Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

"A mind is a fire to be kindled, not a vessel to be filled."
-Plutarch

STEM Department
Melissa Strype, Supervisor

Curriculum Committee
Kelly Hart
Stephanie Manchesi
Jennifer Piascik
Sarah Suydam

Curriculum Revised:
July 2020

Date of Board Approval:
September 15, 2020

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Table of Contents

Section

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Mission Statement

We commit to inspiring and empowering all students in Randolph schools to reach their full potential as unique, responsible and educated members of a global society.

Affirmative Action Statement
Equality and Equity in Curriculum

The Randolph Township School district ensures that the district's curriculum and instruction are aligned to the state's standards. The curriculum provides equity in instruction, educational programs and provides all students the opportunity to interact positively with others regardless of race, creed, color, national origin, ancestry, age, marital status, affectional or sexual orientation, gender, religion, disability or socioeconomic status.

N.J.A.C. 6A:7-1.7(b): Section 504, Rehabilitation Act of 1973; N.J.S.A. 10:5; Title IX, Education Amendments of 1972

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

EDUCATIONAL GOALS
VALUES IN EDUCATION

The statements represent the beliefs and values regarding our educational system. Education is the key to self-actualization, which is realized through achievement and self-respect. We believe our entire system must not only represent these values, but also demonstrate them in all that we do as a school system.

We believe:

- The needs of the child come first
- Mutual respect and trust are the cornerstones of a learning community
- The learning community consists of students, educators, parents, administrators, educational support personnel, the community and Board of Education members
- A successful learning community communicates honestly and openly in a non-threatening environment
- Members of our learning community have different needs at different times. There is openness to the challenge of meeting those needs in professional and supportive ways
- Assessment of professionals (i.e., educators, administrators and educational support personnel) is a dynamic process that requires review and revision based on evolving research, practices and experiences
- Development of desired capabilities comes in stages and is achieved through hard work, reflection and ongoing growth

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Introduction

The sixth-grade math curriculum program continues the study of mathematical concepts that commences in fifth grade. Students continue their mathematical studies by connecting ratio and rate to whole number multiplication and division and using concepts of ratio and rate to solve problems; completing understanding of division of fractions and extending the notion of number to the system of rational numbers, which includes negative numbers; writing, interpreting, and using expressions and equations; and developing understanding of statistical thinking. Upon completion of this course, students will be prepared with the proper skills and knowledge for the transition into Pre-Algebra or Algebra. This course will be guided by the current New Jersey Learning Standards in Mathematics.

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Curriculum Pacing Chart

SUGGESTED TIME ALLOTMENT	UNIT NUMBER	CONTENT - UNIT OF STUDY
4 weeks	I	Numerical Expressions and Factors
4 weeks	II	Fractions and Decimals
5 weeks	III	Ratios and Rates
3 weeks	IV	Percents
3 weeks	V	Integers, Number Lines, and the Coordinate Plane
3 weeks	VI	Algebraic Expressions and Properties
4 weeks	VII	Equations and Inequalities
4 weeks	VIII	Area, Surface Area, and Volume
3 weeks	IX	Statistical Measures
3 weeks	X	Data Displays

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit I: Numerical Expressions and Factors

<table>
<tr><td colspan="3">TRANSFER: Students will be able to independently interpret and persevere in solving complex mathematical problems using strategic thinking and expressing answers with a degree of precision appropriate for the problem context.</td></tr>
<tr><td rowspan="5">STANDARDS / GOALS:

NJ 2016 SLS: Math
6.EE.A.1: Write and evaluate numerical expressions involving whole number exponents.

6.NS.B.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 the sum of two whole numbers 1-100 with a common factor as a multiple of the sum of two whole numbers with no common factor.

NJ 2016 SLS: Mathematical Practices
MP1 Make sense of problems and persevere in solving them.
MP2 Reason abstractly and quantitatively.
MP3 Construct viable arguments and critique the reasoning of others.
MP5 Use appropriate tools strategically.
MP6 Attend to precision.</td><td>ENDURING UNDERSTANDINGS</td><td>ESSENTIAL QUESTIONS</td></tr>
<tr><td>There are many ways to represent a number.</td><td>• How do I determine the best numerical representation (pictorial, symbolic, objects) for a given situation?</td></tr>
<tr><td>Common factors and multiples are the building blocks of the foundation for operations with fractions.</td><td>• In what situations would you use the greatest common factor or the least common multiple?

• Why is there an infinite number of common multiples and a limited number of common factors?</td></tr>
<tr><td><u>KNOWLEDGE</u>
Students will know:</td><td><u>SKILLS</u>
Students will be able to:</td></tr>
<tr><td>The exponent of a whole number indicates how many times the base is used as a factor.

When evaluating numerical expressions, the order of operations is necessary to ensure the correct value.</td><td>Evaluate numerical expressions involving whole-numbered exponents.

Evaluate expressions, including those involving whole number exponents using the order of operations when there are no parentheses.</td></tr>
</table>

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit I: Numerical Expressions and Factors

MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning. **NJ 2016 SLS: Literacy in History, Social Studies, & Technical Subjects** RH.6-8.7: Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts. RST.6-8.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 6-8 texts and topics*.	A factor of a (whole) number is always less than or equal to the number. A multiple of a (whole) number is always greater than or equal to the number. The greatest common factor is the largest factor that two or more counting numbers have in common. The least common multiple is the smallest multiple of two or more numbers. Numerical expressions can be rewritten using the distributive property to the greatest common factor of the expression. The prime factorization of a number is the product of its prime factors that can be expressed using exponents.	Identify that factors of a number occur in pairs. Analyze and explain how a multiple of a number is a product of two numbers. Identify the greatest common factor of two whole numbers less than or equal to 100. Identify the least common multiple of two whole numbers less than or equal to 12. Apply the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of the sum of two whole numbers with no common factor. Express a number as a product of prime factors and represent the product using exponents.

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit I: Numerical Expressions and Factors

	VOCABULARY: evaluate, Venn diagram, diagram **KEY TERMS:** power, base, exponent, perfect square, numerical expression, order of operations, factor pair, prime factorization, factor tree, greatest common factor, common factors, common multiples, least common multiple	

ASSESSMENT EVIDENCE: Students will show their learning by:

- Demonstrating knowledge of order of operations to solve a multi-step expression
- Applying knowledge of greatest common factor and least common multiple to solve real-world problems
- Demonstrating understanding of key concepts by successfully completing a summative assessment at the culmination of the unit

KEY LEARNING EVENTS AND INSTRUCTION:

- Teacher-led demonstration
- Student-led modeling
- Differentiated station activities
- Small-group instruction
- Use of Venn Diagram to understand the relationship between factors, common factors, and greatest common factor
- Use of Venn Diagram to understand the relationship between multiples, common multiples, and least common multiple

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit I: Numerical Expressions and Factors

SUGGESTED TIME ALLOTMENT	**4 weeks**
SUPPLEMENTAL UNIT RESOURCES	**Required Resources:** • Math in Focus Singapore Math: Course 1A (https://my.hrw.com/) **Suggested Resources:** • Khan Academy Videos www.khanacademy.com • Kahoot www.kahoot.com • Quizziz zww.quizziz.com • Interactive Math Practice – Illustrative Mathematics www.illustrativemathematics.org • Interactive Math Practice - IXL www.ixl.com • Big Ideas Math www.bigideasmath.com • NJ Model Curriculum https://www.nj.gov/education/modelcurriculum/math/ • ScootPad www.scootpad.com

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit II: Fractions and Decimals

<table>
<tr><td colspan="3">TRANSFER: Students will be able to independently use their understanding of any problem, initiate a plan, execute it, and evaluate the reasonableness of the solution.</td></tr>
<tr><td rowspan="5">STANDARDS / GOALS:

NJ 2016 SLS: Math
6.NS.A.1: Interpret and compute quotients of fractions and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.

6.NS.B.2: Fluently divide multi-digit numbers using the standard algorithm.

6.NS.B.3: Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

NJ 2016 SLS: Mathematical Practices
MP1 Make sense of problems and persevere in solving them.
MP2 Reason abstractly and quantitatively.
MP3 Construct viable arguments and critique the reasoning of others.</td><td>ENDURING UNDERSTANDINGS</td><td>ESSENTIAL QUESTIONS</td></tr>
<tr><td>Fluently use the four mathematical operations with fractions and decimals.</td><td>• When might you use multi-digit decimal operations?
• When might you divide a fraction by a fraction?</td></tr>
<tr><td><u>KNOWLEDGE</u>
Students will know:</td><td><u>SKILLS</u>
Students will be able to:</td></tr>
<tr><td>The standard algorithm for division of multi-digit numbers.

The standard algorithms for addition, subtraction, multiplication of multi-digit decimals.

Division of fractions by fractions is an extension of division of fractions by whole numbers.</td><td>Divide fluently with multi-digit whole numbers utilizing the standard algorithm.

Compute multi-digit decimals using the standard algorithm for each operation.

Compute and interpret quotients of fractions.</td></tr>
</table>

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit II: Fractions and Decimals

MP4 Model with mathematics. MP5 Use appropriate tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning. **NJ 2016 SLS: Literacy in History, Social Studies, & Technical Subjects** RST.6-8.4**:** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 6-8 texts and topics*. **NJ 2020 SLS: Computer Science and Design Thinking** 8.1.8.DA.5: Test, analyze, and refine computational models.	Compute quotients of fractions and solve problems involving division by fractions including estimation and solving with models. **VOCABULARY:** evaluate, annex, vertical form, invert **KEY TERMS:** reciprocal, multiplicative inverse, sum, difference, product, quotient, dividend, divisor, improper fraction, mixed number, proper fraction, unit fraction, place value, rational number	Solve multi-step word problems involving division of fractions by fractions. Create and manipulate a model to represent division of fractions. Interpret the quotient by checking for reasonableness within real-world problems.

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit II: Fractions and Decimals

ASSESSMENT EVIDENCE: Students will show their learning by:

- Demonstrating computational fluency and accuracy while solving real-world problems with rational numbers
- Persevering through solving complex multi-digit problems
- Classifying mathematical operations in various real-world problems
- Demonstrating understanding of key concepts by successfully completing a summative assessment at the culmination of the unit

KEY LEARNING EVENTS AND INSTRUCTION:

- Teacher-led demonstration
- Student-led modeling
- Differentiated station activities
- Small-group instruction
- Graphic organizer for algorithms of decimal and fraction operations

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit II: Fractions and Decimals

SUGGESTED TIME ALLOTMENT	**4 weeks**
SUPPLEMENTAL UNIT RESOURCES	**Required Resources:** • Math in Focus Singapore Math: Course 1A (https://my.hrw.com/) **Suggested Resources:** • Khan Academy Videos www.khanacademy.com • Kahoot www.kahoot.com • Quizziz zww.quizziz.com • Interactive Math Practice – Illustrative Mathematics www.illustrativemathematics.org • Interactive Math Practice - IXL www.ixl.com • Big Ideas Math www.bigideasmath.com • NJ Model Curriculum https://www.nj.gov/education/modelcurriculum/math/ • ScootPad www.scootpad.com

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit III: Ratios and Rates

<table>
<tr><td colspan="3">TRANSFER: Students will be able to independently apply mathematical knowledge to analyze and model mathematical relationships in the context of a situation in order to make decisions, draw conclusions, and solve problems.</td></tr>
<tr><td rowspan="4">STANDARDS / GOALS:

NJ 2016 SLS: Math
6.RP.A.1: Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.

6.RP.A.2: Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship.

6.RP.A.3: Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

6.RP.A.3.A: Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.</td><td>ENDURING UNDERSTANDINGS</td><td>ESSENTIAL QUESTIONS</td></tr>
<tr><td>A ratio is a comparison of two numbers.</td><td>• How could you describe the relationship between two numbers?</td></tr>
<tr><td>Proportional relationships express how quantities change in relationship to each other.</td><td>• Why would you use a proportional comparison?</td></tr>
<tr><td><u>KNOWLEDGE</u>
Students will know:
A ratio is a comparison of quantities with the same unit.

A ratio table represents multiplicative and additive relationships.</td><td><u>SKILLS</u>
Students will be able to:
Express the relationship between two quantities.

Apply ratio reasoning to solve real-world and mathematical problems.

Construct a table of equivalent ratios relating quantities with whole number measurements and apply them to solve problems.</td></tr>
</table>

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit III: Ratios and Rates

6.RP.A.3.B: Solve unit rate problems including those involving unit pricing and constant speed. 6.RP.A.3.D**:** Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. **NJ 2016 SLS: Mathematical Practices** MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique the reasoning of others. MP4 Model with mathematics. MP5 Use appropriate tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning.	A unit rate is a comparison of two quantities where the second number in the comparison is one unit. Equivalent ratios are the same in simplest form. Ratio tables can be used to plot points on a coordinate plane. Unit measures may be converted into different units. **VOCABULARY:** conversion, U.S. customary system, metric system, speed, average speed	Identify a rate that describes changes in real-world problems. Solve unit rate problems including those involving unit pricing and constant speed. Identify two or more ratios that describe the same relationship. Compare ratios to recognize equivalency. Plot pairs of values found in a ratio table on a coordinate plane. Explore linear measurement in customary and metric units and convert between the two systems. Convert measurement units utilizing ratio reasoning.

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit III: Ratios and Rates

NJ 2016 SLS: Literacy in History, Social Studies, & Technical Subjects RST.6-8.7: Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). RST.6-8.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 6-8 texts and topics*. **NJ 2020 SLS: Career Readiness, Life Literacies, and Key Skills** 9.1.8.CP.1: Compare prices for the same goods or services.	**KEY TERMS:** ratio, term, value of a ratio, equivalent ratios, ratio table, rate, equivalent rates, unit rate, conversion factor, unit analysis, simplest form, common factors	

ASSESSMENT EVIDENCE: Students will show their learning by:

- Engaging in a performance task to effectively apply knowledge of rates and ratios
- Demonstrating and explaining the relationships between rates and ratios by constructing a table and coordinate grid
- Demonstrating understanding of key concepts by successfully completing a summative assessment at the culmination of the unit

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit III: Ratios and Rates

KEY LEARNING EVENTS AND INSTRUCTION:

- Teacher-led demonstration
- Student-led modeling
- Differentiated station activities
- Small-group instruction
- Ratios and Proportional Reasoning Math Menu

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit III: Ratios and Rates

SUGGESTED TIME ALLOTMENT	**5 weeks**
SUPPLEMENTAL UNIT RESOURCES	**Required Resources:** • Math in Focus Singapore Math: Course 1A (https://my.hrw.com/) **Suggested Resources:** • Khan Academy Videos www.khanacademy.com • Kahoot www.kahoot.com • Quizziz zww.quizziz.com • Interactive Math Practice – Illustrative Mathematics www.illustrativemathematics.org • Interactive Math Practice - IXL www.ixl.com • Big Ideas Math www.bigideasmath.com • NJ Model Curriculum https://www.nj.gov/education/modelcurriculum/math/ • ScootPad www.scootpad.com

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit IV: Percents

<table>
<tr><td colspan="3">TRANSFER: Students will be able to independently use their learning to recognize the relationship between fractions, decimals, and percents and use that relationship to solve problems such as finding tax, tip, discount, and interest.</td></tr>
<tr><td rowspan="5">STANDARDS / GOALS:

NJ 2016 SLS: Math
6.RP.A.3: Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

6.RP.A.3.C: Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.

NJ 2016 SLS: Mathematical Practices
MP1 Make sense of problems and persevere in solving them.
MP2 Reason abstractly and quantitatively.
MP3 Construct viable arguments and critique the reasoning of others.
MP4 Model with mathematics.
MP5 Use appropriate tools strategically.</td><td>ENDURING UNDERSTANDINGS</td><td>ESSENTIAL QUESTIONS</td></tr>
<tr><td>Percent is a concept used to compare quantities expressed per hundred.</td><td>• Where would you use percents in everyday life?</td></tr>
<tr><td><u>KNOWLEDGE</u>
Students will know:</td><td><u>SKILLS</u>
Students will be able to:</td></tr>
<tr><td>Percent is a ratio that compares a number to 100.

Rational numbers can be written in different forms while maintaining equivalent values.

Proportional reasoning can be used to solve percent problems.

Fractions, decimals, and percents are ways of describing a part of a whole.</td><td>Evaluate a percent of a quantity as a rate per 100.

Compose equivalent fractions, decimals, and percents.

Solve real-world problems involving finding the whole, given a part and a percent, including calculating and applying sales tax and tip.

Compare and order fractions, decimals, and percents.</td></tr>
</table>

MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning. **NJ 2016 SLS: Literacy in History, Social Studies, & Technical Subjects** RST.6-8.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context. **NJ 2020 SLS: Career Readiness, Life Literacies, and Key Skills** 9.1.8.CP.1: Compare prices for the same goods or services.	**VOCABULARY:** percent, base (of a percent), sales tax, tip, discount, sale, commission, interest, interest rate **KEY TERMS:** percent notation	

ASSESSMENT EVIDENCE: Students will show their learning by:

- Applying the knowledge of percents to accurately solve real-world scenarios
- Demonstrating and explaining the relationships between fractions, decimals, and percents
- Demonstrating understanding of key concepts by successfully completing a summative assessment at the culmination of the unit

KEY LEARNING EVENTS AND INSTRUCTION:

- Teacher-led demonstration
- Student-led modeling
- Differentiated station activities
- Small-group instruction
- Graphic organizer for converting fractions, decimals, and percents

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

SUGGESTED TIME ALLOTMENT	**3 weeks**
SUPPLEMENTAL UNIT RESOURCES	**Required Resources:** • Math in Focus Singapore Math: Course 1A (https://my.hrw.com/) **Suggested Resources:** • Khan Academy Videos www.khanacademy.com • Kahoot www.kahoot.com • Quizziz zww.quizziz.com • Interactive Math Practice – Illustrative Mathematics www.illustrativemathematics.org • Interactive Math Practice - IXL www.ixl.com • Big Ideas Math www.bigideasmath.com • NJ Model Curriculum https://www.nj.gov/education/modelcurriculum/math/ • ScootPad www.scootpad.com

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit V: Integers, Number Lines, and the Coordinate Plane

<table>
<tr><td colspan="3">TRANSFER: Students will be able to independently apply mathematical knowledge to analyze and model mathematical relationships in the context of a situation in order to make decisions, draw conclusions, and solve problems.</td></tr>
<tr><td rowspan="6">STANDARDS / GOALS:

NJ 2016 SLS: Math
6.NS.C.5: Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

6.NS.C.6: Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.</td><td>ENDURING UNDERSTANDINGS</td><td>ESSENTIAL QUESTIONS</td></tr>
<tr><td>A number line is a model that can be used to understand numerical relationships, fractions and negative numbers.</td><td>• How can ordering of rational numbers help to make sense of the world around us?</td></tr>
<tr><td>The absolute value of a number is the distance a number is from 0.</td><td>• When is the absolute value of a rational number used in the real world?</td></tr>
<tr><td>Ordered pairs on a coordinate plane can be used to visualize situations in everyday life.</td><td>• How can plotting points in all four quadrants be applicable to solving real-world problems?

• How are number lines and the coordinate plane related?</td></tr>
<tr><td><u>KNOWLEDGE</u>
Students will know:</td><td><u>SKILLS</u>
Students will be able to:</td></tr>
<tr><td>Positive and negative numbers are used to describe quantities.</td><td>Describe the meaning of 0 in situations using positive and negative numbers.</td></tr>
</table>

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit V: Integers, Number Lines, and the Coordinate Plane

6.NS.C.6.A: Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., -(-3) = 3, and that 0 is its own opposite.		Represent the quantity of positive and negative numbers to represent quantities in real-world contexts.
	Positive and negative numbers can be graphed on a number line.	Illustrate positive and negative numbers on opposite sides of 0 on a number line.
6.NS.C.6.B: Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.	The absolute value of a rational number is its distance from 0 on a number line.	Interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.
		Distinguish comparisons of absolute value from statements about order.
6.NS.C.6.C: Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.	Absolute value can be used to find distance between two points on a coordinate plane.	Interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.
6.NS.C.7: Understand ordering and absolute value of rational numbers.	Integers are whole numbers and their opposites can be represented as a point on a number line.	Construct number lines with integers.
6.NS.C.7.A: Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.	A rational number and zero can be represented as a point on a number line.	Construct number lines with rational numbers.

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit V: Integers, Number Lines, and the Coordinate Plane

6.NS.C.7.B: Write, interpret, and explain statements of order for rational numbers in real-world contexts. 6.NS.C.7.C: Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. 6.NS.C.7.D: Distinguish comparisons of absolute value from statements about order. 6.NS.C.8: Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate. **NJ 2016 SLS: Mathematical Practices** MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique the reasoning of others.	An inequality is the relation between expressions that are not equal and can be used to order and compare positive rational numbers on a number line. An ordered pair can be represented as a point on a coordinate plane where the values of the numbers indicate the locations in the quadrants of the coordinate plane. Coordinate planes can model relationships between ordered pairs. **VOCABULARY:** coordinates, coordinate plane, x-axis, y-axis, horizontal, vertical, origin, positive numbers, negative numbers **KEY TERMS:** plot, scale, line segment, inequalities, opposites, integers, rational numbers, absolute value, quadrants	Interpret statements of order for rational numbers in real-world contexts. Interpret statements of inequalities about the position of two rational numbers on a number line (3.5< 5 and 5 is to the right of 3.5). Model the placement of pairs of rational numbers on a coordinate plane. Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane to calculate the distance between two points.

Unit V: Integers, Number Lines, and the Coordinate Plane

MP4 Model with mathematics. MP5 Use appropriate tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning. **NJ 2016 SLS: Literacy in History, Social Studies, & Technical Subjects** RST.6-8.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 6-8 texts and topics*. **NJ 2020 SLS: Career Readiness, Life Literacies, and Key Skills** 9.1.8.CDM.1: Compare and contrast the use of credit cards and debit cards for specific purchases and the advantages and disadvantages of using each.		

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit V: Integers, Number Lines, and the Coordinate Plane

ASSESSMENT EVIDENCE: Students will show their learning by:

- Interpreting and analyzing relationships between rational numbers on a number line
- Constructing a coordinate grid and plotting points in all four quadrants accurately
- Demonstrating understanding of key concepts by successfully completing a summative assessment at the culmination of the unit

KEY LEARNING EVENTS AND INSTRUCTION:

- Teacher-led demonstration
- Student-led modeling
- Differentiated station activities
- Small-group instruction
- Clothesline number line activity

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit V: Integers, Number Lines, and the Coordinate Plane

SUGGESTED TIME ALLOTMENT	**3 weeks**
SUPPLEMENTAL UNIT RESOURCES	**Required Resources:** • Math in Focus Singapore Math: Course 1A (https://my.hrw.com/) **Suggested Resources:** • Khan Academy Videos www.khanacademy.com • Kahoot www.kahoot.com • Quizziz zww.quizziz.com • Interactive Math Practice – Illustrative Mathematics www.illustrativemathematics.org • Interactive Math Practice - IXL www.ixl.com • Big Ideas Math www.bigideasmath.com • NJ Model Curriculum https://www.nj.gov/education/modelcurriculum/math/ • ScootPad www.scootpad.com

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit VI: Algebraic Expressions and Properties

<table>
<tr><td colspan="3">TRANSFER: Students will be able to independently use their learning to make generalizations about observed patterns.</td></tr>
<tr><td rowspan="7">STANDARDS / GOALS:

NJ 2016 SLS: Math
6.EE.A.1: Write and evaluate numerical expressions involving whole-number exponents.

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

6.EE.A.2.A: Write expressions that record operations with numbers and with letters standing for numbers.

6.EE.A.2.B: 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.</td><td>ENDURING UNDERSTANDINGS</td><td>ESSENTIAL QUESTIONS</td></tr>
<tr><td>Algebra is used to communicate and generalize patterns in mathematics.</td><td>• What is the difference between an algebraic expression and a numerical expression?</td></tr>
<tr><td>Patterns, relations, and functions represent real-life situations and relationships; their extensions help to make predictions and generalizations.</td><td>• How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations?</td></tr>
<tr><td>Algebraic and numeric procedures are interconnected and build on one another to produce a coherent whole.</td><td>• What makes an algebraic algorithm both effective and efficient?</td></tr>
<tr><td><u>KNOWLEDGE</u>
Students will know:</td><td><u>SKILLS</u>
Students will be able to:</td></tr>
<tr><td>Variables, represented by letters, are used in place of unknown numbers.

There are two types of expressions: numerical and algebraic.</td><td>Understand that a variable represents an unknown number.

Formulate expressions corresponding to a real-world or mathematical problem.</td></tr>
</table>

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit VI: Algebraic Expressions and Properties

6.EE.A.2.C: 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). 6.EE.A.3: Apply the properties of operations to generate equivalent expressions. 6.EE.A.4: Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). 6.NS.B.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.	Evaluating an expression means to apply the conventional order of operations when no parentheses are given. There are key words (add, subtract, multiply, or divide) that indicate specific operations.	Evaluate expressions at specific values of their variables. Evaluate 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). Apply the properties of operations to generate equivalent expressions. Translate between written language phrases and mathematical symbolic expressions. Identify and label parts of an expression using mathematical terms (coefficient, variable, constant).

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit VI: Algebraic Expressions and Properties

NJ 2016 SLS: Mathematical Practices MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique the reasoning of others. MP5 Use appropriate tools strategically. MP6 Attend to precision. MP8 Look for and express regularity in repeated reasoning. **NJ 2016 SLS: Literacy in History, Social Studies, & Technical Subjects** RST.6-8.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 6-8 texts and topics*.	The distributive property is a property that relates multiplication to addition or subtraction. Mathematical properties are used to identify, simplify, and rewrite equivalent expressions. **VOCABULARY:** variable, evaluate, simplify, expand, substitute **KEY TERMS:** algebraic expression, constant, equivalent expressions, term, like terns, coefficient, factoring, sum, difference, product, quotient, distributive property, commutative property	Apply the distributive property to multiply numbers and to rewrite algebraic expressions. Identify when two expressions are equivalent by applying properties.

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit VI: Algebraic Expressions and Properties

ASSESSMENT EVIDENCE: Students will show their learning by:

- Simplifying algebraic expressions by completing problem sets as formative assessments to reinforce algebraic concepts
- Representing and analyzing real-world mathematical situations and structures using algebraic expressions
- Demonstrating understanding of key concepts by successfully completing a summative assessment at the culmination of the unit

KEY LEARNING EVENTS AND INSTRUCTION:

- Teacher-led demonstration
- Student-led modeling
- Differentiated station activities
- Small-group instruction

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit VI: Algebraic Expressions and Properties

SUGGESTED TIME ALLOTMENT	**3 weeks**
SUPPLEMENTAL UNIT RESOURCES	**Required Resources:** • Math in Focus Singapore Math: Course 1A (https://my.hrw.com/) **Suggested Resources:** • Khan Academy Videos www.khanacademy.com • Kahoot www.kahoot.com • Quizziz zww.quizziz.com • Interactive Math Practice – Illustrative Mathematics www.illustrativemathematics.org • Interactive Math Practice - IXL www.ixl.com • Big Ideas Math www.bigideasmath.com • NJ Model Curriculum https://www.nj.gov/education/modelcurriculum/math/ • ScootPad www.scootpad.com

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit VII: Equations and Inequalities

<table>
<tr><td colspan="3">TRANSFER: Students will be able to independently initiate a plan, execute it, and evaluate the reasonableness and accuracy of the solution.</td></tr>
<tr><td rowspan="5">STANDARDS / GOALS:

NJ 2016 SLS: Math
6.EE.B.5: 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.

6.EE.B.6: 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.B.7: Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers.</td><td>ENDURING UNDERSTANDINGS</td><td>ESSENTIAL QUESTIONS</td></tr>
<tr><td>Develop student ability to recognize, describe, and analyze two kinds of relationships between variables (independent and dependent).</td><td>• How can real-life problems be represented as equations?</td></tr>
<tr><td>A variable can represent an unknown number or any number in a specific set.</td><td>• How do I use algebraic equations to analyze or solve problems?</td></tr>
<tr><td>Algebraic inequalities are used to model real-world problems and represent quantitative relationships.</td><td>• How can we create and use mathematical models when there is more than one solution?</td></tr>
<tr><td><u>KNOWLEDGE</u>
Students will know:</td><td><u>SKILLS</u>
Students will be able to:</td></tr>
<tr><td>Variables can be used to write algebraic equations and inequalities.

Equations have one solution and inequalities have an infinite number of solutions.</td><td>Represent variables to substitute numbers.

Formulate and solve equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers.</td></tr>
</table>

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit VII: Equations and Inequalities

6.EE.B.8: Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.	Inequality constraints or conditions consist of > or <.	Formulate and solve inequalities of the form $x > c$ or $x < c$ to represent a constraint or condition in a real world or mathematical problem.
	Solutions of an inequality can be graphed on a number line.	Construct a number line diagram that represents solutions of inequalities.
6.EE.C.9: Use variables to represent two quantities in a real-world problem that change in relationship to one another; 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.	Solutions of equations and inequalities can be verified by substituting values for the variables.	Apply substitution to determine whether given numbers in a specific set will make an equation or inequality true.
	Solving equations and inequalities involves using inverse operations.	Construct and solve algebraic equations and inequalities using addition, subtraction, multiplication, and division.
NJ 2016 SLS: Mathematical Practices MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique the reasoning of others. MP4 Model with mathematics.	That dependent variables change in direct relation to the independent variables, which remain constant.	Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.
	Real-world problems can be represented through equations and inequalities.	Model different types of equations and inequalities to solve real-world problems.

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit VII: Equations and Inequalities

MP5 Use appropriate tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning. **NJ 2016 SLS: Literacy in History, Social Studies, & Technical Subjects** RST.6-8.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 6-8 texts and topics*.	**VOCABULARY:** equation, solution, linear equation, independent variable, dependent variable, inequality **KEY TERMS:** evaluate the expression, simplify the expression, solve the expression, inverse operations, algebraic equation, greater than or equal to notation, less than or equal to notation	

ASSESSMENT EVIDENCE: Students will show their learning by:

- Writing and solving algebraic equations and inequalities that represent real-world situations accurately
- Comparing and contrasting independent and dependent variables in given situations
- Demonstrating understanding of key concepts by successfully completing a summative assessment at the culmination of the unit

KEY LEARNING EVENTS AND INSTRUCTION:

- Teacher-led demonstration
- Student-led modeling
- Differentiated station activities
- Small-group instruction

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit VII: Equations and Inequalities

SUGGESTED TIME ALLOTMENT	**4 weeks**
SUPPLEMENTAL UNIT RESOURCES	**Required Resources:** • Math in Focus Singapore Math: Course 1A (https://my.hrw.com/) **Suggested Resources:** • Khan Academy Videos www.khanacademy.com • Kahoot www.kahoot.com • Quizziz zww.quizziz.com • Interactive Math Practice – Illustrative Mathematics www.illustrativemathematics.org • Interactive Math Practice - IXL www.ixl.com • Big Ideas Math www.bigideasmath.com • NJ Model Curriculum https://www.nj.gov/education/modelcurriculum/math/ • ScootPad www.scootpad.com

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit VIII: Area, Surface Area, and Volume

<table>
<tr><td colspan="3">TRANSFER: Students will be able to independently use their learning to find the volume and surface area of objects they encounter in their everyday lives.</td></tr>
<tr><td rowspan="5">STANDARDS / GOALS:

NJ 2016 SLS: Math
6.EE.A.2: Write, read, and evaluate expressions in which letters stand for numbers.

6.EE.A.2.C: 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).

6.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.</td><td>ENDURING UNDERSTANDINGS</td><td>ESSENTIAL QUESTIONS</td></tr>
<tr><td>Develop strategies for measuring perimeter and area of regular and irregular polygons.</td><td>• What rationales can be used for determining when to find perimeter versus when to find area?</td></tr>
<tr><td>Geometric attributes provide descriptive information about an object’s properties and position in space and support visualization and problem solving.</td><td>• How does geometry help us describe objects in the real world?

• Why is it important to persevere in solving problems?</td></tr>
<tr><td><u>KNOWLEDGE</u>
Students will know:</td><td><u>SKILLS</u>
Students will be able to:</td></tr>
<tr><td>All area formulas for 2-dimensional shapes.</td><td>Calculate the area of squares, rectangles, triangles, trapezoids, and parallelograms.

Calculate the height or base when given the area of parallelograms, triangles, and trapezoids.</td></tr>
</table>

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit VIII: Area, Surface Area, and Volume

6.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.	Polygons are decomposed into other 2-dimensional polygons or composed into rectangles to find the area.	Calculate the total area of composite figures by decomposing 2-dimensional polygons and composing into rectangles to solve real-world problems.
	The total area of a net of a 3-D figure is the surface area of the figure.	Interpret the surface area of solids using both nets and formulas to solve real-world problems.
6.G.A.3: Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.	Volume is the measure of how much space is occupied by a three-dimensional object and can be found using formulas and investigations.	Calculate the volume of rectangular prisms; find the length, width, height, or base when given the volume.
	The volume of a right rectangular prism is the number of unit cubes that fill the inside.	Calculate the volume of a right rectangular prism.
6.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.	Ordered pairs on a coordinate plane can be connected with line segments to create polygons.	Draw polygons in a coordinate plane given coordinates for the vertices.
	VOCABULARY: volume, prism, formula, height, base, decomposing	

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit VIII: Area, Surface Area, and Volume

NJ 2016 SLS: Mathematical Practices MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique the reasoning of others. MP4 Model with mathematics. MP5 Use appropriate tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning. **NJ 2016 SLS: Literacy in History, Social Studies, & Technical Subjects** RST.6-8.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 6-8 texts and topics*. **NJ 2020 SLS: Computer Science and Design Thinking** 8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).	**KEY TERMS:** polygon, face, surface area, composite figure, edge, net, kite, vertex, solid, polyhedron, pyramid, cross section, perpendicular, regular polygon, irregular polygon, shaded area, parallel, parallelogram, trapezoid, quadrilateral, perimeter, area, line segment	

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit VIII: Area, Surface Area, and Volume

ASSESSMENT EVIDENCE: Students will show their learning by:

- Engaging in a performance task to effectively apply knowledge of composite figures
- Accurately solving and explaining solutions to complex real-world surface area and volume scenarios
- Demonstrating understanding of key concepts by successfully completing a summative assessment at the culmination of the unit

KEY LEARNING EVENTS AND INSTRUCTION:

- Teacher-led demonstration
- Student-led modeling
- Differentiated station activities
- Small-group instruction
- Composite figure dream home

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit VIII: Area, Surface Area, and Volume

SUGGESTED TIME ALLOTMENT	**4 weeks**
SUPPLEMENTAL UNIT RESOURCES	**Required Resources:** • Math in Focus Singapore Math: Course 1A (https://my.hrw.com/) **Suggested Resources:** • Khan Academy Videos www.khanacademy.com • Kahoot www.kahoot.com • Quizziz www.quizziz.com • Interactive Math Practice – Illustrative Mathematics www.illustrativemathematics.org • Interactive Math Practice - IXL www.ixl.com • Big Ideas Math www.bigideasmath.com • NJ Model Curriculum https://www.nj.gov/education/modelcurriculum/math/ • ScootPad www.scootpad.com

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit IX: Statistical Measures

<table>
<tr><td colspan="3">TRANSFER: Students will be able to independently use their learning to analyze a statistical representation and agree or refute it based on the data utilized and interpretation of the data.</td></tr>
<tr><td rowspan="4">STANDARDS / GOALS:

NJ 2016 SLS: Math
6.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.

6.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.

6.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.

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

6.SP.B.5: Summarize numerical data sets in relation to their context, such as by:</td><td>ENDURING UNDERSTANDINGS</td><td>ESSENTIAL QUESTIONS</td></tr>
<tr><td>Statistical measures inform unique information about the data set.</td><td>• Why is data collected and analyzed?

• How is data used in the real world?</td></tr>
<tr><td><u>KNOWLEDGE</u>
Students will know:</td><td><u>SKILLS</u>
Students will be able to:</td></tr>
<tr><td>A statistical question is one that anticipates variability in the data related to the question and accounts for it in the answers.

A center summarizes a data set with a single number.

A spread is the measure of variation of all values in a data set about the center.</td><td>Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.

Compute the mean, median, and mode to summarize the data set.

Understand that a set of data collected to answer a statistical question has a distribution which can be described by its spread and overall shape.</td></tr>
</table>

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit IX: Statistical Measures

6.SP.B.5.A: Reporting the number of observations. 6.SP.B.5.B: Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. 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 describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. **NJ 2016 SLS: Mathematical Practices** MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique the reasoning of others. MP4 Model with mathematics. MP5 Use appropriate tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning.	The mean absolute deviation describes the variability of a data set with a single number. Measures of center and variability can be used to describe patterns and striking deviations from the overall pattern of the data. Inferences and observations about a data set can be made through using descriptive statistics. **VOCABULARY:** statistics, average, range, outlier	Compute and interpret the mean absolute deviation of a data set. Summarize numerical data by: • giving quantitative measures of center (median and/or mean). • giving quantitative measures of variability (interquartile range and/or mean absolute deviation). • describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered; 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.

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit IX: Statistical Measures

NJ 2016 SLS: Literacy in History, Social Studies, & Technical Subjects RH.6-8.7: Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts. RST.6-8.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 6-8 texts and topics*.	**KEY TERMS:** statistical question, measure of variation, mean, quartiles, first quartile, third quartile, measure of center, interquartile range, mean absolute deviation, median, mode, frequency, dot plot	

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit IX: Statistical Measures

ASSESSMENT EVIDENCE: Students will show their learning by:

- Creating a statistical question to collect data in order to calculate their measures of center and variation
- Demonstrating understanding of key concepts by successfully completing a summative assessment at the culmination of the unit

KEY LEARNING EVENTS AND INSTRUCTION:

- Teacher-led demonstration
- Student-led modeling
- Differentiated station activities
- Small-group instruction
- Collect and analyze data from student-created statistical question

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit IX: Statistical Measures

SUGGESTED TIME ALLOTMENT	**3 weeks**
SUPPLEMENTAL UNIT RESOURCES	**Required Resources:** • Math in Focus Singapore Math: Course 1A (https://my.hrw.com/) **Suggested Resources:** • Khan Academy Videos www.khanacademy.com • Kahoot www.kahoot.com • Quizziz zww.quizziz.com • Interactive Math Practice – Illustrative Mathematics www.illustrativemathematics.org • Interactive Math Practice - IXL www.ixl.com • Big Ideas Math www.bigideasmath.com • NJ Model Curriculum https://www.nj.gov/education/modelcurriculum/math/ • ScootPad www.scootpad.com

`

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

Unit X: Data Displays

<table>
<tr><td colspan="3">TRANSFER: Students will be able to independently use their learning to analyze a statistical representation and agree or refute it based on the data utilized and interpretation of the data.</td></tr>
<tr><td rowspan="4">STANDARDS / GOALS:

NJ 2016 SLS: Math
6.SP.B.4: Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

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

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.

NJ 2016 SLS: Mathematical Practices
MP1 Make sense of problems and persevere in solving them.
MP2 Reason abstractly and quantitatively.
MP3 Construct viable arguments and critique the reasoning of others.
MP4 Model with mathematics.</td><td>ENDURING UNDERSTANDINGS</td><td>ESSENTIAL QUESTIONS</td></tr>
<tr><td>The message conveyed by the data depends on how the data is collected, represented, and summarized.</td><td>How can the collection, organization, interpretation, and display of data be used to answer questions and solve real-world problems?</td></tr>
<tr><td><u>KNOWLEDGE</u>
Students will know:</td><td><u>SKILLS</u>
Students will be able to:</td></tr>
<tr><td>The choice of measures of center and variability depends on the context.

Box-and-whisker plots, dot plots, and histograms are ways to represent data and should be utilized when most appropriate for the given data set.</td><td>Summarize numerical data by 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.

Construct a histogram and dot plot, displaying the frequency of the data.

Construct a box and whisker plot using 5-number summary (minimum, Q1, Q2, Q3, maximum).</td></tr>
</table>

MP5 Use appropriate tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning. **NJ 2016 SLS: Literacy in History, Social Studies, & Technical Subjects** RH.6-8.7: Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts. RST.6-8.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 6-8 texts and topics*. **NJ 2020 SLS: Career Readiness, Life Literacies, and Key Skills** 9.4.8.TL.1: Construct a spreadsheet in order to analyze multiple data sets, identify relationships, and facilitate data-based decision-making. 8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose.	**VOCABULARY:** outlier, data table, histogram, tally marks, skewed, symmetrical, range **KEY TERMS:** stem-and-leaf plot, frequency, stem, leaf, box-and-whisker plot, frequency table, five-number summary, dot plot	

ASSESSMENT EVIDENCE: Students will show their learning by:

- Creating a statistical question to collect and display data (histogram, box-and-whisker, dot plot, stem-and-leaf plot)
- Demonstrating understanding of key concepts by successfully completing a summative assessment at the culmination of the unit

KEY LEARNING EVENTS AND INSTRUCTION:

- Teacher-led demonstration
- Student-led modeling
- Differentiated station activities
- Small-group instruction
- Collect, analyze, and display data from student-created statistical question

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

SUGGESTED TIME ALLOTMENT	**3 weeks**
SUPPLEMENTAL UNIT RESOURCES	**Required Resources:** • Math in Focus Singapore Math: Course 1A (https://my.hrw.com/) **Suggested Resources:** • Khan Academy Videos www.khanacademy.com • Kahoot www.kahoot.com • Quizziz zww.quizziz.com • Interactive Math Practice – Illustrative Mathematics www.illustrativemathematics.org • Interactive Math Practice - IXL www.ixl.com • Big Ideas Math www.bigideasmath.com • NJ Model Curriculum https://www.nj.gov/education/modelcurriculum/math/ • ScootPad www.scootpad.com

Randolph Township Schools
Randolph Middle School
Grade 6 Mathematics Curriculum

APPENDIX A

Ratios and Proportional Reasoning

Math Menu

Directions: Ratio Restaurant is having special where you receive an appetizer, two entrees, and a dessert for $20. You must complete tasks in the ratio of 1: 2: 1 for appetizers, entrees, and desserts in order to receive the special. Read each task or question carefully. Use the answer sheet provided for your and: **Show all work!!!**

Appetizer	Entree	Dessert
You buy a video game that costs $60. There is a sales tax of 7%. How much did you spend in total?	A truck traveled from Town A to Town B. The truck took 3 hours to travel from Town A to Town B at an average speed of 68 kilometers per hour. What is the distance between Town A and Town B?	A machine can stamp 75 caps per minute. At this rate, how long will it take to stamp 3,000 caps?
The Candy Shoppe is having a sale. You get 25% off when you buy 5 pounds of candy. I spent $25 for 5 pounds. How much does the candy usually cost per pound?	A sum of money was shared among Daniel, Elliot, and Frank in the ratio of 5: 7: 8. If Frank's share was $2,781 more than Daniel's share, what was the original sum of money shared among the three men?	On Saturday, Aaron spent $108. On Sunday, he spent $54 more than what he spent on Saturday. Find the ratio of Aaron's spending on Saturday to his spending on both Saturday and Sunday. Give your answer in simplest form.
In Miss Stake's LA class, there are 30 students. 20% of them wear glasses. 10% of the remaining students wear contacts. How many wear contacts?	The distance between School A and School B is 360 kilometers. If a bus leaves School A at 9:30am and reaches School B at 2:30pm, what is its speed in kilometers per hour?	A dalmatian weighs 72 pounds. A bullmastiff is 24 pounds heavier than the dalmatian. A bulldog is 12 pounds lighter than the bullmastiff. Find the ratio of the bulldog's weight to the dalmatian's weight. Give your answer in simplest form.
72% of April is rainy. What is that as a fraction in simplest form and a decimal?	140% of a number is 364. Find the number.	Mrs. Jackson gave a sum of money to her son and daughter in the ratio 8: 9. Her daughter received $3,060. How much did Mrs. Jackson give to her two children in all?