LVS Algebra for the 21st Century "LVS-A21"

"LVS-A21" Developed Activities Aligned to CCSS Unit 3: Descriptive Statistics

CCSS **UNIT 3 LESSON 13: RELATIONS AND FUNCTIONS**

CCSS_S-ID7: Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

➢ **Relating Graphs to Events Lesson Notes**
- *Qualitative Grapher* (Represents situations that do not necessarily have numerical values)
- Interactive Activity: *Graph Party!* (Match graphs to their animated situations)
- *Self-assessment question* (Interpret a graph and matching it to a situation)

➢ **Relations and Functions Lesson Notes**
- *Self-assessment question* (Determine if a table represents a function)
- *Self-assessment question* (Determine if a situation describes a function)
- GeoGebra applet: *Is it a function?* (Determine if a given graph is a function)
- Kahn Academy Video: *Testing if a Relationship is a Function* (Using points on a graph to determine if the graph represents a function)
- Kahn Academy Video: *Functional Relationships* (Determining if there is a functional relationship between each person and his or her height)

CCSS **UNIT 3 LESSON 14: FUNCTION RULES**

CCSS_S-ID7: Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

➢ **Writing a Function Rule Lesson Notes**
- Interactive applet: *Linear Function Machine* (Practice constructing linear functions)
- *Self-assessment question:* Select the function rule represented by a real world situation

CCSS **UNIT 4 LESSON 18: SLOPE AND SLOPE-INTERCEPT FORM**

CCSS_S-ID7: Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

➢ **Rate of Change and Slope Lesson Notes**
- *GeoGebra applet*: Compute slope of a Linear Function
- Kahn Academy Slope Video: *Finding slope given two points*

➢ **Slope-Intercept Form Lesson Notes**
- Khan Academy Slope 1 Video: Finding slope and writing the equation of a line in slope-intercept form - part 1
- Khan Academy Slope 2 Video: Finding slope and writing the equation of a line in slope-intercept form - part 2
- Khan Academy Video: Slope and Y-Intercept Intuition (Explaining slope and Y-Intercept)
- Khan Academy Video: Equation of a Line 1 (Finding the equation of a line given 2 points)
- Khan Academy Video: Equation of a Line 2 (Finding the equation that represents a given line)
- GeoGebra Applet: Further exploration of slope-intercept form

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- Oil Leak problem: Additional practice connecting rate of change to slope - immediate feedback provided
- Check your understanding: Explain Rate of Change and Slope in a Celsius and Fahrenheit Temperature Problem

CCSS **UNIT 4 LESSON 19: STANDARD FORM AND POINT-SLOPE FORM**

CCSS_S-ID7: Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

➢ **Standard Form Lesson Notes**
- Khan Academy Video: *Converting from Standard Form to Slope-Intercept Form of an Equation of a Line* (Changing an equation in standard form into an equation in slope-intercept form)

CCSS **UNIT 4 LESSON 20: PARALLEL & PERPENDICULAR LINES AND LINES OF BEST FIT**

CCSS_S-ID5: Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.

CCSS_S-ID6: Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.
   a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. (Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.)
   b. Informally assess the fit of a function by plotting and analyzing residuals.
   c. Fit a linear function for a scatter plot that suggests a linear association.
CCSS_S-ID8: Compute (using technology) and interpret the correlation coefficient of a linear fit.
CCSS_S-ID9: Distinguish between correlation and causation.

➢ **Parallel and Perpendicular Lines Lesson Notes**
- Khan Academy Video: *Parallel Lines (1)* (Ex 1: Using slope of equations to determine which of the lines are parallel)
- Khan Academy Video: *Parallel Lines (2)* (Ex 2: Using slopes of 3 equations to determine if any of them are parallel)
- Khan Academy Video: *Parallel Lines (3)* (Ex 3: Using slopes of 3 equations to determine if any of them are parallel)
- Khan Academy Video: *Perpendicular Lines (1)* (Ex 1: Using slope of equations to determine which of the lines are perpendicular)
- Khan Academy Video: *Perpendicular Lines (2)* (Ex 2: Using slopes of 3 equations to determine which of the lines are perpendicular)

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➢ **Scatter Plots and Equations of Lines Lesson Notes**
- Video with audio: *residuals*
- GeoGebra Illustration: *Finding a Line of Best Fit* (Answer questions given a graph model that approximates data representing exercising - immediate feedback provided)
- Self-assessment question: *Studying Works!* (Answer questions, given a graph of scatter points that represents time studying and test results – immediate feedback provided)
- Self-assessment question: *Music Sales* (Answer questions, given a graph of scatter points that represents number of CDs sold over six years - immediate feedback provided)

CCSS *UNIT 6 LESSON 24: ORGANIZING AND REPRESENTING DATA*

CCSS_S-ID1: Represent data with plots on the real number line (dot plots, histograms, and box plots.

CCSS_S-ID5: Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.

➢ **Pictographs, Bar Graphs, and Dot Plots Lesson Notes**
- Illustrations, vocabulary, and examples: Complete the activities, self-check assessments, and applets that address Pictographs, Bar Graphs, and Dot Plots
- Viewlet illustration: **example** (Study the illustration of pictograph and bar graph representations of movie theaters in Louisiana data.)
- Viewlet illustration: **create a dot or line plot** (Study the creation of a dot plot representation of the mass of Louisiana crawfish collected by students.)

➢ **Histograms Lesson Notes**
- Activities and self-check assessments addressing Histograms: (Complete the activities and self-check assessments to raise understanding of histograms.)
- Problem example**:** list of states by date of statehood (Answer questions related to given list of the 50 states and the dates of statehood - immediate feedback is provided.)
- Interactive Activity: **practice problem** (Given data and a graph, drag data values into correct bins to make a histogram.)
- Graphing Calculator Guided Practice: **create a histogram using a graphing calculator** (With given data of cities and ticket prices, use a graphing calculator to create a Histogram.)
- Graphing Calculator Guided Practice: within the guided practice activity "**create a histogram using a graphing calculator**": **clear data that already exists in a list** (Use these instructions if there is existing data in the list that has to be cleared before creating a histogram.)

➢ **Two-Way Frequency Tables Lesson Notes** (Learn how two-way frequency and two-way relative frequency tables can help in analyzing data.)
- *Illustrations, vocabulary, and examples***:** (Use vocabulary, and examples to raise understanding of data in Two-Way Frequency tables)
- *Self-Assessment:* (After surveying students and their preferred leisure activity, the data collected is illustrated in Table 1: Relative Frequency of a Table and Table 2: Relative Frequency of Rows. Answer questions relating to the data in both tables. Immediate feedback is provided.)

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CCSS UNIT 6 LESSON 25: MEASURES OF CENTRAL TENDENCY AND SPREAD

CCSS_S-ID2: Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.

CCSS_S-ID3: Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

CCSS_S-ID4: Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.

➢ **Using Measures of Central Tendency Lesson Notes** (Use measures of central tendency and spread to describe and analyze data)
   - Definition: standard deviation.
   - Interactive Activity: *TI-84 **Technology Activity*** Computing Single Variable Statistics (Enter a set of numbers into the calculator, sort them, and compute the statistics such as mean, median, and standard deviation.
   - **GeoGebra Applet**: explore the applet to "see" standard deviation and how it describes data.
   - Practice creating a dot plot*: Use your mouse to "move" quarters to create a dot plot.
   - **GeoGebra Applet**:   explore applet for more practice with mean, median, and mode.
   - *Kahn Academy Video:* **Finding Mean, Median and Mode**
   - *Kahn Academy Video:* **Finding an "average"**
   - *Kahn Academy Video:* **Measure of Center**
   - *GeoGebra Applet:* **Dot plots and mean, median, and mode**
   - *Simulation:* **Ecostat Explorer** *(*See how statistics is applied to science)

➢ **Box Plots Lesson Notes**
   - Five-number summary: Follow the steps to create a five-number summary and box plot using data of 1961 and 2001 home run leaders
   - ***Graph of the two box plots***: Using the TI-84 graphing calculator to graph a Box Plot
   - Interactive Activity with a ***GeoGebra applet***: (Explore applet to practice creating box plots)
   - Kahn Academy Video: ***Box Plots*** (Generate a box-and-whisker diagram)