



SAN DIEGO CITY SCHOOLS

Instructional Module to Enhance the Teaching of

HARCOURT MATH

California Edition

GRADE 6

Module 9

Statistics and Graphing

Part 2

MODULE 9: UNIT 2: STATISTICS AND GRAPHING

Chapter 6: Graph Data

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 9

- The mathematics used for collecting, organizing and studying data is called statistics.
- It is helpful to collect and record data in an organized way.
- The type of data and purpose of the survey determine the type of graph used to display the results.
- To make it possible for the reader to analyze and draw conclusions from results, key information needs to be included in all types of graphs.
- Sometimes surveys and graphs are intentionally biased.
- The wording of a question and method of sampling can bias the results of a survey.
- Outliers have the greatest effect on the mean average.
- Using the median or computing the mean without the outliers results in a more accurate measure of central tendency.
- Graphs can be constructed in a misleading way by using different scales.
- It is usually not possible to detect bias in sampling from just the graph.

Chapter 6: Graph Data

Lesson 3: Stem and Leaf Plots and Histograms

Lesson 4: MATH LAB: Explore Box-and-Whisker Graphs

Lesson 5: Box-and-Whisker Graphs

Lesson 6: Analyze Graphs

MODULE 9: UNIT 2: STATISTICS AND GRAPHING

Chapter 6: Graph Data

Module 9: DAY 1 - Lesson 6.3

LESSON FOCUS:	Stem-and-Leaf Plots
CA STANDARD:	MR 2.4 (MR 2.2; 2.4)
Purpose of Lesson: Math Background: TE p. 126A	At the end of the lesson students will be able to display and analyze data in stem-and-leaf plots.
Warm-up/ Routine(s): p. 119; Check What You Know	Check What You Know: p. 119, #1-4
LAUNCH: <u>Books Closed:</u> p. 126; TE p. 126B ALTERNATIVE TEACHING STRATEGY	EXAMPLE 1; p. 126. CARD-TOWER COMPETITION <i>Write</i> the data on the board. <i>Discuss</i> with students possible ways to organize the data. Refer to TE p. 126B ALTERNATIVE TEACHING STRATEGY .
EXPLORE:	Using the stem-and-leaf plot data from the CARD-TOWER COMPETITION , <i>identify</i> the mean, median, mode and range.
Practice:	QUICKWRITE: <i>How can organizing data into a Stem-and-Leaf Plot help identify the mean, median, mode and range?</i>
SUMMARIZE/ Closure:	TE p. 128: Lesson Quiz 6.3 #1 <i>Discuss</i> (QUICKWRITE): <i>How can organizing data into a Stem-and-Leaf Plot help identify the mean, median, mode and range?</i>
HOMEWORK	Check What You Know: p. 119, #9-12 <i>Using the data from Michael's Golf Scores on p. 119, ask students to identify:</i> <ul style="list-style-type: none"> • The third stem and fourth leaf. • The median of Michael's golf scores. • The range of Michael's scores. • The mode of Michael's scores.

MODULE 9: UNIT 2: STATISTICS AND GRAPHING

Chapter 6: Graph Data

Module 9: DAY 2 - Lesson 6.3

LESSON FOCUS:	Stem and Leaf Plots and Histograms
CA STANDARD:	MR 2.4 (MR 2.2; 2.4)
Purpose of Lesson: Math Background: TE p. 126A	At the end of the lesson students will be able to display and analyze data in histograms.
Warm-up/ Routine(s): p. 119; Check What You Know	Check What You Know: p. 119, #5-8
LAUNCH: <u>Books Closed</u>	p. 127 (top): <i>Discuss</i> the Bar Graph and the Histogram asking students to note the difference between the graphs and what they specifically show. <i>Discuss</i> with students possible ways to organize the data.
EXPLORE:	p. 127; EXAMPLE 3: <i>Ask</i> the students to interpret what the graph shows and <i>write</i> a paragraph for the school paper including all of the important information. (Competition, number of students participating, number of sit-ups, etc.) <i>OR</i> TE p. 126: RETEACH
Practice:	Continue with Exploration
SUMMARIZE/ Closure:	<i>Discuss: How could you display data about the height of the students in your classroom? Which measure of data would be the most appropriate? Explain your thinking.</i>
HOMEWORK	TE p. 126; PRACTICE 6.3

MODULE 9: UNIT 2: STATISTICS AND GRAPHING

Chapter 6: Graph Data

Module 9: DAY 3 - Lesson 6.4 – 6.5

LESSON FOCUS:	Box-and-Whisker Graphs
CA STANDARD:	SDAP 1.0; SDAP 1.1
Purpose of Lesson: Math Background: TE p. 130A	At the end of the lesson students will be able to understand the parts of a Box-and-Whisker Graph
Warm-up/ Routine(s):	TE p. 130A PROBLEM OF THE DAY 6.5 <i>Or</i> TE p. 130A NUMBER OF THE DAY 6.5
LAUNCH: p. 129; MATH LAB	<i>"A Box-and-Whisker Graph provides different information from other graphs. It uses the median because it is not affected by outliers as the mean is. Why do you think that this is so?"</i> Use p. 129; MATH LAB to explore the parts of a Box-and-Whisker Graph with the students.
EXPLORE:	TE p. 130; RETEACH 6.5
Practice:	Continue with the Exploration
SUMMARIZE/ Closure:	Be sure to read the Math Background on TE p. 130A to help students analyze <i>how</i> a Box-and-Whisker Graph is constructed.
HOMEWORK	TE p. 132B WRITING IN MATHEMATICS (<i>If students do not have access to newspapers or magazines, copy a few sample graphs from USA Today or other magazines.</i>)

MODULE 9: UNIT 2: STATISTICS AND GRAPHING

Chapter 6: Graph Data

Module 9: DAY 4 - Lesson 6.5

LESSON FOCUS:	Analyze Graphs
CA STANDARD:	SDAP 2.3 Key Standard; (MR 1.0; MR 1.1; MR 2.4)
Purpose of Lesson: Math Background: TE p. 132A	At the end of the lesson students will be able to analyze data displays and determine how results and conclusions may have been influenced.
Warm-up/ Routine(s):	TE p. 132A NUMBER OF THE DAY
LAUNCH: <u>Books Closed</u> TE p. 132; ADDITIONAL EXAMPLE	TE p. 132; ADDITIONAL EXAMPLE: <i>Draw</i> the graphs then <i>pose</i> Questions 1 and 2. <i>Ask</i> students to match a question with a graph and <i>explain</i> why they chose to match the question with each graph.
EXPLORE: Reference pp. 132-136	Poster Report: Supply each table group with a different type of graph (preferably from <i>USA Today</i> or a variety of magazines) to interpret. A few of the graphs might be purposefully distorted or biased. Included should be a bar graph, line plot, circle graph, stem-and-leaf plot, and histogram. <i>Ask</i> the students to describe the graph, information and interpretation of what the graph shows. These Poster Reports will be the Exploration tomorrow. They may also be used as a mini assessment.
Practice:	p. 135; MIXED REVIEW AND TEST PREP #14-18
SUMMARIZE/ Closure:	TE p. 135: Lesson Quiz 6.6 (<i>This is a review of Benchmark Assessment #1</i>) <i>Ask</i> the students to explain the reasoning.
HOMEWORK	p. 137; CUMULATIVE REVIEW

MODULE 9: UNIT 2: STATISTICS AND GRAPHING

Chapter 6: Graph Data

Module 9: DAY 5 - Lesson 6.6

LESSON FOCUS:	Analyze Graphs
CA STANDARD:	SDAP 2.3 Key Standard; (MR 1.0; MR 1.1; MR 2.4)
Purpose of Lesson: Math Background: TE p. 132A	At the end of the lesson students will be able to analyze data displays and determine how results and conclusions may have been influenced.
Warm-up/ Routine(s):	TE p. 132A; PROBLEM OF THE DAY
LAUNCH: <u>Books Closed</u> TE p. 133; ADDITIONAL EXAMPLE	TE p. 133; ADDITIONAL EXAMPLE: Ask students to <i>explain</i> what influenced Emily's conclusion and their reasoning as to a more accurate method of displaying the data appropriately.
EXPLORE: Reference pp. 132-136	Discussion of <u>selected</u> poster reports from yesterday's Exploration.
Practice:	p. 135; MIXED REVIEW AND TEST PREP #14-18
SUMMARIZE/ Closure: Refer to Math Background on TE p. 132A	Discussion of (teacher) <u>selected</u> poster reports from Exploration. <i>Refer to Math Background on TE p. 132A for the Summary.</i>
HOMEWORK	p. 137; CUMULATIVE REVIEW