# Winslow Township School District
## Mathematics Curriculum – Grade 6
## Unit 4

| Overview | Standards for Mathematical Content | Unit Focus | Standards for Mathematical Practice |
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| **Unit 4**<br><br>**Variability, Distributions, and Relationships between Quantities** | ● 6.EE.C.9<br>● 6.SP.A.1<br>● 6.SP.A.2<br>● 6.SP.A.3<br>● 6.SP.B.4<br>● 6.SP.B.5<br>● 6.RP.A.3*<br>● 6.NS.C.8* | ● Represent and analyze quantitative relationships between dependent and independent variables<br>● Develop understanding of statistical variability<br>● Summarize and describe distributions<br>● Understand ratio concepts and use ratio reasoning to solve problems<br>● Apply and extend previous understandings of numbers to the system of rational numbers | MP.1 Make sense of problems and persevere in solving them.<br><br>MP.2 Reason abstractly and quantitatively.<br><br>MP.3 Construct viable arguments and critique the reasoning of others.<br><br>MP.4 Model with mathematics.<br><br>MP.5 Use appropriate tools strategically.<br><br>MP.6 Attend to precision.<br><br>MP.7 Look for and make use of structure.<br><br>MP.8 Look for and express regularity in repeated reasoning. |
| **Unit 4:**<br>**Suggested Open Educational Resources** | 6.EE.C.9 Families of Triangles<br>6.SP.A.1 Identifying Statistical Questions<br>6.SP.A.2, 6.SP.B.4 Puppy Weights<br>6.SP.A.3 Is It Center or Is It Variability?<br>6.SP.B.5c Number of Siblings<br>6.SP.B.5d Mean or Median? | | |

Major Supporting Additional (Identified by PARCC Model Content Frameworks).

# Winslow Township School District
## Mathematics Curriculum – Grade 6
### Unit 4

| Curriculum Unit 4 | Standards | | Pacing | |
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| | | | Days | Unit Days |
| **Unit 4**<br><br>**Variability, Distributions, and Relationships between Quantities** | ● 6.EE.C.9 | Write an equation using two variables (independent and dependent) to represent two quantities that change in relationship to one another in a real world problem<br>Analyze the relationship between the dependent and independent variables and relate the equation to a given graph and to its table of values. | 8 | 45 |
| | ● 6.SP.A.1 | Distinguish questions that are statistical (anticipate variability in data) from those that are not.5 | 5 | |
| | ● 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. | 4 | |
| | ● 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. | 5 | |
| | ● 6.SP.B.4 | Display numerical data in plots on a number line, including dot plots, histograms, and box plots. | 4 | |
| | ● 6.SP.B.5 | Summarize numerical data in relation to their context by identifying the number of observations and describing how the data was measured.<br>Calculate, and interpret measures of center (mean and median) and variability (interquartile range and mean absolute deviation); report measures of center and variability appropriate to the shape of the distribution and context. | 5 | |
| | ● 6.RP.A.3* | Create and complete tables of equivalent ratios to sole real world and mathematical problems using ratio and rate reasoning that include making tables of equivalent ratios, solving unit rate problems, finding percent of a quantity as a rate per 100. | 4 | |
| | ● 6.NS.C.8* | Solve real world and mathematical problems by graphing points in all four quadrants of the coordinate plane; use the absolute value of the differences of their coordinates to find distances between points with the same first coordinate or same second coordinate. | 5 | |
| | Assessment, Re-teach and Extension | | 5 | |

| Unit 4 Grade 6 | | |
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| **Content Standards** | **Suggested Standards for Mathematical Practice** | **Critical Knowledge & Skills** |
| • 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. *For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.* | MP.2 Reason abstractly and quantitatively.<br><br>MP.4 Model with mathematics.<br><br>MP.6 Attend to precision. | Concept(s):<br><br>• Two quantities that change in relationship to one another may be represented with an equation in two variables, with a graph, and with a table of values.<br>Students are able to:<br><br>• represent two quantities that related to one another, with variables.<br>• write an equation in two variables.<br>• distinguish the dependent variable from the independent variable.<br>• analyze a given graph and table of values, and relate them to the equation.<br><br><br>Learning Goal 1: Write an equation using two variables (independent and dependent) to represent two quantities that change in relationship to one another in a real world problem.<br><br>Learning Goal 2: Analyze the relationship between the dependent and independent variables and relate the equation to a given graph and to its table of values. |

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| ● **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.<br>*For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.* | MP.2 Reason abstractly and quantitatively.<br><br>MP.6 Attend to precision | Concept(s):<br><br>● Variability/Variation<br>● A statistical question is one that anticipates variability in the data that is related to the question.<br>Students are able to:<br><br>● distinguish questions that are statistical (anticipate variability in data) from those that are not.<br><br>Learning Goal 3: Distinguish questions that are statistical (anticipate variability in data) from those that are not. |
| ● **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.<br>● **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.<br>● **6.SP.B.4.** Display numerical data in plots on a number line, including dot plots, histograms, and box plots. | MP.4 Model with mathematics. | Concept(s):<br><br>● A data set has a distribution which can be described by its center, spread, and overall shape.<br>● A measure of center summarizes, with a single number, the values of an entire data set.<br>● A measure of variation describes, with a single number, how the values of a data set vary.<br>Students are able to:<br><br>● distinguish center from variation.<br>● display numerical data in dot plots on a number line.<br>● display numerical data in histograms on a number line.<br>● display numerical data in box plots on a number line.<br><br>Learning Goal 4: Display numerical data in plots on the number line (including dot plots, histograms, and box plots) and summarize in relation to their context. |

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| ● 6.SP.B.5. Summarize numerical data sets in relation to their context, such as by: 6.SP.B.5a. Reporting the number of observations.<br><br>6.SP.B.5b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.<br><br>6.SP.B.5c. 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.<br><br>6.SP.B.5d. 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. | MP.2 Reason abstractly and quantitatively.<br><br>MP.4 Model with mathematics.<br><br>MP.5 Use appropriate tools strategically. | Concept(s): No new concept(s) introduced<br><br>Students are able to:<br><br>● determine the number of observations of a data set.<br>● describe the data in context, including how it was measured and the units of measurement.<br>● calculate measures of center, mean and median.<br>● calculate measures of spread, interquartile range and mean absolute deviation.<br>● describe the overall shape of a distribution (skewed left, skewed right, etc).<br>● identify striking deviations (outliers).<br>● choose measures of center and variability appropriate to the shape of the distribution and context.<br><br>Learning Goal 5: Summarize numerical data in relation to their context by identifying the number of observations and describing how the data was measured.<br><br>Learning Goal 6: Calculate, and interpret measures of center (mean and median) and variability (interquartile range and mean absolute deviation); report measures of center and variability appropriate to the shape of the distribution and context. |

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| ● 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.<br><br>*(benchmarked)*<br><br>6.RP.A.3a. 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.<br><br>6.RP.A.3b. Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?*<br><br>6.RP.A.3c. 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.<br><br>6.RP.A.3d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. | MP.2 Reason abstractly and quantitatively.<br><br>MP.4 Model with mathematics.<br><br>MP.5 Use appropriate tools strategically<br><br>MP.6 Attend to precision.<br><br>MP.7 Look for and make use of structure.<br><br>MP.8 Look for and express regularity in repeated reasoning | Concept(s): No new concept(s) introduced<br><br>Students are able to:<br><br>● use ratio and rate reasoning to create tables of equivalent ratios relating quantities with *whole number* measurements, find missing values in tables and plot pairs of values.<br>● compare ratios using tables of equivalent ratios.<br>● solve real world and mathematical problems involving unit rate (including unit price and constant speed).<br>● calculate a percent of a quantity and solve problems by finding the whole when given the part and the percent.<br>● convert measurement units using ratio reasoning.<br>● transform units appropriately when multiplying and dividing quantities.<br><br>Learning Goal 7*:* Create and complete tables of equivalent ratios to sole real world and mathematical problems using ratio and rate reasoning that include making tables of equivalent ratios, solving unit rate problems, finding percent of a quantity as a rate per 100.<br><br>Learning Goal 8: Use ratio and rate reasoning to convert measurement units and to transform units appropriately when multiplying or dividing quantities. |

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| ● <mark>6.NS.C.8.</mark> 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. | MP.1 Make sense of problems and persevere in solving them.<br><br>MP.2 Reason abstractly and quantitatively.<br><br>MP.5 Use appropriate tools strategically. | Concept(s): No new concept(s) introduced<br><br>Students are able to:<br><br>● graph points in all four quadrants of the coordinate plane in order to solve real-world and mathematical problems.<br>● draw polygons in the coordinate plane.<br>● use absolute value to find distances between points with the same first coordinate or the same second coordinate.<br>● use coordinates to solve real-world distance, perimeter, and area problems.<br><br>Learning Goal 9: Solve real world and mathematical problems by graphing points in all four quadrants of the coordinate plane; use the absolute value of the differences of their coordinates to find distances between points with the same first coordinate or same second coordinate. |

| Unit 4 Grade 6 | |
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| **School/District Formative Assessment Plan** | **School/District Summative Assessment Plan** |
| Pre-Assessment, Quizzes<br>Exit Tickets<br>Daily Monitoring | Chapter Tests<br>LinkIt! |

| Focus Mathematical Concepts |
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| **Prerequisite skills:**<br>**Achieve the Core Coherence Map**<br>**https://achievethecore.org/coherence-map/**<br><br>Standards:<br>**6.EE.C.9**:    5.OA.3<br>**6.SP.A.1:**    5.MD.2<br>**6.SP.A.2**    5.MD.2<br>**6.SP.A.3:**     6.SP.A.1, 6.SP.A.2<br>**6.SP.B.4:**    4.MD.4,  5.MD.2<br>**6.SP.B.5:**    6.MD.3<br>**6.RP.A.3:**    5.OA.3<br>**6.NS.C.8:**    5.G.2 |

**Common Misconceptions:**

**6.EE.C.9**

Students may misunderstand what the graph represents in context. For example, that moving up or down on a graph does not necessarily mean that a person is moving up or down.

**6.SP.A.1 -6.SP.A.3** Students may believe all graphical displays are symmetrical. Exposing students to graphs of various shapes will show this to be false.

Students may not understand that the value of a measure of center describes the data, rather than a value used to interpret and describe the data.

Students will sometimes confuse how to describe skew. When the graph displays a large 'hump' (larger frequency of data) on the left hand side of the graph and the 'tail' (smaller frequency of data) is to the right, the skew is to the right. Students will try to describe the skew by looking at the larger frequency rather than the location of the tail.

Students will sometimes miscalculate the mean by forgetting to divide. This is usually because of a lack of understanding behind the meaning of this measure so they are unable to check the reasonability of their answer.

When finding the upper and lower quartiles in box plots, students will use median of the data set. They should use the data point to the left of the median to find the lower quartile and the data point to the right of the median to find the upper quartile.

**Number Fluency:**

**6.NS.2** Students fluently divide multi-digit numbers using the standard algorithm. This is the culminating standard for several years' worth of work with division of whole numbers.

**6.NS.3** Students fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

**Fluency Support for Grades 6-8**

**https://www.engageny.org/resource/mathematics-fluency-support-grades-6-8**

| District/School Tasks | District/School Primary and Supplementary Resources and Technology Integration |
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| **PARCC Released Items**<br>http://www.parcc-assessment.org/released-items<br><br>**NJDOE Digital Item Library**<br>https://nj.digitalitemlibrary.com/home<br><br>**NJSLA Mathematics Evidence Statements**<br>https://docs.google.com/spreadsheets/d/18M5r1jk4P729fTpAlWAzrw1gE6tken233I-Yk0U712M/edit#gid=554025491<br><br>**LinkIt! Form A, B, & C** | Text – Go Math<br><br>**Link it/Go Math!:**<br>**https://www.k6.thinkcentral.com/ePC/start.do**<br>**GoMath Personal Math Trainer**<br><br>**Fluency Support for Grades 6-8**<br>**https://www.engageny.org/resource/mathematics-fluency-support-grades-6-8**<br><br>**Moby Max:**<br>https://www.mobymax.com/signin<br><br>**6th grade Flip Book:**<br>http://community.ksde.org/Default.aspx?tabid=5646<br><br>**North Carolina Dept of Ed. Wikispaces:**<br>http://maccss.ncdpi.wikispaces.net/Middle+School<br><br>**PARCC Math Resources**<br>http://www.parcc-assessment.org/assessments/test-design/mathematics/math-test-specifications-documents<br><br>**101 Math Discourse Questions:**<br>http://www.casamples.com/downloads/100MathDiscourseQuestions_Printable.pdf<br><br>**Asking Effective Questions**<br>http://www.edu.gov.on.ca/eng/literacynumeracy/inspire/research/CBS_AskingEffectiveQuestions.pdf |

| Instructional Best Practices and Exemplars | |
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| 1. Identifying similarities and differences<br>2. Summarizing and note taking<br>3. Reinforcing effort and providing recognition<br>4. Homework and practice<br>5. Nonlinguistic representations | 6. Cooperative learning<br>7. Setting objectives and providing feedback<br>8. Generating and testing hypotheses<br>9. Cues, questions, and advance organizers<br>10. Manage response rates |

| Vocabulary | |
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| 6.EE.C.9<br>**Represent and analyze quantitative relationships between dependent and independent variables.**<br>dependent variables, independent variables, discrete data, continuous data<br><br>6.SP.A.1, 2, & 3<br>**Develop understanding of statistical variability.**<br>statistics, data, variability, distribution, dot plot, histograms, box plots, median, mean<br><br>6.SP.B.4 & 5<br>**Summarize and describe distributions.**<br>this cluster are: box plots, dot plots, histograms, frequency tables, cluster, peak, gap, mean, median, interquartile range, measures of center, measures of variability, data, Mean Absolute Deviation (M.A.D.), quartiles, lower quartile (1st quartile or Q1), upper quartile (3rd quartile or Q3), symmetrical, skewed, summary statistics, outlier | 6.RP.A.3<br>**Understand ratio concepts and use ratio reasoning to solve problems.**<br>ratio, equivalent ratios, tape diagram, unit rate, part-to-part, part-to-whole, percent<br><br>6.NS.C.8<br>**Apply and extend previous understanding of numbers to the system of rational numbers.**<br>rational numbers, opposites, absolute value, greater than, >, less than, <, greater than or equal to, ≥, less than or equal to, ≤, origin, quadrants, coordinate plane, ordered pairs, *x*-axis, *y*-axis, coordinates |

| 9.1 Personal Financial Literacy, 9.2 Career Awareness, Exploration, Preparation and Training & 9.4 Life Literacies and Key Skills |
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| 9.1.8.CR.2: Compare various ways to give back through strengths, passions, goals, and other personal factors. |
| 9.1.8.EG.5: Interpret how changing economic and societal needs influence employment trends and future education. |
| 9.1.8.EG.7: Explain the effect of the economy (e.g., inflation, unemployment) on personal income, individual and family security, and consumer decisions. |
| 9.1.8.EG.8: Analyze the impact of currency rates over a period of time and the impact on trade, employment, and income. |
| 9.1.8.FI.3: Evaluate the most appropriate financial institutions to assist with meeting various personal financial needs and goals. |
| 9.1.8.RM.1: Determine criteria for deciding the amount of insurance protection needed. |
| 9.2.8.CAP.3: Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income. |
| 9.2.8.CAP.6: Compare the costs of postsecondary education with the potential increase in income from a career of choice. |
| 9.2.8.CAP.14: Evaluate sources of income and alternative resources to accurately compare employment options. |
| 9.2.8.CAP.15: Present how the demand for certain skills, the job market, and credentials can determine an individual's earning power. |
| 9.4.8.CI.1: Assess data gathered on varying perspectives on causes of climate change (e.g., cross- cultural, gender-specific, generational), and determine how the data can best be used to design multiple potential solutions (e.g., RI.7.9, 6.SP.B.5, 7.1.NH.IPERS.6, 8.2.8.ETW.4). |
| 9.4.8.CT.1: Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2). |
| 9.4.8.CT.3: Compare past problem-solving solutions to local, national, or global issues and analyze the factors that led to a positive or negative outcome. |
| 9.4.8.IML.3: Create a digital visualization that effectively communicates a data set using formatting techniques such as form, position, size, color, movement, and spatial grouping (e.g., 6.SP.B.4, 7.SP.B.8b). |
| 9.4.8.IML.5: Analyze and interpret local or public data sets to summarize and effectively communicate the data. |
| 9.4.8.TL.1: Construct a spreadsheet in order to analyze multiple data sets, identify relationships, and facilitate data-based decision-making. |
| 9.4.8.TL.2: Gather data and digitally represent information to communicate a real-world problem (e.g., MS-ESS3-4, 6.1.8.EconET.1, 6.1.8.CivicsPR.4). |
| The implementation of the 21st Century skills and standards for students of the Winslow Township District is infused in an interdisciplinary format in a variety of curriculum areas that include, English language Arts, Mathematics, School Guidance, Social Studies, Technology, Visual and Performing Arts, Science, Physical Education and Health, and World Language.: Additional opportunities to address 9.1, 9.2 & 9.4: |
| **Philadelphia Mint** |
| https://www.usmint.gov/learn/kids/resources/educational-standards |
| **Different ways to teach Financial Literacy.** |
| https://www.makeuseof.com/tag/10-interactive-financial-websites-teach-kids-money-management-skills/ |

| Suggested Modifications for Special Education/504 |
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Students with special needs: The students' needs will be addressed on an individual and grade level using a variety of modalities. Accommodations will be made for those students who need extra time to complete assignments.  Support staff will be available to aid students related to IEP specifications. 504 accommodations will also be attended to by all instructional leaders. Physical expectations and modifications, alternative assessments, and scaffolding strategies will be used to support this learning. The use of Universal Design for Learning (UDL) will be considered for all students as teaching strategies are considered.

☐ Provide the opportunity to re-take tests

☐ Modify activities/assignments/projects/assessments

☐ Breakdown activities/assignments/projects/assessments into manageable units

☐ Additional time to complete activities/assignments/projects/assessments

☐ Provide an option for alternative activities/assignments/projects/assessments

☐ Modify Content

☐ Modify Amount

☐ Small Group Intervention/Remediation

☐ Individual Intervention/Remediation

☐ Additional Support Materials

☐ Guided Notes

☐ Graphic Organizers

☐ Adjust Pacing of Content

☐ Increase one on one time

☐  Peer Support

☐ Other Modifications for Special Education:
- Think Central Online Resources:
  - Reteach
  - Strategic Intervention
  - Intensive Intervention Skill Pack
  - Response to Intervention Activities

| Suggested Modifications for At-Risk Students |
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Formative and summative data will be used to monitor student success. At first signs of failure, student work will be reviewed to determine support. This may include parent consultation, basic skills review and differentiation strategies. With considerations to UDL, time may be a factor in overcoming developmental considerations

☐ Provide the opportunity to re-take tests
☐ Increase one on one time
☐ Oral prompts can be given
☐ Using visual demonstrations, illustrations, and models
☐ Give directions/instructions verbally and in simple written format
☐ Peer Support
☐ Modify activities/assignments/projects/assessments
☐ Additional time to complete activities/assignments/projects/assessments
☐ Provide an option for alternative activities/assignments/projects/assessments

☐ Modify Content
☐ Modify Amount
☐ Adjust Pacing of Content
☐ Small Group Intervention/Remediation
☐ Individual Intervention/Remediation
☐ Additional Support Materials
☐ Guided Notes
☐ Graphic Organizers
☐ Other Modifications for Students At-Risk:
  - Think Central Online Resources:
    - Reteach
    - Strategic Intervention
    - Intensive Intervention Skill Pack
    - Response to Intervention Activities

| English Language Learners | Suggested Modifications for Gifted Students |
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| All WIDA Can Do Descriptors can be found at this link: https://wida.wisc.edu/teach/can-do/descriptors <br> ☐ Grades 6-8 WIDA Can Do Descriptors: <br> ☐ Listening ☐ Speaking <br> ☐ Reading ☐ Writing <br> ☐ Oral Language <br> Students will be provided with accommodations and modifications that may include: <br> • Relate to and identify commonalities in mathematics studies in student's home country <br> • Assist with organization <br> • Use of computer <br> • Emphasize/highlight key concepts <br> • Teacher Modeling <br> • Peer Modeling <br> • Label Classroom Materials - Word Walls | Students excelling in mastery of standards will be challenged with complex, high level challenges related to the topic. <br> • Raise levels of intellectual demands <br> • Require higher order thinking, communication, and leadership skills <br> • Differentiate content, process, or product according to student's readiness, interests, and/or learning styles <br> • Provide higher level texts <br> • Expand use of open-ended, abstract questions <br> • Critical and creative thinking activities that provide an emphasis on research and in-depth study <br> • Enrichment Activities/Project-Based Learning/ Independent Study <br> Additional Strategies may be located at the links: <br> ❖ Gifted Programming Standards <br> ❖ Webb's Depth of Knowledge Levels and/or Revised Bloom's Taxonomy <br> ❖ REVISED Bloom's Taxonomy  Action Verbs |

| Suggested Activities | |
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| ☐ Do Now/Warm-Up <br> ☐ Whole Group <br> ☐ Small Groups <br> ☐ Guided Practice <br> ☐ Independent Practice <br> ☐ Daily 5 | ☐ CAFÉ <br> ☐ Centers <br> ☐ Intervention/Remediation <br> ☐ Projects <br> ☐Academic Games <br> ☐ Other Suggested Activities: |

| Interdisciplinary Connections |
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| Go Math Grab and Go! Activities (Reading, Science, Math, Social Studies) |
| Go Math Real World Project: Big Idea, Geometry and Statistics (Math, Reading, Writing, Science, Social Studies) |
| Go Math Cross-Curricular Science and Social Studies questions, experiments, and activities embedded throughout the chapter. |

| Integration of Computer Science and Design Thinking NJSLS 8 |
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| 8.1.8.NI.2: Model the role of protocols in transmitting data across networks and the Internet and how they enable secure and errorless communication. <br> 8.1.8.NI.3: Explain how network security depends on a combination of hardware, software, and practices that control access to data and systems. <br> 8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose. |