B 5 C 7 D 9

2. Tiger Woods won \$14,750,800 playing golf from 1996 to 2000. Which of the following shows this number written in words? (Obj. 2)

A Fourteen billion, seven hundred eighty thousand

3. Which of the following shows seven million, three hundred sixty-five thousand as a numeral? (Obj. 2)

A 736,500  
B 7,300,965  
C 7,365,000  
D 7,300,965,000

4. Which set shows the weights ordered from lightest to heaviest? (Obj. 2)

A 7520 7614 6942 7652  
B 6942 7520 7614 7652  
C 7614 7520 6942 7652  
D 6942 7520 7652 7614

**Predictive Screening**  
Test questions matched to objectives.

**Every problem on each test matches an objective. For example, problems 1 and 2 match objective 1.**

### Student Progress Report

Name: \_\_\_\_\_

Record results from the pre- and post-test here to see strengths and weaknesses on test questions assigned to the objectives for this level.

Objective # and Description	Score
IM-1 Identify the place value in a 7- to 12-digit number; include writing a whole number in expanded notation. Write standard numerals as Roman numerals and vice versa.	2/5
IM-2 Read, write, order and compare numbers < 12 digits	3/8
IM-3 Round large numbers to the nearest thousand or to the indicated place value.	4/12
IM-4 Identify prime numbers and the factors of composite numbers up to 100. Express a whole number as a	5/18
IM-7 Subtract numbers up to 6 digits including regrouping across zero. Identify terms: difference, minuend, subtrahend. Check subtraction by addition. Select operation or strategy to estimate, solve and justify the solution to a word problem.	6/26
IM-8 Multiply a 2-, 3- or 4-digit number by a 1-, 2- or 3-digit number. Identify terms: product, factors. Multiply by powers of ten and multiples of 10 and 100.	7/38
IM-9 Divide a 5-digit number by a 1-digit number. Identify terms: quotient, dividend, divisor and the three symbols for division. Solve multiplication and division as opposites.	8/43

**Assessment & Monitoring**  
Individualized Education Plan for each student.

### IM1 Class Record Sheet

Teacher: Miss B. Apple

If answer is correct, leave the space empty. Put an X on missed objectives. Fill in the last column labeled "Ab."

Student Name:	(Obj. 1)	(Obj. 1)	(Obj. 2)	(Obj. 2)	(Obj. 3)	(Obj. 3)	(Obj. 4)	(Obj. 4)	(Obj. 4)	(Obj. 4)	(Obj. 5)	(Obj. 5)	(Obj. 6)	(Obj. 6)	(Obj. 6)	(Obj. 7)	(Obj. 7)	(Obj. 8)	(Obj. 8)	(Obj. 9)	(Obj. 9)	(Obj. 10)	(Obj. 10)	(Obj. 11)	(Obj. 11)	(Obj. 12)	(Obj. 12)	(Obj. 13)	(Obj. 13)	(Obj. 14)	(Obj. 14)	No. correct out of 40	% correct	Ab.
1. Sabrina A. Pre-Post	X	X	X						X	X																					33/40	83		
2. Maddox C. Pre-Post								X	X	X	X	X	X	X	X																19/40	48		
3. Gabe D. Pre-Post	X		X	X		X									X	X	X	X	X	X	X	X								19/40	48			
4. Theresa G. Pre-Post									X	X	X							X	X	X	X	X								27/40	68			
5. Naomi H. Pre-Post	X	X	X	X																									X	14/40	35			
6. Juan H. Pre-Post	X	X		X	X			X									X	X	X	X	X	X	X	X	X	X	X	X		17/40	43			
7. Benjamin J. Pre-Post							X				X	X	X									X	X	X	X					25/40	63			
8. Carter L. Pre-Post			X				X	X	X	X										X	X	X	X							24/40	60			
9. Hayley M. Pre-Post	X		X	X	X				X																		X	X		31/40	78			
10. David M. Pre-Post	X	X	X				X							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		17/40	43			
11. Omar O. Pre-Post								X	X	X				X	X		X	X	X	X	X	X							X	27/40	68			
12. Rachel R. Pre-Post								X	X					X	X	X	X	X	X	X	X	X								24/40	60			
13. Abner R. Pre-Post	X		X					X	X	X	X												X	X	X	X	X	X		21/40	54			

**Class Record Sheet**  
The Class Record Sheet keeps it all together. Results by topic and by objective allow teachers to focus on specific content areas. See pages 11-13 for further explanation.

# Progress Monitoring with Reviews for Reteaching

**Identify Missed Objectives**  
Daily review record sheets (in back of the student book) provide continuous tracking of each student's progress. Reteaching pages are suggested.

Name \_\_\_\_\_

**Daily Review**

- The temperature at noon was  $15^\circ$  above zero. By midnight, the temperature had dropped  $20^\circ$ . What was the temperature at midnight? \_\_\_\_\_ (Obj. 59)
- Complete the sentence.  
 $-3 + \square = 0$  \_\_\_\_\_ (Obj. 59)
- Find the sum.  
  
\_\_\_\_\_ (Obj. 59)
- Write the number sentence shown on the number line.  
  
\_\_\_\_\_ (Obj. 59)
- Write the equation for the words in the box.  

a number plus 9 is 16

  
\_\_\_\_\_ (Obj. 56)

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**96**      **Review 26**

**Daily Reviews**  
Questions on the Daily Reviews identify unmastered skills.

**IM1 Daily Reviews**  
Record the results from your Daily Reviews here. "Obj." shows which objective.

Review 1	Review 2	Review 3	Review 4	Review 5	Review 6	Review 7	Review 8	Review 9	Review 10	Review 11	Review 12	Review 13	Review 14	Review 15	Review 16	Review 17	Review 18	Review 19	Review 20	Review 21	Review 22	Review 23	Review 24	Review 25	Review 26	Review 27	
Obj. 6 (SB 6-1)	Obj. 7 (SB 7-1)	Obj. 7 (SB 7-1)	Obj. 1 (SB 1-2)	Obj. 1 (SB 1-2)	Obj. 2 (SB 2-1)	Obj. 4 (SB 4-3)	Obj. 4 (SB 4-4)	Obj. 4 (SB 4-4)	Obj. 4 (SB 4-4)	Obj. 2 (SB 2-1)	Obj. 4 (SB 4-3)	Obj. 4 (SB 4-4)	Obj. 4 (SB 4-4)	Obj. 4 (SB 4-4)	Obj. 6 (SB 6-2)	Obj. 9 (SB 9-2)	Obj. 9 (SB 9-2)	Obj. 9 (SB 9-2)	Obj. 9 (SB 9-2)	Obj. 9 (SB 9-2)	Obj. 8 (SB 8-5)	Obj. 45 (SB 45-3)	Obj. 46 (SB 46-5)	Obj. 46 (SB 46-5)	Obj. 45 (SB 45-2)	Obj. 59 (SB 59-2)	Obj. 45 (SB 45-1)
Obj. 7 (SB 7-1)	Obj. 8 (SB 8-1)	Obj. 8 (SB 8-2)	Obj. 1 (SB 1-2)	Obj. 1 (SB 1-2)	Obj. 3 (SB 3-2)	Obj. 4 (SB 4-2)	Obj. 4 (SB 4-5)	Obj. 5 (SB 5-1)	Obj. 5 (SB 5-1)	Obj. 3 (SB 3-2)	Obj. 4 (SB 4-2)	Obj. 4 (SB 4-5)	Obj. 4 (SB 4-5)	Obj. 4 (SB 4-5)	Obj. 49 (SB 49-1)	Obj. 45 (SB 45-1)	Obj. 8 (SB 8-2)	Obj. 8 (SB 8-4)	Obj. 8 (SB 8-4)	Obj. 8 (SB 8-4)	Obj. 8 (SB 8-4)	Obj. 45 (SB 45-4)	Obj. 46 (SB 46-2)	Obj. 46 (SB 46-2)	Obj. 45 (SB 45-2)	Obj. 45 (SB 45-2)	Obj. 45 (SB 45-1)
Obj. 8 (SB 8-2)	Obj. 1 (SB 1-1)	Obj. 1 (SB 1-2)	Obj. 2 (SB 2-1)	Obj. 2 (SB 2-3)	Obj. 4 (SB 4-2)	Obj. 4 (SB 4-4)	Obj. 5 (SB 5-1)	Obj. 5 (SB 5-4)	Obj. 5 (SB 5-4)	Obj. 4 (SB 4-2)	Obj. 4 (SB 4-4)	Obj. 5 (SB 5-1)	Obj. 5 (SB 5-2)	Obj. 4 (SB 4-2)	Obj. 49 (SB 49-1)	Obj. 45 (SB 45-1)	Obj. 8 (SB 8-2)	Obj. 8 (SB 8-4)	Obj. 8 (SB 8-4)	Obj. 8 (SB 8-4)	Obj. 45 (SB 45-1)	Obj. 46 (SB 46-2)	Obj. 46 (SB 46-2)	Obj. 45 (SB 45-2)	Obj. 45 (SB 45-2)	Obj. 45 (SB 45-1)	Obj. 45 (SB 45-1)
Obj. 7 (SB 7-1)	Obj. 1 (SB 1-2)	Obj. 1 (SB 1-5)	Obj. 2 (SB 2-3)	Obj. 2 (SB 2-3)	Obj. 4 (SB 4-2)	Obj. 4 (SB 4-4)	Obj. 5 (SB 5-2)	Obj. 5 (SB 5-4)	Obj. 5 (SB 5-4)	Obj. 4 (SB 4-2)	Obj. 4 (SB 4-4)	Obj. 5 (SB 5-2)	Obj. 5 (SB 5-2)	Obj. 4 (SB 4-2)	Obj. 49 (SB 49-1)	Obj. 45 (SB 45-1)	Obj. 8 (SB 8-2)	Obj. 8 (SB 8-4)	Obj. 8 (SB 8-4)	Obj. 8 (SB 8-4)	Obj. 45 (SB 45-2)	Obj. 46 (SB 46-3)	Obj. 46 (SB 46-3)	Obj. 45 (SB 45-3)	Obj. 45 (SB 45-3)	Obj. 45 (SB 45-3)	Obj. 45 (SB 45-3)
Obj. 9 (SB 9-1)	Obj. 1 (SB 1-4)	Obj. 1 (SB 1-2)	Obj. 2 (SB 2-4)	Obj. 2 (SB 2-4)	Obj. 4 (SB 4-6)	Obj. 4 (SB 4-5)	Obj. 5 (SB 5-3)	Obj. 5 (SB 5-3)	Obj. 5 (SB 5-3)	Obj. 4 (SB 4-6)	Obj. 4 (SB 4-5)	Obj. 5 (SB 5-3)	Obj. 5 (SB 5-3)	Obj. 4 (SB 4-6)	Obj. 49 (SB 49-1)	Obj. 8 (SB 8-1)	Obj. 8 (SB 8-4)	Obj. 8 (SB 8-2)	Obj. 8 (SB 8-2)	Obj. 8 (SB 8-2)	Obj. 45 (SB 45-2)	Obj. 46 (SB 46-4)	Obj. 46 (SB 46-4)	Obj. 45 (SB 45-2)	Obj. 45 (SB 45-2)	Obj. 45 (SB 45-2)	Obj. 45 (SB 45-2)
# Correct	# Correct	# Correct	# Correct	# Correct	# Correct	# Correct	# Correct	# Correct	# Correct	# Correct	# Correct	# Correct	# Correct	# Correct	# Correct	# Correct	# Correct	# Correct	# Correct	# Correct	# Correct	# Correct	# Correct	# Correct	# Correct	# Correct	

Record results of Daily Reviews by marking an "X" next to missed questions/objectives. Write the **total correct** for each Daily Review in the space provided. For practice related to missed objectives, use the designated *Skill Builders* practice page in the Skill Builder section of the Teacher Manual.

**Daily Review 26, problem 4 matches obj. 59 and Skill Builder 59-5.**

**Weekly Check Points monitor progress (See page 22).**

**Easy Reteaching**  
Students who miss problems on Daily Reviews may be directed to a reproducible Skill Builders page (shown at right) found in the Teacher Manual. Explanations at the top of the page help students recall what they have learned.

Name \_\_\_\_\_

### Adding Integers on a Number Line

Joey's remote-controlled submarine descended 9 feet below the water, then ascended 6 feet. Where is the submarine now?

$-9 + 6 =$  \_\_\_\_\_

You can use a number line to help add integers.

Remember, negative numbers move to the left and positive numbers move to the right. Start at zero. Draw an arrow to the first number, -9. Then move six places to the right for positive 6.

$-9 + 6 = -3$

The submarine is 3 ft. below water.

Show the sum on the number line.

- $-4 + 3 =$  \_\_\_\_\_
- $2 + 5 =$  \_\_\_\_\_

Write the number sentence shown on the number line.

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

Solve.

- Jill's uncle gained 2 pounds, then lost 4 pounds. What was his net gain or loss?
- Marcus withdrew \$5 from his savings account. Later he deposited \$8 into his savings account. What was his net gain or loss for the two transactions?

**Skill Builder 59-5**

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**Every reteaching page is matched to an objective. This is the fifth page (5) for reteaching Objective 59.**

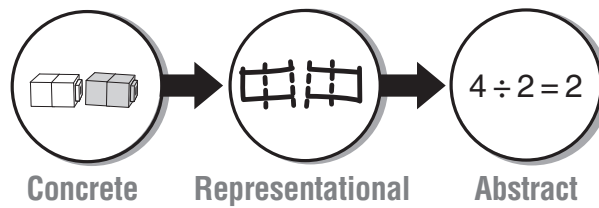
# Concrete-Representational-Abstract (C-R-A)

“We remember  
10% of what we hear,  
30% of what we see,  
and 90% of what  
we do.”

—Jean Piaget

Every *Moving with Math® Foundations for Algebra* lesson starts with a hands-on activity that provides a solid, concrete basis for understanding the math concept. Students develop conceptual understanding and acquire math vocabulary and skills through these **manipulative-based** activities and **problem-solving** situations. All activities are supported by **scripted lessons** that direct the exploration of each math concept and ensure that students move smoothly from concrete, hands-on activities to representational/visual, and then to increasingly abstract levels of problem solving.

## Three Stages of Learning



**Objective:** To add positive and negative integers.

**Materials:** Black and white cubes (or positive and negative integer squares, Master 17), a clear jar, playing cards

**Adding Positive and Negative Integers**

Write on the board:  
A football team lost 5 yards on the first play and gained 9 yards on the second play. What was the total gain or loss?

Have students use black and white cubes to solve the problem. Put 5 white cubes in a clear jar. Add 9 black cubes to the jar.

Pair the cubes out of the jar. **What is the value of a positive 1 and a negative 1?** (zero) Show the pairing of 5 white cubes with 5 black cubes, leaving 4 black cubes.

Write on the board:  
 $-5 + 9 = 4$

**Writing Word Problems**

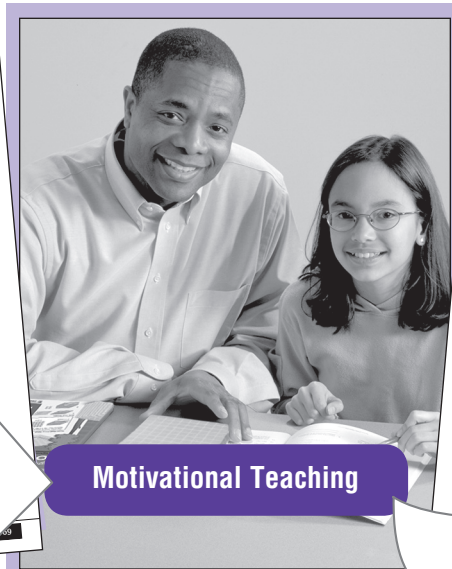
Give each student an index card. Have students select one of the problems 1-8 to write a related word problem. Encourage students to use examples from the real world and include problems with extra facts and hidden facts. After having a student share her word problem aloud, ask volunteers to underline the question and circle each fact. Ask a volunteer to explain and circle each fact.

**Greatest Sum of Integers**

Divide the class into groups of 4. Give each group a deck of playing cards. Each player will draw a card and add the value of the card to the sum. The player with the highest sum is the winner.

**Systematic Instruction**

Example:  
5   -7   -9   -2   -4  
sum = -9



**Motivational Teaching**

**Adding Positive and Negative Integers on a Number Line**

You can use models or a number line to add a positive integer and a negative integer.

A scuba diver descended 6 ft. below the water and then ascended 2 ft. Where is the diver?

$-6 + 2 =$  \_\_\_\_\_

$-2 + 2 = 0$

$-6 + 2 = -4$

**Write the integers. Count to find the sum.**

1.  $(-3) + 4 =$  \_\_\_\_\_

2.  $3 + (-2) =$  \_\_\_\_\_

3.  $(-4) + (-3) =$  \_\_\_\_\_

4.  $5 + (-1) =$  \_\_\_\_\_

**Show the sum on the number line.**

5.  $-3 + 2 =$  \_\_\_\_\_

6.  $-5 + 2 =$  \_\_\_\_\_

**Solve.**

9. A football team gained 3 yards on the first down and lost 5 yards on the second down. What was their net loss or gain after two downs?  
\_\_\_\_\_ yd.

10. A football team lost 5 yards on the first down, lost 3 yards on the second down and gained 8 yards on the third down. What was their net loss or gain after three downs?  
\_\_\_\_\_ yd.

**Visual Math Concepts**

# Problem Solving Success Related to use of Manipulatives

Research indicates that students taught with manipulatives score higher on achievement tests and are better able to transfer the conceptual understanding to problem solving. *Foundations for Algebra* provides explicit instruction for solving word problems by finding their common underlying structure. A firm grasp of the structures of a word problem, and the steps and strategies for problem solving, help students solve word problems. **ELL Tips** provide additional help with language-related issues.

Objective: To use the five-step problem-solving model to solve problems involving addition, subtraction, multiplication, and division.

Materials: Five Steps in Problem Solving (Master 10), Effective Questioning for Problem Solving (Master 20), Math Detective Cards (Master 19)

### Introductory Activities

#### Problem-Solving Steps

A problem-solving situation exists when the student is confronted with an unfamiliar problem for which no immediate path to the answer is apparent. Thus, for many students, solving word problems is problem solving.

Good problem solvers are risk-takers. It is important students understand that taking risks is necessary for learning to take place. Let students know that you expect errors and these errors are often necessary stepping stones to solutions. For this activity it will be helpful to have a copy of the Five Steps in Problem Solving (Master 10). Have students build a class chart as they work through the five problem-solving steps together.

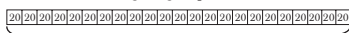
Write the following problem on the board: An intramural soccer league has 23 teams. Each team averages 20 players. How many players are in the soccer league?

Today, we are going to review the general problem-solving steps. What is the first thing you must do to solve this problem? (Read it.) Is it enough to just read the problem? (No, you must also understand it.) To check for understanding, have a volunteer read the problem out loud. Have the volunteer show she understands the problem by writing the problem in her own words.

What is the next step in solving this problem? (Find the question and needed facts.) Have a volunteer underline the question and circle the facts (23 teams; 20 students per team).

What is the next thing we must do to solve this problem? (Decide on a process to solve the problem.) What are some ideas or strategies we can use to help decide how to solve this problem?

Discuss the various strategies together, such as act it out, use a model, draw a picture, simplify the numbers, etc. Be sure to have students model the strategies as they are discussed. Students might draw a bar showing 23 groups of 20:



23 groups of 20

What process should we use to solve the problem? (multiplication) How do you know to use multiplication? (We are putting together groups of equal size.)

#### Steps for Problem Solving

1. Read.
2. Find facts.
3. Decide.
4. Estimate.
5. Solve.

San Francisco's Golden Gate Bridge is 1480 yards long. New York's George Washington Bridge is 3500 feet long. Which bridge is longer? How much longer?

To compare the numbers, you must use the same units of measurement.

1400 yd = 4200 ft

4200 ft > 3500 ft

The Golden Gate Bridge is 700 feet longer.

Read. Underline the question. Circle the needed facts. Complete the problem solving steps. Label the answer.

1. The Carter family (Carter) is going to Grandma's house. They don't have a car. How many hours will it take them to get there?
 

Est.	4	Actual	4 hours
------	---	--------	---------
2. Carl's friend earned \$15.00 per hour as a computer consultant. How much would she earn on a 20-hour project?
 

Est.	\$1400	Actual	\$1560
------	--------	--------	--------
3. The odometer in Cory's car reads 125 miles. The odometer read 120 miles when he bought the car. How many miles has he driven his car?
 

Est.	30,000	Actual	24,475 miles
------	--------	--------	--------------
4. The Bashirins pay \$100 rent each month. How much more do they pay in 12 months?
 

Est.	5000	Actual	\$633
------	------	--------	-------
5. Kim's sister earned \$142 last year.
6. Dwayne's family drove 78 miles on a road trip. How many miles did they drive?

### ELL Strategies

#### Using Sentence Frames:

ELL students often find that word problems are more approachable when rewritten in sentence frames.

#### Emergent Frame:

There are \_\_\_ children.  
\_\_\_ goes/go away.  
\_\_\_ is/are left.

### Five Steps in Problem Solving

- Step 1. Read and understand.
- Step 2. Find the question and needed facts.
- Step 3. Decide on a process.
- Step 4. Estimate.
- Step 5. Solve and check back.

### Problem-Solving Strategies

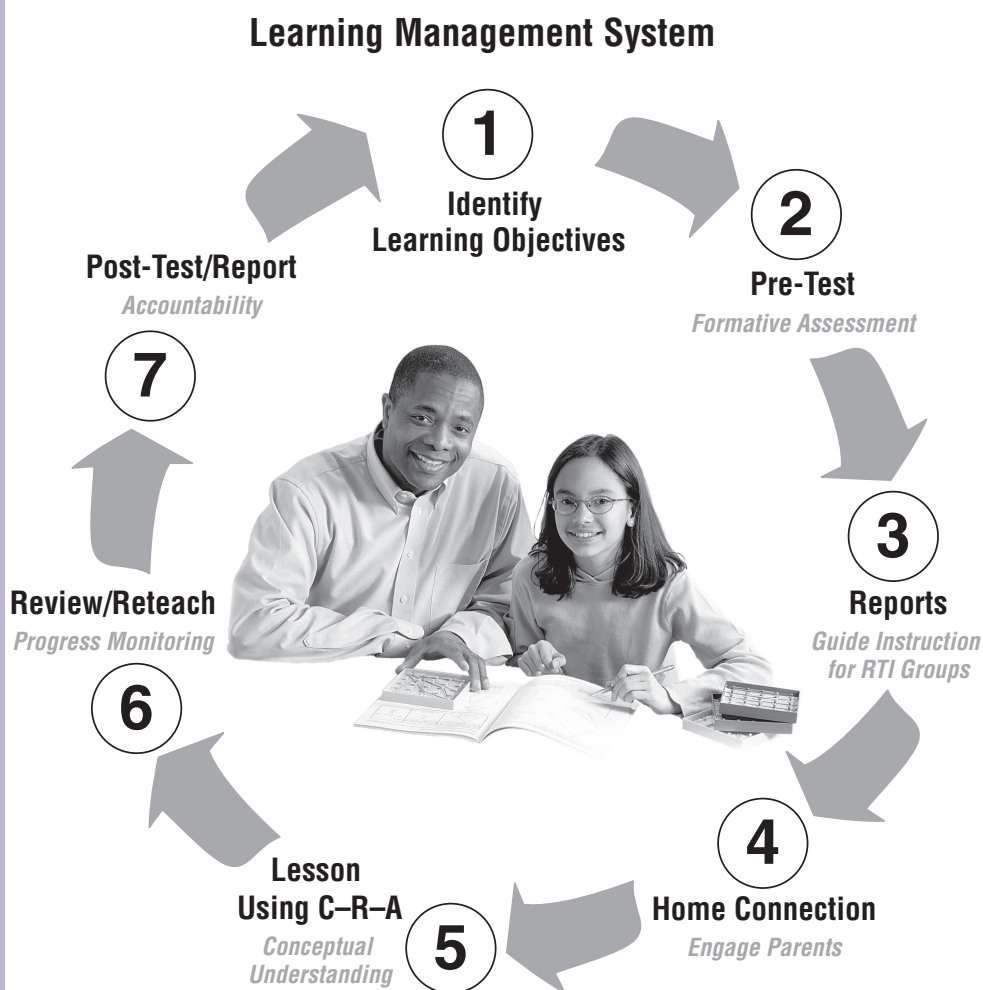
1. Act it out.
2. Use a model.
3. Draw a picture.
4. Simplify.
5. Make a table.
6. Guess and check.
7. Write a number sentence.

## The Moving with Math® Learning Management System

“All elements  
of the curriculum,  
instruction, materials,  
and assessment should  
be aligned to common  
learning goals.”

—Adding It Up: Helping  
Children Learn Mathematics,  
National Research Council,  
J. Kilpatrick, J. Swafford,  
and B. Findell

The components within the assessment and instruction of *Moving with Math Foundations for Algebra* are explicitly linked to national and state standards including CCSS, SOL, and TEKS. This linking keeps both teacher and student on task and simplifies the job of diagnosing, tracking, and reporting student progress. These assessment tools regularly monitor student progress and include embedded assessments providing informal monitoring.



Pages 9–25 will guide you through this well-organized curriculum. Start at **Step 1** and continue through **Step 7**. This integrated linkage ensures that students, teachers, parents, and administrators remain focused on shared goals and informed about student progress toward reaching them.



**100% Correlation to State and National Standards including CCSS and TEKS**

# Step 1

## Objectives

Learning objectives, matched to **state and national standards**, are the foundation for assessment and instruction. These tables simplify the job of targeting instruction and provide accountability to districts, parents, and students. The learning objectives shown below have been matched to instructional pages in *Moving with Math®* as well as to CCSS objectives.

Use this table to match objectives to pages in the Lesson Plans, Student Book and *Skill Builders*.

Obj	Objective Description	Lesson Plan/ Student Book Pages	Skill Builders
IM-11	Write common fractions from shaded regions, number lines, printed words and representations of a part of a set. Identify numerators, denominators.	2-5	11-1, 11-2, 11-3, 11-4, 11-5 11-6
IM-12	Find equivalent fractions in higher or lower terms. Find all the factors of a number and the greatest common factor (GCF) of two or more numbers. Write two numbers as ratios and solve for the missing term in two equivalent fractions.	6-9, 48	12-1, 12-2, 12-3, 12-4, 12-5 12-6, 12-7, 12-8, 12-9, 12-10
IM-13	Compare two like or unlike proper fractions. Order five like or unlike proper fractions and place them on a number line. Estimate fractions to the nearest whole number. Find the least common multiple (LCM) or lowest common denominator (LCD).	10, 11, 18, 24	13-1, 13-2, 13-3, 13-4, 13-5

Use this table to match CCSS objectives to pages in the Student Book and *Skill Builders*.

CCSS	Objective Description	IM1	IM2	IM3
5.NF	<b>NUMBER AND OPERATIONS: FRACTIONS</b>			
	<b>Use equivalent fractions as a strategy to add and subtract fractions.</b>			
5.NF.1	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. <i>For example, <math>2/3 + 5/4 = 8/12 + 15/12 = 23/12</math>. (In general, <math>a/b + c/d = (ad + bc)/bd</math>.)</i>		19–23 SB: 17-1 to 17-4, 18-1, 18-2	
5.NF.2	Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. <i>For example, recognize an incorrect result <math>2/5 + 1/2 = 3/7</math>, by observing that <math>3/7 &lt; 1/2</math>.</i>		26, 27 SB: 18-4	

### Objectives

**Learning Objectives** are linked to the Lesson Plans/Student Book and to reproducible *Skill Builders* that provide topic-specific practice and review.

### CCSS Objectives

Correlations to CCSS, TEKS, and other state objectives are included upon request.

# Step 2

## Assessment

### Pre-Test

**Pre-Tests** for each book in the *Moving with Math® Foundations for Algebra* series identify at-risk students and provide a baseline for gauging both student and class progress. This screening provides the basis for assessing intervention needs for RTI groups: individual student, small groups, and the whole class needs. Tests may be taken paper-pencil or web-based.

#### Pre-Test Screening

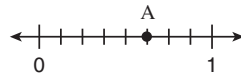
**Pre-Tests** covering each level are linked to **learning objectives**, so teachers can precisely identify the objectives that should be the focus of differentiated instruction (RTI).

Name \_\_\_\_\_

Score \_\_\_\_\_  
(50 possible)

#### Fractions, Decimals, Percent & Probability Pre-Test

1. What fraction is shown at Point A on the number line?



- A  $\frac{5}{8}$       C  $\frac{6}{8}$   
B  $\frac{1}{2}$       D  $\frac{6}{9}$

5. A hardware clerk is ordering nails by the length. Which nail is the shortest?



- A  $\frac{3}{4}$  inch      C  $\frac{7}{8}$  inch  
B  $\frac{1}{4}$  inch      D  $\frac{3}{8}$  inch

2. What fraction of these shapes are circles?



- A  $\frac{3}{7}$       C  $\frac{10}{3}$   
B  $\frac{7}{10}$       D  $\frac{3}{10}$

6. Which of the fractions below would be between  $\frac{1}{4}$  and  $\frac{1}{2}$  on a number line?

- A  $\frac{1}{8}$       C  $\frac{3}{4}$   
B  $\frac{5}{8}$       D  $\frac{3}{8}$

3. What number goes in the box?

$$\frac{3}{5} = \frac{\square}{15}$$

- A 3      C 9  
B 6      D 12

7. Angie bought  $4\frac{1}{3}$  yards of fabric. Which fraction is another name for  $4\frac{1}{3}$ ?

- A  $\frac{41}{3}$       C  $\frac{7}{3}$   
B  $\frac{12}{3}$       D  $\frac{13}{3}$

4. Ann ate  $\frac{6}{8}$  of a pizza. Which fraction is equivalent to  $\frac{6}{8}$ ?



- A  $\frac{1}{8}$       B  $\frac{2}{8}$       C  $\frac{1}{4}$       D  $\frac{3}{4}$

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## Student Progress Report

# Step 3a

## Assessment

The **Student Progress Report** provides a record of both **Pre-Test** screening results and **Post-Test** screening results. **Pre-Test** screening results identify the strengths and weaknesses of individual students. They may be used as a basis for directing differentiated instruction for an Individual Education Plan (IEP) and for communicating with family and home. **Post-Test** screening results measure student progress and identify the need for additional intervention. The **Student Progress Report** is especially helpful in addressing the needs of **Tier 3** students.

**IM2 Student Progress Report** Name \_\_\_\_\_

Record results from the Pre- and Post-Test here to see strengths and weaknesses on test questions aligned to the objectives for this level.

Test Item	CCSS of State Standard	Pre-Test	Post-Test	Objective # and Description
1.	3.NF.2a	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-11</b> Write common fractions from shaded regions, number lines, printed words and representations of a part of a set. Identify numerators, denominators.
2.	3.NF.1	<input type="checkbox"/>	<input type="checkbox"/>	
3.	4.NF.1	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-12</b> Find equivalent fractions in higher or lower terms. Find all the factors of a number and the greatest common factor (GCF) of two or more numbers. Write two numbers as ratios and solve for the missing term in two equivalent fractions.
4.	4.NF.1	<input type="checkbox"/>	<input type="checkbox"/>	
5.	4.NF.2	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-13</b> Compare two like or unlike proper fractions. Order five like or unlike proper fractions and place them on a number line. Estimate fractions to the nearest whole number. Find the least common multiple (LCM) or lowest common denominator (LCD).
6.	4.NF.2	<input type="checkbox"/>	<input type="checkbox"/>	
7.		<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-14</b> Identify mixed numbers and improper fractions. Interchange mixed numbers and improper fractions.
8.		<input type="checkbox"/>	<input type="checkbox"/>	
9.	4.NF.3a	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-15</b> Calculate and solve problems involving addition and subtraction of proper fractions with common denominators with renaming and/or regrouping.
10.	5.NF.2	<input type="checkbox"/>	<input type="checkbox"/>	
	5.NF.2	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-16</b> Calculate and solve problems involving addition and subtraction of mixed numbers with common denominators with regrouping and/or renaming.
		<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	and solve problems involving addition and subtraction of two unlike numbers with no renaming or simplifying.
		<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	and solve problems involving addition and subtraction of two unlike numbers with no renaming or simplifying. Estimate a sum or difference to whole number.
		<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	and solve problems involving multiplication of two proper fractions or a fraction by a whole number.
		<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	and solve problems involving division of proper fractions by proper whole numbers and mixed numbers. Write the reciprocal of a number.
		<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	Identify decimals from a model, picture or on a number line.
		<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	and write decimals through thousandths.
		<input type="checkbox"/>	<input type="checkbox"/>	
23.	5.NBT.3a	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-23</b> Identify place value in a decimal up to ten thousandths.
24.	5.NBT.3a	<input type="checkbox"/>	<input type="checkbox"/>	
25.	5.NBT.3a	<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/> <input type="checkbox"/> Subtotal <b>Correct</b> (out of 25 items, report continued on next page)

Assessment **1**

### Student Report

The **Student Progress Report** identifies a student's strengths and weaknesses by learning objective.

### Using Student Progress Report

The **Student Progress Report** can help answer questions like these:

1. Which are the student's weakest skills?
2. Are weak skills clustered in certain skill areas?
3. What should be the focus of differentiated instruction for this student?

# Step 3b

## Assessment

### Class Record Sheet/ Differentiated Instruction for RTI

The **Class Record Sheet** is tabulated by objective, so a teacher can identify class weaknesses for each learning objective/standard and form small groups of students missing the same objective. At a glance, teachers can easily group students for various RTI levels of differentiated instruction.

#### Class Record Sheet

- The **Class Record Sheet** allows the teacher to identify at-risk students, group students for differentiated instruction, and identify content objectives that need extra attention.

#### IM2 Class Record Sheet

Class: \_\_\_\_\_

Student Name:	CCSS Objectives	MTP Objectives																	
		11	12	13	14	15	16	1	18	1	14	15	16	17	13	14	15	16	17
1. Sabrina A.	Pre- Post-	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
2. Maddox C.	Pre- Post-							X	X	X	X	X	X	X	X	X	X	X	X
3. Gabe D.	Pre- Post-	X	X	X	X	X	X								X	X	X	X	X
4. Theresa G.	Pre- Post-									X	X	X	X	X	X	X	X	X	X
5. Naomi H.	Pre- Post-	X	X	X	X														
6. Juan H.	Pre- Post-	X	X	X	X					X									
7. Benjamin J.	Pre- Post-							X			X	X	X	X	X	X	X	X	X
8. Carter L.	Pre- Post-			X				X	X	X	X	X	X	X	X	X	X	X	X
9. Hayley M.	Pre- Post-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10. David M.	Pre- Post-	X	X	X			X								X	X	X	X	X
18.	Pre- Post-																		
19.	Pre- Post-																		
20.	Pre- Post-																		
	% of students with correct answers	Pre- 40	60	40	60	90	70	90	30	80	60	40	40	70	80	70	60	40	
	% of students with correct answers	Post-																	

#### Using Class Record Sheet

The Class Record Sheet can help answer questions like these:

1. Who are my three weakest students?
2. Who are my three strongest students?
3. Which learning objectives are least understood by my class?

**Tier 2:**  
Set up learning groups by missed objectives.



# Step 4

## Family Math Connections

### Connect to Home

The Student Progress Report (reproducible in the Teacher Manual) is designed to communicate the student's strengths and weaknesses to parents and guardians.

#### IM2 Student Progress Report

Name \_\_\_\_\_

Record results from the Pre- and Post-Test here to see strengths and weaknesses on test questions aligned to the objectives for this level.

Test Item	Pre-Test	Post-Test	Objective # and Description
1.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-11</b> Write common fractions from shaded regions, number lines, printed part of a set. Identify numerators, denominators.
2.	<input type="checkbox"/>	<input type="checkbox"/>	
3.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-12</b> Find equivalent fractions in higher or lower terms. Find all the fact common factor (GCF) of two or more numbers. Write two number missing term in two equivalent fractions.
4.	<input type="checkbox"/>	<input type="checkbox"/>	
5.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-13</b> Compare two like or unlike proper fractions. Order five like or u on a number line. Estimate fractions to the nearest whole num (LCM) or lowest common denominator (LCD).
6.	<input type="checkbox"/>	<input type="checkbox"/>	
7.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-14</b> Identify mixed numbers and improper fractions. Interchange
8.	<input type="checkbox"/>	<input type="checkbox"/>	
9.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-15</b> Calculate and solve problems involving addition and subtra denominators with renaming and/or regrouping.
10.	<input type="checkbox"/>	<input type="checkbox"/>	
11.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-16</b> Calculate and solve problems involving addition and subtr denominators with regrouping and/or renaming.
12.	<input type="checkbox"/>	<input type="checkbox"/>	
13.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-17</b> Calculate and solve problems involving addition and sub no renaming or simplifying.
14.	<input type="checkbox"/>	<input type="checkbox"/>	
15.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-18</b> Calculate and solve problems involving addition and s no renaming or simplifying. Estimate a sum or differ
16.	<input type="checkbox"/>	<input type="checkbox"/>	
17.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-19</b> Calculate and solve problems involving multiplication a whole number.
18.	<input type="checkbox"/>	<input type="checkbox"/>	
19.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-20</b> Calculate and solve problems involving division of numbers and mixed numbers. Write the reciproca
20.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-21</b> Write or identify decimals from a model, picture
21.	<input type="checkbox"/>	<input type="checkbox"/>	
22.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-22</b> Read and write decimals through thousandths.
23.	<input type="checkbox"/>	<input type="checkbox"/>	
24.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-23</b> Identify place value in a decimal up to ten th
25.	<input type="checkbox"/>	<input type="checkbox"/>	
26.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-24</b> Compare and order decimals up to hundre and decimals. Find the pattern for equivale
27.	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> Subtotal Correct (out of 25 items, repc			

#### IM2 Student Progress Report (cont.)

Name \_\_\_\_\_

Test Item	Pre-Test	Post-Test	Objective # and Description
28.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-25</b> Interchange fractions having denominators of 10 or 100 with decimals.
29.	<input type="checkbox"/>	<input type="checkbox"/>	
30.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-51</b> Round decimals to the nearest whole number, tenth or hundredth and money amounts to the nearest dollar.
31.	<input type="checkbox"/>	<input type="checkbox"/>	
32.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-26</b> Calculate and solve problems involving addition and subtraction of decimals and money amounts to the sums and differences to the nearest whole number. Give the value of a combination of coins and bills and make change for a \$20 bill.
33.	<input type="checkbox"/>	<input type="checkbox"/>	
34.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-27</b> Calculate and solve problems involving multiplication of 2-place decimals and money amounts by up to 2-place decimals. Includes multiplying decimals by 10, 100, 1000.
35.	<input type="checkbox"/>	<input type="checkbox"/>	
36.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-28</b> Calculate and solve problems involving division of 2-place decimals and money amounts by number or by 1-place decimals. Includes dividing decimals by 10, 100, 1000.
37.	<input type="checkbox"/>	<input type="checkbox"/>	
38.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-45</b> Use a five-step plan and strategies to estimate and solve two-step word problems with whole numbers, fractions and decimals. Justify the solution as reasonable. Choose the correct operation and write a number sentence to solve a word problem. Use estimation to verify the reasonableness of calculated results.
39.	<input type="checkbox"/>	<input type="checkbox"/>	
40.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-29</b> Identify the percent of a shaded region divided into 100 squares.
41.	<input type="checkbox"/>	<input type="checkbox"/>	
42.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-30</b> Interchange 2-place decimals and fractions having a denominator of 10 or 100 with whole number percents.
43.	<input type="checkbox"/>	<input type="checkbox"/>	
44.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-53</b> Calculate and solve problems involving finding percentages of quantities. Includes problems involving discounts, sales tax. Compare two numbers as a fraction and as a percent.
45.	<input type="checkbox"/>	<input type="checkbox"/>	
46.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-57</b> Represent probability of a simple, independent event in a word problem and express probability as ratios, decimals or percents. Determine the probability of a single event <u>not</u> occurring. Explain the difference between theoretical and experimental probability. Includes the probability of one OR another event occurring.
47.	<input type="checkbox"/>	<input type="checkbox"/>	
48.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-58</b> Represent all possible outcomes for compound events in an organized way, e.g., tree diagrams, tables. Express the theoretical probability of each outcome. Understand the difference between independent and dependent events. Identify and discuss the number of possible arrangements of several objects using a tree diagram or the counting principle.
49.	<input type="checkbox"/>	<input type="checkbox"/>	
50.	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-48</b> Read and interpret line graphs, bar graphs and circle graphs.
<input type="checkbox"/> <input type="checkbox"/> Total Number Correct (out of 50 items, includes number correct from previous page)			

The reproducible Skill Builders found within each of the *Foundations for Algebra* series provide many activities to encourage family members and guardians to support their student's math development and help their child discover a road to success. Over 150 Skill Builder pages in each book provide teachers with multiple opportunities for scaffolded and differentiated instruction according to student needs. Duplicate pages in Spanish are available in the Spanish Teachers Resource Pack.

English

Spanish

Name \_\_\_\_\_

### Adding Like Fractions and Simplifying to Lowest Terms

Kay has  $\frac{5}{12}$  pound of peanuts and  $\frac{1}{12}$  pound of almonds. How many pounds of peanuts and almonds in all?

Rule: (1) Write the sum of the top numbers over the bottom number. (2) Check the answer to be sure it is written in lowest terms.

$$\begin{array}{r} \frac{5}{12} \\ + \frac{1}{12} \\ \hline \frac{6}{12} \end{array}$$

5+1  
12 ← bottom number stays the same

Can you write an equivalent fraction with a smaller number?

$$\frac{6}{12} = \frac{1}{2}$$

6 ÷ 6  
12 ÷ 6

**Add. Simplify.**

1. $\frac{1}{8}$	2. $\frac{1}{6}$	3. $\frac{3}{12}$	4. $\frac{1}{10}$
$+ \frac{1}{6}$	$+ \frac{1}{6}$	$+ \frac{6}{12}$	$+ \frac{1}{10}$
5. $\frac{1}{6}$	6. $\frac{1}{4}$	7. $\frac{1}{8}$	8. $\frac{2}{6}$
$+ \frac{1}{6}$	$+ \frac{1}{4}$	$+ \frac{1}{8}$	$+ \frac{1}{6}$
9. $\frac{5}{8}$	10. $\frac{4}{4}$		
$+ \frac{1}{8}$			

Nombre \_\_\_\_\_

### Suma las Fracciones Similares y Simplifica a Términos Simplificados.

Kay tiene  $\frac{5}{12}$  libras de cacahuetes y  $\frac{1}{12}$  libra de almendras. ¿Cuántas libras de cacahuetes y almendras hay en total?

Regla: (1) Escribe la suma de los números superiores sobre el número inferior. (2) Verifica la respuesta para asegurarte que esté escrita en términos simplificados.

$$\begin{array}{r} \frac{5}{12} \\ + \frac{1}{12} \\ \hline \frac{6}{12} \end{array}$$

5+1  
12 ← El número inferior permanece igual

¿Puedes escribir una fracción equivalente con un número más pequeño?

$$\frac{6}{12} = \frac{1}{2}$$

6 ÷ 6  
12 ÷ 6

**Suma. Simplifica.**

1. $\frac{1}{8}$	2. $\frac{1}{6}$	3. $\frac{3}{12}$	4. $\frac{1}{10}$
$+ \frac{3}{8}$	$+ \frac{1}{6}$	$+ \frac{6}{12}$	$+ \frac{1}{10}$
5. $\frac{3}{6}$	6. $\frac{1}{4}$	7. $\frac{1}{8}$	8. $\frac{2}{6}$
$+ \frac{1}{6}$	$+ \frac{1}{4}$	$+ \frac{1}{8}$	$+ \frac{1}{6}$
9. $\frac{5}{8}$	10. $\frac{4}{10}$	11. $\frac{3}{10}$	12. $\frac{3}{10}$
$+ \frac{1}{8}$	$+ \frac{2}{10}$	$+ \frac{2}{10}$	$+ \frac{2}{5}$

13. Carlos compró 5 \_\_\_\_\_


Name \_\_\_\_\_


### Decimal Fractions: Hundredths from Models

There are 100 pennies in 1 dollar. One penny is  $\frac{1}{100}$  of a dollar. The value of a penny can be written: 1¢ or  $\frac{1}{100}$  or \$0.01

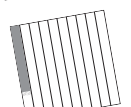
The large square is a whole or unit. It has been divided into 100 matching small squares. Each small square can be written:  $\frac{1}{100}$  or 0.01, "one hundredth"

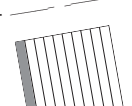
Write the value of the coins as a fractional part of a dollar and as a decimal.

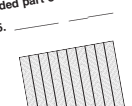
1.  \_\_\_\_\_

2.  \_\_\_\_\_


Write a proper fraction and a decimal fraction for the shaded part of each figure.

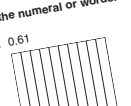
3.  \_\_\_\_\_


4.  \_\_\_\_\_

5.  \_\_\_\_\_

Shade fractions equivalent to the numeral or words.

6. 0.03  \_\_\_\_\_

7. 0.61  \_\_\_\_\_

8. nineteen-hundredths  \_\_\_\_\_

Skill Builders 21-3  
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Nombre \_\_\_\_\_


### Fracciones Decimales: Centésimos Usando Modelos.

Hay 100 pennies en 1 dólar. Un penny es  $\frac{1}{100}$  de un dólar. El valor de un penny se puede escribir: 1¢ ó  $\frac{1}{100}$  ó \$0.01

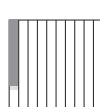
El cuadrado grande es un entero o unidad. Se ha dividido en 100 pequeños cuadrados coincidentes. Cada cuadrado pequeño se puede escribir:  $\frac{1}{100}$  ó 0.01, "un centésimo"

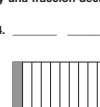
Escribe el valor de las monedas como una parte fraccionaria de un dólar y como un decimal.

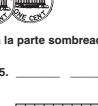
1.  \_\_\_\_\_

2.  \_\_\_\_\_

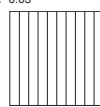
Escribe una fracción propia y una fracción decimal para la parte sombreada de cada figura.

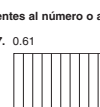
3.  \_\_\_\_\_

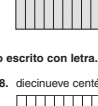
4.  \_\_\_\_\_

5.  \_\_\_\_\_

Sombrea fracciones equivalentes al número o al número escrito con letra.

6. 0.03  \_\_\_\_\_

7. 0.61  \_\_\_\_\_

8. diecinueve centésimos  \_\_\_\_\_

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# Step 5a

## Instruction

## Pacing Calendar

**Daily Reviews** are printed at the back of each Student Book.

**Instructional Support—Lesson Planning.** The pacing calendar directs the instruction for each lesson and reduces planning and prep time. Teachers simply turn to the Foreword of the Teacher Manual to find their lesson calendar, which contains a snapshot of each lesson. Each lesson may be taught in one or more hours, depending on the time available and the math abilities of the class.

### 30 Lesson Pacing Calendar (Lessons 1-5)

IM2	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5
<b>Warm-up</b>	<b>Review 1</b> (in the back of the Student Book)	<b>Review 2</b> (in the back of the Student Book)	<b>Review 3</b> (in the back of the Student Book)	<b>Review 4</b> (in the back of the Student Book)	<b>Check 1 Point</b> may be used as a quiz
<b>Lesson</b>	<p><b>Objective:</b> To introduce the concept of a fraction as a whole divided into parts of equal size. To name the fractional part of a set. To relate a fraction to a division problem. To show that fractional parts need not be congruent. To name fractions from fraction bars. To identify similarities and differences among fraction bars.</p> <p><b>Materials:</b> Clay, scored crackers, zippered bags, geoboards, overhead geoboard, Fraction Bars®, overhead Fraction Bars® (optional), Student Math Glossary (Master 15), Vocabulary Cards (Master 16)</p> <p><b>Lesson Plan pages:</b> 2-4</p>	<p><b>Fractions, Decimals, Percent and Probability Pre-Test:</b> See the Assessment Section of this Teacher Manual.</p> <p>Correct test with answers at end of Assessment Section and record results on Student Progress Report and Class Record Sheet.</p>	<p><b>Objective:</b> To name a fraction from a number line. To find all sets of equivalent fractions from a set of fraction bars. To identify and change a fraction to lowest terms. To use models to find the pattern for equivalent fractions.</p> <p><b>Materials:</b> Fraction Bars®, overhead Fraction Bars® (optional), chocolate bars scored into 12 pieces, crayons, interlocking cubes</p> <p><b>Lesson Plan pages:</b> 5-7</p>	<p><b>Objective:</b> To simplify a fraction to lowest terms using the greatest common factor. To write 2 numbers as a ratio. To find the missing term in a pair of equivalent fractions. To compare and order fractions with unlike denominators.</p> <p><b>Materials:</b> Interlocking cubes or squares cut from One-Inch Graph Paper (Master 2), candy bar of 12 pieces, Fraction Bars®, colored counters, chewy candy bar of 10 pieces, overhead Fraction Bars® (optional)</p> <p><b>Lesson Plan pages:</b> 8-10</p>	<p><b>Objective:</b> To compare and order fractions using the pattern for equivalent fractions. To identify fraction models as proper, improper or mixed numbers. To interchange mixed numbers and improper fractions.</p> <p><b>Materials:</b> Fraction Bars®, two pounds of butter in ¼-lb. sticks, apples or cardboard circles, Coins and Bills (Master 3), overhead bills and coins, 10-sided dice</p> <p><b>Lesson Plan pages:</b> 11-13</p>
<b>Math Practice</b>	Student Book pages: 2-4		Student Book pages: 5-7	Student Book pages: 8-10	Student Book pages: 11-13
<b>Extra Practice</b>	<b>Skill Builders</b> 11-1, 11-2, 11-3, 11-6 (Make copies from the <i>Skill Builders</i> section of this Teacher Manual)		<b>Skill Builders</b> 11-4 (Make copies from the <i>Skill Builders</i> section of this Teacher Manual)	<b>Skill Builders</b> 12-1, 12-2, 12-3, 12-4, 12-5, 12-6, 12-7, 12-8, 12-9, 12-10, 13-1, 13-2, 13-5 (Make copies from the <i>Skill Builders</i> section of this Teacher Manual)	<b>Skill Builders</b> 11-5, 14-1, 14-2 (Make copies from the <i>Skill Builders</i> section of this Teacher Manual)
<b>Games</b>	What's My Secret game, Lesson Plans p. 4		Concentration Equivalencies game, Lesson Plans p. 6	Fraction Bar Bingo game, Lesson Plans p. 8; Fraction Bar War, Lesson Plans p. 10	Roll the Greater Fraction game, Lesson Plans p. 11
<b>Journal Prompts</b>	Journal Prompt, Student Book p. 3				Journal Prompt, Student Book p. 12
<b>Test Preps</b>	Test Prep, Student Book p. 2		Test Prep, Student Book pp. 5 & 6	Test Prep, Student Book p. 8	Test Prep, Student Book p. 11
<b>Sum it Up!</b>			Sum it Up! Student Book p. 7	Sum it Up! Student Book p. 10	Sum it Up! Student Book p. 13

Each lesson lists the **objectives** taught, the **materials** needed, and the **lesson plan pages** used.

**Journal Prompts, Test Preps, and Sum It Ups!** encourage students to demonstrate their knowledge in a variety of ways and prepare students for Smarter Balanced and PARCC assessments.

**Games** at the end of the lesson make learning more fun, and help cement student understanding.



## Universal Access: Developing Math Vocabulary

# Step 5b

## Math Literacy

### Vocabulary

Practical math vocabulary reinforces the meaning of each math term and makes the meaning of the math concept more precise.

**Language and vocabulary development** are an important part of every lesson. Studies show the importance of learning math vocabulary to a student's future success in mathematics. Math vocabulary words highlighted in each lesson, vocabulary games, and completing a math glossary help students gain a working knowledge of terms and concepts to apply in problem solving. Students working in small groups develop oral language skills. Journal Prompts ask students to explain what they have learned by writing or drawing a picture. Sum It Ups ask students to summarize learning.

**Foundations for Algebra** enables all students to become successful, regardless of their academic background, English language proficiency, or special learning needs. Using true manipulatives within the C-R-A process is the most important strategy for improving success and closing the achievement gap.

**Scaffolding**, layering new learning on previously learned concepts, coupled with explicit instruction, modeling and explaining concepts, contribute to the achievement gains documented by independent studies. This scaffolding ensures that all instruction has been front-loaded with the prerequisite concepts needed for success with CCSS.

**English Language Learners.** Teachers using manipulatives convey the meaning of math words even if the teacher is unable to speak the student's native language. General strategies for ELL instruction as well as specific tips related to clarifying the meaning of words are included in the Foreword.

**Special Needs Students.** The Student Progress report makes it easy to implement individualized learning plans. The wide range of learning activities plus the portfolio of Skill Builder worksheets provide opportunities to differentiate instruction according to student needs.

#### My Fractions, Decimals, Percent and Probability Glossary

Write a definition or draw a picture for each word.

about (≈)	dependent events
arrangements	differences
certain event	discount
circle graph	dozen
combination	equivalent
common factor	equivalent decimals
compound events	equivalent fractions
congruent	estimate
decimal fraction	experimental probability
decimal place value names	factor

#### Mi Glosario de Fracciones, Decimales, Por Ciento y Probabilidad

Escribe una definición o haz un dibujo para cada palabra.

aproximadamente (≈)	eventos dependientes
disposiciones	diferencias
evento seguro	descuento
gráfica circular	docena
combinación	equivalente
factor común	decimales equivalentes
eventos compuestos	fracciones equivalentes
congruente	estimar/calcular
fracción decimal	probabilidad experimental
nombres del valor posicional de decimales	factor
denominador	fracción

Master 15a

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IM2 Masters 15

# Step 5c

## Instruction

## Lesson Plan

The **Lesson Plans** section of the Teacher Manual contains **everything the teacher needs to do and say for each lesson**. Teachers strengthen their conceptual understanding of important math ideas with support from daily professional development.

### Getting Ready: Objective, Materials, Vocabulary

Each lesson starts with a **learning objective** for the day, the **materials** required, and the math **vocabulary** word(s) introduced in the lesson.

### 1 Introductory Activities: Hands-On Learning

The *Introductory Activities* section allows students to discover the day's learning objective using an active, hands-on approach. The teacher will find a **lightly scripted** description of what to do, what to say, what questions to ask, and what answers to look for (with statements to be made aloud printed in **bold type**).

### 2 About This Page: Student Practice

The *About This Page* section links the hands-on activity to visual representations and practice problems on pages in the Student Book.

### 3 Follow-Up Activities: Closing the Lesson

The *Follow-Up Activities* section provides additional instructional support in the form of games, problem-solving activities, and suggested reinforcement Masters for remedial practice (found in the *Skill Builders* section of the Teacher Manual).

**Games:** As students discover the winning strategy for each game, they go through steps similar to those used in problem solving.

**Reinforcement Masters:** Many Lesson Plan pages list a *Skill Builders* page to support the lesson and provide differentiated instruction. These pages may be used as homework or as additional in-class practice as needed.

### Lesson Plan Page

**Objective:** To name fractions from fraction bars.  
To identify similarities and differences among fraction bars.

**Materials:** Fraction Bars\* or Fraction Strips (Master 1) and color crayons, overhead Fraction Bars\* (optional)

**Vocabulary:** similarities, differences

**1** **Introductory Activities**

**Fraction Similarities and Differences**

Distribute a set of Fraction Bars\* to each group of 2-5 students (or students may prepare their own out of Fraction Strips, Master 1, by coloring with crayons).

Each fraction bar in this set represents one whole unit such as one whole cracker or one whole brownie. Look through your set of fraction bars with your group. Find ways your bars are all alike (similarities) and ways they are not alike (differences). Record your findings in a table with two columns headed *Similarities and Differences*.

Begin by asking students to name one way they are all alike (all made of the same material) and one way they are different (all different colors). After 5 minutes, ask volunteers from each group to suggest similarities and differences they have found as you list their ideas on the board or overhead.

Similarities	Differences
same material	colors
same size	divided into different parts
same shape	number of shaded parts differs
congruent	number of bars of any one color differs
same width and height	
same area and perimeter	
same thickness	
same weight	
all divided into parts of equal size*	

\*It is very important that the last similarity (that each whole bar is divided into parts of equal size) be verbalized. This is the *essential* concept of a fraction.

**2** **About This Page**

Read the example at the top of the page together. Reinforce that even though there are a different number of equal parts shaded for  $\frac{1}{2}$  and  $\frac{2}{4}$ , they

**3** **Follow-Up Activities**

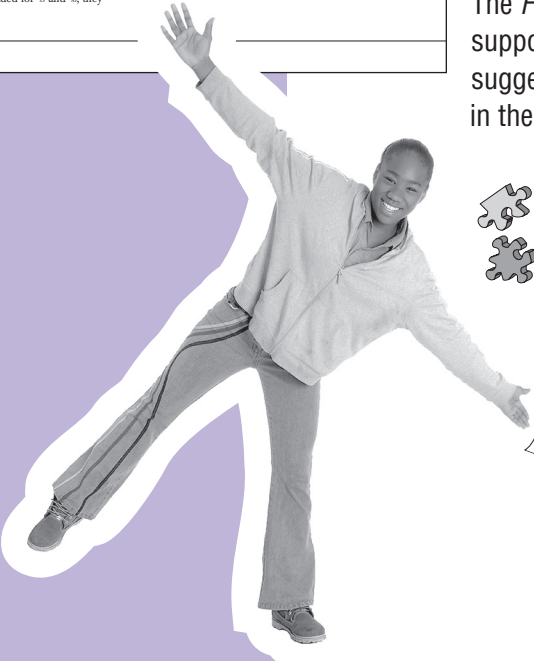
**What's My Secret?**

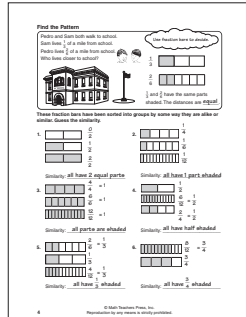
With a partner or small group, students take turns selecting a subset of fraction bars which are alike in one way. Others in the group try to guess the secret. Demonstrate an example by showing all the bars of one color and have students guess the secret of the sorting. Other ways in which the students may sort are everything shaded, nothing shaded, one part shaded and equivalent parts shaded.

**Connections to Literature:**

*Fractions are Part of Things*, Dennis, J. Richard. Fractional parts of simple shapes and irregular figures are shown.

*Skill Builders* 11-1, 11-2, 11-6





represent the same part of the whole fraction bar. On the remainder of this page, students generalize about how a group of three fractions are alike according to a shared attribute. Illustrate the first problem with overhead fraction bars.

Hands-On

Hands-on activities using manipulatives allow students to discover math concepts through experience.

Objective: To find all sets of equivalent fractions from a set of fraction bars. To identify and change a fraction to lowest terms.

Materials: Fraction Bars® or Fraction Strips (Master 1) and color crayons, overhead Fraction Bars® (optional)

Vocabulary: equivalent fractions, lowest terms

Introductory Activities

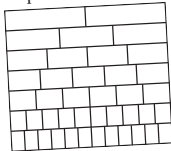
Equivalent Fractions from Fraction Bars

Arrange the students in small groups and give each group a set of Fraction Bars®.

Have one person in your group select and list all the bars where no parts are shaded.

Make a tower with your bars by putting  $\frac{9}{12}$  for the bottom story,  $\frac{9}{10}$  for the next story,  $\frac{9}{6}$  for the next story and so on. Show the tower with a set of overhead fraction bars.

Two or more fractions that represent the same number are called equivalent fractions. Beginning with the  $\frac{1}{2}$  mark on your green bar, identify the other fraction bars which are equivalent to  $\frac{1}{2}$ . Write the name of these equivalencies on the chart on the student page. Students may use a ruler or a sheet of paper to find that  $\frac{1}{2}$  is equivalent to  $\frac{2}{4}$ ,  $\frac{3}{6}$ ,  $\frac{4}{8}$ ,  $\frac{5}{10}$  and  $\frac{6}{12}$ . ( $\frac{1}{2}$  lines up with  $\frac{2}{4}$ ,  $\frac{3}{6}$ ,  $\frac{4}{8}$  and  $\frac{6}{12}$ .)



You can see that  $\frac{1}{2}$  is the same as  $\frac{2}{4}$ . What operation is used on each term to change  $\frac{1}{2}$  to  $\frac{2}{4}$ ? (Multiply both terms by 2.)

Write on the board:

$$\frac{1}{2} \times 2 = \frac{2}{4}$$

How would you change  $\frac{2}{4}$  back to  $\frac{1}{2}$ ? (Divide both terms by 2.) What is the pattern for finding equivalent fractions? (Multiply or divide both terms of the fraction by the same number.)

Write on the board:

$$\frac{2}{4} \div 2 = \frac{1}{2}$$

When the numerator and the denominator have no common factors other than 1, the fraction is expressed in lowest terms.

Equivalent Fractions

For problems 1-20, find all of the sets of equivalent fractions.

Lowest Terms	Equivalent Fractions in Higher Terms						Lowest Terms	Equivalent Fractions in Higher Terms					
	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{5}$	$\frac{1}{6}$	$\frac{1}{10}$	$\frac{1}{12}$		$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{5}$	$\frac{1}{6}$	$\frac{1}{10}$	$\frac{1}{12}$
1. $\frac{1}{2}$	$\frac{2}{4}$			$\frac{3}{6}$	$\frac{5}{10}$	$\frac{6}{12}$	11. $\frac{1}{4}$						
2. $\frac{1}{3}$	$\frac{2}{6}$	$\frac{4}{12}$	$\frac{5}{15}$	$\frac{6}{18}$	$\frac{10}{30}$	$\frac{12}{36}$	12. $\frac{1}{5}$						
3. $\frac{1}{4}$			$\frac{2}{8}$	$\frac{3}{12}$	$\frac{5}{20}$	$\frac{6}{24}$	13. $\frac{1}{6}$						
4. $\frac{1}{5}$				$\frac{2}{10}$	$\frac{3}{15}$	$\frac{4}{20}$	14. $\frac{1}{10}$						
5. $\frac{1}{6}$					$\frac{2}{12}$	$\frac{3}{18}$	15. $\frac{1}{12}$						
6. $\frac{1}{10}$						$\frac{2}{20}$	16. $\frac{1}{12}$						
7. $\frac{1}{12}$							17. $\frac{1}{10}$						
8. $\frac{1}{12}$							18. $\frac{1}{12}$						
9. $\frac{1}{10}$							19. $\frac{1}{12}$						
10. $\frac{1}{12}$							20. $\frac{1}{10}$						

21. A fraction is in lowest terms when \_\_\_\_\_.

TEST PREP

Which is not another name for  $\frac{1}{2}$ ? A  $\frac{5}{10}$  B  $\frac{6}{12}$  C  $\frac{2}{3}$  D  $\frac{3}{6}$

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Identify  $\frac{1}{2}$  as the lowest terms fraction for the items on the board. Repeat with the  $\frac{1}{3}$  bar ( $\frac{1}{3}$  lines up with  $\frac{2}{6}$  and  $\frac{4}{12}$ ). Again, ask for the patterns to change  $\frac{1}{3}$  to  $\frac{2}{6}$  and vice versa.

About This Page

After filling in the chart, allow students time to share their observations about the equivalent fractions they have written. All the fractions in the same row are equivalent. The fractions in the far left column are said to be in lowest terms. How do you know if a fraction is in lowest terms? (The numerator and the denominator have no common factors other than 1.)

Follow-Up Activities



Concentration Equivalencies

Arrange the class into small groups, each with a set of fraction bars, each with a set of fraction bars. Place all bars face down in row of the same color in the middle of the players. Players take turns turning over 2 bars looking for pairs of equivalent fractions. The player keeps the 2 bars if they are equivalent and continues turning over 2 more bars. If the 2 bars turned over are not equivalent, the bars are placed face down in the same location. After all possible bars have been matched, the player with the most bars is the winner.

Equivalent Fractions

For problems 1-20, find all of the sets of equivalent fractions.

Lowest Terms	Equivalent Fractions in Higher Terms						Lowest Terms	Equivalent Fractions in Higher Terms					
	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{5}$	$\frac{1}{6}$	$\frac{1}{10}$	$\frac{1}{12}$		$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{5}$	$\frac{1}{6}$	$\frac{1}{10}$	$\frac{1}{12}$
1. $\frac{1}{2}$	$\frac{2}{4}$			$\frac{3}{6}$	$\frac{5}{10}$	$\frac{6}{12}$	11. $\frac{1}{4}$						
2. $\frac{1}{3}$	$\frac{2}{6}$	$\frac{4}{12}$	$\frac{5}{15}$	$\frac{6}{18}$	$\frac{10}{30}$	$\frac{12}{36}$	12. $\frac{1}{5}$						
3. $\frac{1}{4}$			$\frac{2}{8}$	$\frac{3}{12}$	$\frac{5}{20}$	$\frac{6}{24}$	13. $\frac{1}{6}$						
4. $\frac{1}{5}$				$\frac{2}{10}$	$\frac{3}{15}$	$\frac{4}{20}$	14. $\frac{1}{10}$						
5. $\frac{1}{6}$					$\frac{2}{12}$	$\frac{3}{18}$	15. $\frac{1}{12}$						
6. $\frac{1}{10}$						$\frac{2}{20}$	16. $\frac{1}{12}$						
7. $\frac{1}{12}$							17. $\frac{1}{10}$						
8. $\frac{1}{12}$							18. $\frac{1}{12}$						
9. $\frac{1}{10}$							19. $\frac{1}{12}$						
10. $\frac{1}{12}$							20. $\frac{1}{10}$						

21. A fraction is in lowest terms when \_\_\_\_\_.

TEST PREP

Which is not another name for  $\frac{1}{2}$ ? A  $\frac{5}{10}$  B  $\frac{6}{12}$  C  $\frac{2}{3}$  D  $\frac{3}{6}$

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**Equivalent fractions.** As students find the fraction bars having the same part shaded, they are identifying equivalent fractions. The teacher asks, "You can see that  $\frac{1}{2}$  is the same as  $\frac{2}{4}$ . What operation is used on each term to change  $\frac{1}{2}$  to  $\frac{2}{4}$ ? (Multiply both terms by 2.) How would you change  $\frac{2}{4}$  back to  $\frac{1}{2}$ ? (Divide both terms by 2.)" The script helps students discover and say aloud the important patterns.

# Step 5e

## Instruction

# Lesson Plan > Student Activity

### Hands-On

Hands-on activities using manipulatives allow students to discover math concepts through experience.

Objective: To add fractions with unlike denominators.

Materials: Multiple strips (made from the Table of Multiples, Master 4), Fraction Bars®

#### Introductory Activities

##### Adding with Fraction Bars

The following activities prepare students to discover and use the patterns or rules for finding the lowest common denominator and changing the fractions into equivalent fractions.

Write on the board:

You are making a pizza topping with  $\frac{2}{3}$  cup of white cheese and  $\frac{1}{4}$  cup of yellow cheese. How much cheese in all?

Allow each small group time to discuss possible ways to solve the problem using a set of Fraction Bars®. Have students explain their thinking. Guide students to discover the Golden Rule of Fractions: you cannot add or subtract fractions unless they are the same color. To add  $\frac{2}{3}$  (yellow) plus  $\frac{1}{4}$  (blue), the bars must be changed to a common color.

What common color can we change  $\frac{2}{3}$  and  $\frac{1}{4}$  to? (orange) Find the equivalent fractions in orange. ( $\frac{2}{3} = \frac{8}{12}$  and  $\frac{1}{4} = \frac{3}{12}$ )

Write on the board:

$$\frac{8}{12} + \frac{3}{12} = \frac{11}{12}$$

##### Addition with Multiple Strips

Demonstrate the same problem with the Table of Multiples (Master 4).

x	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

Cut the multiplication table into multiple strips. Use your multiple strips to find the lowest common denominator and equivalent fractions for each pair of fractions.

To add  $\frac{2}{3} + \frac{1}{4}$ , place the 2 multiple strip over the 3 multiple strip and the 1 multiple strip over the 4 multiple strip.

5.NF.1

#### Adding Unlike Fractions

Lisa did  $\frac{1}{4}$  of her weekly piano practice on Monday. She did  $\frac{1}{6}$  of her practice on Tuesday. How much of her weekly practice time has she completed?

The least common multiple of 4 and 6 is 12.

$$\frac{1}{4} = \frac{3}{12}$$

$$+ \frac{1}{6} = \frac{2}{12}$$

$$\frac{3}{12} + \frac{2}{12} = \frac{5}{12}$$

Lisa has completed  $\frac{5}{12}$  of her weekly practice time.

- Add:
- $\frac{1}{3} + \frac{1}{2}$
  - $\frac{1}{5} + \frac{1}{2}$
  - $\frac{2}{3} + \frac{1}{4}$
  - $\frac{3}{10} + \frac{2}{5}$
  - $\frac{1}{5} + \frac{2}{3}$
  - $\frac{1}{5} + \frac{3}{4}$
  - $\frac{1}{8} + \frac{1}{2}$
  - $\frac{1}{3} + \frac{2}{7}$
  - Julie rode her bike  $\frac{2}{5}$  of a mile to school in the morning. After school she rode  $\frac{1}{4}$  of a mile to her after school job. How far did she ride in all?
  - Mary bought  $\frac{1}{3}$  of a pound of caramel and  $\frac{5}{12}$  of a pound of chocolate creams. How many pounds of caramel and chocolate creams did Mary buy?
  - Jane ate  $\frac{2}{5}$  of a candy bar and Ray ate  $\frac{3}{8}$  of the same candy bar. Is this possible? Explain.
  - Jess ate  $\frac{1}{4}$  of a pizza. Jack ate  $\frac{1}{3}$  of the same pizza. Dennis ate  $\frac{1}{2}$  of the same pizza. Is this possible? Explain.

#### Adding Unlike Fractions

Lisa did  $\frac{1}{4}$  of her weekly piano practice on Monday. She did  $\frac{1}{6}$  of her practice on Tuesday. How much of her weekly practice time has she completed?

The least common multiple of 4 and 6 is 12.

$$\frac{1}{4} = \frac{3}{12}$$

$$+ \frac{1}{6} = \frac{2}{12}$$

Lisa has completed \_\_\_\_\_ of her weekly practice time.

- Add:
- $\frac{1}{3} + \frac{1}{2}$
  - $\frac{1}{5} + \frac{1}{2}$
  - $\frac{2}{3} + \frac{1}{4}$
  - $\frac{3}{10} + \frac{2}{5}$
  - $\frac{1}{5} + \frac{2}{3}$
  - $\frac{1}{5} + \frac{3}{4}$
  - $\frac{1}{8} + \frac{1}{2}$
  - $\frac{1}{3} + \frac{2}{7}$

- Julie rode her bike  $\frac{2}{5}$  of a mile to school in the morning. After school she rode  $\frac{1}{4}$  of a mile to her after school job. How far did she ride in all?
- Mary bought  $\frac{1}{3}$  of a pound of caramel and  $\frac{5}{12}$  of a pound of chocolate creams. How many pounds of caramel and chocolate creams did Mary buy?

- Jane ate  $\frac{2}{5}$  of a candy bar and Ray ate  $\frac{3}{8}$  of the same candy bar. Is this possible? Explain.
- Jess ate  $\frac{1}{4}$  of a pizza. Jack ate  $\frac{1}{3}$  of the same pizza. Dennis ate  $\frac{1}{2}$  of the same pizza. Is this possible? Explain.

What if the denominators are different and you need to add two fractions? Write at least three statements to explain.

Students use fraction bars and multiple strips to add unlike fractions (even if they don't know their multiplication facts)!

The **Student Activity Book** provides numerous occasions for informal assessment. These embedded assessments give students a natural opportunity to think out loud, explain their ideas in their own words, and prepare for success using Smarter Balanced and PARCC assessments.

### 1 Sum It Up!

This icon indicates an occasion for students to “think out loud,” as they summarize their understanding, or explain their ideas to their peers. Teachers lead discussions to develop student understanding of central ideas. Students with memory deficits benefit from hearing themselves talk aloud.

### 2 Test Prep

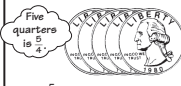
These sample test questions give students practice answering questions in standardized test format. Teachers may discuss test-taking strategies, such as eliminating obviously incorrect answers and checking back for reasonableness.

### 3 Journal Prompts


**Journal Prompts** ask students to demonstrate their math understanding using words, pictures, diagrams, and graphs, similar to what may be asked on Smarter Balanced and PARCC assessments.

### Student Activity Page

**Changing Mixed Numbers and Improper Fractions**  
We can use money to understand mixed numbers and improper fractions.



Five quarters is  $\frac{5}{4}$ .



A \$1 bill and 1 quarter is  $1\frac{1}{4}$ .

$\frac{5}{4}$  is an improper fraction.  $1\frac{1}{4}$  is a mixed number.


To change the **improper fraction**  $\frac{5}{4}$  to a **mixed number**, divide the numerator by the denominator:


$$\frac{5}{4} = 1\frac{1}{4}$$


To change a **mixed number** to an **improper fraction**, multiply the denominator by the whole number and add the numerator:

$$1\frac{1}{4} = \frac{(4 \times 1) + 1}{4} = \frac{5}{4}$$

**Write a mixed number and an improper fraction for the shaded part.**

1.   
\_\_\_\_\_

2.   
\_\_\_\_\_

3.   
\_\_\_\_\_

**Change each improper fraction to a mixed number.**

4.  $\frac{5}{4}$  \_\_\_\_\_

5.  $\frac{7}{3}$  \_\_\_\_\_

6.  $\frac{13}{9}$  \_\_\_\_\_

7.  $\frac{11}{6}$  \_\_\_\_\_

**Change each mixed number to an improper fraction.**

8.  $1\frac{5}{8}$  \_\_\_\_\_

9.  $1\frac{2}{3}$  \_\_\_\_\_


10.  $2\frac{5}{6}$  \_\_\_\_\_

11.  $1\frac{2}{7}$  \_\_\_\_\_

**Solve. Express your answer as a mixed number.**

12. Jessica plans to serve ice cream to 10 guests at her party. Each guest is to receive  $\frac{1}{4}$  of a quart of ice cream. How many quarts will she need to buy?  
\_\_\_\_\_ qt.

13. Mai is baking cookies. She has 2 lb. of butter divided into  $\frac{1}{4}$  lb. sticks, plus three  $\frac{1}{4}$  lb. sticks. How much butter does Mai have in all?  
\_\_\_\_\_ lb.


14.  Describe the pattern for changing a mixed number to an improper fraction. Describe the pattern for changing an improper fraction to a mixed number.

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9. Tim's mother worked  $30\frac{1}{2}$  hours last week. She worked  $28\frac{1}{4}$  hours this week. How many more hours did she work last week than this week?  
\_\_\_\_\_

10. Last week, Tim's brother recorded that he had worked  $15\frac{1}{2}$  hours. The payroll office said he worked  $13\frac{1}{4}$  hours. How many fewer hours did the payroll office say he had worked?  
\_\_\_\_\_

**TEST PREP** 

Jerry is  $5\frac{3}{12}$  feet tall. His sister is  $3\frac{1}{6}$  feet tall. How much taller is Jerry than his sister?

A  $2\frac{2}{6}$

B  $2\frac{1}{12}$

C  $\frac{1}{3}$

D  $\frac{1}{12}$

$-\frac{4}{6}$

$-\frac{3}{10}$

$-\frac{3}{12}$

$-\frac{2}{9}$


9.  $\frac{21}{25} - \frac{3}{25} =$  \_\_\_\_\_

10.  $\frac{1}{2} + \frac{1}{2} =$  \_\_\_\_\_

11.  $\frac{16}{20} - \frac{3}{20} =$  \_\_\_\_\_

12. Kim read  $\frac{2}{8}$  of her book on Monday and  $\frac{1}{6}$  of the book on Tuesday. How much has she read?  
\_\_\_\_\_ book

13. Hugh bought  $\frac{11}{18}$  of a yard of rope. He cut off  $\frac{4}{18}$  of a yard. How much was left?  
\_\_\_\_\_ yd.

15.  Make a drawing using fraction bars to demonstrate the problem  $\frac{3}{6} + \frac{2}{6}$ . Explain with words how drawing is helpful when adding fractions.

# Step 6a

## Monitor and Reteach

### Spiraled Reviews

Daily Reviews and Check Points cycle test questions from the previous book to each subsequent book.


## Progress Monitoring with Daily Reviews and Check Points

Daily Reviews Assess Progress and Direct Reteaching Needs. Quick, 5-question Daily Reviews and weekly Check Points provide continuous assessments on all objectives covered in the Lesson Plans. The **Daily Review Record Sheet** printed on the back inside cover of the Student Book allows students and teachers to track individual progress. The Record Sheet links missed test questions to *Skill Builder* reteaching pages and provides teachers with guidance for individualized instruction.


Name \_\_\_\_\_

1 Check Point

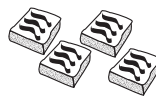
1. What fractional part is shaded? \_\_\_\_\_ (Obj. 11)



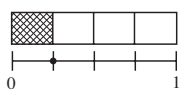
2. What part of the set is shaded? \_\_\_\_\_ (Obj. 11)



3. Four brownies are to be shared by 5 friends. How much will each friend get? \_\_\_\_\_ (Obj. 11)

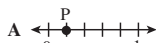


4. Name the fraction represented by the point on the number line.

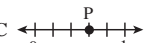


5. What number line shows point P at  $\frac{2}{5}$ ? \_\_\_\_\_ (Obj. 11)

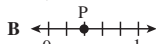
A



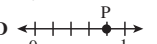
C



B



D



6. Which to  $\frac{1}{5}$ ? \_\_\_\_\_

A  $\frac{5}{10}$

B  $\frac{10}{20}$

7. What factor \_\_\_\_\_

8. What in the \_\_\_\_\_

9. Write to con \_\_\_\_\_

10. Order \_\_\_\_\_

1 Check Point

### IM2 Daily Reviews

Record the results from your Daily Reviews here. "Obj." shows which objective that problem covered.

Review 1		Review 2		Review 3		Review 4		Check Point 1	
1	Obj. 1 (SB 1-1)	Obj. 6 (SB 6-1)	Obj. 43 (SB 43-1)	Obj. 45 (SB 45-6)	1	Obj. 11 (SB 11-1)	Obj. 12 (SB 12-1)		
2	Obj. 2 (SB 2-1)	Obj. 7 (SB 7-1)	Obj. 44 (SB 44-1)	Obj. 46 (SB 46-1)	3	Obj. 11 (SB 11-3)	Obj. 12 (SB 12-2)		
3	Obj. 3 (SB 3-1)	Obj. 8 (SB 8-1)	Obj. 11 (SB 11-1)	Obj. 11 (SB 11-4)	4	Obj. 11 (SB 11-4)	Obj. 12 (SB 12-3)		
4	Obj. 4 (SB 4-1)	Obj. 9 (SB 9-1)	Obj. 11 (SB 11-2)	Obj. 12 (SB 12-1)	5	Obj. 11 (SB 11-4)	Obj. 13 (SB 13-2)		
5	Obj. 5 (SB 5-1)	Obj. 10 (SB 10-1)	Obj. 11 (SB 11-3)	Obj. 12 (SB 12-1)					
	# Correct	# Correct	# Correct	# Correct					
Review 6		Review 7		Review 8		Review 9		Check Point 2	
1	Obj. 49 (SB 49-1)	Obj. 50 (SB 50-1)	Obj. 56 (SB 56-1)	Obj. 59 (SB 59-1)	1	Obj. 13 (SB 13-2)	Obj. 13 (SB 13-4)	6	Obj. 13 (SB 13-4)
2	Obj. 12 (SB 12-3)	Obj. 13 (SB 13-2)	Obj. 16 (SB 16-2)	Obj. 13 (SB 13-4)	2	Obj. 14 (SB 14-2)	Obj. 17 (SB 17-1)	7	Obj. 17 (SB 17-1)
3	Obj. 13 (SB 13-3)	Obj. 15 (SB 15-1)	Obj. 16 (SB 16-2)	Obj. 17 (SB 17-2)	3	Obj. 15 (SB 15-1)	Obj. 17 (SB 17-2)	8	Obj. 17 (SB 17-2)
4	Obj. 14 (SB 14-1)	Obj. 15 (SB 15-2)	Obj. 13 (SB 13-4)	Obj. 17 (SB 17-1)	4	Obj. 16 (SB 16-1)	Obj. 18 (SB 18-1)	9	Obj. 18 (SB 18-1)
5	Obj. 14 (SB 14-2)	Obj. 16 (SB 16-1)	Obj. 17 (SB 17-1)	Obj. 17 (SB 17-3)	5	Obj. 16 (SB 16-2)	Obj. 13 (SB 13-3)	10	Obj. 13 (SB 13-3)
	# Correct	# Correct	# Correct	# Correct					
Review 11		Review 12		Review 13		Review 14		Check Point 3	
1	Obj. 59 (SB 59-1)	Obj. 4 (SB 4-2)	Obj. 5 (SB 5-2)	Obj. 45 (SB 45-4)	1	Obj. 18 (SB 18-4)	Obj. 20 (SB 20-3)	6	Obj. 20 (SB 20-3)
2	Obj. 13 (SB 13-3)	Obj. 13 (SB 13-3)	Obj. 19 (SB 19-3)	Obj. 19 (SB 19-3)	2	Obj. 45 (SB 45-3)	Obj. 19 (SB 19-3)	7	Obj. 19 (SB 19-3)
3	Obj. 18 (SB 18-1)	Obj. 19 (SB 19-1)	Obj. 19 (SB 19-2)	Obj. 19 (SB 19-2)	3	Obj. 19 (SB 19-1)	Obj. 45 (SB 45-8)	8	Obj. 45 (SB 45-8)
4	Obj. 18 (SB 18-1)	Obj. 19 (SB 19-3)	Obj. 19 (SB 19-3)	Obj. 20 (SB 20-2)	4	Obj. 19 (SB 19-3)	Obj. 48 (SB 48-1)	9	Obj. 48 (SB 48-1)
5	Obj. 18 (SB 18-4)	Obj. 19 (SB 19-2)	Obj. 20 (SB 20-1)	Obj. 45 (SB 45-9)	5	Obj. 19 (SB 19-3)	Obj. 48 (SB 48-2)	10	Obj. 48 (SB 48-2)
	# Correct	# Correct	# Correct	# Correct					
Review 16		Review 17		Review 18		Review 19		Check Point 4	
1	Obj. 19 (SB 19-2)	Obj. 26 (SB 26-1)	Obj. 21 (SB 21-2)	Obj. 22 (SB 22-1)	1	Obj. 21 (SB 21-2)	Obj. 25 (SB 25-1)	6	Obj. 25 (SB 25-1)
2	Obj. 19 (SB 19-3)	Obj. 21 (SB 21-1)	Obj. 21 (SB 21-1)	Obj. 25 (SB 25-2)	2	Obj. 22 (SB 22-1)	Obj. 24 (SB 24-2)	7	Obj. 24 (SB 24-2)
3	Obj. 18 (SB 18-1)	Obj. 23 (SB 23-1)	Obj. 23 (SB 23-1)	Obj. 25 (SB 25-1)	3	Obj. 21 (SB 21-1)	Obj. 24 (SB 24-2)	8	Obj. 24 (SB 24-2)
4	Obj. 48 (SB 48-1)	Obj. 21 (SB 21-2)	Obj. 23 (SB 23-2)	Obj. 4 (SB 4-3)	4	Obj. 23 (SB 23-2)	Obj. 24 (SB 24-2)	9	Obj. 24 (SB 24-2)
5	Obj. 48 (SB 48-2)	Obj. 21 (SB 21-2)	Obj. 22 (SB 22-1)	Obj. 24 (SB 24-1)	5	Obj. 25 (SB 25-2)	Obj. 51 (SB 51-1)	10	Obj. 51 (SB 51-1)
	# Correct	# Correct	# Correct	# Correct					
Review 21		Review 22		Review 23		Review 24		Check Point 5	
1	Obj. 24 (SB 24-2)	Obj. 51 (SB 51-1)	Obj. 26 (SB 26-2)	Obj. 27 (SB 27-2)	1	Obj. 51 (SB 51-2)	Obj. 27 (SB 27-3)	6	Obj. 27 (SB 27-3)
2	Obj. 51 (SB 51-1)	Obj. 26 (SB 26-3)	Obj. 26 (SB 26-4)	Obj. 45 (SB 45-5)	2	Obj. 26 (SB 26-3)	Obj. 28 (SB 28-2)	7	Obj. 28 (SB 28-2)
3	Obj. 51 (SB 51-2)	Obj. 45 (SB 45-5)	Obj. 27 (SB 27-1)	Obj. 28 (SB 28-1)	3	Obj. 26 (SB 26-4)	Obj. 27 (SB 27-4)	8	Obj. 27 (SB 27-4)
4	Obj. 26 (SB 26-2)	Obj. 27 (SB 27-2)	Obj. 27 (SB 27-2)	Obj. 28 (SB 28-2)	4	Obj. 27 (SB 27-2)	Obj. 28 (SB 28-1)	9	Obj. 28 (SB 28-1)
5	Obj. 26 (SB 26-4)	Obj. 27 (SB 27-1)	Obj. 27 (SB 27-3)	Obj. 28 (SB 28-3)	5	Obj. 27 (SB 27-3)	Obj. 45 (SB 45-4)	10	Obj. 45 (SB 45-4)
	# Correct	# Correct	# Correct	# Correct					
Review 26		Review 27		Record results of Daily Reviews by marking an "X" next to <i>missed</i> questions/objectives. Write the <b>total correct</b> for each Daily Review in the space provided. For practice related to missed objectives, use the designated <i>Skill Builders</i> practice page (in the Skill Builder section of the Teacher Manual).					
1	Obj. 27 (SB 27-2)	Obj. 53 (SB 53-2)							
2	Obj. 45 (SB 45-7)	Obj. 53 (SB 53-3)							
3	Obj. 29 (SB 29-1)	Obj. 53 (SB 53-4)							
4	Obj. 30 (SB 30-1)	Obj. 57 (SB 57-1)							
5	Obj. 30 (SB 30-3)	Obj. 57 (SB 57-1)							
	# Correct	# Correct							

Name \_\_\_\_\_

22

**Reproducible Blackline Masters Reinforce Important Skills and Reteach Essential Concepts.** *Skill Builders* make reteaching easy. The top of each page uses pictorial representations that review the activities from the Lesson Plan. Students then apply that understanding when completing the accompanying practice problems.

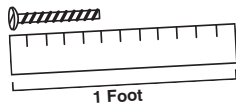
Visual Concepts

*Skill Builder* reteaching worksheets rely heavily on illustrations and other kinds of graphic aids to explain and reinforce the transition from concrete to abstract.

Name \_\_\_\_\_

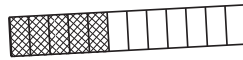
**Naming Fractions**

There are 12 inches in a foot. A bolt is 5 inches long. What fractional part of a foot is this bolt?



The bolt is  $\frac{5}{12}$  of a foot.

There are 12 matching parts in this bar. There are 5 shaded parts. What fractional part of the bar is shaded?

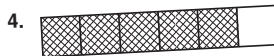
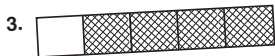


$\frac{5}{12}$  is shaded (five-twelfths).

1. How many matching parts? \_\_\_\_\_  
 How many shaded parts? \_\_\_\_\_  
 What fractional part is shaded? \_\_\_\_\_

2. How many matching parts? \_\_\_\_\_  
 How many shaded parts? \_\_\_\_\_  
 What fractional part is shaded? \_\_\_\_\_

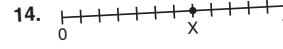
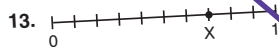
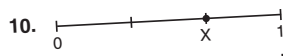
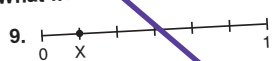
Write the fraction for the shaded part of the bar.



7. How many matching parts? \_\_\_\_\_  
 How many parts from 0 to point X? \_\_\_\_\_  
 What fractional part of the line is represented by point X? \_\_\_\_\_

8. How many matching parts? \_\_\_\_\_  
 How many parts from 0 to point X? \_\_\_\_\_  
 What fractional part of the line is represented by point X? \_\_\_\_\_

What fractional part of the line does point X represent?



Skill Builders 11-4

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# Step 7

## Assessment

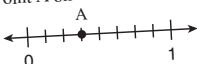
## Post-Test

A **Post-Test** is administered at the end of each book to measure progress and identify the need for further intervention.


The **Student Progress Report** compares Pre- and Post-Test results and shows the student's progress relative to each learning objective and math content standard.

Name \_\_\_\_\_ Score \_\_\_\_\_ (50 possible)

### Fractions, Decimals, Percent & Probability Post-Test

1. What fraction is shown at Point A on the number line?  
  
 (Obj. 11)

A  $\frac{1}{4}$       C  $\frac{4}{8}$   
 B  $\frac{3}{8}$       D  $\frac{4}{9}$

2. What fraction of these shapes are shaded?  
  
 (Obj. 11)

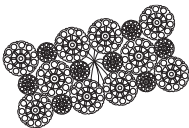
A  $\frac{7}{10}$       C  $\frac{3}{10}$   
 B  $\frac{3}{7}$       D  $\frac{10}{3}$

3. What number goes in the box?  
 $\frac{3}{5} = \frac{\square}{10}$   
 (Obj. 12)

A 2      C 6  
 B 5      D 20

4. Jules is mowing a lawn. He completed  $\frac{3}{4}$  of the job. Which fraction is equivalent to  $\frac{3}{4}$ ?  
 (Obj. 12)

A  $\frac{3}{12}$       C  $\frac{6}{8}$   
 B  $\frac{3}{5}$       D  $\frac{4}{3}$

5. Rosie has 4 rolls of lace trim. Which roll of trim is shortest?  
  
 (Obj. 13)

A  $\frac{7}{10}$  meter      C  $\frac{2}{5}$  meter

### IM2 Student Progress Report

Name \_\_\_\_\_

Record results from the Pre- and Post-Test here to see strengths and weaknesses on test questions aligned to the objectives for this level.

Test Item	CCSS or State Standard	Pre-Test	Post-Test	Objective # and Description
1.	3.NF.2a	<input type="checkbox"/>	<input type="checkbox"/>	IM-11 Write common fractions from shaded regions, number lines, printed words and representations of a part of a set. Identify numerators, denominators.
2.	3.NF.1	<input type="checkbox"/>	<input type="checkbox"/>	
3.	4.NF.1	<input type="checkbox"/>	<input type="checkbox"/>	IM-12 Find equivalent fractions in higher or lower terms. Find all the factors of a number and the greatest common factor (GCF) of two or more numbers. Write two numbers as ratios and solve for the missing term in two equivalent fractions.
4.	4.NF.1	<input type="checkbox"/>	<input type="checkbox"/>	
5.	4.NF.2	<input type="checkbox"/>	<input type="checkbox"/>	IM-13 Compare two like or unlike proper fractions. Order five like or unlike proper fractions and place them on a number line. Estimate fractions to the nearest whole number. Find the least common multiple (LCM) or lowest common denominator (LCD).
6.	4.NF.2	<input type="checkbox"/>	<input type="checkbox"/>	
7.		<input type="checkbox"/>	<input type="checkbox"/>	IM-14 Identify mixed numbers and improper fractions. Interchange mixed numbers and improper fractions.
8.		<input type="checkbox"/>	<input type="checkbox"/>	
9.	4.NF.3a	<input type="checkbox"/>	<input type="checkbox"/>	IM-15 Calculate and solve problems involving addition and subtraction of proper fractions with common denominators with renaming and/or regrouping.
10.	5.NF.2	<input type="checkbox"/>	<input type="checkbox"/>	
11.	5.NF.2	<input type="checkbox"/>	<input type="checkbox"/>	IM-16 Calculate and solve problems involving addition and subtraction of mixed numbers with common denominators with regrouping and/or renaming.
12.	5.NF.2	<input type="checkbox"/>	<input type="checkbox"/>	
13.	5.NF.1	<input type="checkbox"/>	<input type="checkbox"/>	IM-17 Calculate and solve problems involving addition and subtraction of two unlike proper fractions with no renaming or simplifying.
14.	5.NF.2	<input type="checkbox"/>	<input type="checkbox"/>	
15.	5.NF.2	<input type="checkbox"/>	<input type="checkbox"/>	IM-18 Calculate and solve problems involving addition and subtraction of two unlike mixed numbers with no renaming or simplifying. Estimate a sum or difference to the nearest whole number.
16.	5.NF.2	<input type="checkbox"/>	<input type="checkbox"/>	
17.	5.NF.4	<input type="checkbox"/>	<input type="checkbox"/>	IM-19 Calculate and solve problems involving multiplication of two proper fractions or a proper fraction by a whole number.
18.	5.NF.6	<input type="checkbox"/>	<input type="checkbox"/>	
19.	5.NF.7c, 6.NS.1	<input type="checkbox"/>	<input type="checkbox"/>	IM-20 Calculate and solve problems involving division of proper fractions by proper fractions, whole numbers and mixed numbers. Write the reciprocal of a number.
20.	5.NBT.3a	<input type="checkbox"/>	<input type="checkbox"/>	IM-21 Write or identify decimals from a model, picture or on a number line.
21.	5.NBT.3a	<input type="checkbox"/>	<input type="checkbox"/>	
22.	5.NBT.3a	<input type="checkbox"/>	<input type="checkbox"/>	IM-22 Read and write decimals through thousandths.
23.	5.NBT.3a	<input type="checkbox"/>	<input type="checkbox"/>	
24.	5.NBT.3a	<input type="checkbox"/>	<input type="checkbox"/>	IM-23 Identify place value in a decimal up to ten thousandths.
25.	5.NBT.3a	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	Subtotal <b>Correct</b> (out of 25 items, report continued on next page)

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# Blended Learning with Web-Based Assessment

# Step 7

## Assessment

Tests may be taken paper-pencil or web-based. Instant reports provide data for the teacher to differentiate instruction. The suite of reports for the teacher, principal, and district administrator make it easy to differentiate instruction, measure progress, and provide accountability.

### Print Report

#### Students Grouped by Objective

This web-based report shows test results by objective. Teachers are able to easily differentiate instruction by grouping students who have missed the same objective(s) and focusing instruction on those objectives.

### Report: Students Grouped by Missed Objective

TEACHER: Mr. Teacher Edit Profile Log Off  
 CLASS: Teacher's Class Change Class

LIST OF CLASSES | MANAGE STUDENTS | MANAGE TESTS | PLANNING REPORTS | TEST RESULTS

**Students Grouped by Objective** Print

This report lists all students who did not correctly answer each learning objective on the pre-test.

Objective Number	State Standard	Objective Description	Students Who Missed the Pre-Test Objective
1		Identify the place value in a 7- to 12-digit number.	Barbara Hawkinson, Van Kellogg, Steve Fischer
10	6.C.1B	Divide a 4-digit by a 2-digit number.	Scott Meyer, Carrie Fischer, Clinton Anderson, Sean Anderson, Dan Kellogg, Barbara Hawkinson, Chester Anderson, Steve Fischer, kim stewart
11	6.A.1A	Write fractions from shaded regions, number lines and printed words.	Jim Fischer, Scott Meyer, Carrie Fischer, Clinton Anderson, Sean Anderson, Dan Kellogg, Barbara Hawkinson, Chester Anderson, Van Kellogg, Jan Kellogg, Steve Fischer

### Print Report

#### Individual Student Progress

Web-based assessment measures student proficiency on each objective in the curriculum.

### Report: Individual Student Proficiency

TEACHER: Mr. Teacher Edit Profile Log Off  
 CLASS: Mr. Teacher's Class Change Class

LIST OF CLASSES | MANAGE STUDENTS | MANAGE TESTS | PLANNING REPORTS | TEST RESULTS

**Student Progress Report:** Jake Wilson Print

This report shows this student's Pre-Test, Post-Test, and Benchmark Test score. It also shows test results organized by content strand, state standard, and objective.

**Pre-Test: 20% (9 of 45 Correct)**  
**Post-Test: 29% (13 of 45 Correct)**  
**Benchmark Test: Incomplete**

Obj.	State Standard	Pre-Test	Post-Test	Benchmark Test	Description
<b>Numeration</b>					
1		<input type="checkbox"/>	<input type="checkbox"/>		Identify the place value in a 7- to 12-digit number.
<b>Whole Number Operations</b>					
10	6.C.1B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Divide a 4-digit by a 2-digit number.
<b>Fraction Concepts</b>					
11	6.A.1A	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Write fractions from shaded regions, number lines and printed words.

- **Learning Objectives** are aligned to state, national, and Common Core standards.

### Aligned



### Standards

State Standards, TEKS, SOL, and CCSS are shown here on web-based reports.

### IM1 Student Progress Report

Name \_\_\_\_\_

Record results from the Pre- and Post-Test here to see strengths and weaknesses on test questions aligned to the objectives for this level.

Test Item	CCSS or State Standard	Pre-Test	Post-Test	Objective # and Description
1.	4.NBT.2	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-1</b> Identify the place value in a 7- to 12-digit number. Includes writing a whole number in expanded notation. Write standard numerals as Roman numerals and vice versa.
2.	4.NBT.2	<input type="checkbox"/>	<input type="checkbox"/>	
3.	4.NBT.2	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-2</b> Read, write, order and compare numbers $\leq 12$ digits.
4.	4.NBT.2	<input type="checkbox"/>	<input type="checkbox"/>	
5.	4.NBT.2	<input type="checkbox"/>	<input type="checkbox"/>	
6.	4.NBT.3	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-3</b> Round large numbers to the nearest thousand or to the indicated place value.
7.	4.NBT.3	<input type="checkbox"/>	<input type="checkbox"/>	
8.	4.OA.4	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-4</b> Identify prime numbers and the factors of composite numbers up to 100. Express a whole number as a product of its prime factors. Find the greatest common factor of the numbers 1 to 20. Find rules of divisibility for 2s, 3s, 4s, 5s, 6s, 9s and 10s. Find the square or cube of a number $\leq 12$ in exponential form and relate these forms to factoring.
9.		<input type="checkbox"/>	<input type="checkbox"/>	
10.	6.EE.1	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	
11.	6.EE.3	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-5</b> Find a missing number using the commutative, associative, distributive and identity properties. Use the properties to perform appropriate mental computations. Use parentheses and the order of operations to evaluate expressions.
12.	6.EE.3	<input type="checkbox"/>	<input type="checkbox"/>	
13.	4.NBT.4	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-6</b> Add numbers up to 6 digits of the same or varying lengths in vertical or horizontal formats. Check for computational errors. Identify math terms: sum, addend, plus. Select operation or strategy to estimate, solve and justify the solution to a word problem.
14.	4.NBT.4	<input type="checkbox"/>	<input type="checkbox"/>	
15.	4.NBT.4	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-7</b> Subtract numbers up to 6 digits including regrouping across zero. Identify terms: difference, minus, less. Check subtraction by addition. Select operation or strategy to estimate, solve and justify the solution to a word problem.
16.	4.NBT.4	<input type="checkbox"/>	<input type="checkbox"/>	
17.	5.NBT.5	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-8</b> Multiply a 2-, 3- or 4-digit number by a 1-, 2- or 3-digit number. Identify terms: product, factors. Multiply by powers of ten and multiples of 10 and 100.
18.	5.NBT.5	<input type="checkbox"/>	<input type="checkbox"/>	
19.	5.NBT.6	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-9</b> Divide a 6-digit number by a 1-digit number. Identify terms: quotient, dividend, divisor and the three symbols for division. Relate multiplication and division as opposites.
20.	5.NBT.6	<input type="checkbox"/>	<input type="checkbox"/>	

Subtotal **Correct** (out of 20 items, *report continued on next page*)

### Prime and Composite

Students discover a pattern for prime and composite numbers.

Objective: To find a pattern for prime and composite numbers.

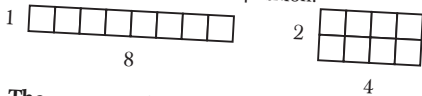
Materials: Cubes or squares cut from Inch Graph Paper (Master 5), index cards, playing cards

Vocabulary: array, prime number, composite number, factor

#### Introductory Activities

##### Prime Numbers

Each group will need cubes or square tiles cut from Inch Graph Paper (Master 5). Count out 8 tiles and arrange them to show how they might be packed into rectangular shaped boxes with only one layer. Draw a picture of the different ways you could arrange the 8 tiles. Display or draw a sketch of the two possible rectangles: a 1-by-8 and a 2-by-4. Rotate each rectangle to several positions to establish that the shape of the rectangle is the same, regardless of the position.



These rectangles are also called **arrays**. The numbers on the side of each box are related to the multiplication facts equal to 8. What are the two multiplication facts shown? ( $1 \times 8 = 8$  and  $2 \times 4 = 8$ ) The numbers on each side are the **factors** of 8.

Write on the board:

The factors of 8 are: 1, 8, 2, and 4.

Numbers which have more than one array are called **composite numbers**.

Now select 11 cubes. Find all the different arrays that can be made using exactly 11 cubes. (There will be only one array, a  $1 \times 11$ .)

Write on the board:

The factors of 11 are: 1 and 11.

Numbers which have only one array also have only two different or unique **factors**.

We call these numbers **prime numbers**. Direct attention to the factors for 8 and 11 on the board. **Is 8 prime or composite?** (composite) **Is 11 prime or composite?** (prime)

Distribute a set of index cards numbered from 1 to 20 to each small group. Each student selects an index card and builds all the different arrays that can be found for the number shown on the card. Students write the number of arrays and the sides (or factors) of each array on the back of each card. Continue until all the cards have been selected.

Ask each small group to select the cards with numbers having only one array. List these numbers on the board: 1, 2, 3, 5, 7, 11, 13, 17, 19. **Which**

**Prime and Composite Numbers**

A prime number has only one array.

7 is a prime number.

The factors of the number 7 are: 1 and 7.

A prime number has only two unique factors: the number itself and the number 1.

A composite number has more than one array.

6 is a composite number.

The factors of the number 6 are: 1, 2, 3, and 6.

A composite number has more than two unique factors.

Use square tiles to find the number of arrays and the factors of each number from 1 to 20. Write P if the number is prime and C if the number is composite.

Number of Squares	Number of Arrays	Factors	P or C
1.	1	1	N/A
2.	1	1,2	P
3.	1	1,3	P
4.	2	1,2,4	C
5.	1	1,5	P
6.	2	1,2,3,6	C
7.	1	1,7	P
8.	2	1,2,4,8	C
9.	2	1,3,9	C
10.	2	1,2,5,10	C
11.	1	1,11	P
12.	3	1,2,3,4,6,12	C
13.	1	1,13	P
14.	2	1,2,7,14	C
15.	2	1,3,5,15	C
16.	3	1,2,4,8,16	C
17.	1	1,17	P
18.	3	1,2,3,6,9,18	C
19.	1	1,19	P
20.	3	1,2,4,5,10,20	C

21. How do you know if a number is prime? It will have only 2 unique factors, 1 and itself.

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array does **not** have **unique factors**? (1) So, the number 1 is **not** prime. All the other numbers with only 1 array are called **prime numbers**.

**How you know if a number is prime?**

(A prime number can have only 1 array made from 2 unique numbers.)

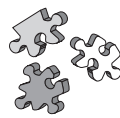
#### About This Page

Students may complete the page from the activities they have already done.

#### Follow Up Activities

##### Prime Card

Have the class separate into groups of 3 with a deck of 52 playing cards (tens and face cards



and turn the r  
Players take t  
prime number  
deck until it is  
The person wi  
round wins. Th  
card in the opp  
points in her h  
permits. Aces =  
kings = 13. Pri  
and 13 (kings).

Skill Builders

#### Sample of Scripting (Bold Type)

These rectangles are also called **arrays**. The numbers on the side of each box are related to the multiplication facts equal to 8. What are the two multiplication facts shown? ( $1 \times 8 = 8$  and  $2 \times 4 = 8$ ) The numbers on each side are the **factors** of 8.

Write on the board:

The factors of 8 are: 1, 8, 2, and 4.

Numbers which have more than one array are called **composite numbers**.

### IM2 Student Progress Report

Name \_\_\_\_\_

Record results from the Pre- and Post-Test here to see strengths and weaknesses on test questions aligned to the objectives for this level.

Test Item	CCSS or State Standard	Pre-Test	Post-Test	Objective # and Description
1.	3.NF.2a 3.NF.1	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-11</b> Write common fractions from shaded regions, number lines, printed words and representations of a part of a set. Identify numerators, denominators.
2.		<input type="checkbox"/>	<input type="checkbox"/>	
3.	4.NF.1 4.NF.1	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-12</b> Find equivalent fractions in higher or lower terms. Find all the factors of a number and the greatest common factor (GCF) of two or more numbers. Write two numbers as ratios and solve for the missing term in two equivalent fractions.
4.		<input type="checkbox"/>	<input type="checkbox"/>	
5.	4.NF.2 4.NF.2	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-13</b> Compare two like or unlike proper fractions. Order five like or unlike proper fractions and place them on a number line. Estimate fractions to the nearest whole number. Find the least common multiple (LCM) or lowest common denominator (LCD).
6.		<input type="checkbox"/>	<input type="checkbox"/>	
7.		<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-14</b> Identify mixed numbers and improper fractions. Interchange mixed numbers and improper fractions.
8.		<input type="checkbox"/>	<input type="checkbox"/>	
9.	4.NF.3a 5.NF.2	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-15</b> Calculate and solve problems involving addition and subtraction of proper fractions with common denominators with renaming and/or regrouping.
10.		<input type="checkbox"/>	<input type="checkbox"/>	
11.	5.NF.2 5.NF.2	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-16</b> Calculate and solve problems involving addition and subtraction of mixed numbers with common denominators with regrouping and/or renaming.
12.		<input type="checkbox"/>	<input type="checkbox"/>	
13.	5.NF.1 5.NF.2	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-17</b> Calculate and solve problems involving addition and subtraction of two unlike proper fractions with no renaming or simplifying.
14.		<input type="checkbox"/>	<input type="checkbox"/>	
15.	5.NF.2 5.NF.2	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-18</b> Calculate and solve problems involving addition and subtraction of two unlike mixed numbers with no renaming or simplifying. Estimate a sum or difference to the nearest whole number.
16.		<input type="checkbox"/>	<input type="checkbox"/>	
17.	5.NF.4 5.NF.6	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-19</b> Calculate and solve problems involving multiplication of two proper fractions or a proper fraction by a whole number.
18.		<input type="checkbox"/>	<input type="checkbox"/>	
19.	5.NF.7c, 6.NS.1	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-20</b> Calculate and solve problems involving division of proper fractions by proper fractions, whole numbers and mixed numbers. Write the reciprocal of a number.
20.	5.NBT.3a 5.NBT.3a	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-21</b> Write or identify decimals from a model, picture or on a number line.
21.		<input type="checkbox"/>	<input type="checkbox"/>	
22.	5.NBT.3a 5.NBT.3a	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-22</b> Read and write decimals through thousandths.
23.		<input type="checkbox"/>	<input type="checkbox"/>	
24.	5.NBT.3a 5.NBT.3a	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-23</b> Identify place value in a decimal up to ten thousandths.
25.		<input type="checkbox"/>	<input type="checkbox"/>	

Subtotal **Correct** (out of 25 items, report continued on next page)

# Decimal Place Value

# IM2 Lesson Plan

Students develop understanding of decimals using base ten blocks and money.

Objective: To write a decimal fraction in tenths and hundredths from a model.

Materials: Base ten blocks, overhead base ten blocks (optional), \$1 bill, dimes and pennies (or Master 3)

### Introductory Activities

#### Models of Decimal Fractions

Distribute base ten blocks—flats, longs and units—to each small group. After allowing an appropriate exploratory time with the base ten blocks, have students work in small groups of 2 to 4 students each to find ways that the blocks are alike and ways that they are different. Have them write the similarities and differences in two columns.

Similarities	Differences
made of wood natural color points and corners solids made of 1 cm cubes 10 of 1 block = 1 of the next larger block	sizes shape volume weight

**Can you see a special relationship describing how one block is related to the next larger block?** (It takes 10 of 1 block to equal 1 of the next larger block.)

Relate this pattern to the pattern of tens used with whole numbers in the decimal number system. **We have used the base ten blocks with whole numbers. We are now going to use base ten blocks with decimals. The blocks have a pattern of tens.**

#### Assigning Values to the Blocks

**How many different sizes do you have?** (3) **Place the blocks in order from greatest to least.** Hold up or display a flat block. **In decimals, we are going to call the largest block the ones or whole block. Think of this block as being like a one-dollar bill.** Display a one-dollar bill.

Display the middle size block, identifying it as a long block. **How many of these long blocks does it take to make 1 whole block?** (10) **What fractional part of a block is a long block?** (one-tenth) **We call this block the tenths block. Think of these blocks as being like dimes.** Display a dime.

Repeat with the units block, relating it to the hundredths place and to the penny. Display a penny.

**Relating Models to Tenths and Hundredths**

Jo divided her garden into 10 rows. She planted 1 row of tomatoes. What part of her garden is tomatoes?

Greg tiled the bathroom floor with 100 small tiles.

1 whole or 1 unit is divided into 100 equal parts.

1 part out of 10 equal parts is  $\frac{1}{10}$  or 0.1 of the whole number 1. What fractional part is 5 parts? 25 parts?

Write the fraction and decimal for the shaded part.

- $\frac{3}{10}$  or 0.3
- $\frac{2}{10} = \frac{1}{5}$  or 0.2
- $\frac{3}{10}$  or 0.3
- $\frac{3}{100}$  or 0.03
- $\frac{10}{100}$  or 0.1
- $\frac{25}{100}$  or 0.25
- 0.3
- 0.25
- 0.56

10. How is a decimal fraction like a common fraction? How is it different?

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Display one one-dollar bill, three dimes and seven pennies. **How much money is shown?** (\$1.37) Display 1 flat block, 3 longs and 7 units. Ask students to write the value of the blocks as a decimal. (1.37) Repeat with other combinations including these variations: (a) 1 flat block, 13 longs and 7 units (2.37), (b) 1 flat block, 7 units (1.07).

### About This Page

Together, read the example at the top of the page. Be sure students understand there are 10 equal-sized parts in the garden and 100 equal-sized tiles on the floor. Question 10, a Sum It Up! question, is an important generalization emphasizing that decimals are just a different representation of a common fraction.

**How is a decimal fraction like a common fraction?** (Decimals and fractions have equal size.) **How is a decimal fraction different from a common fraction?** (Common fractions are always divided into smaller place value units. Decimal fractions can be divided into different parts,

### Sample of Scripting (Bold Type)

#### Assigning Values to the Blocks

**How many different sizes do you have?** (3) **Place the blocks in order from greatest to least.** Hold up or display a flat block. **In decimals, we are going to call the largest block the ones or whole block. Think of this block as being like a one-dollar bill.** Display a one-dollar bill.

Display the middle size block, identifying it as a long block. **How many of these long**

### IM3 Student Progress Report

Name \_\_\_\_\_

Record results from the Pre- and Post-Test here to see strengths and weaknesses on test questions aligned to the objectives for this level.

Test Item	CCSS of State Standard	Pre-Test	Post-Test	Objective # and Description
1.	4.G.1	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-31</b> Know the characteristics and relationships among points, lines, line segments, rays, angles and planes.
2.	4.G.1	<input type="checkbox"/>	<input type="checkbox"/>	
3.	4.G.1	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-32</b> Identify lines as intersecting, parallel and perpendicular.
4.	4.G.1	<input type="checkbox"/>	<input type="checkbox"/>	
5.	4.G.1	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-33</b> Identify angles as acute, right, obtuse and straight.
6.	4.G.1	<input type="checkbox"/>	<input type="checkbox"/>	
7.		<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-37</b> Use a protractor to measure and draw angles and estimate the measure of an angle to the nearest 10 degrees.
8.		<input type="checkbox"/>	<input type="checkbox"/>	
9.		<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-34</b> Identify, classify and describe the properties of basic shapes and solids: square, rectangle, circle, triangle, parallelogram, quadrilateral, trapezoid, rhombus, pentagon, hexagon, octagon, decagon, diagonals of polygons, sides, vertices, faces, edges, regular polygon, isosceles triangle, right triangle, equilateral triangle, scalene triangle, sphere, prism, cone, pyramid, cylinder, rectangular solid.
10.	4.G.2	<input type="checkbox"/>	<input type="checkbox"/>	
11.	4.G.2	<input type="checkbox"/>	<input type="checkbox"/>	
12.		<input type="checkbox"/>	<input type="checkbox"/>	
13.		<input type="checkbox"/>	<input type="checkbox"/>	
14.		<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-35</b> Identify parts of a circle: center, diameter, radius and circumference. Use variables in expressions describing geometric quantities ( $C = \pi d$ ). Understand the concept of a constant such as $\pi$ .
15.		<input type="checkbox"/>	<input type="checkbox"/>	
16.	5.G.2	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-43</b> Use the Cartesian system to place a point or name its coordinates.
17.	5.G.2	<input type="checkbox"/>	<input type="checkbox"/>	
18.	4.G.3	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-60</b> Use concrete experiences to explain line symmetry and congruence of line segments, angles and polygons. Recognize figures resulting from geometric transformations such as translations (slides), reflections (flips), or rotations (turns). Explore tessellations.
19.		<input type="checkbox"/>	<input type="checkbox"/>	
20.		<input type="checkbox"/>	<input type="checkbox"/>	
21.	4.OA.5	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-44</b> Find the missing number in patterns that are arithmetic, geometric or neither. Build simple functions using concrete models and generate a corresponding rule, equation, table or graph. Know mathematical relationships of special patterns such as Fibonacci.
22.	6.EE.9	<input type="checkbox"/>	<input type="checkbox"/>	
23.	4.MD.7	<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-54</b> Explain and identify angles formed by intersecting lines, such as vertical, adjacent, complementary or supplementary.
24.		<input type="checkbox"/>	<input type="checkbox"/>	
25.		<input type="checkbox"/>	<input type="checkbox"/>	<b>IM-55</b> Use the properties of the sum of the angles of a triangle and a quadrilateral to find an unknown angle.
26.		<input type="checkbox"/>	<input type="checkbox"/>	

Subtotal **Correct** (out of 26 items, report continued on next page)

Assessment

1

# Exploring Perimeter

# IM3 Lesson Plan

Students use unit cubes to find the perimeter of a polygon.

**Objective:** To find the perimeter of a polygon.

**Materials:** Base ten unit cubes (ones blocks), tagboard rectangles

**Vocabulary:** perimeter

## Introductory Activities

### Finding Perimeters

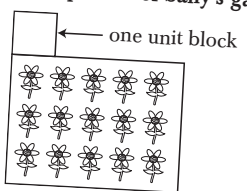
Each pair or small group of students will need unit cubes and a 3 cm by 4 cm rectangle cut from tagboard.

Approximately one-half of the 13-year-olds in the United States confused the concepts of perimeter and area on a recent National Assessment of Educational Progress (NAEP). In this lesson, students will begin developing the concept of perimeter by estimating the total length of all sides. They will then use unit cubes to measure the distance around a figure (the perimeter).

- The two stages in using unit cubes will be to:
1. place unit cubes along the sides of a polygon and then count the unit cubes, and
  2. use only one unit cube to mark off equal spaces along the outside edge of the figure

Begin by estimating the number of feet in the perimeter of the classroom. Have a student find the perimeter of the classroom by walking and counting paces. Have another student find the perimeter with rulers placed end to end. Compare the actual perimeter to the estimated perimeters.

Display the outline of a 3 cm by 4 cm rectangle on the overhead projector. Draw flowers inside the rectangle. **Here is a picture of Sally's garden.**



**She wants to place edging to separate the garden from the rest of the yard. Each unit of edging is the size of this unit block. How many units will she need?**

Display a unit block. Ask students to estimate how many units will be needed to go around the outside of the garden. Record the estimate on the overhead or board. Then ask students to physically place blocks around the outside of the rectangle to find the actual number needed. (14 blocks)

Be careful that students do not place a unit cube in each of the four corners of the rectangle. **What part of the rectangle have we measured?** (the

**Exploring Perimeter**

Anna wanted to build a fence around her garden. She placed units around the outside edge to see how many units she needed.

Anna's brother said he could find the number of units needed to fence the garden. He used one unit to mark off 1-unit lengths along the outside.

Write numbers inside each unit.

Use your unit cube to mark off equal units.

Number of units needed to fence the garden: 14

The distance around the outside of a figure is called the perimeter.

1. Place unit cubes around the outside to find the perimeter.
2. Use one unit cube to mark off units of 1 along the sides of the garden.

Estimate      Actual 6

Estimate      Actual 15

The distance between dots on the paper is 1 centimeter (1 cm). Find the perimeter of each figure to the nearest centimeter.

3. perimeter = 12 cm

4. perimeter = 12 cm

5. perimeter = 16 cm

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distance around the outside) **We call the distance around the outside of a figure its perimeter. What is the perimeter of the garden in units?** (14) Compare the actual answer to the estimate to see whose guess is closest. **There are 3 letters in the word perimeter that can help you remember the meaning of the word. What are those letters?** (RIM)

After students have placed cubes around the rectangle and found the perimeter to be 14 cm, rearrange the cm cubes in one continuous line. **How does the length of this line compare to the total lengths of the sides of the rectangle?** (They are the same.) **How do you know?** (Because the units have just been rearranged.) Repeat with a 2 cm by 6 cm rectangle and other examples.

## Sample of Scripting (Bold Type)

### About This Page

Together, r... page. Demon... to find a perim... at the concret... move from the... students look... Have studen...

### Follow Up

### Skill Builders

**She wants to place edging to separate the garden from the rest of the yard. Each unit of edging is the size of this unit block. How many units will she need?**

Display a unit block. Ask students to estimate how many units will be needed to go around the outside of the garden. Record the estimate on the overhead or board. Then ask students to physically place blocks around the outside of the rectangle to find the actual number needed. (14 blocks)

### MH1 Student Progress Report

Name \_\_\_\_\_

Record results from the Pre- and Post-Tests here to see strengths and weaknesses on test questions aligned to the objectives for this level.

Test Item	CCSS of State Standard	Pre-Test	Post-Test	Objective # and Description
1.	7.EE.4	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-1</b> Know the signs and names of terms used in the four basic operations. Describe the relationship between the subsets of the real number system.
2.		<input type="checkbox"/>	<input type="checkbox"/>	
3.	7.EE.1	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-2</b> Complete a true statement using the number properties: commutative, associative, distributive, identity elements and inverse properties for addition and multiplication, impossibility of dividing by zero and the notion of closure of a subset of the rational numbers under an operation.
4.		<input type="checkbox"/>	<input type="checkbox"/>	
5.		<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-3</b> Define and identify prime and composite numbers. Write the prime factorization by using the rules of divisibility and list all the factors of a number.
6.		<input type="checkbox"/>	<input type="checkbox"/>	
7.	5.NBT.1	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-4</b> Identify the place value of and read, write, compare and order numbers $\leq 12$ digits. Understands the structure of number systems other than the decimal system.
8.		<input type="checkbox"/>	<input type="checkbox"/>	
9.		<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-5</b> Round any number $\leq 12$ digits to any place.
10.		<input type="checkbox"/>	<input type="checkbox"/>	
11.	6.EE.4 6.EE.1	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-6</b> Give the value of and write an exponential expression in factored form and vice versa.
12.		<input type="checkbox"/>	<input type="checkbox"/>	
13.	8.EE.2 8.EE.2	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-54</b> Know the Pythagorean theorem relationship and find the missing side of a right triangle. Find the square root of perfect squares $\leq 225$ and estimate the square root of a number between two consecutive integers.
14.		<input type="checkbox"/>	<input type="checkbox"/>	
15.	7.NS.1 7.NS.3	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-7</b> Add numbers up to 6 digits of the same or varying lengths in vertical or horizontal formats.
16.		<input type="checkbox"/>	<input type="checkbox"/>	
17.	7.NS.1 7.NS.3	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-8</b> Subtract numbers up to 6 digits including regrouping across zero. Check subtraction by addition.
18.		<input type="checkbox"/>	<input type="checkbox"/>	
19.	7.NS.2 7.NS.2	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-9</b> Multiply a 3- or 4-digit number by a 2- or 3-digit number. Multiply by powers of ten and multiples of 10 and 100.
20.		<input type="checkbox"/>	<input type="checkbox"/>	
21.	7.NS.2 7.NS.2	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-10</b> Divide a 4-digit number by a 2-digit number. Divide a 5-digit number by 10, 100 or 1000. Check division by multiplication.
22.		<input type="checkbox"/>	<input type="checkbox"/>	
23.	8.F.1	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-42</b> Identify, describe and extend patterns (numerical and geometric). Includes finding the $n^{\text{th}}$ term of a pattern.
24.		<input type="checkbox"/>	<input type="checkbox"/>	
25.		<input type="checkbox"/>	<input type="checkbox"/>	

Subtotal **Correct** (out of 25 items, report continued on next page)

Assessment

1



### Problem Solving

Students use a 5-step plan.

**Objective:** To use the five-step problem solving model to solve problems involving addition and subtraction.

**Materials:** Steps in Problem Solving (Master 11)

**Vocabulary:** reasonable solution, estimate

#### Introductory Activities

#### The Five-Step Plan

In this activity, students will discover the five steps in problem solving. Be sure to write each step on the board as it is discovered. It is important that students understand clearly you believe they are capable of solving most problems you pose. Good problem solvers need strong self-concepts to become confident risk takers.

Write the following problem on the board:

In an online poll, 11,896 students said they completed their homework on Saturday and 17,143 students said they completed their homework on Sunday. How many more students completed their homework on Sunday?

**Today, we are going to find steps to help solve word problems. What is the first thing we must do to solve this problem?** (Read it.) Have a volunteer read the problem and restate it in her own words. When the story is retold correctly, acknowledge that the student has shown she understands the problem.

**What is the next step in solving the problem?** (Find the question and needed facts.)

**What is the question?** Underline the question.

**What are the facts?** Have a volunteer circle the facts in the problem on the board.

**What is the next thing we must do to solve this problem?** (Decide on a process to solve the problem.) **What ideas or strategies can we use to help decide how to solve this problem?**

Discuss the various problem-solving strategies (Master 11) together. Have students model the strategies as they are discussed.

**Can we use a model?** (Yes, students can use base ten blocks to build each number. Discuss which operation is needed to solve the problem.)

**Can we simplify the problem?** (Yes, smaller numbers can be used to model the problem. For example, 11 students do homework on Saturday and 17 do homework on Sunday. Discuss which operation is needed to solve this problem.)

**Can we act out the problem?** (Students can combine acting it out and simplifying the numbers by showing 11 students on Saturday and 17 students on Sunday. Discuss which operation is needed to solve.)

Ask students to explain the strategies they used

**Steps for Problem Solving**

Mount Everest in Asia is 28,028 feet high. Mount McKinley in Alaska is 20,320 feet high. How much higher is Mount Everest than Mount McKinley?

1. Read.  
2. Find.  
3. Decide.  
4. Estimate.  
5. Solve and check back.

How much higher is Mount Everest than Mount McKinley?  
28,028 rounds to 28,000 and 20,320 rounds to 20,000. A good estimate is about 8,000 feet.

28,028  
- 20,320  
-----  
7,708

7,708 is close to 8,000, so my answer is reasonable.

I know that I need these facts: Mt. Everest = 28,028 ft. Mt. McKinley = 20,320 ft.

Use the problem solving steps to answer the following problems.

- The deepest spot in all the oceans of the world is 35,640 ft. in the Mariana Trench near Guam. The greatest depth in the Atlantic Ocean is 30,240 ft. near Puerto Rico. Find the difference in these depths.  
Est. will vary. Actual **5394 ft.**
- Find the area of the Pacific States if the area of California is 155,959 square miles, Oregon is 95,969 square miles and Washington is 66,544 square miles.  
Est. will vary. Actual **518,499 sq. mi.**
- How many more square miles did the United States acquire through the Louisiana Purchase of 827,192 square miles than through the purchase of Alaska with 586,400 square miles?  
Est. will vary. Actual **240,792 sq. mi.**
- The distance from the earth to the moon is 238,857 miles and the distance from the earth to the sun is 92,897,416 miles. How much farther away is the sun from the earth?  
Est. will vary. Actual **92,658,559 miles**
- A basketball court is 94 feet long from end line to end line. A football field is 300 feet long from goal line to goal line. How much longer is a football field than a basketball court?  
Est. will vary. Actual **206 ft.**
- The length of the Nile River in Africa is 4145 miles. The Yangtze River in China is 3954 miles long. How much longer is the Nile than the Yangtze?  
Est. will vary. Actual **191 miles**

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and justify their selections. This process helps to clarify their thoughts and make them aware that they are making their own choices and becoming independent problem solvers.

**What process should we use to solve the problem?** (Subtraction.) **How do you know to use subtraction?** (We are comparing one number to another.)

Ask a volunteer to estimate the solution. (17,000 - 12,000 = 5000) **After estimating the answer, what should we do?** (Solve the problem.) Have a volunteer solve the problem. (17,143 - 11,896 = 5247) **How do we know if the answer is reasonable?** (Compare the answer to the estimate.) **How do we decide if the answer is correct?** (Check the problem by adding and subtracting.)

Check for understanding by asking students to explain the steps they used to solve the problem. Have students restate the problem to be sure they understand it.

#### About This

Walk the student through the example at the beginning of the lesson. Have the student complete the problem.

#### Sample of Scripting (Bold Type)

**Today, we are going to find steps to help solve word problems. What is the first thing we must do to solve this problem?** (Read it.) Have a volunteer read the problem and restate it in her own words. When the story is retold correctly, acknowledge that the student has shown she understands the problem.

**What is the next step in solving the problem?** (Find the question and needed facts.) **What is the question?** Underline the question. **What are the facts?** Have a volunteer circle the

#### MH2 Student Progress Report

Name \_\_\_\_\_

Record results from the Pre- and Post-Test here to see strengths and weaknesses on test questions aligned to the objectives for this level.

Test Item	CCSS of State Standard	Pre-Test	Post-Test	Objective # and Description
1.		<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-11</b> Use the fundamental principle of fractions to change a fraction to higher or lower terms. Identify a set of equivalent fractions. Compare and order positive and negative unlike fractions. Interchange mixed numbers and improper fractions.
2.		<input type="checkbox"/>	<input type="checkbox"/>	
3.		<input type="checkbox"/>	<input type="checkbox"/>	
4.		<input type="checkbox"/>	<input type="checkbox"/>	
5.	<b>7.NS.1</b>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-12</b> Add and subtract like and unlike proper fractions with reducing and/or regrouping. Identify multiples of a number, common denominator (least common multiple) of numbers $\leq 20$ , divisible numbers and the greatest common factor of two numbers $\leq 50$ .
6.	<b>7.NS.3</b>	<input type="checkbox"/>	<input type="checkbox"/>	
7.	<b>7.NS.1</b>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-13</b> Add and subtract mixed numbers with like and unlike denominators with simplifying and/or regrouping.
8.	<b>7.NS.1</b>	<input type="checkbox"/>	<input type="checkbox"/>	
9.	<b>7.NS.2</b>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-14</b> Multiply a proper fraction by a proper fraction or a whole number with simplifying. Find a fractional discount.
10.	<b>7.NS.3</b>	<input type="checkbox"/>	<input type="checkbox"/>	
11.	<b>7.NS.3</b>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-15</b> Multiply a mixed number by a mixed number, whole number or proper fraction with simplifying.
12.	<b>7.NS.2</b>	<input type="checkbox"/>	<input type="checkbox"/>	
13.	<b>7.NS.3</b>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-16</b> Divide a proper fraction by a proper fraction or whole number with simplifying. Write the reciprocal of a fraction or whole number.
14.	<b>7.NS.2</b>	<input type="checkbox"/>	<input type="checkbox"/>	
15.	<b>7.NS.3</b>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-17</b> Divide a mixed number by a mixed number, whole number or proper fraction with simplifying. Write the reciprocal of a mixed number.
16.	<b>7.NS.2</b>	<input type="checkbox"/>	<input type="checkbox"/>	
17.	<b>7.EE.3</b>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-44</b> Estimate the answer to a word problem. Judge the reasonableness of results and estimate operations with whole numbers, fractions, decimals and percents. Determine when an estimate rather than an exact answer is appropriate and apply in problem situations.
18.	<b>7.EE.3</b>	<input type="checkbox"/>	<input type="checkbox"/>	
19.	<b>7.NS.3</b>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-43</b> Solve a 1- or 2-step word problem using whole numbers, fractions, decimals or percents. Select the correct operation, number sentence or necessary information to solve a problem and justify that selection. Determine the reasonableness of a solution to a problem.
20.	<b>7.NS.3</b>	<input type="checkbox"/>	<input type="checkbox"/>	
21.	<b>7.NS.3</b>	<input type="checkbox"/>	<input type="checkbox"/>	
22.	<b>7.NS.3</b>	<input type="checkbox"/>	<input type="checkbox"/>	
23.	<b>7.NS.3</b>	<input type="checkbox"/>	<input type="checkbox"/>	
24.	<b>5.NBT.3a</b>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-18</b> Identify the place value of, read, write, compare and order positive and negative decimals up to the ten thousandths' place. Know that for the numeral 732.3, the value of the 3 in the tens' place is how many times the value of the 3 in the tenths' place.
25.	<b>5.NBT.3a</b>	<input type="checkbox"/>	<input type="checkbox"/>	
26.	<b>5.NBT.3a</b>	<input type="checkbox"/>	<input type="checkbox"/>	
27.	<b>5.NBT.3b</b>	<input type="checkbox"/>	<input type="checkbox"/>	

Subtotal **Correct** (out of 27 items, report continued on next page)

Assessment

1

## Representative Forms

Students relate fractions to equivalent decimals.

Objective: To change fractions to decimals.

Materials: Decimeter squares outlined on Centimeter Graph Paper (Master 2), interlocking cubes

Vocabulary: repeating decimals

### Introductory Activities

#### Changing Fractions to Terminating and Repeating Decimals

Each group will need a sheet of Centimeter Graph Paper (Master 2), scissors and at least 10 interlocking cubes.

In this activity, students share 100 cubes and shade their findings on decimeter squares. From these activities, students are led to discover the pattern for changing a fraction to a decimal.

Write on the board:

100 miles are to be paved by a number of construction crews. Find the fractional and decimal part each crew will pave if there are 4 crews sharing the 100 miles equally. What if there are 5 or 10 construction crews?

$$4 \text{ crews: } \frac{1}{4} = \frac{25}{100} = 0.25$$

$$5 \text{ crews: } \frac{1}{5} = \frac{20}{100} = 0.20$$

$$10 \text{ crews: } \frac{1}{10} = \frac{10}{100} = 0.10$$

What is the relationship between the  $\frac{1}{4}$  and 0.25,  $\frac{1}{5}$  and 0.20, and  $\frac{1}{10}$  and 0.10? (0.25 is the same as 1 divided by 4, and 25 is the same as  $\frac{1}{4}$  of 100. 0.20 is the same as 1 divided by 5; and 0.10 is the same as 1 divided by 10) **To change any fraction to a decimal, we can divide the numerator by the denominator.** Have students change the 1 to the decimal 1.00 before dividing.

Write on the board:

$$\frac{1}{4} = 4 \overline{) 1.00} \begin{array}{r} .25 \\ \end{array}$$

How can we change  $\frac{1}{3}$  to an equivalent fraction in hundredths? (divide 1.00 by 3)

Write on the board:

$$3 \overline{) 1.00} \begin{array}{r} .3333 \\ \end{array}$$

This is an example of a repeating decimal. It may be written as  $0.3\overline{3}$  or  $0.3\overline{3}$ .

Have students outline a square 10 cm by 10 cm on a sheet of graph paper. Identify the large square as one whole, a small square as  $\frac{1}{100}$  and  $\frac{100}{100}$  as the fractional name for a whole.

#### Changing Fractions to Decimals: Repeating Decimals

Molly bought an order of Big Fries to share equally with her 2 friends. There are exactly 100 fries in each order of Big Fries. If they did not divide any of the fries into a smaller piece, what fractional part of the order will each person get? What decimal part will each person get?

There are 100 pieces to be shared with 3 people. Each person will get:

$$\frac{33}{100} \text{ or } 0.3\overline{3}$$

You can change a fraction to a decimal by **dividing the numerator by the denominator.**

$$\frac{1}{3} = 3 \overline{) 1.00} \dots$$

0.333... is an example of a repeating decimal. There are two common ways of expressing this:  $0.3\overline{3}$  or  $0.3\overline{3}$

Change each fraction to a decimal. Add 0's to the decimal until the answer comes out even.

$$1. \frac{1}{8} \underline{0.125} \quad 2. \frac{3}{8} \underline{0.375} \quad 3. \frac{1}{16} \underline{0.0625} \quad 4. \frac{3}{40} \underline{0.75}$$

Change each fraction to a decimal in hundredths. Express any remainder as a fraction.

$$5. \frac{2}{3} \underline{0.66\frac{2}{3}} \quad 6. \frac{1}{6} \underline{0.16\frac{2}{3}} \quad 7. \frac{3}{7} \underline{0.42\frac{6}{7}} \quad 8. \frac{1}{9} \underline{0.11\frac{1}{9}}$$

Change each fraction to a decimal. Put a bar above repeating digits.

$$9. \frac{1}{6} \underline{0.1\overline{6}} \quad 10. \frac{5}{6} \underline{0.8\overline{3}} \quad 11. \frac{7}{9} \underline{0.7\overline{7}} \quad 12. \frac{1}{3} \underline{0.3\overline{3}}$$

13. Mom used 15 yards of cloth to make 16 small towels. How much material was used to make each towel?

$$\underline{.9375 \text{ yd.}}$$

14. After school, Sue finished 19 out of 25 items on her homework page. Joe finished 11 out of 16 items. Who completed more of his/her homework?

$$\underline{\text{Sue}}$$

15. In a contest, Ira's frog jumped  $\frac{3}{4}$  of a meter. Sal's frog jumped 0.76 or long. How far did Ira's frog jump in decimals? Whose frog jumped farther?

$$\underline{.75, \text{ Sal}}$$

16. Tom has a board that is 5 ft. long. If he cuts it into 9 equal pieces, how long will each piece be? (Express answer as a decimal.)

$$\underline{.55 \text{ ft.}}$$

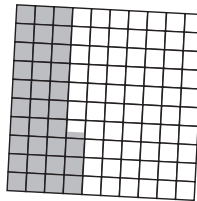
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Write on the board:

$$\frac{1}{3} = \frac{?}{100}$$

Shade one out of every three small squares. (Students shade 33 small squares and  $\frac{1}{3}$  of the remaining one.)



Repeat by shading  $\frac{1}{4}$  of the

fraction  
the de  
out fou

### Sample of Scripting (Bold Type)

What is the relationship between the  $\frac{1}{4}$  and 0.25,  $\frac{1}{5}$  and 0.20, and  $\frac{1}{10}$  and 0.10? (0.25 is the same as 1 divided by 4, and 25 is the same as  $\frac{1}{4}$  of 100. 0.20 is the same as 1 divided by 5; and 0.10 is the same as 1 divided by 10) **To change any fraction to a decimal, we can divide the numerator by the denominator.** Have students change the 1 to the decimal 1.00 before dividing.

Write on the board:

$$\frac{1}{4} = 4 \overline{) 1.00} \begin{array}{r} .25 \\ \end{array}$$

#### MH3 Student Progress Report

Name \_\_\_\_\_

Record results from the Pre- and Post-Test here to see strengths and weaknesses on test questions aligned to the objectives for this level.

Test Item	CCSS of State Standard	Pre-Test	Post-Test	Objective # and Description
1.	7.EE.3	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-25</b> Interpret percent as parts per 100 using a variety of manipulatives. Develop understanding of relationships among ratios, fractions, decimals and percents and interchange representations. Know common equivalencies.
2.		<input type="checkbox"/>	<input type="checkbox"/>	
3.		<input type="checkbox"/>	<input type="checkbox"/>	
4.		<input type="checkbox"/>	<input type="checkbox"/>	
5.		<input type="checkbox"/>	<input type="checkbox"/>	
6.	7.RP.2	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-26</b> Find the missing number in a proportion. Write the ratio of two whole numbers. Use proportions to solve scale model problems with fractions and decimals.
7.	7.RP.2	<input type="checkbox"/>	<input type="checkbox"/>	
8.	7.RP.2	<input type="checkbox"/>	<input type="checkbox"/>	
9.	7.RP.3	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-27</b> Find the percent of a whole number, decimal or money amount, including word problems.
10.	7.RP.3	<input type="checkbox"/>	<input type="checkbox"/>	
11.	7.RP.3	<input type="checkbox"/>	<input type="checkbox"/>	
12.	7.RP.3	<input type="checkbox"/>	<input type="checkbox"/>	
13.	7.RP.3	<input type="checkbox"/>	<input type="checkbox"/>	
14.	7.RP.3	<input type="checkbox"/>	<input type="checkbox"/>	
15.	7.RP.3	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-28</b> Find the amount of discount, sales tax, commission or simple and compound interest in a percent problem. Calculate percent of increases and decreases.
16.	7.RP.3	<input type="checkbox"/>	<input type="checkbox"/>	
17.	7.RP.3	<input type="checkbox"/>	<input type="checkbox"/>	
18.	7.RP.3	<input type="checkbox"/>	<input type="checkbox"/>	
19.	7.RP.3	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-51</b> Find what percent one number is of another, including word problems.
20.	7.RP.3	<input type="checkbox"/>	<input type="checkbox"/>	
21.	7.RP.3	<input type="checkbox"/>	<input type="checkbox"/>	
22.	7.NS.3	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-43</b> Solve a 1- or 2-step word problem using whole numbers, fractions, decimals or percents. Use a problem solving model that incorporates understanding the problem, making a plan, carrying out the plan and evaluating the solution for reasonableness. Use a variety of problem solving strategies including drawing a picture, looking for a pattern, guess and check, acting it out, making a table, working a simpler problem. Select the correct operation, number sentence or necessary information to solve a problem and justify that selection. Includes finding the base or whole in a percent problem.
23.	7.RP.3	<input type="checkbox"/>	<input type="checkbox"/>	
24.	7.EE.3	<input type="checkbox"/>	<input type="checkbox"/>	

Subtotal **Correct** (out of 24 items, report continued on next page)

# Percent of a Whole

# MH3 Lesson Plan

Students use models to find percent.

Objective: To use a proportion to find the percent or part of a whole.

Materials: Fraction Bars, Percent Number Lines to 100 (Master 5)

### Introductory Activities

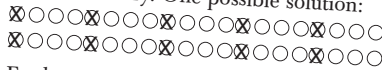
#### Finding a Part of a Whole

Each pair of students or small group will need a set of fraction bars and a copy of Percent Number Lines to 100 (Master 5).

Write on the board:

There are 40 students in the art class. 25% of the students are boys. How many boys are in the class?

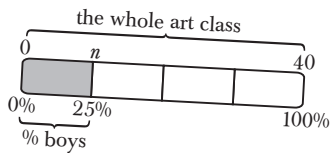
Ask students to read the problem and use a picture to solve the problem. Pictures and solutions will vary. One possible solution:



Explanation: If 25% are boys, 1 out of every 4 students are boys. I marked an X on 1 out of each group of 4. There were 25 X's.

You can also use fraction bars to visualize the whole-part relationships. What color bars would you use for 25%? (blue bars)

Write on the board:



What does this picture show us? (The shaded part shows the boys in the art class.) We can set up a proportion from this picture. We know that 25% means 25 parts out of 100, and that 100 is the whole.

Write on the board:

$$\frac{25 \text{ (parts)}}{100 \text{ (whole)}}$$

If we let  $x$  stand for the number of boys, where should we write  $x$ ? ( $x$  goes above the bar because it is the part of a whole.) Where should we write 40? (40 goes below the bar because it represents the whole class.)

$$\frac{25 \text{ (parts)}}{100 \text{ (whole)}} = \frac{x \text{ (part boys)}}{40 \text{ (whole class)}}$$

How do we solve this proportion? (Use the cross products method.)

**Percent of a Number using Proportions**

Hector got 75% on his math test. There were 60 problems on the test. How many questions did he get correct?

Let  $n$  represent the number correct out of 60.

number correct =  $\frac{75}{100} = \frac{n}{60}$

whole

You can use a proportion to solve this problem. Should the 60 be written above or below the fraction bar? Is 60 the whole test or part of the test?

Use multiply.

Divide both sides by 100.

$100 \cdot n = 75 \cdot 60$   
 $100n = 4500$   
 $n = 45$

Hector got 45 questions correct.

Solve for  $n$ .

- $\frac{40}{100} = \frac{n}{60}$   $n=40$
- $\frac{30}{100} = \frac{5}{150}$   $n=45$
- $\frac{16}{100} = \frac{n}{60}$   $n=8$
- $\frac{15}{100} = \frac{n}{160}$   $n=24$

Write the proportion and solve.

- Shawn had 80% on his math test. There were 50 problems on the test. How many did Shawn get correct?  
40
- Veron got 84% correct on his math test. There were 25 questions on the test. How many questions did he get correct?  
21
- 20% of the students bring their lunch to school. If there are 45 students in the school, how many bring their lunches?  
9
- Drew made 45% of his free throw attempts. If he tried 200 free throws, how many did he make?  
90
- Leah got 65% problems correct on a science test. There were 40 questions on the test. How many problems did she get correct?
- Vicki got 60% on a social studies test. The test had 60 problems. How many problems did Vicki get correct?

Jason got 80% on a math test of 25 problems. Find the number of problems he got correct. Use a proportion and words to explain your answer.

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Write on the board:

$$\frac{25}{100} \times \frac{x}{40}$$

$$25 \times 40 = 100 \times x$$

$$1000 = 100x$$

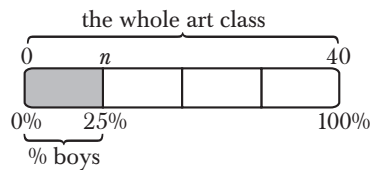
$$10 \text{ students} = x$$

There is another way to solve this proportion using equivalent fractions. First we reduce the fraction if possible. Next make both ratios have the same denominator. What number do you multiply by 4 to get 40? (10) We will multiply the fraction by  $\frac{10}{10}$ , which is the same as multiplying by one.

Write **Sample of Scripting (Bold Type)**

You can also use fraction bars to visualize the whole-part relationships. What color bars would you use for 25%? (blue bars)

Write on the board:



About

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#### MH4 Student Progress Report

Name \_\_\_\_\_

Record results from the Pre- and Post-Test here to see strengths and weaknesses on test questions aligned to the objectives for this level.

Test Item	CCSS or State Standard	Pre-Test	Post-Test	Objective # and Description
1.		<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-29</b> Know the following symbols and names: point, line, ray, angle, line segment, radius, diameter, circumference, cone cylinder, sphere, pyramid, rectangular solid, cube, chord, central angle. Use properties to classify solids, including rectangular solids, pyramids, cones, prisms, cylinders and spheres.
2.		<input type="checkbox"/>	<input type="checkbox"/>	
3.		<input type="checkbox"/>	<input type="checkbox"/>	
4.		<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-30</b> Identify angles as acute, right, obtuse, straight and lines as horizontal, diagonal, parallel, perpendicular. Draw, measure and estimate angles.
5.		<input type="checkbox"/>	<input type="checkbox"/>	
6.		<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-31</b> Classify triangles and quadrilaterals by the relationships of their sides and angles. Name polygons with up to 10 sides.
7.		<input type="checkbox"/>	<input type="checkbox"/>	
8.	<b>8.G.1a</b>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-32</b> Identify corresponding parts of congruent figures made by translations and reflections. Construct congruent lines, angles, triangles, bisectors of segments and angles and perpendicular lines. Identify line symmetry, reflection and rotational symmetry. Demonstrate an understanding of conditions that indicate two given figures are congruent.
9.	<b>8.G.1b</b>	<input type="checkbox"/>	<input type="checkbox"/>	
10.	<b>8.G.2</b>	<input type="checkbox"/>	<input type="checkbox"/>	
11.	<b>7.G.2</b>	<input type="checkbox"/>	<input type="checkbox"/>	
12.	<b>7.G.5</b>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-33</b> Find the measure of a missing angle when the angles are complimentary, supplementary, vertical or adjacent. Know the relationship of angles made when parallel lines are cut by a transversal.
13.	<b>8.G.5</b>	<input type="checkbox"/>	<input type="checkbox"/>	
14.	<b>8.G.5</b>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-52</b> Know the sum of the angles in a triangle and in a quadrilateral. Find the missing angle in a triangle and quadrilateral. Discover functional relationship between the number of sides of a regular polygon and the sum of the measure of the interior angles.
15.	<b>8.G.5</b>	<input type="checkbox"/>	<input type="checkbox"/>	
16.	<b>7.RP.2</b>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-53</b> Identify pictorial representations and corresponding sides of similar figures. Know the relationship between the corresponding angles and sides of similar figures.
17.	<b>8.EE.2</b>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-54</b> Know the Pythagorean theorem relationship and find the missing side of a right triangle. Find the square root of perfect squares $\leq 225$ .
18.	<b>8.EE.2</b>	<input type="checkbox"/>	<input type="checkbox"/>	
19.	<b>8.G.7</b>	<input type="checkbox"/>	<input type="checkbox"/>	
20.		<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-34</b> Tell clock time intervals, measure lines to the nearest $\frac{1}{8}$ inch or nearest millimeter and estimate temperatures in Fahrenheit and Celsius. Determine degree of accuracy needed in measurement situations.
21.		<input type="checkbox"/>	<input type="checkbox"/>	
22.	<b>5.MD.1</b>	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-35</b> Add, subtract, multiply and divide customary measurements of length, weight, capacity and time. Know common equivalencies.

Subtotal **Correct** (out of **22** items, *report continued on next page*)

Assessment

1

## Right Triangles

Students discover the Pythagorean Theorem.

**Objectives:** To find the Pythagorean relationship in right triangles.

**Materials:** Centimeter Graph Paper (Master 5), scissors, glue

**Vocabulary:** square, squared, exponent, factor, Pythagorean theorem, legs, hypotenuse

### Introductory Activities

#### Discover the Right Triangle Pattern

In this activity, students find the squares of numbers from 1 to 10. Each student or small group will need a sheet of centimeter graph paper and scissors. Have students outline and cut out 10 squares having sides of 1, 2, 3, ..., 10 cm.

Display a 1 centimeter square and describe the number of units on each side. **This is the smallest square shape we can make with these squares. Each side of the square has a unit of 1. How many units on the horizontal side? (1) on the vertical side? (1) How many small squares in the whole figure? (1)**

Write on the board:

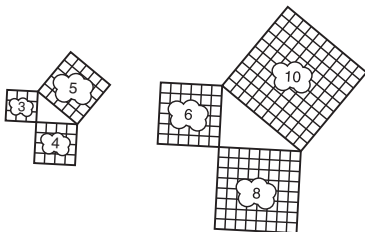
The square of 1 or 1 squared or  $1^2$  means  $1 \times 1 = 1$

Have students complete the following table:

Units	Vertical by Horizontal	Squares	Relationship
1	1 by 1	1	$1^2 = 1 \times 1 = 1$
2	2 by 2	4	$2^2 = 2 \times 2 = 4$
⋮	⋮	⋮	⋮
10	10 by 10	100	$10^2 = 10 \times 10 = 100$

**Try forming a right triangle by connecting the sides of any 3 of your squares. How many different right triangles can you make? (2)**

Ask students to describe each right triangle they find. (Students will find the 3-4-5 right triangle and the 6-8-10.)



#### The Pythagorean Theorem

Pythagoras, a Greek mathematician, discovered a special property about right triangles. This property relates to the square which can be drawn on each side. The right triangle below has sides of 3, 4 and 5.



The shorter sides, 3 and 4, are called the legs of the right triangle. The longest side, 5, is called the hypotenuse. The hypotenuse is the side opposite the right angle.

$$3^2 = 9 \quad 4^2 = 16 \quad 5^2 = 25$$

$$3^2 + 4^2 = 25 \quad 5^2 = 25$$

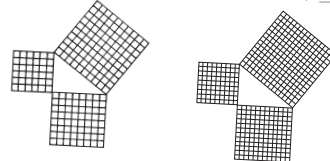
**Describe this relationship (known as the Pythagorean Theorem):**  
In a right triangle, the sum of squares on the legs equals the square on the hypotenuse.

Three sides of a triangle are given. Is the triangle a right triangle?

- 5, 12, 13    yes
- 4, 5, 6    no
- 6, 8, 10    yes
- 5, 7, 9    no
- 9, 12, 15    yes
- 7, 24, 25    yes

Find the legs and hypotenuse of the right triangle formed by these squares.

- legs = 6, 8    hypotenuse = 10
- legs = 9, 12    hypotenuse = 15



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**There is a special pattern for the sides of every right triangle. Study your squares to find the pattern. (The sum of the squares on the 2 small sides of a right triangle equals the square on the large side.)**

#### About This Page

Read the top of the page with the class.

Ask students to circle the side which would be the hypotenuse (the longest side) in each of the problems 1 to 6. Ask volunteers to use the words "if" and "then" to tell how they will know if the sides form a right triangle. (In problem 1, if the sum of the squares of 5 and 12 equals the square of 13, then it is a right triangle.)

#### Sample of Scripting (Bold Type)

Display a 1 centimeter square and describe the number of units on each side. **This is the smallest square shape we can make with these squares. Each side of the square has a unit of 1. How many units on the horizontal side? (1) on the vertical side? (1) How many small squares in the whole figure? (1)**

Write on the board:

The square of 1 or 1 squared or  $1^2$  means  $1 \times 1 = 1$

### MH5 Student Progress Report

Name \_\_\_\_\_

Record results from the Pre- and Post-Test here to see strengths and weaknesses on test questions aligned to the objectives for this level.

Test Item	CCSS or State Standard	Pre-Test	Post-Test	Objective # and Description
1.	6.NS.7a	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-48</b> Identify, graph, compare, order and solve word problems with integers. Know an integer and its opposite have a sum of zero. Know the meaning of the absolute value sign. Investigate the existence of closure under the operations with integers.
2.	6.NS.5	<input type="checkbox"/>	<input type="checkbox"/>	
3.	7.NS.1b	<input type="checkbox"/>	<input type="checkbox"/>	
4.	6.NS.7c	<input type="checkbox"/>	<input type="checkbox"/>	
5.	6.NS.6c	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-49</b> Use the Cartesian system to place a point or name its coordinates. Use the Cartesian system to draw and identify figures from points and translate points and figures to new images.
6.	6.NS.6c	<input type="checkbox"/>	<input type="checkbox"/>	
7.		<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-50</b> Solve and graph 1- or 2-step linear equations with whole number coefficients. Solve and graph a 1-step inequality having one variable. Solve equations involving absolute value.
8.	7.EE.3	<input type="checkbox"/>	<input type="checkbox"/>	
9.	7.EE.3	<input type="checkbox"/>	<input type="checkbox"/>	
10.	7.EE.3	<input type="checkbox"/>	<input type="checkbox"/>	
11.	7.EE.3	<input type="checkbox"/>	<input type="checkbox"/>	
12.	7.EE.4b	<input type="checkbox"/>	<input type="checkbox"/>	
13.	7.NS.1b	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-58</b> Add, subtract, multiply and divide with the set of integers and rational numbers. Solve word problems involving integers and rational numbers.
14.	7.NS.1c	<input type="checkbox"/>	<input type="checkbox"/>	
15.	7.NS.2c	<input type="checkbox"/>	<input type="checkbox"/>	
16.	7.NS.2d	<input type="checkbox"/>	<input type="checkbox"/>	
17.	7.NS.2c	<input type="checkbox"/>	<input type="checkbox"/>	
18.	6.EE.3	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-59</b> Translate models, pictures and words to algebraic phrases and equations. Use the distributive property to remove parentheses and combine like terms. Substitute numbers for variables. Use the order of operations with parentheses and exponents to evaluate a word phrase, number phrase or formula.
19.	6.EE.3	<input type="checkbox"/>	<input type="checkbox"/>	
20.	6.EE.3	<input type="checkbox"/>	<input type="checkbox"/>	
21.	6.EE.2c	<input type="checkbox"/>	<input type="checkbox"/>	
22.	6.EE.2a	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-60</b> Understand that a function represents a dependence of one quantity on another and can be described in a variety of ways. Write an equation and graph a function with two variables. Verify that a point lies on a line. Solve word problems using the distance relationship $d = rt$ . Graph functions of the form $y = nx^2$ .
23.	6.EE.2c	<input type="checkbox"/>	<input type="checkbox"/>	
24.	6.NS.8	<input type="checkbox"/>	<input type="checkbox"/>	
25.	7.EE.3	<input type="checkbox"/>	<input type="checkbox"/>	
26.	HSA-SSE-2	<input type="checkbox"/>	<input type="checkbox"/>	<b>MH-61</b> Multiply and divide monomials. Evaluate monomials raised to a power. Find the square root of a monomial. Multiply binomials. Find the slope of a line.
27.	HSA-SSE-2	<input type="checkbox"/>	<input type="checkbox"/>	
28.	HSA-SSE-2	<input type="checkbox"/>	<input type="checkbox"/>	
29.	HSN-RN-2	<input type="checkbox"/>	<input type="checkbox"/>	
30.	HSA-APR-1	<input type="checkbox"/>	<input type="checkbox"/>	

Total Number Correct (out of 30 items)

Assessment

1



Students write one-step equations.

**Objective:** To write equations from models or from sentences.

**Materials:** Rectangular rods (or positive rectangular rods, Master 5), black and white cubes (or positive and negative integer squares, Master 5), equal sign index card (Master 5)

**Vocabulary:** equation, phrase, equality symbol

### Introductory Activities

#### Comparing a Phrase to an Equation

In these activities, students write equations from prose and models. In equations, the variable represents a specific unknown number.

Write on the board:

$$x + 4$$

Display 1 brown bag marked  $x$  (or one rectangular rod) and 4 black cubes to model the expression.



**What is the value of  $x$ ?** (The value can be any number.)

Write on the board:

$$x + 4 = 6$$

Next to the 1 rectangular rod and 4 black cubes, put an equal sign followed by 6 black cubes.



Ask a student volunteer to explain the meaning of the models in his/her own words. (We start with an unknown number, add 4 to the number and it equals 6.)

**What number would you add to 4 and get 6? (2) Is there any other number? (no) How many different values of  $x$  will make the statement true? (only one,  $x = 2$ )**

Emphasize that the equal sign turns the phrase into a sentence or equation in which only one value of  $x$  will make the equation true.

Display other combinations with rectangular rods and cubes and an equal sign, asking students to guess and check to find the value of  $x$  that makes the statement true.

#### Writing Equations from Models or Words

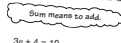
An equation is a sentence with an equal sign. In a mathematical sentence, the words "is equal to" are replaced by the equal sign. The equal sign tells you that both sides of the equation have the same value.

An equation can be written from a model or picture of a model.



An equation may be written from words.

The sum of three times a number and 4 is 10.



Write an equation for each picture. Use  $x$  as the variable.

- $x - 3 = 4$
- $3x + 4 = -2$
- $2x + 2 = 8$
- $2x + 2 = 5x - 4$
- $x + 3 + x = -2x + 3$
- $2x + 2 = 4x - 4$
- A number plus 5 is 8.  $n + 5 = 8$
- A number less 6 is 34.  $n - 6 = 34$
- 10 more than a number is 45.  $n + 10 = 45$
- A number increased by 6 is 58.  $n + 6 = 58$
- A number minus 20 is 80.  $n - 20 = 80$
- 2 times a number less 5 is 7.  $2n - 5 = 7$
- A number divided by 2 is 12.  $\frac{n}{2} = 12$
- 3 times a number decreased by 4 is 23.  $3n - 4 = 23$
- Twice the number is 12.  $2n = 12$
- 11 less than a number is 7.  $n - 11 = 7$
- A number decreased by 4 is 50.  $n - 4 = 50$
- 4 times a number is 40.  $4n = 40$

#### TEST PREP

Joan had some money in her purse. She went to the store and bought a CD for \$18. When she got home, Joan had \$10 left. Pick the equation that shows what happened.

- Answer**  A  B  C  D
- A  $n - 18 = 10$     B  $18 - 10 = 8$     C  $18 + n = 10$     D  $28 - 18 = 10$

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#### About This Page

Read and model the explanation at the top of the page together. Use one rectangular rod, black cubes, and an equal sign to model and simplify the equation.

Have student volunteers use rods and cubes to model problems 1 and 2 before they are recorded. Ask student volunteers to read and identify key operational words in problems 7–18 before they are assigned.

#### Follow Up Activities

Using

Students ways. is to k variab equati to solv

Skill B

#### Sample of Scripting (Bold Type)

**What number would you add to 4 and get 6? (2) Is there any other number? (no) How many different values of  $x$  will make the statement true? (only one,  $x = 2$ )**

Emphasize that the equal sign turns the phrase into a sentence or equation in which only one value of  $x$  will make the equation true.

Display other combinations with rectangular rods and cubes and an equal sign, asking students to guess and check to find the value of  $x$  that makes the statement true.

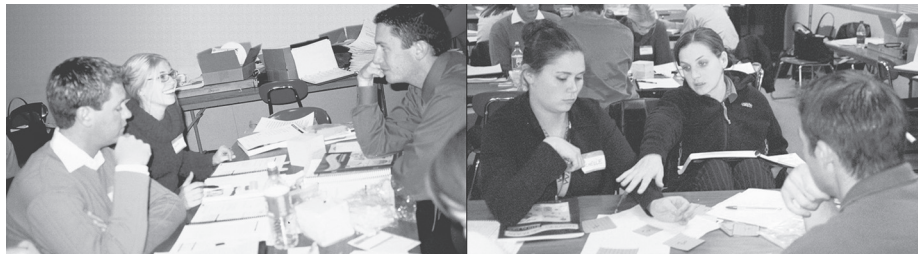
## Professional Development

*Research indicates that the mathematical proficiency of the teacher is the number one indicator of achievement in the classroom.*

Teachers receive professional development every day as they read the lesson plans and guide students in the use of manipulatives. The exploration, discovery and communication of a concept assist both the students and teachers having varying levels of math proficiency. Math directors report teachers gain confidence and enjoy teaching math more.



### Professional Training Options



Math Teachers Press, Inc. draws on talented teaching professionals to conduct hands-on workshops in districts. Consultants have expertise in teaching mathematics to students having a wide range of abilities, including special education and ELL.

Lessons incorporate assessment strategies for RTI, daily reviews, vocabulary development, classroom discussion, writing and games. Teachers learn to guide conceptually-guided instruction with true manipulatives and problem solving as they move students from the concrete stage to the abstract. Teachers learn to implement the Best Practices for RTI published by What Works Clearinghouse.



*“The activities you selected highlighted the importance of helping students move from the concrete to the abstract in stages.”*

*“You modeled differentiation as you tailored each session to meet the diverse needs of our participants.”*

Cynthia L. Chirumbole,  
Supervisor of Mathematics  
Queen Anne’s County Public Schools

*“The workshops helped teachers reach students who are struggling in math...”*

*“The teachers have reported student improvement.”*

Cathleen McStroul, Math Program Consultant 4–7  
Regional Center for Teaching and Learning, Reno, Nevada

## *Moving with Math*<sup>®</sup> **Foundations for Algebra** **RTI Components**



*Moving with Math Foundations for Algebra* addresses all the essential math content standards for grades 5 through 8+. *Foundations for Algebra* is RTI Ready™ and includes all the components listed below.

### ***Moving with Math Foundations for Algebra* RTI Check List** ✓ (Recommended by What Works Clearinghouse)

#### ✓ **Predictive Screening:**

- ▶ **Pre-Tests, Post-Tests, Daily Reviews**, and weekly **Check Points** identify at-risk students and monitor progress

#### ✓ **In-Depth Instruction:**

- ▶ Instructional focus on whole numbers in grades 1 through 4
- ▶ Supplemental focus on rational numbers in grades 3 and 4 (decimals and fractions)

#### ✓ **Systematic and Explicit Instruction:**

- ▶ Lightly-scripted lesson plans guide instruction
- ▶ Classroom activities use explicit models and strategies
- ▶ Students given opportunities to verbalize, write, discuss, and practice skills learned

#### ✓ **Solving Word Problems:**

- ▶ Explicit steps and strategies for solving word problems
- ▶ Practice solving word problems using alternative strategies
- ▶ Use of word frames (underlying structures) in solving word problems

#### ✓ **Visual Representations of Math Concepts:**

- ▶ Manipulative-based activities introduce each math concept
- ▶ Graphics-intensive Student Activity Book

#### ✓ **Fluency-Building Activities:**

- ▶ *Skill Builder* worksheets include flash cards, timed exercises, speed games
- ▶ Fact family focus builds fluency

#### ✓ **Monitoring:**

- ▶ **Pre-Tests, Post-Tests, Daily Reviews**, weekly **Check Points**, and embedded assessments monitor the progress of at-risk students

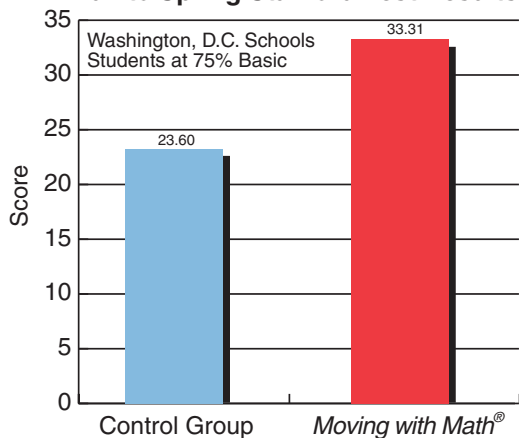
#### ✓ **Motivation:**

- ▶ Activity-based instruction offers rich opportunities for student success, and natural occasions for communication, praise, and encouragement

*“RTI intentionally cuts across the borders of special education and general education and involves school-wide collaboration.”*

*Assisting Students Struggling with Mathematics: Response to Intervention (RTI) for Elementary and Middle Schools, National Center for Education Evaluation and Regional Assistance, 2009*

## Average Increase in Scores Fall to Spring Stanford Test Results



\*Source: George Washington University Center for Equity and Excellence in Education.

# Scientifically-Based Research Shows Proven Results

George Washington University conducted an independent study of 11,000 students in the District of Columbia's extended day program. The study found that students who used *Moving with Math*® made statistically significant achievement gains on the Stanford test. **Compared to a control group, the Basic and Below Basic groups made the greatest gains!**

## Teacher Observation and Evaluations\*

### Teacher Surveys

"Teacher perceptions were obtained from responses to a 50-item survey by 832 teachers. ...regarding various aspects of the programs' implementation, features, and effectiveness. The final section of the teacher survey included five open-ended items that asked teachers to discuss their perceptions of the success of the program and the program's strengths and weaknesses."

### Teacher Responses:

"The *Moving with Math* program, with its manipulatives and highly structured script format, garnered the most praise. The teachers considered it very important for all students to receive their own sets of manipulatives, because this encouraged a sense of being a 'stakeholder' and thus a sense of responsibility. The survey respondents also praised the manipulatives' concretion of abstract concepts."

"Teacher response as to the effectiveness of the *Moving with Math* curriculum was a 5.62 on a 7 point Likert scale, with 7 as 'strongly agree.'" "A clear majority (89.6%) of the Saturday STARS instructors agreed with the statement regarding the [positive] impact of STARS on students" self-esteem...

"Teachers' perceptions of the effectiveness of the *Moving with Math* curriculums' teaching and assessment procedures were related to perceptions that academically at-risk students made enough progress in the STARS program to warrant their promotion. By contrast, teachers' ratings of the [other curricula] and STARS program features were not related to perceived student progress."

\*Copies of the complete study are available upon request.



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