Moving with Math®
Foundations for Algebra
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Foundations for Algebra
Level IM (Grades 5–6)

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- Geometry, Measurement, & Graphing 30

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Math Teachers Press, Inc.
www.movingwithmath.com  PHONE (800) 852-2435
Foundations for Algebra Overview of Topics

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

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
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.
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.

Formative Assessment for Differentiated Instruction

Math Content Standards
Math content standards matched to instructional pages.

Predictive Screening
Test questions matched to objectives.

Assessment & Monitoring
Individualized Education Plan for each student.

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

IM1 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.
The temperature at noon was 15° above zero. By midnight, the temperature had dropped 20°. What was the temperature at midnight?

2. Complete the sentence.

3. Find the sum.

4. Write the number sentence shown on the number line.

5. Write the equation for the words in the box.

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

**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.

**Progress Monitoring with Reviews for Reteaching**

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

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

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

Concrete → Representational → Abstract

4 ÷ 2 = 2

Motivational Teaching

Systematic Instruction

Visual Math Concepts
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.

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**Problem-Solving Success Related to use of Manipulatives**

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**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)

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**Problem-Solving Steps**

1. **Read and understand.**
   - The odometer in Cory’s car reads 3,737. Kim’s sister earned $1142 babysitting last year and $756 this year. How much has Kim’s sister earned?

2. **Identify the question.**
   - How do we decide how much distance we drive per gallon of gas?

3. **Decide.**
   - How do we decide if the answer is reasonable?

4. **Estimate.**
   - How many kilometers did Kim’s sister earn on a 20-hour project?

5. **Solve.**
   - How many hours did it take for them to get there?

6. **Write a number sentence.**
   - How far is San Francisco’s Golden Gate Bridge longer than New York’s George Washington Bridge?

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**Using Sentence Frames:**

**ELL Strategies**

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

**Emergent Frame:**

There are ___ children. ___ is/are left. ___ goes/go away.

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**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.

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**Five Steps in Problem Solving**

1. Read and understand.
2. Identify the question and needed facts.
3. Decide on a process.
4. Estimate.
5. Solve.
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.

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


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.
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.

### Objective Description

<table>
<thead>
<tr>
<th>Objective</th>
<th>Description</th>
<th>Lesson Plan/Student Book Pages</th>
<th>Skill Builders</th>
</tr>
</thead>
<tbody>
<tr>
<td>IM-11</td>
<td>Write common fractions from shaded regions, number lines, printed words and representations of a part of a set. Identify numerators, denominators.</td>
<td>2-5</td>
<td>11-1, 11-2, 11-3, 11-4, 11-5, 11-6</td>
</tr>
<tr>
<td>IM-12</td>
<td>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.</td>
<td>6-9, 48</td>
<td>12-1, 12-2, 12-3, 12-4, 12-5, 12-6, 12-7, 12-8, 12-9, 12-10</td>
</tr>
<tr>
<td>IM-13</td>
<td>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).</td>
<td>10, 11, 18, 24</td>
<td>13-1, 13-2, 13-3, 13-4, 13-5</td>
</tr>
</tbody>
</table>

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

### CCSS Objectives

<table>
<thead>
<tr>
<th>CCSS</th>
<th>Objective Description</th>
<th>IM1</th>
<th>IM2</th>
<th>IM3</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.NF</td>
<td>NUMBER AND OPERATIONS: FRACTIONS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.NF.1</td>
<td>Use equivalent fractions as a strategy to add and subtract fractions.</td>
<td>19-23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.NF.2</td>
<td>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. For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)</td>
<td></td>
<td>18-1, 18-2</td>
<td></td>
</tr>
<tr>
<td>5.NF.3</td>
<td>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. For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 &lt; 1/2.</td>
<td>26, 27</td>
<td></td>
<td>18-4</td>
</tr>
</tbody>
</table>

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

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

1. What fraction is shown at Point A on the number line?
   - A \( \frac{5}{8} \)
   - B \( \frac{1}{2} \)
   - C \( \frac{6}{8} \)
   - D \( \frac{6}{9} \)

2. What fraction of these shapes are circles?
   - A \( \frac{3}{7} \)
   - B \( \frac{7}{10} \)
   - C \( \frac{10}{3} \)
   - D \( \frac{3}{10} \)

3. What number goes in the box?
   - A 3
   - B 6
   - C 9
   - D 12

4. Ann ate \( \frac{5}{8} \) of a pizza. Which fraction is equivalent to \( \frac{5}{8} \)?
   - A \( \frac{1}{8} \)
   - B \( \frac{2}{8} \)
   - C \( \frac{1}{4} \)
   - D \( \frac{3}{4} \)

5. A hardware clerk is ordering nails by the length. Which nail is the shortest?
   - A \( \frac{3}{4} \) inch
   - B \( \frac{7}{8} \) inch
   - C \( \frac{5}{8} \) inch
   - D \( \frac{3}{8} \) inch

6. Which of the fractions below would be between \( \frac{1}{4} \) and \( \frac{3}{4} \) on a number line?
   - A \( \frac{1}{8} \)
   - B \( \frac{5}{8} \)
   - C \( \frac{3}{4} \)
   - D \( \frac{3}{8} \)

7. Angie bought \( 4 \frac{1}{3} \) yards of fabric. Which fraction is another name for \( 4 \frac{1}{3} \)?
   - A \( \frac{41}{3} \)
   - B \( \frac{12}{3} \)
   - C \( \frac{7}{3} \)
   - D \( \frac{13}{3} \)

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**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).
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.

**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?
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.

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.

### 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?

### IM2 Class Record Sheet

<table>
<thead>
<tr>
<th>Student Name:</th>
<th>Class:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sabrina A.</td>
<td></td>
</tr>
<tr>
<td>Maddox C.</td>
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<tr>
<td>Gabe D.</td>
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<tr>
<td>Theresa G.</td>
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<td>Naomi H.</td>
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<td>Juan H.</td>
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<td>Benjamin J.</td>
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<td>Carter L.</td>
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<td>Hayley M.</td>
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<td>David M.</td>
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</tbody>
</table>

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<td>4.</td>
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<td>5.</td>
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<td>6.</td>
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<td>7.</td>
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<td>8.</td>
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</tr>
</tbody>
</table>

**Tier 2:**
Set up learning groups by missed objectives.
The **Class Record Sheet** allows the teacher to quickly identify students who need individualized instruction (Tier 3), students who might benefit from topic-specific instruction in small groups (Tier 2), and the weakest objectives for the whole class (Tier 1).

| Tier 3: Pre-Test data identifies weakest students in the class. |
| Tier 1: Identify weaknesses of whole class by objective. |

### Class Record Sheet

#### Step 3b: Assessment

- **Class/School:**

<table>
<thead>
<tr>
<th>No. correct out of 50</th>
<th>% correct</th>
<th>Abs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>19/50</td>
<td>38%</td>
<td></td>
</tr>
<tr>
<td>26/50</td>
<td>52%</td>
<td></td>
</tr>
<tr>
<td>36/50</td>
<td>72%</td>
<td></td>
</tr>
<tr>
<td>41/50</td>
<td>82%</td>
<td></td>
</tr>
<tr>
<td>26/50</td>
<td>52%</td>
<td></td>
</tr>
<tr>
<td>34/50</td>
<td>68%</td>
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</tr>
<tr>
<td>33/50</td>
<td>66%</td>
<td></td>
</tr>
</tbody>
</table>

#### CCSS Objectives shown here

- 5.NF.4
- 5.NF.6
- 6.NS.1
- 5.NBT.3a
- 5.NBT.3b
- 6.EE.5
- 6.NS.3
- 6.EE.6
- 6.NS.4
- 6.NS.3
- 6.RP.3c

*Put an X on missed objectives.*

*Record days absent in the last column.*
### IM2 Student Progress Report

#### Objective # and Description

<table>
<thead>
<tr>
<th>Objective #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IM-11</td>
<td>Write common fractions from shaded regions, number lines, printed part of a set. Identify numerators, denominators.</td>
</tr>
<tr>
<td>IM-12</td>
<td>Find equivalent fractions in higher or lower terms. Find the least common factor (LCM) or lowest common denominator (LCD).</td>
</tr>
<tr>
<td>IM-13</td>
<td>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 greatest common factor (GCF) of two or more numbers. Write two numbers as ratios and solve for the missing term in two equivalent fractions.</td>
</tr>
<tr>
<td>IM-14</td>
<td>Identify mixed numbers and improper fractions. Interchange mixed numbers and improper fractions. Identify numerators, denominators.</td>
</tr>
<tr>
<td>IM-15</td>
<td>Calculate and solve problems involving addition and subtraction of mixed numbers with common denominators with renaming and/or regrouping.</td>
</tr>
<tr>
<td>IM-16</td>
<td>Calculate and solve problems involving addition and subtraction of mixed numbers with no renaming or simplifying. Estimate a sum or difference to the nearest whole number.</td>
</tr>
<tr>
<td>IM-17</td>
<td>Calculate and solve problems involving addition and subtraction of mixed numbers with no renaming or simplifying. Estimate a sum or difference to the nearest whole number.</td>
</tr>
<tr>
<td>IM-18</td>
<td>Calculate and solve problems involving addition and subtraction of mixed numbers with no renaming or simplifying. Estimate a sum or difference to the nearest whole number.</td>
</tr>
<tr>
<td>IM-19</td>
<td>Calculate and solve problems involving multiplication of two proper fractions or a proper fraction by a whole number. Identify mixed numbers and improper fractions. Interchange mixed numbers and improper fractions. Identify numerators, denominators.</td>
</tr>
<tr>
<td>IM-20</td>
<td>Calculate and solve problems involving division of proper fractions by proper fractions, whole numbers, fractions and decimals. Write the reciprocal of a number. Identify mixed numbers and improper fractions. Interchange mixed numbers and improper fractions. Identify numerators, denominators.</td>
</tr>
<tr>
<td>IM-21</td>
<td>Write or identify decimals from a model, picture or on a number line. Identify place value in a decimal up to ten thousandths.</td>
</tr>
<tr>
<td>IM-22</td>
<td>Read and write decimals through thousandths. Read and interpret line graphs, bar graphs and circle graphs.</td>
</tr>
<tr>
<td>IM-23</td>
<td>Compare and order decimals up to hundredths and numbers in different forms such as fractions and decimals. Find the pattern for equivalent decimals.</td>
</tr>
<tr>
<td>IM-24</td>
<td>Compare and order decimals up to hundredths and decimals. Find the pattern for equivalent decimals. Calculate and solve problems involving addition and subtraction of decimals and money amounts by up to 2-place decimals. Includes multiplying decimals by 10, 100, 1000.</td>
</tr>
<tr>
<td>IM-25</td>
<td>Interchange 2-place decimals and money amounts by a whole number or by 1-place decimals. Includes dividing decimals by 10, 100, 1000.</td>
</tr>
<tr>
<td>IM-26</td>
<td>Read and interpret line graphs, bar graphs and circle graphs. Interchange fractions having denominators of 10 or 100 with decimals. Interchange 2-place decimals and money amounts by a whole number or by 1-place decimals. Includes dividing decimals by 10, 100, 1000.</td>
</tr>
<tr>
<td>IM-27</td>
<td>Use a five-step plan and strategies to estimate and solve two-step word problems with whole numbers, fractions and decimals. Identify the percentage of a shaded region divided into 100 squares. Identify the present or future value of a set of coins and bills and make change for a $20 bill.</td>
</tr>
<tr>
<td>IM-28</td>
<td>Interchange 2-place decimals and fractions having a denominator of 10 or 100 with mixed numbers. Calculate and solve problems involving division of proper fractions and whole numbers, fractions and decimals. 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.</td>
</tr>
<tr>
<td>IM-29</td>
<td>Identifying and comparing 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 greatest common factor (GCF) of two or more numbers. Write two numbers as ratios and solve for the missing term in two equivalent fractions.</td>
</tr>
<tr>
<td>IM-30</td>
<td>Read and write decimals through thousandths. Read and interpret line graphs, bar graphs and circle graphs.</td>
</tr>
<tr>
<td>IM-31</td>
<td>Calculate and solve problems involving addition and subtraction of two unlike mixed numbers with renaming and/or regrouping. Estimate a sum or difference to the nearest whole number.</td>
</tr>
<tr>
<td>IM-32</td>
<td>Calculate and solve problems involving addition and subtraction of two unlike mixed numbers with renaming and/or regrouping. Estimate a sum or difference to the nearest whole number.</td>
</tr>
<tr>
<td>IM-33</td>
<td>Calculate and solve problems involving addition and subtraction of two unlike mixed numbers with renaming and/or regrouping. Estimate a sum or difference to the nearest whole number.</td>
</tr>
<tr>
<td>IM-34</td>
<td>Calculate and solve problems involving addition and subtraction of two unlike mixed numbers with renaming and/or regrouping. Estimate a sum or difference to the nearest whole number.</td>
</tr>
<tr>
<td>IM-35</td>
<td>Calculate and solve problems involving addition and subtraction of two unlike mixed numbers with renaming and/or regrouping. Estimate a sum or difference to the nearest whole number.</td>
</tr>
<tr>
<td>IM-36</td>
<td>Calculate and solve problems involving addition and subtraction of two unlike mixed numbers with renaming and/or regrouping. Estimate a sum or difference to the nearest whole number.</td>
</tr>
<tr>
<td>IM-37</td>
<td>Calculate and solve problems involving addition and subtraction of two unlike mixed numbers with renaming and/or regrouping. Estimate a sum or difference to the nearest whole number.</td>
</tr>
<tr>
<td>IM-38</td>
<td>Calculate and solve problems involving addition and subtraction of two unlike mixed numbers with renaming and/or regrouping. Estimate a sum or difference to the nearest whole number.</td>
</tr>
<tr>
<td>IM-39</td>
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<td>IM-51</td>
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</tr>
<tr>
<td>IM-52</td>
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</tr>
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#### Subtotal Correct (out of 25 items, repeat as needed)

<table>
<thead>
<tr>
<th>Item</th>
<th>Correct</th>
<th>Incorrect</th>
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</thead>
<tbody>
<tr>
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<td>25</td>
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</tr>
</tbody>
</table>

#### Total Number Correct (out of 50 items, includes number correct from previous page)

1. Correct
2. Incorrect

---

Step 4
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.

---

www.movingwithmath.com | 1.800.852.2435
Family Math Activities in English and Spanish

Step 4
Special Needs and ELL Connections

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.
Pacing Calendar

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)

<table>
<thead>
<tr>
<th>IM2</th>
<th>Lesson 1</th>
<th>Lesson 2</th>
<th>Lesson 3</th>
<th>Lesson 4</th>
<th>Lesson 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warm-up</td>
<td>Fractions, Decimals, Percent and Probability Pre-Test: See the Assessment Section of this Teacher Manual.</td>
<td>Objective: 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.</td>
<td>Objective: 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.</td>
<td>Objective: 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.</td>
<td>Objective: 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.</td>
</tr>
<tr>
<td>Objective: 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.</td>
<td>Objective: 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.</td>
<td>Lesson Plan pages: 5-7</td>
<td>Lesson Plan pages: 8-10</td>
<td>Lesson Plan pages: 11-13</td>
<td></td>
</tr>
<tr>
<td>Math Practice</td>
<td>Student Book pages: 2-4</td>
<td>Student Book pages: 5-7</td>
<td>Student Book pages: 8-10</td>
<td>Student Book pages: 11-13</td>
<td>Student Book pages: 11-13</td>
</tr>
<tr>
<td>Extra Practice</td>
<td>Skill Builders 11-1, 11-2, 11-3, 11-4 (Make copies from the Skill Builders section of this Teacher Manual)</td>
<td>Skill Builders 11-1-4 (Make copies from the Skill Builders section of this Teacher Manual)</td>
<td>Skill Builders 12-1, 12-2, 12-3, 12-4, 12-5, 12-6, 12-7, 12-8, 12-9, 12-10, 13-1, 13-2, 13-3, 13-4, 13-5, 14-1, 14-2 (Make copies from the Skill Builders section of this Teacher Manual)</td>
<td>Skill Builders 11-5, 11-6 (Make copies from the Skill Builders section of this Teacher Manual)</td>
<td>Skill Builders 11-5, 11-6 (Make copies from the Skill Builders section of this Teacher Manual)</td>
</tr>
<tr>
<td>Game</td>
<td>What’s My Secret game, Lesson Plans p. 4</td>
<td>Concentration Equivalencies game, Lesson Plans p. 6</td>
<td>Fraction Bar Bingo game, Lesson Plans p. 6; Fraction Bar War, Lesson Plans p. 10</td>
<td>Roll the Greater Fraction game, Lesson Plans p. 11</td>
<td>Roll the Greater Fraction game, Lesson Plans p. 11</td>
</tr>
<tr>
<td>Journal Prompts</td>
<td>Test Prep, Student Book p. 3</td>
<td>Test Prep, Student Book p. 5 &amp; 6</td>
<td>Test Prep, Student Book p. 8</td>
<td>Test Prep, Student Book p. 10</td>
<td>Test Prep, Student Book p. 10</td>
</tr>
</tbody>
</table>

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.
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.
Lesson Plan Page

**Lesson Plan Page**

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

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

**Vocabulary:** similarities, differences

**Instruction**

**Fraction Similarities and Differences**

- Distribute a set of Fraction Bar® 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 the set represents one whole unit such as one whole circle or one whole rectangle. Look through your set of fraction bars with your group. Find ways your bars are alike (similar) and ways they are different (differences).
- Record your findings in a table with two columns headed Similarities and Differences.

**Sample Table:**

<table>
<thead>
<tr>
<th>Similarities</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>All have the same number of shaded parts</td>
<td>All have different number of shaded parts</td>
</tr>
<tr>
<td>All have the same number of equal parts shaded</td>
<td>All have different number of equal parts shaded</td>
</tr>
</tbody>
</table>

**Steps:**

1. **About This Page:**
   - Read the example at the top of the page together. Direct students to complete the table as directed. (Lightly scripted)

2. **Step 5c: Instruction**
   - Begin by asking students to name one way they are alike (similar) and one way they are different (differences). This is the essential concept of a fraction.

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 name the secret. Demonstrate an example by doing what the students guess the secret of the sorting. Other ways in which students may sort are:
       - All shaded
       - All equal
       - One part shaded
       - Every bar equal
       - One part different
       - All shaded parts equal
       - All unshaded parts equal

**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

**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.
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.

(½, ⅔, ⅕, ⅙, ⅙, ⅙)

Make a tower with your bars by putting ⅙ for the bottom story, ⅝ for the next story, ⅙ 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 ⅓ mark on your green bar, identify the other fraction bars which are equivalent to ⅓. Write the name of these equivalent sets on the chart on the student page. Students may use a color of a sheet of paper to find that ⅙ is equivalent to ⅑, ⅛, ⅙ and ⅕.

Identify ⅔ as the lowest terms fraction for the items on the board. Repeat with the ⅚ bar (⅕ lines up with ⅔ and ⅖). Again, ask for the patterns to change ⅖ to ⅕ and vice versa.

About the 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 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. Place all bars face down in rows 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.

Equivalent Fractions in Lowest Terms

Identify ⅓ as the lowest terms fraction for the items on the board. Repeat with the ⅚ bar (⅕ lines up with ⅔ and ⅖). Again, ask for the patterns to change ⅖ to ⅕ and vice versa.

You can see that ⅓ is the same as ⅛. What operation is used on each term to change ⅓ to ⅛? (Multiply both terms by 2.)

Write on the board:

⅓ x 2 = ⅛

How would you change ⅕ back to ⅔? (Divide both terms by 2.)

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

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 ½ is the same as ⅔. What operation is used on each term to change ½ to ⅔? (Multiply both terms by 2.)”

How would you change ⅖ back to ⅔? (Divide both terms by 2.)”

The script helps students discover and say aloud the important patterns.
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 \( \frac{1}{2} \) cup of white cheese and \( \frac{1}{4} \) cup of yellow cheese. How much cheese is 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 \( \frac{1}{2} \) (yellow) plus \( \frac{1}{4} \) (blue), the bars must be changed to a common color.
- What common color can we change \( \frac{1}{2} \) and \( \frac{1}{4} \) to (orange)? Find the equivalent fractions in orange. \( \left( \frac{1}{2} = \frac{2}{4} \text{ and } \frac{1}{4} = \frac{1}{4} \right) \)

Write on the board:

\[ \frac{1}{2} \text{ red} + \frac{1}{4} \text{ blue} = \frac{2}{4} \text{ orange} \]

**Addition with Multiple Strips**

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

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 \( \frac{1}{2} \) and \( \frac{1}{4} \), place the 2 multiple strip over the 3 multiple strip and the 1 multiple strip over the 4 multiple strip.

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.

\[
\text{To change the improper fraction, multiply the denominator by the whole number and add the numerator.}
\]

\[
\text{To change a mixed number to an improper fraction, divide the numerator by the denominator.}
\]

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

1. ________ 3. ________ 5. ________

Change each improper fraction to a mixed number.

a. 5 3 6 3 7 11 b. 7 5 8 6 10 11 c. 7 5

Change each mixed number to an improper fraction.

a. 16 2 10 3 16 5 b. 23 3 20 7 20 11 c. 23 4

Solve. Express your answer as a mixed number.

11. 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?

12. Mai is making cookies. She has 2 lb. of butter divided into 6 sticks. Plus three 1 lb. sticks. How much butter does Mai have in all?

13. A recipe calls for 2\(\frac{1}{3}\) cups of flour. Tim's mother worked 30\(\frac{1}{2}\) hours last week. She worked 29\(\frac{1}{2}\) hours this week. How many more hours did she work last week than this week?

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.

15. Jerry is 5\(\frac{1}{2}\) feet tall. His sister is 2\(\frac{1}{2}\) feet tall. How much taller is Jerry than his sister?

16. Kim read \(\frac{3}{4}\) of her book on Monday and \(\frac{1}{2}\) of the book on Tuesday. How much has she read?

17. Hugh bought \(\frac{3}{4}\) of a yard of rope. He cut off \(\frac{1}{3}\) of a yard. How much was left?

Explain with words how drawing is helpful when adding fractions.
**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.

**Check 1 Point**

1. What fractional part is shaded?

2. What part of the set is shaded?

3. Four brownies are to be shared by 5 friends. How much will each friend get?

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

5. What number line shows point P at \( \frac{2}{3} \)?

6. Which is to \( \frac{2}{3} \)?
   - \( A \)
   - \( B \)
   - \( C \)
   - \( D \)

7. What factor?

8. What in the

9. Write to 10:00

10. Order
   - \( A \)
   - \( B \)
   - \( C \)
   - \( D \)

**IM2 Daily Reviews**

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

<table>
<thead>
<tr>
<th>Review 1</th>
<th>Review 2</th>
<th>Review 3</th>
<th>Review 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ( 15 )</td>
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</tbody>
</table>

**Check Points**

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 pages (in the Skill Builder section of the Teacher Manual).

**Name** ___________________________
Skill Builders

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.

**Linking Questions with Reteaching**

**Note:** A student missing problem 4 on Check Point 1 finds a matching **Skill Builder** page (11-4) to reteach and practice the objective.
A Post-Test is administered at the end of each book to measure progress and identify the need for further intervention.

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

**1.** What fraction of these shapes are shaded? 

![Shaded shapes diagram]

A) 7/10  
B) 3/7  
C) 3/10  
D) 4/5

**2.** What fraction of these shapes are shaded? 

A) 1/4  
B) 3/8  
C) 4/8  
D) 4/9

**3.** What number goes in the box? 

\( \frac{3}{5} = \) ___  

A) 2  
B) 5  
C) 6  
D) 20

**4.** Jules is mowing a lawn. He completed \( \frac{3}{5} \) of the job. Which fraction is equivalent to \( \frac{9}{15} \)? 

A) 3/12  
B) 3/5  
C) 6/8  
D) 4/3

**5.** Rosie has 4 rolls of lace trim. Which roll of trim is shortest? 

![Rolls of lace trim]

A) 3/16 meter  
B) 3/15 meter  
C) \( \frac{7}{8} \) meter  
D) \( \frac{3}{9} \) 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.**

<table>
<thead>
<tr>
<th>Objective # and Description</th>
<th>Score (50 possible)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IM-11 Write common fractions from shaded regions, number lines, printed words and representations of a part of a set. Identify numerators, denominators.</td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>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 Least Common Denominator (LCD).</td>
<td></td>
</tr>
<tr>
<td>IM-14 Identify mixed numbers and improper fractions. Interchange mixed numbers and improper fractions.</td>
<td></td>
</tr>
<tr>
<td>IM-15 Calculate and solve problems involving addition and subtraction of proper fractions with common denominators with renaming and/or regrouping.</td>
<td></td>
</tr>
<tr>
<td>IM-16 Calculate and solve problems involving addition and subtraction of mixed numbers with common denominators with regrouping and/or renaming.</td>
<td></td>
</tr>
<tr>
<td>IM-17 Calculate and solve problems involving addition and subtraction of two unlike proper fractions with no renaming or simplifying.</td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>IM-19 Calculate and solve problems involving multiplication of two proper fractions or a proper fraction by a whole number.</td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>IM-21 Write or identify decimals from a model, picture or on a number line.</td>
<td></td>
</tr>
<tr>
<td>IM-22 Read and write decimals through thousandths.</td>
<td></td>
</tr>
<tr>
<td>IM-23 Identify place value in a decimal up to ten thousandths.</td>
<td></td>
</tr>
<tr>
<td>IM-24 Identify place value in a decimal up to ten thousandths.</td>
<td></td>
</tr>
</tbody>
</table>

**Assessment** 1
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.

### Report: Students Grouped by Missed Objective

<table>
<thead>
<tr>
<th>Objective</th>
<th>State Standard</th>
<th>Objective Description</th>
<th>Students Who Missed the Pre-Test Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6.C.1.B</td>
<td>Identify the place value in a 7- to 12-digit number.</td>
<td>Barbara Hawkinson, Van Kellogg, Steve Fischer</td>
</tr>
</tbody>
</table>

### Report: Individual Student Proficiency

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

<table>
<thead>
<tr>
<th>State Standard</th>
<th>Pre-Test</th>
<th>Post-Test</th>
<th>Benchmark Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numeration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>□</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Whole Number Operations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>□</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Fraction Concepts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>□</td>
<td>□</td>
<td></td>
</tr>
</tbody>
</table>

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

### IM1 Standards

#### Number, Reasoning, & Data

**IM-1** 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.

**IM-2** Read, write, order and compare numbers up to 12 digits.

**IM-3** Round large numbers to the nearest thousand or to the indicated place value.

**IM-4** 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 in exponential form and relate these forms to factoring.

**IM-5** 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.

**IM-6** 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.

**IM-7** 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.

**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.

**IM-9** 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.

---

**IM1 Student Progress Report**

<table>
<thead>
<tr>
<th>Objective # and Description</th>
<th>Pre-Test</th>
<th>Post-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 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.</td>
<td>☐</td>
<td>☒</td>
</tr>
<tr>
<td>2. Read, write, order and compare numbers up to 12 digits.</td>
<td>☐</td>
<td>☒</td>
</tr>
<tr>
<td>Round large numbers to the nearest thousand or to the indicated place value.</td>
<td>☐</td>
<td>☒</td>
</tr>
<tr>
<td>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 in exponential form and relate these forms to factoring.</td>
<td>☐</td>
<td>☒</td>
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<td>☒</td>
</tr>
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<td>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.</td>
<td>☐</td>
<td>☒</td>
</tr>
<tr>
<td>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.</td>
<td>☐</td>
<td>☒</td>
</tr>
<tr>
<td>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.</td>
<td>☐</td>
<td>☒</td>
</tr>
</tbody>
</table>

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

**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 x 8 = 8 and 2 x 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 x 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 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 do 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 included).

Prime Card

Play several rounds as time permits.

The person who discards a prime card first wins the game. If a round starts and no one discards a prime card, the person holding the most cards wins the round.

Players take turns discarding one card with a prime number on it or drawing cards from the deck until it is possible to discard a prime card. When a player discards a prime card, the person to her left discards a card to the discard pile. Each player subtracts the points in her hand from her total points, then continues to discard cards. The winner is the person who has the fewest points at the end of the game.

**Vocabulary:** array, prime number, composite number, factor

**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 x 8 = 8 and 2 x 4 = 8) The numbers on each side are the factors of 8.

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 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 do you know if a number is prime?

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

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 x 8 = 8 and 2 x 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.
**Fractions, Decimals, Percent, & Probability**

**IM2 Standards**

**Learning Objectives**

<table>
<thead>
<tr>
<th>IM2 Student Progress Report</th>
<th>Name ________________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Record results from the Pre- and Post-Test here to see strengths and weaknesses on test questions aligned to the objectives for this level.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test Item</th>
<th>Objective # and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 3.NF.2a</td>
<td>IM-11 Write common fractions from shaded regions, number lines, printed words and representations of a part of a set. Identify numerators, denominators.</td>
</tr>
<tr>
<td>2. 3.NF.1</td>
<td></td>
</tr>
<tr>
<td>3. 4.NF.1</td>
<td>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.</td>
</tr>
<tr>
<td>4. 4.NF.1</td>
<td></td>
</tr>
<tr>
<td>5. 4.NF.2</td>
<td>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).</td>
</tr>
<tr>
<td>6. 4.NF.2</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>IM-14 Identify mixed numbers and improper fractions. Interchange mixed numbers and improper fractions.</td>
</tr>
<tr>
<td>8.</td>
<td></td>
</tr>
<tr>
<td>9. 4.NF.3a</td>
<td>IM-15 Calculate and solve problems involving addition and subtraction of proper fractions with common denominators with renaming and/or regrouping.</td>
</tr>
<tr>
<td>10. 5.NF.2</td>
<td></td>
</tr>
<tr>
<td>11. 5.NF.2</td>
<td>IM-16 Calculate and solve problems involving addition and subtraction of mixed numbers with common denominators with regrouping and/or renaming.</td>
</tr>
<tr>
<td>12. 5.NF.2</td>
<td></td>
</tr>
<tr>
<td>13. 5.NF.1</td>
<td>IM-17 Calculate and solve problems involving addition and subtraction of two unlike proper fractions with no renaming or simplifying.</td>
</tr>
<tr>
<td>14. 5.NF.2</td>
<td></td>
</tr>
<tr>
<td>15. 5.NF.2</td>
<td>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.</td>
</tr>
<tr>
<td>16. 5.NF.2</td>
<td></td>
</tr>
<tr>
<td>17. 5.NF.4</td>
<td>IM-19 Calculate and solve problems involving multiplication of two proper fractions or a proper fraction by a whole number.</td>
</tr>
<tr>
<td>18. 5.NF.6</td>
<td></td>
</tr>
<tr>
<td>19. 5.NF.7c, 6.NS.1</td>
<td>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.</td>
</tr>
<tr>
<td>20. 5.NBT.3a</td>
<td></td>
</tr>
<tr>
<td>21. 5.NBT.3a</td>
<td>IM-21 Write or identify decimals from a model, picture or on a number line.</td>
</tr>
<tr>
<td>22. 5.NBT.3a</td>
<td></td>
</tr>
<tr>
<td>23. 5.NBT.3a</td>
<td>IM-22 Read and write decimals through thousandths.</td>
</tr>
<tr>
<td>24. 5.NBT.3a</td>
<td></td>
</tr>
<tr>
<td>25. 5.NBT.3a</td>
<td>IM-23 Identify place value in a decimal up to ten thousandths.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Similarities</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>made of wood</td>
<td>sizes</td>
</tr>
<tr>
<td>natural color</td>
<td>shape</td>
</tr>
<tr>
<td>points and corners</td>
<td>volume</td>
</tr>
<tr>
<td>solids</td>
<td>weight</td>
</tr>
<tr>
<td>made of 1 cm cubes</td>
<td></td>
</tr>
<tr>
<td>10 of 1 block = 1 of the next large block</td>
<td></td>
</tr>
</tbody>
</table>

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? (3)

Display a dime. What fractional part of a block is a dime? (1/10)

Hold up or display a flat block. How is a decimal fraction like a common fraction? How is it different? (Decimal fractions are always divided into tenths and hundredths and smaller place values based on tenths. Common fractions can be divided into any number of different parts, e.g., fifths, sevenths, etc.)

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).

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 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.
## IM3 Standards

### Learning Objectives

<table>
<thead>
<tr>
<th>Task Item</th>
<th>State or Standard</th>
<th>Pre-Test</th>
<th>Post-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>4.G.1</td>
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</tr>
<tr>
<td>2.</td>
<td>4.G.2</td>
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<tr>
<td>3.</td>
<td>4.G.3</td>
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<tr>
<td>4.</td>
<td>4.MD.7</td>
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<td></td>
</tr>
</tbody>
</table>

#### Objective # and Description

- **IM-31**: Know the characteristics and relationships among points, lines, line segments, rays, angles and planes.
- **IM-32**: Identify lines as intersecting, parallel and perpendicular.
- **IM-33**: Identify angles as acute, right, obtuse and straight.
- **IM-34**: 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.
- **IM-35**: 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 $\pi$.
- **IM-37**: Use a protractor to measure and draw angles and estimate the measure of an angle to the nearest 10 degrees.
- **IM-38**: 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.
- **IM-39**: 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 $\pi$.
- **IM-40**: Use the Cartesian system to place a point or name its coordinates.
- **IM-41**: 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.
- **IM-42**: 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.
- **IM-43**: Explain and identify angles formed by intersecting lines, such as vertical, adjacent, complementary or supplementary.
- **IM-44**: Use the properties of the sum of the angles of a triangle and a quadrilateral to find an unknown angle.
**Exploring Perimeter**

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

**Introducing Activity:**

**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 actual perimeter to the nearest centimeter.

Display an 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 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 with other examples if time permits.

Together, read the information at the top of the page. Demonstrate each of the two different ways to find a perimeter. These two different ways are at the concrete level. The problems on the page move from the concrete to the pictorial stage as students look at dot paper to find the perimeters.

**Follow Up:**

Have students finish the page on their own.

**Skill Builders 38-1, 38-2**

**Sample of Scripting (Bold Type)**

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)
# Learning Objectives

**MH-1** Know the signs and names of terms used in the four basic operations. Describe the relationship between the subsets of the real number system.

**MH-2** 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.

**MH-3** 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.

**MH-4** Identify the place value of and read, write, compare and order numbers 12 digits. Understands the structure of number systems other than the decimal system.

**MH-5** Round any number 12 digits to any place.

**MH-6** Give the value of and write an exponential expression in factored form and vice versa.

**MH-7** Add numbers up to 6 digits of the same or varying lengths in vertical or horizontal formats.

**MH-8** Subtract numbers up to 6 digits including regrouping across zero. Check subtraction by addition.

**MH-9** 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.

**MH-10** Divide a 4-digit number by a 2-digit number. Divide a 5-digit number by 10, 100 or 1000. Check division by multiplication.

**MH-42** Identify, describe and extend patterns (numerical and geometric). Includes finding the n^th term of a pattern.

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## MH1 Student Progress Report

<table>
<thead>
<tr>
<th>Test Item</th>
<th>CSS or State Standard</th>
<th>Pre-Test</th>
<th>Post-Test</th>
<th>Objective # and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>7.EE.4</td>
<td></td>
<td></td>
<td>MH-1 Know the signs and names of terms used in the four basic operations. Describe the relationship between the subsets of the real number system.</td>
</tr>
<tr>
<td>2.</td>
<td>7.EE.1</td>
<td></td>
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<td>MH-2 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.</td>
</tr>
<tr>
<td>3.</td>
<td>5.NBT.1</td>
<td></td>
<td></td>
<td>MH-3 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.</td>
</tr>
<tr>
<td>4.</td>
<td>1.2.1</td>
<td></td>
<td></td>
<td>MH-4 Identify the place value of and read, write, compare and order numbers 12 digits. Understands the structure of number systems other than the decimal system.</td>
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<tr>
<td>5.</td>
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<td>MH-5 Round any number 12 digits to any place.</td>
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<td>6.</td>
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<td>MH-6 Give the value of and write an exponential expression in factored form and vice versa.</td>
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<tr>
<td>7.</td>
<td>6.EE.4</td>
<td></td>
<td></td>
<td>MH-7 Add numbers up to 6 digits of the same or varying lengths in vertical or horizontal formats.</td>
</tr>
<tr>
<td>8.</td>
<td>6.EE.1</td>
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<td></td>
<td>MH-8 Subtract numbers up to 6 digits including regrouping across zero. Check subtraction by addition.</td>
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<tr>
<td>9.</td>
<td>8.EE.2</td>
<td></td>
<td></td>
<td>MH-9 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.</td>
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<td>10.</td>
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<td>MH-10 Divide a 4-digit number by a 2-digit number. Divide a 5-digit number by 10, 100 or 1000. Check division by multiplication.</td>
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<tr>
<td>11.</td>
<td>7.NS.1</td>
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<td>MH-42 Identify, describe and extend patterns (numerical and geometric). Includes finding the n^th term of a pattern.</td>
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<td>12.</td>
<td>7.NS.2</td>
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<td>7.NS.7</td>
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<td>7.NS.8</td>
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<td>25.</td>
<td>8.F.1</td>
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</tbody>
</table>

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

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

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**Assessment:**

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32

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www.movingwithmath.com  |  1.800.852.2435
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 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 the answer.)

Check for understanding and reinforce skills by using a second word problem. Allow time for students to complete the page on their own.

Steps for Problem Solving

1. Decide.
2. Find.
3. Estimate.
4. Solve.
5. Check.

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 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.)

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Check for understanding and reinforce skills by using a second word problem. Allow time for students to complete the page on their own.

About This Concept

Walk the students through the steps in the example at the top of the page. Draw students' attention to the graphic on the page containing steps for problem solving. Have students complete the page on their own.

Students use a 5-step plan.
# Fractions & Decimals

## MH2 Standards

### Learning Objectives

<table>
<thead>
<tr>
<th>MH2 Student Progress Report</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Record results from the Pre- and Post-Test here to see strengths and weaknesses on test questions aligned to the objectives for this level.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Key Item</th>
<th>Objective # and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>MH-11 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.</td>
</tr>
<tr>
<td>2.</td>
<td>MH-12 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 ≤ 20, divisible numbers and the greatest common factor of two numbers ≤ 50.</td>
</tr>
<tr>
<td>3.</td>
<td>MH-13 Add and subtract mixed numbers with like and unlike denominators with simplifying and/or regrouping.</td>
</tr>
<tr>
<td>4.</td>
<td>MH-14 Multiply a proper fraction by a proper fraction or a whole number with simplifying. Find a fractional discount.</td>
</tr>
<tr>
<td>5.</td>
<td>MH-15 Multiply a mixed number by a mixed number, whole number or proper fraction with simplifying.</td>
</tr>
<tr>
<td>6.</td>
<td>MH-16 Divide a proper fraction by a proper fraction or whole number with simplifying. Write the reciprocal of a fraction or whole number.</td>
</tr>
<tr>
<td>7.</td>
<td>MH-17 Divide a mixed number by a mixed number, whole number or proper fraction with simplifying. Write the reciprocal of a mixed number.</td>
</tr>
<tr>
<td>8.</td>
<td>MH-44 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.</td>
</tr>
<tr>
<td>9.</td>
<td>MH-43 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.</td>
</tr>
<tr>
<td>10.</td>
<td>MH-18 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.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>11.</td>
<td>7.NS.1</td>
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<tr>
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<td>13.</td>
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<td>14.</td>
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<td>15.</td>
<td>7.NS.2</td>
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<tr>
<td>16.</td>
<td>7.NS.3</td>
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<td>21.</td>
<td>7.NS.3</td>
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<td>22.</td>
<td>7.NS.3</td>
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<tr>
<td>23.</td>
<td>7.NS.3</td>
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<tr>
<td>24.</td>
<td>5.NBT.3a</td>
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<td>25.</td>
<td>5.NBT.3a</td>
</tr>
<tr>
<td>26.</td>
<td>5.NBT.3a</td>
</tr>
<tr>
<td>27.</td>
<td>5.NBT.3b</td>
</tr>
</tbody>
</table>

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

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 crews: \( \frac{1}{4} = \frac{25}{100} = 0.25 \)
5 crews: \( \frac{1}{5} = \frac{20}{100} = 0.20 \)
10 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 \( \frac{1}{4} \) divided by 4, and 25 is the same as \( \frac{1}{4} \) of 100. 0.20 is the same as \( \frac{1}{5} \) divided by 5; and 0.10 is the same as \( \frac{1}{10} \) 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:

\[ \frac{1}{3} = \frac{0.333…}{100} \]

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

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 \( \frac{1}{4} \) divided by 4, and 25 is the same as \( \frac{1}{4} \) of 100. 0.20 is the same as \( \frac{1}{5} \) divided by 5; and 0.10 is the same as \( \frac{1}{10} \) 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:

\[ \frac{1}{4} = \frac{0.25}{100} \]
### MH3 Standards Learning Objectives

#### MH-25
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.

#### MH-26
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.

#### MH-27
Find the percent of a whole number, decimal or money amount, including word problems.

#### MH-28
Find the amount of discount, sales tax, commission or simple and compound interest in a percent problem. Calculate percent of increases and decreases.

#### MH-51
Find what percent one number is of another, including word problems.

#### MH-43
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.

### MH3 Student Progress Report

<table>
<thead>
<tr>
<th>Objective # and Description</th>
<th>Pre-Test</th>
<th>Post-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. MH-25 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.</td>
<td></td>
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<tr>
<td>2. MH-26 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.</td>
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<tr>
<td>3. MH-27 Find the percent of a whole number, decimal or money amount, including word problems.</td>
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<tr>
<td>4. MH-28 Find the amount of discount, sales tax, commission or simple and compound interest in a percent problem. Calculate percent of increases and decreases.</td>
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<tr>
<td>5. MH-51 Find what percent one number is of another, including word problems.</td>
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<tr>
<td>6. MH-43 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.</td>
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</table>

Subtotal Correct (out of 24 items, report continued on next page)
Percent of a Whole

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:

\[
\begin{array}{c}
\text{40 students} \\
\text{25 boys} \\
\text{25%} \\
\end{array}
\]

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 Xs.

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:

\[
\begin{array}{c}
\text{the whole art class} \\
\text{40 students} \\
\text{25 boys} \\
\text{25%} \\
\end{array}
\]

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%= 25 parts out of 100, and that 100 is the whole.

Write on the board:

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

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.)

Write on the board:

\[
\begin{align*}
25 \times 40 &= 100 \times x \\
1000 &= 100x \\
10 \text{ students} &= x
\end{align*}
\]

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 on the board:

\[
\frac{25 \times 10}{100 \times 10} = \frac{250}{1000}
\]

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:

\[
\begin{array}{c}
\text{the whole art class} \\
\text{40 students} \\
\text{25 boys} \\
\text{25%} \\
\end{array}
\]

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:

\[
\begin{array}{c}
\text{the whole art class} \\
\text{40 students} \\
\text{25 boys} \\
\text{25%} \\
\end{array}
\]
### Learning Objectives

**MH4 Standards**

| Objective # and Description | Test Item 1 | Test Item 2 | Test Item 3 | Test Item 4 | Test Item 5 | Test Item 6 | Test Item 7 | Test Item 8 | Test Item 9 | Test Item 10 | Test Item 11 | Test Item 12 | Test Item 13 | Test Item 14 | Test Item 15 | Test Item 16 | Test Item 17 | Test Item 18 | Test Item 19 | Test Item 20 | Test Item 21 | Test Item 22 |
|-----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| MH-29 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, pyramid, cones, prisms, cylinders and spheres. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| MH-30 Identify angles as acute, right, obtuse, straight and lines as horizontal, diagonal, parallel, perpendicular. Draw, measure and estimate angles. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| MH-31 Classify triangles and quadrilaterals by the relationships of their sides and angles. Name polygons with up to 10 sides. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| MH-32 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. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| MH-33 Find the measure of a missing angle when the angles are complementary, supplementary, vertical or adjacent. Know the relationship of angles made when parallel lines are cut by a transversal. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| MH-34 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. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| MH-35 Identify pictorial representations and corresponding sides of similar figures. Know the relationship between the corresponding angles and sides of similar figures. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| MH-52 Know the Pythagorean theorem relationship and find the missing side of a right triangle. Find the square root of perfect squares ≤ 225. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| MH-54 Tell clock time intervals, measure lines to the nearest 1/8 inch or nearest millimeter and estimate temperatures in Fahrenheit and Celsius. Determine degree of accuracy needed in measurement situations. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| MH-55 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)
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.

\[ 3^2 = 9 \]
\[ 4^2 = 16 \]
\[ 5^2 = 25 \]
\[ 3^2 + 4^2 = 25 = 5^2 \]

Describe this relationship (known as the Pythagorean Theorem):

___________________________________________________________________
___________________________________________________________________

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

1. 5, 12, 13
2. 4, 5, 6
3. 6, 8, 10
4. 5, 7, 9
5. 9, 12, 15
6. 7, 24, 25

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

7. legs = _____ hypotenuse = _____
8. legs = _____ hypotenuse = _____

In a right triangle, the sum of squares on the legs equals the square on the hypotenuse.

Students discover the Pythagorean relationship in right triangles.

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:

<table>
<thead>
<tr>
<th>Units</th>
<th>Vertical by Horizontal</th>
<th>Squares</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 by 1</td>
<td>1</td>
<td>( 1^2 = 1 \times 1 = 1 )</td>
</tr>
<tr>
<td>2</td>
<td>2 by 2</td>
<td>4</td>
<td>( 2^2 = 2 \times 2 = 4 )</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>10</td>
<td>10 by 10</td>
<td>100</td>
<td>( 10^2 = 10 \times 10 = 100 )</td>
</tr>
</tbody>
</table>

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.)

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 \( 1 \times 1 = 1 \)
<table>
<thead>
<tr>
<th>Objective # and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MH-48 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.</td>
</tr>
<tr>
<td>MH-49 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.</td>
</tr>
<tr>
<td>MH-50 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.</td>
</tr>
<tr>
<td>MH-58 Add, subtract, multiply and divide with the set of integers and rational numbers. Solve word problems involving integers and rational numbers.</td>
</tr>
<tr>
<td>MH-59 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.</td>
</tr>
<tr>
<td>MH-60 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 ).</td>
</tr>
<tr>
<td>MH-61 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.</td>
</tr>
</tbody>
</table>
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:

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.

Using Guess and Check

Students enjoy solving problems in a variety of ways. Explain that one way of solving an equation is to keep substituting different numbers for the variable until you find the one that makes the equation true. Ask students to use guess and check to find the value of $x$ that makes the equation true.

Follow Up Activities

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.
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 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
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.

Math Teachers Press, Inc.
www.movingwithmath.com   PHONE (800) 852-2435