write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.	• unit rate • variable	two different units such as miles per minute • Writing a percent rate as a rate over 100, including percents greater than 100 and less than 1 • Finding the percents of a number using rate methods • Representing relationships using models • Converting units by dividing or multiplying • Using variables to represent two quantities • Identifying relationships between tables, graphs and equations • Identifying a change in the independent variable creates a change in the depend variable and write equations to express a quantity in terms of the dependent and independent variable

Revision

STAGE 2

Stage 2 – Evidence		
Code	**Evaluative Criteria**	**Assessment Evidence**
T, M, A	Rubric Criteria: **Mathematical Concepts:** 4 - Explanation shows complete understanding of mathematical concepts. 3 - Explanation shows substantial understanding of mathematical concepts. 2 - Explanation shows some understanding of mathematical concepts. 1 - Explanation shows very limited understanding of mathematical concepts OR is not written. **Strategy/Procedures:** 4 - Uses an efficient and effective strategy to solve the problem(s). 3 - Uses an effective strategy to solve the problem(s). 2 - Sometimes uses an effective strategy to solve the problem(s), but does not do it consistently. 1 - Rarely uses an effective strategy to solve the problem(s). **Mathematical Errors:** 4 - 90-100% of the steps and solutions have no mathematical errors. 3 - Almost all (85-89%) of the steps and solutions have no mathematical errors. 2 - Most (75-84%) of the steps and solutions have no mathematical errors. 1 - More than 75% of the steps and solutions have mathematical errors. **Completion:** 4 - All problems are completed. 3 - 75% of all problems are completed. 2 - 50% of all problems are completed. 1 - 25% or less of problems are completed. **Neatness and Organization:** 4 - The work is presented in a neat, clear, organized fashion that is easy to read.	PERFORMANCE TASK(S): **Goal:** Use a real life scenario students analyze the article and speeding ticket in order to reason, accurately convert and calculate the speed of the motorcycle. **Role:** As mathematicians, students use ratio reasoning to investigate and derive accurate solutions. **Audience:** Classmates **Products:** Using a problem solving framework, students convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. **Standards for Success:** scoring rubric including focus on explanation, process and accuracy of the solution **Differentiation:** For more advanced students you can challenge them to develop equations, develop tables and graphs to represent the relationship between the speed and the fine. Consider students of language learners and accommodations by providing images as well as a calculator, place value charts or graphic organizers to assist with the algorithms and organization.

	3 - The work is presented in a neat and organized fashion that is usually easy to read. 2 - The work is presented in an organized fashion but may be hard to read at times. 1 - The work appears sloppy and unorganized. It is hard to know what information goes together	
T, M, A T, M, A T, M, A M, A M, A T, M, A		OTHER EVIDENCE: **Embedded Assessment 1:** Using Unit Rates to Convert Measurement **Embedded Assessment 2:** Graphing Proportional Relationships and Percents **Common Unit Test:** Proportional Relationships and Algebraic Reasoning **Skill Check**: Daily Warm-ups and/or Exit Tickets **Prompt**: Why is it necessary to have a system of measurement and how does knowing about converting within a system or systems is an important life skill to understand real life situations? **Homework:** Almost daily

STAGE 3

Stage 3 - Learning Plan		
Code	***Pre-Assessment***	
M	• Unit Pre-Assessment	
M	• Teacher monitors for prerequisite understanding(s) and misconception(s) though warm up questions	
	Summary of Key Learning Events and Instruction	Progress Monitoring
M	• Students will work independently to complete pre-assessment of prior knowledge involving ratio understanding, equivalent ratio tables, plotting pairs in the coordinate plane; teacher will plan and facilitate learning to clarify any prior misconception foundational to the new learning.	• Warm ups • Classwork • IXL • Homework • Exit Tickets • Embedded Assessments • Mid-Unit Assessment
T, A	• Teacher will develop a lesson to engage students in exploring the idea that a rate contains information about equivalent ratios. Students will discuss and practice to understand that equivalent ratios have the same unit rate using tables and/ or double number lines.	
T, A	• Teacher will develop a lesson to engage students in using various strategies for using unit rates to find an unknown quantity in an equivalent ratio. Students will discuss and practice to understand that real life rate problems can be solved by dividing numbers in a ratio to find the unit rate and use the unit rate as a multiplier to	

	solve other mathematical problems.	
T, A	• Teacher will develop a lesson to engage students in using various strategies, like tables and double number lines, to compare two or more ratios. Students practice to further understand unit rates in context.	
T, A	• Teacher will develop a lesson engaging students using various strategies to convert measurements by using ratio reasoning in context within metric and customary systems. Students will discuss and solve a variety of mathematical problems.	
T, M, A	• Assess students' knowledge and application and review misconceptions.	
T, A	• Teacher will develop a lesson engaging students to explore that the value of one quantity (or variable) can depend on the value of another quantity (or variable). Students explore and discuss real life scenarios to determine which variable is independent and which is dependent.	
T, A	• Teacher will develop a lesson engaging students in strategies to write an equation that represents the relationship between two quantities. Students continue to master, through real life examples, that an equation with two variables represents a pattern that stands for the value of the independent variable the value of the dependent variable.	
T, A	• Teacher will develop a lesson engaging students to explore strategies for analyzing the relationship between two quantities such as tables and graphs to understand how the change in one value changes the dependent one.	
T, A	• Students discuss and practice, using real life scenarios, to analyze and represent relationships between two variables, as well as the connections between the two.	
T, A	• Teacher will develop a lesson engaging students to explore percents as a rate per 100. Students practice to understand the modeling of percent(s) on a hundredths grid and/ or on a bar model similar to a fraction representation.	
T, A	• Teacher will develop a lesson engaging students to understand that a percent is another way to express a portion of a quantity. It is critical that students discuss and practice to understand the relationships between fractions, percents and decimals.	
T, A	• Students discuss and practice, using real life scenarios, percents at a rate of 100.	

T, M, A T T, A	● Assess students' knowledge and application and review misconceptions. ● Performance Task: Students will ● Assess knowledge and application though the unit CFA and review misconceptions as needed.	

Revision

UNIT 7 - APPLICATIONS OF GEOMETRY

Stage 1 Desired Results

ESTABLISHED GOALS

CCSS.MATH.CONTENT.G.A.1:
Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

CCSS.MATH.CONTENT.G.A.2:
Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas *V = l w h* and *V = b h* to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

CCSS.MATH.CONTENT.G.A.4:
Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

Transfer

Students will be able to independently use their learning to analyze and calculate the dimensions of various objects using standardized shapes and figures.

Meaning

UNDERSTANDINGS

Students will understand that…

- Shapes can be put together and apart (composed and decomposed) to create shapes whose area is equal to that of the sum of the areas of the joining shapes or remaining
- Area formula are generalizations deriving from familiar shapes
- Area is two dimensional involving length and width (sometime either or can be referred to the height)
- Filling a solid with cubes and counting them gives the same result as using a volume formula
- Volume is three dimensional involving, length, width and height (sometimes the base can represent the length or width)
- Nets relate to visual representation of three dimensional figures
- Expressions and equations can assist to finding the area of nets by relating the two dimensional figures to three dimensional figures

ESSENTIAL QUESTIONS

Students will keep considering…

1. How can you find the area of a polygon by decomposing (deconstructing) it into other shapes?
2. What is volume and how does it relate to the attribute of an individual figure?
3. What strategies could you use to recognize the existence of, and visualize components of three dimensional shapes that are not visible from a given viewpoint?

Acquisition

	Students will know… ● area ● base (of a parallelogram) ● base (of a triangle) ● compose ● decompose ● difference ● dimension ● expression ● height (of a parallelogram) ● height (of a triangle) ● parallelogram ● perpendicular ● polygon ● product ● trapezoid (exclusive) ● trapezoid (inclusive)	*Students will be skilled at…* ● Finding the area of parallelograms with whole number side lengths by composing and decomposing ● Identifying base/height of a parallelogram ● Generalizing and use the area of a parallelogram ● Using the formula of a parallelogram accurately to solve problems involving fractional and decimal lengths ● Finding the area of triangles with whole number side lengths by composing and decomposing into rectangles and parallelograms ● Identifying base/height of a triangle ● Generalizing and use the area of a triangle ● Finding area of polygons by composing and decomposing triangles, rectangles and parallelograms ● Finding the volume of a rectangular prism ● Solving mathematical real world problems involving volume ● Identifying and draw nets for three dimensional figures ● Using nets to find the surface area of three dimensional figures

STAGE 2

Stage 2 – Evidence		
Code	**Evaluative Criteria**	**Assessment Evidence**
T, M, A	Rubric Criteria: **Mathematical Concepts:** 4 - Explanation shows complete understanding of mathematical concepts. 3 - Explanation shows substantial understanding of mathematical concepts. 2 - Explanation shows some understanding of mathematical concepts. 1 - Explanation shows very limited understanding of mathematical concepts OR is not written. **Strategy/Procedures:** 4 - Uses an efficient and effective strategy to solve the problem(s). 3 - Uses an effective strategy to solve the problem(s). 2 - Sometimes uses an effective strategy to solve the problem(s), but does not do it consistently. 1 - Rarely uses an effective strategy to solve the problem(s). **Mathematical Errors:** 4 - 90-100% of the steps and solutions have no mathematical errors. 3 - Almost all (85-89%) of the steps and solutions have no mathematical errors. 2 - Most (75-84%) of the steps and solutions have no mathematical errors. 1 - More than 75% of the steps and solutions have mathematical errors. **Completion:** 4 - All problems are completed. 3 - 75% of all problems are completed. 2 - 50% of all problems are completed. 1 - 25% or less of problems are completed. **Neatness and Organization:** 4 - The work is presented in a neat, clear, organized fashion that is easy to read.	PERFORMANCE TASK(S): **Goal:** Design a new cereal box for a cereal company **Role:** Employee proposing a solution to the company's manager **Audience:** Manager and classmates **Products:** Using a problem solving framework, evidence and transfer knowledge to design a new cereal box and use appropriate vocabulary to explain the findings **Standards for Success:** scoring rubric including focus on explanation, process and accuracy of the solution **Differentiation:** Consider students of language learners and accommodations by providing images, as well as a calculator, place value charts or graphic organizer to assist with the algorithms and organization

	3 - The work is presented in a neat and organized fashion that is usually easy to read. 2 - The work is presented in an organized fashion but may be hard to read at times. 1 - The work appears sloppy and unorganized. It is hard to know what information goes together	
T, M, A T, M, A T, M, A M, A M, A T, M, A		OTHER EVIDENCE: **Embedded Assessment 1:** Areas of triangles and parallelograms **Embedded Assessment 2:** Volume and area of nest **Common Unit Test:** Application of Geometry **Skill Check**: Daily Warm-ups and/or Exit Tickets **Prompt**: How can knowledge of areas and volume help in different carreers? **Homework:** Almost daily

STAGE 3

Stage 3 – Learning Plan		
Code	***Pre-Assessment***	
M	● Unit Pre-Assessment	
M	● Teacher monitors for prerequisite understanding(s) and misconception(s) through warm-up questions	
	Summary of Key Learning Events and Instruction	Progress Monitoring
M	● Students will work independently to complete pre-assessment to prior knowledge involving the understanding that area is measured in square units, finding the area of a rectangle, solve real life problems involving area of squares and rectangle with whole numbers; teacher will plan and facilitate learning to clarify any prior misconception foundational to the new learning.	● Warm ups ● Classwork ● IXL ● Homework ● Exit Tickets ● Embedded Assessments ● Mid-Unit Assessment
A	● Teacher will develop engaging activities where students explore the area of parallelograms is the amount of space the shape covers, as well as identify heights as perpendicular to the base. Note: It is crucial to accomplish this through hands-on discovery and visual representations.	
T, A	● Teacher will develop engaging activities where students explore and practice strategies for finding areas of parallelograms including the composing and decomposing of rectangles, as well as formulas.	
T, A	● Students will continue to discuss and solve problems including the area of parallelograms.	
A	● Teacher will develop engaging activities where students explore	

	identical triangles arranged to form rectangles and parallelograms. Students find the relationship of triangles and the relationship to the area of a parallelogram through hands-on activities.	
T, A	● Teacher will develop engaging activities where students develop strategies to find the area of a triangle. Students recognize the area of a triangle as half of the area of a parallelogram and practice solving area problems in context.	
A	● Teacher will develop engaging activities where students identify and develop strategies for areas of polygons.	
T, M, A	● Assess students' knowledge and application and review misconceptions.	
T, A	● Teacher will develop engaging activities where students explore with hands on manipulations that cubes with unit fraction edge lengths can be used to find volume. Students develop an understanding of volumes.	
T, A	● Teacher will develop engaging activities where students develop and practice strategies for solving real world and mathematical problems involving volume.	
T, A	● Teacher will develop engaging activities where students explore strategies for finding which 2 dimensional shapes make up the net for a given 3 dimensional figure. Students practice with hands on activities.	
T, A	● Students continue to develop strategies for finding the surface area of 3 dimensional figures using nets.	
T, M, A	● Assess students' knowledge and application and review misconceptions.	
T	● Performance Task: Students will design a new cereal box and use appropriate vocabulary to explain the findings.	
T, A	● Assess knowledge and application though the unit CFA and review misconceptions as needed.	

Stage 1 Desired Results

ESTABLISHED GOALS

CCSS.MATH.CONTENT.SP.A.1:
Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. *For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages*.

CCSS.MATH.CONTENT.SP.A.2:
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.

CCSS.MATH.CONTENT.SP.A.3:
Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.

CCSS.MATH.CONTENT.SP.B.4:
Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

CCSS.MATH.CONTENT.SP.B.5:
Summarize numerical data sets in relation to their context, such as by:

CCSS.MATH.CONTENT.6.SP.B.5.A
Reporting the number of observations.

CCSS.MATH.CONTENT.6.SP.B.5.B
Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.

CCSS.MATH.CONTENT.6.SP.B.5.C
Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as

Transfer

Students will be able to independently use their learning to look for and make use of structure to collect and analyze information.

Meaning

UNDERSTANDINGS

Students will understand that…

- Collected data can be analyzed to answer a question
- Various statistical methods are used for specific purposes
- Data consists of different attributes, counts, and measurements
- Graphs show a distribution shape, whether centered around symmetret or containing unusual traits like clusters, gaps, and outliers
- Different forms of data representation are used including charts, graphs and statistics

ESSENTIAL QUESTIONS

Students will keep considering…

1. How does our interpretation of data guide our decisions?
2. What is the best way to represent collected data?
3. How can I explain the data distribution?

Acquisition

Students will know…

- attribute
- box plot
- categorical data
- data
- dot plot
- histogram
- interquartile range
- mean
- mean absolute value
- measures of variation
- median
- mode
- numerical data
- outlier
- quartile
- range

Students will be skilled at…

- Collecting, analyzing, and interpreting sets of data
- Describing the shape of data distribution based on its center, spread, and/or variability
- Creating surveys as a tool to collect data, formulate and answer a statistical question
- Differentiating between categorical and numerical data
- Describing a set of data using its center (mean, median, and mode), spread (range), and overall shape
- Determining appropriate center and variation for various data sets
- Identifying how changes in data affect the mean, median, and mode of a data set
- Compiling and organize data in the form of a table, histogram, dot plot, line plot, ordered-value

describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. **CCSS.MATH.CONTENT.6.SP.B.5.D** Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.	• sample • sample space • scale • statistics • statistical question • variability	bar graph, or box plot • Determining which graph or table is best suited to represent a data set • Performing a statistical investigation including the collection, organization, and analysis of the data • Communicating a deep understanding of observations, measures of center and spread, graph to represent data collected and overall patterns in a distribution including any outliers impacted the measures of center

Revision

STAGE 2

Stage 2 – Evidence		
Code	**Evaluative Criteria**	**Assessment Evidence**
T, M, A	Rubric Criteria: **Mathematical Concepts:** 4 - Explanation shows complete understanding of mathematical concepts. 3 - Explanation shows substantial understanding of mathematical concepts. 2 - Explanation shows some understanding of mathematical concepts. 1 - Explanation shows very limited understanding of mathematical concepts OR is not written. **Strategy/Procedures:** 4 - Uses an efficient and effective strategy to solve the problem(s). 3 - Uses an effective strategy to solve the problem(s). 2 - Sometimes uses an effective strategy to solve the problem(s), but does not do it consistently. 1 - Rarely uses an effective strategy to solve the problem(s). **Mathematical Errors:** 4 - 90-100% of the steps and solutions have no mathematical errors. 3 - Almost all (85-89%) of the steps and solutions have no mathematical errors. 2 - Most (75-84%) of the steps and solutions have no mathematical errors. 1 - More than 75% of the steps and solutions have mathematical errors. **Completion:** 4 - All problems are completed. 3 - 75% of all problems are completed. 2 - 50% of all problems are completed. 1 - 25% or less of problems are completed. **Neatness and Organization:** 4 - The work is presented in a neat, clear, organized fashion that is easy to read.	**Goal:** Use a real life scenario to analyze the statistics and identify which group of students performed better. **Role:** Analyzing data using statistics **Audience:** Classmates **Products:** Generate quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. **Standards for Success:** scoring rubric including focus on explanation, process and accuracy of the solution **Differentiation:** For more advanced students you can challenge them to use estimation in doubling or tripling the scores by using desmos to perform the statistics. Consider students of language learners and accommodations by providing images, as well as a calculator, place value charts or graphic organizer to assist with the algorithm and organization.

	3 - The work is presented in a neat and organized fashion that is usually easy to read. 2 - The work is presented in an organized fashion but may be hard to read at times. 1 - The work appears sloppy and unorganized. It is hard to know what information goes together	
T, M, A T, M , A T, M , A M, A M, A T, M, A		OTHER EVIDENCE: **Embedded Assessment 1:** Data Organization, Finding the Mean **Embedded Assessment 2:** Variability, Data Analysis **Common Unit Test:** Data Collection and Organization, Data Types, Various Data Displays, Variability, Data Analysis **Skill Check**: Daily warm-ups **Prompt**: What data should I collect to help answer a statistical question? **Homework:** Almost daily

STAGE 3

Stage 3 – Learning Plan		
Code	***Pre-Assessment***	
M	• Unit Pre-Assessment	
M	• Teacher monitors for prerequisite understanding(s) and misconception(s) though warm up questions	
	Summary of Key Learning Events and Instruction *Student success at transfer, meaning, and acquisition depends on…*	Progress Monitoring • Warm ups • Classwork • IXL • Homework • Exit Tickets • Embedded Assessments • Mid-Unit Assessment
M, A	• Teacher checks for prior knowledge using warm-up and questioning activities involving collecting data and creating dot plots.	
M	• Students will work independently to complete pre-assessment involving collecting data and creating dot plots.	
A	• Teacher will present warm-up questions helping explain and facilitate discussion in discovering what us the study of statistics through examples, statistical versus non statistical questions, categorical and numerical data and developing vocabulary.	
T, M	• Students will practice identifying the difference between categorical and numerical data along with calculating the mean, median, and mode.	
T, A	• Assess students' knowledge and application and review misconceptions.	
T, A	• Teacher will model how change in data changes the distribution of data.	
A	• Teacher will model the different charts, tables, and diagrams used for presenting data.	
T	• Students will experiment with the different charts, tables, and diagrams to determine which one best fits a particular data set.	
T	• Performance Task: Students will use a real life scenario to analyze the statistics and identify which group of students performed better.	
M, T, A	• Assess knowledge and application though the unit CFA and review misconceptions as needed.	