



Rigorous Curriculum Design

Unit Planning Organizer



Subject:	Math 7	Grade:	7
Unit Number:	5	Unit Name:	Statistics
Unit Length	Weeks: 4 ± 1 buffer	Mins / Day:	57 minutes
Unit Synopsis	Students build on their previous work with single data distributions to compare two data distributions and address questions about differences between populations. They begin informal work with random sampling to generate data sets and learn about the importance of representative samples for drawing inferences.		

	Math CCSS
Priority Standards	<p>SP 1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.</p> <p>SP 4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. <i>For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.</i></p>
	Standards for Mathematical Practice
SMP	<ul style="list-style-type: none"> X Make sense of problems and persevere in solving them X Reason abstractly and quantitatively X Construct viable arguments and critique the reasoning of others X Model with mathematics X Use appropriate tools strategically X Attend to precision X Look for and make use of structure X Look for and express regularity in repeated reasoning
Unit St	Math CCSS

	<p>NS 3 Solve real-world and mathematical problems involving the four operations with rational numbers.</p> <p>EE 2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, $a + 0.05a = 1.05a$ means that “increase by 5%” is the same as “multiply by 1.05.”</p> <p>SP 2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.</p> <p>SP 3 Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.</p>	
Interdisciplinary Connections	Literacy/Science/ History/Other	NG ELD Standards
	<p>Communications</p> <p>Sociology</p> <p>Marketing</p> <p>Business</p> <p>Art</p>	<p>ELD.7.I.B.6 - Reading closely literary and informational texts and viewing multimedia to determine how meaning is conveyed explicitly and implicitly through language</p>

Unwrapped Priority Standards

Standard:	<p>SP 1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.</p>			
Skills	Concepts	Bloom’s	DOK	Language Demand
Understand	that statistics can be used to gain information about a population	Bloom’s 2	DOK 3	Interpretive B6 (data from a sample population)
by examining	a sample of the population			
Understand	generalizations about a population from a sample are valid only if the sample is representative of that population	Bloom’s 5	DOK 3	
Understand	that random sampling tends to produce representative samples and support valid inferences	Bloom’s 2	DOK 3	
Essential Question(s)		Big Idea(s)		
What is the favorite food of teenagers? At this		Information from sampling can provide generalizations		

school/state/country/world? How do you know?	about a population
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Standard:	SP 4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.			
Skills	Concepts	Bloom's	DOK	Language Demand
Use to draw	measures of center and measures of variability for numerical data from random samples informal comparative inferences about two populations	Bloom's 4	DOK 4	Interpretive B6 (inferences)
Essential Question(s)		Big Idea(s)		
Are the boys in our class/8 th grade/school taller than the girls?		Two populations can be compared mathematically/statistically (using measures of center/variability) from random samples		

Learning Progressions

Standard:	7 SP 1				
Previous Grade		Current Grade		Next Grade	
Skills	Concepts	Skills	Concepts	Skills	Concepts
Understand	that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.	Understand by examining	that statistics can be used to gain information about a population a sample of the population	Construct and interpret to investigate	scatter plots for bivariate measurement data patterns of association between two quantities.
Describ[e]	The nature of the attribute under investigation, including how it was measured and its units of measurement	Understand	generalizations about a population from a sample are valid only if the sample is representative of that population		
Summarize	Numerical data sets in their contexts, such as by	Understand	that random sampling tends to produce representative		

Describing	The nature of the attribute under investigation, including how it was measured and its units of measurement		samples and support valid inferences		
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Standard:		7 SP 4			
Previous Grade		Current Grade		Next Grade	
Skills	Concepts	Skills	Concepts	Skills	Concepts
Understand	That a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.	Use to draw	measures of center and measures of variability for numerical data from random samples informal comparative inferences about two populations	interpret	scatter plots for bivariate measurement data
Recognize	that a measure of center for a numerical set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number			investigate	patterns of association between two quantities.
Giv[e]	quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation).			Describe	patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.

Unit Vocabulary Words

Academic Cross-Curricular Vocabulary (Tier 2)	Content/Domain Specific Vocabulary (Tier 3)
Understand Examine Use Draw Generate Estimate Predict	Statistics Population Generalization Representative Sample Random sample Validity Measures of center Measures of variability Distribution
Resources for Vocabulary Development (Strategies, Routines and Activities)	
Word Wall Flash Cards Graphic Organizer Examples & Non-examples Sentence Frames The Frayer Model Word Pyramid Concept Map Targeted Vocabulary Partner Activity	

21 st Century Skills	
<input checked="" type="checkbox"/> Creativity and Innovation <input checked="" type="checkbox"/> Critical Thinking and Problem Solving <input checked="" type="checkbox"/> Teamwork and Collaboration <input type="checkbox"/> Flexibility and Adaptability <input type="checkbox"/> Globally and Financially Literate <input checked="" type="checkbox"/> Effective Oral and Written Communication	<input checked="" type="checkbox"/> Initiative and Self-Direction <input checked="" type="checkbox"/> Social and Cross-Cultural Skills <input checked="" type="checkbox"/> Productivity and Accountability <input checked="" type="checkbox"/> Leadership and Responsibility <input checked="" type="checkbox"/> Curiosity and imagination <input checked="" type="checkbox"/> Accessing and Analyzing Information

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

X Creativity and Innovation-Write a well-developed survey question
 X Teamwork and Collaboration-Collaborate fro question development
 X Effective Oral and Written Communication- Write a well-developed survey question
 X Initiative and Self-Direction-Independent development of question and plan of action
 X Leadership and Responsibility- Roles within group formed
 X Curiosity and imagination -Development of survey question and plan of action

Costa & Kallick, 2008

Unit Assessments	
Pre-Assessment	Post-Assessment
Go to: http://www.alvordschools.org/Page/2698	Go to: http://www.alvordschools.org/Page/2698
Scoring Guides and Answer Keys	
Go to: http://www.alvordschools.org/Page/2698	Go to: http://www.alvordschools.org/Page/2698

Assessment Differentiation		
Students with Disabilities	<p>Accommodations Reference IEP to ensure appropriate testing environment Allow students to use notes</p>	<p style="text-align: center;">Emerging</p> <p>Allow students to use notes</p>
	<p>Modifications Refer to each students' individual IEPs</p>	<p style="text-align: center;">Expanding</p> <p>Use sentence frame for constructed response items.</p>
English Language Learners		

Engaging Scenario Overview (Situation, challenge, role, audience, product or performance)		
You are creating and conducting a survey for the school newspapers monthly publication.		<p style="text-align: center;">Suggested Length of Time</p> <p>Days: 7-9</p> <p>Mins/Day: 57</p>
Engaging Learning Experiences Synopsis of Authentic Performance Tasks		
Authentic Performance Tasks	Description	Suggested Length of Time
Task 1: Develop a Survey	Develop the content of your survey with your team. Your survey will be conducted to reflect two samples of the population. For example, 6 th graders and 7 th graders, or boys and girls. Develop a plan to conduct your survey, so that each of your sample populations is a good representation of the general populations. Justify the relevance of the survey.	<p>Days: 1-2</p> <p>Mins/Day: 57</p>
Task 2: Survey Data Analysis	Conduct the survey for both sample populations, collect the data, and numerically analyze your data as a team using measures of central tendencies.	<p>Days: 2</p> <p>Mins/Day: 57</p>
Task 3: Represent Data Graphically	Visually represent the data using two different visual representations of their choice and identify the display that best displays their findings and explain their choice.	<p>Days: 2</p> <p>Mins/Day: 57</p>
Task 4: Presentation	As a group create a presentation of your survey results for the school newspaper. Include: your survey question, how your sample populations represent the general population, and your results (include a visual). Be sure to explain why your survey and results are important.	<p>Days: 2-3</p> <p>Mins/Day: 57</p>

Authentic Performance Task 1

Name:	Develop a Survey		Suggested Length	Days: 1-2 Mins/Day: 57
Standards Addressed	Priority Standards			
	CCCSS Math			
	<p>SP 1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences</p>			
	Standards for Mathematical Practice			
	<p>X Make sense of problems and persevere in solving them <input type="checkbox"/> Reason abstractly and quantitatively X Construct viable arguments and critique the reasoning of others <input type="checkbox"/> Model with mathematics <input type="checkbox"/> Use appropriate tools strategically <input type="checkbox"/> Attend to precision <input type="checkbox"/> Look for and make use of structure <input type="checkbox"/> Look for and express regularity in repeated reasoning</p>			
	Supporting Standards			
	<p>CCCSS Math</p> <p>SP 2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.</p>			
Interdisciplinary Connections	Literacy/Science/ History/Other		NG ELD Standards	
	<p>Communications Sociology Marketing Business</p>			
Teaching and Learning Progression	Definition of Random sample		Bloom's	DOK
	What makes a good random sample/good criteria		2	3
	How to compare random sample to the population		Scoring Rubric	
	<p>Make generalizations from sample data to the population</p> <p>Considerations of implementing a survey (privacy, appropriate, etc.)</p>		See rubric in Unit 4 APT	
Instructional Strategies				
All Students	SWD	Els	Enrichment	

Graphic organizer Use of calculators	Accommodations Refer to each students' individual IEPs	Emerging Clarification of directions by aide or peer in primary language	
	Modifications Refer to each students' individual IEPs	Expanding Clarification of directions by teacher in English	
		Bridging Clarification of directions by student to the teacher	

Authentic Performance Task 2

Name:	Survey Data Analysis	Suggested Length	Days: 2 Mins/Day: 57
Standards Addressed	Priority Standards		
	CCCSS Math		
	SP 1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences		
	SP 4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.		
	Standards for Mathematical Practice		
	<input checked="" type="checkbox"/> Make sense of problems and persevere in solving them <input checked="" type="checkbox"/> Reason abstractly and quantitatively <input checked="" type="checkbox"/> Construct viable arguments and critique the reasoning of others <input checked="" type="checkbox"/> Model with mathematics <input checked="" type="checkbox"/> Use appropriate tools strategically <input checked="" type="checkbox"/> Attend to precision <input checked="" type="checkbox"/> Look for and make use of structure <input checked="" type="checkbox"/> Look for and express regularity in repeated reasoning		
	Supporting Standards		
CCCSS Math			

	<p>NS 3 Solve real-world and mathematical problems involving the four operations with rational numbers.</p> <p>SP 2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.</p> <p>SP 3 Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.</p>		
Interdisciplinary Connections	Literacy/Science/ History/Other		NG ELD Standards
	Communications Sociology Marketing Business		
Teaching and Learning Progression	Measures of central tendencies – mean, median, mode, range Compare and contrast two sets of data Mean deviation	Bloom’s	
		DOK	
		5	
		3	
		Scoring Rubric	
		See rubric in Unit 4 APT	
Instructional Strategies			
All Students	SWD	Els	Enrichment
Graphic organizer Use of calculators	Accommodations Refer to each students’ individual IEPs Modifications Refer to each students’ individual IEPs	Emerging Clarification of directions by aide or peer in primary language	
		Expanding Clarification of directions by teacher in English	
		Bridging Clarification of directions by student to the teacher	

Authentic Performance Task 3

Name:	Represent Data Graphically	Suggested Length	Days: Mins/Day: 57
Standards Addressed	Priority Standards		
	CCCSS Math		
	<p>SP 1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences</p> <p>SP 4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.</p>		
	Standards for Mathematical Practice		
	<ul style="list-style-type: none"> X Make sense of problems and persevere in solving them X Reason abstractly and quantitatively X Construct viable arguments and critique the reasoning of others X Model with mathematics X Use appropriate tools strategically X Attend to precision X Look for and make use of structure <input type="checkbox"/> Look for and express regularity in repeated reasoning 		
	Supporting Standards		
CCCSS Math			
<p>SP 2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.</p> <p>SP 3 Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.</p>			
Interdisciplinary Connections	Literacy/Science/ History/Other	NG ELD Standards	
	Communications Sociology Marketing Business Art		
Teaching and Learning Progression			Bloom's
			5 4

		Scoring Rubric	
		See rubric in Unit 4 APT	
Instructional Strategies			
All Students	SWD	Els	Enrichment
Graphic organizer Use of calculators	Accommodations Refer to each students' individual IEPs Modifications Refer to each students' individual IEPs	Emerging Clarification of directions by aide or peer in primary language	
		Expanding Clarification of directions by teacher in English	
		Bridging Clarification of directions by student to the teacher	

Authentic Performance Task 4

Name:	Presentation	Suggested Length	Days: Mins/Day: 57
Standards Addressed	Priority Standards		
	CCCSS Math		
	<p>SP 1 <u>Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences</u></p>		
	<p>SP 4 <u>Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.</u></p>		
	Standards for Mathematical Practice		
	<input type="checkbox"/> Make sense of problems and persevere in solving them <input type="checkbox"/> Reason abstractly and quantitatively <input checked="" type="checkbox"/> Construct viable arguments and critique the reasoning of others <input type="checkbox"/> Model with mathematics <input checked="" type="checkbox"/> Use appropriate tools strategically <input checked="" type="checkbox"/> Attend to precision <input type="checkbox"/> Look for and make use of structure <input type="checkbox"/> Look for and express regularity in repeated reasoning		
	Supporting Standards		
	CCCSS Math		

	<p>SP 2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.</p> <p>SP 3 Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.</p>								
Interdisciplinary Connections	Literacy/Science/ History/Other		NG ELD Standards						
	Communications Sociology Marketing Business Art								
Teaching and Learning Progression			<table border="1"> <tr> <th data-bbox="941 816 1339 856">Bloom's</th> <th data-bbox="1339 816 1523 856">DOK</th> </tr> <tr> <td data-bbox="941 856 1339 896">5</td> <td data-bbox="1339 856 1523 896">3</td> </tr> <tr> <td data-bbox="941 896 1339 957">4</td> <td data-bbox="1339 896 1523 957">4</td> </tr> </table>	Bloom's	DOK	5	3	4	4
	Bloom's	DOK							
	5	3							
	4	4							
		Scoring Rubric							
		See rubric in Unit 4 APT							
Instructional Strategies									
All Students	SWD	Els	Enrichment						
Graphic organizer Use of calculators	Accommodations Refer to each students' individual IEPs	Emerging Clarification of directions by aide or peer in primary language							
	Modifications Refer to each students' individual IEPs	Expanding Clarification of directions by teacher in English							
		Bridging Clarification of directions by student to the teacher							

Engaging Scenario

Detailed Description (situation, challenge, role, audience, product or performance)

You are creating and conducting a survey for the school newspapers monthly publication.

Instructional Strategies

All Students	SWD	Els	Enrichment
Graphic organizer Use of calculators	Accommodations Refer to each students' individual IEPs Modifications Refer to each students' individual IEPs	Emerging Clarification of directions by aide or peer in primary language	
		Expanding Clarification of directions by teacher in English	
		Bridging Clarification of directions by student to the teacher	

Feedback to Curriculum Team

Reflect on the teaching and learning process within this unit of study. What were some successes and challenges that might be helpful when refining this unit of study?

	Successes	Challenges
Student Perspective		
Teacher Perspective		