MATHEMATICS

Grade 4: Unit 4
Geometry and Measurement
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.

Fourth grade Mathematics consists of the following domains: Operations and Algebraic Thinking (OA), Number and Operations in Base Ten (NBT), Number and Operations-Fractions (NF), Measurement and Data (MD), and Geometry (G). In fourth grade, instructional time should focus on three critical areas: (1) developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends; (2) developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers; (3) understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry.

1) Students generalize their understanding of place value to 1,000,000, understanding the relative sizes of numbers in each place. They apply their understanding of models for multiplication (equal-sized groups, arrays, and area models), place value, and properties of operations, in particular the distributive property, as they develop, discuss, and use efficient, accurate, and generalizable methods to compute products of multi-digit whole numbers. Depending on the numbers and the context, they select and accurately apply appropriate methods to estimate or mentally calculate products. They develop fluency with efficient procedures for multiplying whole numbers; understand and explain why the procedures work based on place value and properties of operations; and use them to solve problems. Students apply their understanding of models for division, place value, properties of operations, and the relationship of division to multiplication as they develop, discuss, and use efficient, accurate, and generalizable procedures to find quotients involving multi-digit dividends. They select and accurately apply appropriate methods to estimate and mentally calculate quotients, and interpret remainders based upon the context.

2) Students develop understanding of fraction equivalence and operations with fractions. They recognize that two different fractions can be equal (e.g., 15/9 = 5/3), and they develop methods for generating and recognizing equivalent fractions. Students extend previous understandings about how fractions are built from unit fractions, composing fractions from unit fractions, decomposing fractions into unit fractions, and using the meaning of fractions and the meaning of multiplication to multiply a fraction by a whole number.

3) Students describe, analyze, compare, and classify two-dimensional shapes. Through building, drawing, and analyzing two-dimensional shapes, students deepen their understanding of properties of two-dimensional objects and the use of them to solve problems involving symmetry.
ESL Framework

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>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines and identify these in two-dimensional figures.</td>
<td>4.G.A.1</td>
</tr>
<tr>
<td>2</td>
<td>Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a particular size; recognize right angles as a category, and identify right, acute, obtuse, equilateral, isosceles, and scalene triangles.</td>
<td>4.G.A.2</td>
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<tr>
<td>3</td>
<td>Draw lines of symmetry and identify line-symmetric figures.</td>
<td>4.G.A.3</td>
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<tr>
<td>4</td>
<td>Explain angles as geometric shapes formed by two rays sharing a common endpoint and explain the relationship between a one-degree angle, a circle, and angle measure.</td>
<td>4.MD.C.5a,b</td>
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<tr>
<td>5</td>
<td>Measure angles in whole number degrees using a protractor and sketch angles of specific measures.</td>
<td>4.MD.C.6</td>
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<tr>
<td>6</td>
<td>Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems using a symbol for an unknown angle measure.</td>
<td>4.MD.C.7</td>
</tr>
<tr>
<td>7</td>
<td>Write and solve each equation (including any of the four operations) in order to solve multi-step word problems, using a letter to represent the unknown; interpret remainders in context and assess the reasonableness of answers using mental computation with estimation strategies.</td>
<td>4.OA.A.3*</td>
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<tr>
<td>8</td>
<td>Fluently add and subtract multi-digit whole numbers using the standard algorithm.</td>
<td>4.NBT.B.4*</td>
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</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)

Balanced Mathematics Instructional Model

Balanced math consists of three different learning opportunities; guided math, shared math, and independent math. Ensuring a balance of all three approaches will build conceptual understanding, problem solving, computational fluency, and procedural fluency. Building conceptual understanding is the focal point of developing mathematical proficiency. Students should frequently work on rigorous tasks, talk about the math, explain their thinking, justify their answer or process, build models with graphs or charts or manipulatives, and use technology.

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)
## Effective Pedagogical Routines/Instructional Strategies

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<th>Analyze Student Work</th>
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<tr>
<td>Connect Previous Knowledge to New Learning</td>
<td>Identify Student’s Mathematical Understanding</td>
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<td>Making Thinking Visible</td>
<td>Identify Student’s Mathematical Misunderstandings</td>
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<tr>
<td>Develop and Demonstrate Mathematical Practices</td>
<td>Interviews</td>
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<td>Inquiry-Oriented and Exploratory Approach</td>
<td>Role Playing</td>
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<tr>
<td>Multiple Solution Paths and Strategies</td>
<td>Diagrams, Charts, Tables, and Graphs</td>
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<tr>
<td>Use of Multiple Representations</td>
<td>Anticipate Likely and Possible Student Responses</td>
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<tr>
<td>Explain the Rationale of your Math Work</td>
<td>Collect Different Student Approaches</td>
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<tr>
<td>Quick Writes</td>
<td>Multiple Response Strategies</td>
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<td>Pair/Trio Sharing</td>
<td>Asking Assessing and Advancing Questions</td>
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<td>Turn and Talk</td>
<td>Revoicing</td>
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<td>Charting</td>
<td>Marking</td>
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<td>Gallery Walks</td>
<td>Recapping</td>
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<td>Small Group and Whole Class Discussions</td>
<td>Challenging</td>
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<td>Student Modeling</td>
<td>Pressing for Accuracy and Reasoning</td>
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<td>Maintain the Cognitive Demand</td>
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# Educational Technology

## Standards

<table>
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<tr>
<th>8.1.5.A.1, 8.1.5.A.2, 8.1.5.A.3, 8.2.5.C.7</th>
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- **Technology Operations and Concepts**
  - Select and use the appropriate digital tools and resources to accomplish a variety of tasks including problem solving.

  **Example:** A digital protractor can assist with the measuring of angles, finding the measurements of unknown angles, and enabling students to use tools that they will utilize during PARCC. [http://www.visnos.com/demos/basic-angles](http://www.visnos.com/demos/basic-angles)

  - Format a document using a word processing application to enhance text and include graphics, symbols, and/or pictures.

  **Example:** Microsoft Word can be used to create a map utilizing geometry, such as angles, parallel lines, perpendicular lines, and two-dimensional figures.

  - Use graphic organizer to organize information about problem or issue.

  **Example:** Graphic organizers can be used to sort information and create a solution path when students are solving multi-step word problems. [https://www.understood.org/~/media/c2bfb2d7d53a4f72adf04f8ed449c36.pdf](https://www.understood.org/~/media/c2bfb2d7d53a4f72adf04f8ed449c36.pdf)

- **Design**
  - Work with peers to redesign an existing product for a different purpose.

  **Example:** Students can work collaboratively to redesign a product, such as a bicycle with two-dimensional shapes and decide if it can be used for something else.
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 and use tools to explore and deepen understanding of concepts. Protractors can be used to measure and create angles and rulers can be used to draw lines, rays, and angles in this unit.

- **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 will communicate precisely using clear definitions and provide carefully formulated explanations when constructing arguments. Students will communicate and defend mathematical reasoning using objects, drawings, diagrams, and/or actions. Students will ask probing questions to clarify or improve arguments. In this unit, drawings of angles, measuring of angles, and drawings of two-dimensional figures will be used to explain and define different mathematical terms, such as scalene triangle, right angles, and symmetry.

- **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:** Students will understand the meaning of a problem and look for entry points to its solution. They will analyze information, make conjectures, and plan a solution pathway. Students will monitor and evaluate progress and change course as necessary. In this unit, students will find unknown angles by analyzing real world and mathematical problems to decide if they are adding or subtracting angle measures.

- **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 collaboratively in groups to solve mathematical tasks. Students will listen to or read the arguments of others and ask probing questions to clarify and improve arguments. In this unit, students will create and clarify explanations being provided by analyzing the visual representations of the geometric concepts that are being demonstrated, such as drawing and identifying lines of symmetry.
**WIDA Proficiency Levels**

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

<table>
<thead>
<tr>
<th>Level</th>
<th>Descriptions</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 meaning 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

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 helps 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 helps students question and unpack biases & stereotypes.

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

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

This unit / lesson challenges dominant perspectives.

**EQUITABLE PEDAGOGY**
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.

*Windows and mirrors are terms coined byhiroshi matsushita to describe educational materials and experiences that provide students with perspectives on culture, history, and society.

Culturally Relevant Pedagogy Examples

- **Present new concepts using student vocabulary.** Use student diction to capture attention and build understanding before using academic terms.
  
  **Example:** Work with students to create a variety of vocabulary sorting and matching games that relate student diction to vocabulary words in this unit. Students can work in teams or individually to play these games for approximately 10-15 minutes each week.

- **Bring in Guest Speakers:** Invite guest speakers who can add context to your lesson and speak from a specific culture’s general perspective.
  
  **Example:** Invite an art teacher to visit your class to speak about the use of angles, symmetry and geometric concepts in visual art.

- **Everyone has a Voice:** Create a classroom environment where students know that their contributions are expected and valued.
  
  **Example:** Norms for sharing are established that communicate a growth mindset for mathematics. All students are capable of expressing mathematical thinking and contributing to the classroom community. Students learn new ways of looking at problem solving by working with and listening to each other.

- **Use Problem-Based Learning Scenarios:** Present relatable real-world problems for your students to solve, explicitly referencing cultures and communities when applicable.
  
  **Example:** Create and use word problems that students will be able to relate to, have prior knowledge of, includes their interests, current events and/or are relevant to real-world situations. Using content the 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/
## 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>
</tr>
</thead>
<tbody>
<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 reports and projects</td>
<td>- Repeat, clarify or reword directions</td>
<td>- Brief and concrete directions</td>
<td>- Reference resources to promote independence</td>
</tr>
<tr>
<td>- Communication system between home and school</td>
<td>- Mini-breaks between tasks</td>
<td>- Provide immediate feedback</td>
<td>- Visual and verbal reminders</td>
</tr>
<tr>
<td>- Provide lecture notes/outline</td>
<td>- Provide a warning for transitions</td>
<td>- Small group instruction</td>
<td>- Graphic organizers</td>
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<tr>
<td></td>
<td>- Partnering</td>
<td>- Emphasize multi-sensory learning</td>
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</tbody>
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<thead>
<tr>
<th>Assistive Technology</th>
<th>Tests/Quizzes/Grading</th>
<th>Behavior/Attention</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<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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<td></td>
<td>- Read directions aloud</td>
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<td>- Color code materials</td>
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Differentiated Instruction
Accommodate Based on Content Specific Needs

- Chart academic vocabulary with visual representations.
- Anchor charts to model strategies
- Graphic organizers (examples include: venn diagram, 4 square graphic organizer for math word problems, K-W-L etc.)
- Translation dictionary
- Teacher modeling
- Students can utilize math journals to write notes, copy solution steps, and translate terms and key vocabulary.
- Grid paper
- Utilize technological programs which provide verbal and visual instruction in native and/or second language.
- Place value chart
- Calculators to verify computational accuracy
- 2-Dimensional figures
- Tracing Paper
- Protractors to accurately measure angles
- Rulers
## Interdisciplinary Connections

*Model interdisciplinary thinking to expose students to other disciplines.*

### Social Studies Connection:

**Intersecting Roads: 6.1.4.B.3**
- Students will be creating a small part of a map using different geometrical attributes. They can learn about the features and uses of a map as they explore sample maps. Students can see world maps created by other students at [http://www.mapping.com/mapfiles.shtml](http://www.mapping.com/mapfiles.shtml). An activity on creating a map can be found at [http://teacher.scholastic.com/lessonrepro/lessonplans/profbooks/ss971114b.htm](http://teacher.scholastic.com/lessonrepro/lessonplans/profbooks/ss971114b.htm).

**Destination Utah: 6.1.4.B.6**
- Students will be adding the miles and time that it takes to get from one city or tourist attraction to another. They can learn about the state of Utah and explore the locations and history of the state. [http://wikitravel.org/en/Utah](http://wikitravel.org/en/Utah).

### Science Connection:

**Sending the Right Signal: 4-PS4-1**

### ELA Connection:

**Quilt of Symmetry: W.4.3.A, B, C, D**
- Students are creating quilt squares that can be used to tell a story. Students can write a story that matches their quilt and read literature books about quilting to help them. Some books that can be used are *The Patchwork Quilt* by Valerie Flournoy or *Sam Johnson and the Blue Ribbon Quilt* by Lisa Campbell Ernst. An activity for developing a Story Quilt can be found at [http://www.litcircles.org/Extension/storyquilt.html](http://www.litcircles.org/Extension/storyquilt.html).
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 Learning Standards

4.G.A.1. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

4.G.A.2. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.

4.G.A.3. Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

4.MD.C.5. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement.
   
   4.MD.C.5a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a “one-degree angle,” and can be used to measure angles.

   4.MD.C.5b. An angle that turns through $n$ one-degree angles is said to have an angle measure of $n$ degrees.


4.MD.C.7. Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.
New Jersey Learning Standards

4.NBT.B.4
Fluently add and subtract multi-digit whole numbers using the standard algorithm.\(\text{[Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000.]}\)

4.OA.A.3.
Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
<table>
<thead>
<tr>
<th>Mathematical Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Make sense of problems and persevere in solving them.</td>
</tr>
<tr>
<td>2. Reason abstractly and quantitatively.</td>
</tr>
<tr>
<td>3. Construct viable arguments and critique the reasoning of others.</td>
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<tr>
<td>4. Model with mathematics.</td>
</tr>
<tr>
<td>5. Use appropriate tools strategically.</td>
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<tr>
<td>6. Attend to precision.</td>
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<tr>
<td>7. Look for and make use of structure.</td>
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<tr>
<td>8. Look for and express regularity in repeated reasoning.</td>
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<td>Grade: Four</td>
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</table>

**NJSLS:**

**Unit Focus:**
- Draw and identify lines and angles, and classify shapes by properties of their lines and angles
- Understand concepts of angle and measure angles (Geometric measurement)
- Use the four operations with whole numbers to solve problems
- Use place value understanding and properties of operations to perform multi-digit arithmetic

**New Jersey Student Learning Standard:**
4.G.A.1: Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

**Student Learning Objective 1:** Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines and identify these in two-dimensional figures.

**Modified Student Learning Objectives/Standards:**
M.EE.4.G.A.1: Recognize parallel lines and intersecting lines.

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<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>
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<tbody>
<tr>
<td>MP 5</td>
<td>4.G.1</td>
<td>Develop a clear understanding that a point, line, and plane are the core attributes of space objects, and real-world situations can be used to think about these attributes.</td>
<td>Line segments and rays are sets of points that describe parts of lines, shapes, and solids. Angles are formed by two intersecting lines or by rays with a common endpoint. They are classified by size.</td>
<td>The Geometry of Letters Making Roads Be an Expert Angle Sort Moving Around Town</td>
</tr>
<tr>
<td>MP 7</td>
<td></td>
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<tr>
<td>Enforcing precise geometrical vocabulary is important for mathematical communication.</td>
<td>How can lines, angles, and shapes be described, analyzed, and classified?</td>
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<tr>
<td><strong>Example:</strong> How many acute, obtuse and right angles are in this shape?</td>
<td>What is the difference between a point, ray, line, and line segment?</td>
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</tr>
<tr>
<td></td>
<td>How are points, lines, line segments, rays, and angles related?</td>
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<tr>
<td>Draw and identify points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines.</td>
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<tr>
<td>Name and identify attributes of two-dimensional figures.</td>
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<tr>
<td>Distinguish between lines, line segments, and rays.</td>
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<tr>
<td><strong>SPED Strategies:</strong> Let the student use concrete materials and manipulatives (shapes, rulers, geoboards) to draw points, lines, line segments, rays, angles, and identify two-dimensional figures.</td>
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<tr>
<td>Create an interactive math journal to demonstrate growth in math writing and reasoning.</td>
<td><strong>What’s the point?</strong></td>
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<td></td>
</tr>
</tbody>
</table>
Create flip books with pictures, academic vocabulary and examples.

Use different learning modalities to introduce and practice drawing points, lines, segments, rays, angles, perpendicular and parallel lines and identify two-dimensional figures (short videos, songs, manipulatives).

**ELL Strategies:**
Demonstrate comprehension of lines, rays, types of angles and perpendicular and parallel lines by identifying and drawing them in two-dimensional figures after reading problems written in L1 (student’s native language) and/or using gestures, models and selected, single words.

Use direct instruction for vocabulary with visuals or concrete representations.

Scaffold questioning to guide connections, analysis, and mastery.

Let students choose the language they prefer for arithmetic computation and discourse.
**New Jersey Student Learning Standard:**
4.G.A.2: Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.

**Student Learning Objective 2:** Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a particular size; recognize right angles as a category, and identify right, acute, obtuse, equilateral, isosceles, and scalene triangles.

**Modified Student Learning Objectives/Standards:**

<table>
<thead>
<tr>
<th>MPs</th>
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<th>Tasks/Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP 5</td>
<td>4.G.2</td>
<td>Classify triangles based on the presence or absence of perpendicular lines and based on the presence or absence of angles of a particular size.</td>
<td>How are geometric objects different from one another?</td>
<td>What Shape am I?</td>
</tr>
<tr>
<td>MP 7</td>
<td>A trapezoid is defined as “A quadrilateral with at least one pair of parallel sides.” Tasks may include terminology: equilateral, isosceles, scalene, acute, right, and obtuse.</td>
<td>Classify quadrilaterals based on the presence or absence of parallel or perpendicular lines and based on the presence or absence of angles of a particular size.</td>
<td>How are quadrilaterals alike and different?</td>
<td>Is it Possible?</td>
</tr>
<tr>
<td></td>
<td>Two-dimensional or plane shapes have many properties that make them different from one another.</td>
<td>Students should become familiar with the concept of parallel and perpendicular lines. Two lines are parallel if they never intersect and are always equidistant. Two lines are</td>
<td>What are the difference between triangles, quadrilaterals, pentagons, hexagons, and octagons?</td>
<td>Thoughts about Triangles</td>
</tr>
<tr>
<td></td>
<td>Students should become familiar with the concept of parallel and perpendicular lines. Two lines are parallel if they never intersect and are always equidistant. Two lines are</td>
<td></td>
<td>How are triangles alike and different?</td>
<td>My Many Triangles</td>
</tr>
<tr>
<td></td>
<td></td>
<td>How can angle and side measures help us to create and classify triangles?</td>
<td></td>
<td>Classify Two-Dimensional Shapes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>How can shapes be classified by their angles and lines?</td>
<td></td>
<td>Sorting Shapes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>How can the attributes of sides be used to classify quadrilaterals?</td>
<td></td>
<td>Defining Attributes of Rectangles and Parallelograms</td>
</tr>
</tbody>
</table>
Parallel and perpendicular lines are shown below:

```
A       F       B
C       D       G
```

Polygons can be described and classified by their sides and angles.

Identify triangles, quadrilaterals, pentagons, hexagons, and octagons based on their attributes.

Have a clear understanding of how to define and identify a right triangle.

**TEACHER NOTE:** In the U.S., the term “trapezoid” may have two different meanings. Research identifies these as inclusive and exclusive definitions. The inclusive definition states: A trapezoid is a quadrilateral with at least one pair of parallel sides. The exclusive definition states: A trapezoid is a quadrilateral with exactly one pair of parallel sides. With this definition, a parallelogram is not a trapezoid. (Progressions for the CCSSM: Geometry, June 2012.)

How can triangles be classified by the measure of their angles?

How can we sort two-dimensional figures by their angles?
SPED Strategies:
Demonstrate comprehension by orally classifying two-dimensional figures based on the presence or absence of parallel or perpendicular lines, and specific angles (obtuse, acute, right) using key, technical vocabulary in simple sentences.

Use real-life examples and concrete materials as needed to classify two-dimensional figures. Identify if they are right, acute, obtuse, equilateral, isosceles, and scalene triangles.

Offering learners choices can develop self-determination, instill pride, and increase the level in which they feel connected to their learning. One way to offer choice is to let students decide the sequence of some components of their learning. Menus from which students may choose tasks are one way to offer such academic choice.

ELL Strategies:
Have students explain their thinking process aloud in their native language to a classmate while solving a problem.

Using L1 (student’s native language) create an interactive math journal to utilize as a reference and utilize cognates.
New Jersey Student Learning Standard:
4.G.A.3: Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

Student Learning Objective 3: Draw lines of symmetry and identify line-symmetric figures.

Modified Student Learning Objectives/Standards:
M. EE.4.G.3: Recognize that lines of symmetry partition shapes into equal areas.

<table>
<thead>
<tr>
<th>MP 5</th>
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</thead>
<tbody>
<tr>
<td>MP 5</td>
<td>4.G.3</td>
<td>Gain a conceptual understanding that a line of symmetry will split a figure into two equal parts. Recognize a line of symmetry for a two-dimensional figure as a line across the figure, so that the figure can be folded along the line into matching parts. Develop an understanding that each half of a figure is a mirror image of the other half. Draw lines of symmetry.</td>
<td>What is symmetry? How are symmetrical figures created? How are symmetrical figures used in art work? How can you determine the lines of symmetry in a figure? What do they tell us? How can you prove that a shape is symmetrical?</td>
<td>Superhero Symmetry Line Symmetry A Quilt of Symmetry The Rest of the Shape Finding Lines of Symmetry Decoding ABC Symmetry</td>
</tr>
<tr>
<td>MP 7</td>
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<tr>
<td>Folding cut-out figures will help students determine whether a figure has one or more lines of symmetry.</td>
<td>How is symmetry used in areas such as architecture and art? In what areas is symmetry important?</td>
<td></td>
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</tr>
<tr>
<td>Identify figures and letters of the alphabet that have lines of symmetry.</td>
<td>Polygons with an odd number of sides have lines of symmetry that go from a midpoint of a side through a vertex.</td>
<td></td>
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</tr>
</tbody>
</table>

**SPED Strategies:**
Demonstrate and explain orally and in writing how to draw lines of symmetry and identify line-symmetric figures using key vocabulary in simple sentences.

Practice identifying and drawing lines of symmetry by using technology.

Use direct instruction for vocabulary with visual or concrete representations.

Model in small groups how to identify and draw a line of symmetry.

**ELL Strategies:**
Demonstrate and explain orally and in writing how to draw lines of symmetry and identify line-symmetric figures in L1 (student’s native language) and/or use gestures, drawings and selected single words.

Peer Coach - Allow ELL students to talk to a peer in their native language when necessary to clarify
understanding and clear up misunderstandings.

Provide sufficient wait time to allow the student to process the meanings in their native language.

**New Jersey Student Learning Standards:**

4.MD.C.5: Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement.

   4.MD.C.5a: An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a “one-degree angle,” and can be used to measure angles.

   4.MD.C.5b: An angle that turns through $n$ one-degree angles is said to have an angle measure of $n$ degrees.

**Student Learning Objective 4:** Explain angles as geometric shapes formed by two rays sharing a common endpoint and explain the relationship between a one-degree angle, a circle, and angle measure.

**Modified Student Learning Objectives/Standards:**

M.EE.4.MD.C.5: Recognize angles in geometric shapes.

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</thead>
<tbody>
<tr>
<td>MP 2</td>
<td>4.MD.5</td>
<td>Develop a clear understanding that angles are geometric shapes composed of two rays that are infinite in length, share a common endpoint, and result from the rotation of one ray around the endpoint. Become aware that the unit for measuring the size of the opening of an angle is 1 degree.</td>
<td>What is an angle? How are a circle and an angle related? How can we measure angles using wedges of a circle? A protractor can be used to draw and label an angle.</td>
<td>Turn, Turn, Turn The Water Sprinklers Build an Angle Ruler</td>
</tr>
</tbody>
</table>
| Angle Measurement: An angle that turns through \( n \) one-degree angles is said to have an angle measure of \( n \) degrees.  
As the rays of an angle extend, the degree of the angle does not change, but the distance between the rays increases.  

Describe an angle as measured with reference to a circle with the center of the circle being the common endpoint of the rays.  
Explain a ‘one-degree angle’ and its relation to a circle; a “degree” is defined as \( 1/360 \) (one degree angle) of the entire circle.  
Identify angles in two-dimensional figures.  
**SPED Strategies:**  
Provide students with color coded notes and samples.  

| How are the angles of a triangle related?  
How can angles be combined to create other angles?  
Why do we need a standard unit with which to measure angles?  
Why would one need to measure an angle?  


Review vocabulary and provide students with the opportunity to engage in hands-on activities.

Assess by multiple means, including “show and tell” rather than written.

**ELL Strategies:**

Connect students’ prior knowledge and experiences to new learning. Find out what students already know about a topic by making a semantic web on the board. Write the topic in the center of a circle and record students’ knowledge around it.

To reduce the pressure on ELL students, let them discuss a question in pairs for a minute before calling on a student to give an answer. This strategy gives everyone in the class more time to think about the question and form an answer. It also increases comprehension and gives all students more opportunities to participate in class discussions.

Create an interactive math journal in L1 (student’s native language) to demonstrate growth in math writing and reasoning.
New Jersey Student Learning Standard:
4.MD.C.6: Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.

Student Learning Objective 5: Measure angles in whole number degrees using a protractor and sketch angles of specific measures.

Modified Student Learning Objectives/Standards:
M.EE.4.MD.C.6: Identify angles as larger and smaller.

<table>
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</thead>
<tbody>
<tr>
<td>MP 2</td>
<td>4.MD.6</td>
<td>Become aware of the relationship that acute and obtuse angles have to right angles.</td>
<td>What do we actually measure when we measure an angle?</td>
<td>Guess my Angle</td>
</tr>
<tr>
<td>MP 5</td>
<td></td>
<td>Reinforce that the unit for measuring the size of the opening of an angle is 1 degree and angles are measured in whole number degrees.</td>
<td>What mathematical tool is used to measure and draw angles?</td>
<td>Making Shapes</td>
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<tr>
<td></td>
<td></td>
<td>Students should measure angles and sketch angles.</td>
<td>How does knowing whether an angle is acute or obtuse help us when using a protractor?</td>
<td>Going Different Directions</td>
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<td></td>
<td></td>
<td>Provide varied examples and explicit discussions to avoid learning limited ideas about measuring angles.</td>
<td>What are benchmark angles and how can they be useful in estimating angle measures?</td>
<td>Intersecting Roads</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Develop a clear understanding of how to use a protractor to measure and draw angles in whole number degrees.</td>
<td>How do we measure an angle using a protractor?</td>
<td>Activities: Angle Barrier Game</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>How can we use angle measure to draw reflex angles?</td>
<td>Predicting and Measuring Angles</td>
</tr>
</tbody>
</table>
Given an angle measure, sketch the angle.

**SPED Strategies:**
Describe and explain orally and in writing how to measure angles in whole number degrees using a protractor and sketch angles of specified measure using key vocabulary in simple sentences.

Model how to measure using a protractor. Provide student with the opportunity to measure angles using technology.

Use alternative methods of delivery of instruction such as recordings and videos that can be accessed independently or repeated if necessary.

**ELL Strategies:**
Describe and explain orally and in writing how to measure angles in whole-number degrees using a protractor and sketch angles of
specified measure in L1 (student’s native language) and/or use gestures, pictures and selected single words.

Let students choose the language they prefer for arithmetic computation and discourse.

Keep picture dictionaries in the class and allow ELL students to create individualized bilingual math dictionaries.

New Jersey Student Learning Standard:
4.MD.C.7: Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.

Student Learning Objective 6: Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems using a symbol for an unknown angle measure.

Modified Student Learning Objectives/Standards: N/A

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</tr>
</thead>
<tbody>
<tr>
<td>MP 1</td>
<td>4.MD.7</td>
<td>Recognize angle measurements as additive.</td>
<td>How are angles measured, added, and subtracted?</td>
<td>Sending the Right Signal</td>
</tr>
<tr>
<td>MP 7</td>
<td></td>
<td>Understand that when an angle is decomposed into non-overlapping parts, the angle measurement of the whole is the sum of the angle measurements of the parts.</td>
<td>How can you find an unknown angle measurement when two other related angle measurements are given?</td>
<td>Measuring Angles</td>
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<td></td>
<td>How Many Degrees?</td>
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<td>Adding Up Angles</td>
</tr>
</tbody>
</table>
Recognize that you can find an unknown angle measurement by adding or subtracting angle parts.

Understand that you can write an equation for the unknown angle measurement (symbol).

This standard addresses the idea of decomposing (breaking apart) an angle into smaller parts.

**Example:**
80° is decomposed as (30° + ?°).

Write an equation with a symbol for the unknown angle measure.

Add and subtract to find unknown angles on a diagram in real world and mathematical problems.

**Example:**
The five shapes in the diagram are the exact same size. Write an equation that will help you find the measure of...
the indicated angle. Find the angle measurement.

**SPED Strategies:**
Demonstrate comprehension of addition and subtraction problems of unknown angles on a diagram in real world and mathematical problems by identifying the solution using key vocabulary in simple sentences.

Elaborate on the problem-solving process. Read word problems aloud. Post a visual display of the problem-solving process. Have students check off or highlight each step as they work. Talk through the problem-solving process step-by-step to demonstrate thinking process. Before students solve, ask questions to check for comprehension.
<table>
<thead>
<tr>
<th></th>
<th>Give students a few extra minutes to process the information before giving the signal to respond.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ELL Strategies:</strong></td>
<td><strong>Demonstrate comprehension of addition and subtraction problems of unknown angles on a diagram in real world and mathematical problems by identifying the solution in L1 (student’s native language) and/or use gestures, pictures and selected single words.</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Interactive math journal to demonstrate growth in math writing and reasoning.</strong></td>
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<td></td>
<td><strong>Highlight words/boldface words that students should remember.</strong></td>
</tr>
</tbody>
</table>
New Jersey Student Learning Standard:
**4.OA.A.3**: Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

**Student Learning Objective 7**: Write and solve each equation (including any of the four operations) in order to solve multi-step word problems, using a letter to represent the unknown; interpret remainders in context and assess the reasonableness of answers using mental computation with estimation strategies.

**Modified Student Learning Objectives/Standards**:
**M.EE.4.OA.A.3**: Solve one-step real-world problems using addition or subtraction within 100.

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<tr>
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<tbody>
<tr>
<td>MP 1</td>
<td>4.OA.3-1 4.OA.3-2</td>
<td>Use graphic organizers to help identify unknowns to create equations and solve a word problem based on clues in the word problem.</td>
<td>How do multiplication, division, addition, subtraction, and estimation help us solve real world problems? How can we find evidence in word problems to support our equations? Variables can be used to represent an unknown in any part of an equation.</td>
<td>Recycling Cans</td>
</tr>
<tr>
<td>MP 2</td>
<td></td>
<td>Some operations can be used interchangeably to create different equations that solve the same word problem.</td>
<td></td>
<td>Zoo Field Trip</td>
</tr>
<tr>
<td>MP 4</td>
<td></td>
<td>Variables can be used to represent an unknown in any part of an equation.</td>
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<td>How Many Cookies Do We Have?</td>
</tr>
<tr>
<td>MP 7</td>
<td></td>
<td>Emphasize the proper use of the equal (=) sign and the improper use (3+7=10-5=5)</td>
<td></td>
<td>Birthday Treats</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relate the terms in the equation to the context in the word problem.</td>
<td></td>
<td>Ice Cream Party</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Carnival Tickets</td>
</tr>
</tbody>
</table>
- present corrected reasoning. (For example, some flawed ‘student’ reasoning is presented and the task is to correct and improve it.)

- Reasoning in these tasks centers on interpretation of remainders.

**4.C.6-1**

- Present solutions to multi-step problems in the form of valid chains of reasoning, using symbols such as equals signs appropriately (for example, rubrics award less than full credit for the presence of nonsense statements such as $1 + 4 = 5 + 7 = 12$, even if the final answer is correct), or identify or describe errors in solutions to multi-step problems and present corrected solutions

- Tasks may involve interpreting remainders.

Students should be able to identify the unknown(s) in the problem and use a variable to represent that term in context.

Solve multi-step word problems involving any of the four operations.

Explain why an answer is reasonable, such as using mental computation and estimation strategies.

Provide students with a variety of equations and have students create their own math story that is represented in the given equation.

**SPED Strategies:**

Elaborate on the problem-solving process. Read word problems aloud. Post a visual display of the problem-solving process. Have students check off or highlight each step as they work. Talk through the problem-solving process step-by-step to demonstrate thinking process. Before students solve, ask questions for comprehension, such as, “What unit are we counting? What happened to the units in the story?” Teach students to use self-questioning techniques, such as, “Does my answer make sense?”

Interactive Math Journal with samples.
<table>
<thead>
<tr>
<th>Multi-step problems must have at least 3 steps.</th>
<th>Replace unknown numbers with given values in two digit by two digit addition/subtraction sentences.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ELL Strategies:</strong> In L1 (student’s native language), elaborate on the problem-solving process. Read word problems aloud. Post a visual display of the problem-solving process. Have students check off or highlight each step as they work. Talk through the problem-solving process step-by-step to demonstrate thinking process.</td>
<td>Provide sufficient wait time to allow the student to process the meaning in their first language. Determine the reasonableness of an answer to an addition or subtraction problem using estimation strategies of “more” and “less” and the reasonableness of an answer to division problems using estimation strategies (e.g., repeated subtraction).</td>
</tr>
</tbody>
</table>
**New Jersey Student Learning Standard:**

4.NBT.B.4: Fluently add and subtract multi-digit whole numbers using the standard algorithm. [*Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000.*]

**Student Learning Objective 8:** Fluently add and subtract multi-digit whole numbers using the standard algorithm.

**Modified Student Learning Objectives/Standards:**

M.EE.4.NBT.4: Add and subtract two-digit whole 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 7</td>
<td>4.NBT.4-1</td>
<td>Recognize the need for regrouping and not just subtracting the smaller digit from the larger one.</td>
<td>What strategies can we use to help us make sense of a written algorithm?</td>
<td>Make Sense of an Algorithm</td>
</tr>
<tr>
<td>MP 8</td>
<td></td>
<td>Utilize grid paper to line up similar place values when adding and subtracting. Fluency refers to accuracy, efficiency (using a reasonable amount of steps and times) and flexibility (variety of strategies learned previously if needed).</td>
<td>How can we combine hundreds, tens, and ones in two or more numbers efficiently?</td>
<td>Reality Checking</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explain why algorithms work with the use of multiples of 10, place value, and diagrams of arrays and area.</td>
<td>The value of a number is determined by the place of its digits.</td>
<td>Beehive Adventure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Computation involves taking apart and combining numbers using a variety of approaches.</td>
<td>Addition and subtraction algorithms are abbreviations or summaries of the connection between math drawings and written numerical work.</td>
<td>Filling the Auditorium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flexible methods of computation involve grouping numbers in strategic ways: partial sum, regrouping, and trade first.</td>
<td>Why does it help to know inverse relationships?</td>
<td>How Much Liquid</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Computation algorithm:</strong></td>
<td>If I Had a Million Dollars?</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Japan Trip</td>
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<td></td>
<td></td>
<td></td>
<td>Destination Utah</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Comparing Manti and La Sal Mountain Range Elevation</td>
</tr>
</tbody>
</table>
- Tasks are not timed.

**4.NBT.4-2**
- The given subtrahend and minuend are such as to require an efficient/standard algorithm (e.g., 7263 – 4875 or 7406 – 4637). The subtrahend and minuend do not suggest any obvious ad hoc or mental strategy (as would be present for example in a case such as 7300 – 6301).
- Tasks do not have a context and are not timed.
- Grade 4 expectations in NJSLS are limited to whole numbers less than or equal to 1,000,000; for purposes of assessment, both of the given numbers should have 4 digits.

One could use an alternate algorithm to check the answer to a problem.

**SPED Strategies:**
In small groups students can practice adding and subtracting facts by using bundles, chips and other resources.

Use of grid paper to assist students with lining up digits and emphasize place value and the meaning of each of the digits.

Provide flashcards and or the opportunity to practice basic facts on the computer.

Start with a students’ understanding of a certain strategy, and then make intentional connections for the student to the standard algorithm. This allows the student to gain understanding of the algorithm rather than just memorize certain steps to follow.

**ELL Strategies:**
Sequence orally the steps needed to add and subtract two multi-digit whole numbers in L1 (student’s native language) and/or use gestures, examples, and selected, technical words.

Have students peer tutor classmates who are having difficulties applying standard algorithms in addition and subtraction.

Use technology to practice adding and subtracting single digit numbers and use a set of predefined steps applicable to a class of problems that gives the correct result in every case when the steps are carried out correctly.

**Computation strategy:**
Purposeful manipulations that may be chosen for specific problems, may not have a fixed order, and may be aimed at converting one problem into another.
| grid paper to assist students with lining up digits. Explain directions in L1 (student’s native language) to ensure understanding of the task. |
## Integrated Evidence Statements

### 4.Int.5: Solve multi-step word problems posed with whole numbers and involving computations best performed by applying conceptual understanding of place value, perhaps involving rounding. Content Scope: 4.OA.3, 4.NBT
- Multi-step problems must have at least 3 steps.
- Tasks must be aligned to the first standard and 1 or more of the subsequent standards listed in the content scope.

### 4.Int.7: Solve one-step word problems involving adding or subtracting two four-digit numbers.
- The given numbers are such as to require an efficient/standard algorithm (e.g., 7263 + 4875, 7263 – 4875, 7406 – 4637). The given numbers do not suggest any obvious ad hoc or mental strategy (as would be present, for example, in a case such as 6,999 + 3,501 or 7300 – 6301).
- Word problems shall include a variety of grade-level appropriate applications and contexts.

### 4.Int.8: Solve addition and subtraction word problems involving three four-digit addends, or two four-digit addends and a four-digit subtrahend.
- The given numbers are such as to require an efficient/standard algorithm (e.g., 7263 + 4875 + 6901). The given numbers do not suggest any obvious ad hoc or mental strategy (as would be present, for example, in a case such as 6,999 + 3,501 - 5,000).

### 4.C.5-6 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 3.OA.B, 3.NF, 3.MD.C
- Tasks may have scaffolding if necessary in order to yield a degree of difficulty appropriate to Grade 4.

### 4.D.1 Solve multi-step contextual word problems with degree of difficulty appropriate to Grade 4, requiring application of knowledge and skills articulated in Type I, Sub-Claim A Evidence Statements.
- Tasks may have scaffolding.
- Multi-step problems must have at least 3 steps.
Integrated Evidence Statements

4.D.2 Solve multi-step contextual problems with degree of difficulty appropriate to Grade 4, requiring application of knowledge and skills articulated in 3.OA.A, 3.OA.8, 3.NBT, and/or 3.MD.

- Tasks may have scaffolding, if necessary, in order to yield a degree of difficulty appropriate to Grade 4.
- Multi-step problems must have at least 3 steps.
- Tasks do not require a student to write a single equation with a letter standing for the unknown quantity in a two-step problem, and then solve that equation.
- Tasks may require students to write an equation as part of their work to find a solution, but students are not required to use a letter for the unknown.

Addition, subtraction, multiplication and division situations in these problems may involve any of the basic situation types with unknowns in various positions (see NJSLS, Table 1, Common addition and subtraction, p. 93; NJSLS Table 2, Common multiplication and division situations, p. 94; and the OA Progression document.)
## Unit 4 Vocabulary

<table>
<thead>
<tr>
<th>Left Column</th>
<th>Right Column</th>
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<tbody>
<tr>
<td>Acute Angle</td>
<td>Octagon</td>
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<tr>
<td>Acute Triangle</td>
<td>Parallel Lines</td>
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<tr>
<td>Additive</td>
<td>Parallelogram</td>
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<tr>
<td>Algorithm</td>
<td>Pentagon</td>
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<tr>
<td>Angle</td>
<td>Perpendicular Lines</td>
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<tr>
<td>Angle Extension</td>
<td>Place Value</td>
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<tr>
<td>Angle Measure</td>
<td>Plane Shapes/ Figure</td>
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<tr>
<td>Attributes</td>
<td>Point</td>
</tr>
<tr>
<td>Circle</td>
<td>Polygon Protractor</td>
</tr>
<tr>
<td>Classify</td>
<td>Quadrilateral</td>
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<tr>
<td>Compose</td>
<td>Ray</td>
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<tr>
<td>Computation</td>
<td>Rectangle</td>
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<td>Congruent</td>
<td>Regular Polygon</td>
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<tr>
<td>Decompose</td>
<td>Rhombus</td>
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<td>Degree</td>
<td>Right Angle</td>
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<tr>
<td>Diagonal</td>
<td>Right Triangle</td>
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<tr>
<td>Endpoint</td>
<td>Shapes</td>
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<tr>
<td>Geometry</td>
<td>Side Measures</td>
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<tr>
<td>Hexagon</td>
<td>Sketch</td>
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<tr>
<td>Horizontal</td>
<td>Square</td>
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<tr>
<td>Intersecting Lines</td>
<td>Standard Unit</td>
</tr>
<tr>
<td>Length</td>
<td>Straight Angle</td>
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<tr>
<td>Line</td>
<td>Symmetry</td>
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<tr>
<td>Line Segment</td>
<td>Triangle</td>
</tr>
<tr>
<td>Line of Symmetry</td>
<td>Trapezoid</td>
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<tr>
<td>Line Segment</td>
<td>Two-Dimensional Figure</td>
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<tr>
<td>Mathematical Tool</td>
<td>Unknown Angle</td>
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<tr>
<td>Non-Overlapping</td>
<td>Vertex</td>
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<tr>
<td>Obtuse Angle</td>
<td></td>
</tr>
<tr>
<td>Obtuse Triangle</td>
<td></td>
</tr>
</tbody>
</table>
## References & Suggested Instructional Websites

- [www.internet4classrooms.com](http://www.internet4classrooms.com)
- [www.k-5mathteachingresources.com/](http://www.k-5mathteachingresources.com/)
- [www.georgiastandards.org/Common-Core/Pages/Math-K-5.aspx](http://www.georgiastandards.org/Common-Core/Pages/Math-K-5.aspx)
- [www.illustrativemathematics.org/](http://www.illustrativemathematics.org/)
- [mathcommoncoreresources.wikispaces.com/Elementary+Resources](http://mathcommoncoreresources.wikispaces.com/Elementary+Resources)
- [http://www.sebring.k12.oh.us/userfiles/28/Classes/7664/4th%20Grade%20Common%20Core%20Math%20Vocabulary%20on%20one%20sheet%20for%20notebook-0.pdf](http://www.sebring.k12.oh.us/userfiles/28/Classes/7664/4th%20Grade%20Common%20Core%20Math%20Vocabulary%20on%20one%20sheet%20for%20notebook-0.pdf)
- [http://3-5cctask.ncdpi.wikispaces.net/Fourth+Grade+Tasks](http://3-5cctask.ncdpi.wikispaces.net/Fourth+Grade+Tasks)
- [http://www.katm.org/flipbooks/4%20FlipBook%20Final%20CCSS%202014.pdf](http://www.katm.org/flipbooks/4%20FlipBook%20Final%20CCSS%202014.pdf)
- [http://ccak52012.wikispaces.com/](http://ccak52012.wikispaces.com/)
Field Trip Ideas

NATIONAL MUSEUM OF MATHEMATICS: 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. http://momath.org/

THE BOUNCE FACTORY: 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. 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 - 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/

NEW JERSEY JACKALS – Students will be able to watch a live minor league baseball game while figuring out the players batting averages, the earned run average, determine the win to loss ratio for the season, the pitch count, and other player statistics. http://njjackals.pointstreaksites.com/view/njjackals/home-page-657

STORMING ROBOTS – Engage your group in STEM-oriented Robotics Engineering Exploration. Each experience may range from three to five hours. Storming Robots is listed in the NASA’s Educational Robotics Matrix. SR’s program aims to capitalize creativity with engineering disciplines. Projects captivate young minds; stimulate critical thinking and creativity with mathematics. Key Activities will include Open-ended, but application-based mini-projects focusing on problem-solving skills with computational thinking skills. http://www.stormingrobots.com/prod/techtrip.html
Field Trip Ideas

**BUEHLER CHALLENGER & SCIENCE CENTER** – Buehler Challenger & Science Center in New Jersey provides students, scouts, homeschoolers, and youth groups with the opportunity to “fly” simulated space missions using applied science and inquiry-based learning in our state-of-the-art simulators. Participants work as a team as they take on the role of astronauts and mission controllers to Rendezvous with Comet Halley, Return to the Moon, or Voyage to Mars. Students, scouts, and youth groups use team-building and hands-on learning with a focus on STEM to complete their mission goal. Programming for day field trips is available for students Pre-K through 12th grade. In addition, the Center also offers overnight camp-ins, professional development and outreach programs, including StarLab Planetarium & Living in Space Experience. [http://www.bcsc.org/](http://www.bcsc.org/)

**PANTHER ACADEMY PLANETARIUM** – Since 2004, the Panther Academy Planetarium has brought the universe to the Paterson community by educating and entertaining generations of school children and adults, inspiring imaginations and expanding horizons. Located in Paterson’s downtown business district and near Passaic County Community College, it is one of the best-equipped school planetariums in the United States. The planetarium resides at the heart of PANTHER, the Paterson Academy for Earth and Space Science. The Paterson school district equipped the planetarium with an interactive computerized system that supports Panther’s mathematics and science curriculum while providing district-wide weekly programs for elementary and secondary students. In addition to its value as an educational tool, the planetarium is also an important community resource, offering a variety of special presentations for public, college and community groups. [http://www.paterson.k12.nj.us/planetarium/](http://www.paterson.k12.nj.us/planetarium/)