



San Diego Unified School District

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Instructional Module to Enhance the Teaching of

**HARCOURT**

**Math**

**California Edition**

**Grade 1**

**Module 12– Revised**

Addition and Subtraction with  
2-Digit Numbers

**MODULE 12 – ADDITION AND SUBTRACTION WITH 2-DIGIT NUMBERS**  
**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 be provided opportunities to:
- Develop understanding of numbers and the number system and use their understanding to solve problems and recognize reasonable results.
  - Use mathematical reasoning to solve problems.
  - Develop understanding of and fluency in basic computation and procedural skills.
  - Use equations and to express generalizations of patterns and relationships.
  - Communicate their mathematical thinking by using words, numbers, symbols, graphs and charts, and describe different representations
  - Express generalizations of patterns and relationships.
  - 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 flexibly compute by taking apart and combining numbers in a wide variety of ways.*
- Students recognize that numbers to 100 are organized into groups of tens and ones.
- *Students use their knowledge of the parts of numbers to 10 to add/subtract two-digit numbers.*
- *When adding numbers, students look for ways to form tens.*
- *Students estimate answers to two-digit addition and subtraction problems*

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

- How can I use what I know about single-digit numbers to solve addition and subtraction problems for two-digit numbers?
- How can I combine addends to make a ten(s) when adding two-digit numbers?
- What flexible strategies can I use to add and subtract two-digit numbers?
- What strategies do I use to make reasonable estimates for two digit addition and subtraction problems?

**Resources:** Van de Walle, Chapter 12, p. 178 – 118; Chapter 13, 201-214, K. Richardson, *Hiding Assessment; Combination Trains, Ten Frames; Mathematics Source Book*, pp. 14 -26

Harcourt Math – Grade 1

**Module 12: Addition and Subtraction with 2-Digit Numbers**

**15 days**

**Key Mathematical Concepts:**

- Add tens and ones
- Count on by ones and tens to two-digit numbers
- Count back by ones and tens to subtract
- Add one- and two-digit numbers
- Subtract one- and two-digit numbers
- Estimate sums and differences
- Solve problems by using an appropriate strategy

<p><b>Chapter 29: Adding Two-Digit Numbers</b> <u>DAY</u></p> <p>1     29.1 Add Tens</p> <p>2     29.2 Count On By Ones</p> <p>3     29.3 Count On By Tens</p> <p>4     29.4 Add Tens and Ones</p> <p>5     29.5 Model Adding 1-Digit to 2-Digit Numbers</p>	<p><b>Chapter 27: Subtraction Facts and Strategies</b> <u>DAY</u></p> <p>6     30.1 Subtract Tens</p> <p>7     30.2 Count Back by Ones</p> <p>8     30.3 Count Back by Tens</p> <p>9     30.4 Subtract Tens and Ones</p> <p>10    30.5 Model Subtracting 1-Digit from 2-Digit Numbers</p> <p>11    30.6 Problem Solving: Use Logical Reasoning</p>
<p><b>Module 12 Practice and Assessment*</b> <u>DAY</u></p> <p>12    Practice/Assessment</p> <p>13    Practice/Assessment</p> <p>14    Practice/Assessment</p> <p>15    Practice/Assessment</p>	

**\*NOTE: Four additional days are provided in Module 12 for practice and assessment. Use them at any time during Module 12 where you see the greatest need for additional practice time, or when formal assessment will be the most valuable.**

## Harcourt Math: Grade 1

## Module 12: Addition and Subtraction with Two-Digit Numbers

15 Days

<b><u>Day 1</u></b> Unit 6 Lesson 29.1	<b><u>Day 2</u></b> Unit 6 Lesson 29.2	<b><u>Day 3</u></b> Unit 6 Lesson 29.3	<b><u>Day 4</u></b> Unit 6 Lesson 29.4	<b><u>Day 5</u></b> Unit 6 Lesson 29.5
<b><u>Day 6</u></b> Unit 6 Lesson 30.1	<b><u>Day 7</u></b> Unit 6 Lesson 30.2	<b><u>Day 8</u></b> Unit 6 Lesson 30.3	<b><u>Day 9</u></b> Unit 6 Lesson 30.4	<b><u>Day 10</u></b> Unit 6 Lesson 30.5
<b><u>Day 11</u></b> Unit 6 Lesson 30.6	<b><u>Day 12</u></b> Practice/ Assessment*	<b><u>Day 13</u></b> Practice/ Assessment*	<b><u>Day 14</u></b> Practice/ Assessment*	<b><u>Day 15</u></b> Practice/ Assessment*

**\*NOTE:** Four additional days are provided in Module 12 for practice and assessment. Use them at any time during Module 12 where you see the greatest need for additional practice time, or when formal assessment will be the most valuable.

## Teaching Notes Grade 1

### Module 12: Addition and Subtraction With 2-Digit Numbers

This reading supports lessons in Module 12 as well as the following Mathematics Content Standards, Grade 1

Number Sense: 1.4, 2.0, 2.6  
Algebra and Functions 1.1  
Mathematical Reasoning 1.1

#### Invented Procedures

To help develop understanding of addition and subtraction, young children can be encouraged to invent their own procedures for multi digit addition and subtraction. Students learn more about numbers, operations and place value when they figure things out for themselves. Starting on Day 2, each launch in this module starts with a Problem-Solving Activity for students. This is a time for students to explore, practice, and invent strategies that make sense to them.

A few words of caution. Though many of the lessons in this module attempt to instruct a particular strategy, our job is not to teach students a particular strategy. Kathy Richardson points out, “ If we attempt to teach children to use strategies before they themselves see the need for them, they will either not use them, or they will use them inappropriately or without understanding”. Carpenter also states that “ with opportunity and encouragement, children construct for themselves strategies that model the relationships in a problem...they do not have to be shown how to count on or be explicitly taught specific derived facts. In an environment that encourages children to use procedures that are meaningful to them, they will construct these strategies for themselves. Without formal or direct instruction on specific number facts, algorithms, or procedures children can construct viable solutions to a variety of problems.”  
(Thomas Carpenter, et al, *Children’s Mathematics, Cognitively Guided Instruction*, 1999.)

#### Addition

*Cognitively Guided Instruction* highlights for teachers the necessity to vary problem types in order to facilitate strategy development. These problem types include result unknown ( $12 + 2 =$ ), change unknown ( $12 + ? =$ ), and start unknown ( $? + 2 = 15$ ).

That said, below are some common strategies that often emerge from children’s thinking for solving addition and subtraction using two-digit numbers. These strategies are modeled for students in Harcourt and Module 12. [NOTE: No student should be forced to use any of the strategies presented if they do not make sense of them].

- Counting on by ones (Day 2, Harcourt 29.2)  
 $34 + 5$   
 "34, 35, 36, 37, 38, 39"
- Counting on by tens (Day 3, Harcourt 29.3)  
 $34 + 20$   
 "34, 44, 54"
- Decomposing addends to get to the nearest 10 (Days 4 & 5, Harcourt 29.4 & 29.5)  
 $38 + 5$  Think, "What do I need to add to 38 to get to 40? 2. So I will break apart 5 into 2 and 3 more."  
 $5 = 2 + 3$   
 $38 + 2 = 40$   
 $40 + 3 = 43$

### Subtraction

- Counting back by ones (Day 7, Harcourt 30.2)  
 $33 - 4$   
 "33, 32, 31, 30, 29"
- Counting back by tens (Day 8, Harcourt 30.3)  
 $51 - 30$   
 "51, 41, 31, 21"
- Adding-Up or Counting-Up (Day 10, Harcourt, 30.5)  
 $28 - 22$   
 "22 plus 6 is 28" so  $28 - 22 = 6$   
 Or  
 "22, 23, 24, 25, 26, 27, 28" I counted up 6 so  $28 - 22 = 6$
- Decomposing the subtrahend using connecting cubes and trains of ten (Days 9 and 10, Harcourt 30.4 and 30.5)  
 $34 - 6$   
 $6 = 4 + 2$   
 Take away the 4 ones.  
 Break the 10 into 8 and 2.  
 Take away 2  
 $34 - 4 = 30$   
 $30 - 2 = 28$

Encourage students to use strategies that make sense to them when solving problems during launch. Keep in mind that child-invented procedures aren't always the most efficient, they are important for children's sense making of operations and our number system. They often need to have a context for a problem in order to make sense of the symbolic representations. Young students at this stage are using invented procedures to develop their sense of number. The long-term objective is for students to develop their number sense in a way that allows them to choose the strategy that makes the most sense for the situation and is efficient.

DAY 1  
 Addition and Subtraction With Two-Digit Numbers  
 Chapter 29: Adding Two-Digit Numbers  
 LESSON 29.1 TE P. 413A

<b>LESSON FOCUS:</b>	<b>Add Tens</b>
<b>CALIFORNIA STANDARD:</b>	<b>Number Sense</b> 2.6: Solve addition and subtraction problems with one- and two-digit numbers.
<b>PURPOSE OF LESSON:</b>	To understand adding tens.
<b>ROUTINE:</b> <i>TE and Workbook P. 411</i>  <i>Hundred Chart</i> <i>Number Line</i> <i>Cubes</i> <i>Ten Trains</i>	Suggestion: <b>Introducing the Chapter: TE P. 411</b>  Or  <b>Exploring Addition</b> <ul style="list-style-type: none"> <li>• Pose a variety of problems adding a single digit to a two-digit number (e.g. <math>25+7=</math>). If students struggle with finding strategies adjust the numbers (e.g. <math>25+5</math> or <math>25+6</math>) so that that can connect what they know to the new problems being explored. Ask students to use a strategy that makes sense to them. Have a variety of tools available.</li> <li>• Have students share their strategies with one another and with the class. Strategies might include hundred chart, number line, tens and ones cubes, counting up in head, etc.</li> <li>• Focus on questioning students as to how they know their answer is reasonable:  <i>How did you think about the problem to come up with that answer?</i>  <i>Did anyone think about it another way?</i>  <i>What was your strategy?</i>  <i>Explain how you got your answer.</i></li> </ul>
<b>LAUNCH:</b> <i>For each pair, manipulatives such as connecting cubes, trains of ten connecting cubes, etc., 2 half-sheets of blank paper.</i>	<b>Introduce Activities: Model Ones/Tens Relationships</b> <ul style="list-style-type: none"> <li>• Lead a class discussion about the following pairs of equations. Let students use manipulatives (connecting cubes, trains of tens, etc.) to demonstrate thinking.             How does knowing...<math>2+1</math>            Help you to know...<math>2</math> tens + <math>1</math> ten?            As well as <math>20+10</math>?             How does knowing...<math>3+4</math>            Help you to know...<math>3</math> tens + <math>4</math> tens?            As well as <math>30+40</math>?             How does knowing...<math>5+1</math>            Help you to know...<math>5</math> tens + <math>1</math> ten?            As well as <math>50+10</math>?</li> </ul>

	<p>How does knowing...<math>2+7</math>                  Help you to know...<math>2 \text{ tens} + 7 \text{ tens}</math>?                  As well as <math>20+70</math>?</p> <ul style="list-style-type: none"> <li>• Have students fold a half sheet of blank paper in half forming 2 columns. Ask students to construct their own table, inserting their own equations. Have them choose one or more relationship pair to write in their table, then demonstrate its reasonableness to a partner.</li> </ul> <p>Knowing...</p> <p>Helps me to know...</p>
<p><b>EXPLORE:</b></p> <p><i>For each pair, manipulatives such as connecting cubes, trains of ten connecting cubes, etc., 2 half-sheets of blank paper.</i></p>	<ul style="list-style-type: none"> <li>• Students work in pairs writing down addition problems using what they know about the ones/tens relationship and discussing their work with their partner.</li> </ul> <p><b>Observations to note:</b></p> <ul style="list-style-type: none"> <li>• Do students need to model the action of the problem? That is making one group, making another group and then counting the total again in all?</li> <li>• Can they use what they know about <math>5 + 1</math> to help them with <math>50 + 10</math>? Or do they need to count out groups of ten sticks?</li> <li>• Do they add on 10 more? Or do they “just know”? Can they decompose/pull numbers apart and put them back together accurately?</li> <li>• Are they solving problems quickly and confidently? When asked, can they think of a context for their number sentence?</li> <li>• Students might be able to connect <math>5+1</math> to <math>50 + 10</math> but not <math>5+3</math> to <math>50 +30</math> because their number sense below the number 10 in not yet fully developed.</li> <li>• Note which numbers students are facile with and which ones still need additional practice.</li> </ul>
<p><b>PRACTICE:</b>  <i>TE and Workbook P. 414</i></p>	<p>As time allows, TE and Workbook P. 414</p>
<p><b>SUMMARIZE:</b></p>	<p>Revisit with students the lesson’s objective by connecting the following discussion to the purpose of the lesson.</p> <p><b>Discuss:</b> Ask students to share the work they did on their tables. Ask them how they know that their answer is correct. Be explicit about the patterns (<math>5+1=6</math>, <math>5 \text{ tens} + 1 \text{ ten}</math>, <math>50+10=60</math>).</p>
<p><b>HOMEWORK:</b></p>	<p><b>Suggestion:</b> Family Involvement Activities pp. FA125 and Reteach 29.1 (see bottom margin TE P. 413)</p>



<p><i>Book P. TR31), Numeral Cards 0-9 (written on index cards or copied from Pp. TR36-37 in Teacher's Resource Book.)</i></p>	<p><b>Part 2: Adding on the 100 Chart</b></p> <ul style="list-style-type: none"> <li>• Players shuffle numeral cards.</li> <li>• Student A places his finger on any number on the 100 Chart.</li> <li>• Student B draws a number card from the pile.</li> <li>• Student A adds the number card to the number he found with his finger.</li> <li>• Student B writes the equation for the problem they solved.</li> <li>• Players switch roles.</li> </ul>
<p><b>EXPLORE:</b></p> <p><i>For each pair, blank paper, 100 Chart (Teacher's Resource Book P. TR31), Numeral Cards 0-9 (written on index cards or copied from pages TR36-37 in Teacher's Resource Book.)</i></p>	<ul style="list-style-type: none"> <li>• Students work in pairs solving and recording addition problems.</li> </ul> <p><b>Things to note:</b></p> <ul style="list-style-type: none"> <li>• Do the students think in groups of tens? Can they use what they know about one fact to help them with another? Do they relate <math>2+3</math> to <math>12+3</math>, for example? Do they still count by ones or use fingers to keep track? Do they "just know"?</li> <li>• Students who have not yet developed the earlier concepts of number relationships – one/two more, one two less, part - part whole- anchors of 5 and 10 and spatial relationships might continue to count by ones to find the total.</li> <li>• As you assess students during the <i>Explore</i>, note which problems are easy/quick and which problems push them back to inefficient strategies such as counting by ones. You might need to adjust the numbers in the problems so that their learning is at their edge of understanding.</li> </ul>
<p><b>PRACTICE:</b> <i>TE and Workbook P. 415</i></p>	<p><b>TE and Workbook P. 415</b></p> <ul style="list-style-type: none"> <li>• Discuss similarities and differences of using the hundred chart and the number line to add.</li> </ul>
<p><b>SUMMARIZE:</b></p>	<p><i>Revisit with students the lesson's objective by connecting the following discussion to the purpose of the lesson.</i></p> <p><b>Discuss:</b></p> <ul style="list-style-type: none"> <li>• Ask students to share an equation they generated while playing <i>Adding on the 100 Chart</i>.</li> <li>• Ask them to solve this same equation using the class number line.</li> <li>• Pose 1 or 2 more addition problems involving one- and two-digit numbers.</li> <li>• Ask students to demonstrate more than one way to solve the problem(s).</li> </ul>
<p><b>HOMEWORK:</b></p>	<p><b>Suggestion:</b> Problem Solving 29.2 (TE P. 416)</p>

**DAY 3**  
**Addition and Subtraction With Two-Digit Numbers**  
**Chapter 29: Adding Two-Digit Numbers**  
**LESSON 29.3 TE P. 417A**

<b>LESSON FOCUS:</b>	<b>Count on by Tens</b>
<b>CALIFORNIA STANDARD:</b>	<b>Number Sense</b> 2.6: Solve addition and subtraction problems with one- and two-digit numbers.
<b>PURPOSE OF LESSON:</b>	To understand how to count on by tens
<b>ROUTINE:</b> TE P. 417A For the teacher, Numeral Cards 11 – 49 (Pp. TR37-42), Class Hundred Chart.  Hundred Chart Number Line Cubes Ten Trains Paper/pencil	Suggestion: <b>Count on by Tens: TE P. 417A</b>  Or  <b>Exploring Addition</b> <ul style="list-style-type: none"> <li>• Pose a variety of problems adding tens to a two-digit number (i.e. <math>25+20=</math>). Ask students to use a strategy that makes sense to them. Have a variety of tools available.</li> <li>• Have students share their strategies with one another and with the class. Strategies might include hundred chart, number line, tens and ones cubes, counting up in head, etc.</li> <li>• Focus on questioning students as to how they know their answer is reasonable:  <i>How did you think about the problem to come up with that answer?</i>  <i>Did anyone think about it another way?</i>  <i>What was your strategy?</i>  <i>Explain how you got your answer.</i> </li> </ul>
<b>LAUNCH:</b>  For each student, manipulatives for solving problems: <ul style="list-style-type: none"> <li>• Cubes and tens trains</li> <li>• 100 chart</li> <li>• number line</li> <li>• plain paper/pencil</li> </ul>	<b>Introduce Activities: Solving Problems and Color Your Square</b>  <b>Part 1: Solving Problems</b> Give students a problem to solve. <ul style="list-style-type: none"> <li>• Mrs. Fish sent 18 students to the library. Mr. Chavez sent 20 students. How many students were sent to the library?</li> </ul> Or <ul style="list-style-type: none"> <li>• Mrs. Fish and Mr. Chavez sent both of the classes to the library to study. Mrs. Fish has 20 students in her class. The librarian counted 41 students altogether for the 2 classes. How many students did Mr. Chavez send to the library?</li> <li>• Ask students to solve the problem in a way that makes sense to them.</li> </ul>

<p><i>For each student, Pp. FA 128 and FA 137 (Family Involvement Activities), scissors, plastic bowl, paper bag, crayon</i></p>	<ul style="list-style-type: none"> <li>• Make manipulatives available.</li> <li>• Ask students to share their methods for solving the problem, first with a partner, then with the whole class.</li> <li>• Record thinking on a class chart.</li> <li>• Discuss how to represent the problem in an equation.</li> <li>• Record the equation horizontally.</li> </ul> <p><b>Part 2: Color Your Square</b> See directions P. FA 128, Family Involvement Activities</p>
<p><b>EXPLORE:</b></p> <p><i>For each student, manipulatives for solving problems:</i></p> <ul style="list-style-type: none"> <li>• Cubes and tens trains</li> <li>• 100 chart</li> <li>• Number line</li> </ul> <p><i>plain paper/pencil</i></p>	<p>Students work in pairs adding tens in Color Your Square</p>
<p><b>PRACTICE:</b> <i>TE and Workbook Pp.417-418</i></p>	<p>As time allows, TE and Workbook Pp. 417-418</p>
<p><b>SUMMARIZE:</b></p>	<p><i>Revisit with students the lesson's objective by connecting the following discussion to the purpose of the lesson.</i></p> <p><b>Discuss:</b></p> <ul style="list-style-type: none"> <li>• Ask students to share equations they generated while playing Color Your Square.</li> <li>• Use chart paper, overhead or chalkboard to record their equations horizontally.</li> </ul> <p style="text-align: center;"> <math>27 + 30 = 57</math>      or    <math>57 = 27 + 30</math>  <math>18 + 20 = 38</math>      or    <math>38 = 18 + 20</math>  <math>47 + 50 = 97</math>      or    <math>97 = 47 + 50</math> </p> <p><i>What strategies did you use to solve the problems?</i></p>
<p><b>HOMEWORK:</b></p>	<p><b>Suggestion:</b> Problem Solving 29.3 (TE P. 418) plus a copy of 100 chart, FA 137</p>

