



San Diego Unified School District

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Instructional Module to Enhance the Teaching of

HARCOURT

**Math**

California Edition

**Grade 5**  
**Module 6 – Modified**

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Divide Whole Numbers and Decimals

## MATHEMATICS CURRICULUM MAP - GRADE 5

**MODULE 6 – Divide Whole Numbers and Decimals**  
Modules represent individual units of study that lead to essential learnings

### THREADS THROUGHOUT THE YEAR:

*The threads represent ongoing learning opportunities in which students should be actively engaged throughout all units of inquiry during the entire school year. These items should not be isolated to any one particular unit of inquiry.*

#### Students will:

- Develop understanding of numbers and the number system and use their understanding to solve problems and recognize reasonable results.
- Develop understanding of and fluency in basic computation and procedural skills.
- Use mathematical reasoning to solve problems.
- Communicate their mathematical thinking by using words, numbers, symbols, graphs and charts and translate between different representations.
- Use equations and variables to express generalizations of patterns and relationships.
- Develop logical thinking to analyze evidence and build arguments to support or refute a hypothesis.
- Make connections among mathematical ideas and between other disciplines
- Develop and use strategies, skills, and concepts to solve problems.
- Use appropriate tools, including technology, as vehicles to learn mathematical concepts.

### These are essential learnings that represent bigger ideas/concepts:

- Students understand and use the two models of division (sharing and grouping) when solving division problems.
- Students use a variety of strategies to estimate and find quotients.

### These are essential questions that learners ask themselves in order to achieve the essential learnings:

- \*How do I use counters to review key division ideas and vocabulary?
- How do I estimate quotients using patterns and compatible numbers?
- How do I use patterns and basic facts to write quotients for decimals divided by whole numbers?
- How do I extend estimation strategies to larger dividends?
- \*How do I use the context to interpret remainders?
- \*How do I use different strategies to solve division problems (basic facts, the inverse relationship of multiplication, division patterns of multiples of ten, partial products and partial quotients)?
- How do I predict when the quotient will be a decimal less than one?
- How do I know when a fraction represents a division problem?
- How do I use patterns to find quotients in decimal division?
- How does “clearing” the decimal point in the divisor connect to patterns of multiplying and dividing by powers of ten?

\* Presented in previous grades

**Resources:** Van de Walle: Chapter 10 (143-153), Ch 11 (173-174), Ch 14 (235-236), Ch 15 (243), Ch 17 (294-295); Mathematics Source Book, (pp. 49, 51, 57-58)

## Harcourt Mathematics

## Grade 5

## Unit 4: Divide Whole Numbers and Decimals

**MODULE 6 NOTES**

- The numbers that are used in this module are based on the standards for the grade. They may or may not reflect your students' number sense understanding. Adjust the numbers where necessary to give all students access to the learning. It is sometimes necessary to give different numbers to different students so that each student is challenged within their "zone of proximal development."
- Many of the **Explores** in this module pose questions with multiple answers. Your students will develop their higher level thinking skills by solving these problems. It is your role to encourage the exploration needed to do these tasks. To do this, you will need to pose many questions to the students throughout the lesson in order to push their thinking.
- The order of Lessons 13.1 and 13.2 and Lessons 14.1 and 14.2 has been switched.
- Chapter 14 is inserted within the lessons for Chapter 13.
- Students are encouraged to use strategies that make sense to them including partial quotients. Using such methods negates any reason for differentiating between 1-digit and 2-digit divisors. Therefore, the first 10 days of this module use both size divisors.
- Consider using parts of Unit 4 Test for Assessment

<p><b>CHAPTER 11:</b> <i>“Divide by 1-Digit Divisors”</i></p> <p><u>Day 1</u></p> <p><b>Lesson 11.1</b> Estimate Quotients Using Compatible Numbers</p>	<p><u>Day 2</u></p> <p><b>Lesson 11.2</b> Divide Large Numbers</p>	<p><u>Day 3</u></p> <p><b>Lesson 11.3</b> Understand and Use Strategies for Dividing Including Zeros in Division</p>	<p><u>Day 4</u></p> <p><b>Lesson 11.4</b> Divide Large Numbers by 1- and 2-Digit Divisors</p>	<p><u>Day 5</u></p> <p><b>Lesson 11.6</b> Using Context to Interpret the Remainder</p>
<p><b>CHAPTER 12:</b> <i>“Divide by 2-Digit Divisors”</i></p> <p><u>Day 6</u></p> <p><b>Lesson 12.1</b> Algebra: Patterns in Division</p>	<p><u>Day 7</u></p> <p><b>Lesson 12.2</b> Estimate Quotients</p>	<p><u>Day 8</u></p> <p><b>Lesson 12.3</b> Divide by 2-Digit Divisors</p>	<p><u>Day 9</u></p> <p><b>Lesson 12.4</b> Practice Division</p>	<p><u>Day 10</u></p> <p><b>Lesson 12.6</b> Practice Division</p>
<p><b>CHAPTER 13:</b> <i>“Divide Decimals by Whole Numbers”</i></p> <p><u>Day 11</u></p> <p><b>Lesson 13.2</b> Hands on: Decimal Division</p>	<p><u>Day 12</u></p> <p><b>Lesson 13.1</b> Algebra: Patterns in Decimal Division</p>	<p><b>CHAPTER 14:</b> <i>“Divide Decimals by Decimals”</i></p> <p><u>Day 13</u></p> <p><b>Lesson 14.2</b> Hands on: Divide with Decimals</p>	<p><u>Day 14</u></p> <p><b>Lesson 14.1</b> Algebra: Patterns in Decimal Division</p>	<p><u>Day 15</u></p> <p><b>Lesson 13.3/14.3</b> Divide Decimals by Whole Numbers/Divide Decimals by Decimals</p>
<p><u>Day 16</u></p> <p><b>Lesson 13.5</b> Divide to Change a Fraction to a Decimal</p>	<p><u>Day 17</u></p> <p>Assessment</p>			

DAY: 1  
 Divide Whole Numbers and Decimals  
 Unit 4: Chapter 11  
 LESSON 11.1, pp. 181-183

<b>MATERIALS:</b>	26 counters (cubes, beans, tiles, etc.) for each pair or small group.
<b>LESSON FOCUS:</b>	Estimate quotients using compatible numbers.
<b>CALIFORNIA STANDARDS:</b>	<p><b>Number Sense:</b></p> <p>1.1: Estimate, round, and manipulate very large and very small numbers.</p> <p>2.2: Demonstrate proficiency with division, including division with positive decimals and long division with multi-digit divisors.</p> <p><b>Mathematical Reasoning:</b></p> <p>2.1: Use estimation to verify the reasonableness of calculated results.</p> <p>2.3: Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning.</p> <p>2.4: Express the solution clearly and logically by using the appropriate mathematical notation and terms and clear language; support solutions with evidence in both verbal and symbolic work.</p> <p>2.6: Make precise calculations and check the validity of the results from the context of the problem.</p>
<b>PURPOSE OF LESSON/ ESSENTIAL QUESTIONS:</b>	<p>How do I estimate quotients using patterns and compatible numbers?</p> <p>How do I use different strategies to solve division problems?</p>
<p><b>LAUNCH:</b></p> <p><u>Compatible numbers</u> are numbers that are easy to compute mentally.</p>	<p><b>To connect to prior learning:</b>  <b>Students use 26 counters.</b></p> <ul style="list-style-type: none"> <li>Ask students how many groups of 4 are in 26.</li> <li>Have them show the groups on their desks.</li> <li>Ask students to record the problem:</li> </ul> $26 \div 4 \qquad 4 \overline{)26} \qquad \frac{26}{4}$ <ul style="list-style-type: none"> <li>Ask which multiples of 4 does 26 come between. (students might count by fours or recognize six 4s = 24; seven 4s = 28, so 26 comes between 24 and 28. These are <u>compatible numbers</u> because they can be divided by 4 mentally. Using compatible numbers is one strategy for estimating in division. Highlight this process and encourage students to use compatible numbers to <u>estimate</u> that the answer is between 6 and 7.</li> </ul> <p><b>To connect to the Explore, write the following problem for the class to see:</b></p> <p><i>Ten years ago, Mr. Jiminy started 5 stores that sold video games. He ordered 489 video games during that first year. He wanted each store to get the same number of video games to sell. How many did each store receive?</i></p> <ul style="list-style-type: none"> <li>Ask students what numbers would make this an “easy” problem to solve in their heads. (e.g., <math>500 \div 5</math> or <math>450 \div 5</math>).</li> <li>Ask: <i>What would be a reasonable number of video games for each store to get?</i></li> <li>Ask students that if we were dividing by 5 what “easy” number would they think of if the dividend was 324? 2,477?</li> </ul> <p><b>Note:</b> Different students will have different numbers they think are “easy” to work with.</p>

<p><b>EXPLORE:</b></p> <p>Examples of Partial Quotient Method</p> $  \begin{array}{r}  72 \overline{)24,051} \\  \underline{-7,200} \quad 100 \\  16,851 \\  \underline{-7,200} \quad 100 \\  9,651 \\  \underline{-7,200} \quad 100 \\  2,451 \\  \underline{-720} \quad 10 \\  1,731 \\  \underline{-720} \quad 10 \\  1,011 \\  \underline{-720} \quad 10 \\  291 \\  \underline{-144} \quad 2 \\  147 \\  \underline{-144} \quad +2 \\  3 \quad 334 \text{ R.3}  \end{array}  $ $  \begin{array}{r}  24 \overline{)24,051} \\  \underline{-24,000} \quad 1,000 \\  51 \\  \underline{-48} \quad +2 \\  3 \quad 1,002 \text{ R.3}  \end{array}  $	<p><b>Write the following problems for the class to see:</b></p> <p><i>This year Mr. Jiminy owns 72 stores that sell video games. He has ordered 24,051 video games this year. He still wants each store to get the same number of video games to sell. How many will each store receive?</i></p> <p><i>This year Mr. Jiminy is still selling video games. As a special offer, he is packaging the games in 24-packs. If he has 24,051 video games, how many 24-pack boxes can he make?</i></p> <ul style="list-style-type: none"> <li>To be sure all students understand the problems, have volunteers restate both problems in their own words.</li> <li>Have students work with a partner to estimate and solve both problems.</li> </ul> <p><b>Note:</b> Circulate during work time looking for estimation and solution strategies that are connected to the purpose to share (i.e., using compatible numbers to estimate, using partial quotients as a division strategy, using multiplication to help solve division problems).</p> <p><b>Note:</b> Students used the partial quotient algorithm in both 3<sup>rd</sup> and 4<sup>th</sup> grades. See examples to the left.</p>
<p><b>SUMMARIZE:</b></p>	<p><b>Focus the conversation around the 2 Essential Questions for this lesson:</b></p> <p><i>“How do I estimate quotients using patterns and compatible numbers?”</i></p> <p><i>“How do I use different strategies to solve division problems?”</i></p> <ul style="list-style-type: none"> <li>Share estimation and division strategies.</li> <li>Chart the strategies you have chosen to be shared as the students share them.</li> <li>Help students make connections between the strategies by recognizing how the strategies are alike and how they are different. While several students may use the partial quotient method, the groups they pull out each time may be different. Other students may use strategies other than partial quotients.</li> </ul>
<p><b>PRACTICE/HOMEWORK:</b></p>	<p><b>Suggestion:</b> Have students choose 2 – 3 problems from p. 183 and write a story problem for each of them. They should include an estimate and a solution for their story problems.</p> <p><b>Note:</b> Save these problems as future practice and homework.</p>

DAY: 2  
Divide Whole Numbers and Decimals  
Unit 4: Chapter 11-13

LESSON 11.2, pp. 184-185

<b>MATERIALS:</b>	
<b>LESSON FOCUS:</b>	Divide large numbers by 1- and 2-digit divisors.
<b>CALIFORNIA STANDARDS:</b>	<p><b>Number Sense:</b>  <b>1.1:</b> Estimate, round, and manipulate very large and very small numbers.  <b>2.2:</b> Demonstrate proficiency with division, including division with positive decimals and long division with multi-digit divisors.</p> <p><b>Mathematical Reasoning:</b>  <b>2.1:</b> Use estimation to verify the reasonableness of calculated results.  <b>2.3:</b> Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning.  <b>2.4:</b> Express the solution clearly and logically by using the appropriate mathematical notation and terms and clear language; support solutions with evidence in both verbal and symbolic work.  <b>2.6:</b> Make precise calculations and check the validity of the results from the context of the problem.</p>
<b>PURPOSE OF LESSON/ ESSENTIAL QUESTIONS:</b>	<p>How do I use different strategies to solve division problems?                  How do I estimate quotients using patterns and compatible numbers?                  How do I use the context to interpret remainders?</p>
<b>LAUNCH:</b>	<p><b>Note:</b> Collect the homework problems to be used in Lesson 11.3.  <b>Write the following problem for the class to see:</b></p> <p><i>Zack has 65 candies. If he shares them equally with 7 friends, how many candies will each friend get?</i></p> <ul style="list-style-type: none"> <li>• Have students estimate the answer.</li> <li>• Ask students what compatible numbers they used to estimate the answer. (e.g., <math>63 \div 7</math> or <math>70 \div 7</math>)</li> <li>• Ask students what is the exact answer. Does the estimate show the reasonableness of the actual answer?</li> <li>• Discuss the fact that there is a remainder. What did the students do with the remainder and why did they make those choices (e.g., “I left the quotient the same. Zack just didn’t share them.” “I divided the leftover candies into fractional parts so that each friend got <math>9 \frac{2}{7}</math> pieces of candy.”)</li> </ul>

<p><b>EXPLORE:</b></p>	<p>• <b>Write the following problems for the class to see:</b></p> <p><i>The Early Risers Egg Company gathered 5,120 eggs this morning. How many cartons of eggs will they ship to the stores today if they pack them in cartons that hold a dozen eggs?</i></p> <p><i>The Early Risers Egg Company sells their eggs to 12 stores. If they gathered 5,120 eggs this morning and sell the same number of eggs to each store, how many eggs would each store receive today?</i></p> <p><b>Scaffold:</b> To ensure the math is accessible to all students, adjust the number of eggs to smaller or larger numbers as needed. For example, 512 and 51,200.</p> <p><b>Note:</b> The divisor in both of these problems has 2 digits. Some students may estimate the divisor to be 10 while others may keep 12 and find compatible numbers for it in the dividend.</p> <p>To be sure all students understand the problems, have volunteers restate both problems in their own words.</p> <p>Have students work in pairs to:</p> <ul style="list-style-type: none"> <li>• Estimate the quotients</li> <li>• Find the exact answer using a method that makes sense to them</li> <li>• Compare their estimates to the exact answers to see if the actual answers were reasonable</li> </ul> <p><b>Extension:</b> <i>If the Early Risers Egg Company changed the cartons they used to cartons that hold 18 eggs each, how would it change the number of cartons of eggs they would be shipping? Explain your thinking using actual examples (do the math!!).</i></p> <p><b>Note:</b> Circulate during work time looking for estimation and solution strategies to share (i.e., using compatible numbers to estimate, using partial quotients as a division strategy, using multiplication to help solve division problems).</p>
<p><b>SUMMARIZE:</b></p>	<p><b>Focus the conversation around the 3 Essential Questions for this lesson:</b>  <i>“How do I use different strategies to solve division problems?”</i>  <i>“How do I estimate quotients using patterns and compatible numbers?”</i>  <i>“How do I use the context to interpret remainders?”</i></p> <ul style="list-style-type: none"> <li>• Share efficient estimation and division strategies the students are using with meaning.</li> <li>• Chart the strategies you have chosen to be shared as the students share them.</li> </ul> <p>Discuss how the students dealt with the remainders. <i>Does more than one way of dealing with the remainders make sense in this context?</i></p>
<p><b>PRACTICE/ HOMEWORK:</b></p>	<p><b>Suggestion:</b> Have students choose 2 – 3 problems from p. 185 and write a story problem for each of them. They should include an estimate and a solution for their story problems. If there is a remainder, have students explain how they interpreted the remainder (i.e., drop the remainder, add 1 more to the quotient, write the remainder as a fractional quantity).</p> <p><b>Note:</b> These problems will be used as future practice and homework.</p>

DAY: 3  
 Divide Whole Numbers and Decimals  
 Unit 4: Chapter 11  
 LESSON 11.3, pp. 186-187

<b>MATERIALS:</b>	
<b>LESSON FOCUS:</b>	Understand and use strategies for division including zeros in division
<b>CALIFORNIA STANDARDS:</b>	<p><b>Number Sense:</b>  <b>1.1:</b> Estimate, round, and manipulate very large and very small numbers.  <b>2.2:</b> Demonstrate proficiency with division, including division with positive decimals and long division with multi-digit divisors.</p> <p><b>Mathematical Reasoning:</b>  <b>2.3:</b> Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning.  <b>2.4:</b> Express the solution clearly and logically by using the appropriate mathematical notation and terms and clear language; support solutions with evidence in both verbal and symbolic work.  <b>2.6:</b> Make precise calculations and check the validity of the results from the context of the problem.</p>
<b>PURPOSE OF LESSON/ ESSENTIAL QUESTIONS:</b>	<p>How do I estimate quotients using patterns and compatible numbers?          How do I use different strategies to solve division problems?</p>
<p><b>LAUNCH:</b></p> <p><u>Benchmark numbers</u> are familiar numbers used as a point of reference.</p>	<ul style="list-style-type: none"> <li>• <b>Collect homework problems</b> to be used for Practice/Homework in Lesson 11.4.</li> <li>• Discuss with students that sometimes <u>benchmark numbers</u> are used to give approximations of actual numbers. For example, if we say 20,000 people were at the ballgame, it's very unlikely that exactly 20,000 people were there. But 20,000 gives an easy number to think about as a reference of the number of people that were at the game.</li> <li>• <b>Write the following problem for the class to see:</b></li> </ul> <p><i>About 30 people were at the party last night. Four people sat at each table, and there were no empty seats. How many people could have been at the party? How many tables could there have been?</i></p> <ul style="list-style-type: none"> <li>• Discuss possible numbers for the people at the party and the number of tables.</li> </ul>

<p><b>EXPLORE:</b></p>	<p><b>Write the following problems for the class to see:</b></p> <p>Problem 1:  <i>A huge car transport ship docked in the Port of San Diego yesterday. It was loaded with about 11,000 cars from Japan. The cars were loaded on 15 monstrous decks. If the same number of cars were on each deck, how many cars could have been on each deck? How many cars could have been on the ship?</i></p> <p><b>Scaffold:</b> To ensure that the math is accessible to all students, adjust the size of the possible number of cars on the ship. For example, 1,000 and 100.</p> <p>Problem 2:  <i>Another ship docked yesterday as well. But this ship was a container ship with about 14,000 containers stacked 6 high in the hold. How many stacks of containers could have been loaded on the ship? How many containers could have been on the ship?</i></p> <p><b>Scaffold:</b> To ensure that the math is accessible to all students, adjust the size of the possible number of containers on the ship. For example, 1,000 and 200.</p> <p><b>Have students work in pairs</b> to estimate then solve both problems.</p> <p><b>Note:</b> In Problem 1, some students may use 20 as their divisor in the quotient while other students may leave the 15 and find compatible numbers to go with it.</p>
<p><b>SUMMARIZE:</b></p>	<p><b>Focus the conversation around the 2 Essential Questions for this lesson:</b>  <i>“How do I use different strategies to solve division problems?”</i>  <i>“How do I estimate quotients using patterns and compatible numbers?”</i></p> <ul style="list-style-type: none"> <li>• Have students share the number of cars/containers they found in each problem and the strategies they used to find them. Accept all reasonable numbers of cars/containers.</li> </ul>
<p><b>PRACTICE/ HOMEWORK:</b></p>	<p><b>Give students several of the problems they created for homework for Lesson 11.1.</b></p>

DAY: 4  
 Divide Whole Numbers and Decimals  
 Unit 4: Chapter 11  
 LESSON 11.4, pp. 188-189

<b>MATERIALS:</b>	
<b>LESSON FOCUS:</b>	Divide large numbers by 1- and 2-digit divisors.
<b>CALIFORNIA STANDARDS:</b>	<p><b>Number Sense</b>  <b>2.2:</b> Demonstrate proficiency with division, including division with positive decimals and long division with multi-digit divisors.</p> <p><b>Mathematical Reasoning:</b>  <b>2.3:</b> Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning.  <b>2.4:</b> Express the solution clearly and logically by using the appropriate mathematical notation and terms and clear language; support solutions with evidence in both verbal and symbolic work.  <b>2.6:</b> Make precise calculations and check the validity of the results from the context of the problem.</p>
<b>PURPOSE OF LESSON: ESSENTIAL QUESTIONS:</b>	<p>How do I use different strategies to solve division problems?                  How do I use the context to interpret remainders?</p>
<b>LAUNCH:</b>	<p><b>Write the following problem for the class to see:</b></p> <p><i>Joey wants to put his 24 baseball cards into small card-size boxes. He wants an equal number of cards in each box. How many boxes could he use and how many cards might be in each box?</i></p> <ul style="list-style-type: none"> <li>• Ask students to contrast this problem with the other problems they have worked with during the module. (i.e., only the dividend is given)</li> <li>• Have students share some possible answers and the strategies they used for finding them. Students should realize that more than one set of answers is possible. All answers will be factors of 24; there are no remainders possible in this context.</li> </ul>

