Instructional Focus Document
Grade 6 Mathematics

TITLE : Unit 10: Data Analysis **SUGGESTED DURATION :** 20 days

UNIT OVERVIEW

Introduction

This unit bundles student expectations that address data analysis, including representing, interpreting, and describing data distributions, summarizing numeric and categorical data, and distinguishing between situations that yield data with and without variability. According to the Texas Education Agency, mathematical process standards including application, a problem-solving model, tools and techniques, communication, representations, relationships, and justifications should be integrated (when applicable) with content knowledge and skills so that students are prepared to use mathematics in everyday life, society, and the workplace. The introduction to the grade level standards state, “While the use of all types of technology is important, the emphasis on algebra readiness skills necessitates the implementation of graphing technology.”

Prior to this Unit

In Grade 3, students summarized a data set with multiple categories using frequency tables, dot plots, pictographs, or bar graphs with scaled intervals. Students solved one- and two-step problems using categorical data represented in frequency tables, dot plots, pictographs, or bar graphs with scaled intervals. In Grade 4, students represented data with frequency tables, dot plots, and stem-and-leaf plots, and solved one- and two-step problems with the representations and data in the form of whole numbers, decimals, and fractions. In Grade 5, students represented categorical data with bar graphs and frequency tables, and represented numerical data with dot plots and stem-and-leaf plots, including data sets of measurements in fractions or decimals. Also in Grade 5, students were introduced to scatterplots as a means to represent discrete paired data and utilized all graphical representations to solve one- and two-step problems

During this Unit

Students extend previous knowledge of data representations including dot plots and stem-and-leaf plots, and are formally introduced to histograms, box plots, and percent bar graphs. Students use graphical representations to describe the shape, center, and spread of the data distribution. Descriptions of shape, center, and spread include skewed right, skewed left, symmetric, mean, median, mode, range, and interquartile range. Students also summarize numeric data with numerical summaries, including the measures of center and the measures of spread. Categorical data is summarized numerically with the mode and a relative frequency table and summarized graphically with a percent bar graph. Students are required to distinguish between situations that yield data with and without variability.

Other considerations: Reference the Mathematics Grade 6 Instructional Considerations to Activate Purposeful Planning (ICAPP) Resource.

After this Unit

In Grade 7, students will extend their knowledge of using numeric data to describe the center, spread, and shape of the data distribution to comparing two groups of numeric data. Comparative box plots and dot plots are used to compare two sets of data graphically. Students will be introduced to circle graphs as a representation of categorical data as students examine part-to-part and part-to-whole comparisons.

Additional Notes

In Grade 6, representing numeric data graphically and using the graphical representation to describe the data distribution are identified as Supporting Standards 6.12A and 6.12B. Summarizing numerical data with numerical summaries and summarizing categorical data with numerical and graphical summaries are described as Readiness Standards 6.12C and 6.12D. Interpreting numeric data summarized in graphical representations is identified as Readiness Standard 6.13A. Distinguishing between situations

that yield data is classified as Supporting Standard 6.13B. All of these standards are subsumed under the Grade 6 STAAR Reporting Category 4: Data Analysis and Personal Financial Literacy and part of the Grade 6 *Texas Response to Curriculum Focal Points* (TxRCFP): Understanding data representation. This unit is supporting the development of the *Texas College and Career Readiness Standards* (TxCCRS): I. Numeric Reasoning B1; II. Algebraic Reasoning D1, D2; V. Statistical Reasoning A1, B1, B2, B3, C1, C2, C3; VII. Problem Solving and Reasoning A1, A2, A3, A4, A5, B1, C1, D1, D2; VIII. Communication and Representation A1, A2, A3, B1, B2, C1, C2, C3; IX. Connections A1, A2, B1, B2, B3.

Research

According to Van De Walle, Bay-Williams, Lovin, and Karp (2014), "Statistical literacy is critical to understanding the world around us, essential for effective citizenship, and vital for developing the ability to question information presented in the media (Shaughnessy, 2007)" (p. 325-326). The National Council of Teachers of Mathematics (2003) states that, "in working with data, students encounter and apply ideas that connect directly with those in the other strands of the mathematics curriculum as well as with the mathematical ideas that they regularly meet in other school subjects and in daily life" (p.1).

National Council of Teachers of Mathematics. (2003). *Navigating through Data Analysis in grades 6 – 8*. Reston, VA: National Council of Teachers of Mathematics, Inc.
Texas Education Agency & Texas Higher Education Coordinating Board. (2009). *Texas college and career readiness standards.* Retrieved from http://www.thecb.state.tx.us/institutional-resources-programs/public-community-technical-state-colleges/texas-college-and-career-readiness-standards/
Texas Education Agency. (2013). *Texas response to curriculum focal points for kindergarten through grade 8 mathematics.* Retrieved from https://www.texasgateway.org/resource/txrcfp-texas-response-curriculum-focal-points-k-8-mathematics-revised-2013
Van De Walle, J., Bay-Williams, J., Lovin, L., & Karp, K., (2014). *Teaching student-centered mathematics: Developmentally Appropriate Instruction for Grades 6 - 8*. (2nd ed., Vol. 3). Boston, MA: Pearson.

OVERARCHING UNDERSTANDINGS AND QUESTIONS

Statistical displays often reveal patterns within data that can be analyzed to interpret information, inform understanding, make predictions, influence decisions, and solve problems in everyday life with degrees of confidence.

- How does society use or make sense of the enormous amount of data in our world available at our fingertips?
- How can data and data displays be purposeful and powerful?
- Why is it important to be aware of factors that may influence conclusions, predictions, and/or decisions derived from data?

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UNIT UNDERSTANDINGS AND QUESTIONS

Data can be described and quantified using various methods in order to communicate and reason statistically about the entire data set.

- What are the characteristics of …
  - dot plots?
  - stem-and-leaf plots?
  - histograms?
  - box plots?
- What is the process to construct a …
  - dot plot?
  - stem-and-leaf plot?
  - histogram?
  - box plot?
- How can the …
  - shape
  - center
  - spread

  … of a set of data be described?
- What is the process to determine the …
  - mean
  - median
  - range
  - interquartile range

  … of a set of numeric data?
- How can clusters of data affect the …

OVERARCHING CONCEPTS AND UNIT CONCEPTS

Measurement and Data

- Data
  - Numeric data
  - Numerical summaries
  - Graphical summaries
  - Conclusions and predictions
  - Variability
- Graphical representations
  - Dot plots
  - Stem-and-leaf plots
  - Histograms
  - Box plots

Associated Mathematical Processes

- Application
- Problem Solving Model
- Tools and Techniques
- Communication
- Representations
- Relationships
- Justification

PERFORMANCE ASSESSMENT(S)

Mathematics Grade 6 Unit 10 PA 01

Click on the PA title to view related rubric.

Analyze the problem situation(s) described below. Organize and record your work for each of the following tasks. Using precise mathematical language, justify and explain each solution process.

1. The track team at Cedar Brook Middle School runs after school five days per week. The track coach recorded the total miles ran per day by the track team for a month. The table below summarizes the miles that the coach recorded.

$4\frac{3}{4}$	$5\frac{1}{2}$	6	$5\frac{1}{4}$	$3\frac{3}{4}$
$7\frac{1}{2}$	5	$6\frac{1}{4}$	7	$5\frac{3}{4}$
$6\frac{1}{4}$	$7\frac{3}{4}$	$5\frac{1}{2}$	$8\frac{1}{2}$	3
4	$8\frac{1}{2}$	$6\frac{1}{4}$	3	$7\frac{3}{4}$

   a. Represent the numeric data with a dot plot, histogram, and box plot.

   b. Summarize the data by identifying the:
      - Mean

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UNIT UNDERSTANDINGS AND QUESTIONS	OVERARCHING CONCEPTS AND UNIT CONCEPTS	PERFORMANCE ASSESSMENT(S)
◦ measures of center? ◦ measures of spread? • What aspects of a data distribution can be emphasized with … ◦ dot plots? ◦ stem-and-leaf plots? ◦ histograms? ◦ box plots? • How can data … ◦ with variability ◦ without variability … be summarized? • What types of situations yield data … ◦ with variability? ◦ without variability?		• Median • Mode • Range • Interquartile range (IQR) c. Use your graphical representations and numerical summaries of the data to describe the center, spread, and shape of the data distribution. d. How many days did the track team run for less than 4.5 miles? e. Describe whether this situation yields data with or without variability. 2. The track coach also recorded the number of miles that he ran per day over the same month. The stem-and-leaf plot below summarizes this data.

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UNIT UNDERSTANDINGS AND QUESTIONS	OVERARCHING CONCEPTS AND UNIT CONCEPTS	PERFORMANCE ASSESSMENT(S)
		Number of Miles Ran Each Day STEM | LEAVES 3 | 00 25 4 | 25 5 | 00 25 50 75 75 6 | 25 7 | 25 50 50 75 75 75 8 | 75 75 75 75 9 | 50 Key: 5 | 75 means 5.75 a. Summarize the numeric data by identifying the mean, median, mode, and range of the data distribution, if possible. b. Explain why each of the summaries may not be possible to determine if data is represented in a dot plot, histogram, or box plot. c. How many more days did the track coach run for 8.75 miles than he ran for 7.5 miles? d. Describe whether this situation yields data with or without variability. Standard(s): 6.1A, 6.1B, 6.1C, 6.1D, 6.1E, 6.1F, 6.1G, 6.12A, 6.12B, 6.12C, 6.13A, 6.13B, ELPS.c.1A, ELPS.c.1B, ELPS.c.1E, ELPS.c.2D, ELPS.c.4G, ELPS.c.4K, ELPS.c.5B, ELPS.c.5C, ELPS.c.5G

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UNIT UNDERSTANDINGS AND QUESTIONS	OVERARCHING CONCEPTS AND UNIT CONCEPTS	PERFORMANCE ASSESSMENT(S)

OVERARCHING UNDERSTANDINGS AND QUESTIONS

Statistical displays often reveal patterns within data that can be analyzed to interpret information, inform understanding, make predictions, influence decisions, and solve problems in everyday life with degrees of confidence.

- How does society use or make sense of the enormous amount of data in our world available at our fingertips?
- How can data and data displays be purposeful and powerful?
- Why is it important to be aware of factors that may influence conclusions, predictions, and/or decisions derived from data?

UNIT UNDERSTANDINGS AND QUESTIONS	OVERARCHING CONCEPTS AND UNIT CONCEPTS	PERFORMANCE ASSESSMENT(S)

Data can be described and quantified using various methods in order to communicate and reason statistically about the entire data set.
• How can categorical data be described …
  ◦ graphically?
  ◦ numerically?
• How can a …
	Measurement and Data
	• Data
	  • Categorical data
	  • Numerical summaries
	  • Graphical summaries
	  • Conclusions and predictions
	  • Variability
		Mathematics Grade 6 Unit 10 PA 02
		Click on the PA title to view related rubric.
		Analyze the problem situation(s) described below. Organize and record your work for each of the following tasks. Using precise mathematical language, justify and explain each solution process.

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UNIT UNDERSTANDINGS AND QUESTIONS	OVERARCHING CONCEPTS AND UNIT CONCEPTS	PERFORMANCE ASSESSMENT(S)
◦ relative frequency table ◦ percent bar graph … be used to summarize a data distribution? • What is the process to construct a … ◦ relative frequency table? ◦ percent bar graph?	• Graphical representations • Relative frequency tables • Percent bar graphs <u>Associated Mathematical Processes</u> • Application • Problem Solving Model • Tools and Techniques • Communication • Representations • Relationships • Justification	1. Each student in the sixth, seventh, and eighth grade was surveyed to identify which item they would like to sell for the school fundraiser. The choices were chocolate bars, pizzas, cookie dough, or magazines. The table below shows the results of the survey taken. a. Use the table to construct a relative frequency table and percent bar graph of the data. b. Use your relative frequency table and percent bar graph to describe the data distribution. Standard(s): **6.1A**, **6.1B**, **6.1C**, **6.1D**, **6.1E**, **6.1F**, **6.1G**, **6.12D**, **ELPS.c.1A**, **ELPS.c.1B**, **ELPS.c.1E**, **ELPS.c.2D**, **ELPS.c.4D**, **ELPS.c.4G**, **ELPS.c.4K**, **ELPS.c.5D**, **ELPS.c.5F**, **ELPS.c.5G**

	Chocolate Bars	Pizzas	Cookie Dough	Magazines
Grade 6	65	50	45	40
Grade 7	35	55	75	35
Grade 8	40	45	80	35

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MISCONCEPTIONS / UNDERDEVELOPED CONCEPTS

Misconceptions:

- Some students may think that categorical and numerical data can always be displayed by the same representations rather than realizing that the appropriate representation for a set of data depends on the type of question being asked about the data (e.g., Bar graphs and frequency tables can represent categories of data that do not have numeric ordering, such as favorite colors or type of transportation to get to school, as well as representing numeric data such as shoe size or number of family members.)
- Some students may determine that fractions and decimals cannot be represented on a stem-and-leaf plot rather than using the whole number as the stem and fraction or decimal amount as the leaf.
- Students may choose one of the two center numbers in an even number of values as the median instead of finding the average of the two middle values.

Underdeveloped Concepts:

- Although some students may be proficient at displaying data using different representations, they may lack the experience to solve problems by analyzing the data.
- Some students may have difficulty constructing graphs due to the scale on the number lines.

UNIT VOCABULARY

- **Box plot (box and whisker plot)** – a graphical representation showing the five-number summary of data (minimum, lower quartile, median, upper quartile, maximum)
- **Categorical data** – data that represents the attributes of a group of people, events, or objects
- **Data** – information that is collected about people, events, or objects
- **Dot plot** – a graphical representation to organize small sets of data that uses dots (or Xs) and an axis to show the frequency (number of times) that each number occurs
- **Graph** – a visual representation of the relationships between data collected
- **Histogram** – a graphical representation of adjacent bars with different heights or lengths used to represent the frequency of data in certain ranges of continuous and equal intervals
- **Interquartile range (IQR)** – difference between the first quartile and the third quartile of a set of numbers (IQR = Q3 – Q1)
- **Mean** – average of a set of data found by finding the sum of a set of data and dividing the sum by the number of pieces of data in the set
- **Median** – the middle number of a set of data that has been arranged in order from greatest to least or least to greatest
- **Mode** – most frequent piece of data in a set of data
- **Mode of categorical data (modal category)** – most frequent category in a set of data

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- **Mode of numeric data** – most frequent value in a set of data
- **Numerical data** – data that represents values or observations that can be measured and placed in ascending or descending order
- **Percent** – a part of a whole expressed in hundredths
- **Percent bar graph** – a graphical representation to organize data that uses solid bars that do not touch each other to show the frequency (number of times) that each category occurs as a percentage as compared to the related part(s) or to the whole
- **Positive rational numbers** – the set of numbers that can be expressed as a fraction $\frac{a}{b}$, where *a* and *b* are counting (natural) numbers
- **Range** – the difference between the greatest number and least number in a set of data
- **Relative frequency table** – a table to organize data that lists categories and the frequency (number of times) that each category occurs as a percentage
- **Stem-and-leaf plot** – a graphical representation used to analyze and compare groups or clusters of numerical data by separating the digits in numerical values based on place value. The left digit(s) of the data form the stems and the remaining digit(s) or fraction form the leaves that correspond with each stem, as designated by a key.
- **Variability** – measure of the spread of a set of data

Related Vocabulary:

- Asymmetric
- Average
- Cluster
- Frequency
- Horizontal
- Interval
- Key
- Leaf
- Lower Quartile
- Measures of center
- Measures of spread
- Number line
- Outlier
- Peak
- Quartile
- Range
- Scale
- Shape
- Skewed
- Stem
- Symmetric
- Tally marks
- Title
- Upper Quartile
- Value
- Vertical

UNIT ASSESSMENT ITEMS	SYSTEM RESOURCES	OTHER RESOURCES
Unit Assessment Items that have been published by your district may be accessed through **Search All Components** in the District Resources tab. Assessment items may also be found using the	**Mathematics Concepts Charts** **Mathematics Grade 6 Backward Design Document**	Texas Higher Education Coordinating Board – **Texas College and Career Readiness Standards** Texas Education Agency – **Texas Response to**

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Assessment Center if your district has granted access to that tool.	**Mathematics Grade 6 Enhanced TEKS Clarification** **Mathematics Grade 6 Focal Points with Aligned Standards and TEKS Introduction** **Mathematics Grade 6 Instructional Considerations to Activate Purposeful Planning (ICAPP)** **Mathematics Grade 6 STAAR Analysis Resources** **Mathematics Grade 6 STAAR Blueprint and Item Percentages** **Mathematics Grade 6 STAAR Enhanced Blueprint** **Mathematics Grade 6 Vertical Alignment** **Mathematics Grade 6_Unit 10_TEKS System STAAR Analysis** **Mathematics K-HS Overarching Understandings and Questions** **Mathematics Long Term Transfer Goals** **Mathematics Suggested Basic Manipulatives by Grade Level** **Mathematics Suggested Engaging Literature** **Mathematics Teacher Manipulative Google Slide Decks**	**Curriculum Focal Points for K-8 Mathematics Revised 2013** Texas Education Agency – **Mathematics Curriculum** Texas Education Agency – **STAAR Mathematics Resources** Texas Education Agency Texas Gateway – **Revised Mathematics TEKS: Vertical Alignment Charts** Texas Education Agency Texas Gateway – **Mathematics TEKS: Supporting Information** Texas Education Agency Texas Gateway – **Interactive Mathematics Glossary** Texas Education Agency Texas Gateway – **Resources Aligned to Grade 6 Mathematics TEKS** Texas Instruments – **Graphing Calculator Tutorials**

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	[Mathematics Texas Education Agency Grade 6 TEKS Supporting Information (with TEKS Resource System Comments)] [Mathematics Vertical Quick Guide]	

TAUGHT DIRECTLY TEKS

TEKS INTENDED TO BE EXPLICITLY TAUGHT IN THIS UNIT.

TEKS/SE Legend:

- ***Knowledge and Skills Statements (TEKS) identified by TEA are in italicized, bolded, black text.***
- **Student Expectations (TEKS) identified by TEA are in bolded, black text.**
- ***Student Expectations (TEKS) are labeled Readiness as identified by TEA of the assessed curriculum.***
- ***Student Expectations (TEKS) are labeled Supporting as identified by TEA of the assessed curriculum.***
- ***Student Expectations (TEKS) are labeled Process standards as identified by TEA of the assessed curriculum.***
- Portions of the Student Expectations (TEKS) that are not included in this unit but are taught in previous or future units are indicated by a ~~strike-through~~.

Specificity Legend:

- Supporting information / clarifications (specificity) written by TEKS Resource System are in blue text.
- *Unit-specific clarifications are in italicized, blue text.*
- Information from Texas Education Agency (TEA), Texas College and Career Readiness Standards (TxCCRS), Texas Response to Curriculum Focal Points (TxRCFP) is labeled.
- A Partial Specificity label indicates that a portion of the specificity not aligned to this unit has been removed.

TEKS# / SE#	TEKS	SPECIFICITY

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6.1	***Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:***	

6.1A	**Apply mathematics to problems arising in everyday life, society, and the workplace.** ***Process Standard***	Apply
		
		MATHEMATICS TO PROBLEMS ARISING IN EVERYDAY LIFE, SOCIETY, AND THE WORKPLACE
		
		Including, but not limited to:
		
		• Mathematical problem situations within and between disciplines
		  ◦ Everyday life
		  ◦ Society
		  ◦ Workplace
		
		Note(s):
		
		• The mathematical process standards may be applied to all content standards as appropriate.
		• TxRCFP:
		  ◦ Using operations with integers and positive rational numbers to solve problems
		  ◦ Understanding and applying ratios and rates and using equivalent ratios to represent proportional relationships
		  ◦ Using expressions and equations to represent relationships in a variety of contexts
		  ◦ Understanding data representation
		• TxCCRS:
		  ◦ VII.D. Problem Solving and Reasoning – Real-world problem solving
		  • VII.D.1. Interpret results of the mathematical problem in terms of the original real-world situation.
		  ◦ IX.A. Connections – Connections among the strands of mathematics
		  • IX.A.1. Connect and use multiple key concepts of mathematics in situations and problems.

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TEKS# / SE#	TEKS	SPECIFICITY
		• IX.A.2. Connect mathematics to the study of other disciplines. ◦ IX.B. Connections – Connections of mathematics to nature, real-world situations, and everyday life • IX.B.1. Use multiple representations to demonstrate links between mathematical and real-world situations. • IX.B.2. Understand and use appropriate mathematical models in the natural, physical, and social sciences. • IX.B.3. Know and understand the use of mathematics in a variety of careers and professions.
6.1B	**Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.** ***Process Standard***	Use A PROBLEM-SOLVING MODEL THAT INCORPORATES ANALYZING GIVEN INFORMATION, FORMULATING A PLAN OR STRATEGY, DETERMINING A SOLUTION, JUSTIFYING THE SOLUTION, AND EVALUATING THE PROBLEM-SOLVING PROCESS AND THE REASONABLENESS OF THE SOLUTION Including, but not limited to: • Problem-solving model ◦ Analyze given information ◦ Formulate a plan or strategy ◦ Determine a solution ◦ Justify the solution ◦ Evaluate the problem-solving process and the reasonableness of the solution Note(s): • The mathematical process standards may be applied to all content standards as appropriate.

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TEKS# / SE#	TEKS	SPECIFICITY
		• TxRCFP: ◦ Using operations with integers and positive rational numbers to solve problems ◦ Understanding and applying ratios and rates and using equivalent ratios to represent proportional relationships ◦ Using expressions and equations to represent relationships in a variety of contexts ◦ Understanding data representation • TxCCRS: ◦ I.B. Numeric Reasoning – Number sense and number concepts • I.B.1. Use estimation to check for errors and reasonableness of solutions. ◦ V.A. Statistical Reasoning – Design a study • V.A.1. Formulate a statistical question, plan an investigation, and collect data. ◦ VII.A. Problem Solving and Reasoning – Mathematical problem solving • VII.A.1. Analyze given information. • VII.A.2. Formulate a plan or strategy. • VII.A.3. Determine a solution. • VII.A.4. Justify the solution. • VII.A.5. Evaluate the problem-solving process. ◦ VII.D. Problem Solving and Reasoning – Real-world problem solving • VII.D.2. Evaluate the problem-solving process.
6.1C	**Select tools, including ~~real objects,~~ ~~manipulatives,~~ paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.** ***Process Standard***	Partial Specificity Select TOOLS, INCLUDING PAPER AND PENCIL AND TECHNOLOGY AS APPROPRIATE, AND TECHNIQUES, INCLUDING MENTAL MATH, ESTIMATION, AND NUMBER SENSE AS APPROPRIATE, TO SOLVE PROBLEMS Including, but not limited to: • Appropriate selection of tool(s) and techniques to apply in order to solve problems

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		◦ Tools • Paper and pencil • Technology ◦ Techniques • Mental math • Estimation • Number sense Note(s): • The mathematical process standards may be applied to all content standards as appropriate. • TxRCFP: ◦ Using operations with integers and positive rational numbers to solve problems ◦ Understanding and applying ratios and rates and using equivalent ratios to represent proportional relationships ◦ Using expressions and equations to represent relationships in a variety of contexts ◦ Understanding data representation • TxCCRS: ◦ I.B. Numeric Reasoning – Number sense and number concepts • I.B.1. Use estimation to check for errors and reasonableness of solutions. ◦ V.C. Statistical Reasoning – Analyze, interpret, and draw conclusions from data • V.C.2. Analyze relationships between paired data using spreadsheets, graphing calculators, or statistical software.
6.1D	**Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.** ***Process Standard***	Communicate MATHEMATICAL IDEAS, REASONING, AND THEIR IMPLICATIONS USING MULTIPLE REPRESENTATIONS, INCLUDING SYMBOLS, DIAGRAMS, GRAPHS, AND LANGUAGE AS APPROPRIATE

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		Including, but not limited to:
		• Mathematical ideas, reasoning, and their implications
		  ◦ Multiple representations, as appropriate
		  • Symbols
		  • Diagrams
		  • Graphs
		  • Language
		Note(s):
		• The mathematical process standards may be applied to all content standards as appropriate.
		• TxRCFP:
		  ◦ Using operations with integers and positive rational numbers to solve problems
		  ◦ Understanding and applying ratios and rates and using equivalent ratios to represent proportional relationships
		  ◦ Using expressions and equations to represent relationships in a variety of contexts
		  ◦ Understanding data representation
		• TxCCRS:
		  ◦ II.D. Algebraic Reasoning – Representing relationships
		  • II.D.1. Interpret multiple representations of equations, inequalities, and relationships.
		  • II.D.2. Convert among multiple representations of equations, inequalities, and relationships.
		  ◦ VIII.A. Communication and Representation – Language, terms, and symbols of mathematics
		  • VIII.A.1. Use mathematical symbols, terminology, and notation to represent given and unknown information in a problem.
		  • VIII.A.2. Use mathematical language to represent and communicate the

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		mathematical concepts in a problem. • VIII.A.3. Use mathematical language for reasoning, problem solving, making connections, and generalizing. ◦ VIII.B. Communication and Representation – Interpretation of mathematical work • VIII.B.1. Model and interpret mathematical ideas and concepts using multiple representations. • VIII.B.2. Summarize and interpret mathematical information provided orally, visually, or in written form within the given context. ◦ VIII.C. Communication and Representation – Presentation and representation of mathematical work • VIII.C.1. Communicate mathematical ideas, reasoning, and their implications using symbols, diagrams, models, graphs, and words. • VIII.C.2. Create and use representations to organize, record, and communicate mathematical ideas. • VIII.C.3. Explain, display, or justify mathematical ideas and arguments using precise mathematical language in written or oral communications. ◦ IX.B. Connections – Connections of mathematics to nature, real-world situations, and everyday life • IX.B.1. Use multiple representations to demonstrate links between mathematical and real-world situations.
6.1E	**Create and use representations to organize, record, and communicate mathematical ideas.** ***Process Standard***	Create, Use REPRESENTATIONS TO ORGANIZE, RECORD, AND COMMUNICATE MATHEMATICAL IDEAS Including, but not limited to: • Representations of mathematical ideas ◦ Organize

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TEKS# / SE#	TEKS	SPECIFICITY
		◦ Record ◦ Communicate • Evaluation of the effectiveness of representations to ensure clarity of mathematical ideas being communicated • Appropriate mathematical vocabulary and phrasing when communicating mathematical ideas Note(s): • The mathematical process standards may be applied to all content standards as appropriate. • TxRCFP: ◦ Using operations with integers and positive rational numbers to solve problems ◦ Understanding and applying ratios and rates and using equivalent ratios to represent proportional relationships ◦ Using expressions and equations to represent relationships in a variety of contexts ◦ Understanding data representation • TxCCRS: ◦ VIII.B. Communication and Representation – Interpretation of mathematical work • VIII.B.1. Model and interpret mathematical ideas and concepts using multiple representations. • VIII.B.2. Summarize and interpret mathematical information provided orally, visually, or in written form within the given context. ◦ VIII.C. Communication and Representation – Presentation and representation of mathematical work • VIII.C.1. Communicate mathematical ideas, reasoning, and their implications using symbols, diagrams, models, graphs, and words. • VIII.C.2. Create and use representations to organize, record, and communicate mathematical ideas.
6.1F	**Analyze mathematical relationships to connect and communicate mathematical ideas.**	Analyze

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	Process Standard	MATHEMATICAL RELATIONSHIPS TO CONNECT AND COMMUNICATE MATHEMATICAL IDEAS
		
		Including, but not limited to:
		
		• Mathematical relationships
		  ◦ Connect and communicate mathematical ideas
		  • Conjectures and generalizations from sets of examples and non-examples, patterns, etc.
		  • Current knowledge to new learning
		
		Note(s):
		
		• The mathematical process standards may be applied to all content standards as appropriate.
		• TxRCFP:
		  ◦ Using operations with integers and positive rational numbers to solve problems
		  ◦ Understanding and applying ratios and rates and using equivalent ratios to represent proportional relationships
		  ◦ Using expressions and equations to represent relationships in a variety of contexts
		  ◦ Understanding data representation
		• TxCCRS:
		  ◦ VII.A. Problem Solving and Reasoning – Mathematical problem solving
		  • VII.A.1. Analyze given information.
		  ◦ VIII.A. Communication and Representation – Language, terms, and symbols of mathematics
		  • VIII.A.1. Use mathematical symbols, terminology, and notation to represent given and unknown information in a problem.
		  • VIII.A.2. Use mathematical language to represent and communicate the mathematical concepts in a problem.
		  • VIII.A.3. Use mathematical language for reasoning, problem solving, making connections, and generalizing.

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		◦ VIII.B. Communication and Representation – Interpretation of mathematical work • VIII.B.1. Model and interpret mathematical ideas and concepts using multiple representations. ◦ VIII.C. Communication and Representation – Presentation and representation of mathematical work • VIII.C.1. Communicate mathematical ideas, reasoning, and their implications using symbols, diagrams, models, graphs, and words. • VIII.C.2. Create and use representations to organize, record, and communicate mathematical ideas. • VIII.C.3. Explain, display, or justify mathematical ideas and arguments using precise mathematical language in written or oral communications. ◦ IX.A. Connections – Connections among the strands of mathematics • IX.A.1. Connect and use multiple key concepts of mathematics in situations and problems. • IX.A.2. Connect mathematics to the study of other disciplines.
6.1G	**Display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.** ***Process Standard***	Display, Explain, Justify MATHEMATICAL IDEAS AND ARGUMENTS USING PRECISE MATHEMATICAL LANGUAGE IN WRITTEN OR ORAL COMMUNICATION Including, but not limited to: • Mathematical ideas and arguments ◦ Validation of conclusions • Displays to make work visible to others ◦ Diagrams, visual aids, written work, etc. • Explanations and justifications ◦ Precise mathematical language in written or oral communication

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		Note(s): • The mathematical process standards may be applied to all content standards as appropriate. • TxRCFP: ◦ Using operations with integers and positive rational numbers to solve problems ◦ Understanding and applying ratios and rates and using equivalent ratios to represent proportional relationships ◦ Using expressions and equations to represent relationships in a variety of contexts ◦ Understanding data representation • TxCCRS: ◦ VII.A. Problem Solving and Reasoning – Mathematical problem solving • VII.A.4. Justify the solution. ◦ VII.B. Problem Solving and Reasoning – Proportional reasoning • VII.B.1. Use proportional reasoning to solve problems that require fractions, ratios, percentages, decimals, and proportions in a variety of contexts using multiple representations. ◦ VII.C. Problem Solving and Reasoning – Logical reasoning • VII.C.1. Develop and evaluate convincing arguments. ◦ VIII.A. Communication and Representation – Language, terms, and symbols of mathematics • VIII.A.3. Use mathematical language for reasoning, problem solving, making connections, and generalizing. ◦ VIII.B. Communication and Representation – Interpretation of mathematical work • VIII.B.1. Model and interpret mathematical ideas and concepts using multiple representations. • VIII.B.2. Summarize and interpret mathematical information provided orally, visually, or in written form within the given context. ◦ VIII.C. Communication and Representation – Presentation and representation of mathematical work

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		• VIII.C.3. Explain, display, or justify mathematical ideas and arguments using precise mathematical language in written or oral communications.
6.12	***Measurement and data. The student applies mathematical process standards to use numerical or graphical representations to analyze problems. The student is expected to:***	

6.12A	**Represent numeric data graphically, including dot plots, stem-and-leaf plots, histograms, and box plots.**
	Supporting Standard
		Represent
		
		NUMERIC DATA GRAPHICALLY, INCLUDING DOT PLOTS, STEM-AND-LEAF PLOTS, HISTOGRAMS AND BOX PLOTS
		
		Including, but not limited to:
		
		• Graph – a visual representation of the relationships between data collected
		  ◦ Organization of data used to interpret data, draw conclusions, and make comparisons
		• Data – information that is collected about people, events, or objects
		  ◦ Numerical data – data that represents values or observations that can be measured and placed in ascending or descending order
		  • Can be counted (discrete) or measured (continuous)
		• Limitations
		  ◦ Various forms of positive rational numbers
		  • Counting (natural) numbers
		  • Decimals
		  • Fractions
		  • Percents
		• Data representations
		  ◦ Dot plot – a graphical representation to organize small sets of data that uses dots (or Xs)

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		and an axis to show the frequency (number of times) that each number occurs • Characteristics of a dot plot ◦ Titles, subtitles, and labels • Title represents the purpose of collected data • Subtitle clarifies the meaning of number line • Labels identify each numerical increment below the line ◦ Representation of numerical data • Dots (or Xs) ◦ Placed in a horizontal or vertical linear arrangement ◦ Vertical graph beginning at the bottom and progressing up above the line ◦ Horizontal graph beginning at the left and progressing to the right of the line ◦ Spaced approximately equal distances apart within each category • Axis ◦ Numerical data represented by a number line labeled with proportional increments ◦ Every piece of data represented using a one-to-one or scaled correspondence, as indicated by the key • Dots (or Xs) generally represent one count ◦ May represent multiple counts if indicated with a key ◦ Value of the data in each category • Determined by the number of dots (or Xs) or total value of dots (or Xs), as indicated by the key if given • Represents the frequency for that category ◦ Density of dots relates to the frequency distribution of the data. ◦ Shape of the dot plot may be used to compare shape, spread, and center of data

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		◦ Stem-and-leaf plot – a graphical representation used to analyze and compare groups or clusters of numerical data by separating the digits in numerical values based on place value. The left digit(s) of the data form the stems and the remaining digit(s) or fraction form the leaves that correspond with each stem, as designated by a key. • Characteristics of a stem-and-leaf plot ◦ Titles and column headers • Title represents the purpose of collected data • Column headers indicate stems and leaves ◦ Representation of numerical data • Vertical line, such as in a T-chart, separates stems from their corresponding leaves • Stems listed to the left of the vertical line with their corresponding leaves listed in a row to the right of the vertical line ◦ Determination of place value(s) that represents stems versus place value(s) that represents leaves is dependent upon how to best display the distribution of the entire data set and then indicated by a key • Left digit(s) of the data forms the stems and remaining digit(s) or fraction forms the leaves that correspond with each stem, as indicated by the key ◦ Every piece of data represented using a one-to-one correspondence, including repeated values • Stem represents one or more pieces of data in the set • Leaf represents only one piece of data in the set ◦ Leaves provide frequency counts for the range of numbers included in that row of the stem-and-leaf plot ◦ Density of leaves relates to the frequency distribution of the data ◦ Histogram – a graphical representation of adjacent bars with different heights or lengths used to represent the frequency of data in certain ranges of continuous and equal intervals

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		• Characteristics of a histogram ◦ Titles and subtitles • Title represents the purpose of collected data • Subtitles clarify the meaning of data represented on each axis ◦ Representation of numerical data • Bars ◦ Placed in a horizontal or vertical linear arrangement to represent data ◦ Solid bars that are equal in width ◦ Bars touch each other without overlap to indicate the intervals of the numeric data are continuous ◦ Length of the bar represents the distance from zero on the axis scale • Axes ◦ Represented as number lines ◦ Scale intervals proportionally displayed ◦ Intervals of one or more units ◦ Individual data points cannot be determined from a histogram ◦ Value of the data represented by bar • Determined by reading the number on the scaled axis associated with the length of the bar • Represents the frequency for that range ◦ Box plot (box and whisker plot) – a graphical representation showing the five-number summary of data (minimum, lower quartile, median, upper quartile, maximum) • Titles and subtitles ◦ Title represents the purpose of collected data ◦ Subtitle clarifies the meaning of the data represented on number line • Representation of numerical data ◦ Axis

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		• Numerical data represented by a number line labeled with proportional increments • Vertical or horizontal arrangement • Does not display each element in the data set • Data is divided into quartiles using the five-number summary. ◦ Minimum or lower extreme ◦ Quartile 1 (Q1): median of lower 50% of the data • For data sets with an odd number of elements, the lower 50% of the data will not include the median of the entire data set. • For data sets with an even number of elements, the lower 50% of the data will include the first half of the entire data set. ◦ Median of the entire data set ◦ Quartile 3 (Q3): median of the upper 50% of the data • For data sets with an odd number of elements, the upper 50% of the data will not include the median of the entire data set. • For data sets with an even number of elements, the upper 50% of the data will include the last half of the entire data set. ◦ Maximum or upper extreme • Interquartile range (IQR) – difference between the first quartile and the third quartile of a set of numbers (IQR = Q3 – Q1) • Outliers may or may not exist. ◦ Outliers calculated as any data point that falls outside of range of 1.5 times the IQR (Outliers = 1.5IQR) from Q1 and Q3 • From the lower quartile: Q1 – 1.5IQR • From the upper quartile: Q3 + 1.5IQR • Density of quartiles represents the frequency distribution of the data • Shape of the box related to the spread (variability) of the data • Connection between graphs ◦ Same data represented using a dot plot, stem-and-leaf plot, histogram, and box plot

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		including the five-number summary Note(s): • Grade Level(s): ◦ Grade 3 represented categorical data with a frequency table, dot plot, pictograph, or bar graph with scaled intervals. ◦ Grade 4 represented data on a frequency table, dot plot, or stem-and-leaf plot marked with whole numbers and fractions. ◦ Grade 5 represented categorical data with bar graphs or frequency tables and numerical data, including data sets of measurements in fractions or decimals, with dot plots or stem-and-leaf plots. ◦ Various mathematical process standards will be applied to this student expectation as appropriate. • TxRCFP: ◦ Understanding data representation • TxCCRS: ◦ V.B. Statistical Reasoning – Describe data • V.B.2. Construct appropriate visual representations of data. ◦ V.C. Statistical Reasoning – Analyze, interpret, and draw conclusions from data • V.C.1. Analyze data sets using graphs and summary statistics.
6.12B	**Use the graphical representation of numeric data to describe the center, spread, and shape of the data distribution.** ***Supporting Standard***	Use THE GRAPHICAL REPRESENTATION OF NUMERIC DATA TO DESCRIBE THE CENTER, SPREAD, AND SHAPE OF THE DATA DISTRIBUTION Including, but not limited to:

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		• Graph – a visual representation of the relationships between data collected
		  ◦ Organization of data used to describe and summarize data
		• Data – information that is collected about people, events, or objects
		  ◦ Numerical data – data that represents values or observations that can be measured and placed in ascending or descending order
		  • Can be counted (discrete) or measured (continuous)
		• Limitations
		  ◦ Various forms of positive rational numbers
		  • Counting (natural) numbers
		  • Decimals
		  • Fractions
		• Center of the data distribution from a graphical representation
		  ◦ Mean – average of a set of data found by finding the sum of a set of data and dividing the sum by the number of pieces of data in the set
		  ◦ Median – the middle number of a set of data that has been arranged in order from greatest to least or least to greatest
		  ◦ Mode – most frequent piece of data in a set of data
		  ◦ Mean or median may describe the data distribution if the shape of the data is symmetrical
		  ◦ Median may describe the data distribution if the shape of the data is skewed (asymmetrical)
		  • Outlier does not describe the numerical summary, although it may alter the relationship between the mean and the median
		• Spread of the data distribution from a graphical representation
		  ◦ Range – the difference between the greatest number and least number in a set of data
		  • May be expressed as a single value or as a range of numbers
		  ◦ Interquartile range (IQR) – difference between the first quartile and the third quartile of a set of numbers (IQR = Q3 – Q1)
		  • Usually used only for box plots

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		◦ Outlier does not describe the numerical summary, although it may alter the relationship between the range and IQR. • Shape of the data distribution from a graphical representation ◦ Symmetrical distribution • Mean, median, and mode usually approximately the same • Most data points clustered around the middle value of the range within the distribution • Peak of the data usually occurs around the middle of the distribution • Shape of the data resembles a bell curve when graphed ◦ Asymmetrical Distribution • Skewed right ◦ Mean usually greater than the median, and median greater than the mode ◦ Median considered the better representation of the center of the distribution ◦ Most data points clustered towards the left, or the low end, of the range within the data distribution ◦ Peak occurs towards the left, or the low end, of the range within the data distribution ◦ Shape of the data has a tail to the right when graphed • Skewed left ◦ Mean usually less than the median, and median less than the mode ◦ Median considered the better representation of the center of the distribution ◦ Most data points clustered towards the right, or the high end, of the range within the data distribution ◦ Peak occurs towards the right, or the high end, of the range within the data distribution ◦ Shape of the data has a tail to the left when graphed • Not symmetrical or skewed

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		◦ No general statement about the median, median, or mode ◦ No general statement about the shape of the data ◦ Clusters of points usually do not indicate a pattern or trend within the data distribution Note(s): • Grade Level(s): ◦ Grade 6 introduces using the graphical representation of numeric data to describe the center, spread, and shape of the data distribution. ◦ Grade 7 will compare two groups of numeric data using dot plots or box plots by comparing their shapes, centers, and spreads. ◦ Various mathematical process standards will be applied to this student expectation as appropriate. • TxRCFP: ◦ Understanding data representation • TxCCRS: ◦ V.B. Statistical Reasoning – Describe data • V.B.3. Compute and describe the study data with measures of center and basic notions of spread. ◦ VIII.B. Communication and Representation – Interpretation of mathematical work • VIII.B.2. Summarize and interpret mathematical information provided orally, visually, or in written form within the given context.
6.12C	**Summarize numeric data with numerical summaries, including the mean and median (measures of center) and the range and interquartile range (IQR) (measures of spread), and use these summaries to describe the center, spread, and shape of the data distribution.**	Summarize NUMERIC DATA WITH NUMERICAL SUMMARIES, INCLUDING THE MEAN AND MEDIAN (MEASURES OF CENTER) AND THE RANGE AND INTERQUARTILE RANGE (IQR) (MEASURES OF SPREAD)

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	Readiness Standard	Including, but not limited to: • Graph – a visual representation of the relationships between data collected ◦ Organization of data used to describe and summarize data • Data – information that is collected about people, events, or objects ◦ Numerical data – data that represents values or observations that can be measured and placed in ascending or descending order • Can be counted (discrete) or measured (continuous) • Limitations ◦ Various forms of positive rational numbers • Counting (natural) numbers • Decimals • Fractions • Percents • Measures of center ◦ Mean – average of a set of data found by finding the sum of a set of data and dividing the sum by the number of pieces of data in the set ◦ Median – the middle number of a set of data that has been arranged in order from greatest to least or least to greatest ◦ Mode – most frequent piece of data in a set of data • Measures of spread ◦ Range – the difference between the greatest number and least number in a set of data • May be expressed as a single value or as a range of numbers ◦ Interquartile range (IQR) – difference between the first quartile and the third quartile of a set of numbers (IQR = Q3 – Q1) • Usually only for box plots Use

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		NUMERICAL SUMMARIES TO DESCRIBE THE CENTER, SPREAD, AND SHAPE OF THE DATA DISTRIBUTION Including, but not limited to: • Center of the data distribution from numerical summaries ◦ Mean ◦ Median ◦ Mode ◦ Mean or median may describe the data distribution if the shape of the data is symmetrical ◦ Median may describe the data distribution if the shape of the data is skewed (asymmetrical) ◦ Outlier does not describe the numerical summary, although it may alter the relationship between the mean and the median • Spread of the data distribution from numerical summaries ◦ Range • May be expressed as a single value or as a range of numbers ◦ Interquartile range (IQR) ◦ The smaller the spread, the closer the data values are to each other. ◦ The larger the spread, the farther the data values are from each other. ◦ Outlier does not describe the numerical summary, although it may alter the relationship between the range and IQR • Shape of the data distribution from numerical summaries ◦ Symmetrical • Mean, median, and mode ◦ Usually approximately the same ◦ Tend to be in the middle category(ies) in a histogram ◦ Tend to be in the middle column(s) in a dot plot ◦ Tend to be in the middle row(s) in a stem and leaf plot

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		◦ Asymmetrical • Mean, median, and mode ◦ Tend not to be in the middle category(ies) in a histogram ◦ Tend not to be in the middle column(s) in a dot plot ◦ Tend not to be in the middle row(s) in a stem and leaf plot • Skewed right ◦ Mean usually greater than the median, and median greater than the mode ◦ Median considered the better representation of the center of the distribution • Skewed left ◦ Mean usually less than the median, and median less than the mode ◦ Median considered the better representation of the center of the distribution Note(s): • Grade Level(s): ◦ Grade 6 introduces summarizing numeric data with numerical summaries, including the mean and median (measures of center) and the range and interquartile range (IQR) (measures of spread), and using these summaries to describe the center, spread, and shape of the data distribution. ◦ Grade 7 will compare two groups of numeric data using comparative dot plots or box plots by comparing their shapes, centers, and spreads. ◦ Various mathematical process standards will be applied to this student expectation as appropriate. • TxRCFP: ◦ Understanding data representation • TxCCRS: ◦ V.B. Statistical Reasoning – Describe data • V.B.1. Classify types of data.

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		• V.B.3. Compute and describe the study data with measures of center and basic notions of spread. ◦ V.C. Statistical Reasoning – Analyze, interpret, and draw conclusions from data • V.C.1. Analyze data sets using graphs and summary statistics. • V.C.3. Make predictions using summary statistics. ◦ VIII.B. Communication and Representation – Interpretation of mathematical work • VIII.B.2. Summarize and interpret mathematical information provided orally, visually, or in written form within the given context.
6.12D	**Summarize categorical data with numerical and graphical summaries, including the mode, the percent of values in each category (relative frequency table), and the percent bar graph, and use these summaries to describe the data distribution.** ***Readiness Standard***	Summarize CATEGORICAL DATA WITH NUMERICAL AND GRAPHICAL SUMMARIES, INCLUDING THE MODE, THE PERCENT OF VALUES IN EACH CATEGORY (RELATIVE FREQUENCY TABLE), AND THE PERCENT BAR GRAPH Including, but not limited to: • Graph – a visual representation of the relationships between data collected ◦ Organization of data used to describe and summarize data • Data – information that is collected about people, events, or objects ◦ Categorical data – data that represents the attributes of a group of people, events, or objects • May represent numbers or ranges of numbers • Limitations ◦ Various forms of positive rational numbers • Counting (natural) numbers • Decimals • Fractions • Percents

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		◦ Percent – a part of a whole expressed in hundredths • Mode of categorical data (modal category) – most frequent category in a set of data • Data representations ◦ Relative frequency table – a table to organize data that lists categories and the frequency (number of times) that each category occurs as a percentage • Characteristics of a relative frequency table ◦ Titles and labels • Title represents the purpose of collected data • Column headers and row labels clarify meaning of the data represented in the table ◦ Representation of categorical data • Table format • May include frequency count of each category • Includes the frequency of each category as a percentage of the total frequency for all categories ◦ Data values • Calculated by dividing the number of observations in a specific category by the total number of observations • Represented as percents, with the total of all categories representing 100% ◦ Percent bar graph – a graphical representation to organize data that uses solid bars that do not touch each other to show the frequency (number of times) that each category occurs as a percentage as compared to the related part(s) or to the whole • Characteristics of a percent bar graph ◦ Titles, subtitles, and labels • Title represents the purpose of collected data • Labels identify each category ◦ Representation of categorical data • Percent bars

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		◦ Placed in a linear horizontal or vertical arrangement to represent data • Scale of the axis ◦ Intervals of one or more units ◦ Scaled intervals proportionally displayed ◦ Represented as a number line from 0% to 100% ◦ Bars of graph • Represent the relative frequency (as a percentage) for each category • May represent part-to-part relationships or part-to-whole relationships ◦ Length of the bar represents • Percentage of data points for a given category • Distance from zero on the scale of the axis ◦ Value of the data represented by the bar • Determined by reading its associated number (the intervals) on the axis scale Use NUMERICAL AND GRAPHICAL SUMMARIES TO DESCRIBE THE DATA DISTRIBUTION Including, but not limited to: • Summaries of data distribution ◦ Numerical summary • Mode appears as the greatest percent for each category in a relative frequency table ◦ Graphical summary • Comparative heights or lengths of the category bars can be used to draw

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		conclusions about the data represented • Mode appears as the tallest or longest bar in a percent bar graph Note(s): • Grade Level(s): ◦ Grade 6 introduces summarizing categorical data with numerical and graphical summaries, including the mode, the percent of values in each category (relative frequency table), and the percent bar graph, and using these summaries to describe the data distribution. ◦ Grade 7 will compare two groups of numeric data using comparative dot plots or box plots by comparing their shapes, centers, and spreads. ◦ Various mathematical process standards will be applied to this student expectation as appropriate. • TxRCFP: ◦ Understanding data representation • TxCCRS: ◦ V.B. Statistical Reasoning – Describe data • V.B.1. Classify types of data. • V.B.3. Compute and describe the study data with measures of center and basic notions of spread. ◦ V.C. Statistical Reasoning – Analyze, interpret, and draw conclusions from data • V.C.1. Analyze data sets using graphs and summary statistics. • V.C.3. Make predictions using summary statistics. ◦ VIII.B. Communication and Representation – Interpretation of mathematical work • VIII.B.2. Summarize and interpret mathematical information provided orally, visually, or in written form within the given context.
6.13	***Measurement and data. The student applies mathematical process standards to use numerical***	

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	or graphical representations to solve problems. The student is expected to:	
6.13A	**Interpret numeric data summarized in dot plots, stem-and-leaf plots, histograms, and box plots.** ***Readiness Standard***	Interpret NUMERIC DATA SUMMARIZED IN DOT PLOTS, STEM-AND-LEAF PLOTS, HISTOGRAMS, AND BOX PLOTS Including, but not limited to: • Data – information that is collected about people, events, or objects ◦ Numerical data – data that represents values or observations that can be measured and placed in ascending or descending order • Can be counted (discrete) or measured (continuous) • Limitations ◦ Various forms of positive rational numbers • Counting (natural) numbers • Decimals • Fractions • Percents • Numeric summaries ◦ Mean – average of a set of data found by finding the sum of a set of data and dividing the sum by the number of pieces of data in the set ◦ Median – the middle number of a set of data that has been arranged in order from greatest to least or least to greatest ◦ Mode of numeric data – most frequent value in a set of data ◦ Range – the difference between the greatest number and least number in a set of data • May be expressed as a single value or as a range of numbers ◦ Interquartile range (IQR) – difference between the first quartile and the third quartile of a

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		set of numbers (IQR = Q3 – Q1) • Usually used only for box plots • Data representations ◦ Dot plot – a graphical representation to organize small sets of data that uses dots (or Xs) and a scale axis to show the frequency (number of times) that each number occurs ◦ Stem-and-leaf plot – a graphical representation used to analyze and compare groups or clusters of numerical data by separating the digits in numerical values based on place value. The left digit(s) of the data form the stems and the remaining digit(s) or fraction form the leaves that correspond with each stem, as designated by a key. ◦ Histogram – a graphical representation of adjacent bars with different heights or lengths used to represent the frequency of data in certain ranges of continuous and equal intervals ◦ Box plot (box and whisker plot) – a graphical representation showing the five-number summary of data (minimum, lower quartile, median, upper quartile, maximum) Note(s): • Grade Level(s): ◦ Grade 5 solved one- and two-step problems using data from a frequency table, dot plot, bar graph, stem-and-leaf plot, or scatterplot. ◦ Grade 6 introduces box plots and histograms. ◦ Various mathematical process standards will be applied to this student expectation as appropriate. • TxRCFP: ◦ Understanding data representation • TxCCRS: ◦ V.B. Statistical Reasoning – Describe data • V.B.3. Compute and describe the study data with measures of center and basic notions of spread. ◦ V.C. Statistical Reasoning – Analyze, interpret, and draw conclusions from data

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		• V.C.1. Analyze data sets using graphs and summary statistics. ◦ VIII.B. Communication and Representation – Interpretation of mathematical work • VIII.B.2. Summarize and interpret mathematical information provided orally, visually, or in written form within the given context.
6.13B	**Distinguish between situations that yield data with and without variability.** ***Supporting Standard***	Distinguish BETWEEN SITUATIONS THAT YIELD DATA WITH AND WITHOUT VARIABILITY Including, but not limited to: • Variability – measure of the spread of a set of data ◦ Data with variability may occur as data is recorded at different time periods. ◦ Data with variability may occur as data is recorded at a single time for different or many subjects. ◦ Data with variability can be summarized with a range. ◦ Data without variability may be recorded from an individual or event at a specific time. ◦ Data without variability can be summarized with a single value. Note(s): • Grade Level(s): ◦ Grade 6 introduces distinguishing between situations that yield data with and without variability. ◦ Grade 8 will determine the mean absolute deviation, which is a measure of variability for quantitative data. ◦ Statistics will distinguish among different sources of variability, including measurement, natural, induced, and sampling variability. ◦ Various mathematical process standards will be applied to this student expectation as

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		appropriate.
		• TxRCFP:
		  ◦ Understanding data representation
		• TxCCRS:
		  ◦ V.B. Statistical Reasoning – Describe data
		  • V.B.1. Classify types of data.
		  • V.B.3. Compute and describe the study data with measures of center and basic notions of spread.

ELPS#	SUBSECTION C: CROSS-CURRICULAR SECOND LANGUAGE ACQUISITION ESSENTIAL KNOWLEDGE AND SKILLS.

The English Language Proficiency Standards (ELPS), as required by 19 Texas Administrative Code, Chapter 74, Subchapter A, §74.4, outline English language proficiency level descriptors and student expectations for English language learners (ELLs). School districts are required to implement ELPS as an integral part of each subject in the required curriculum.

School districts shall provide instruction in the knowledge and skills of the foundation and enrichment curriculum in a manner that is linguistically accommodated commensurate with the student's levels of English language proficiency to ensure that the student learns the knowledge and skills in the required curriculum.

School districts shall provide content-based instruction including the cross-curricular second language acquisition essential knowledge and skills in subsection (c) of the ELPS in a manner that is linguistically accommodated to help the student acquire English language proficiency.
http://ritter.tea.state.tx.us/rules/tac/chapter074/ch074a.html#74.4

Choose appropriate ELPS to support instruction.

Last Updated 08/01/2018

Instructional Focus Document
Grade 6 Mathematics

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