A, M A, M, T A, M, T A, M, T	Evaluative Criteria consists of: ● Was the range of usual values calculated correctly using the mean and standard deviation ● Were the usual values determined using the empirical rule and its percentiles ● Were the usual values used to correctly interpret real life normal data ● Was Chebyshev's formula used in calculating the range of usual values for non-normal data	OTHER EVIDENCE: ● Alternative assessment projects such as matching activities and work with a variety of real life data sets ● Review of standardized test questions to prep students for the challenge of the SAT and ACT exams ● Participation in class discussion, group work, and responses. ● Quizzes ● Unit Test - to include a variety of DOK level of problems and may include SAT style problems.

Code	*Pre-Assessment*	
M	● Teacher checks for prerequisite and prior knowledge via warm-up and questioning activities, such as calculating means and standard deviations	
M A A, M, T A A, M, T A, M, T	● Students will review entering data in the graphing calculator and finding the mean and standard deviation ● Teacher will demonstrate how to find a range of usual values for normal data using the range rule of thumb formula and the empirical rule, as well as explaining the percentages associated with the ranges ● Students will use real life data sets to practice finding ranges of usual values and then deciding if a value is within the range of what is considered 'usual' ● Teacher will explain when data is not considered normal and then introduce Chebyshev's formula which is used to find the range of usual values for data that is not normal ● Students will complete practice problems involving data that is not normal ● Students will calculate the range of usual values for the data they gathered in unit 2 and then make determination about values in their lists that are not 'usual'	Progress Monitoring ● Warm up questions ● Monitoring class work through board work, group work, questioning, and walk-arounds ● Check for understanding via going over homework and medium such as reflections and exit tickets ● Class worksheets with direct teacher observation or self assessment ● Practice on whiteboard/chalkboard with direct teacher observation ● Kahoot quiz or pear deck slideshow with review questions and direct teacher observation ● Reflective journals or exit tickets at the end of the lesson ● Edulastic or google form review assignments ● Homework assignments with direct teacher observation or self assessment

		• Projects/performance tasks modeling real world problems involving all aspects of a sampling , crossword puzzles and matching activities • Summative assessments Quizzes Unit test

Unit Title: Unit 5 – Applications of Percentiles

CC.9-12.S.IC.1 Understand statistics as a process for making inferences about population parameters based on a random sample from that population. CC.9-12.S.IC.3 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each. CCSS.MATH.CONTENT.HSS.ID.A.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean)	***Transfer*** *Students will be able to independently use their learning to…* • *Make sense of a problem by initiating a plan and designing a method for data collection* • *Make use of structure by organizing data into appropriate frequency tables* • *Model with mathematics by calculating the percentiles/quartiles for a data set and/or determining the value at a specific percentile* • *Justify reasoning or understanding by making interpretations of real life data based on the percentiles/quartiles and/or values at specific percentiles*	
	Meaning UNDERSTANDINGS *Students will understand that…* • That a data set can be divided into percentiles/quartiles to more specifically interpret the data • The percentiles of a data set are used in the calculations of usual values and outliers.	ESSENTIAL QUESTIONS *Students will keep considering…* • How is a data set divided into percentiles? • How do the percentiles aid in the determination of outliers and usual values? • How do you determine the percentile of a specific value?

<table>
<tr><td rowspan="3">and spread (interquartile range, standard deviation) of two or more different data sets.

<u>CCSS.MATH.CONTENT.HSS.ID.A.3</u>

Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).</td><td>● Each percentile has a specific value associated with it
● Each value in a data set has a percentile associated with it.</td><td>● How do you find the value at a specific percentile?</td></tr>
<tr><td colspan="2">Acquisition</td></tr>
<tr><td>Students will know…

● The division of a data set into quartiles
● The value at a given percentile
● The percentile for a given value</td><td>Students will be skilled at…

● Calculating the 4 quartiles for a data set
● Calculating which value lies at a specific percentile
● Calculating the percentile for a specific value</td></tr>
</table>

STAGE 2

Code	Evaluative Criteria	Assessment Evidence
A, M, T	Evaluative Criteria consists of: ● An accurate display of data and how it was collected ● The calculations that show the student the percentile for their score ● The calculations that show the student the score that separates the top 10% of the population of students who took the test	PERFORMANCE TASK(S): Goal: To provide feedback to students about their scores on the SAT in comparison to all other students who took the test Role: Guidance counselor Audience: Students who took the SAT and looking to apply to college Product or Performance: Calculations that show the student the percentile their score falls into and what value separates the top 10% of students Standards & Criteria for Success: Presentation contains: - Display of data - Calculations of the percentile for their score - calculations of the score that separates the top 10%

A, M A, M A, M, T	Evaluative Criteria consists of: ● Was the percentile for a given value calculated correctly ● Were the quartiles for a data set accurately identified ● Was the value at a given percentile calculated correctly ● Were appropriate conclusions drawn based on percentiles in real life data	OTHER EVIDENCE: ● Alternative assessment projects such as calculations on real life data gathered by the students ● Review of standardized test questions to prep students for the challenge of the SAT and ACT exams ● Participation in class discussion, group work, and responses. ● Quizzes ● Unit Test - to include a variety of DOK level of problems and may include SAT style problems.

Code	*Pre-Assessment*	
M	● Teacher checks for prerequisite and prior knowledge via warm-up and questioning activities, such as calculating percents and evaluating expressions	
M A A, M, T A A, M, T A, M, T M, T	● Students will review calculating percents ● Teacher will explain how to calculate a percentile when using a data set and looking a specific data point ● Students will practice finding percentiles for values in real life data sets ● Teacher will explain how to find the value at a specific percentile ● Students will practice finding the values at a specific percentile for real life data sets ● Students will practice finding the values at the quartiles in preparation for the next unit ● Students will calculate percentiles and quartiles for their personal data gathered in unit 2	Progress Monitoring ● Warm up questions ● Monitoring class work through board work, group work, questioning, and walk-arounds ● Check for understanding via going over homework and medium such as reflections and exit tickets ● Class worksheets with direct teacher observation or self assessment ● Practice on whiteboard/chalkboard with direct teacher observation ● Kahoot quiz or pear deck slideshow with review questions and direct teacher observation ● Reflective journals or exit tickets at the end of the lesson ● Edulastic or google form review assignments ● Homework assignments with direct teacher observation or self-assessment

		• Projects/performance tasks modeling real world problems involving all aspects of a sampling , crossword puzzles and matching activities • Summative assessments Quizzes Unit test

Unit Title: Unit 6 - Outliers and boxplots

CC.9-12.S.IC.1 Understand statistics as a process for making inferences about population parameters based on a random sample from that population. CC.9-12.S.IC.3 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each. CCSS.MATH.CONTENT.HSS.ID.A.2 Use statistics appropriate to the shape of the data distribution to	***Transfer*** *Students will be able to independently use their learning to…* • *Make sense of a problem by initiating a plan and designing a method for data collection* • *Make use of structure by organizing data into appropriate frequency tables* • *Justify reasoning or understanding by making interpretations of real life data based on the boxplot and outliers*	
	Meaning UNDERSTANDINGS *Students will understand that…* • An outlier in a data set influences the measures of central tendencies • The 5 number summary can be used to make a box plot • A box plot is a graphic representation of the 4 quartiles of a data set	ESSENTIAL QUESTIONS *Students will keep considering…* • What is an outlier and how does it influence a data set? • Do all dispersions contain an outlier? • What is the 5 number summary and how can it be used to make a boxplot? • How is a boxplot used to represent data?

<table>
<tr><td rowspan="4">compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.

<u>CCSS.MATH.CONTENT.HSS.ID.A.3</u>

Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).</td><td>• An outlier is a value that is more than 1.5 IQR above the 3rd quartile or 1.5 IQR below the 1st quartile</td><td>• How are quartiles used to calculate outliers?</td></tr>
<tr><td colspan="2">Acquisition</td></tr>
<tr><td>Students will know…

• The values that are used to determine if a given value is an outlier
• The 5 number summary
• Box plots constructed using the 5 number summary
• If a value is an outlier using the 1.5 IQR rule</td><td>Students will be skilled at…

• Using the 1.5 IQR rule to identify possible outliers and identify outliers in boxplots
• Creating a 5-number summary of a variable
• Constructing a box plot by hand from a 5-number summary
• Determining outliers for a data set using the 5 number summary</td></tr>
</table>

STAGE 2

Code	Evaluative Criteria	Assessment Evidence
A, M, T	Evaluative Criteria consists of: ● An accurate display of data and how it was collected ● A graph displaying the boxplot ● An explanation of what the boxplot represents and which players are in need of improvement or who is already achieving success	PERFORMANCE TASK(S): Goal: To create a boxplot that will display the separation of the quartiles for data on the batting averages for a baseball team Role: Statistician for a baseball team Audience: Manager and batting coach for the team Product or Performance: An accurate box plot displaying the batting averages for the team to determine who needs extra batting practice or who needs to move down to a lower league or who is performing extremely well Standards & Criteria for Success: Presentation contains: - Display of data - A boxplot - An explanation

A, M A, M A, M, T A, M A, M, T	Evaluative Criteria consists of: ● Was the 5 number summary for a data set determined ● Was an accurate boxplot created using the 5 number summary ● Were outliers identified that exist for a data set and was there an explanation of how they affect the data ● Were the quartiles in the box plot used to correctly calculate the outliers for each data set ● Were appropriate conclusions drawn on real life data based on the box plot and outliers	OTHER EVIDENCE: ● Alternative assessment projects such as partner review using real life data to find outliers and graphing the data or practice using data gathered by the students ● Review of standardized test questions to prep students for the challenge of the SAT and ACT exams ● Participation in class discussion, group work, and responses. ● Quizzes ● Unit Test - to includes a variety of DOK level of problems and may include SAT style problems.

Code	***Pre-Assessment***
M	● Teacher checks for prerequisite and prior knowledge via warm-up and questioning activities, such as calculating percents and finding quartiles

M A A A, M, T A A, M, T M, T	• Students will review calculating percents and quartiles and accessing data in the graphing calculator • Teacher will explain what the 5 number summary is and where to find it in the calculations in the calculator. • Teacher will introduce the steps to creating a boxplot using the 5 number summary and explain what the box plot displays • Students will use real life data to create boxplots from the 5 number summaries for the data sets • Teacher will demonstrate how to use the values in the box plot to calculate the minimum and maximum values that constitute a value being an outlier using the 1.5 IQR rule • Students will practice finding outliers from boxplots • Students will use their personal data from unit 2 to create a box plot and then determine if there are any outliers in their data set	Progress Monitoring • Warm up questions • Monitoring class work through board work, group work, questioning, and walk-arounds • Check for understanding via going over homework and medium such as reflections and exit tickets • Class worksheets with direct teacher observation or self assessment • Practice on whiteboard/chalkboard with direct teacher observation • Kahoot quiz or pear deck slideshow with review questions and direct teacher observation • Reflective journals or exit tickets at the end of the lesson • Edulastic or google form review assignments • Homework assignments with direct teacher observation or self assessment • Projects/performance tasks modeling real world problems involving all aspects of a sampling , crossword puzzles and matching activities • Summative assessments Quizzes and Unit Test

Unit Title: Unit 7 - Z-scores and the normal curve

CCSS.MATH.CONTENT.HSS.ID.A.4

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.

Transfer

Students will be able to independently use their learning to…

- *Make sense of a problem by initiating a plan and designing a method for data collection*
- *Make use of structure by organizing data into appropriate frequency tables*
- *Justify reasoning or understanding by making interpretations of real life data based on the probabilities that are calculated*

Meaning

UNDERSTANDINGS

Students will understand that…

- The normal distribution curve is a family of symmetrical curves defined by the mean and the standard deviation.
- Areas under the curve represent probabilities associated with continuous distributions.
- The normal curve is a probability distribution and the total area under the curve is 1.
- The distribution of outcomes of many real life events can be approximated by the normal curve

ESSENTIAL QUESTIONS

Students will keep considering…

- What is a normal curve?
- How is the probability of an event calculated?
- What are the properties of a normal probability distribution?
- How does the standard deviation and mean affect the graph of the normal distribution?
- Why is an understanding of the normal curve essential to statistics?
- In what real life situations can the normal curve be applied to data?
- How can one recognize a normal (bell shape) distribution?

	● The z-score formula can be used to calculate the probability of an event occurring ● The graphing calculator can be a valuable tool in finding normal probabilities	● How can the z-score formula be used to calculate the probability of an event occurring? ● How can the graphing calculator assist in finding normal probabilities?
	Acquisition	
	Students will know… ● Z-score calculations ● The total area under a normal curve is 1 ● A portion of the area under a normal curve represents the probability for a specific observation ● The z-score formula can be used to find the probability for a specific observation ● Normal probabilities have a variety of real world applications ● That the graphing calculator can be used to calculate probabilities more efficiently	*Students will be skilled at…* ● Calculating a z –score ● Using the z-score formula to find a normal probability for a specific observation ● Calculating real life probabilities using the z-score and normal curve ● Using graphing calculators as a method for calculating normal probabilities more efficiently

STAGE 2

Code	Evaluative Criteria	Assessment Evidence
A, M, T	Evaluative Criteria consists of: ● An accurate display of data and how it was collected ● The calculations and explanation of how data determines the probability of catching a large fish	PERFORMANCE TASK(S): Goal: To determine the probability of catching an oversized tuna on a fishing expedition Role: Marine biologist Audience: Charter boat captain and tourists Product or Performance: Data that explains the probability of catching a 'whopper' on a fishing trip Standards & Criteria for Success: Presentation contains: - Display of data - Calculations and explanation

A, M A, M A, M, T A, M, T	Evaluative Criteria consists of: ● Were the basic characteristics of the normal curve identified ● Was the Z-score calculated correctly for a data set ● Were probabilities accurately calculated using the z-score chart ● Was the graphing calculator used to calculate probabilities ● Were appropriate conclusions drawn based on the probabilities using real life data	OTHER EVIDENCE: ● Alternative assessment projects such as partner reviews involving real life data ● Review of standardized test questions to prep students for the challenge of the SAT and ACT exams ● Participation in class discussion, group work, and responses. ● Quizzes ● Unit Test - to include a variety of DOK level of problems and may include SAT style problems.

Code	*Pre-Assessment*	
M	● Teacher checks for prerequisite and prior knowledge via warm-up and questioning activities, such as evaluating and solving simple equations and finding the mean and standard deviation	
		Progress Monitoring
A	● Teacher will introduce the z-score formula and demonstrate how it can be used to determine 'usual' values for a data set	● Warm up questions ● Monitoring class work through board work, group work, questioning, and walk-arounds ● Check for understanding via going over homework and medium such as reflections and exit tickets ● Class worksheets with direct teacher observation or self-assessment ● Practice on whiteboard/chalkboard with direct teacher observation ● Kahoot quiz or pear deck slideshow with review questions and direct teacher observation ● Reflective journals or exit tickets at the end of the lesson ● Edulastic or google form review assignments ● Homework assignments with direct teacher observation or self-assessment ● Projects/performance tasks modeling real
A, M, T	● Students will practice finding the mean and standard deviation for a data set and then using them to calculate a z-score	
A	● Teacher will introduce the z-score table and explain how to use it to determine the probability of an event occurring	
A, M, T	● Students will practice find probabilities of real life events occurring	
A	● Teacher will demonstrate how to use the graphing calculator to find these same probabilities	
A, M, T	● Students will practice finding the probabilities using the graphing calculator	
A	● Teacher will explain how to find the value associated with a specific probability or percentile using the z-score chart and the graphing calculator	
M, T	● Students will explore find probabilities of real life events occurring using their data sets from unit	

		world problems involving all aspects of a sampling , crossword puzzles and matching activities ● Summative assessments Quizzes Unit test