Rigorous Curriculum Design

Unit Planning Organizer

Subject:	Integrated Math 1			Grade:	9
Unit Number:	6	Unit Name:	Interpretive Statistics		
Unit Length	Days: 20 days		Mins / Day: 50-55		
Unit Synopsis	Statistical applications				

	Math CCSS
Priority Standards	**M1.S.ID. 3** **Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).** **M1.S.ID.5** **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.** **M1.S.ID 9** **Distinguish between correlation and causation**
SMP	Standards for Mathematical Practice ☐Make sense of problems and persevere in solving them ☐Reason abstractly and quantitatively ☐Construct viable arguments and critique the reasoning of others ☐Model with mathematics ☐Use appropriate tools strategically ☐Attend to precision ☐Look for and make use of structure ☐Look for and express regularity in repeated reasoning
Supporting Standards	Math CCSS **M1.NQ.1 -** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. **M1.S.ID.1 –** Represent data with plots on the real number line (dot plots, histograms, and box plots). **M1.S.ID.2** – 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. **M1.S.ID.7-** Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data under supporting standards. **M1.S.ID.8** – Compute (using technology) and interpret the correlation coefficient of a linear fit.

Interdisciplinary Connections	Literacy/Science/ History/Other	NG ELD Standards
		ELD.9.1.B.6 Reading closely literary and informational texts and viewing multimedia to determine how meaning is conveyed explicitly and implicitly through language. ELD.9.1.B.8 Analyzing how writers and speakers use vocabulary and other language resources for specific purposes (to explain, persuade, entertain, etc.) depending on modality, text type, purpose, audience, topic, and content area. ELD.9.1.C.12 Selecting and applying varied and precise vocabulary and other language resources to effectively convey ideas.

Unwrapped Priority Standards

Standard:	M1.S.ID.3			
Skills	Concepts	Bloom's	DOK	Language Demand
Interpret	Differences in shape, center, and spread in the context of the data sets	Analyze	2	Interpretive
Accounting	For possible effects of extreme data points (outliers).	Analyze	3	

Essential Question(s)	Big Idea(s)
Does the representation of all data sets look exactly the same? Explain why or why not.	The data sets you use affect the shape, center, and spread of the distribution of the data.

Standard:	M1.S.ID.5			
Skills	Concepts	Bloom's	DOK	Language Demand
Summarize	Categorical data for two categories in two-way frequency tables	Understand	2	Interpretive And
Interpret	Relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies)	Understand	2	Productive
Recognize	Possible associations and trends in the data	Analyze	2	

Essential Question(s)	Big Idea(s)
How can you visually represent the difference between boys and girls and the shows they like to watch, or the food they like to eat? How can this representation be used to find trends?	Sets of data can be organized into subcategories and compared to find possible trends and associations.

Standard:	M1.S.ID.9			
Skills	Concepts	Bloom's	DOK	Language Demand
Distinguish	Between correlation and causation	Evaluate	3	Productive

Essential Question(s)	**Big Idea(s)**
How are correlation and causation different?	Just because something has a high correlation does not mean there is causation.

Learning Progressions

Standard:	M1.S.ID.3				
Previous Grade		Current Grade		Next Grade	
Skills	Concepts	Skills	Concepts	Skills	Concepts
Summarize Describe	Distributions (6.SP.4/5b/5c/5d)	Interpret	Differences in shape, center, and spread in the context of the data sets	N/A	N/A
		Accounting	For possible effects of extreme data points (outliers).		

Standard:	M1.S.ID.5				
Previous Grade		Current Grade		Next Grade	
Skills	Concepts	Skills	Concepts	Skills	Concepts
Summarize	Numerical data sets in relation to their context (6.SP.5)	Summarize	Categorical data for two categories in two-way frequency tables	Summarize Represent Interpret	Data on a single count or measurement variable. (M3.S.ID.4)
		Interpret	Relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies)		
Draw	Informal comparative inferences about two populations (7.SP.3,4)	Recognize	Possible associations and trends in the data		

Standard:	M1.S.ID.9				
Previous Grade		Current Grade		Next Grade	
Skills	Concepts	Skills	Concepts	Skills	Concepts
Recognize	a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. (6.SP.1)	Distinguish	Between correlation and causation	N/A	N/A

Unit Vocabulary Words	
Academic Cross-Curricular Vocabulary (Tier 2)	Content/Domain Specific Vocabulary (Tier 3)
Political campaign, advertisement, false advertisement, misleading data	Causation, correlation, two-way frequency table, relative frequency table, conditional statements, data distribution, statistical representation, data set, data trends, joint, marginal, and conditional relative frequencies, quantitative and categorical data, shape, center, spread, outlier, dot plot, histogram, box plot, standard deviation, median, mean, correlation coefficient
Resources for Vocabulary Development (Strategies, Routines and Activities) Unit Graphic Organizers, Word Walls, Vocabulary Quizzes, Crosswords, foldables, Cornell Notes, Flashcards, Quizlet.	

21st Century Skills	
☐Creativity and Innovation	☐Initiative and Self-Direction
☐Critical Thinking and Problem Solving	☐Social and Cross-Cultural Skills
☐Communication and Collaboration	☐Productivity and Accountability
☐Flexibility and Adaptability	☐Leadership and Responsibility
☐Globally and Financially Literate	☐_____
☐Communicating and Collaborating	☐_____

Connections between 21st Century Skills, CCCSS, and Unit Overview:

Webquest, anticipatory set videos, internet research, collaborative tasks, cultural implications, communication in the form of different media

Costa & Kallick, 2008

<table>
<tr><th colspan="4">Unit Assessments</th></tr>
<tr><td colspan="2">Pre-Assessment</td><td colspan="2">Post-Assessment</td></tr>
<tr><td colspan="2">Go to:
http://www.alvordschools.org/Page/2700</td><td colspan="2">Go to:
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<tr><th colspan="4">Scoring Guides and Answer Keys</th></tr>
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<tr><th colspan="4">Assessment Differentiation</th></tr>
<tr><td>Students with Disabilities</td><td>Accommodations
Reference IEP to ensure appropriate testing environment

Modifications</td><td>English Language Learners</td><td>Emerging

Expanding</td></tr>
</table>

Engaging Scenario Overview (Situation, challenge, role, audience, product or performance)	
S: current situation: You are a campaign manager for a local politician. In order win this campaign you will need to support your candidate with data driven campaign ads. Additionally, it will be your job to identify and disprove any false advertisement from your opponent. C: student challenge: Students will be required to research data online (from provided resources). Within different tasks, this data will be interpreted, analyzed, and summarized. Students will need to interpret differences in quantitative and categorical data. Students will identify and create scenarios differentiating between causation and correlation. R: student role: Students take on the role of campaign manager. They will research, interpret, and present data relevant to a political campaign. A: intended audience: Voters. Students will act as "the people" and elect a winning campaign. P: product or performance: 1) Students will produce data interpretations in form of a written paragraph. 2) Students will produce a two-way frequency table analysis and summary in a written paragraph. 3a) Students will produce printed copies of 2 accurate campaign advertisements with a brief summary, verifying that the data is accurate. 3b) Students will produce printed copies of 2 misleading campaign advertisements with a description and explanation of the misrepresentations. 4) Students will produce 2 campaign advertisements, either as posters or as digital commercials. One campaign ad will represent causation, using accurate data and accurate graphical representations. The other ad will use correlation and misrepresent the (accurate) data using misleading graphs, statements, or other interpretation strategies.	Suggested Length of Time Days: 7.5 Min/Day: 55

Engaging Learning Experiences Synopsis of Authentic Performance Tasks		
Authentic Performance Tasks	Description	Suggested Length of Time
Task 1: Interpret data. Look at a variety of social and political data. Interpret differences in shape, center, and spread in the context of data sets, accounting for extreme data points.	Students will learn how to read data in reports, charts, and graphs. Pre-instruction: Data should be presented to students in a variety of formats; students should examine the data and write a reflection of their interpretation of the data. In small groups, students will discuss these interpretations in order to gather more perspective on the data. Instruction will focus on the different representations of data, shape, center, and spread and the implications of each. To proficiently interpret data, students should understand where to look for identifying the context of the data, as well as grasping the meaning of the shape, measures of central tendency, and the spread, including outliers.	Days: 1.5 Min/Day: 55

	Task 1 will involve students gathering three examples of statistical data that is used in a political or social context. Students will identify, interpret, and summarize the data. Each summary should be between one to two paragraphs, totaling roughly one to two pages for all three.	
Task 2: Analyze and summarize data in two-way frequency tables. Focus on comparing categories such as male vs. female, age groups, demographics, or education. Issues such as crime, education, and healthcare. Summaries should recognize associations and trends in the data that you find to be interesting or significant.	With knowledge of reading and interpreting data, students will reorganize data into two-way frequency tables. Students will be asked to address questions from these tables (i.e. which group prefers which topic, which is more popular, how many prefer what?). Focus should be placed on key demographics while investigating relevant and current social, political, and geographic issues. Task 2: Students are to identify a minimum of two areas of political or social interest that represent a trend in thought. They will analyze and summarize the data using a two-way frequency table in their argument. Students will write, at minimum, a one page summary of the trend in data. Students should take a stance on the data, justifying why the data supports their opinion.	Days: 2 Min/Day: 55
Task 3: Identify 2 accurate campaign advertisements (political messages). Verify the relevance and accuracy of the data. Then, identify 2 misleading campaign advertisements. Analyze the accuracy of the data. Describe where the misrepresentations lie (i.e. in a graph, statement, or interpretation).	After learning to analyze data in tables, charts, and graphs (and identify discontinuities), students will be ready to search for real world examples of statistical misrepresentations in the media. Data ethics should be introduced as a real world application of identifying misleading statistical representations. Task 3: Students will research political, commercial, and/or social propaganda (advertising or publicity) in news journalism, print media, the internet, etc. For the purpose of this task, any propaganda researched should include the use of statistics in attempt to influence the public. In a one paragraph summary (per ad), students will identify 2 advertisements that use misleading statistics, cite the source, describe the misrepresentation, and make a suggestion for presenting the information honestly.	Days: 2 Min/Day: 55

	Also, students will find and summarize 2 advertisements, campaigns, or promotions that use statistics honestly. Verify the relevance and accuracy of the data by cross-referencing and citing at least one additional reliable source.	
Task 4: Create 2 campaign ads. Create 1 accurate campaign add (causation). Present accurate data with accurate graphical representation. Create 1 misleading campaign add (correlation). Present accurate data with misleading graphical representation and/or misleading statements.	Begin by teaching causation vs. correlation Using the knowledge and skills learned in unit 6, students will research data and create their own campaign ads. Teachers may want to spend one day reviewing data analysis and interpretation, as well as presenting sample campaigns, promotions, and advertisements that show honest representations vs. misleading representations. Task 4: Students will create their own campaign ads. One ad will use data representations honestly, depicting causation; the other campaign ad will misrepresent data using correlation without causation.	Days: 2 Min/Day: 55

Authentic Performance Task 1

<table>
<tr><td>Name:</td><td colspan="2">Interpret Social and Political Data</td><td>Suggested Length</td><td>Days: 1.5
Min/Day: 55</td></tr>
<tr><td rowspan="6">Standards Addressed</td><td colspan="4">Priority Standards</td></tr>
<tr><td colspan="4">CCCSS Math</td></tr>
<tr><td colspan="4">M1.S.ID. 3
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☐Look for and make use of structure
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<tr><td>Analyze</td><td>2</td></tr>
<tr><td>Analyze</td><td>3</td></tr>
<tr><td colspan="2">Scoring Rubric</td></tr>
<tr><td colspan="5">Instructional Strategies</td></tr>
</table>

All Students	SWD	ELs	Enrichment
	Accommodations	Emerging	
	Modifications	Expanding	
		Bridging	

Authentic Performance Task 2

<table>
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<tr><td>Understand

Analyze</td><td>2

2</td></tr>
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	Accommodations	Emerging	
	Modifications	Expanding	
		Bridging	

Authentic Performance Task 3

<table>
<tr><td>Name:</td><td colspan="2">Propaganda: Misleading Data Representations</td><td>Suggested Length</td><td>Days: 2
Min/Day: 55</td></tr>
<tr><td rowspan="7">Standards Addressed</td><td colspan="4">Priority Standards</td></tr>
<tr><td colspan="4">CCCSS Math</td></tr>
<tr><td colspan="4">M1.S.ID 9
Distinguish between correlation and causation</td></tr>
<tr><td colspan="4">Standards for Mathematical Practice</td></tr>
<tr><td colspan="4">☐Make sense of problems and persevere in solving them
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<tr><td>Evaluate</td><td>3</td></tr>
<tr><td colspan="2">Scoring Rubric</td></tr>
<tr><td colspan="2"></td></tr>
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	Modifications	Expanding	
		Bridging	

Authentic Performance Task 4

<table>
<tr><td>Name:</td><td colspan="2">Political Campaign Poster Presentation</td><td>Suggested Length</td><td>Days: 2
Min/Day: 55</td></tr>
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<tr><td colspan="4">CCCSS Math</td></tr>
<tr><td colspan="4">M1.S.ID.5
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<tr><td>Analyze</td><td>2</td></tr>
<tr><td>Evaluate</td><td>3</td></tr>
<tr><td colspan="2">Scoring Rubric</td></tr>
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Instructional Strategies		
All Students	SWD	ELs	Enrichment
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Engaging Scenario

Detailed Description (situation, challenge, role, audience, product or performance)
S: current situation: You are a campaign manager for a local politician. In order win this campaign you will need to support your candidate with data driven campaign ads. Additionally, it will be your job to identify and disprove any false advertisement from your opponent. C: student challenge: Students will be required to research data online (from provided resources). Within different tasks, this data will be interpreted, analyzed, and summarized. Students will need to interpret differences in quantitative and categorical data. Students will identify and create scenarios differentiating between causation and correlation. R: student role: Students take on the role of campaign manager. They will research, interpret, and present data relevant to a political campaign. A: intended audience: Voters. Students will act as "the people" and elect a winning campaign. P: product or performance: 1) Students will produce data interpretations in form of a written paragraph. 2) Students will produce a two-way frequency table analysis and summary in a written paragraph. 3a) Students will produce printed copies of 2 accurate campaign advertisements with a brief summary, verifying that the data is accurate. 3b) Students will produce printed copies of 2 misleading campaign advertisements with a description and explanation of the misrepresentations. 4) Students will produce 2 campaign advertisements, either as posters or as digital commercials. One campaign ad will represent causation, using accurate data and accurate graphical representations. The other ad will use correlation and misrepresent the (accurate) data using misleading graphs, statements, or other interpretation strategies.

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