Kenilworth Public Schools
Curriculum Guide

Content Area: Math
Grade: 7
BOE Approved: 7/11/16

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Submitted by: Jeanine Farber
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Mathematics- Grade 7 Scope and Sequence

Unit 1- The Number System	Unit 2- Ratio and Proportional Relationships	Unit 3- Expressions, Equations, and Inequalities	Unit 4- Geometry	Unit 5- Statistics	Unit 6- Probability
Weeks 1-6	Weeks 7-10	Weeks 11-18	Weeks 19-26	Weeks 27-32	Weeks 33-38
Unit Description: Students will add, subtract, multiply, and divide integers, understand sets and subsets of rational numbers, and apply all four operations to rational numbers	*Unit Description:* Students will understand rates and proportionality and the relationships between proportions and percent. They will connect linear proportional and non-proportional situations, proportional and non-proportional functions, proportional and non-proportional relationships and slope, and proportions and percents.	*Unit Description:* Students will write and solve one and two step equations and inequalities. Students will solve equations and inequalities with variables on both sides of the equation with rational number coefficients and constants.	*Unit Description:* Students will learn about angle pair relationships, circumference and area of circles, area of composite figures, and volume and surface area of prisms and pyramids.	*Unit Description:* Students will analyze data about a population, make inferences from random samples, and compare two sets of data.	*Unit Description:* Students will learn about theoretical and experimental probability. They will learn about the fundamental counting principle, permutations and combinations, probability and predictions, and probability and odds.
Unit Targets: • Add integers with the same sign • Add integers with different signs • Subtract integers • Multiply integers	*Unit Targets:* • Identify and find unit rates • Identify and represent proportional relationships • Use graphs to	*Unit Targets:* • Add, subtract, factor, and multiply algebraic expressions • Write and solve one-step equations • Use one-step	*Unit Targets:* • Use scale drawings to solve problems • Draw shapes that satisfy given conditions • Identify cross	*Unit Targets:* • Use a sample to gain information about a population • Use random samples to make inferences about a population	*Unit Targets:* • Describe the likelihood of an event • Find the experimental probability • Find the experimental probability of a

• Divide integers • Use integer operations to solve real-world problems • Convert rational numbers to decimals • Add rational numbers • Subtract rational numbers • Multiply rational numbers • Divide rational numbers • Use rational number operations to solve real-world problems	represent and analyze proportional relationships. • Use a proportion to find percents • Use percents to describe a change in quantity • Re-write expressions to help solve markup and markdown, sales tax, and tip • Apply percents to calculate simple interest	equations with rational coefficients to solve problems • Write and solve two-step equations • Write and solve one-step inequalities • Write and solve two-step inequalities	sections of three-dimensional figures • Use angle relationships to solve problems • Find and use the circumference of a circle • Find the area of a circles • Find the area of composite figures • Find the surface area of a figure made up of cubes and prisms • Find the volume of a figure made of cubes and prisms	• Generate and use random samples to represent a population • Compare two sets of data displayed in dot plots • Compare two sets of data displayed in box plots • Use statistical measures to compare populations	compound event • Make predictions using experimental probability • Find the theoretical probability of a simple event • Find the probability of a compound event • Make predictions using theoretical probability

Mathematics- Grade 7 Unit 1: The Number System

Unit Title: The Number System

Unit Summary: Students will add, subtract, multiply, and divide integers, understand sets and subsets of rational numbers, and apply all four operations to rational numbers

Primary Interdisciplinary Connections: Technology

Career Readiness, Life Literacies, and Key Skills: Financial, Economic, Business, and Entrepreneurial Literacy

Learning Targets

NJSLS Standards: 7.NS.A.1, 7.NS.A.1a, 7.NS.A.1b, 7.NS.A.1c, 7.NS.A.1d; 7.NS.A.2, 7.NS.A.2a, 7.NS.A.2b, 7.NS.A.2c, 7.NS.A.2d; 7.NS.A.3

Computer Science and Design Thinking Standards: 8.1.8.DA.1

Climate Change Standards: 9.4.8.CT.3

Content Statements:

1	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.
2	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
3	Solve real-world and mathematical problems involving the four operations with rational numbers.

Big Idea: To add, subtract, multiply, and divide integers and positive and negative fractions and decimals.

Unit Essential Questions:	Unit Enduring Understandings:
• How do you solve real-world and mathematical problems involving the four operations with rational numbers?	• Computational fluency includes understanding not only the meaning, but also the appropriate applications. • The magnitude of numbers affects the outcome of operations on them.

Unit Learning Targets
Students will…

- Describe situations in which opposite quantities combine to make 0. For example, in the first round of a game, Maria scored 20 points. In the second round of the same game, she lost 20 points. What is her score at the end of the second round?
- Understand p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its

opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts

- Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.
- Apply properties of operations as strategies to add and subtract rational numbers.
- Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.
- Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real world contexts.
- Apply properties of operations as strategies to multiply and divide rational numbers.
- Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.
- Solve real-world and mathematical problems involving the four operations with rational numbers.

Evidence of Learning

Summative Assessment: Benchmark #1/Unit Assessment

Formative Assessments:

- Module quizzes
- Module tests
- Notebook checks
- Teacher observation
- Do Now/homework review
- Cooperative learning groups

Lesson Plans

Activities/Interdisciplinary Connections	Timeframe
• Use a number line to visualize absolute value of integers and real numbers by counting spaces to compare and order. • Use colored chips to model integer addition, subtraction, multiplication, and division. • Use rules to add, subtract, multiply, and divide integers. • Use flashcards to match equivalent fractions and	Weeks 1-6

decimals. • Use fraction models to demonstrate comparison of fractions with unlike denominators. • Use rules for fraction and decimal operations.	
Teacher Resources	*Teacher Note*

• GoMath! Textbook
 • GoMath! Resource materials
 • Smartboard
 • Colored chips
 • Number lines
 • Technology Tools :
   -Google Classroom
   -GoMath! Personal Math trainer
   -Pear Deck
   -KUTA software
   -EdPuzzle
   -Study Island
   -Kahoot
   -Kami	

Differentiating Instruction:
Students with Disabilities, English Language Learners,
and Gifted & Talented Students

Examples of Strategies and Practices that Support Students with Disabilities:
• Use of visual and multisensory formats
• Use of assisted technology
• Use of prompts
• Modification of content and student products
• Testing accommodations
• Authentic assessments

Examples of Strategies and Practices that Support Gifted & Talented Students:
• Adjusting the pace of lessons
• Curriculum compacting
• Inquiry-based instruction
• Independent study
• Higher-order thinking skills
• Interest-based content
• Student-driven instruction
• Real-world problems and scenarios

Examples of Strategies and Practices that Support English Language Learners:
• Pre-teaching of vocabulary and concepts
• Visual learning, including graphic organizers
• Use of cognates to increase comprehension
• Teacher modeling
• Pairing students with beginning English language skills with students who have more advanced English language skills
• Scaffolding
•Word walls
•Sentence frames
•Think-pair-share
•Cooperative learning groups

Mathematics- Grade 7 Unit 2: Ratio and Proportional Relationships

Unit Title: Ratio and Proportional Relationships
Unit Summary: Students will use rates and proportionality, proportional relationships, and percents to solve real-world problems.
Primary Interdisciplinary Connections: Science, technology
Career Readiness, Life Literacies, and Key Skills: Financial, Economic, Business, and Entrepreneurial Literacy

Learning Targets

NJSLS Standards: 7.RP.A, 7.RP.A.1, 7.RP.A.2, 7.RP.A.2a, 7.RP.A.2b, 7.RP.A.2c, 7.RP.A.2d, 7.RP.A.3	
Computer Science and Design Thinking Standards: 8.1.8.DA.1	
Climate Change Standards: 9.4.8.CT.3	
Content Statements:	
1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.
2	Recognize and represent proportional relationships between quantities.
3	Use proportional relationships to solve multistep ratio and percent problems.

Big Idea:

Unit Essential Questions:	**Unit Enduring Understandings:**
• How can you use rates and proportionality to solve real-world problems? • How can you use proportional relationships and percent to solve real-world problems?	• Proportional reasoning is a tool used to solve real world problems by showing relationships and making comparisons in quantitative problems. • Converting between fractions, decimals, and percents helps to analyze real-world situations.

Unit Learning Targets
Students will…

- Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction 1/2/1/4 miles per hour, equivalently 2 miles per hour.
- Recognize and represent proportional relationships between quantities.
- Decide whether two quantities are in a proportional relationship, e.g., by testing for

equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.

- Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
- Represent proportional relationships by equations. For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as $t = pn$.
- Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.
- Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.

Evidence of Learning

Summative Assessment: Benchmark #2/Unit Assessment

Formative Assessments:

- Module quizzes
- Module tests
- Notebook checks
- Teacher observation
- Do Now/homework review
- Cooperative learning groups

Lesson Plans

Activities/Interdisciplinary Connections	Timeframe
- Simplify fractions to determine unit rate. - Use tables and graphs to tell if a relationship is proportional and to find the constant of proportionality. - Use equivalent fractions and cross multiplication and division to solve proportions. - Use the percent proportion to solve percent problems. - Use the percent of change formula to calculate the increase or decrease in a number. - Use real-world projects/scenarios to calculate percent applications (example: Menu Math)	Weeks 7-10
Teacher Resources	*Teacher Note*
- GoMath! Textbook - GoMath! Resource materials - Smartboard	

- Technology Tools :
  -Google Classroom
  -GoMath! Personal Math trainer
  -Pear Deck
  -KUTA software
  -EdPuzzle
  -Study Island
  -Kahoot
  -Kami

Differentiating Instruction:
Students with Disabilities, English Language Learners,
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- Higher-order thinking skills
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- Scaffolding
- Word walls
- Sentence frames
- Think-pair-share
- Cooperative learning groups

Mathematics- Grade 7 Unit 3: Expressions, Equations, and Inequalities

Unit Title: Expressions, Equations, and Inequalities
Unit Summary: Students will use properties to generate equivalent expressions and solve real-life and mathematical problems using numerical and algebraic expressions and equations.
Primary Interdisciplinary Connections: Science, technology
Career Readiness, Life Literacies, and Key Skills: Financial, Economic, Business, and Entrepreneurial Literacy

Learning Targets
NJSLS Standards: 7.EE.A, 7.EE.A.1, 7.EE.A.2, 7.EE.B, 7.EE.B.3, 7.EE.B.4, 7.EE.B.4a, 7.EE.B.4b
Computer Science and Design Thinking Standards: 8.1.8.DA.1
Climate Change Standards: 9.4.8.CT.3
Content Statements:

1	Use properties of operations to generate equivalent expressions.
2	Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Big Idea: Expressions, equations, and inequalities can be used to solve real-world problems.

Unit Essential Questions:	**Unit Enduring Understandings:**
• How can you use algebraic expressions and equations to solve real-world problems? • How can you use inequalities to solve real-world problems?	• Variables represent a value and can be verified for accuracy. • Real-world and mathematical problems can be represented and solved by using equations and inequalities. • Inequalities compare two expressions indicating which is greater than (or greater than equal to) or less than (or less than equal to) the other.

Unit Learning Targets
Students will…

- Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
- 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."

- Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.
- Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities
- Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?
- Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.

Evidence of Learning

Summative Assessment: Benchmark #3/Unit Assessment

Formative Assessments:

- Module quizzes
- Module tests
- Notebook checks
- Teacher observation
- Do Now/homework review
- Cooperative learning groups

Lesson Plans

Activities/Interdisciplinary Connections	*Timeframe*
• Read and translate verbal and numeric expressions. • Use substitution to evaluate variable expressions. • Use distributive property to write and simplify expressions. • Apply basic knowledge of equations, distributive property, and combining like terms to solve for the	Weeks – 11-18

variable. • Isolate the variable using inverse operations to solve one and two-step equations. • Apply rules for solving equations to evaluate inequalities and graph on a number line.	
Teacher Resources	*Teacher Note*

• GoMath! Textbook
 • GoMath! Resource materials
 • Smartboard
 • Technology Tools :
   -Google Classroom
   -GoMath! Personal Math trainer
   -Pear Deck
   -KUTA software
   -EdPuzzle
   -Study Island
   -Kahoot
   -Kami	

Differentiating Instruction:
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• Use of visual and multisensory formats
• Use of assisted technology
• Use of prompts
• Modification of content and student products
• Testing accommodations
• Authentic assessments

Examples of Strategies and Practices that Support Gifted & Talented Students:
• Adjusting the pace of lessons
• Curriculum compacting
• Inquiry-based instruction
• Independent study
• Higher-order thinking skills
• Interest-based content
• Student-driven instruction
• Real-world problems and scenarios

Examples of Strategies and Practices that Support English Language Learners:
• Pre-teaching of vocabulary and concepts

- Visual learning, including graphic organizers
- Use of cognates to increase comprehension
- Teacher modeling
- Pairing students with beginning English language skills with students who have more advanced English language skills
- Scaffolding
- Word walls
- Sentence frames
- Think-pair-share
- Cooperative learning groups

Mathematics: Grade 7 Unit 4: Geometry

Unit Title: Geometry

Unit Summary: Students will develop spatial sense and the ability to use geometric properties, relationships, and measurement to model and analyze phenomena.

Primary Interdisciplinary Connections: Science, technology

Career Readiness, Life Literacies, and Key Skills: Financial, Economic, Business, and Entrepreneurial Literacy

Learning Targets

NJSLS Standards: 7.G.A, 7.G.A.1, 7.G.A.2, 7.G.A.3, 7.G.B.4, 7.G.B.5, 7.G.B.6

Computer Science and Design Thinking Standards: 8.1.8.DA.1

Climate Change Standards: 9.4.8.CT.3

Content Statements:

1	Draw, construct, and describe geometrical figures and describe the relationships between them.
2	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

Big Idea: Expressions, equations, and inequalities can be used to solve real-world problems.

Unit Essential Questions:	Unit Enduring Understandings:
• How can you use proportions to solve real-world geometry problems? • How can you apply geometry concepts to solve real-world problems?	• Geometric properties can be used to construct figures. • Geometric relationships provide a means to make sense of a variety of situations. • Everyday objects have a variety of attributes, each of which can be measured in many ways.

Unit Learning Targets
Students will…

- Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
- Draw (with technology, with ruler and protractor, as well as freehand) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
- Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.

- Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
- Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
- Solve real-world and mathematical problems involving area, volume and surface area of two and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

Evidence of Learning

Summative Assessment: Benchmark #4/Unit Assessment

Formative Assessments:

- Module quizzes
- Module tests
- Notebook checks
- Teacher observation
- Do Now/homework review
- Cooperative learning groups

Lesson Plans

Activities/Interdisciplinary Connections	Timeframe
- Identify complementary and supplementary angles using visual cues. - Use real-world situations to model vertical, corresponding, alternate, and adjacent angles. - Create a poster classifying triangles by angle and side length. - Classify quadrilaterals such as trapezoids, parallelograms, rhombuses, rectangles, and squares by using Venn diagrams to detail similarities and differences. - Apply the formula (n-2) *180 to find the missing angle in a polygon. - Use proportions to analyze relationships between similar figures. - Use scale factor to analyze figures. - Combine shapes to find the area of composite figures. - Make connection between circumference of a circle and perimeter of polygons. - Apply formulas for area and circumference of circles.	Weeks – 19-26

• Use the area of a circle to find the circumference and the circumference to find the area. • Draw nets of solids to create actual 3D figures. • Use formulas and tangible objects to find the surface area and volume of 3D figures.	
Teacher Resources	*Teacher Note*

• GoMath! Textbook
 • GoMath! Resource materials
 • Smartboard
 • Technology Tools :
   -Google Classroom
   -GoMath! Personal Math trainer
   -Pear Deck
   -KUTA software
   -EdPuzzle
   -Study Island
   -Kahoot
   -Kami	

Differentiating Instruction:
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Examples of Strategies and Practices that Support Gifted & Talented Students:
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• Curriculum compacting
• Inquiry-based instruction
• Independent study
• Higher-order thinking skills
• Interest-based content
• Student-driven instruction
• Real-world problems and scenarios

Examples of Strategies and Practices that Support English Language Learners:
• Pre-teaching of vocabulary and concepts

• Visual learning, including graphic organizers
• Use of cognates to increase comprehension
• Teacher modeling
• Pairing students with beginning English language skills with students who have more advanced English language skills
• Scaffolding
•Word walls
•Sentence frames
•Think-pair-share
•Cooperative learning groups

Mathematics- Grade 7 Unit 5: Statistics

Unit Summary: Students will develop an understanding of the concepts and techniques of data analysis and will use it to model situations, solve problems, and analyze and draw appropriate inferences from data.
Primary Interdisciplinary Connections: Social Studies
Career Readiness, Life Literacies, and Key Skills: Financial, Economic, Business, and Entrepreneurial Literacy

Learning Targets

NJSLS Standards: 7.SP.A, 7.SP.A.1, 7.SP.A.2, 7.SP.B, 7.SP.B.3, 7.SP.B.4
Computer Science and Design Thinking Standards: 8.1.8.DA.1
Climate Change Standards: 9.4.8.CT.3
Content Statements:

1	Use random sampling to draw inferences about a population.
2	Draw informal comparative inferences about two populations.

Big Idea: Expressions, equations, and inequalities can be used to solve real-world problems.

Unit Essential Questions:	**Unit Enduring Understandings:**
• How can you use random samples and populations to solve real-world problems? • How can you solve real-world problems by analyzing and comparing data?	• Sampling involves choosing a subset of a population in order to make statistical inferences about the population. The sampling method can have a profound effect on how representative the data can be • The interquartile range, or IQR, is a value equal to the difference of the upper quartile (Q3) and lower quartile (Q1). The interquartile range can be used to find outliers in a data set • When a population is too large to be studied easily, a representative sample of the population may be studied instead. Random sampling is a way to select a group that represents the larger group. Statistics based on a study of the smaller group can be used as a basis for inferring the results for the entire population. • Dot plots can be used to analyze data. There are two categories of dot plots. A Wilkinson dot plot shows the data points plotted above a horizontal scale

	• The mean, median, and mode of a data set are measures of central tendency. Here are guidelines for choosing which measure to use to describe a data set

Unit Learning Targets
Students will…

- 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.
- 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.
- 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.
- 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.

Evidence of Learning

Summative Assessment: Benchmark #5/Unit Assessment

Formative Assessments:
- Module quizzes
- Module tests
- Notebook checks
- Teacher observation
- Do Now/homework review
- Cooperative learning groups

Lesson Plans

Activities/Interdisciplinary Connections	Timeframe
• Construct and analyze data in dot plots. • Construct and analyze data in box plots.	Weeks – 27-32

• Compare double box plots.
• Use a sample to gain information about and make inferences about a population.
• Generate and use random samples to represent a population.
• Use proportional reasoning to solve multistep ratio problems.
• Use statistical measures to compare populations.

Teacher Resources	*Teacher Note*

• GoMath! Textbook
• GoMath! Resource materials
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Differentiating Instruction:
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Examples of Strategies and Practices that Support Gifted & Talented Students:
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• Independent study
• Higher-order thinking skills
• Interest-based content
• Student-driven instruction

• Real-world problems and scenarios

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• Use of cognates to increase comprehension
• Teacher modeling
• Pairing students with beginning English language skills with students who have more advanced English language skills
• Scaffolding
•Word walls
•Sentence frames
•Think-pair-share
•Cooperative learning groups

Mathematics- Grade 7 Unit 6: Probability

Unit Title: Probability
Unit Summary: Students will understand that probability ranges from 0-1 and causes events that are impossible, unlikely, neither unlikely nor likely, likely, certain.
Primary Interdisciplinary Connections: Social Studies
Career Readiness, Life Literacies, and Key Skills: Financial, Economic, Business, and Entrepreneurial Literacy

Learning Targets
NJSLS Standards: 7.SP.C.5, 7.SP.C.6, 7.SP.C.7, 7.SP.C.7a, 7.SP.C.7b, 7.SP.C.8, 7.SP.C.8a, 7.SP.C.8b, 7.SP.C.8c
Computer Science and Design Thinking Standards: 8.1.8.DA.1; 8.1.8.DA.5
Climate Change Standards: 9.4.8.CT.3; 9.4.8.DC.7
Content Statements:

1	Investigate chance processes and develop, use, and evaluate probability models.

Big Idea:

Unit Essential Questions:	Unit Enduring Understandings:
• How can you use experimental probability to solve real-world problems? • How can you use theoretical probability to solve real-world problems?	• The probability of an event is the likelihood of the event on a scale from 0 to 1. A probability may be expressed as a ratio, a decimal, or a percent from 0% to 100%, inclusive. • The Law of Large Numbers relates experimental probability and theoretical probability. The basic idea of the theorem is as follows. • Two events are independent events if the occurrence of one event does not affect the occurrence of the other.

Unit Learning Targets
Students will…

- Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2

indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.

- Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.
- Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.
- Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.
- Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?
- Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
- Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.
- Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.
- Design and use a simulation to generate frequencies for compound events. For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?

Evidence of Learning

Summative Assessment: Benchmark #5/Unit Assessment

Formative Assessments:

- Module quizzes
- Module tests
- Notebook checks
- Teacher observation
- Do Now/homework review
- Cooperative learning groups

Lesson Plans

Activities/Interdisciplinary Connections	Timeframe
• Find the probability of simple and compound events. • Use tree diagrams to determine probability in various situations. • Use counting methods to count the number of choices. • Calculate the expected probability based game given the probabilities of the various outcomes and determine if the game is fair. • Model situations (dice, spinners, calculator, and computers) and solve problems using these models. • Calculate combinations using replacement and without replacement. • Justify solutions to counting problems.	Weeks – 33-38
Teacher Resources	*Teacher Note*

• GoMath! Textbook
• GoMath! Resource materials
• Smartboard
• Technology Tools :
  -Google Classroom
  -GoMath! Personal Math trainer
  -Pear Deck
  -KUTA software
  -EdPuzzle
  -Study Island
  -Kahoot
  -Kami	

Differentiating Instruction:
Students with Disabilities, English Language Learners,
and Gifted & Talented Students

Examples of Strategies and Practices that Support Students with Disabilities:
• Use of visual and multisensory formats
• Use of assisted technology
• Use of prompts
• Modification of content and student products
• Testing accommodations
• Authentic assessments

Examples of Strategies and Practices that Support Gifted & Talented Students:
• Adjusting the pace of lessons

- Curriculum compacting
- Inquiry-based instruction
- Independent study
- Higher-order thinking skills
- Interest-based content
- Student-driven instruction
- Real-world problems and scenarios

Examples of Strategies and Practices that Support English Language Learners:
- Pre-teaching of vocabulary and concepts
- Visual learning, including graphic organizers
- Use of cognates to increase comprehension
- Teacher modeling
- Pairing students with beginning English language skills with students who have more advanced English language skills
- Scaffolding
- Word walls
- Sentence frames
- Think-pair-share
- Cooperative learning groups