

by fractions, requiring multiple exposures connecting various concrete and abstract models.

6.NS.4. Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. *For example, express $18 + 48$ as $6(3 + 8)$.*

UNIT 5: Data and Statistics

ESSENTIAL QUESTION

How can measures of center, variability and shape be used to analyze data?

BIG IDEAS

Students generate questions that anticipate variability.
Students use appropriate measures to analyze data.
Students display data visually.

GUIDING QUESTIONS

Content and Process

- What makes a question statistical? **6.SP.1.**
- How are measures of center and spread of data identified? **6.SP.2.**
- How can individual numbers be used to summarize the center of data and also its variance? **6.SP.3.**
- How are dot plots, stem and leaf plots, box plots, and histograms created from data? **6.SP.4.**
- How can data be summarized in reference to the context? **6.SP.5a., 6.SP.5b., 6.SP.5c.**
- How does the shape of a data set determine the appropriate measure of center? **6.SP.5d.**
- How are conditions of an inequality proven true? **6.EE.4.**

Reflective

- How would you define “average”?
- How do you determine when to use the appropriate measure of center?
- What does the shape and spread of data tell you?
- How do visuals help you summarize data?

FOCUS STANDARDS

Standards of Mathematical Practice

MP.3 Construct viable arguments and critique the reasoning of others.

MP.8 Look for and express regularity in repeated reasoning.

Content Standards

6.SP.1. Recognize and generate a statistical question as one that anticipates variability in the data related to

question and accounts for it in the answers. *For example, “How old am I?” is not a statistical question, but “old are the students in my school?” is a statistical question because one anticipates variability in students’ ages.*

6.SP.2. Analyze a set of data collected to answer a statistical question with a distribution which can be described by its center (mean, median and/or mode), spread (range and/or interquartile range), and overall shape (cluster, peak, gap, symmetry, skew (data) and/or outlier).

6.SP.3. Recognize that a measure of center (mean, median and/or mode) for a numerical data set summarizes all of its values with a single number, while a measure of variation (range and/or interquartile range) describes how its values vary with a single number.

6.SP.4. Display numerical data on dot plots, histograms, stem-and-leaf plots, and box plots.

6.SP.5. Summarize numerical data sets in relation to their context, such as by:

- **6.SP.5a.** Reporting the number of observations.
- **6.SP.5b.** Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
- **6.SP.5c.** Giving quantitative measures of center (mean, median and/or mode) and variability (range and/or interquartile range), as well as describing any overall pattern and any striking deviations from overall pattern with reference to the context in which the data were gathered.
- **6.SP.5d.** Relating the choice of measures of center and variability to the distribution of the data.

6.EE.4. Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

UNIT 6: Expressions and Equations

ESSENTIAL QUESTION

BIG IDEAS

How can situations be expressed with symbols?

Students use variables to represent quantities.
Students generate equivalent expressions.
Students write and solve equations and inequalities.
Students will explore relationships between variables.

GUIDING QUESTIONS

Content and Process

- How are expressions with exponents written and evaluated? **6.EE.1.**
- How are numbers, letters and operations used to write expressions? **6.EE.2., 6.EE.2a.**
- What are the parts of an expression? **6.EE.2b.**
- How is the conventional Order of Operations used to evaluate expressions? **6.EE.2c.**

- How are properties of operations used to simplify expressions? **6.EE.3.**
- How does substitution prove an equation or inequality to be true? **6.EE.4.**
- How are expressions used to represent real world problems? **6.EE.5.**
- How are operations used to solve equations? **6.EE.6.**
- How are variables identified in real-world problems? **6.EE.8a.**
- How are equations used to explain the relationship between two variables? **6.EE.8b.**
- How is an equation represented using tables and graphs? **6.EE.8c., 6.RP.3a.**

Reflective

- How do symbols help you communicate mathematical ideas?
- How would you explain the difference between an expression and equation to a peer?
- How did representing patterns with symbols help you make predictions?
- How do you know the relationship between variables is the same in your equation, table and graph?

FOCUS STANDARDS

Standards of Mathematical Practice

MP.1 Make sense of problems and persevere in solving them.

MP.7 Look for and make use of structure.

Content Standards

6.EE.1. Write and evaluate numerical expressions involving whole-number exponents.

6.EE.2. Write, read, and evaluate expressions in which letters stand for numbers.

- **6.EE.2a.** Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation “Subtract y from 5” as $5 - y$.*
- **6.EE.2b.** Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. *For example, describe the expression $2(8 + 7)$ as a product of two factors; view $(8 + 7)$ as both a single entity and a sum of two terms.*
- **6.EE.2c.** Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *For example, use the formulas $V = s^3$ and $A = 6s^2$ to find the volume and surface area of a cube with sides of length $s = \frac{1}{2}$.*

6.EE.3. Apply the properties of operations and combine like terms, with the conventions of algebraic notation to identify and generate equivalent expressions. *For example, apply the distributive property to the expression $3(2 + x)$ to produce the equivalent expression $6 + 3x$; apply properties of operations to $y + y + y$ to produce the equivalent expression $3y$.*

6.EE.4. Understand solving an equation or inequality as a process of answering a question: which values in a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

6.EE.5. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

6.EE.6. Write and solve one-step equations involving non-negative rational numbers using addition, subtraction, multiplication and division.

6.EE.8. Use variables to represent two quantities in a real-world problem that change in relationship to one another.

- **6.EE.8a.** Identify the independent and dependent variable.
- **6.EE.8b.** 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. *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.*
- **6.EE.8c.** Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

6.RP.3a. Make tables of equivalent ratios relating quantities with whole-number measurements, find the missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?*

