



**SAN DIEGO CITY SCHOOLS**

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**Instructional Module to Enhance the Teaching of**

# **HARCOURT MATH**

**California Edition**

**GRADE 6**

**Module 2**

**Number Sense and Operations**

## KEY MATHEMATICAL CONCEPTS FOR GRADE SIX - BIG IDEAS:

*By the end of grade six, students will:*

- **Master the four arithmetic operations with positive and negative whole numbers, positive fractions, and decimals. They accurately solve problems involving fractions, ratios, proportions, and percentages.**
- Understand the concepts of mean, median and mode of data sets, and how to calculate the range. They analyze data and sampling processes for possible bias and misleading conclusions. They calculate the probabilities for compound events and understand the difference between independent and dependent events.
- Write verbal expressions and sentences as algebraic expressions and equations; **they evaluate algebraic expressions**, solve simple linear equations, and graph and interpret their results. They analyze and use tables, graphs, and rules to solve problems involving rates and proportions.
- Deepen their understanding of the measurement of plane and solid shapes and use this understanding to solve problems.

### Key Mathematical Concepts for Module 2

- Any equivalent set of a fraction, decimal and percent has the same graphical representation on a 10x10 grid, number line or any fraction model.
- Different strategies can be used to compare and order fractions, decimals and percents: Using a number line; comparing to 0,  $\frac{1}{2}$ , or 1.
- Estimation helps determine if an answer is reasonable.
- Students can estimate with decimals by using the same strategies they have used to estimate whole numbers.
- Place value concepts and properties in whole number operations can be used to add, subtract, multiply and divide decimals.
- The algorithm of multiplying without the decimals and then counting the number of places works because when you multiply by a number and then divide by the same number, the value remains equivalent.
- "Moving the decimal point" is multiplying or dividing by powers of ten.
- The remainder plays different roles in division.
- The same strategies and understanding can be used to evaluate decimal and whole number expressions.

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| <b><u>Chapter 2: Operation Sense</u></b><br>Lesson 2: Exponents<br>Lesson 3 and 4: Order of Operations                          | <b><u>Chapter 4: Decimal Operations</u></b><br>Lesson 1: Add and Subtract Decimals<br>Lesson 2: Multiply Decimals<br>Lesson 3: Math Lab: Explore Division of Decimals<br>Lesson 4: Divide with Decimals<br>Lesson 5: Problem Solving Skill: Interpret the Remainder<br>Lesson 6: Algebra: Decimal Expressions and Equations |
| <b><u>Chapter 3: Decimal Concepts</u></b><br>Lesson 1: Represent, Order and Compare Decimals<br>Lesson 4: Decimals and Percents |   |

# MODULE 2: UNIT 1: NUMBER SENSE AND OPERATIONS

## Number Sense and Operations

### MODULE 2: DAY: 1 - LESSONS: 2.1/2.2

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| <b>LESSON FOCUS:</b>   | Algebra: Exponents<br><br><i>Optional Lesson: Exponents may be explored through other lessons in context and in Warm-ups, instead of with this separate lesson.</i>  |
| <b>CA STANDARD:</b>  | <b>NS 2.0 Key Standard; AF 1.3; MR 2.0; (MR 1.3; MR 2.4; MR 2.5)</b>   |
| <b>Purpose of Lesson:</b><br>Math Background:<br>TE p. 36A and 40A | At the end of the lesson students will be able to represent numbers by using exponents, and explain their use of compensation for mental addition.   |
| <b>Warm-up/<br/>Routine(s):</b><br>Reference p. 36                 | <b>Associative Property:</b> <ul style="list-style-type: none"> <li>• <math>(6 + 8) + 5 = 6 + (8 + 5)</math></li> <li>• <math>(2 \times 9) \times 5 = 2 \times (9 \times 5)</math></li> <li>• <math>(9 + 45) + 15 = 9 + (45 + 15)</math></li> <li>• <math>(8 \times 3) \times 10 = 8 \times (3 \times 10)</math></li> <li>• <math>(7 \times 3) \times 3 = \underline{\hspace{2cm}}</math></li> <li>• <math>12 + (23 + 8) = \underline{\hspace{2cm}}</math></li> </ul> <i>"What did you learn from the pattern about the <b>Associative Property</b>?"</i><br><i>"How can the <b>Associative Property</b> help with mental math?"</i> |
| <b>LAUNCH:</b><br>TE p. 40 and p. 40<br><br>p. 41                  | <b>QUICK REVIEW: p. 40 #1-5</b> <ul style="list-style-type: none"> <li>• Students evaluate the expressions. Groups discuss how to write equivalent expressions for the equal factors using exponents. (2x2x2 are equal factors.)</li> </ul> <b>Teach: Guided Instruction: TE p. 40</b> <ul style="list-style-type: none"> <li>• <b>ADDITIONAL EXAMPLES, p. 40</b> (If needed.)</li> <li>• <b>Discuss</b> with partner/ group, then whole class: <b>p. 41; #1, 2, 5 and 19</b></li> </ul>   |
| <b>EXPLORE:</b><br>TE p. 38; TR 73:<br>Spinner                     | <b>Alternative Teaching Strategy: TE p. 38 (Compensation)</b>  |
| <b>Practice:</b>   | Partner/ group: <b>p. 41; #8, 17, 23, 26, 29, 32, 35.</b>  |
| <b>SUMMARIZE/Closure</b>   | <ul style="list-style-type: none"> <li>• <b>Discuss</b> p. 41; #35</li> <li>• <b>Assess: DISCUSS; TE p. 41</b><br/>OR</li> <li>• <b>Assess: WRITE; TE p. 41</b></li> <li>• <b>Lesson Quiz 2.2; TE p. 41</b></li> </ul>   |
| <b>Homework:</b><br>p. 39 or p. 41                                 | <ul style="list-style-type: none"> <li>• <b>Thinker's CORNER: p. 39</b><br/>OR</li> <li>• <b>MIXED REVIEW AND TEST PREP: p. 41; #36-40</b></li> </ul>  |



# MODULE 2: UNIT 1: NUMBER SENSE AND OPERATIONS

## Number Sense and Operations

### MODULE 2: DAY: 3 - LESSON: 3.1

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| <b>LESSON FOCUS:</b>  | Represent, Compare and Order Decimals  |
| <b>CA STANDARD:</b>   | NS 1.0 Key Standard; NS 1.1 Key Standard; (MR 2.5; MR 3.2)   |
| <b>Purpose of Lesson:</b><br>Math Background:<br>TE p. 52A  | At the end of the lesson students will be able to use their understanding of place value to express, compare and order decimals.<br><i>This lesson may require 2 days for the students to develop an understanding.</i>  |
| <b>Warm-up/<br/>Routine(s):</b><br><br>TR 7 Decimal Models  | <b>"What's the Difference?"</b> <ul style="list-style-type: none"> <li>Ask students to use grids to determine the difference between: <ul style="list-style-type: none"> <li><math>(3/10 + 9/100)</math> and 0.9</li> <li><math>27/10</math> and <math>174/100</math></li> </ul> </li> <li>Represent fractions as equivalent decimals.</li> <li>"How did you use the models to subtract?"</li> </ul>   |
| <b>LAUNCH:</b><br>TR 7 Decimal Squares;<br>Base 10 pieces (2 or 3 dimensional)<br>Index Cards     | <b>Ordering Decimals: Special Needs TE p. 52B.</b> <ul style="list-style-type: none"> <li>Students use one 10 by 10 decimal square as the unit (one whole).</li> <li><b>Modification:</b> Give sets of decimal cards to tables. Partners build with pieces or shade grids of the base 10 collections to verify order from least to greatest. (Example: 0.09, 0.18, 0.2, 0.19, and 1)</li> <li><b>Discuss strategies used to order the decimals.</b></li> </ul>   |
| <b>EXPLORE:</b><br>TR 7 Decimal Squares;<br>TR 4 Place Value Chart;<br>TR 73 Alternative Spinners | <b>Order and Compare Decimals:</b> <ul style="list-style-type: none"> <li><b>Thinker's CORNER: p. 55; "Spin a Decimal":</b><br/><b>Modification:</b> Accumulate points by finding the difference between the two numbers. Highest score records difference as points. <ul style="list-style-type: none"> <li>If students are just developing an understanding of decimal/ fraction connection and place value: <ul style="list-style-type: none"> <li>Spin 3 instead of six times, and use ones through hundredths places on the place value chart.</li> <li>Verify with decimal squares.</li> <li>"What strategies did you use to make your decision?"</li> </ul> </li> </ul> </li> </ul> |
| <b>Practice:</b><br><br>p. 52 and p. 54   | <b>Equivalent Representation: Forms of Decimals (Books closed.)</b> <ul style="list-style-type: none"> <li>Make a chart labeled <b>Standard, Expanded and Word (p. 52).</b></li> <li>Write 0.053 in the three forms on the chart: <b>EXAMPLE 1A: p. 52.</b></li> <li>Students fill out the chart for <b>EXAMPLES B and C.</b></li> </ul> <b>PRACTICE AND PROBLEM SOLVING: p. 54; #33 and #37.</b>  |
| <b>SUMMARIZE/Closure</b>  | <ul style="list-style-type: none"> <li><b>Thinker's CORNER: REASONING: TE p. 55.</b></li> <li><b>Assess: WRITE TE p. 55.</b></li> </ul>  |
|   | <b>Assess: Lesson Quiz 3.1; #3-6: TE p. 55.</b>  |
| <b>Homework:</b>  | <ul style="list-style-type: none"> <li>p. 54; #30 and 36; <i>Justify the order of the numbers.</i></li> <li><b>Problem Solving Applications: p. 55; #39 and 40. "What's the Error?"</b></li> </ul>   |

**MODULE 2: UNIT 1: NUMBER SENSE AND OPERATIONS**  
**Number Sense and Operations**

**MODULE 2: DAY: 4 - LESSON: 3.4**

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| <b>LESSON FOCUS:</b>   | Decimals and Percents   |
| <b>CA STANDARD:</b>  | <b>NS 1.0 Key Standard;</b> (MR 1.1; MR 2.4)  |
| <b>Purpose of Lesson:</b><br>Math Background:<br>TE p. 60A                             | At the end of the lesson students will be able to use their understanding of the relationship between decimal and percent and write a decimal as a percent and a percent as a decimal.  |
| <b>Warm-up/<br/>Routine(s):</b>  | <b>PROBLEM OF THE DAY 3.4: TE p. 60A.</b>   |
| <b>LAUNCH:</b><br>TR 7 Decimal Grids   | <p><b>MATH LAB Activity; p. 60</b></p> <ul style="list-style-type: none"> <li>Students shade their first initial using whole squares, as big as will fit on the grid; and estimate the percent for their initial.</li> <li>Record equivalent representations in decimal, fraction and expanded notation for fractions and decimals. (Example: <math>36\% = 0.36 = (0.3 + 0.06) = 36/100 = (3/10 + 6/100) = (30\% + 6\%)</math>)</li> <li>Next: shade one grid representing the total percent in a way that makes it easy to determine the total without counting all of the squares.</li> <li>Students explain their representations using the shaded grid to the group.</li> </ul> <p><b>Guided Instruction: TE p. 60</b></p> <ul style="list-style-type: none"> <li>Students use grids and translate the percent of the circle graph into the shaded decimal grid representation.</li> <li>For the <b>REASONING</b> question, students justify answer with grid model.</li> <li>Use <b>ADDITIONAL EXAMPLES A and/or B</b> if needed.</li> </ul> |
| <b>EXPLORE:</b><br>1 copy of CHALLENGE<br>3.4 worksheet per student and a transparency | <p><b>CHALLENGE 3.4: TE p. 61.</b> (Partner/ group)</p> <ul style="list-style-type: none"> <li>Students shade #1 independently.</li> <li><b>Write</b> equivalent decimal and fraction in addition to the percent.</li> <li><b>Discuss</b> reasoning with partner, then whole class.</li> <li><b>Ask:</b> "How did you decide how many to shade?"</li> <li>Assign one problem per group. Students explore problem independently, then discuss in groups.</li> <li>Partners choose from among the remaining problems when everyone in the group can explain the assigned problem.</li> </ul>  |
| <b>Practice:</b>   | <b>Independent Practice p. 61; #10, 12, 14 and 23.</b>  |
| <b>SUMMARIZE/Closure</b>   | <p><b>Discuss</b> solutions to <b>CHALLENGE</b> problem(s):</p> <ul style="list-style-type: none"> <li>Group members use transparency to explain reasoning for their assigned starting problem. <b>Ask:</b> "How did you decide to .?" or "How did you know to ?" type questions if reasoning doesn't come out from student discussion.</li> </ul>  |
|  | <b>ASSESS: Lesson Quiz 3.4:</b> Write the fraction in hundredths in addition to the equivalent decimal or percent.  |
| <b>Homework:</b>   | <b>p. 62: Estimate #10-17. Explain</b> solution to #29.   |

**MODULE 2: UNIT 1: NUMBER SENSE AND OPERATIONS**  
**Decimal Operations**

**MODULE 2: DAY: 5 - LESSON: 4.1**

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| <b>LESSON FOCUS:</b>                                       | Add and Subtract Decimals   |
| <b>CA STANDARD:</b>  | <b>NS 2.0 Key Standard; MR 2.1; (MR 2.4)</b>  |
| <b>Purpose of Lesson:</b><br>Math Background:<br>TE p. 66A | At the end of the lesson students will be able to understand addition and subtraction of decimals; and connect their understanding of place value and operations with whole numbers.  |
| <b>Warm-up/<br/>Routine(s):</b>                            | <p><b>Mental Math: <math>39 + 57</math> and <math>4.7 + 5.9</math></b></p> <ul style="list-style-type: none"> <li>• <i>Discuss</i> strategies in groups.</li> <li>• <i>Compare</i> whole number to decimal strategies.</li> <li>• If <b>compensation</b> strategy does not come up, record:<br/><math>(49 + 1) + (57 - 1) = 50 + 56</math></li> <li>• <i>Ask students to record a "path" using the compensation strategy for the decimal problem:</i> <math>(4.7 - 0.1) + (5.9 + 0.1) = 4.6 + 6</math>.</li> <li>• "How do you decide what to add or subtract when using compensation for mental math?"</li> </ul>  |
| <b>LAUNCH:</b>   | <p><b>"I had \$67.87 and bought three items for: \$6.21, \$32.75 and \$8. Estimate how much money I have left."</b></p> <ul style="list-style-type: none"> <li>• <i>Discuss</i> strategies and record any reasonable estimates.</li> <li>• Students determine the exact answer using any method they wish (<i>Private Think Time</i>); then <i>discuss</i> strategies.</li> <li>• <i>Write</i> a representation for the computation of the same problem vertically without aligning decimal points for all of the numbers and compare the estimate to this incorrect answer. (Example: List the \$8 under the hundredths place instead of the one's place.)</li> </ul> <p><b>Questions:</b></p> <ul style="list-style-type: none"> <li>• "How does the estimate help avoid errors when dealing with adding and subtracting decimals?"</li> <li>• "How are adding and subtracting decimals connected to adding and subtracting whole numbers without decimal points?"</li> </ul> |
| <b>EXPLORE:</b><br>TE p. 66A;<br>Transparency 4.1          | <p><b>PROBLEM OF THE DAY 4.1: TE p. 66A</b></p> <ul style="list-style-type: none"> <li>• <i>Private Think Time</i>. Then partner/ group work.</li> <li>• <b>Record</b> solution from one student and ask for strategies and reasoning used. Press student to explain reasoning behind procedure "How did you decide how to start the problem?" "How did you determine...?" "Once you had one number, what strategy did you use to..?"</li> </ul> <p><b>Partners:</b></p> <ul style="list-style-type: none"> <li>• Use the same digits to create a subtraction problem.</li> <li>• Trade problems with another pair and try to solve the new problem.</li> </ul>   |
| <b>Practice:</b>   | <b>p. 69; #37-40.</b> Include the "path to solution" for #39 and 40.  |
| <b>SUMMARIZE:</b>  | Select different students to share strategies they used to add and subtract decimals.   |
| <b>Closure:</b>  | <p><b>Assess: DISCUSS; TE p. 69</b></p> <p><b>Assess: Lesson Quiz 4.1 (#4 and 6 only).</b> Write "path" to estimate and show how you found an exact answer.</p>   |
| <b>Homework:</b>   | <b>p. 69; #42-45</b>  |

# MODULE 2: UNIT 1: NUMBER SENSE AND OPERATIONS

## Decimal Operations

### MODULE 2: DAY: 6 - LESSON: 4.5

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| <b>LESSON FOCUS:</b>  | Interpret the Remainders   |
| <b>CA STANDARD:</b>   | <b>NS 2.0 Key Standard;</b> MR 3.2; (MR 2.0; MR 3.1)   |
| <b>Purpose of Lesson:</b><br>Math Background: TE p. 80A   | At the end of the lesson students will be able to solve problems dealing with remainders; and explore the meanings of division.<br><i>This lesson is optional, if embedded in other lessons.</i>   |
| <b>Warm-up/<br/>Routine(s):</b><br><br>Decimal grids  | <b>Use Mental Math strategies and/ or decimal grids to find the mean average:</b> <ul style="list-style-type: none"> <li>• 0.6; 0.2; 0.3; 0.5</li> <li>• 0.24; 0.3; 0.06</li> </ul> <p>If leveling strategy doesn't emerge, use transparency to model. Shade bar graphs of the 4 numbers, using 1/10 for each square. Ask students to level the "stacks". (Example: "Moving" 2/10 from the 6/10 and 1/10 from 5/10 to make four equal stacks of 4/10.)</p> <p><b>Ask students how this leveling process relates to the algorithm of adding and dividing.</b></p>   |
| <b>LAUNCH:</b><br>Tiles, centimeter cubes or other manipulatives to model division<br><br>TE p. 80B | <p><b>Model and verbalize different meanings of division.</b></p> <ul style="list-style-type: none"> <li>• Students <b>sketch</b> or build models that represent these situations: "May had 8 candy bars that she shared equally with one friend." And, "May bought 8 pencils with two pencils in a pack. How many packs did she buy?"</li> <li>• <b>Record</b> sketches and equation: <math>8/2 = 4</math>.</li> <li>• Students verbalize to partner how their model shows <math>8/2 = 4</math>.</li> <li>• <b>Record</b> meanings from students in their own words. Example: "8 put into 2 equal groups" and other descriptions that match the meaning.</li> <li>• Repeat with the second problem. After students explain new model to partner, record their explanations and make a template that works for the two meanings.<br/>Examples: "_____ put into _____ equal groups." And: "How many equal groups of _____ are in _____?"</li> </ul> <p><b>ALTERNATIVE TEACHING STRATEGY: TE p. 80B.</b><br/>(Students build, sketch or visualize a model for each problem.)</p> <p><b>Sample problems to use in addition to the problem given on p. 80B:</b></p> <ul style="list-style-type: none"> <li>• "Thirteen students, 4 students per car. How many cars needed?"</li> <li>• "Giselle had 14.75 to spend on ride tickets at the carnival. Tickets were \$1.50 each. After she bought as many tickets as she could, how much money did she have left?"</li> <li>• "13 pencils for 4 students. How many pencils does each student get?"</li> <li>• "Four men need to empty thirteen crates. If they each empty an equal number of crates, how many crates will each man empty?"             <ul style="list-style-type: none"> <li>• Students explain to partner what the numbers represent in each problem and how they determined what to do with the remainder (round up, ignore, include the remainder in the answer as a fraction, or interpret the remainder as the answer.</li> </ul> </li> </ul> |

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| <b>EXPLORE:</b>          | <ul style="list-style-type: none"> <li>• <b>Write</b> two division problems with remainders that have different roles.</li> <li>• Exchange problems with another pair of students.</li> <li>• <b>Discuss</b> solution and role of the remainder. (Use template to scaffold.)</li> </ul>  |
| <b>Practice:</b>         | Partner work: <b>CHALLENGE 4.5: TE p. 81.</b>  |
| <b>SUMMARIZE/Closure</b> | <ul style="list-style-type: none"> <li>• Selected students <b>read aloud and discuss</b> the meaning of the division and the role of the remainder in their problem(s).</li> <li>• "<i>How do you decide whether to drop, round up, or keep the remainder?</i>"</li> <li>• <b>Discuss: CHALLENGE 4.5; #1 and 2.</b></li> </ul> |
|                          | <b>Assess: WRITE Lesson Quiz 4.5: TE p. 81; #1 and 2.</b>  |
| <b>Homework:</b>         | <ul style="list-style-type: none"> <li>• <b>MIXED APPLICATIONS: p. 81; #5, 7, 9:</b> include "<i>path to solution</i>"</li> <li>• <b>PROBLEM SOLVING PRACTICE: p. 81; #1-3:</b> mental math</li> <li>• <b>CHALLENGE 4.5: TE p. 81;</b> Choose 1 remaining problem.</li> </ul>  |

Notes:

**MODULE 2: UNIT 1: NUMBER SENSE AND OPERATIONS**  
**Decimal Operations**

**MODULE 2: DAY: 7 - LESSON: 4.2**

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| <b>LESSON FOCUS:</b>                                    | Multiply Decimals  |
| <b>CA STANDARD:</b>                                     | <b>NS 2.0 Key Standard; MR 2.1; (MR 1.3; MR2.4; MR 2.5; MR 3.1)</b>  |
| <b>Purpose of Lesson:</b><br>Math Background: TE p. 70A | At the end of the lesson students will be able to understand and use strategies for multiplying decimals: and connect those strategies to whole number concepts and mental math.   |
| <b>Warm-up/<br/>Routine(s):</b><br><br>Base 10 pieces   | <p><b>Estimate: <math>4 \times 4.2</math>.</b> Students evaluate the numerical expression.</p> <ul style="list-style-type: none"> <li>• Use a mental math strategy <i>and</i> decimal pieces to find the product.</li> <li>• <b>Discuss</b> student models for multiplication: If it doesn't emerge, bring up: <b>Repeated addition</b> and the <b>distributive property</b>. <ul style="list-style-type: none"> <li>• Students write and model the problem using the distributive property: <math>4 \times 4.2 = 4 \times (4 + 0.2) = (4 \times 4) + (4 \times 0.2) = 16.8</math> and repeated addition: <math>4.2 + 4.2 + 4.2 + 4.2 = 16.8</math></li> <li>• "How are these numerical representations equivalent to models with the decimal pieces (or any other method students bring up)?"</li> </ul> </li> <li>• <b>Compare</b> estimate to actual answer.</li> <li>• Use mental math strategies and/ or decimal pieces to solve: <math>5 \times 0.12</math>. <ul style="list-style-type: none"> <li>• <b>Verify</b> reasonableness with the estimate.</li> </ul> </li> </ul> |
| <b>LAUNCH:</b><br><br>p. 71                             | <p><b>Area model for multiplying decimals; p. 71 (Books closed.)</b></p> <ul style="list-style-type: none"> <li>• Students shade their grids to represent the following situation: "6/10 of Juliana's yard (the 10x10 grid) was set aside for a play area. 2/10 of the play area was used for the basketball court. How much of the yard is the basketball court?"</li> <li>• Students use grids to explain solution to partner/ group.</li> <li>• Selected students explain solution at overhead.</li> <li>• Record <b>numerical equation</b> for the path using fractions and decimals: <math>2/10</math> of <math>6/10 = 2/10 \times 6/10 = 12/100</math> and <math>0.2 \times 0.6 = 0.12</math></li> </ul>   |
| <b>EXPLORE:</b>   | <p><b>Situation:</b> (The large square is a whole cake.):<br/> "4/10 (0.4) of the cake was left after the party. When Sammy came home, he ate 7/10 (0.7) of what was left. What part of the whole cake did he eat?"</p> <ul style="list-style-type: none"> <li>• Students model problem on grid and write "path" with equivalent fraction and decimal representations: <math>7/10 \times 4/10 = 28/100</math> and <math>0.7 \times 0.4 = 0.28</math>.</li> <li>• Solve with grid and write "path" using decimal representation: <math>0.3 \times 0.9</math> and <math>0.4 \times 0.8</math></li> </ul>   |

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| <p><b>Practice:</b><br/>pp. 72-73</p> | <p><b>Partner Work: pp. 72-73; #14-17 and 25, 26.</b></p> <ul style="list-style-type: none"> <li>• <b>Estimate</b>, then <b>solve</b> using one of the strategies: (Scaffold with the book and class chart of the methods and examples.) <ul style="list-style-type: none"> <li>• Distributive property</li> <li>• Repeated addition</li> <li>• Decimal grid area model</li> </ul> </li> <li>• Multiply without decimal points and use estimate to determine placement of the point in the product.</li> </ul> |
| <p><b>SUMMARIZE/Closure</b></p>       | <ul style="list-style-type: none"> <li>• Choose students to <b>explain solutions</b> to specific problems and discuss.</li> <li>• Students make observations and conjectures about any patterns they notice about the list of multiplication equations and their products.</li> </ul>  |
|                                       | <p><b>Assess: Lesson Quiz 4.2: TE p. 73; #1-4.</b><br/>(For #3 and 4, record the products on the transparency without placing the decimal points in the products.)</p> <ul style="list-style-type: none"> <li>• Solve #1 and 2 and show numerical "<i>path</i>", and use estimation with other strategies to determine the placement of the decimal points for #3 and 4.</li> </ul>  |
| <p><b>Homework:</b></p>               | <p>p. 73; #21, 24, 43, 44 and <b>MIXED REVIEW AND TEST PREP.</b></p>   |

Notes:

# MODULE 2: UNIT 1: NUMBER SENSE AND OPERATIONS

## Decimal Operations

### MODULE 2: DAY: 8 - LESSON: 4.3

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| <b>LESSON FOCUS:</b>  | Explore Division of Decimals  |  |                      |                |               |                 |               |                                |               |                          |               |          |               |
| <b>CA STANDARD:</b>   | <b>NS 2.0 Key Standard; MR 2.4</b>  |  |                      |                |               |                 |               |                                |               |                          |               |          |               |
| <b>Purpose of Lesson:</b>   | At the end of the lesson students will be able to use a model to explore division of decimals and its relationship to division of whole numbers.  |  |                      |                |               |                 |               |                                |               |                          |               |          |               |
| <b>Warm-up/<br/>Routine(s):</b>   | <p>Students look for the pattern in the equations and complete. If time, students write new equations that follow the same rule. <i>(Instead of writing as fractions, use the division sign. Later when you record fractional representation of division it will provide opportunities for students to relate dividing and multiplying divisor and dividend to multiplying and dividing fractions by the "Giant One".)</i></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 60%;"><math>8/4 = 8 \div 4 = 4/2 = 4 \div 2 = 2/1 = 2 \div 1 = 2</math></td> <td style="text-align: right;"><b>New Equations</b></td> </tr> <tr> <td><math>24/12 = 12/6</math></td> <td style="text-align: right;">_____ = _____</td> </tr> <tr> <td><math>88/22 = 44/11</math></td> <td style="text-align: right;">_____ = _____</td> </tr> <tr> <td><math>54/18 = \underline{\quad} /9</math></td> <td style="text-align: right;">_____ = _____</td> </tr> <tr> <td><math>\underline{\quad} /3 =</math></td> <td style="text-align: right;">_____ = _____</td> </tr> <tr> <td><math>360/40</math></td> <td style="text-align: right;">_____ = _____</td> </tr> </table>  | $8/4 = 8 \div 4 = 4/2 = 4 \div 2 = 2/1 = 2 \div 1 = 2$ | <b>New Equations</b> | $24/12 = 12/6$ | _____ = _____ | $88/22 = 44/11$ | _____ = _____ | $54/18 = \underline{\quad} /9$ | _____ = _____ | $\underline{\quad} /3 =$ | _____ = _____ | $360/40$ | _____ = _____ |
| $8/4 = 8 \div 4 = 4/2 = 4 \div 2 = 2/1 = 2 \div 1 = 2$                            | <b>New Equations</b>  |  |                      |                |               |                 |               |                                |               |                          |               |          |               |
| $24/12 = 12/6$  | _____ = _____   |  |                      |                |               |                 |               |                                |               |                          |               |          |               |
| $88/22 = 44/11$   | _____ = _____   |  |                      |                |               |                 |               |                                |               |                          |               |          |               |
| $54/18 = \underline{\quad} /9$  | _____ = _____   |  |                      |                |               |                 |               |                                |               |                          |               |          |               |
| $\underline{\quad} /3 =$  | _____ = _____   |  |                      |                |               |                 |               |                                |               |                          |               |          |               |
| $360/40$  | _____ = _____   |  |                      |                |               |                 |               |                                |               |                          |               |          |               |
| <b>LAUNCH:</b><br>TR 7 Decimal Square Paper and Decimal Square or Base 10 pieces. | <p>Display 3.66 decimal squares: <b>Activity 1, p. 74.</b> (Books Closed.)</p> <ul style="list-style-type: none"> <li>• Use <i>Private Think Time</i> to determine the value of this collection. Students explain to partners how they determined the total.</li> <li>• 3.66 and 366 should both come up. If only 366 comes up, write 3.66 and ask how that could also know that could also be a correct value for the diagram or collection. <i>(If the large decimal square is one, the value is 3.66, but if the small square is one, the value is 366.)</i></li> <li>• Students explain to partner how they determined the value of the other pieces once they knew the unit.</li> </ul> <p><b>Model division with the pieces:</b> Students read the following problem (or one in context you know is of interest to your students) in two ways using the chart they created in Lesson 4.5:</p> <ul style="list-style-type: none"> <li>• <i>"If the numeral 36 represents chairs, create a word problem in your group that matches the first meaning of division on the template." (36 divided into <u>3</u> equal groups.)</i></li> <li>• Students create a problem about the 36 chairs that fits the second meaning of division: <i>"How many groups of <u>3</u> are there in <u>36</u>?"</i></li> <li>• Students solve 36/3.</li> <li>• Partners <b>explain solutions</b> and interpretation they modeled: 36 divided into 3 equal groups, or How many groups of three are in 36?</li> </ul> |  |                      |                |               |                 |               |                                |               |                          |               |          |               |

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| <p><b>EXPLORE:</b><br/>Base 10 pieces and Base 10 grid paper.</p> | <p><b>Students change the unit to solve 3.6/ 0.3:</b> (Large square represents 1 unit.)</p> <ul style="list-style-type: none"> <li>• <b>Read</b> problem aloud both ways: students decide which meaning makes sense to them. (3.6 divided into 3/10 equal groups does not make as much sense as taking groups of 3/10 from 3.6.)</li> <li>• <b>Chart</b> the numerical equations during the lesson to use for making observations and conjectures.</li> <li>• <b>Predict</b>, then <b>solve</b> using pieces and/ or shaded Base 10 grid paper: 3.66/0.3 and 3.66/3.</li> <li>• <b>Practice</b>, p. 74; #1 and 3: <b>Verify</b> with grids/ pieces.</li> </ul>  |
| <p><b>Practice:</b></p>   | <p><b>Activity 2: p. 75</b> (Books Closed.): 36/12 and 3.6/1.2</p> <ul style="list-style-type: none"> <li>• Partners <b>read</b> the problems both ways. Use pieces or grid paper to solve the problems and then <b>record</b> the numerical equations.</li> <li>• Partners/ groups <b>discuss</b> their observations.</li> <li>• Predict 0.36/0.12. Check prediction using the pieces.</li> </ul>  |
| <p><b>SUMMARIZE/Closure</b></p>                                   | <p><b>"What did you notice about the changes to the patterns that resulted in the same answer?"</b></p> <ul style="list-style-type: none"> <li>• Partners/ groups change these problems to make them easier to solve using mental math:<br/>(Rotate starting problem for different groups.) 5.6/0.8; 0.36/0.09; 24/0.2;<br/>(56/8; 36/9; 240/2)</li> <li>• <b>Discuss</b> strategies.</li> <li>• <b>"How do these problems relate to what we learned about simplifying division problems for mental math?"</b> (We can divide or multiply the divisor and the dividend by the same number, and the quotient is always the same. When we move the decimal point, we are multiplying or dividing by powers of 10.)</li> </ul> <p><b>Oral Assessment: TE p 75.</b><br/><b>Modification:</b> Use decimal squares/paper to explain solution orally to partner.</p> |
| <p><b>Homework:</b></p>   | <p><b>p. 75 #4 and 7:</b> Use decimal square paper to solve.</p> <ul style="list-style-type: none"> <li>• <b>Change</b> the problems to get the same quotient.</li> <li>• <b>Write</b> a division pattern set for others to solve. (See Warm-up.)</li> </ul>  |



**MODULE 2: UNIT 1: NUMBER SENSE AND OPERATIONS**  
**Decimal Operations**

**MODULE 2: DAY: 10 - LESSON: 4.6**

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| <b>LESSON FOCUS:</b>   | Algebra: Decimal Expressions and Equations   |
| <b>CA STANDARD:</b>  | AF 1.0; AF 1.1 Key Standard; (NS 2.0 Key Standard)   |
| <b>Purpose of Lesson:</b><br>Math Background:<br>TE p. 82A                 | At the end of the lesson students will be able to evaluate expressions and solve equations with decimals using mental math and substitution. They will be able to translate between numerical and verbal representations of equations and expressions.   |
| <b>Warm-up/<br/>Routine(s):</b><br><br>p. 31 #12-16                        | <b>Mental Math:</b> Solve the equation on #12 ( $p - 7 = 14$ ) <ul style="list-style-type: none"> <li>Students translate the first equation (#12) into words that show understanding of the meaning of the equation and then verbalize the reasoning used to solve the equation.</li> <li>Mentally solve p. 31; #14-16.</li> <li>Verify solution by substitution.</li> </ul>   |
| <b>LAUNCH:</b><br>Transparency 4.6<br>TE p. 82B                            | <ul style="list-style-type: none"> <li><b>NUMBER OF THE DAY 4.6 or PROBLEM OF THE DAY 4.6</b></li> <li>Evaluate expressions: <b>ENGLISH LANGUAGE LEARNERS: TE p. 82B.</b></li> </ul>   |
| <b>EXPLORE:</b><br><br>p. 83 #15-20<br><br>Guided Instruction:<br>TE p. 82 | <p><i>Write equations on p. 83; #15-20 (Solving for x.)</i></p> <ul style="list-style-type: none"> <li>Students make sense of the equations orally before solving with partner/ group. For example: <math>1.7 = d/4</math> is read: "1 and 7/10 equals some number divided by four." OR "What number divided by 4 = 1.7?"</li> <li><b>Ask:</b> "How would you determine the solution for x?"</li> </ul> <p><b>Guided Instruction: TE p. 82:</b> Scaffold by substituting whole numbers for decimals in the examples, or by changing numbers by rounding to make meaning before finding the solution.</p> <p><b>Guided Practice: p. 83; #3-8:</b> Partners/groups first read aloud.</p> |
| <b>Practice:</b>   | <p>Solve two of the problems on p. 83; #15-20, using mental math.</p> <ul style="list-style-type: none"> <li><b>Record and explain path to solution.</b> Then solve p. 83; #21.</li> </ul>   |
| <b>SUMMARIZE/Closure</b>   | <p><b>Assess: Lesson Quiz 4.6</b> on Transparency 4.6: Scaffold by changing to compatible whole numbers, then repeating with the actual numbers.</p> <ul style="list-style-type: none"> <li><b>Translate #5, 6, and 7</b> into words with a partner before whole class discussion of meaning: "3 times what number = 4.8?" and "4.8 divided by what number = 3?"</li> <li><b>Chart</b> the "path to solution" for each problem ("<math>4.8/3 = a</math>") without solving for the variable.</li> </ul> <p><b>Assess: Lesson Quiz 4.6:</b> Solve one problem from each of the two sections.</p>   |
| <b>Homework:</b>   | <ul style="list-style-type: none"> <li>p. 84; #35 and 39: Include "path to solution" for each equation.</li> <li>p. 83; #22 and MATH DETECTIVE: p. 86; #2</li> </ul>   |

**MODULE 2: UNIT 1: NUMBER SENSE AND OPERATIONS**  
**Decimal Operations**

**MODULE 2: DAY: 11 - LESSON: Assessment**

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| <b>LESSON FOCUS:</b>                               | Assessment of Unit Standards.   |
| <b>CA STANDARD:</b>                                | MR 2.0; AF 1.1 Key Standard; NS 2.0 Key Standard  |
| <b>Purpose of Lesson:</b>                          | <ul style="list-style-type: none"> <li>• Complete Performance Assessment</li> <li>• Teacher choice for additional assessment</li> </ul>     |
| <b>Warm-up/<br/>Routine(s):</b><br>TR 76-77; TR 71 | <b>Performance Assessment 6.1B: PA 4 Pizza Party</b><br>Partners or small groups: <b>Modify:</b> Students respond to the first bullet only. |
| <b>LAUNCH:</b>                                     | Teacher choice for additional assessment:<br><br>↓  |
| <b>EXPLORE:</b>                                    | ↓   |
| <b>Practice:</b>                                   | <b>CHALLENGE 4.6; TE p. 83</b>  |
| <b>SUMMARIZE/Closure</b>                           |   |
| <b>Homework:</b>                                   | Complete <b>CHALLENGE 4.6; TE p. 83</b>   |

**MODULE 2: UNIT 1: NUMBER SENSE AND OPERATIONS**  
**Decimal Operations**

**MODULE 2: DAY: 12 - (Optional) LESSON: Challenge**

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|---------------------------------|---|
| <b>LESSON FOCUS:</b>            | Scientific Notation: (Optional at this time.)<br><i>Optional Lesson: Scientific Notation may be explored through other lessons in context and in Warm-ups, instead of with this separate lesson.</i>  |
| <b>CA STANDARD:</b>             | NS 1.0 (Grade 7)  |
| <b>Purpose of Lesson:</b>       | At the end of the lesson students will be able to interpret and write values using scientific notation.   |
| <b>Warm-up/<br/>Routine(s):</b> | p. 41; #15, 18, 29, 30, 31  |
| <b>LAUNCH:</b>                  | <ul style="list-style-type: none"> <li>• <i>Make a chart on board: Label one column <b>Standard Notation</b> and the other <b>Scientific Notation</b>.</i></li> <li>• <i>Write three numbers in <b>scientific notation</b> and <b>standard notation</b>;</i></li> <li>• <i>Ask students to look for patterns, but not discuss what they notice yet.</i></li> <li>• <i>Write another number in <b>scientific notation</b>. Give students time for Private Think Time to make conjectures.</i></li> <li>• <i>Students translate between <b>scientific</b> and <b>standard notation</b> when you supply one representation or another.</i></li> <li>• <i>Questions: (Partner/group talk before class discussions.)</i></li> <li>• <i>"What do you think the rules might be for <b>scientific notation</b>?"</i></li> <li>• <i>"Why do you suppose they developed <b>scientific notation</b>?"</i></li> </ul> <p style="text-align: right;">TE p. 87 <b>USING THE PAGE:</b> TE p. 87 (Select according to class needs.)</p> |
| <b>EXPLORE:</b>                 | TRY IT; p. 87; #1-5   |
| <b>Practice:</b>                | TRY IT; p. 87; #1-5   |
| <b>SUMMARIZE/Closure</b>        | <p><b>Reasoning TE p. 87:</b> Partners discuss how to write a number in scientific notation and how to compare two numbers written in scientific notation.</p> <p><i>Chart: "Rules" students have verbalized for writing and comparing numbers written in scientific notation.</i></p>  |
| <b>Homework:</b>                | <p><b>Cumulative Review: p. 85; #1-10</b></p> <ul style="list-style-type: none"> <li>• <i>For two of the problems, include an explanation of the use of estimation strategies to verify or eliminate answers.</i></li> </ul>  |