MATHEMATICS

Grade 6: Unit 3
Equations, the Rational Number and System and 2-D Geometry
Course Philosophy/Description

In mathematics, students will learn to address a range of tasks focusing on the application of concepts, skills and understandings. Students will be asked to solve problems involving the key knowledge and skills for their grade level as identified by the NJSLs; express mathematical reasoning and construct a mathematical argument and apply concepts to solve model real world problems. The balanced math instructional model will be used as the basis for all mathematics instruction.

Sixth Grade Mathematics consists of the following domains: Ratios and Proportional Relationships (RP), The Number System (NS), Expressions and Equations (EE), Geometry (G), and Statistics and Probability (SP). In sixth grade, instructional time should focus on four critical areas: (1) connecting ratio and rate to whole number multiplication and division and using concepts of ratio and rate to solve problems; (2) completing understanding of division of fractions and extending the notion of number to the system of rational numbers, which includes negative numbers; (3) writing, interpreting, and using expressions and equations; and (4) developing understanding of statistical thinking.

1) Students use reasoning about multiplication and division to solve ratio and rate problems about quantities. By viewing equivalent ratios and rates as deriving from, and extending, pairs of rows (or columns) in the multiplication table, and by analyzing simple drawings that indicate the relative size of quantities, students connect their understanding of multiplication and division with ratios and rates. Thus students expand the scope of problems for which they can use multiplication and division to solve problems, and they connect ratios and fractions. Students solve a wide variety of problems involving ratios and rates.

2) Students use the meaning of fractions, the meanings of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for dividing fractions make sense. Students use these operations to solve problems. Students extend their previous understandings of number and the ordering of numbers to the full system of rational numbers, which includes negative rational numbers, and in particular negative integers. They reason about the order and absolute value of rational numbers and about the location of points in all four quadrants of the coordinate plane.

3) Students understand the use of variables in mathematical expressions. They write expressions and equations that correspond to given situations, evaluate expressions, and use expressions and formulas to solve problems. Students understand that expressions in different forms can be equivalent, and they use the properties of operations to rewrite expressions in equivalent forms. Students know that the solutions of an equation are the values of the variables that make the equation true. Students use properties of operations and the idea of maintaining the equality of both sides of an equation to solve simple one-step equations. Students construct and analyze tables, such as tables of quantities that are in equivalent ratios, and they use equations (such as $3x = y$) to describe relationships between quantities.

4) Building on and reinforcing their understanding of number, students begin to develop their ability to think statistically. Students recognize that a data distribution may not have a definite center and that different ways to measure center yield different values. The median measures center in the sense that it is roughly the middle value. The mean measures center in the sense that it is the value that each data point would take on if the total of the data values were redistributed equally, and also in the sense that it is a balance point. Students recognize that a measure of variability (interquartile range or mean absolute deviation) can also be useful for summarizing data because two very different sets of data can have the same mean and median yet be distinguished by their variability.
Students learn to describe and summarize numerical data sets, identifying clusters, peaks, gaps, and symmetry, considering the context in which the data were collected. Students in Grade 6 also build on their work with area in elementary school by reasoning about relationships among shapes to determine area, surface area, and volume. They find areas of right triangles, other triangles, and special quadrilaterals by decomposing these shapes, rearranging or removing pieces, and relating the shapes to rectangles. Using these methods, students discuss, develop, and justify formulas for areas of triangles and parallelograms. Students find areas of polygons and surface areas of prisms and pyramids by decomposing them into pieces whose area they can determine. They reason about right rectangular prisms with fractional side lengths to extend formulas for the volume of a right rectangular prism to fractional side lengths. They prepare for work on scale drawings and constructions in Grade 7 by drawing polygons in the coordinate plane.
This ESL framework was designed to be used by bilingual, dual language, ESL and general education teachers. Bilingual and dual language programs use the home language and a second language for instruction. ESL teachers and general education or bilingual teachers may use this document to collaborate on unit and lesson planning to decide who will address certain components of the SLO and language objective. ESL teachers may use the appropriate leveled language objective to build lessons for ELLs which reflects what is covered in the general education program. In this way, whether it is a pull-out or push-in model, all teachers are working on the same Student Learning Objective connected to the New Jersey Student Learning Standards. The design of language objectives are based on the alignment of the World-Class Instructional Design Assessment (WIDA) Consortium’s English Language Development (ELD) standards with the New Jersey Student Learning Standards (NJSLS). WIDA’s ELD standards advance academic language development across content areas ultimately leading to academic achievement for English learners. As English learners are progressing through the six developmental linguistic stages, this framework will assist all teachers who work with English learners to appropriately identify the language needed to meet the requirements of the content standard. At the same time, the language objectives recognize the cognitive demand required to complete educational tasks. Even though listening and reading (receptive) skills differ from speaking and writing (expressive) skills across proficiency levels the cognitive function should not be diminished. For example, an Entering Level One student only has the linguistic ability to respond in single words in English with significant support from their home language. However, they could complete a Venn diagram with single words which demonstrates that they understand how the elements compare and contrast with each other or they could respond with the support of their home language (L1) with assistance from a teacher, para-professional, peer or a technology program.

http://www.state.nj.us/education/modelcurriculum/ela/ELLOverview.pdf
<table>
<thead>
<tr>
<th>#</th>
<th>Student Learning Objective</th>
<th>NJSLS</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Use substitution to determine whether a given number makes an equation or inequality true. Use variables to represent numbers and write expressions when solving real world or mathematical problems.</td>
<td>6.EE.B.5, 6.EE.B.6</td>
</tr>
<tr>
<td>2</td>
<td>Solve real world problems by writing and solving equations of the form $x + p = q$ and $px = q$ ($p$, $q$, and $x$ are non-negative rational numbers).</td>
<td>6.EE.B.7</td>
</tr>
<tr>
<td>3</td>
<td>Use positive and negative numbers to represent quantities in real-world situations, explaining the meaning of zero in the context of the real-world situation.</td>
<td>6.NS.C.5</td>
</tr>
<tr>
<td>4</td>
<td>Locate rational numbers and their opposites on horizontal and vertical number line; explain their relation of the opposites to zero.</td>
<td>6.NS.C.6a, c</td>
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<tr>
<td>5</td>
<td>Plot pairs of positive and negative rational numbers in the coordinate plane; describe two ordered pairs that differ only by signs as reflections across one or both axes.</td>
<td>6.NS.C.6b, c</td>
</tr>
<tr>
<td>6</td>
<td>Use statements of inequality to determine relative positions of two rational numbers on a number line; write and explain statements of order for rational numbers in real-world contexts.</td>
<td>6.NS.C.7a, b</td>
</tr>
<tr>
<td>7</td>
<td>Explain the meaning of absolute value of a rational number as distance from zero on the number line and as magnitude for a positive or negative quantity in a real-world situation.</td>
<td>6.NS.C.7c, d</td>
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<tr>
<td>8</td>
<td>Write an inequality of the form $x &gt; c$ or $x &lt; c$ to represent a constraint or condition in a real world or mathematical problem and represent them on a number line.</td>
<td>6.EE.B.8</td>
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<tr>
<td>9</td>
<td>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.</td>
<td>6.NS.C.8*, 6.G.A.3</td>
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<tr>
<td>10</td>
<td>Find the area of right triangles, other triangles, special quadrilaterals and polygons by composing into rectangles or decomposing into triangles.</td>
<td>6.G.A.1</td>
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</tbody>
</table>

Instruction: 8 weeks
Assessment: 1 week
Research about Teaching and Learning Mathematics

Structure teaching of mathematical concepts and skills around problems to be solved (Checkly, 1997; Wood & Sellars, 1996; Wood & Sellars, 1997)

Encourage students to work cooperatively with others (Johnson & Johnson, 1975; Davidson, 1990)

Use group problem-solving to stimulate students to apply their mathematical thinking skills (Artzt & Armour-Thomas, 1992)

Students interact in ways that support and challenge one another’s strategic thinking (Artzt, Armour-Thomas, & Curcio, 2008)

Activities structured in ways allowing students to explore, explain, extend, and evaluate their progress (National Research Council, 1999)

There are three critical components to effective mathematics instruction (Shellard & Moyer, 2002):

- Teaching for conceptual understanding
- Developing children’s procedural literacy
- Promoting strategic competence through meaningful problem-solving investigations

Teachers should be:

- Demonstrating acceptance and recognition of students’ divergent ideas
- Challenging students to think deeply about the problems they are solving, extending thinking beyond the solutions and algorithms required to solve the problem
- Influencing learning by asking challenging and interesting questions to accelerate students’ innate inquisitiveness and foster them to examine concepts further
- Projecting a positive attitude about mathematics and about students’ ability to “do” mathematics

Students should be:

- Actively engaging in “doing” mathematics
- Solving challenging problems
- Investigating meaningful real-world problems
- Making interdisciplinary connections
- Developing an understanding of mathematical knowledge required to “do” mathematics and connect the language of mathematical ideas with numerical representations
- Sharing mathematical ideas, discussing mathematics with one another, refining and critiquing each other’s ideas and understandings
- Communicating in pairs, small group, or whole group presentations
- Using multiple representations to communicate mathematical ideas
- Using connections between pictures, oral language, written symbols, manipulative models, and real-world situations
- Using technological resources and other 21st century skills to support and enhance mathematical understanding
Mathematics is not a stagnate field of textbook problems; rather, it is a dynamic way of constructing meaning about the world around us, generating knowledge and understanding about the real world every day. Students should be metaphorically rolling up their sleeves and “doing mathematics” themselves, not watching others do mathematics for them or in front of them. (Protheroe, 2007)

When balanced math is used in the classroom it provides students opportunities to:

- solve problems
- make connections between math concepts and real-life situations
- communicate mathematical ideas (orally, visually and in writing)
- choose appropriate materials to solve problems
- reflect and monitor their own understanding of the math concepts
- practice strategies to build procedural and conceptual confidence

Teacher builds conceptual understanding by modeling through demonstration, explicit instruction, and think alouds, as well as guiding students as they practice math strategies and apply problem solving strategies. (whole group or small group instruction)

Teacher and students practice mathematics processes together through interactive activities, problem solving, and discussion. (whole group or small group instruction)

Students practice math strategies independently to build procedural and computational fluency. Teacher assesses learning and reteaches as necessary. (whole group instruction, small group instruction, or centers)
<table>
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<tr>
<th>Effective Pedagogical Routines/Instructional Strategies</th>
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<td><strong>Collaborative Problem Solving</strong></td>
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<td>Connect Previous Knowledge to New Learning</td>
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<td>Making Thinking Visible</td>
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<td><strong>Develop and Demonstrate Mathematical Practices</strong></td>
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<td>Inquiry-Oriented and Exploratory Approach</td>
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<td>Multiple Solution Paths and Strategies</td>
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<tr>
<td>Use of Multiple Representations</td>
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<td>Explain the Rationale of your Math Work</td>
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<td>Quick Writes</td>
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<td>Pair/Trio Sharing</td>
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<td>Turn and Talk</td>
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<td>Charting</td>
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<td>Gallery Walks</td>
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<td>Small Group and Whole Class Discussions</td>
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<td>Student Modeling</td>
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<td><strong>Analyze Student Work</strong></td>
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<tr>
<td>Identify Student’s Mathematical Understanding</td>
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<td>Identify Student’s Mathematical Misunderstandings</td>
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<td>Interviews</td>
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<tr>
<td>Role Playing</td>
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<tr>
<td>Diagrams, Charts, Tables, and Graphs</td>
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<td>Anticipate Likely and Possible Student Responses</td>
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<td>Collect Different Student Approaches</td>
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<td>Multiple Response Strategies</td>
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<td>Asking Assessing and Advancing Questions</td>
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<td>Revoicing</td>
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<td>Challenging</td>
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<tr>
<td>Pressing for Accuracy and Reasoning</td>
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<td>Maintain the Cognitive Demand</td>
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### Educational Technology

#### Standards

| 8.1.8.A.1, 8.1.8.A.3, 8.1.8.E.1, 8.2.8.C.8 |

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#### Technology Operations and Concepts
- Demonstrate knowledge of a real world problem using digital tools.
  

- Use and/or develop a simulation that provides an environment to solve a real world problem or theory.
  
  **Example:** Students can use [https://www.desmos.com/calculator](https://www.desmos.com/calculator) to plot ordered pairs and describe how the signs of a number change when reflected across one or both axes.

#### Research and Information Fluency
- Effectively use a variety of search tools and filters in professional public databases to find information to solve a real world problem.
  
  **Example:** Students can search through Learnzillion, Imagine Math Facts and other interactive sites for appropriate instructional videos and/or information pertaining to strategies and modeling.

#### Design
- Develop a proposal for a chosen solution that include models (physical, graphical or mathematical) to communicate the solution to peers.
  
  **Example:** Students can create their own shapes on the virtual geoboard and then compose or decompose it into rectangles or triangles. [https://www.mathlearningcenter.org/web-apps/geoboard/](https://www.mathlearningcenter.org/web-apps/geoboard/)
Career Ready Practices

Career Ready Practices describe the career-ready skills that all educators in all content areas should seek to develop in their students. They are practices that have been linked to increase college, career, and life success. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

- **CRP2. Apply appropriate academic and technical skills.**
  Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.

  **Example:** Students will apply prior knowledge when solving real world problems. Students will make sound judgements about the use of specific tools, such as the Cartesian plan and use the tool to explore and deepen the understanding of the concept of plotting pairs of positive and negative rational numbers.

- **CRP4. Communicate clearly and effectively and with reason.**
  Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others’ time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.

  **Example:** Students on a daily basis will communicate their reasoning behind their solution paths by making connections to the context and the quantities, using proper vocabulary, along with decontextualizing and/or contextualizing the problem. Students will create representations using objects, drawings, diagrams, and/or actions, such as horizontal and vertical number lines to locate rational numbers and their opposites. They will also explain the meaning behind the quantities and units involved. Students will also ask probing questions to clarify and improve arguments.

- **CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.**
  Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.
Career Ready Practices

Example: Throughout their daily lessons, students will understand the meaning of a problem and look for entry points into solving their problems by analyzing the relationships of the quantities, constraints and goals of the task. Plans for solution paths will be made and have meaning. Students will self-monitor, evaluate and critique their process and progress as they are working and make changes as necessary.

- **CRP12. Work productively in teams while using cultural global competence.**
  Career-ready individuals positively contribute to every team, whether formal or informal. They apply an awareness of cultural difference to avoid barriers to productive and positive interaction. They find ways to increase the engagement and contribution of all team members. They plan and facilitate effective team meetings.

  Example: Students will work in collaborative and whole group settings to develop various solutions to math tasks that are presented to them. They will work together to understand the terms of the problem, ask clarifying and challenging questions among each other, and develop agreed upon solutions using a variety of strategies and models. Students will listen to, read and discuss arguments with each other with respect and courtesy at all times and will be willing to assist those that may need assistance. In this unit, students will demonstrate and explain to a peer or small group how to explain the meaning of absolute value of a rational number as distance from zero on the number line and as magnitude for a positive or negative quantity in a real-world situation.
## WIDA Proficiency Levels

At the given level of English language proficiency, English language learners will process, understand, produce or use:

<table>
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<tr>
<th>Level</th>
<th>Characteristics</th>
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</table>
| **6- Reaching** | Specialized or technical language reflective of the content areas at grade level  
- A variety of sentence lengths of varying linguistic complexity in extended oral or written discourse as required by the specified grade level  
- Oral or written communication in English comparable to proficient English peers |
| **5- Bridging** | Specialized or technical language of the content areas  
- A variety of sentence lengths of varying linguistic complexity in extended oral or written discourse, including stories, essays or reports  
- Oral or written language approaching comparability to that of proficient English peers when presented with grade level material. |
| **4- Expanding** | Specific and some technical language of the content areas  
- A variety of sentence lengths of varying linguistic complexity in oral discourse or multiple, related sentences or paragraphs  
- Oral or written language with minimal phonological, syntactic or semantic errors that may impede the communication, but retain much of its meaning, when presented with oral or written connected discourse, with sensory, graphic or interactive support |
| **3- Developing** | General and some specific language of the content areas  
- Expanded sentences in oral interaction or written paragraphs  
- Oral or written language with phonological, syntactic or semantic errors that may impede the communication, but retain much of its meaning, when presented with oral or written, narrative or expository descriptions with sensory, graphic or interactive support |
| **2- Beginning** | General language related to the content area  
- Phrases or short sentences  
- Oral or written language with phonological, syntactic, or semantic errors that often impede of the communication when presented with one to multiple-step commands, directions, or a series of statements with sensory, graphic or interactive support |
| **1- Entering** | Pictorial or graphic representation of the language of the content areas  
- Words, phrases or chunks of language when presented with one-step commands directions, WH-, choice or yes/no questions, or statements with sensory, graphic or interactive support |
## Language Development Supports For English Language Learners To Increase Comprehension and Communication Skills

### Environment
- Welcoming and stress-free
- Respectful of linguistic and cultural diversity
- Honors students' background knowledge
- Sets clear and high expectations
- Includes routines and norms
- Is thinking-focused vs. answer-seeking
- Offers multiple modalities to engage in content learning and to demonstrate understanding
- Includes explicit instruction of specific language targets
- Provides participation techniques to include all learners
- Integrates learning centers and games in a meaningful way
- Provides opportunities to practice and refine receptive and productive skills in English as a new language
- Integrates meaningful and purposeful tasks/activities that:
  - Are accessible by all students through multiple entry points
  - Are relevant to students' lives and cultural experiences
  - Build on prior mathematical learning
  - Demonstrate high cognitive demand
  - Offer multiple strategies for solutions
  - Allow for a language learning experience in addition to content

### Sensory Supports*
- Real-life objects (realia) or concrete objects
- Physical models
- Manipulatives
- Pictures & photographs
- Visual representations or models such as diagrams or drawings
- Videos & films
- Newspapers or magazines
- Gestures
- Physical movements
- Music & songs

### Graphic Supports*
- Graphs
- Charts
- Timelines
- Number lines
- Graphic organizers
- Graphing paper

### Interactive Supports*
- In a whole group
- In a small group
- With a partner such as Turn-and-Talk
- In pairs as a group (first, two pairs work independently, then they form a group of four)
- In triads
- Cooperative learning structures such as Think-Pair-Share
- Interactive websites or software
- With a mentor or coach

### Verbal and Textual Supports
- Labeling
- Students’ native language
- Modeling
- Repetitions
- Paraphrasing
- Summarizing
- Guiding questions
- Clarifying questions
- Probing questions
- Leveled questions such as What? When? Where? How? Why?
- Questioning prompts & cues
- Word Banks
- Sentence starters
- Sentence frames
- Discussion frames
- Talk moves, including Wait Time

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BUILDING EQUITY IN YOUR TEACHING PRACTICE

How do the essential questions highlight the connection between the big ideas of the unit and equity in your teaching practice?

**CONTENT INTEGRATION**
Teachers use examples and content from a variety of cultures & groups.

This unit / lesson is connected to other topics explored with students.

There are multiple viewpoints reflected in the content of this unit / lesson.

The materials and resources are reflective of the diverse identities and experiences of students.

The content affirms students, as well as exposes them to experiences other than their own.

**KNOWLEDGE CONSTRUCTION**
Teachers help students understand how knowledge is created and influenced by cultural assumptions, perspectives & biases.

This unit / lesson provides context to the history of privilege and oppression.

This unit / lesson addresses power relationships.

This unit / lesson help students to develop research and critical thinking skills.

This curriculum creates windows and mirrors* for students.

**PREJUDICE REDUCTION**
Teachers implement lessons and activities to assert positive images of ethnic groups & improve intergroup relations.

This unit / lesson help students question and unpack biases & stereotypes.

This unit / lesson help students examine, research and question information and sources.

The curriculum encourage discussion and understanding about the groups of people being represented.

This unit / lesson challenges dominant perspectives.

**EQUITABLE PEDAGOGY**
Teachers modify techniques and methods to facilitate the academic achievement of students from diverse backgrounds.

The instruction has been modified to meet the needs of each student.

Students feel respected and their cultural identities are valued.

Additional supports have been provided for students to become successful and independent learners.

Opportunities are provided for student to reflect on their learning and provide feedback.

**EMPOWERING SCHOOL CULTURE**
Using the other four dimensions to create a safe and healthy educational environment for all.

There are opportunities for students to connect with the community.

My classroom is welcoming and supportive for all students?

I am aware of and sensitive to the needs of my students and their families.

There are effective parent communication systems established. Parents can talk to me about issues as they arise in my classroom.

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Culturally Relevant Pedagogy Examples

- **Problem-Based Learning Scenarios:** Present relatable real-world problems for your students to solve, explicitly referencing cultures and communities when applicable.  
  **Example:** Provide the students with the depths of the oceans and the elevations of various well-known mountains, including Garrett Mountain. Have students plot the elevations and depths on a number line. Show a map to the students as to where the location of the oceans and mountains are in the world. Also, have students research the average temperatures of various locations of their choice in different climate zones and then plot them on a number line.

- **Integrate Relevant Word Problems:** Contextualize equations using word problems that reference student interests and cultures.  
  **Example:** Create and use word problems that students relate to, have prior knowledge of and includes their interest. These can include current events and/or relevant real-world situations. Using content that students can relate to adds meaning, value and connection. The following link provides you with a variety of word problems that are current, relevant to real-world and student interests: [https://www.yummymath.com/](https://www.yummymath.com/)

- **Use Learning Stations:** Provide a range of material by setting up learning stations.  
  **Example:** Reinforce understandings of concepts and skills by promoting learning through student interests, modalities, experiences and/or prior knowledge. Encourage the students to make content choices based upon their strengths, needs, values and experiences. Providing students with choice boards will give them a sense of ownership to their learning and understanding.

- **Present New Concepts Using Student Vocabulary:** Use student diction to capture attention and build understanding before using academic terms.  
  **Example:** Teach math vocabulary in various modalities to increase students’ retention. Use multi-modal activities, analogies, realia, visual cues, graphic representations, gestures, pictures, practice and cognates. Inform students that some vocabulary words have multiple meanings. Have students create the Word Wall with their definitions and examples to foster ownership. Work with students to create a sorting and matching game using vocabulary words from within the unit. Students can work in teams or individually to play these games. This will allow students to familiarize themselves with the vocabulary words within the unit.
## Differentiated Instruction

### Accommodate Based on Students Individual Needs: Strategies

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<th>Time/General</th>
<th>Processing</th>
<th>Comprehension</th>
<th>Recall</th>
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<tr>
<td>Extra time for assigned tasks</td>
<td>Extra Response time</td>
<td>Precise processes for balanced math instructional model</td>
<td>Teacher-made checklist</td>
</tr>
<tr>
<td>Adjust length of assignment</td>
<td>Have students verbalize steps</td>
<td>Short manageable tasks</td>
<td>Use visual graphic organizers</td>
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<tr>
<td>Timeline with due dates for</td>
<td>Repeat, clarify or reword</td>
<td>Brief and concrete directions</td>
<td>Reference resources to promote</td>
</tr>
<tr>
<td>reports and projects</td>
<td>directions</td>
<td>Provide immediate feedback</td>
<td>independence</td>
</tr>
<tr>
<td>Communication system</td>
<td>Mini-breaks between tasks</td>
<td>Small group instruction</td>
<td>Visual and verbal reminders</td>
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<tr>
<td>between home and school</td>
<td>Provide a warning for</td>
<td>Emphasize multi-sensory learning</td>
<td>Graphic organizers</td>
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<tr>
<td>Provide lecture notes/outline</td>
<td>transitions</td>
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<td></td>
<td>Partnering</td>
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<tr>
<th>Assistive Technology</th>
<th>Tests/Quizzes/Grading</th>
<th>Behavior/Attention</th>
<th>Organization</th>
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<td>Computer/whiteboard</td>
<td>Extended time</td>
<td>Consistent daily structured routine</td>
<td>Individual daily planner</td>
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<tr>
<td>Tape recorder</td>
<td>Study guides</td>
<td>Simple and clear classroom rules</td>
<td>Display a written agenda</td>
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<tr>
<td>Video Tape</td>
<td>Shortened tests</td>
<td>Frequent feedback</td>
<td>Note-taking assistance</td>
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<tr>
<td></td>
<td>Read directions aloud</td>
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<td>Color code materials</td>
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### Behavior/Attention

- Consistent daily structured routine
- Simple and clear classroom rules
- Frequent feedback

### Organization

- Individual daily planner
- Display a written agenda
- Note-taking assistance
- Color code materials
Differentiated Instruction

Accommodate Based on Content Specific Needs: Strategies

- Anchor charts to model strategies and use of formulas
- Reference sheets that list formulas, step-by-step procedures and model strategies
- Conceptual word wall that contains definition, translation, pictures and/or examples
- Graphic organizers (Examples include: Venn diagram, Four Square, K-W-L)
- Translation dictionary
- Teacher modeling
- Four-function calculator to assist with computations
- Students can utilize math journals to write notes, copy solution steps, and translate terms and key vocabulary
- Highlight and label the solution steps for multi-step problems in different colors
- Utilize technological programs which provide verbal and visual instruction in native and/or second language
- Algebra tiles to solve for equations and inequalities
- Horizontal and vertical number lines to assist with identifying integers, recognizing opposites and their relation to zero and understanding absolute zero
- Coordinate grids to locate ordered pairs and draw polygons
- Reflection mirror to assist with locating the opposite point on a coordinate grid
- Two dimensional figures to trace on a coordinate grid
- Tangrams and two-dimensional figures to decompose and compose shapes into rectangles and triangles to determine the area
Interdisciplinary Connections

Model interdisciplinary thinking to expose students to other disciplines.

Social Studies Connection:
*Above and Below Sea Level: (6.1.8.B.4.a & 6.1.8.B.4.b)*
  - Students will use positive and negative numbers to examine and compare the sea level of New Orleans, Denver, and Seattle.

Physical Education:
*Football Plays: (2.1ABCDE & 2.2ABCDE)*
  - This task requires the knowledge of football plays and how the game is played. Students will be given plays will need to plot them on a number line.

ELA Connection:
*Various Tasks: (RL.6.1 & RI.6.1)*
  - Students will be able to read, analyze, and cite informational text to solve problems and explain their reasoning of how the task was solved. Students will also focus on vocabulary, mechanics and grammar in effective writing.
Enrichment

What is the purpose of Enrichment?

- The purpose of enrichment is to provide extended learning opportunities and challenges to students who have already mastered, or can quickly master, the basic curriculum. Enrichment gives the student more time to study concepts with greater depth, breadth, and complexity.
- Enrichment also provides opportunities for students to pursue learning in their own areas of interest and strengths.
- Enrichment keeps advanced students engaged and supports their accelerated academic needs.
- Enrichment provides the most appropriate answer to the question, “What do you do when the student already knows it?”

**Enrichment is…**

- Planned and purposeful
- *Different,* or differentiated, work – not just *more* work
- Responsive to students’ needs and situations
- A promotion of high-level thinking skills and making connections within content
- The ability to apply different or multiple strategies to the content
- The ability to synthesize concepts and make real world and cross-curricular connections
- Elevated contextual complexity
- Sometimes independent activities, sometimes direct instruction
- Inquiry based or open ended assignments and projects
- Using supplementary materials in addition to the normal range of resources
- Choices for students
- Tiered/Multi-level activities with flexible groups (may change daily or weekly)

**Enrichment is not…**

- Just for gifted students (some gifted students may need intervention in some areas just as some other students may need frequent enrichment)
- Worksheets that are more of the same (busywork)
- Random assignments, games, or puzzles not connected to the content areas or areas of student interest
- Extra homework
- A package that is the same for everyone
- Thinking skills taught in isolation
- Unstructured free time
## Assessments

### Required District/State Assessments
- Unit Assessments
- PARCC
- SGO Assessments

### Suggested Formative/Summative Classroom Assessments
- Describe Learning Vertically
- Identify Key Building Blocks
- Make Connections (between and among key building blocks)
- Short/Extended Constructed Response Items
- Multiple-Choice Items (where multiple answer choices may be correct)
- Drag and Drop Items
- Use of Equation Editor
- Quizzes
- Journal Entries/Reflections/Quick-Writes
- Accountable talk
- Projects
- Portfolio
- Observation
- Graphic Organizers/Concept Mapping
- Presentations
- Role Playing
- Teacher-Student and Student-Student Conferencing
- Homework
New Jersey Student Learning Standards

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.

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.

6.NS.C.6a. 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.

6.NS.C.6b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.

6.NS.C.6c. 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.


6.NS.C.7a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. For example, interpret \( -3 > -7 \) as a statement that \( -3 \) is located to the right of \( -7 \) on a number line oriented from left to right.
New Jersey Student Learning Standards

6.NS.C.7b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. For example, write $-3 \, ^\circ C > -7 \, ^\circ C$ to express the fact that $-3 \, ^\circ C$ is warmer than $-7 \, ^\circ C$.

6.NS.C.7c. 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. For example, for an account balance of $-30$ dollars, write $| -30 | = 30$ to describe the size of the debt in dollars.

6.NS.C.7d. Distinguish comparisons of absolute value from statements about order. For example, recognize that an account balance less than $-30$ dollars represents a debt greater than 30 dollars.

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.

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. *(benchmarked)*

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.

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.
# Mathematical Practices

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

2. Reason abstractly and quantitatively.

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

4. Model with mathematics.

5. Use appropriate tools strategically.

6. Attend to precision.

7. Look for and make use of structure.

8. Look for and express regularity in repeated reasoning.
<table>
<thead>
<tr>
<th>Grade: Six</th>
<th>Unit: 3 (Three)</th>
<th>Topic: Equations, The Rational Number System and 2-D Geometry</th>
</tr>
</thead>
</table>

**NJSLS:** 6.EE.B.5, 6.EE.B.6, 6.EE.B.7, 6.NS.C.5, 6.NS.C.6a,b,c, 6.NS.C.7a,b,c,d, 6.EE.B.8, 6.NS.C.8*, 6.G.A.3, 6.G.A.1

**Unit Focus:**
- Reason about and solve one-variable equations and inequalities
- Apply and extend previous understandings of numbers to the system of rational numbers
- Solve real-world and mathematical problems involving area, surface area, and volume

**New Jersey Student Learning Standard(s):**

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.

**Student Learning Objective 1:** Use substitution to determine whether a given number makes an equation or inequality true.

**Modified Student Learning Objectives/Standards:**

M.EE.6.EE.B.5–7: Match an equation to a real-world problem in which variables are used to represent numbers.

<table>
<thead>
<tr>
<th>MPs</th>
<th>Evidence Statement Key/Clarifications</th>
<th>Skills, Strategies &amp; Concepts</th>
<th>Essential Understandings/Questions (Accountable Talk)</th>
<th>Tasks/Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP 2</td>
<td>6.EE.5-1</td>
<td>In elementary grades, students explored the concept of equality. In 6th grade, students explore equations as expressions being set equal to a specific value. The solution is the value of the</td>
<td>How do I solve a one-step equation or inequality?</td>
<td>IFL Task(s) – Set of Related Lessons named “Solving One Variable Equations and Inequalities”</td>
</tr>
<tr>
<td>MP 5</td>
<td>6.EE.5-2</td>
<td></td>
<td>How do I evaluate an algebraic expression?</td>
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<tr>
<td>MP 6</td>
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<tr>
<td>MP 7</td>
<td>Most of tasks involve values from an infinite set of nonnegative numbers (e.g.,</td>
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</table>
even numbers; whole numbers; fractions). Some tasks involve values from a finite set of nonnegative numbers (e.g., \{2, 5, 7, 9\}).

**6.EE.6**

- Tasks may require students to write an expression to represent a real-world or mathematical problem. Tasks do not require students to find a solution.
- Tasks may require students to interpret a variable as a specific unknown number, or, as a number that could represent any number in a specified set.

Students write expressions to represent and solve various real-world situations.

**Examples:**

Maria has three more than twice as many crayons as Elizabeth. Write an algebraic expression to represent the number of crayons that Maria has.

Solution: \(2c + 3\) where \(c\) represents the number of crayons that Elizabeth has.

An amusement park charges $28 to enter and $0.35 per ticket. Write an algebraic expression to represent the total amount spent.

How can we solve simple algebraic equations and inequalities, and how do we interpret the meaning of the solutions?

What does it mean to find the solution to an equation or inequality?

Why do we use letters to represent numbers in mathematics?

How can variables be used to describe patterns?

**PBA:**

- Buying Snacks
- Mowing the Lawn

**Additional Tasks:**

- Log Ride
- Find Solutions to Make Equations True
- Make Use of Structure

**Maximum Texts**
Solution: $28 + 0.35t$ where $t$ represents the number of tickets purchased.

**SPED Strategies:**
Review and practice equations as mathematical sentences that shows that two expressions are equivalent.

Create, review and practice expressions as a mathematical phrase that contains operations, numbers, and/or variables.

Create, review and practices inequality as a mathematical sentence that shows the relationship between quantities that are not equivalent.

Provide step-by-step guides with visuals for practicing solving equations and/or inequalities.

Review the understanding that variables represent quantities that can change.

Review and practice identifying solutions of an equation that represent values of the variables that make the equation/inequality true.

Review and practice that a variable can be a letter or symbol representing an unknown number (e.g., the price of apples varies, so the cost of 4 apples can...
<p>| | |</p>
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<thead>
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<tbody>
<tr>
<td>be represented as $4a$ where $a$ is the cost of an apple.</td>
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<tr>
<td>Review and practice how, when, and why variables are used to represent unknowns in real-world or mathematical situations.</td>
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<tr>
<td>Review and demonstrate how to solve algebraic equations when using the inverse operations of addition, subtraction, multiplication, and division.</td>
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<td>Review and practice identifying like/similar terms.</td>
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<tr>
<td>Review, demonstrate and provide an inequality anchor chart that utilizes relation symbols other than the equal sign (i.e. $&lt;, &gt;, \leq, \geq$, or $=, \neq$).</td>
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<tr>
<td>Connect to real-life experiences.</td>
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<tr>
<td>Pre-teach prerequisite skills and concepts.</td>
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<tr>
<td>Link new learning to prior learning.</td>
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<td>Embed links to websites for additional knowledge.</td>
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<tr>
<td>Teach and model fundamental skills and procedures explicitly until they become automatic.</td>
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Present information through different modalities (i.e. visual, auditory, tactile, kinesthetic).

Adjust color of text, graphs and visual content.

**Resources UDL - Visual and Auditory Learner(s):**
6 EE 5 Solutions of Equations
[https://youtu.be/MC70tnxjbl4](https://youtu.be/MC70tnxjbl4)

How to Solve an Equation CCSS Math Content 6 EE B 6
[https://youtu.be/R13aHQR0r64](https://youtu.be/R13aHQR0r64)

**ELL Strategies**
Use an adapted text with a lower readability level, a teacher-modified text (with highlighted words, explanations, and context clues), or a simplified teacher-generated text illustrating various expressions and equations.

Provide word walls with translations side by side.

Utilize a KWL-chart graphic organizer, have the parts listed in both their L1 (students’ native Language) and L2 (students’ target language) language to clarify understanding.
| Provide students a math word bank with translations. |
| Provide Math reference sheets. |
| Provide picture cards with formulas and real world examples of each. |
| Provide audio lessons which explain how to solve equations in both languages. |

**Website:**
**LearnZillion**
*Write, read and evaluate expressions in which letters stand for numbers*  
[https://learnzillion.com/resources/72284-write-read-and-evaluate-expressions-in-which-letters-stand-for-numbers-6-ee-2](https://learnzillion.com/resources/72284-write-read-and-evaluate-expressions-in-which-letters-stand-for-numbers-6-ee-2)
New Jersey Student Learning Standard (s):

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.

Student Learning Objective 2: Solve real world problems by writing and solving equations of the form $x + p = q$ and $px = q$ ($p$, $q$, and $x$ are non-negative rational numbers).

Modified Student Learning Objectives/Standards:

M.EE.6.EE.B.5–7: Match an equation to a real-world problem in which variables are used to represent numbers.

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<td>MP 1</td>
<td>6.EE.7</td>
<td>Students have used algebraic expressions to generate answers given values for the variable. This understanding is now expanded to equations where the value of the variable is unknown but the outcome is known. For example, in the expression, $x + 4$, any value can be substituted for the $x$ to generate a numerical answer; however, in the equation $x + 4 = 6$, there is only one value that can be used to get a 6. Problems should be in context when possible and use only one variable. Students write equations from real-world problems and then use inverse operations to solve one-step equations.</td>
<td>How do I solve a one-step equation? How is an equation like a balance? How can the idea of balance help me solve an equation? What strategies can I use to help me understand and represent real situations using equations?</td>
<td>IFL Task(s) – Set of Related Lessons named “Solving One Variable Equations and Inequalities” Additional Tasks Morning Walk Set it Up How Fast Can You Type? Race Training One-Step Equations Lesson 26 One-Step Equations Lesson 27</td>
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<tr>
<td>MP 2</td>
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<td>MP 6</td>
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<td>MP 7</td>
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</table>
Equations may include fractions and decimals with non-negative solutions.

Beginning experiences in solving equations require students to understand the meaning of the equation and the solution in the context of the problem.

Students will solve real world problems by writing and solving equations of the forms:
- \( x + p = q \) (\( p, q, \) and \( x \) are non-negative and rational).
- \( px = q \) (\( p, q, \) and \( x \) are non-negative and rational).

**SPED Strategies:**
Review and practice equations as mathematical sentences that shows that two expressions are equivalent.

Create, review and practice expressions as a mathematical phrase that contains operations, numbers, and/or variables.

Create, review and practices inequality as a mathematical sentence that shows the relationship between quantities that are not equivalent.

Provide step-by-step guides with visuals for practicing solving equations.

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<table>
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<tr>
<th>One-Step Equations Lesson 28</th>
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<tbody>
<tr>
<td>Fund-Raising</td>
</tr>
<tr>
<td>Making Party Punch</td>
</tr>
<tr>
<td>Lawn Mowing Business</td>
</tr>
<tr>
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<td>Review and practice how, when, and why variables are used to represent unknowns in real-world or mathematical situations.</td>
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<tr>
<td><strong>Resources UDL - Visual and Auditory Learner(s):</strong> Expressions and Equations - Grade 6 Math Educational Video (6.EE.7) <a href="https://youtu.be/NXcP01ULURg">https://youtu.be/NXcP01ULURg</a></td>
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| | L1 (students’ native language) and L2 (students’ target language) to clarify understanding.  
Provide Math word bank/translated/copied for students.  
Provide Math reference sheets.  
Provide picture cards with formulas and real world examples of each.  
Provide audio lessons which explain how to solve equations in both languages.  
**Website:** LearnZillion  
*Write, read and evaluate expressions in which letters stand for numbers*  
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New Jersey Student Learning Standard(s):

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.

Student Learning Objective 3: Use positive and negative numbers to represent quantities in real-world situations, explaining the meaning of zero in the context of the real-world situation.

Modified Student Learning Objectives/Standards:

M.EE.6.NS.C.5–8: Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero).

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<th>MPs</th>
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<th>Tasks/Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP 2 MP 5</td>
<td>6.NS.5</td>
<td>Positive and negative numbers, used together, describe quantities having opposite directions or opposite values. Positive numbers represent values greater than 0 and negative numbers represent values less than 0. Many real-world situations can be modeled with both positive and negative values because it is possible to measure above and below a baseline value (often 0). Students use rational numbers (fractions, decimals, and integers) to represent real-world contexts and understand and explain the meaning of 0 in each situation. <strong>Examples:</strong> • Use an integer to represent 25 feet below sea level as (-25).</td>
<td>When are negative numbers used and why are they important? Why is it useful for me to know the absolute value of a number? How do I use positive and negative numbers to represent quantities in real-world contexts?</td>
<td>IFL Task(s) – Set of Related Lessons named “Locating, Ordering, and Finding Distance Between Positive and Negative Numbers” PBA: Savings Account Additional Tasks: Warmer in Miami Mile High Above and Below Sea Level</td>
</tr>
</tbody>
</table>
- Use an integer to represent 25 feet above sea level as (+25).
- What would 0 (zero) represent in the scenario above? (0 would represent sea level)

**SPED Strategies:**
Review and practice identifying the difference between a positive and negative number and how is this used to represent real life situations.

Review and practice placing positive and negative numbers on a number line. Identify how the placement relative to zero helps explain the meaning of situations presented.

Review and practice identifying zero pairs.

Practice using positive and negative integers to describe everyday situations (i.e. temperature, scuba diving, parachuting or planes etc.).

Practice identifying positive and negative integers in relation to zero on a standard number line; using a vertical number line (i.e. thermometer).

Practice finding the opposite of an integer (additive inverse) and develop anchor charts with illustrations and examples.

Practice applying integers to represent real-world situations (UDL).
Remind and demonstrate to students that number lines may run horizontally or vertically.

Create visual, verbal or tactile cues or reminders.

Link new learning to prior learning.

Connect to real-life experiences.

Pre-teach prerequisite skills and concepts.

Embed links to websites for additional knowledge.

Teach and model fundamental skills and procedures explicitly until they become automatic.

Present information through different modalities (i.e. visual, auditory, tactile, and kinesthetic).

Adjust color of text, graphs and visual content.

**Resources UDL - Visual and Auditory Learner(s):**
Negative Numbers (6.NS.C.5)
https://youtu.be/5zitKzzJ44w
**ELL Strategies:**
Create charts with mathematical concepts.

Clarify, compare, and make connections to math words in discussion, particularly during and after practice.

Provide translations of all content and general vocabulary words.

Know, use, and make the most of student cultural and home experiences.

Build on the student’s background knowledge.

Point to visuals while speaking, using your hands to clearly indicate the image that corresponds to your words.

Provide a variety of ways to respond: oral, choral, student boards, concrete models (e.g., fingers), pictorial models (e.g., ten-frame), pair share, and small group share.

Embed visual, non-linguistic supports for vocabulary clarification.

**Website:**
**Teachers First**  
*Adapt a Strategy. Adjusting Lessons for ESL/ELL students*  
http://www.teachersfirst.com/content/esl/adaptstrat.cfm
New Jersey Student Learning Standard(s):
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.

6.NS.C.6a: 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.

6.NS.C.6c: 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.

Student Learning Objective 4: Locate rational numbers and their opposites on horizontal and vertical number line; explain their relation of the opposites to zero.

Modified Student Learning Objectives/Standards:
M.EE.6.NS.C.5–8: Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero).

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<tr>
<td>MP 5</td>
<td>6.NS.6a</td>
<td>In elementary school, students worked with positive fractions, decimals and whole numbers on the number line and in quadrant 1 of the coordinate plane.</td>
<td>When are negative numbers used and why are they important?</td>
<td>IFL Task(s) – Set of Related Lessons named “Locating, Ordering, and Finding Distance Between Positive and Negative Numbers”</td>
</tr>
<tr>
<td>MP 8</td>
<td>6.NS.6c-1</td>
<td>In 6th grade, students extend the number line to represent all rational numbers and recognize that number lines may be either horizontal or vertical (i.e. thermometer) which facilitates the movement from number lines to coordinate grids.</td>
<td>Why is it useful for me to know the absolute value of a number? How do I use positive and negative numbers to represent quantities in real-world contexts?</td>
<td>PBA: Savings Account</td>
</tr>
</tbody>
</table>

- Tasks have “thin context” or no context.
- Coordinates are not limited to integers.
Students recognize that a number and its opposite are equidistance from zero (reflections about the zero). The opposite sign (–) shifts the number to the opposite side of 0.

**Example:**
– 4 could be read as “the opposite of 4” which would be negative 4. In the example, – (–6.4) would be read as “the opposite of the opposite of 6.4” which would be 6.4. Zero is its own opposite.

The opposite of the opposite of a number is the number itself (e.g. the opposite of three is -3. The opposite of the opposite of three, -(-3), is equal to the original number, 3).

Rational numbers can be located on a number line with opposite numbers on opposite sides of 0.

The distance between a positive and negative value on a number line is equal to the sum of their absolute values because they are located on opposite sides of zero.

Students position rational numbers on horizontal and vertical number lines and position pairs of rational numbers on a coordinate plane.

**SPED Strategies:**
Review and practice identifying the difference between a positive and negative number and

| What are opposites and how are they shown on a number line? |
| What are opposites and how are they shown on a number line? |
| Additional Tasks: Football Plays |
| Golfing with Number Line and Coordinate Planes |
| Alaska Temperatures |
| Sea Level Locations |
| Lemonade Business |
how is this used to represent real life situations.

Review and practice placing positive and negative numbers on a number line, and how does its placement relative to zero help explain the meaning of the situation represented.

Provide and practice using a number line to identify positive and negative integers.

Review and practice identifying zero pairs.

Practice using positive and negative integers to describe everyday situations (i.e. temperature, scuba diving, parachuting or planes etc.). Practice identifying positive and negative integers in relation to zero on a standard number line; using a vertical number line (i.e. thermometer).

Practice finding the opposite of an integer (additive inverse) and develop anchor charts with illustrations and examples.

Create visual, verbal or tactile cues or reminders.

Link new learning to prior learning.

Connect to real-life experiences.

Pre-teach prerequisite skills and concepts.
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<td>Embed links to websites for additional knowledge.</td>
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<td>Teach and model fundamental skills and procedures explicitly until they become automatic.</td>
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<td>Present information through different modalities (i.e. visual, auditory, tactile, and kinesthetic).</td>
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<td>Adjust color of text, graphs and visual content.</td>
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<td>Visuals, anchor charts and desk decals.</td>
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<tr>
<td><strong>ELL Strategies:</strong></td>
<td>Utilize body cues and hand gestures to assist with expression identification.</td>
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<td>Create charts with mathematical concepts.</td>
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<td>Clarify, compare, and make connections to math words in discussion, particularly during and after practice.</td>
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<td></td>
<td>Connect language (such as ‘tens’) with concrete and pictorial experiences (such as money and fingers).</td>
<td></td>
</tr>
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</table>
Know, use, and make the most of student cultural and home experiences.

Build on the student’s background knowledge.

Point to visuals while speaking, using your hands to clearly indicate the image that corresponds to your words.

Provide a variety of ways to respond: oral, choral, student boards, concrete models (e.g., fingers), pictorial models (e.g., ten-frame), pair share, small group share.

Support oral or written response with sentence frames, such as “______ is ___ hundreds, ___ tens, and ____.”

Embed visual, non-linguistic supports for vocabulary clarification.

**Website:**
**Teachers First Adapt a Strategy. Adjusting Lessons for ESL/ELL students**
[http://www.teachersfirst.com/content/esl/adapt strat.cfm](http://www.teachersfirst.com/content/esl/adapt strat.cfm)
New Jersey Student Learning Standard(s):
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.

6.NS.C.6b: Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.

6.NS.C.6c: 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.

Student Learning Objective 5: Plot pairs of positive and negative rational numbers in the coordinate plane; describe two ordered pairs that differ only by signs as reflections across one or both axes.

Modified Student Learning Objectives/Standards:
M.EE.6.NS.C.5–8: Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero).

<table>
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<th>Essential Understandings/Questions (Accountable Talk)</th>
<th>Tasks/Activities</th>
</tr>
</thead>
</table>
| MP 5 | 6.NS.6b-1  
• Tasks have “thin context” or no context.  
• Students need not recognize or use traditional notation for quadrants (such as I, II, III, IV).  
• Coordinates are not limited to integers.  
| Signs of numbers in ordered pairs indicate their locations in quadrants of the coordinate plane.  
Students will be able to explain the conditions for which pairs of points are reflections across an axes in the coordinate plane. They will locate numbers and their opposites on the number line and explain their relation to 0. | When are negative numbers used and why are they important?  
Why is it useful for me to know the absolute value of a number?  
How do I use positive and negative numbers to represent quantities in real-world contexts? | IFL Task(s) – Set of Related Lessons named “Locating, Ordering, and Finding Distance Between Positive and Negative Numbers”  
**Additional Tasks:** Triangles Across Axes |
| Students need not recognize or use traditional notation for quadrants (such as I, II, III, IV).  
| Coordinates are not limited to integers. | When two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.  
| Students recognize that a number and its opposite are equidistance from zero (reflections about the zero). The opposite sign (–) shifts the number to the opposite side of 0. | What are opposites and how are they shown on a number line?  
| Tasks have “thin context” or no context. | Rational numbers can be located on a number line with opposite numbers on opposite sides of 0.  
| Students need not recognize or use traditional notation for quadrants (such as I, II, III, IV). | The distance between a positive and negative value on a number line is equal to the sum of their absolute values because they are located on opposite sides of zero.  
| Coordinates are not limited to integers. | **SPED Strategies:**  
|  | Review and practice identifying the difference between a positive and negative number and how is this used to represent real life situations.  
|  | Review and practice placing positive and negative numbers on a number line, and how does its placement relative to zero help explain the meaning of the situation represented.  
|  | Provide and practice using a number line.  
|  | Review and practice identifying zero pairs. | **Parallelograms Across Axes**

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**Parallelograms Across Axes**

- Students need not recognize or use traditional notation for quadrants (such as I, II, III, IV).
- Coordinates are not limited to integers.

**6.NS.6c-2**
- Tasks have “thin context” or no context.
- Students need not recognize or use traditional notation for quadrants (such as I, II, III, IV).
- Coordinates are not limited to integers.
| Practice identifying positive and negative integers in relation to zero on a standard number line; using a vertical number line (i.e. thermometer).

Practice finding the opposite of an integer (additive inverse) and develop anchor charts with illustrations and examples.

Review and practice plotting ordered pairs on coordinate planes that are positive, negative, or one of each.

Remind and demonstrate to students that number lines may run horizontally or vertically.

Create visual, verbal or tactile cues or reminders.

Link new learning to prior learning.

Connect to real-life experiences.

Pre-teach prerequisite skills and concepts.

Design web quests to search for background information.

Teach and model fundamental skills and procedures explicitly until they become automatic. |
Present information through different modalities (i.e. visual, auditory, tactile, and kinesthetic).

Adjust color of text, graphs and visual content.

Visuals, anchor charts and desk decals. **Resources UDL - Visual and Auditory Learner(s):**
Integers and the Coordinate Plane (6.NS.C.6b)
https://youtu.be/xXU8SS1BQUk

**ELL Strategies:**
Utilize body cues and hand gestures to assist with expression identification.

Create charts with mathematical concepts.

Clarify, compare, and make connections to math words in discussion, particularly during and after practice.

Provide translations of all content and general vocabulary words.

Connect language (such as ‘tens’) with concrete and pictorial experiences (such as money and fingers).

Know, use, and make the most of student cultural and home experiences.
Build on the student’s background knowledge.

Point to visuals while speaking, using your hands to clearly indicate the image that corresponds to your words.

Provide a variety of ways to respond: oral, choral, student boards, concrete models (e.g., fingers), pictorial models (e.g., ten-frame), pair share, small group share.

Embed visual, non-linguistic supports for vocabulary clarification.

Website: Teachers First Adapt a Strategy. Adjusting Lessons for ESL/ELL students http://www.teachersfirst.com/content/esl/adtstrat.cfm
New Jersey Student Learning Standard(s):
6.NS.C.7: Understand ordering and absolute value of rational numbers.

6.NS.C.7a: Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. For example, interpret \(-3 > -7\) as a statement that \(-3\) is located to the right of \(-7\) on a number line oriented from left to right.

6.NS.C.7b: Write, interpret, and explain statements of order for rational numbers in real-world contexts. For example, write \(-3 \degree C > -7 \degree C\) to express the fact that \(-3 \degree C\) is warmer than \(-7 \degree C\).

Student Learning Objective 6: Use statements of inequality to determine relative positions of two rational numbers on a number line; write and explain statements of order for rational numbers in real-world contexts.

Modified Student Learning Objectives/Standards:
M.EE.6.NS.C.5–8: Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero).

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</table>
| MP 2 MP 3 MP 5 | 6.NS.7a  
- Tasks do not have a context.  
- Tasks are not limited to integers. | When students are given an inequality, they will determine the position of one rational number relative to another. They will write an inequality and explain statements of order for rational numbers in real world situations. | Why is it useful for me to know the absolute value of a number?  
How do statements of inequality help me place numbers on a number line?  
How are opposites and absolute value related? | IFL Task(s) – Set of Related Lessons named “Locating, Ordering, and Finding Distance Between Positive and Negative Numbers” |
| | 6.NS.7b  
- Tasks are not limited to integers.  
- For the explain aspect of 6.NS.7b, see 6.C.4. | Students recognize the distance from zero as the absolute value or magnitude of a rational number.  
Students need multiple experiences to understand the relationships between numbers, absolute value, and statements about order. | | PBA: Comparing on a Number Line  
Additional Tasks: Comparing Temperatures |
The absolute value of a number is the number’s magnitude or distance from 0. If two rational numbers differ only by their signs, they have the same absolute value because they are the same distance from zero.

**SPED Strategies:**
Review and practice identifying the difference between a positive and negative number and how is this used to represent real life situations.

Review and practice placing positive and negative numbers on a number line, and how does its placement relative to zero help explain the meaning of the situation represented.

Provide and practice using a number line.

Review and practice identifying zero pairs.

Practice identifying positive and negative integers in relation to zero on a standard number line; using a vertical number line (i.e. thermometer).

Practice finding the opposite of an integer (additive inverse) and develop anchor charts with illustrations and examples. Practice applying integers to represent real-world situations (UDL).
Remind and demonstrate to students that number lines may run horizontally or vertically.

Create visual, verbal or tactile cues or reminders.

Link new learning to prior learning.

Connect to real-life experiences.

Pre-teach prerequisite skills and concepts.

Teach and model fundamental skills and procedures explicitly until they become automatic.

Present information through different modalities (i.e. visual, auditory, tactile, and kinesthetic).

Adjust color of text, graphs and visual content.

**Resources UDL - Visual and Auditory Learner(s):**

Absolute Value by Phinease, CCSS 6.NS.C.7
https://youtu.be/PtEpf7qPriY

**ELL Strategies:**
Clarify, compare, and make connections to math words in discussion, particularly during and after practice.
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<th>Provide translations of all content and general vocabulary words.</th>
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<td>Know, use, and make the most of student cultural and home experiences.</td>
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<td>Build on the student’s background knowledge.</td>
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<td>Point to visuals while speaking, using your hands to clearly indicate the image that corresponds to your words.</td>
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<td>Provide a variety of ways to respond: oral, choral, student boards, concrete models (e.g., fingers), pictorial models (e.g., ten-frame), pair share, and small group share.</td>
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<td>Embed visual, non-linguistic supports for vocabulary clarification.</td>
</tr>
<tr>
<td><strong>Website:</strong></td>
<td><strong>Teachers First</strong></td>
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<tr>
<td><strong>Adapt a Strategy. Adjusting Lessons for ESL/ELL students</strong></td>
<td><a href="http://www.teachersfirst.com/content/esl/adaptivestrat.cfm">http://www.teachersfirst.com/content/esl/adaptivestrat.cfm</a></td>
</tr>
</tbody>
</table>
New Jersey Student Learning Standard(s):
6.NS.C.7: Understand ordering and absolute value of rational numbers.

6.NS.C.7c: 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. For example, for an account balance of –30 dollars, write \(|–30| = 30\) to describe the size of the debt in dollars.

6.NS.C.7d: Distinguish comparisons of absolute value from statements about order. For example, recognize that an account balance less than –30 dollars represents a debt greater than 30 dollars.

Student Learning Objective 7: Explain the meaning of absolute value of a rational number as distance from zero on the number line and as magnitude for a positive or negative quantity in a real-world situation.

Modified Student Learning Objectives/Standards:
M.EE.6.NS.C.5–8: Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero).

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</tr>
</thead>
<tbody>
<tr>
<td>MP 2</td>
<td>6.NS.7c-1</td>
<td>When students are given an inequality, they will determine the position of one rational number relative to another. They will write an inequality and explain statements of order for rational numbers in real world situations.</td>
<td>Why is it useful for me to know the absolute value of a number? How do statements of inequality help me place numbers on a number line?</td>
<td></td>
</tr>
<tr>
<td>MP 3</td>
<td>6.NS.7c-2</td>
<td>Students recognize the distance from zero as the absolute value or magnitude of a rational number. Students need multiple experiences to understand the relationships between numbers, absolute value, and statements about order.</td>
<td>How do I use positive and negative numbers to represent quantities in the real-world contexts?</td>
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<tr>
<td>MP 5</td>
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<td>MP 2</td>
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<td>MP 5</td>
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Additional Tasks:
6.NS.7d

- Tasks may or may not contain context.
- Tasks are not limited to integers.
- Prompts do not present students with a number line diagram, but students may draw a number line diagram as a strategy.

The absolute value of a number is the number’s magnitude or distance from 0. If two rational numbers differ only by their signs, they have the same absolute value because they are the same distance from zero.

**SPED Strategies:**

Review and practice placing positive and negative numbers on a number line, and how does its placement relative to zero help explain the meaning of the situation represented.

Provide and practice using a number line.

Practice and demonstrate identifying positive and negative integers.

Review and practice identifying zero pairs.

Practice using positive and negative integers to describe everyday situations (i.e. temperature, scuba diving, parachuting or planes etc.).

Practice identifying positive and negative integers in relation to zero on a standard number line; using a vertical number line (i.e. thermometer).

Practice finding the opposite of an integer (additive inverse) and develop anchor charts with illustrations and examples.

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<tr>
<th>President’s Approval Ratings</th>
<th>Stock Market Investments</th>
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</thead>
</table>
Practice applying integers to represent real-world situations (UDL).

Remind and demonstrate to students that number lines may run horizontally or vertically.

Create visual, verbal or tactile cues or reminders.

Pre-teach prerequisite skills and concepts.

Present information through different modalities (i.e. visual, auditory, tactile, and kinesthetic).

**Resources UDL - Visual and Auditory Learner(s):**
Absolute Value by Phinease, CCSS 6.NS.C.7
https://youtu.be/PtEpf7qPriY

**ELL Strategies:**
Utilize body cues and hand gestures to assist with expression identification.

Create charts with mathematical concepts.

Clarify, compare, and make connections to math words in discussion, particularly during and after practice.

Provide translations of all content and general vocabulary words.
Know, use, and make the most of student cultural and home experiences.

Build on the student’s background knowledge.

Point to visuals while speaking, using your hands to clearly indicate the image that corresponds to your words.

Provide a variety of ways to respond: oral, choral, student boards, concrete models (e.g., fingers), pictorial models (e.g., ten-frame), pair share, and small group share.

Embed visual, non-linguistic supports for vocabulary clarification

**Website:**
**Teachers First**
*Adapt a Strategy. Adjusting Lessons for ESL/ELL students*
[http://www.teachersfirst.com/content/esl/adaptivestrat.cfm](http://www.teachersfirst.com/content/esl/adaptivestrat.cfm)
**New Jersey Student Learning Standard (s):**

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.

**Student Learning Objective 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 and represent them on a number line.

**Modified Student Learning Objectives/Standards:** N/A

<table>
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<tbody>
<tr>
<td>MP 2</td>
<td>6.EE.8</td>
<td>Many real-world situations are represented by inequalities. Students write inequalities to represent real-world and mathematical situations. Student graph inequalities of the form ( x &gt; c ) or ( x &lt; c ) on number lines. Students use the number line to represent inequalities from various contextual and mathematical situations. <strong>SPED Strategies:</strong> Review and practice inequality using mathematical sentence formed by placing an inequality symbol between two expressions. Practice identifying inequality symbols. Practice writing the inequality ( x &gt; c ) or ( x &lt; c ) to represent numerical relationships. What strategies can I use to help me understand and represent real situations using inequalities? How can I write, interpret and manipulate inequalities? How can I solve an inequality? How are the solutions of equations and inequalities different?</td>
<td>IFL Task(s) – Set of Related Lessons named “Solving One Variable Equations and Inequalities”</td>
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<tr>
<td>MP 6</td>
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<td>PBA: Buying Snacks</td>
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<tr>
<td>MP 7</td>
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<td></td>
<td></td>
<td>Additional Tasks: Fishing Adventures 1 From Equations to Inequalities Height Requirements How Tall Are You? More Than Him But Less Than Her</td>
</tr>
</tbody>
</table>
Demonstrate using any number substituted in place of c justifies the inequality symbol.

Practice and demonstrate using open/close circles on a number line refer to the symbols > and < or ≤ and ≥.

Review and provide key pointer when a number to the left of the open/close circle on a number line are smaller and number to the right are greater.

Create visual, verbal or tactile cues or reminders.

Link new learning to prior learning.

Connect to real-life experiences.

Teach and model fundamental skills and procedures explicitly until they become automatic.

Present information through different modalities (i.e. visual, auditory, tactile, and kinesthetic).

Adjust color of text, graphs and visual content.

Visuals, anchor charts and desk decals.

**ELL Strategies:**
Develop graphic representations of math expressions and processes.
| Have students utilize white boards to represent their solutions for math expressions. |
| Have students work in small groups, pairs/triads, to solve real-world mathematical problems. |
| Provide ELL students with additional time and native language support during classroom activities. |
| Provide students with graphic math organizers, which allow students to write and organize their thoughts. |
| Peer coaching, have ELL’s work with higher math proficient students for content support. |
| Utilize technology to illustrate various real-world mathematical problems with various number lines. |
**New Jersey Student Learning Standard(s):**

**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. *(benchmarked)*

**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.

**Student Learning Objective 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.

**Modified Student Learning Objectives/Standards:**

**M.EE.6.NS.C.5–8:** Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero).

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<td>MP 2</td>
<td></td>
<td>Students find the distance between points when ordered pairs have the same x-coordinate or same y-coordinate. They will use absolute value to find distances between points with the same first coordinate or the same second coordinate.</td>
<td>When are negative numbers used and why are they important?</td>
<td>Distance Between Points</td>
</tr>
<tr>
<td>MP 3</td>
<td>6.NS.8</td>
<td></td>
<td>Why is it useful for me to know the absolute value of a number?</td>
<td>Perimeters of Rectangles</td>
</tr>
<tr>
<td>MP 4</td>
<td>Tasks may or may not contain context.</td>
<td>Example:</td>
<td>How do I plot points on the coordinate plane?</td>
<td>Reflecting Trapezoids</td>
</tr>
<tr>
<td>MP 5</td>
<td>Finding distances is limited to points with integer coordinates.</td>
<td>What is the distance between (−5, 2) and (−9, 2)? Solution: The distance would be 4 units. This would be a horizontal line since the y-coordinates are the same.</td>
<td>How is the absolute value of a number used to determine its distance on the coordinate plane?</td>
<td>Doubling Areas</td>
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<td>Which Perimeter is Larger?</td>
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<td>6.G.A.3</td>
</tr>
</tbody>
</table>
In this scenario, both coordinates are in the same quadrant. The distance can be found by using a number line to find the distance between −5 and −9. Students could also recognize that −5 is 5 units from 0 (absolute value) and that −9 is 9 units from 0 (absolute value). Since both of these are in the same quadrant, the distance can be found by finding the difference between the distances 9 and 5. (| 9 | - | 5 |).

Students will be graphing in all four quadrants of the coordinate plane in order to solve real-world and mathematical problems.

6.G.A.3
Students are given the coordinates of polygons to draw in the coordinate plane.

If both x-coordinates are the same (2, -1) and (2, 4), then students recognize that a vertical line has been created and the distance between these coordinates is the distance between -1 and 4, or 5.

If both the y-coordinates are the same (-5, 4) and (2, 4), then students recognize that a horizontal line has been created and the distance between these coordinates is the distance between -5 and 2, or 7.

Using this understanding, students solve real-world distance and mathematical problems.

How can I use vertical and horizontal number lines to solve problems?

How do I compare and order rational numbers?

6.G.A.3
Why is graphing on the coordinate plane helpful?

How can I use coordinates to find the distances between points?

How can I use number lines to find the distances between points?

Sounds of the Band
Walking the Block
Completing the Parallelogram
Changing the Dimensions
problems, including finding the area and perimeter of geometric figures drawn on a coordinate plane.

**SPED Strategies:**
Provide examples and practice identifying the scale on an axis of a coordinate plane.

Provide examples and practice identifying absolute values of integers in relation to coordinates.

Practice and demonstrate adding and subtracting integers in relation to coordinates.

Provide examples, review and practice determining the length of a side of a polygon joining points with the same first and second coordinate.

Practice drawing the conclusion that a horizontal line is formed when the y-values are the same and vertical when the x-values are the same in a set of coordinate pairs.

Create visual, verbal or tactile cues or reminders.

Link new learning to prior learning.

Connect to real-life experiences.

Pre-teach prerequisite skills and concepts.
Embed links to websites for additional knowledge.

Design web quests to search for background information.

Teach and model fundamental skills and procedures explicitly until they become automatic.

Present information through different modalities (i.e. visual, auditory, tactile, and kinesthetic).

**ELL Strategies:**
Provide students with graph paper and have them work in groups to plot given points on a coordinate plane, and orally discuss the process to the class.

Use small groups/ triads.

Provide a variety of ways to respond: oral, choral, student boards, concrete models (e.g., fingers), pictorial models (e.g., ten-frame), pair share, and small group share.

Create a large picture wall with different shapes, and formulas, with translated names of figures and properties.
Provide students with reference sheets with L1 (Student’s native language) text materials.

Utilize white boards where students can draw mathematical representations of coordinate planes, formulas for figures and illustrate problem solving skills.

Use of translation dictionary or software.

Teach students how to ask questions such as: “Do you agree?” and “Why do you think so?” to extend think-pair-share conversations.

Model and post conversation starters such as: “I agree because…” “Can you explain how you solved it?” “I noticed that…” “Your solution is different from/ the same as mine because…” “My mistake was to…”. 
New Jersey Student Learning Standard(s):
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.

Student Learning Objective 10: Find the area of right triangles, other triangles, special quadrilaterals and polygons by composing into rectangles or decomposing into triangles.

Modified Student Learning Objectives/Standards:

<table>
<thead>
<tr>
<th>MPs</th>
<th>Evidence Statement Key/Clarifications</th>
<th>Skills, Strategies &amp; Concepts</th>
<th>Essential Understandings/Questions (Accountable Talk)</th>
<th>Tasks/Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP 1</td>
<td>6.G.1</td>
<td>Students continue to understand that area is the number of squares needed to cover a plane figure.</td>
<td>How can we use one figure to determine the area of another?</td>
<td>Covering the Patio</td>
</tr>
<tr>
<td>MP 2</td>
<td></td>
<td>Students should know the formulas for rectangles and triangles. Knowing the formula does not mean memorization of the formula. To know means to have an understanding of why the formula works and how the formula relates to the measure (area) and the figure.</td>
<td>How can shapes be composed to create new shapes?</td>
<td>Building a Collage</td>
</tr>
<tr>
<td>MP 5</td>
<td></td>
<td>Finding the area of triangles is introduced in relationship to the area of rectangles. A rectangle can be decomposed into two congruent triangles. Therefore, the area of the triangle is ½ the area of the rectangle. The area of a rectangle can be found by multiplying base x height, therefore, the area of the triangle is ½ bh or (b x h)/2.</td>
<td>How can a shape be decomposed into smaller shapes?</td>
<td>Finding Areas of Polygons</td>
</tr>
<tr>
<td>MP 7</td>
<td></td>
<td></td>
<td>How are the areas of geometric figures related to each other?</td>
<td>Wallpaper Decomposition</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>How do we figure the area of a shape without a formula for that shape?</td>
<td>Finding Patterns in Design</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>The Area of Right Triangles</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>The Area of Acute and Right Triangles Using Height and Base</td>
</tr>
</tbody>
</table>
Students decompose shapes into rectangles and triangles to determine the area. For example, a trapezoid can be decomposed into triangles and rectangles. Using the trapezoid's dimensions, the area of the individual triangle(s) and rectangle can be found and then added together.

**SPED Strategies:**
Review and practice how to use rectangles and triangles to find the area of other polygons.

Review and practice how rectangles and triangles can be composed or decomposed to find the area of other polygons.

Review area formulas. Provide reference sheet with formulas.

Practice and demonstrate decomposing polygons into triangles and rectangles.

Practice calculating the area of a polygon by determining the area of the parts of that polygon after construction into rectangles or deconstruction into triangles.

Provide a calculator for student use.

Create visual, verbal or tactile cues or reminders.
Present information through different modalities (i.e. visual, auditory, tactile, and kinesthetic).

**Resources UDL - Visual and Auditory Learner(s):**
6.G.1 - Area of Irregular Polygons
[https://youtu.be/461qf7N7Qbg](https://youtu.be/461qf7N7Qbg)

**ELL Strategies:**
Small group/ triads.

Provide a variety of ways to respond: oral, choral, student boards, concrete models (e.g., fingers), pictorial models (e.g., ten-frame), pair share, and small group share.

Create a large picture wall with different shapes, and formulas, with translated names of figures and properties.

Provide students with reference sheets with L1 (students’ native language) text materials.

Utilize white boards where students can draw mathematical representations on coordinate planes, formulas for figures and illustrate problem solving skills.

Utilize Math journals for students to practice writing skills with math terminology.

Use of translation dictionary or software with the emphasis on area and relevant formulas.
Teach students how to ask questions such as: “Do you agree?” and “Why do you think so?” to extend think-pair-share conversations.

Model and post conversation starters such as: “I agree because….” “Can you explain how you solved it?” “I noticed that…” “Your solution is different from/ the same as mine because…” “My mistake was to…”.
Integrated Evidence Statements

6.Int.1: Solve two-step word problems requiring operations on multi-digit whole numbers or decimals.
- Operations are no more complex than those specified for 6.NS.2, 6.NS.3-1, 6.NS.3-2, 6.NS.3-3, and 6.NS.3-4 with the exception of 3-digit x 3-digit.
- For purposes of assessment, the possibilities for multiplication are 1-digit x 2-digit, 1-digit x 3-digit, 2-digit x 3-digit, 2-digit x 4-digit, 2-digit x 5-digit, or 3-digit x 3-digit (For example, 7.68 x 15.3 or 0.35 x 18.241.)

6.C.4: Base explanations/reasoning on a number line diagram (whether provided in the prompt or constructed by the student in her response). Content Scope: Knowledge and skills articulated in 6.NS.6, 6.NS.7

6.C.5: Base explanations/reasoning on a coordinate plane diagram (whether provided in the prompt or constructed by the student in her response). Content Scope: Knowledge and skills articulated in 6.NS.6, 6.NS.8

6.C.9: Distinguish correct explanation/reasoning from that which is flawed, and – if there is a flaw in the argument – present corrected reasoning. (For example, some flawed ‘student’ reasoning is presented and the task is to correct and improve it.) Content Scope: Knowledge and skills articulated in 5.NBT, 5.MD.C.
- Tasks may have scaffolding1, if necessary, in order to yield a degree of difficulty appropriate to Grade 6.

6.D.1: Solve multi-step contextual word problems with degree of difficulty appropriate to Grade 6, requiring application of knowledge and skills articulated in Type I, Sub-Claim A Evidence Statements.
- Tasks may have scaffolding, if necessary, in order yield a degree of difficulty appropriate to Grade 6.

6.D.2: Solve multi-step contextual problems with degree of difficulty appropriate to Grade 6, requiring application of knowledge and skills articulated in 5.NBT.B, 5.NF, 5.MD, and 5.G.A.
- Tasks may have scaffolding, if necessary, in order yield a degree of difficulty appropriate to Grade 6.

- Tasks may have scaffolding, if necessary, in order to yield a degree of difficulty appropriate to Grade 6.
## Unit 3 Vocabulary

<table>
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<tr>
<th>Number Sense</th>
<th>Expressions and Equations</th>
<th>Geometry</th>
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<td>Absolute value</td>
<td>Algebraic expressions</td>
<td>Area</td>
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<td>Difference</td>
<td>Associative Property of Addition</td>
<td>Axis (plural – axes)</td>
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<tr>
<td>Distributive Property</td>
<td>Associative Property of Multiplication</td>
<td>Base</td>
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<tr>
<td>Dividend</td>
<td>Coefficient</td>
<td>Compose</td>
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<tr>
<td>Evaluate</td>
<td>Commutative Property of Addition</td>
<td>Coordinate grid</td>
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<tr>
<td>Expression</td>
<td>Commutative Property of Multiplication</td>
<td>Coordinate pair</td>
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<td>Inverse operations</td>
<td>Constant</td>
<td>Coordinate plane</td>
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<tr>
<td>Multi-digit</td>
<td>Dependent variable</td>
<td>Coordinate plane</td>
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<tr>
<td>Multiplicative inverses</td>
<td>Difference</td>
<td>Coordinate plane</td>
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<td>Number Line</td>
<td>Equal to =</td>
<td>Coordinate system</td>
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<tr>
<td>Numerical expressions</td>
<td>Equivalent expressions</td>
<td>Coordinates</td>
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<tr>
<td>Product</td>
<td>Evaluate</td>
<td>Coordinates</td>
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<tr>
<td>Quotient</td>
<td>Expression</td>
<td>Coordinates</td>
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<tr>
<td>Simplest form</td>
<td>Factor(s)</td>
<td>Decompose</td>
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<tr>
<td>Simplify</td>
<td>Greater than &gt;</td>
<td>Graph</td>
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<tr>
<td>Sum</td>
<td>Independent variable</td>
<td>Ordered pair</td>
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<td>Distance</td>
<td>Inequalities</td>
<td>Perimeter</td>
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<td>Integers</td>
<td>Less than &lt;</td>
<td>Polygon</td>
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<td>Magnitude</td>
<td>Number line</td>
<td>Quadrants</td>
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<tr>
<td>Negative Numbers</td>
<td>Numerical expressions</td>
<td>Quadrilaterals</td>
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<tr>
<td>Opposite Number</td>
<td>Product</td>
<td>Volume</td>
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<tr>
<td>Positive Number</td>
<td>Quantity</td>
<td>X-axis</td>
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<tr>
<td>Rational Number</td>
<td>Quotient</td>
<td>X-coordinate</td>
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<tr>
<td>Sign</td>
<td>Sum</td>
<td>Y-axis</td>
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<tr>
<td></td>
<td>Table of Values</td>
<td>Y-coordinate</td>
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<tr>
<td></td>
<td>Term</td>
<td>Distance</td>
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<td></td>
<td>Variables</td>
<td>Origin</td>
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</table>
# References & Suggested Instructional Websites

<table>
<thead>
<tr>
<th>Reference</th>
<th>Description</th>
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</table>
| North Carolina Department of Public Instruction | Common Core standards “unpacked” for 6th Grade Mathematics  
http://www.ncpublicschools.org/curriculum/mathematics/scos/current/#unpacking |
| Georgia Department of Education | Various Common Core resources  
https://www.georgiastandards.org/Common-Core/Pages/Math-6-8.aspx |
| Illustrative Mathematics | Common Core tasks  
https://www.illustrativemathematics.org/ |
| Learnzillion | Common Core lessons and presentations  
https://learnzillion.com/ |
| Inside Mathematics | Various Common Core resources  
http://www.insidemathematics.org/ |
| EngageNY | Common Core lessons and resources  
https://www.engageny.org/ |
| PARCC Math Evidence Statements | Grade 6  
| Youtube.com |  |
| Teachertube.com |  |
| Khan Academy |  
https://www.khanacademy.org/commoncore/grade-6-RP |
Field Trip Ideas

THE BOUNCE FACTORY (Warren, NJ) - STEM- Inspired FUN Field Trips The Bounce Factory, Bricks 4 Kidz of Hunterdon Somerset and Team Makers of North Jersey have combined to create a unique and exciting Field Trip for students in grades 1st – 8th. It integrates STEM learning with fun, hands on activities that will focus on Science, Engineering and Math concepts. The students will build motorized models with LEGO® bricks and discuss engineering and physics principals; enter the Bounce rooms for activities that will set in motion discussions of how physics impacts their play; learn about Math and Science concepts while playing integrative teambuilding activities that build their skills and promote working together; learn strategy and the power of collaboration while playing laser tag in a state of the art facility
http://www.bouncefactorynj.com/

LIBERTY SCIENCE CENTER (Jersey City, NJ) - An interactive science museum and learning center with math connections. There is a math guidebook for teachers to make connections with math: http://lsc.org/plan-your-visit/

NATIONAL MUSEUM OF MATHEMATICS (New York, NY) - Mathematics illuminates the patterns and structures all around us. Our dynamic exhibits, gallery, and programs will stimulate inquiry, spark curiosity, and reveal the wonders of mathematics. MoMath has innovative exhibits that will engage folks from 105 to 5 years old (and sometimes younger), but with a special emphasis on activities for 4th through 8th graders. **Requires approval from Unit Superintendent**
http://momath.org/

MUSEUM OF AMERICAN FIANANCE (New York, NY) – For more than 20 years, educators from around the country have been bringing students to the Museum to help them understand how finance impacts their daily lives. The Museum offers discounted admission for pre-booked groups of eight or more, as well as a variety of classes for students in middle school through college.
http://www.moaf.org/index

LEGOLAND DISCOVERY CENTER (Yonkers, NY) – Merry-Go-Round Workshop (Engineering Design, Mathematics, Listening and Speaking) This workshop provides a fun, hand-on way to get students excited about engineering, design, and mathematics. Students build a LEGO merry-go-round to explore gear ratios then experiment with gear trains to see which combination enables their ride to spin the fastest. **Requires approval from Unit Superintendent**
https://www.legolanddiscoverycenter.com/westchester/education/elementary-school.aspx

BUEHLER'S CHALLENGER & SCIENCE CENTER (Paramus, NJ) - Fly a space mission beyond your wildest dreams in the challenger simulator! Students will work on teams to complete their mission, while conducting experiments, monitoring life support, and implementing navigation orders. In this dynamic environment, students use principles of science, mathematics, and technology to complete their tasks. There are 3 missions to choose from: “Rendezvous with Comet Halley”, “Return to the Moon”, “Voyage to Mars”.
**Requires approval from Unit Superintendent**
http://www.bcsc.org/5-9th-grade/

**BRANCH BROOK PARK SKATING RINK (Newark, NJ)** - A unique educational experience that gets students excited about learning! Students will learn how the concepts of Science, Technology, Engineering and Math can be found in everyday experiences, even FUN experiences like roller skating! Our professional STEM Educators teach visiting students about how STEM principles exist in just about every part of life. The lessons focus on hands on activities that are both educational and fun! Lessons are customized based on teachers needs to directly relate back to classroom learning making this program completely unique! Following the completion of the 1 hour STEM Lesson, the students roller skate for physical fitness. While Roller Skating the concepts students learned are continually reinforced. Our lessons are designed not only to help students overcome their fear of learning STEM concepts but to show how STEM is both FUN & EXCITING!