MATHEMATICS

Grade 2: Unit 3
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.

Second grade Mathematics consists of the following domains: Operations and Algebraic Thinking (OA), Number and Operations in Base Ten (NBT), Measurement and Data (MD), and Geometry (G). In second grade, instructional time should focus on four critical areas: (1) extending understanding of base-ten notation; (2) building fluency with addition and subtraction; (3) using standard units of measure; and (4) describing and analyzing shapes.

1) Students extend their understanding of the base-ten system. This includes ideas of counting in fives, tens, and multiples of hundreds, tens, and ones, as well as number relationships involving these units, including comparing. Students understand multi-digit numbers (up to 1000) written in base-ten notation, recognizing that the digits in each place represent amounts of thousands, hundreds, tens, or ones (e.g., 853 is 8 hundreds + 5 tens + 3 ones).

2) Students use their understanding of addition to develop fluency with addition and subtraction within 100. They solve problems within 1000 by applying their understanding of models for addition and subtraction, and they develop, discuss, and use efficient, accurate, and generalizable methods to compute sums and differences of whole numbers in base-ten notation, using their understanding of place value and the properties of operations. They select and accurately apply methods that are appropriate for the context and the numbers involved to mentally calculate sums and differences for numbers with only tens or only hundreds.

3) Students recognize the need for standard units of measure (centimeter and inch) and they use rulers and other measurement tools with the understanding that linear measure involves an iteration of units. They recognize that the smaller the unit, the more iterations they need to cover a given length.

4) Students describe and analyze shapes by examining their sides and angles. Students investigate, describe, and reason about decomposing and combining shapes to make other shapes. Through building, drawing, and analyzing two- and three-dimensional shapes, students develop a foundation for understanding area, volume, congruence, similarity, and symmetry in later grades.
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>
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<tr>
<th>#</th>
<th>Student Learning Objective</th>
<th>NJSLS</th>
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<tbody>
<tr>
<td>1</td>
<td>Estimate lengths of objects and measure lengths of objects using appropriate tools.</td>
<td>2.MD.A.1, 2.MD.A.3</td>
</tr>
<tr>
<td>2</td>
<td>Compare measurements of an object taken with two different units of measure and describe how the two measurements relate to the size of the unit chosen.</td>
<td>2.MD.A.2</td>
</tr>
<tr>
<td>3</td>
<td>Compare lengths of two objects and determine how much longer one object is than the other using a standard unit of measure.</td>
<td>2.MD.A.4</td>
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<tr>
<td>4</td>
<td>Add and subtract within 100 to solve word problems involving lengths using a symbol to represent the unknown number.</td>
<td>2.MD.B.5</td>
</tr>
<tr>
<td>5</td>
<td>Use a number line to represent the solution of whole number sums and differences related to length within 100.</td>
<td>2.MD.B.6</td>
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<tr>
<td>6</td>
<td>Tell and write time using analog and digital clocks to the nearest five minutes using a.m. and p.m.</td>
<td>2.MD.C.7</td>
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<tr>
<td>7</td>
<td>Orally count within 1000 including skip-counting by 5s, 10s, and 100s.</td>
<td>2.NBT.A.2*</td>
</tr>
<tr>
<td>8</td>
<td>Select and use a strategy (place value, properties of operation, and/or the relationship between addition and subtraction) to add and subtract within 100.</td>
<td>2.NBT.B.5*</td>
</tr>
<tr>
<td>9</td>
<td>Add and subtract within 100 to solve 1- and 2-step word problems with unknowns in any position.</td>
<td>2.OA.A.1*</td>
</tr>
<tr>
<td>10</td>
<td>Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method.</td>
<td>2.NBT.B.7*</td>
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</tbody>
</table>
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)
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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><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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<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><strong>Analyze Student Work</strong></td>
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<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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<td>Role Playing</td>
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<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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<td>Pressing for Accuracy and Reasoning</td>
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<td>Maintain the Cognitive Demand</td>
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# Educational Technology Standards

**8.1.2.A.4, 8.1.2.E.1, 8.2.2.A.2, 8.2.2.A.3, 8.2.2.C.1, 8.2.2.E.3**

- **Technology Operations and Concepts**
  - Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums).
  - **Example:** Students will navigate websites such as Imagine Math Facts, MobyMax, SplashMath, Extramath, Sumdog, Learnzillion, Khan Academy.

- **Research and Information Fluency**
  - Use digital tools and online resources to explore a problem or issue.
  - **Example:** Students will access on-line interactive resources to gain understanding of measurement concepts and solve problems using virtual manipulatives.
    - [https://www.mathlearningcenter.org/resources/apps](https://www.mathlearningcenter.org/resources/apps)
    - [http://nlvm.usu.edu/en/nav/grade_g_1.html](http://nlvm.usu.edu/en/nav/grade_g_1.html)

- **The Nature of Technology: Creativity and Innovation**
  - Describe how designed products and systems are useful at school, home, and work.
  - **Example:** Students will explain how tools such as rulers, non-standard units of measure (i.e. paper clips), analog and digital clocks, and number lines, are useful for solving addition and subtraction problems related to measurement.

- **The Nature of Technology: Creativity and Innovation**
  - Identify a system and the components that work together to accomplish its purpose.
  - **Example:** Students will use drawings or objects such as base ten blocks to explain how addition or subtraction strategies based on place value and the properties of operations work.

- **Design**
  - Brainstorm ideas on how to solve a problem or build a product.
  - **Example:** Students will work together to create drawings or equations to represent and solve one and two step problems.

- **Computational Thinking: Programming**
  - Create algorithms (a sets of instructions) using a pre-defined set of commands (e.g., to move a student or a character through a maze).
  - **Example:** Students will explain how to use a ruler to measure and compare the lengths of various objects.

**Link:** [http://www.state.nj.us/education/cccs/2014/tech/](http://www.state.nj.us/education/cccs/2014/tech/)
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 ten frames, number lines, part-part-whole mats, base ten blocks, non-standard units of measure and rulers. Students will choose and use appropriate tools to explore and deepen understanding of mathematical operations and measurement.

- 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.
• **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.

  **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 to solve one and two step word problems involving addition or subtraction. Students will monitor and evaluate progress and change course 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 collaboratively in groups to solve mathematical tasks. Students will listen to or read the arguments of others and ask probing questions to clarify or improve arguments. They will be able to explain why strategies based on place value and properties of operations work and relate the strategy to a written method.
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>Description</th>
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<tbody>
<tr>
<td>6- Reaching</td>
<td>- Specialized or technical language reflective of the content areas at grade level&lt;br&gt;- A variety of sentence lengths of varying linguistic complexity in extended oral or written discourse as required by the specified grade level&lt;br&gt;- Oral or written communication in English comparable to proficient English peers</td>
</tr>
<tr>
<td>5- Bridging</td>
<td>- Specialized or technical language of the content areas&lt;br&gt;- A variety of sentence lengths of varying linguistic complexity in extended oral or written discourse, including stories, essays or reports&lt;br&gt;- Oral or written language approaching comparability to that of proficient English peers when presented with grade level material.</td>
</tr>
<tr>
<td>4- Expanding</td>
<td>- Specific and some technical language of the content areas&lt;br&gt;- A variety of sentence lengths of varying linguistic complexity in oral discourse or multiple, related sentences or paragraphs&lt;br&gt;- 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</td>
</tr>
<tr>
<td>3- Developing</td>
<td>- General and some specific language of the content areas&lt;br&gt;- Expanded sentences in oral interaction or written paragraphs&lt;br&gt;- 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</td>
</tr>
<tr>
<td>2- Beginning</td>
<td>- General language related to the content area&lt;br&gt;- Phrases or short sentences&lt;br&gt;- 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</td>
</tr>
<tr>
<td>1- Entering</td>
<td>- Pictorial or graphic representation of the language of the content areas&lt;br&gt;- 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</td>
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</table>
# 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

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 students 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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*Windows and mirrors are teaching strategies that allow students to explore their own identity and also to understand the perspectives of others.
### 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:** Ask students to choose three objects in the classroom and estimate their lengths. Then ask the students to measure the objects with a ruler. Have the students discuss their estimations and actual lengths.

- **Integrate Relevant Word Problems:** Contextualize equations using word problems that reference student interests and cultures.  
  **Example:** Create and use one and two-step word problems that include student interests, current events, and/or relevance to real-world situations. Using content that students can relate to, such as music, sports, and art enable the students to understand and relate to the concept in a more meaningful way.

- **Everyone has a Voice:** Create a classroom environment where students know that their contributions are expected and valued.  
  **Example:** Establish norms 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 Learning Stations:** Provide a range of material by setting up learning stations.  
  **Example:** Reinforce understanding of concepts and skills by promoting the learning through student interests and modalities, experiences and/or prior knowledge. Encourage the students to make choices in content 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.
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<td>Accommodate Based on Students Individual Needs: Strategies</td>
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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 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>
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<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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<td></td>
<td>Partnering</td>
<td>Emphasize multi-sensory learning</td>
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<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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<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:

- Teacher modeling

- Review pre-requisite skills and mental math strategies. These strategies may include review of using doubles, doubles plus one, number partners for 10, counting on, counting back, place value, units of measure, skip counting.

- Use drawings to represent problems involving addition and subtraction.

- Use hundred charts, ten frames, number lines, part-part-whole mats, or base ten blocks to assist in solving addition or subtraction problems, understanding place value.

- Use manipulatives such as counters, color tiles, unifix cubes, rulers, yard sticks, or paper clips to reinforce measurement concepts.

- Have students devise a plan for determining the longest/shortest of three crooked paths that have been created with masking tape. Students use non-standard and standard units of measure to justify their reasoning.

- Provide analog clocks and number lines for students to make the connection between skip counting by 5s and telling time.

- Chart academic vocabulary with visual representations.

- Use hundred charts and number lines to identify counting patterns.
Interdisciplinary Connections

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

**Science/Technology Connection:** Science Standard 2.LS4-1; Technology Standard 8.1.2.E.1

Students investigate by researching on the Internet to find stories of creatures that have the longest and widest footprints. They draw these footprints on the White board. Then, they measure the length of the footprints and add them all together to see how far it can reach down the hallway.

**Social Studies/Literature Connection:** Social Studies Standard 6.1.4.B.1

Explain that maps show distances or how far it is from one place to another. Ask children to help you draw a map of a town or city on the board. Call on volunteers to name several places that might be in the town. (They might name supermarket, library, school, park and so on.) Record each place on the board. Then, draw straight lines connecting each of the places to the others. Suggest reasonable distances between the places and record these along the lines. Now have pairs of children write down a word problem that involves three places and the distances between them. Have children share their word problems with the class.

**Literature Connection:** Language Arts Standard L.2.1

Read the book “How Big is a Foot” [https://www.youtube.com/watch?v=Xky3yEXyNHc](https://www.youtube.com/watch?v=Xky3yEXyNHc)


**Math-to-Sewing Connection:** Life Skills Standard CRP.2

Piecing Fabric: Explain that fabric comes in certain widths. People who have fabric that is not wide enough for what they want to sew can put pieces together to make it wider. Help children work in pairs to model this. Give each pair of students or small group four 3 in. by 8 in. strips of paper, four 3 in. squares of paper, a ruler, and tape. Tell children to pretend that the paper is their fabric for making a placemat. Direct them to arrange the pieces and (sew) tape them together to form a rectangle that is 12 in. long and 11 in. wide. Have volunteers explain how they arranged the pieces to form a placemat.
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
- 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
2.MD.A.1
Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.

2.MD.A.2
Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.

2.MD.A.3
Estimate lengths using units of inches, feet, centimeters, and meters.

2.MD.A.4
Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.

2.MD.B.5
Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.

For example, if Angela needs 30 feet of ribbon for gifts, but she only has 17 feet, number sentences 17 + □ = 30 and 30 - □ = 17 both represent the situation and □ represents the number of feet of ribbon that she still needs.

2.MD.B.6
Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.

2.MD.C.7
Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.

2.NBT.A.2
Count within 1000; skip-count by 5s, 10s, and 100s. *(benchmarked)*
## New Jersey Student Learning Standards

### 2.NBT.B.5
Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction. *(benchmarked)*

### 2.OA.A.1
Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. *(benchmarked)*

### 2.NBT.B.7
Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.
# 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.
### Grade: Two  
### Unit: 3 (Three)  
### Topic: Measurement

**NJSLS:**  
2.MD.A.1, 2.MD.A.2, 2.MD.A.3, 2.MD.A.4, 2.MD.B.5, 2.MD.B.6, 2.MD.C.7, 2.NBT.A.2, 2.NBT.B.5, 2.OA.A.1, 2.NBT.B.7

**Unit Focus:**  
- Measure and estimate lengths in standard units  
- Relate addition and subtraction to length  
- Work with time  
- Understand place value  
- Use place value understanding and properties of operations to add and subtract

**New Jersey Student Learning Standard(s):**  
2.MD.A.1: Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.  
2.MD.A.3: Estimate lengths using units of inches, feet, centimeters, and meters.

**Student Learning Objective 1:** Estimate lengths of objects and measure lengths of objects using appropriate tools.

**Modified Student Learning Objectives/Standards:**  
M.EE.2.MD.A.1: Measure the length of objects using non-standard units.

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</table>
| MP 5 | 2.MD.1  
MP 6 | Length may be measured in whole units within the same measurement system using metric or U.S. customary.  
MP 7 | Students are able to:  
- Measure lengths of objects using rulers, yardsticks, meter sticks and measuring tapes.  
- Estimate lengths of objects.  
Students will identify the customary units of measure (inches, feet, yards) | What do you know about measuring length?  
How do you estimate the length of an object?  
What is an example of an object that may be 7 cm long? | Determining Length  
MD Task 1a  
MD Task 3a  
MD Task 3b |
| Units are limited to inches, feet, centimeters, and meters. |
| 2.MD.3 |
| Rulers are not used to estimate. |

and metric unit of measure (centimeters, meters).

Students relate how to measure objects with nonstandard units of measure.

**Example:** Paperclips

Students should be able to determine which unit of measure to use based on the size of the object.

**Example:**
- Finger, centimeters
- Football field, meters

Students will use rulers, yardsticks, and non-standard units of measurement (pencils, copies of ladybugs, feathers, sharpeners, paperclips), and will estimate to measure in both systems of measurement.

Students will estimate the lengths of objects using customary units of measure.

**SPED Strategies:**
Students should use rulers, yardsticks, meter sticks, and tape measures.

Make sure students know to start at zero.

**Example:** The width of the tip of your finger is approximately one inch.

When do you think estimation is a good strategy?

How do you choose the best measurement tool, based on what you are measuring?

What is the difference between the customary unit of measure and the metric system unit of measure? Explain.

The whole school is going on a field trip. There are 360 students at Happy Valley Elementary. The average length of a school bus is 40 feet. Sixty students can get on each bus. How many school buses will be needed?

If the buses park along the road in front of the school with 1 foot between each bus, what is the length of the bus line? The principal is going to put out cones to show where the bus line begins and the bus line ends. What unit of measure should he use and why?
Give students an exemplar of unit of measure being used. To measure the length of a shoe, knowledge of an inch or a centimeter is important so that one can approximate the length in inches or centimeters. Students should begin practicing estimation with items which are familiar to them (length of desk, pencil, favorite book, etc.).

Some useful body benchmarks for measurement are:
- Width of pinky finger is about a centimeter.
- First joint to the tip of a thumb is about an inch.
- Length from your elbow to your wrist is about a foot.
- If your arm is held out perpendicular to your body, the length from your nose to the tip of your finger is about a yard.

**ELL Strategies:**
Introduce and chart academic vocabulary with visuals: measure, estimate, length, unit, inches, centimeters, feet, meter.

Use gestures, pictures and selected, technical words to identify the appropriate measurement tool for various objects and orally describe the
length of objects with those measurements.

Use key, technical vocabulary in phrases or simple sentences with provided sentence frames to identify the appropriate measurement tool for various objects and orally describe the length of objects with those measurements.

The teacher or peer coach models with appropriate measuring tools and the student follows oral instructions given.

Students maintain a math journal to demonstrate growth in math writing and reasoning.

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

2.MD.A.2: Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.

**Student Learning Objective 2:** Compare measurements of an object taken with two different units of measure and describe how the two measurements relate to the size of the unit chosen.

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

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<tr>
<td>MP 2</td>
<td>2.MD.2</td>
<td>Students are able to:</td>
<td>How can we decide on appropriate units of measurement (i.e. inch, foot, yard, centimeter, and meter)?</td>
<td>Footsteps on the Rug</td>
</tr>
<tr>
<td>MP 3</td>
<td>Tasks should be limited to whole units within the</td>
<td>measure the length of an object using different units of measure.</td>
<td></td>
<td>High Horse</td>
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<tr>
<td>MP 5</td>
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</tr>
</tbody>
</table>
| MP 6 | same measurement system.  
- Units are limited to inches, feet, centimeters, and meters.  
- Example: Student measures the length of a table in inches and in feet and notes that the number of feet is less than the number of inches because an inch is smaller than a foot. Therefore, it takes more inch units than foot units to measure the table’s length. |
| MP 7 | • compare the measurements and explain how they relate to each unit.  
Students will be able to measure with precision the length of an object utilizing two different measurements.  
Students will be able to describe how two measurements relate to the size of the unit chosen.  
**Example:** Measuring in inches vs. measuring in feet.  
Students should understand that it takes more inches than feet to measure an object because 1 inch is smaller or shorter than 1 foot.  
Teacher allows students opportunities to measure various objects in the classroom.  
**Example:** CD cover or pencil, using inches and centimeters.  
**SPED Strategies:**  
Students measure the length of the same object using different tools (ruler with inches, ruler with centimeters, a yardstick, or meter stick). This will help students learn which tool is more appropriate.  
Measure the length of your notebook using both inches and centimeters. What is the difference in their measurement?  
Why is it important for me to know how to measure different objects using different units of measurement?  
Students work collaboratively to measure the classroom in both centimeters and meters and explain your understanding of the difference in the measurements.  
The pencil in the figure below is measured with a ruler. The ruler has one graduation per inch.  
The pencil has a length of______

| MD Task 2a | MD Task 2b |
appropriate for measuring a given object.

Have students describe the relationship between the size of the measurement unit and the number of units needed to measure something. For example: a student might say, “The longer the unit, the fewer I need.”

**ELL Strategies:**
Introduce and chart academic vocabulary with visuals: ruler, measure, measurement, unit, length, inches, centimeters, feet, meters, more than, greater than, less than, equal to.

Use gestures, pictures and selected technical words to compare and explain orally and in writing the measurements of an object taken with two different units of measure.

Use key, technical vocabulary in phrases or simple sentences with provided sentence frames to compare and explain orally and in writing the measurements of an object taken with two different units of measure.

Create anchor charts that model how to compare and explain comparing
measurements of an object taken with two different units of measure.

Students maintain a math journal to demonstrate growth in math writing and reasoning.

New Jersey Student Learning Standard(s):

2.MD.A.4: Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.

Student Learning Objective 3: Compare lengths of two objects and determine how much longer one object is than the other using a standard unit of measure.

Modified Student Learning Objectives/Standards:

M.EE.2.MD.A.3–4: Order by length using non-standard units.

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<tbody>
<tr>
<td>MP 5</td>
<td>2.MD.4</td>
<td>Students are able to:</td>
<td>How can you compare the lengths of two objects?</td>
<td>How Far Can You Jump</td>
</tr>
<tr>
<td>MP 6</td>
<td>Length may be measured in whole units within the same measurement system using metric or U.S. customary. Units are limited to inches, feet, centimeters, and meters.</td>
<td>• Measure objects and compare to determine how much longer one object is than another. • Express the difference in length in terms of a standard unit of measure. Students should use precision when lining up the object with the 0-mark on the ruler. Students will be able to compare the lengths of two objects.</td>
<td>Which unit of measure would you use to measure? Example: pencil</td>
<td>Determining Length Measurement Scavenger Hunt The Longer Foot</td>
</tr>
</tbody>
</table>

Tasks/Activities:

- How Far Can You Jump
- Determining Length
- Measurement Scavenger Hunt
- The Longer Foot
Students will be able to find the difference in measurements to determine how much longer one object is than another.

**SPED Strategies:**
Students should be familiar with inches, feet, yards, centimeters, and meters to be able to compare the differences in lengths of two objects.

They can make direct comparisons by measuring the difference in length between two objects by laying them side by side and selecting an appropriate standard length unit of measure.

Students should use comparative phrases such as “It is longer by 2 inches” or “It is shorter by 5 centimeters” to describe the difference between two objects.

**ELL Strategies:**
Introduce and chart academic vocabulary with visuals: ruler, scale, map, top, bottom, inches, feet, centimeters.

Use gestures, pictures and selected technical words to compare and explain orally and in writing the
| lengths of two objects and identify how much longer one object is than another. Use key, technical vocabulary in phrases or simple sentences with provided sentence frames to compare and explain orally and in writing the lengths of two objects and identify how much longer one object is than another. Student works with a peer coach to compare lengths of two objects orally and in writing. Students maintain a math journal to demonstrate growth in math writing and reasoning. |
New Jersey Student Learning Standard(s):

2.MD.B.5: Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.

*For example, if Angela needs 30 feet of ribbon for gifts, but she only has 17 feet, number sentences 17 + □ = 30 and 30 - □ = 17 both represent the situation and □ represents the number of feet of ribbon that she still needs.*

**Student Learning Objective 4:** Add and subtract within 100 to solve word problems involving lengths using a symbol to represent the unknown number.

**Modified Student Learning Objectives/Standards:**

M.EE.2.MD.B.5: Increase or decrease length by adding or subtracting unit(s).

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</thead>
<tbody>
<tr>
<td>MP 1</td>
<td>2.MD.5</td>
<td>Students are able to:</td>
<td>Students practice solving word problems in order to strengthen understanding of adding and subtracting lengths.</td>
<td>IFL Task(s) - “Compare Situations: Contexts, Models and Strategies as they Relate to Subtraction and Missing Addend Addition.”</td>
</tr>
<tr>
<td>MP 2</td>
<td>Tasks may include measurements in whole units within the same measurement system using metric or U.S. customary.</td>
<td></td>
<td></td>
<td><strong>Additional Tasks:</strong> Footprints</td>
</tr>
<tr>
<td>MP 4</td>
<td>Problems may be one or two-step.</td>
<td></td>
<td></td>
<td>High Jump</td>
</tr>
<tr>
<td>MP 5</td>
<td>For one-step problems, all problem situations and all of their subtypes and language variants may be included but 50% of tasks should include the most difficult problem subtypes and language variants.</td>
<td>Teacher encourages students to connect and apply the concept of length to solve addition and subtraction word problems with numbers within 100. Students must use the same unit in these problems.</td>
<td></td>
<td>Kangaroo Jumps</td>
</tr>
<tr>
<td>MP 1</td>
<td>For two-step problems, the most difficult</td>
<td></td>
<td></td>
<td>MD Task 4a</td>
</tr>
</tbody>
</table>
Problem subtypes and language variants should not be included. The majority of the two-step problems involve single-digit addends.

- Subtraction and addition are emphasized beyond 20 but within 100. At least 75% of the tasks must focus on addition and subtraction greater than 20.

* For more information see NJSLS Table 1, p. 93 and the OA Progression.

**Example:**
In P.E. class Kate jumped 14 inches. Mary jumped 23 inches. How much farther did Mary jump than Kate? Write an equation and then solve the problem.

**Student 1**
My equation is $14 + \_ = 23$ since I am trying to find out the difference between Kate and Mary’s jump. I used **place value blocks** and counted out 14. I then added blocks until I got to 23. I needed to add 9 blocks. Mary jumped 9 more inches than Kate.

**Student 2**
My equation is $23 - 14 = \_$. I drew a **number line**. I started at 23. I moved back to 14 and counted how far I moved (the units). I moved back 9 spots. Mary jumped 9 more inches than Kate.

Strategies which will help tie this concept to previous knowledge, such as counting on and/or counting back on a number line, are revisited to ensure student understanding.

Some representations students can use include drawings, number lines,
rulers, pictures, and/or physical objects.

**SPED Strategies:**
Counting on and/or counting back on a number line will help tie this concept to previous knowledge.

Some representations students can use include: drawings, rulers, pictures, and/or physical objects.

Use whiteboards or large construction paper to show strategies used.

**Examples:**
- Mary is making a dress. She has 5 yards of fabric. She uses some of the fabric and has 2 yards left. How many yards did Mary use? $5 - n = 2$
- The length of Tracy’s desk is 23 inches. The teacher’s desk measures 60 inches. How much longer is the teacher’s desk than Tracy’s desk? $23 + z = 60$ or $60 - 23 = z$

**ELL Strategies:**
Introduce and chart academic vocabulary with visuals: equation,
| | compare, unknown, inches, feet, yards, centimeters, long, tall. Use gestures, pictures and selected, illustrated single words to demonstrate comprehension of addition and subtraction word problems within 100 by writing equations with symbols for unknowns. Use key, technical vocabulary in phrases or simple sentences with provided sentence frames to demonstrate comprehension of addition and subtraction word problems within 100 by writing equations with symbols for unknowns. Students work in small groups with the teacher or peer coach to solve word problems involving lengths using symbols to represent the unknown number. Students maintain a math journal to demonstrate growth in math writing and reasoning. |
**New Jersey Student Learning Standard(s):**

2.MD.B.6: Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.

**Student Learning Objective 5:** Use a number line to represent the solution of whole number sums and differences related to length within 100.

**Modified Student Learning Objectives/Standards:**

M.EE.2.MD.B.6: Use a number line to add one more unit of length.

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<tr>
<td>MP 2</td>
<td>2.MD.6-1</td>
<td>Students are able to:</td>
<td>A blank number line is given so that students can understand equal partitioning on the number line. They also work with grid paper to draw a number a line.</td>
<td>Frog and Toad on the Number Line</td>
</tr>
<tr>
<td>MP 4</td>
<td></td>
<td></td>
<td>Examples to help students practice with the number lines.</td>
<td>MD Task 6a</td>
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<td>MP 5</td>
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<td>10-6=4</td>
<td>Solving Problems on Number Line</td>
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<td>2.MD.6-2</td>
<td></td>
<td></td>
<td>Where Will I Land</td>
</tr>
<tr>
<td></td>
<td>Represent whole-number sums and differences within 100 on a number line diagram.</td>
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<tr>
<td></td>
<td></td>
<td>Teacher calls for students to create number lines using numbers within 100 to solve addition and subtraction problems.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Students are involved in several activities to create the number line with evenly spaced points</td>
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</table>
Students represent their thinking when adding and subtracting within 100 by using a number line. An interactive whiteboard or document camera can be used to help students demonstrate their thinking.

Students are expected to show the starting point on the number line. (They start with the greater addend.)

**SPED Strategies:**
Use number line, draw pictures

**ELL Strategies:**
Introduce and chart academic vocabulary with visuals: number line, equation, answer, show, matches.

Gestures, pictures and selected, illustrated single words to demonstrate and explain orally and in writing how to use a number line to represent the solution of whole number sums and differences related to length.

Use key, technical vocabulary in a series of phrases or simple sentences
with provided sentence frames to demonstrate and explain orally and in writing how to use a number line to represent the solution of whole number sums and differences related to length.

Students maintain a math journal to demonstrate growth in math writing and reasoning.

**New Jersey Student Learning Standard(s):**
2.MD.C.7: Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.

**Student Learning Objective 6:** Tell and write time using analog and digital clocks to the nearest five minutes using a.m. and p.m.

**Modified Student Learning Objectives/Standards:**
M.EE.2.MD.C.7: Identify on a digital clock the hour that matches a routine activity.

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</table>
| MP 5 MP 6 | N/A | Students are able to:  
- use analog and digital clocks, tell time to the nearest five minutes using a.m. and p.m.
- use analog and digital clocks, write time to the nearest five minutes using a.m. and p.m. | Students will determine what hour it is first and then skip count to find the minutes. Students then determine whether the time is am or pm.  
Students practice using the mini clocks or their own created clocks (paper plate clocks) to simulate skip counting by moving the clock hands.  
Students need to focus on the movement and features of the hands | Building a Number Line Clock  
Missed Bedtime  
Ordering Time  
What Time is it Mr. Crocodile? |
Time should be to 5 minute intervals, and students should also use the terms a.m. and p.m.

Teachers help students make the connection between skip counting by 5s (2.NBT.2) and telling time on an analog clock.

Teacher promotes learning time in intervals of 5 and a.m. and p.m. by allowing students to manipulate mini clocks. (Teacher created or mini clocks.)

**SPED Strategies:**

Students should skip-count by 5 to recognize 5-minute intervals on the clock.

Provide both digital and analog clocks. It is important that they can recognize time in both formats and communicate their understanding of time using both numbers and language.

Students should understand that there are 2 cycles of 12 hours in a day - a.m. and p.m. Recording their daily actions in a journal would be helpful for making real-world connections and understanding the
| difference between these two cycles. | **ELL Strategies:**
|-------------------------------------| Introduce and chart academic vocabulary with visuals: time, analog, digital, minutes, hours, nearest, same, AM, PM. Use gestures, pictures and selected, illustrated single words describe and explain orally and in writing how to tell time using analog and digital clocks. Use key vocabulary in a series of phrases or simple sentences with provided sentence frames to describe and explain orally and in writing how to tell time using analog and digital clocks. Describe and explain orally and in writing how to tell time using analog and digital clocks. |
New Jersey Student Learning Standard(s):
2.NBT.A.2: Count within 1000; skip-count by 5s, 10s, and 100s. *(benchmarked)*

**Student Learning Objective 7:** Orally count within 1000 including skip-counting by 5s, 10s, and 100s.

**Modified Student Learning Objectives/Standards:**
M.EE.2.NBT.A.2: Count from 1 to 30 (count with meaning; cardinality).

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<td>MP 2</td>
<td>2.NBT.2</td>
<td>Students are able to: &lt;ul&gt;&lt;li&gt;count within 1000 by ones.&lt;/li&gt;&lt;li&gt;count within 1000 by fives, tens, and hundreds beginning at any multiple of 5, 10, or 100.&lt;/li&gt;&lt;/ul&gt;Students will recognize when they skip count by 5s there will be a pattern of 0 and 5. Students relate what they know about place value to the numbers that form the pattern. Teacher empowers students to discover what skipping means by providing a set of 20 pencils and asking students to touch every 5&lt;sup&gt;th&lt;/sup&gt; pencil. Example: They would touch the 5th, 10th, 15th, and 20th. Students are able to visualize and understand the pencils that were skipped (passed over it when they touched).</td>
<td>How can you count by 5s, 10s and 100s? What pattern do you notice when you skip count by 5s, 10s 100s? Are there any similarities in the patterns when you skip count by 5s, 10s, and 100s? Students will understand that skip counting is counting by a number other than one. Students work with counters. <strong>Example:</strong> 6 groups of 5 counters in each group. They skip count by 5’s to find the total number of counters. They discover that the last number tells how many in all. Skip counting using a number line or chart to demonstrate the relationship between skip counting and multiplication.</td>
<td>Counting Collections Number Hop Skip Counting Grade 2 Skip Counting Up to 1000 Skip Count by 5s, 19s, and 100s Formative Assessment Task - Skip Counting</td>
</tr>
<tr>
<td>MP 7</td>
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<tr>
<td>MP 8</td>
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</tr>
</tbody>
</table>

**Modified Learning Objectives/Standards:**
M.EE.2.NBT.A.2: Count from 1 to 30 (count with meaning; cardinality).
were touching all the other pencils). There is a pattern to how many you pass over when you skip count.

**SPED Strategies:**
Use 100 charts to identify counting patterns.

Use nickels and dimes for skip counting.

Base ten blocks

Use Highlighters and highlight the 5s and 10s as they skip count.

Provide a number line as a visual.

**ELL Strategies:**
Introduce and chart academic vocabulary with visuals: number line, skip count, pattern, after, before, between.

Use gestures, pictures and selected, illustrated single words to demonstrate orally and in writing how to skip count by 5s and 10s utilizing a number line.

Use phrases and short sentences with illustrations and key vocabulary to explain the solution

<table>
<thead>
<tr>
<th>Students need many opportunities counting up to 1000 from different starting points. They should also have many experiences skip counting by 5s, 10s, and 100s to develop the concept of place value.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Examples:</strong></td>
</tr>
<tr>
<td>- The use of the 100s chart may be helpful for students to identify the counting patterns.</td>
</tr>
<tr>
<td>- The use of money (nickels, dimes, dollars) or base ten blocks may be helpful visual cues.</td>
</tr>
<tr>
<td>- The use of an interactive whiteboard may also be used to develop counting skills.</td>
</tr>
</tbody>
</table>
to demonstrate orally and in writing how to skip count by 5s and 10s.

Students maintain a math journal, using a graphic organizer for support as needed, to demonstrate growth in math writing and reasoning.

<table>
<thead>
<tr>
<th>New Jersey Student Learning Standard(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.NBT.B.5: Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction. <em>(benchmarked)</em></td>
</tr>
</tbody>
</table>

**Student Learning Objective 8:** Select and use a strategy (place value, properties of operation, and/or the relationship between addition and subtraction) to add and subtract within 100.

**Modified Student Learning Objectives/Standards:**
M.EE.2.NBT.5.a: Identify the meaning of the “+” sign (i.e., combine, plus, add), “−” sign (i.e., separate, subtract, take), and the “=” sign (equal).

<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>
</table>
| MP 2 | 2.NBT.5 | Concept(s):  
- Place value  
- Relationship between addition and subtraction  
- Properties of Operations  
Students are able to:  
- add and subtract within 100 using place value strategies.  
- add and subtract within 100 using properties of operations and the | How do you use the place value strategy to add 2-digit numbers?  
How do you record the steps when adding 2-digit numbers?  
What are two different ways to write addition problems?  
How does using 10 as a benchmark number help us add or subtract? | Addition Strategies  
Break Apart  
Number Destinations  
Number Wheel Spin  
Take 100 |
| MP 7 |  |  |  |  |
| MP 8 |  |  |  |  |
students will understand the relationship between addition and subtraction.

**Example:**

\[ 42 + 22 \]
\[ 40 + 2 + 20 + 2 \]
\[ 40 + 20 = 60 \]
\[ 2 + 2 = 4 \]
\[ 60 + 4 = 64 \]

**Example:**

Place value

\[ 4 \text{ tens } + 2 \text{ ones} \]
\[ 2 \text{ tens } + 2 \text{ ones} \]
\[ 6 \text{ tens } + 4 \text{ ones} = 64 \]

Students will understand the relationship between addition and subtraction.

**SPED Strategies:**

Problems may be written in a story problem format to help develop a stronger understanding of larger numbers and their values.

Provide large grid paper and place numbers in each box to have students see how to line up their numbers and then add or subtract as needed using place value.
<table>
<thead>
<tr>
<th>ELL Strategies:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduce and chart academic vocabulary with visuals: tens, ones, find, work, correct, incorrect, first, then, together.</td>
</tr>
<tr>
<td>Use gestures, examples and selected technical words to demonstrate and explain orally how to add and subtract within 100.</td>
</tr>
<tr>
<td>Use key, technical vocabulary in simple sentences with provided sentence frames to demonstrate and explain orally how to add and subtract within 100.</td>
</tr>
<tr>
<td>Students maintain a math journal to demonstrate growth in math writing and reasoning.</td>
</tr>
</tbody>
</table>
New Jersey Student Learning Standard(s):
2.OA.A.1: Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. *(benchmarked)*

Student Learning Objective 9: Add and subtract within 100 to solve 1- and 2-step word problems with unknowns in any position.

Modified Student Learning Objectives/Standards: N/A

<table>
<thead>
<tr>
<th>MPs</th>
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<th>Essential Understandings/Questions (Accountable Talk)</th>
<th>Tasks/Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP 1</td>
<td><strong>2.OA.1-1</strong></td>
<td>Students are able to:</td>
<td>Students will use drawings and equations to solve addition word problems.</td>
<td>IFL Task(s) - “Compare Situations: Contexts, Models and Strategies as they Relate to Subtraction and Missing Addend Addition.”</td>
</tr>
<tr>
<td>MP 2</td>
<td></td>
<td>• count on and put together to add to solve one- and two-step word problems.</td>
<td>How does knowing our facts help us to solve math problems?</td>
<td>Additional Tasks</td>
</tr>
<tr>
<td>MP 3</td>
<td></td>
<td>• take from or take apart to subtract to solve one- and two-step word problems.</td>
<td>How do strategies assist in more efficient and accurate computation?</td>
<td>Multi-Digit Addition Strategies</td>
</tr>
<tr>
<td>MP 4</td>
<td></td>
<td>• use drawings and equations to represent the problem.</td>
<td>Students write an equation to solve an addition word problem.</td>
<td>Addition Strategies</td>
</tr>
<tr>
<td>MP 5</td>
<td><strong>2.OA.1-2</strong></td>
<td>Students should relate addition to combining two or more groups and subtraction to taking from.</td>
<td>How can you use pictures and equations to solve subtraction word problems?</td>
<td>Sale Flyer Shopping</td>
</tr>
<tr>
<td>MP 8</td>
<td></td>
<td>Understand and use the inverse relation between addition and subtraction to solve problems and check solutions.</td>
<td>Mapping devices and tools can help you gain a sense of the quantities involved to notice increases and decreases, and consider the doing and undoing related to addition and subtraction.</td>
<td>Subtraction Story Problems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Have students show at least two different strategies to solve the addition and subtraction problems.</td>
<td>Menu Math</td>
<td></td>
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<tr>
<td>should not be included in these problems.</td>
<td></td>
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<tr>
<td>For more information see NJSLS Table 1, p. 93 and the OA Progression.</td>
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</tbody>
</table>

| Students solve situational tasks using a variety of strategies and part-part whole mats, diagrams, and or physical models. |
| Involve students in creating their own problem scenarios to assess their understanding of vocabulary involved and other major features of addition and subtraction situations. |
| Start with a story problem and two diagrams and ask students to notice similarities and differences, ask students to use the strategic representations of others to solve situational problems, and then ask students to solve missing addend addition equations with subtraction. |
| Solve “compare” situational tasks (unknown difference) using a variety of strategies such as part-part-whole mats and comparison models. |
| Pose the following problem, “A pencil costs 59 cents, and a sticker costs 20 cents less. How much do a pencil and a sticker cost together?” Students are asked to use cubes, number sentences or visual representations to solve the problem individually. |

| Problems can be solved by counting all, counting on from a quantity, counting on from the largest set, or using derived facts when solving for the whole amounts or the missing part of the whole. |
| When sets are compared, there is a one-to-one correspondence between items within the sets, and the underlined items indicate the amount that the sets are different (amount less or amount more.) |
| Does changing the order of the numbers affect the problem and its solution? |
| What strategies can be used to solve story problems with an unknown addend? |
| What strategies can be used to solve “compare” story problems? |
Determine the unknown difference as being “how many more” or “how many fewer”.

**Examples:**
Lucy has two apples. Julie has five apples. How many more does Julie have than Lucy? Lucy has two apples. Julie has five apples. How many fewer apples does Lucy have than Julie? 2 + ? = 5, 5 − 2 = ?

Show a bag containing exactly 30 cubes. Then, reach into the bag and pull out 6 cubes. Then, ask the students, “How many cubes are left in the bag?”
<table>
<thead>
<tr>
<th>SPED Strategies:</th>
<th>ELL Strategies:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use counters (color counters, links).</td>
<td>Introduce and chart academic vocabulary with visuals: add, subtract, solve, unknowns, more, remaining, left, in all.</td>
</tr>
<tr>
<td>Use manipulatives (base ten blocks).</td>
<td>The teacher models using gestures, pictures, counters and selected technical words to describe and explain orally and in writing the solution to 1- and 2- step word problems.</td>
</tr>
<tr>
<td>Provide models and teacher modeling for student.</td>
<td>Utilize sentence frames and simple sentences to support students in speaking and writing their explanations.</td>
</tr>
<tr>
<td>Use number lines.</td>
<td>Students work with a partner and utilize manipulatives and drawings to solve 1 and 2 step word problems.</td>
</tr>
<tr>
<td>Explain orally using pictures and gestures.</td>
<td></td>
</tr>
</tbody>
</table>
Students maintain a math journal to demonstrate growth in math writing and reasoning.

New Jersey Student Learning Standard(s):
2.NBT.B.7: Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.

Student Learning Objective 10: Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method.

Modified Student Learning Objectives/Standards:
M.EE.2.NBT.B.7: Use objects, representation, and numbers (0-20) to add and subtract.

<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>MP 2</td>
<td>2.NBT.7</td>
<td>Concept(s): In adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones. Sometimes it is necessary to compose or decompose tens or hundreds. Students are able to: add and subtract within 1000, using concrete models or drawings</td>
<td>Mapping devices and tools can help you gain a sense of the quantities involved, to notice increases and decreases, and consider the doing and undoing related to addition and subtraction. Addition and subtraction are inverse operations because two or more quantities can come together and then the whole amount of objects can be taken apart, but the composition of the whole quantity remains the same. (Doing and Undoing, Inverse Operations)</td>
<td>IFL Task(s) - “Compare Situations: Contexts, Models and Strategies as they Relate to Subtraction and Missing Addend Addition.”</td>
</tr>
<tr>
<td>MP 4</td>
<td></td>
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<tr>
<td>MP 5</td>
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<tr>
<td>MP 7</td>
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<tr>
<td>MP 8</td>
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</tbody>
</table>

Additional Tasks:
NBT Task 4a
NBT Task 4b
NBT Task 4c
• add and subtract within 1000 using strategies based on place value
• add and subtract within 1000 using properties of operations or the relationship between addition and subtraction
• relate the strategies to a written method

Teacher emphasizes that this standard also references composing and decomposing a ten. Teacher includes practice for students and strategies such as making a 10, making a 100, breaking apart a 10, or creating an easier problem.

*Students are not expected to add and subtract whole numbers using a standard algorithm until the end of Fourth Grade.

**Example:** 354 + 287 =

Use a place-value chart to review subtracting 2 digit numbers with and without regrouping and encourage students to relate this concept and discover how to subtract 3 digit numbers.
Provide practice to help students arrive at the understanding that the greater number in a situation is the total, and the other number is how many are taken away.

Encourage students to realize that subtraction does not follow the commutative property by working with manipulatives.

Use of the following:
- Counting on/Counting back
- Part-part-whole map
- Diagram

**Comparison model:**
Start with a story problem and two diagrams and equations. Ask students to select equations that describe the diagram, then ask students to solve a series of situational problems and make noticings about the structure of the problems.

Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.
**SPED Strategies:**
Model strategies using counters or base ten blocks, ten flats for 100, and centimeter grid paper.

Laminate place value charts and have students place numbers in correct columns.

- **Addition strategies based on place value for 48 + 37 may include:**
  - Adding by place value: 40 + 30 = 70 and 8 + 7 = 15 and 70 + 15 = 85.
- **Subtraction strategies based on place value for 81 - 37 may include:**
  - Adding up (from smaller number to larger number): 37 + 3 = 40, 40 + 40 = 80, 80 + 1 = 81, and 3 + 40 + 1 = 44.
- **Properties that students should know and use are:**
  - Commutative property of addition (3 + 5 = 5 + 3)
  - Associative property of addition (2 + 7) + 3 = 2 + (7 + 3)
  - Identity property of 0 (8 + 0 = 8)
<table>
<thead>
<tr>
<th><strong>ELL Strategies:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduce and chart academic vocabulary with visuals: amount, total, hundreds, tens, ones, single, together, each, included, above, below.</td>
</tr>
<tr>
<td>Use gestures, pictures and selected, illustrated single words to describe and explain orally and in writing how to add and subtract within 1000.</td>
</tr>
<tr>
<td>Use key, technical vocabulary in phrases and short sentences with illustrations and provided sentence frames to describe and explain orally and in writing how to add and subtract within 1000.</td>
</tr>
<tr>
<td>Students maintain a math journal to demonstrate growth in math writing and reasoning. Sentences frames may be provided for support in writing.</td>
</tr>
</tbody>
</table>
## Unit 3 Vocabulary

- add
- addend
- analog clock
- Associative Property
- base-ten
- centimeter
- compose
- count on
- Commutative Property
- decompose
- digit
- digital clock
- doubles
- equal
- equal addends
- equation
- estimate
- feet
- hundreds
- Identity Property of 0
- inch
- length
- less
- meter
- more
- ones
- part-part-whole
- place value
- Properties of Operations
- putting together
- skip count
- subtract
- sum
- taking apart
- taking from
- tens
- total
- unknown
# References & Suggested Instructional Websites

<table>
<thead>
<tr>
<th>Source</th>
<th>URL</th>
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<tbody>
<tr>
<td>Georgia Department of Education</td>
<td><a href="https://www.georgiastandards.org/common-core/pages/math-k-5.aspx">https://www.georgiastandards.org/common-core/pages/math-k-5.aspx</a></td>
</tr>
<tr>
<td>Inside Mathematics</td>
<td><a href="www.insidemathematics.org">www.insidemathematics.org</a></td>
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<tr>
<td>Illustrative Mathematics</td>
<td><a href="https://www.illustrativemathematics.org">https://www.illustrativemathematics.org</a></td>
</tr>
<tr>
<td>Thurmont Primary School On Line Games</td>
<td><a href="http://education.fcps.org/tps/SecondGradeOnlineMathGames">http://education.fcps.org/tps/SecondGradeOnlineMathGames</a></td>
</tr>
<tr>
<td>K-5 Math Teaching Resources</td>
<td><a href="http://www.k-5mathteachingresources.com/2nd-grade-number-activities.html">http://www.k-5mathteachingresources.com/2nd-grade-number-activities.html</a></td>
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<tr>
<td>Fact Fluency</td>
<td><a href="http://www.k-5mathteachingresources.com/computational-fluency.html">http://www.k-5mathteachingresources.com/computational-fluency.html</a></td>
</tr>
<tr>
<td>Interactive Resources</td>
<td><a href="http://interactivesites.weebly.com/math.html">http://interactivesites.weebly.com/math.html</a></td>
</tr>
</tbody>
</table>
**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 teamwork 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/


**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/

**ALSTEDE FARMS Chester, NJ** - Let us teach you about farming in the most fun way! We open our doors to groups of all ages and sizes because we understand the importance of hands-on education. We personalize each farm tour and field trip, depending on the group’s interests. You will navigate our farm by taking hayrides out to the beautiful fields and orchards, greenhouses, school classroom, our friendly animals and last but not least – having a great outdoor day at our family owned farm. You choose the other activities- climb the giant hay pyramid, have lunch and refreshing lemonade or take a self-guided tour of our animals.

http://alstedefarms.com/group-events-and-tours/group-farm-tours/?gclid=CIjzn-W4lMYCFQgUhGwodK1oAxA

**GREEN MEADOWS FARM Hazlet, NJ** - Green Meadows Petting Farm in Hazlet, New Jersey is a unique hands on learning adventure with hundreds of friendly farm animals. Some of our many petting zoo activities include milking a cow, feeding our animals, tractor drawn hayrides and fall pumpkin picking. Give us a call and we'll bring the fun to you! We're the ideal farm animal experience for families, birthday parties, groups and school field trips!

http://www.greenmeadowsfarmnj.com/
Field Trip Ideas

PENNINGS ORCHARD Warwick, NY - We look forward to seeing you for all your favorite activities including the u-pick, farm market, pumpkin fields, hayrides, farm animals, kiddie maze and more.
http://www.penningsorchard.com/blog/

TURTLE BACK ZOO West Orange, NJ - We have daily, free live animal programs. We also offer programs for groups that can be scheduled for an Education Center Classroom. There is a fee for these programs and they have to be scheduled at least three weeks in advance. Programs can be especially tailored for to meet your needs, including for Boy and Girl Scout groups to help with badge requirements.
http://turtlebackzoo.com/education/

BRONX ZOO Bronx, NY - Visit the largest urban zoo in America and get up close to more than 600 species from around the globe. Meet exotic animals, birds, reptiles, and insects from across Asia, Africa, the Americas and more without ever leaving the Bronx.
http://bronxzoo.com/field-trips

MATH CONNECTION FOR ALL FIELD TRIPS:
- count objects
- classify objects into given categories
- answer how many questions / create addition and subtraction events
- describe objects in the environment and describe the relative positions of these objects
- compare numbers
- identify shapes
- describe measurable attributes of multiple objects / directly compare two objects with a measurable attribute in common