



San Diego Unified School District

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Instructional Module to Enhance the Teaching of

HARCOURT

# Math

California Edition

# Grade 3

## Module 1 - Revised

### *Chapters 14-15*

Unit 5: Data and Graphing

2 Weeks

August 2003

**Grade Three – Traditional Calendar – 2006-2007  
Order of Units and Pacing Guide**

<b>Month</b>	<b>Module</b>	<b>Number of Days</b>
<b>September</b> 19 instructional days	<b>Module 1:</b> Data, Graphing and Probability	10 days
	<b>Module 2:</b> Multiplication Concepts and Facts	9 days
<b>October</b> 22 instructional days	<b>Module 2:</b> Multiplication Concepts and Facts	16 days
	<b>Module 3:</b> Understand Numbers and Operations	6 days
<b>November</b> 16 instructional days	<b>Module 3:</b> Understand Numbers and Operations	16 days
<b>December</b> 11 instructional days Winter Break 12/18 – 1/1	<b>Module 3:</b> Understand Numbers and Operations	3 days
	<b>Module 4:</b> Geometry	8 days
<b>January</b> 21 instructional days	<b>Module 4:</b> Geometry	12 days
	<b>Module 5:</b> Division Concepts and Facts	9 days
<b>February</b> 18 instructional days	<b>Module 5:</b> Division Concepts and Facts	10 days
	<b>Module 6:</b> Fractions and Decimals	8 days
<b>March</b> 22 instructional days	<b>Module 6:</b> Fractions and Decimals	12 days
	<b>Module 7:</b> Multiply and Divide by 1-Digit Numbers	10 days
<b>April</b> 16 instructional days Spring Break 4/2 – 4/6	<b>Module 7:</b> Multiply and Divide by 1-Digit Numbers	14 days
<b>May</b> 22 instructional days STAR 4/26 – 5/17	<b>Module 8:</b> Measurement	20 days
<b>June</b> 13 instructional days	<b>Module 9:</b> Data, Graphing, and Probability	6 days

**Grade Three – Year Round Calendar – 2006-2007  
Order of Units and Pacing Guide**

<b>Month</b>	<b>Module</b>	<b>Number of Days</b>
<b>September</b> 19 instructional days	<b>Module 1:</b> Data, Graphing and Probability	10 days
	<b>Module 2:</b> Multiplication Concepts and Facts	9 days
<b>October</b> 22 instructional days	<b>Module 2:</b> Multiplication Concepts and Facts	16 days
	<b>Module 3:</b> Understand Numbers and Operations	6 days
<b>November</b> 16 instructional days	<b>Module 3:</b> Understand Numbers and Operations	16 days
<b>December</b> 11 instructional days Winter Break 12/18 – 1/15	<b>Module 3:</b> Understand Numbers and Operations	3 days
	<b>Module 4:</b> Geometry	8 days
<b>January</b> 12 instructional days	<b>Module 4:</b> Geometry	12 days
<b>February</b> 18 instructional days	<b>Module 5:</b> Division concepts and Facts	18 days
<b>March</b> 21 instructional days Spring Break 3/20 – 4/24	<b>Module 5:</b> Division concepts and Facts	1 days
	<b>Module 6:</b> Fractions and Decimals	20 days
<b>April</b> 4 instructional days	<b>Module 7:</b> Multiply and Divide by 1-Digit Numbers	4 days
<b>May</b> 22 instructional days	<b>Module 7:</b> Multiply and Divide by 1-Digit Numbers	20 days
<b>June</b> 21 instructional days STAR 5/29 – 6/19	<b>Module 8:</b> Measurement	17 days
<b>July</b> 14 instructional days	<b>Module 8:</b> Measurement	3 days
	<b>Module 9:</b> Data, Graphing, and Probability	6 days

**MODULE 1 – DATA AND GRAPHING**

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.
- 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 make decisions about the organization and display of information in different graphical forms.
- Students analyze and interpret data in various ways including how spread out the data is (range) and how it is centered (mode).

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

- How do I collect, organize and display information?
- How do I group data in different ways?
- How do I use a *pictograph*\* key to help me display and interpret a graph?
- How do I make and read a *bar graph*\* to interpret data?
- How do I make a line plot, interpret the data, and use it to find the mode and range?
- How do I interpret and plot an ordered pair on a coordinate grid?
- How do I read points on a coordinate grid and then use that understanding to build strategies for reading maps and line graphs?
- How do I relate reading a line graph to reading coordinates on a grid?
- How do I use line graphs to show change over time?
- How does collecting information in an organized way help me analyze data?

\* Presented in previous grades

**Resources:** Van de Walle: Chapter 21 (pp. 386-395)

## UNIT 5: Data and Graphing 2 WEEKS

### Key Mathematics Concepts:

- The mathematics used for collecting, organizing, and studying data is called statistics.
- Collecting information in an organized way facilitates understanding and analyzing of the data.
- There are many special ways to collect, organize, and display data collected in surveys that help students develop representational thinking skills.

charts	grid
tables	line graph
tally table	line plot
frequency table	vertical bar graph
bar graph	horizontal bar graph
pictograph	

- There are many special terms used to interpret and analyze statistical information and the terms provide different methods for understanding the data.

classify	intervals
data	conclusions
range	results
mode	ordered pairs
scale	

<b>Chapter 14 <u>Collect and Organize Data</u></b>	<b>Chapter 15 <u>Analyze and Graph Data</u></b>
Lesson 1: Collect and Organize Data Tally Tables Lesson 2: Collect and Organize Data Frequency Tables Lesson 3: Understand Data Summarize the Information Lesson 4: Group Data in more than One Way	Lesson 1: Pictograph keys Lesson 2: Bar Graphs Lesson 3: Make a bar graph Lesson 4: Line Plots Lesson 5: Points on a grid Lesson 6: Read line graphs

**GRADE 3**  
**Harcourt Mathematics**

**UNIT 5: DATA, GRAPHING, AND PROBABILITY**  
**Module 1: 2 Weeks of Instruction**

<p><u>Day 1:</u>  <b>Chapter 14: Collect and Organize Data</b></p> <p><b>Lesson 14.1</b>          Collect and Organize Data          Tally Tables</p>	<p><u>Day 2:</u></p> <p><b>Lesson 14.2</b>          Collect and Organize Data:          Frequency Tables</p>	<p><u>Day 3:</u></p> <p><b>Lesson 14.3</b>          Understand Data:          Summarize the Information</p>	<p><u>Day 4:</u></p> <p><b>Lesson 14.4</b>          Problem Solving          Strategy: Make a Table</p>	<p><u>Day 5:</u>  <b>Chapter 15: Analyze and Graph Data</b></p> <p><b>Lesson 15.1</b>          Problem Solving          Strategy: Make a Graph</p>
<p><u>Day 6:</u>  <b>Chapter 15</b></p> <p><b>Lessons 15.2 and 15.3</b>          Read and Make Bar Graphs</p>	<p><u>Day 7:</u></p> <p><b>Lesson 15.4</b>          Line Plots</p>	<p><u>Day 8:</u></p> <p><b>Lesson 15.5</b>          Locate Points on a Grid</p>	<p><u>Day 9:</u>  <b>**OPTIONAL Lesson</b></p> <p><b>Lesson 15.6</b>          Read Line Graphs</p>	<p><u>Day 10:</u></p> <p><b>Chapter 14-15 Review and Assessment</b></p>

**Note: Chapter 16 will be taught later in the year.**

**UNIT 5: Data and Graphing**  
**Module 1: Chapter 14**

**DAY 1: LESSON 14.1, pp. 238 - 239**

<b>LESSON FOCUS:</b>	<b>Hands on:</b> Collect and organize data about our class and display it in a tally table.
<b>CALIFORNIA STANDARD:</b>	Statistics and Data Analysis
<b>Purpose of Lesson:</b>	Understand and use strategies for collecting and organizing information.
<b>LAUNCH:</b>	<p><b>Launch Questions</b></p> <p>What is a table?</p> <p>Have you ever seen a graph or table in a newspaper?</p> <p>Have you ever made a table or graph?</p> <p>Have you ever seen a television schedule <del>chart</del> in the newspaper?</p> <p>""Learning About Each Other Using a Survey""</p> <p>What information we can learn about each other by observing or asking questions? These questions are called a survey.</p> <p>Possible survey questions. Ask students for other suggestions.</p> <p><i>What month were you born?</i></p> <p><i>Are there more girls or boys in our class? In our school?</i></p> <p><i>Do you have an older brother or sister?</i></p> <p><i>Do you own a pet?</i></p> <p><i>What color are your eyes? hair?</i></p> <p><i>What is your favorite color? Fruit? Pet? Music? After school activity? Sport? Food? Games? School Subject? Snack? Sandwich? Ice Cream? Day of the Week? Drink?</i></p> <ul style="list-style-type: none"> <li>• Display the chart.</li> </ul> <p>Students reference the survey list and to add to it.</p>
<b>EXPLORE:</b>	<p><b>Model</b> how to organize data in a tally table.</p> <p>Use one of the survey ideas from the list. Conduct a class survey with students. Record the results in a table, using tally marks.</p> <p>Show how to organize the information neatly.</p>

	<p>Question: What is the month in which you were born?</p> <p><u>Grade 3: Birth Month Survey</u></p> <table> <thead> <tr> <th><u>Month</u></th> <th><u>votes (tally marks)</u></th> </tr> </thead> <tbody> <tr> <td>January</td> <td>   </td> </tr> <tr> <td>February</td> <td>    </td> </tr> <tr> <td>March</td> <td>  </td> </tr> <tr> <td>April</td> <td> </td> </tr> <tr> <td>Continue ...May - December</td> <td></td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>• Discuss the information collected in the selected survey. Model how to count tallies by groups of 5s and "counting-on" .</li> </ul>	<u>Month</u>	<u>votes (tally marks)</u>	January		February		March		April		Continue ...May - December	
<u>Month</u>	<u>votes (tally marks)</u>												
January													
February													
March													
April													
Continue ...May - December													
<b>PRACTICE:</b>	<ul style="list-style-type: none"> <li>• Students, work in pairs, select a survey question and conduct a survey.</li> <li>• Each pair shows the results using a tally table.</li> <li>• Tell students that the information they collect will be shared with the class the next day.</li> </ul> <p>Other students will interpret the tally tables they made.</p>												
<b>SUMMARIZE/ CLOSURE:</b>	<p><b>Whole class discussion:</b></p> <ul style="list-style-type: none"> <li>• What information did we learn from our surveys?</li> <li>• How can the results of our surveys help us?</li> <li>• Collect and save surveys</li> </ul>												
<b>Homework:</b>	<p><b>Future classmate surveys -</b></p> <p>Students write two other survey questions to add to the class list.</p> <p>P. 237: #s: 1-5: Show or represent the solution to one of the problems.</p>												

**ROUTINES: Day 1**

Set aside an area in your classroom for these daily activities.

**Calendar Work**

Place a large calendar in this area.

- Have each child make a calendar at the beginning of every month.  
See Teacher Resource Book page 45, for a student blackline master.
- Use the calendar to keep the class informed of upcoming dates and events.
- Have the children learn how to use the calendar as a tool for staying organized and keeping track of special events.
- Discuss: Is a calendar a chart?

**Unit 5: Data and Graphing**  
**Module 1: Chapter 14**

**DAY 2: LESSON 14.2, pp. 240-241**

<b>LESSON FOCUS:</b>	<b>Understand Data</b>
<b>CALIFORNIA STANDARD:</b>	Statistics, and Data Analysis
<b>Purpose of Lesson:</b>	Understand and use strategies for collecting data about the class, organize and display it in a frequency table and know how to interpret the results.
<b>LAUNCH:</b> Transparency 14.2	<p><b>Problem of the Day:</b> Act out problem with students. (Use Transparency 14.2)</p> <p><b>Questions</b> What kinds of information did we begin to find about our class? How did we collect the information?</p> <p>What other information we can add to our list of possible survey questions? Discuss Homework task.</p> <p>Possible additions to survey list. <i>How many letters in your first name? Last?</i> <i>Do you have a middle name? (yes/no response)</i></p>
<b>EXPLORE:</b>	<p><b>Model how to make a frequency table</b> (See examples on Pg. 238 and 241), Using the model of the tally table constructed about birth months.</p> <ul style="list-style-type: none"> <li>• Show a tally table.</li> <li>• Discuss the results. ("What can we say about the data?")</li> <li>• Count the tallies, redo the table by replacing the tally marks with the number they represent. This makes it a frequency table.</li> </ul> <p>Question: What is the month were you were born?</p>

	<p><u>Grade 3: Birth Month Survey</u></p> <table border="1"> <thead> <tr> <th><u>Month</u></th> <th><u>number of tallies</u></th> </tr> </thead> <tbody> <tr> <td>January</td> <td>3</td> </tr> <tr> <td>February</td> <td>4</td> </tr> <tr> <td>March</td> <td>2</td> </tr> <tr> <td>April</td> <td>1</td> </tr> <tr> <td colspan="2">Continue ...May - December</td> </tr> </tbody> </table> <p><b>Questions:</b> Pg. 238: Look at the tables at the top of the page. How are the tally table and frequency table the same? different? Discuss: What is the meaning of the word frequency? Explain why tally tables might be made into frequency tables?</p>	<u>Month</u>	<u>number of tallies</u>	January	3	February	4	March	2	April	1	Continue ...May - December	
<u>Month</u>	<u>number of tallies</u>												
January	3												
February	4												
March	2												
April	1												
Continue ...May - December													
<b>PRACTICE:</b>	<p><b>Make a frequency table from a tally table</b></p> <ul style="list-style-type: none"> <li>• Give each pair of students a tally table that was constructed the day before. Each pair then makes a frequency table of the data collected by their classmates.</li> <li>• Have two students discuss the information in the surveys by identifying all they can from the data displayed. (eg. Most/fewest/total surveyed/how much difference between?)</li> </ul>												
<b>SUMMARIZE:</b> <b>CLOSURE:</b>	<p><b>Whole class discussion</b></p> <ul style="list-style-type: none"> <li>• Was the survey from a classmate easy to understand? Why/why not?</li> <li>• What information did you learn about our class?</li> <li>• If we were do this over what should we do?</li> <li>• Collect and save surveys.</li> </ul>												
<b>Homework:</b>	Pg. 241: #s: 8-11, 13 OR Reteach 14.2												

**ROUTINES: Day 2**

**Calendar Work**

- Are there any school holidays this month?
- How many days will we attend school this month?
- How many days will we have off?
- Does anyone have a birthday this month? Record this date.

**Math Word Wall** - Set aside an area for math vocabulary words

- Vocabulary cards pg. TR143 (data, tally table, frequency table, survey, results)
- Clearly state each word as you place it on the wall.

UNIT 5: Data and Graphing  
Module 1: Chapter 14

**DAY 3: LESSON 14.3, pp. 242-243**

<b>LESSON FOCUS:</b>	<b>Classify Data</b>
<b>CALIFORNIA STANDARD:</b>	Statistics, Data Analysis, and Probability
<b>Purpose of Lesson:</b>	Understand how to use a table to group data in more than one way. Learn how to write statements about our survey results.
<b>LAUNCH:</b> Transparency 14.3	<p><b>Problem of the Day:</b> Act out and discuss student approaches.</p> <p>Discuss students survey from the previous day's work. Show the results on the board or a transparency. How many students were surveyed?</p> <ul style="list-style-type: none"> <li>• Model writing a statement that describes the survey results.</li> </ul> <p>Questions - discuss with a partner:</p> <ul style="list-style-type: none"> <li>• What other questions could I ask and answer about these results?</li> <li>• What is another true statement we can write about this data?</li> <li>• How might the data in this survey be used?</li> </ul>
<b>EXPLORE:</b>	<p>Practice and Problem Solving</p> <ul style="list-style-type: none"> <li>• In pairs, students take a survey, make a tally table and convert it to a frequency table.</li> <li>• Ask each pair to interpret the survey results and write at least one statement that describes the survey results.</li> <li>• Students share the survey results with a partner.</li> </ul> <p>Explain how and why they "interpreted" the data.</p>
<b>PRACTICE:</b>	<p>P. 243: Practice and Problem Solving: #s: 6 - 9: Do with students. Discuss solutions and reasoning for responses.</p> <p>#s: 10 - 13: Do with a partner</p>
<b>SUMMARIZE/ CLOSURE:</b> Transparency 14.3 - Lesson Quiz	Pg. 241: Lesson Quiz: Discuss responses with class.
<b>Homework:</b>	Reteach 14.2

Reteach 14.2 - 1 per student	
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**ROUTINES: Day 3****Calendar Work**

How are charts and calendars the same?

How many days until the last Friday of the month?

**Math Word Wall** - (data, tally table, frequency table, survey, results)

- Can you spell data? What does this word mean?
- What is a tally table?
- What is a survey?

**Daily high and low temperatures**

- How can we find today's temperature? (Use data from a newspaper, radio, television or internet site)
- See Page 55 Teacher Resource Guide for thermometer blackline.
- Explain/show how to fill in a temperature on the thermometer.

UNIT 5: Data and Graphing  
Module 1: Chapter 14

**DAY 4: LESSON 14.4, 244-245**

<b>LESSON FOCUS:</b>	Problem Solving Strategy: Make a Table
<b>CALIFORNIA STANDARD:</b>	Statistics, Data Analysis, and Probability
<b>Purpose of Lesson:</b>	Understand how to use the strategy of making a table to solve a problem.
<b>LAUNCH:</b>	<ul style="list-style-type: none"> <li>• Discuss how the previous days' surveys gave them information about one category of data. For example, using tables to organize data make results such as <i>most and least often</i> easier to determine.</li> <li>• Explain they are going to explore groups within groups and how to name them. For example, we are one group of children, but we can divide ourselves into other groups. Such as boys and girls, or children with blue eyes, green eyes or brown eyes.</li> </ul> <p>Launch: P. 242B: "Alternative Teaching Strategy" with this variation: Students model classifying data by forming one large group. Brainstorm a list of other ways to group the class.</p> <p>Discuss: <u>What are different ways that we can group ourselves?</u></p> <p><i>Month you were born</i> <i>Boy or girl</i> <i>Have an older brother or sister (younger)</i> <i>Have a pet</i> <i>Color of eyes. hair,</i> <i>Are left handed or right handed</i> <i>How do you sleep (side, stomach or back)</i> <i>Length of time it takes to get to school</i></p>
<b>EXPLORE:</b>  Post-its - 1 per student	<p>Recording more than one group.</p> <ul style="list-style-type: none"> <li>• Introduce the idea of grouping the class in more than one way.</li> <li>• Provide each child with one name card (a first name on a sticky note works well)</li> <li>• Use the list that was brainstormed by the class.</li> </ul> <p>Select two grouping categories.</p>

	<ul style="list-style-type: none"> <li>• Make a large table on the board and label.</li> </ul> <p>Examples:</p> <ul style="list-style-type: none"> <li>• boys &amp; girls</li> <li>• right handed &amp; left handed</li> </ul> <p>Your class chart might be labeled like this:</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td colspan="2" style="text-align: center;">Our Class</td> </tr> <tr> <td></td> <td style="text-align: center;">Right handed</td> <td style="text-align: center;">Left handed</td> </tr> <tr> <td>boys</td> <td></td> <td></td> </tr> <tr> <td>girls</td> <td style="text-align: center;">x</td> <td></td> </tr> </table> <ul style="list-style-type: none"> <li>• Have each student comes to the chart and place name in the correct box.</li> <li>• After all the names are in the correct place on the chart, process the information. Tally and show the frequency for each box. Be sure that students understand how to identify the attributes and value of each box, by reading both across and down.</li> </ul> <p>Pg. 243: See Common Error Alert-for more information.</p>		Our Class			Right handed	Left handed	boys			girls	x	
	Our Class												
	Right handed	Left handed											
boys													
girls	x												
<p><b>PRACTICE:</b></p>	<p>Pg. 243: #14: Discuss with students. Students develop/make their own table.</p> <ul style="list-style-type: none"> <li>• Students share tables and results with the class.</li> </ul> <p>Pg. 243: # 15</p>												
<p><b>SUMMARIZE:</b> <b>CLOSURE:</b></p>	<p>Discuss and share solutions to # 15.</p> <p>Discuss: What they be determined from the table.</p> <p>Examples: How many different classifications are there? Have students explain how they got the answer.</p> <p>Students read the glossary definition for classify on page H79. Ask the children how they classify data.</p>												
<p><b>Homework:</b> Practice 14.3 - 1 per student</p>	<p>Practice 14.3 : Eliminate Mixed Review: #s: 7-10 if necessary.</p>												

**ROUTINES: Day 4**

**Calendar Work**

- How many days have passed since the first of the month?
- Make up a calendar question for your classmates to solve?

**Math Word Wall - (data, tally table, frequency table, survey, results)**

- Can you spell survey? What does this word mean?
- Check these words in your student glossary.
- Add the word classify to the word wall. Page TR145.

**Daily high and low temperature**

- The temperature differential is figured daily? (difference between the high and low)

**Daily Number Sense Task**

- Play guess my number

I'm thinking of a number between 250 and 300

First guess - 275

That number is too high. Teacher gives clue such as the number is even.

Second guess - 260

That number is too low. Teacher clue: number is a multiple of 5.

Third Guess - 264

That number is too low. Teacher clue: number is equal to 11 quarters. (25 cents)

Continue taking guesses and giving clues until the number is discovered.

