MATHEMATICS

Grade 3: Unit 4
Representing Data
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 NJSL; 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.

Third 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 third grade, instructional time should focus on four critical areas: (1) developing understanding of multiplication and division and strategies for multiplication and division within 100; (2) developing understanding of fraction, especially unit fractions (fractions with numerator, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers; (3) developing understanding of the structure of rectangular arrays and of area; and (4) describing and analyzing two-dimensional shapes.

1) Students develop an understanding of the meanings of multiplication and division of whole numbers through activities and problems involving equal-sized groups, arrays, and area models; multiplication is finding an unknown product, and division is finding an unknown factor in these situations. For equal-sized group situations, division can require finding the unknown number of groups or the unknown group size. Students use properties of operations to calculate products of whole numbers, using increasingly sophisticated strategies based on these properties to solve multiplication and division problems involving single-digit factors. By comparing a variety of solution strategies, students learn the relationship between multiplication and division.

2) Students develop an understanding of fractions, beginning with unit fractions. Students view fractions in general as being built out of unit fractions, and they use fractions along with visual fraction models to represent parts of a whole. Students understand that the size of a fractional part is relative to the size of the whole. For example, 1/2 of the paint in a small bucket could be less paint than 1/3 of the paint in a larger bucket, but 1/3 of a ribbon is longer than 1/5 of the same ribbon because when the ribbon is divided into 3 equal parts, the parts are longer than when the ribbon is divided into 5 equal parts. Students are able to use fractions to represent numbers equal to, less than, and greater than one. They solve problems that involve comparing fractions by using visual fraction models and strategies based on noticing equal numerators or denominators.

3) Students recognize area as an attribute of two-dimensional regions. They measure the area of a shape by finding the total number of same size units of area required to cover the shape without gaps or overlaps, a square with sides of unit length being the standard unit for measuring area. Students understand that rectangular arrays can be decomposed into identical rows or into identical columns. By decomposing rectangles into rectangular arrays of squares, students connect area to multiplication, and justify using multiplication to determine the area of a rectangle.

4) Students describe, analyze, and compare properties of two-dimensional shapes. They compare and classify shapes by their sides and angles, and connect these with definitions of shapes. Students also relate their fraction work to geometry by expressing the area of part of a shape as a unit fraction of the whole.
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 Common Core State 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
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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>Draw scaled picture and scaled bar graphs to represent data with several categories. Solve one and two-step word problems using scaled bar graphs.</td>
<td>3.MD.B.3</td>
</tr>
<tr>
<td>2</td>
<td>Depict data measured in fourths and halves of an inch with a line plot with scales marked with appropriate units.</td>
<td>3.MD.B.4</td>
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<tr>
<td>3</td>
<td>Fluently multiply and divide within 100 using strategies such as the relationship between multiplication and division.</td>
<td>3.OA.C.7*</td>
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<td>4</td>
<td>Write equation(s) containing an unknown and find the value of an unknown in an equation that is a representation of a two-step word problem (with any four operations); use estimation strategies to assess the reasonableness of answers.</td>
<td>3.OA.D.8*</td>
</tr>
<tr>
<td>5</td>
<td>Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.</td>
<td>3.NBT.A.2*</td>
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<tr>
<td>6</td>
<td>Solve real world problems involving finding areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts.</td>
<td>3.MD.C.7d*</td>
</tr>
</tbody>
</table>

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

Structure teaching of mathematical concepts and skills around problems to be solved (Checkly, 1997; Wood & Sellars, 1996; Wood & Sellars, 1997)
Encourage students to work cooperatively with others (Johnson & Johnson, 1975; Davidson, 1990)
Use group problem-solving to stimulate students to apply their mathematical thinking skills (Artzt & Armour-Thomas, 1992)
Students interact in ways that support and challenge one another’s strategic thinking (Artzt, Armour-Thomas, & Curcio, 2008)
Activities structured in ways allowing students to explore, explain, extend, and evaluate their progress (National Research Council, 1999)

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

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

Teachers should be:

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

Students should be:

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

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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<td>Connect Previous Knowledge to New Learning</td>
<td>Identify Student’s Mathematical Understanding</td>
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<td>Making Thinking Visible</td>
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<td>Develop and Demonstrate Mathematical Practices</td>
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<td>Inquiry-Oriented and Exploratory Approach</td>
<td>Role Playing</td>
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<td>Multiple Solution Paths and Strategies</td>
<td>Diagrams, Charts, Tables, and Graphs</td>
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<td>Use of Multiple Representations</td>
<td>Anticipate Likely and Possible Student Responses</td>
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<td>Explain the Rationale of your Math Work</td>
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<td>Maintain the Cognitive Demand</td>
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Educational Technology

Standards

8.1.5.A.1, 8.1.5.A.3, 8.1.5.F.1, 8.2.5.D.2

➢ Technology Operations and Concepts:
  • Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems. **Example:** Students will navigate websites such as Imagine Math Facts, MobyMax, Learnzillion, IXL Math, Khanacademy, or SuccessMaker.

  • Use a graphic organizer to organize information about a problem or issue: **Example:** Students will use these graphic organizers to help reinforce various ways of solving math problems involving area, measuring, and various ways to organize data.


➢ Critical thinking, problem solving, and decision making:
  • Apply digital tools to collect, organize, and analyze data that support a scientific finding. **Example:** Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources when problem solving.


➢ Abilities for a Technological World:
  • Evaluate and test alternative solutions to a problem using the constraints and trade-offs identified in the design process to evaluate potential solution. **Example:** Students will apply a design process with math problems involving area, measuring, and various ways to organize data.

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 judgments about the use of specific tools and use tools to explore and deepen understanding of concepts.

**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.
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.

**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.
## 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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| **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 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

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BUILDING EQUITY IN YOUR TEACHING PRACTICE

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

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

- This unit / lesson is connected to other topics explored with students.
- There are multiple viewpoints reflected in the content of this unit / lesson.
- The materials and resources are reflective of the diverse identities and experiences of students.
- The content affirms students, as well as exposes them to experiences other than their own.

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

- This unit / lesson provides context to the history of privilege and oppression.
- This unit / lesson addresses power relationships.
- This unit / lesson help students to develop research and critical thinking skills.
- This curriculum creates windows and mirrors* for students.

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

- This unit / lesson help students question and unpack biases & stereotypes.
- This unit / lesson help students examine, research and question information and sources.
- The curriculum encourage discussion and understanding about the groups of people being represented.
- This unit / lesson challenges dominant perspectives.

**EQUITABLE PEDAGOGY**
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.

Culturally Relevant Pedagogy Examples

- **Present new concepts using student vocabulary.** Use student diction to capture attention and build understanding before using academic terms.
  
  **Example:** Teach math vocabulary in various modalities for students to remember. Use multi-modal activities, analogies, realia, visual cues, graphic representations, gestures, pictures, practice and cognates. Model to students that some vocabulary has multiple meanings. Have students create the Word Wall with their definitions and examples of vocabulary from this unit to foster ownership.

- **Use Learning Stations: Provide a range of materials 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 will give them a sense of ownership to their learning and understanding. For example: Teacher provides various fruit items that can be easily divided into halves or fourths. Students choose the fruit they would like to work with. Groups of students are comprised of those who choose the same fruit. Students collaborate to divide their fruit first into halves and then into fourths. Each group will share their reasons for choosing the fruit with the class.

- **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:** Teacher will provide students with a copy of a "Personal Profile" sheet. Each student will complete their own personal profile and may add extra information about themselves. The information should consist of physical characteristics as well as interests and background information. The teacher will randomly group students. Students work with their group to discuss their personal profiles and determine similarities and differences. After the discussion, students will record their information on a bar graph titled “Things we have in Common”. Students will record at least five similar characteristics. Each group will share profile information with the class. The teacher can conclude the lesson with a discussion about the use and significance of graphs to manage information. The class will also discuss the use of graphs to organize and record personal information to enhance the observance of diversity in the classroom (Ruggiano & Wen Ma, 2006, p. 14-15).
### Differentiated Instruction

**Accommodate Based on Students Individual Needs: Strategies**

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<th>Time/General</th>
<th>Processing</th>
<th>Comprehension</th>
<th>Recall</th>
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<tr>
<td>Extra time for assigned tasks</td>
<td>Extra response time</td>
<td>Precise processes for balanced math instructional model</td>
<td>Teacher-made checklist</td>
</tr>
<tr>
<td>Adjust length of assignment</td>
<td>Have students verbalize steps</td>
<td>Short manageable tasks</td>
<td>Use visual graphic organizers</td>
</tr>
<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>
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<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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<tr>
<td></td>
<td>Partnering</td>
<td>Emphasize multi-sensory learning</td>
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<th>Assistive Technology</th>
<th>Tests/Quizzes/Grading</th>
<th>Behavior/Attention</th>
<th>Organization</th>
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<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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<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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<th>Organization</th>
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<tr>
<td>Note-taking assistance</td>
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</table>
**Differentiated Instruction**

**Accommodate Based on Content Specific Needs:**

- Demonstrate comprehension of 1- and 2- step word problems which use key, technical vocabulary in simple sentences by interpreting data and creating a scaled bar graph.
- Teacher models how to create a bar graph and discuss common errors.
- Create flip books with pictures, academic vocabulary and examples.
- Use different learning modalities to introduce and practice drawing bar graphs to represent data (short videos, songs, color coded bars).
- Display samples on an anchor chart. Shade alternate rows of information so that students can easily track information within the chart.
- Display the information one line at a time in order to help students see relevant information as needed.
- Provide students the opportunity to practice skills by providing students step-by-step directions.
- Provide students with rulers to use for measuring.
- Use hands-on activities, pictures, videos, computers to support understanding (group and individual projects).
- Provide students with a list of examples of academic vocabulary.
- Some students, when asked to work cooperatively with a partner, may need more direction. It may be necessary to develop roles and guidelines for each person in the group. In addition, a collaboratively produced set of expectations or class norms for all group work should be part of the class culture for small group success.
- Scaffold complex concepts and provide leveled problems for multiple entry points.
- Teach in small chunks so students get a lot of practice with one step at a time.
- Re-teach the same concept with a variety of fluency games.
- Use methods of delivery of instruction such as recordings and videos that can be accessed independently or repeated if necessary.
- Adjust numbers in calculations to suit learner’s levels.
Interdisciplinary Connections

Model interdisciplinary thinking to expose students to other disciplines.

Technology Connection: 8.1.5.F.1
Name of Task: Greens, Eggs, and Ham- The Plan!
Students will find out which fruits and vegetables to put in the Healthy Eating Area by collecting data. Students will analyze the collected data to plan and measure garden beds for the 'Healthy Eating Area'. [http://questgarden.com/179/70/8/15111161848/task.htm]

Students can also take a look at nutritional labels of different types of foods for this activity. They will divide into small groups, and each group will pick a different aspect of the labels to look at -- the amount of sugar in a single serving, the amount of protein, carbohydrates, sodium, etc. After gathering the information from the labels, students will create bar graphs for each food item, and compare findings with other groups. The discussion following will include surprising observations, how the bar graphs helped with their data, and a lesson on food labels and beneficial foods.

Health Connection: 2.1ABCDE
Name of Task: It's in the Data
Students will decide which meal to serve to your classmates; breakfast, lunch, or dinner. Students will need to investigate the food groups and choose one food from each group to include in your meal. After students have planned their menu they will find out the price of the items they will need from a grocery store advertisement. To keep track of their food items and the prices, they will create a spreadsheet that includes the grocery list and the price of each item and the total cost of the food. Explore the task at: [http://questgarden.com/181/71/3/150529160642/index.htm]

Science Connection: 3-ESS2-1
Name of Task: It's in the Data
Scientists use mathematics to better understand oceans, the atmosphere and polar ice caps. Students will learn about climate change and global warming through web explorations. You will then explore sites with data to see how climate change and global warming are monitored. Next, you will then learn how humans affect global warming and what you can do to stop it. Lastly, you will apply your knowledge by solving related math problems. These tasks will require a computer, access to the web and paper and pencil. Learn more about global warming at: [http://www.mathgoodies.com/Webquests/climate/]
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
3.MD.B.3.
Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.

3.MD.B.4.
Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.

3.OA.C.7.
Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers. *(benchmarked)*

3.OA.D.8.
Solve two-step word problems using the four operations. 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. *(benchmarked)*

3.NBT.A.2.
Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. *(benchmarked)*

3.MD.C.7. Relate area to the operations of multiplication and addition.

3.MD.C.7d.
Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems. *(benchmarked)*
### 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.
## New Jersey Student Learning Standard:

**3.MD.B.3:** Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.

**Student Learning Objective 1:** Draw scaled picture and scaled bar graphs to represent data with several categories. Solve one and two-step word problems using scaled bar graphs.

## Modified Student Learning Objectives/Standards:

**M.EE.3.MD.B.3** Use picture or bar graph data to answer questions about data.

<table>
<thead>
<tr>
<th>MPs</th>
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<th>Skills, Strategies &amp; Concepts</th>
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<th>Tasks/Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP 2</td>
<td>3.MD.3-1</td>
<td>Graphs organize information and contain labels. Pictures and bars can represent numbers in graphs. Different graphs may display different scales.</td>
<td>Why is data collected and analyzed? How can information be gathered, recorded and organized?</td>
<td>Parking Cars Planning a Field Trip Toni’s School Supplies What’s Your Favorite</td>
</tr>
</tbody>
</table>
represented numerically (e.g., ages of students).

- Tasks do not require students to create the entire graph, but might ask students to complete a graph or otherwise demonstrate knowledge of its creation.

While exploring data concepts, students should collect data, analyze data, and interpret data.

Students should analyze, interpret and create bar graphs and pictographs in real world situations.

How does the type of data influence the choice of display?

The way that data is collected, organized and displayed influences interpretation.

How does collecting data help us solve problems or make decisions in our world?

What aspects of a graph help people understand and interpret the data easily?

<table>
<thead>
<tr>
<th>M&amp;M Color Graphing</th>
</tr>
</thead>
</table>

**SPED Strategies:**
Demonstrate comprehension of 1- and 2-step word problems which use key, technical vocabulary in simple sentences by interpreting data and creating a scaled bar graph.

<table>
<thead>
<tr>
<th>Favorite Pizza Toppings</th>
</tr>
</thead>
<tbody>
<tr>
<td>cheese</td>
</tr>
<tr>
<td>mushroom</td>
</tr>
<tr>
<td>sausage</td>
</tr>
<tr>
<td>pepperoni</td>
</tr>
</tbody>
</table>

**Key:** 1 = 5 pizzas
Teacher models how to create a bar graph and discuss common errors.

Create flip books with pictures, academic vocabulary and examples.

Use different learning modalities to introduce and practice drawing bar graphs to represent data (short videos, songs, color coded bars).

**ELL Strategies:**

Demonstrate comprehension of 1- and 2-step word problems which use L1 (student’s native language) and/or pictures, gestures and selected technical words by interpreting data and creating a scaled bar graph.

Model the process. Talk aloud while solving problems on the smartboard or chalkboard to show the thinking process and common errors.

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

Teacher creates a cloze activity where words are omitted from a math passage and students are required to fill in the blanks.
### New Jersey Student Learning Standard:

**3.MD.B.4:** Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.

**Student Learning Objective 2:** Depict data measured in fourths and halves of an inch with a line plot with scales marked with appropriate units.

**Modified Student Learning Objectives/Standards: M.EE.3.MD.B.4**

Measure length of objects using standards tools, such as rulers, yardsticks, and meter sticks.

<table>
<thead>
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<th>Tasks/Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP 2 MP 5</td>
<td>N/A</td>
<td>Show measurements on a line plot to display the information in an organized way.</td>
<td>Relate measuring to halves, quarters on the number line/ruler to fractions and equal shares.</td>
<td>It’s in the Data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Measure length using rulers marked with inch, quarter inch and half inch.</td>
<td>The way that data is collected, organized and displayed influences interpretation.</td>
<td>Estimating Measurements</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accurately measure several small objects using a standard ruler and display findings on a line plot.</td>
<td>Graphs convey data in a concise way.</td>
<td>Reading Survey</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Third graders need many opportunities measuring the length of various objects in</td>
<td>Why is data collected and analyzed?</td>
<td>Olympic Long Jump</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A Giant’s Hand Task</td>
</tr>
</tbody>
</table>
their environment.

**Example:**
Measure objects in your desk to the nearest $\frac{1}{2}$ inch or $\frac{1}{4}$ of an inch. Display data collected on a line plot. How many objects measured $\frac{1}{4}$ inch? $\frac{1}{2}$ inch? etc…

Display data on line plots with horizontal scales in whole numbers, halves, and quarters.

Review with students how to read and use a standard ruler including details about halves and quarter marks on the ruler as an effective strategy to implement.

Students should connect their understanding of fractions to the measuring of one-half and one-quarter inch.
### SPED Strategies:
- Display samples on an anchor chart. Shade alternate rows of information so that students can easily track information within the chart. Display the information one line at a time in order to help students see relevant information as needed.

- Provide students the opportunity to practice skills by providing students step-by-step directions.

- Provides students with rulers to use for measuring.

- Use hands-on activities, pictures, videos, computers to support understanding (group and individual projects).

- Provide students with a list with examples of academic vocabulary.

- Some students, when asked to work cooperatively with a partner, may need more direction. It may be necessary to develop roles and guidelines for each person in the group. In addition, a collaboratively produced set of expectations or class norms for all group work should be part of the class culture for small group success.

### ELL Strategies:
- Demonstrate comprehension of word problems which use L1 (student’s native
language) and/or pictures, gestures and selected technical words on how to measure objects to the nearest fourth inch and then plot the measurements. Be sure to enunciate /th/ at the end of tenths/hundredths and /v/ at the end of halves to help English language learners distinguish tenths, hundredths and halves. Check for student understanding and correct pronunciation of fraction names.

Teacher Modeling - Talk aloud while solving problems on the smartboard or chalkboard to show the thinking process and common errors.

Teach in small chunks so students get a lot of practice with one step at a time.

Peer Coach - Allow ELL students to talk to a peer in their native language when necessary to clarify understanding and clear up misunderstandings.
### New Jersey Student Learning Standard:

3.OA.C.7: Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

### Student Learning Objective 3:
Fluently multiply and divide within 100 using strategies such as the relationship between multiplication and division.

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

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>MP 5</td>
<td>3.OA.7-1 3.OA.7-2</td>
<td>Engage students in multiple strategies to reach all types of learners. Students should have exposure to multiplication and division problems presented in both vertical and horizontal forms.</td>
<td>Multiplying and dividing fluently refers to knowledge of procedures, knowledge of when and how to use them appropriately, and skills in performing them flexibly, accurately, and efficiently.</td>
<td>My Special Day</td>
</tr>
<tr>
<td></td>
<td>• Tasks do not have a context.</td>
<td>• Strategies students may use to attain fluency include: Multiplication by zeros and ones</td>
<td>Operations create relationships among numbers.</td>
<td>Find the Unknown Number</td>
</tr>
<tr>
<td></td>
<td>• Only the answer is required.</td>
<td>• Doubles (2s facts), Doubling twice (4s), Doubling three times (8s)</td>
<td>The relationship among the operations and their properties promote computational fluency.</td>
<td>Finding Factors</td>
</tr>
<tr>
<td></td>
<td>• Tasks require finding of products and related quotients accurately. For example, each 1-point task might require four or more computations, two or more multiplication and two or more division.</td>
<td>• Tens facts (relating to place value, 5 x 10 is 5 tens or 50)</td>
<td>How do you solve problems using multiplication and division in real world situations?</td>
<td>Making the Hard Facts Easy</td>
</tr>
<tr>
<td></td>
<td>• 75% of tasks are from the harder three quadrants of the times table (a × b where a &gt; 5 and/or b &gt; 5).</td>
<td>• Five facts (half of tens)</td>
<td></td>
<td>Field Trip</td>
</tr>
<tr>
<td></td>
<td>• Tasks are not timed.</td>
<td>• Skip counting (counting groups of ___ and knowing how many groups have been counted)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Square numbers (ex: 3 x 3)</td>
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</tbody>
</table>
- Nines (10 groups less one group, e.g., 9 x 3 is 10 groups of 3 minus one group of 3)
- Decomposing into known facts (6 x 7 is 6 x 6 plus one more group of 6)
- Turn-around facts (Commutative Property)
- Fact families (Ex: 6 x 4 = 24; 24 ÷ 6 = 4; 24 ÷ 4 = 6; 4 x 6 = 24)

Students demonstrate fluency with multiplication facts through 10 and the related division facts.

Create situations for students to engage in experiences working with manipulatives, pictures, arrays, word problems, and numbers to internalize the basic facts (up to 9 x 9).

Provide ample experiences and strategies for students to understand the relationship between multiplication and division.

Plan activities that allow students the opportunity to study and examine patterns and relationships in multiplication facts and relating multiplication and division; this way students build a foundation for fluency with multiplication and division facts.

In order to multiply and divide fluently, students must have a variety of strategies. How does understanding the inverse relationship between multiplication and division help you efficiently multiply and divide?
SPED Strategies:
Partner work - have students discuss with a partner each step that was taken in order to solve the multiplication and division problem correctly.

Scaffold complex concepts and provide leveled problems for multiple entry points.

Teach in small chunks so students get a lot of practice with one step at a time.

Re-teach the same concept with a variety of fluency games.

Use methods of delivery of instruction such as recordings and videos that can be accessed independently or repeated if necessary.
| Adjust numbers in calculations to suit learner’s levels. **ELL Strategies:** Model each step of the algorithm before students begin. Give students a chance to practice the next day’s objective beforehand. (At home, for example). Listen intently in order to uncover the math content in the student’s speech. Explain orally how to multiply and divide within 100, using the relationship between multiplication and division in L1 (student’s native language) and/or using Diagrams, Charts/Posters, pictures and single words. Expose students to other formats of notating fractions, such as those which use a diagonal to separate numerator from denominator (i.e. /). Have students respond by multiple means, including “show and tell” rather than written. |
New Jersey Student Learning Standard:

3.OA.D.8: Solve two-step word problems using the four operations. 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 4: Write equations containing an unknown and find the value of an unknown in an equation that is a representation of a two-step problem (with any four operations); use estimation strategies to assess the reasonableness of answers.

Modified Student Learning Objectives/Standards:

M.EE.3.OA.D.8: Solve one-step word problems using addition or subtraction within 20.

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>MP 1</td>
<td>3.OA.8</td>
<td>Students use benchmark numbers that are easy to compute.</td>
<td>Are students able to identify key words in word problem that will point to the particular operations that are necessary to solve a multi-step word problem?</td>
<td>Hooked On Solutions!</td>
</tr>
<tr>
<td>MP 4</td>
<td></td>
<td>Rounding can be used as an estimation strategy.</td>
<td>Are students able to translate a word problem into a numeric sentence and assign a variable to an unknown quantity?</td>
<td>It Takes Two!</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Teacher encourages students to represent problems using equations with a letter to represent unknown quantities.</td>
<td>What are some strategies for solving unknowns in open sentences and equations?</td>
<td>Unknown Factor Bowling</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Example:</strong> Mike runs 2 miles a day. His goal is to run 25 miles. After 5 days, how many miles does Mike have left to run in order to meet his goal? Write an equation and find the solution (2 x 5 + m = 25).</td>
<td>How do you decide that your calculation is reasonable?</td>
<td>Read All About It!</td>
</tr>
</tbody>
</table>

Estimation strategies are revisited, including using compatible numbers (numbers that sum to 10, 50, or 100) or rounding.
| unknowns in various positions. | The focus in this standard is to have students use and discuss various strategies. Students should estimate during problem solving, and then revisit their estimate to check for reasonableness. Encourage students to represent the problem situation in a drawing or with counters or blocks. Students should determine the reasonableness of the solution to all problems using mental computations and estimation strategies. Students skip-count and examine multiplication patterns. **SPED Strategies:** Demonstrate understanding of a two-step word problem which uses key, technical vocabulary in simple sentences by writing an equation with an unknown value. Teacher models the process of how to write an equation containing an unknown and how to find the value of that unknown number in a two-step word problem Allow students to lead group and pair-share activities. |
|   | Scaffold complex concepts and provide leveled problems for multiple entry points.  
Review rules and provide a color coded anchor chart.  
Allow students to use calculators to determine the value of given expressions.  
In small groups, read word problems aloud.  
Highlight key information in the text.

**ELL Strategies:**
Create an interactive math journal in L1 (student’s native language) to demonstrate growth in math writing and reasoning.  
Provide a checklist of steps in L1 (student’s native language) on how to solve problems involving the four operations.  
Demonstrate understanding of a two-step word problem which uses L1 (student’s native language) and/or pictures, drawings, step-by-step word problems with selected technical vocabulary by writing an equation with an unknown value.  
Model the process. Talk aloud while solving problems on the smartboard or |
chalkboard to show the thinking process and common errors.

Teacher creates a cloze activity where words are omitted from a math passage and students are required to fill in the blanks.

Use cognates or flip books written in native language to use as a reference.

Scaffold complex concepts and provide leveled problems for multiple entry points.

In small groups create note cards with academic vocabulary in L1 (student’s native language).
### New Jersey Student Learning Standard:
3.NBT.A.2: Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. *(benchmarked)*

### Student Learning Objective 5:
Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. *(benchmarked)*

### Modified Student Learning Objectives/Standards:
M.EE.3.NBT.A.2: Demonstrate understanding of place value to tens.

<table>
<thead>
<tr>
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<th>Tasks/Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP 2</td>
<td>3.NBT.2</td>
<td>Teacher engages students in working with problems written in both vertical and horizontal forms, including opportunities for students to apply the commutative and associative properties and the use of inverse operations. Students explain their thinking and show their work by using strategies and algorithms, and verify that their answer is reasonable. <strong>Examples:</strong> 172+265 = Add the hundreds first 100+200 = 300 Add the tens 70+60=130 Add the ones 2+5=7 300+130=7= 437 OR USE EXPANDED FORM 100+70+2</td>
<td>Students use the place value strategy to add and subtract with ease. Students use the properties to accurately find sums or differences. How can we select among the most useful mental math strategies for the task we are trying to solve? How can I learn to quickly calculate sums in my head? What strategies will help me add numbers quickly and accurately? Adding and subtracting fluently refers to knowledge of</td>
<td>Arrow Cards Compatible Numbers Field Day Fun From 100 to 0 Mental Mathematics Perfect 500 The Power of Properties Toys for Us Performance Assessment: A Question of Numbers</td>
</tr>
</tbody>
</table>
the total number of students on the playground?
100 + 200 = 300
70 + 20 = 90
8 + 5 = 13
300 + 90 + 13 = 403

Use place value understanding to round numbers to the nearest 10 and 100. Estimate sums/differences.

Fluently add and subtract within 1,000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

Give students opportunities to practice adding to 1000 to achieve fluency. Algorithms, place value, and properties of operations are among the most effective strategies used.

Interactive websites are used to help students with fluency.

Pair up students to allow discussion time for their work.

Students practice doubles, making tens, and making hundreds to help them mentally add numbers.

procedures, knowledge of when and how to use them appropriately, and skill in performing them flexibly, accurately, and efficiently.
Students work with base ten blocks and the number line (open and closed) to master addition and subtraction skills.

**SPED Strategies:**
Explain orally how to add and subtract within 1000 using strategies and algorithms.

Model each step of the algorithm before students begin and provide students the opportunity to practice mental math.

Scaffold complex concepts and provide leveled problems for multiple entry points.

First use manipulatives or real objects (ten-frame, counters, base ten blocks, coins, dollar bills, etc.) then make transfer from concrete to pictorial to abstract.

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

**ELL Strategies:**
Explain orally how to add and subtract within 1000 using strategies and algorithms in L1 (student’s native language) and /or diagrams, charts/posters, pictures and single words.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Check frequently for understanding (e.g., ‘show’). Listen intently in order to uncover the math content in the students’ speech. Use non-verbal signals, such as “thumbs-up.”</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Assign a buddy or a group to clarify directions or process</td>
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<tr>
<td></td>
<td></td>
<td>Connect students’ prior knowledge and experiences to new learning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>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</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Partner work - Have students explain their thinking process aloud to a classmate while solving a problem of their choice</td>
</tr>
</tbody>
</table>
New Jersey Student Learning Standard:

3.MD.C.7d: Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.

Student Learning Objective 6: Solve real-world problems involving finding areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts.

Modified Student Learning Objectives/Standards: N/A

<table>
<thead>
<tr>
<th>MPs</th>
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</thead>
<tbody>
<tr>
<td>MP 7</td>
<td>N/A</td>
<td>Teacher provides a model for students to explore finding the area of a rectilinear figure by decomposing and with no overlapping.</td>
<td>Students can decompose a rectilinear figure into different rectangles.</td>
<td>Micah’s and Nina’s Rectangle</td>
</tr>
</tbody>
</table>

Tasks/Activities:

- Field Day
- My New Bedroom
- My Room
- PBAs: Finding Area
- Area of Square
- Using Simpler Problems
They find the area of the figure by adding the areas of each of the rectangles together.

**SPED Strategies:**
Read, listen to and demonstrate understanding of real world problems involving finding area of irregular figures.
In small groups, read word problems aloud, highlight key information in the text.
Have students create anchor charts and re-teach the same concept with a variety of fluency games.
Allow students to lead group and pair-share activities.

**ELL Strategies:**
In L1 (student’s native language) review background knowledge, prerequisite skills and concepts.
In L1 (student’s native language) review rules and provide color coded anchor chart.
Teacher creates a cloze activity where words are omitted from a math passage and students are required to fill in the blanks.

Explain the technique of finding areas of rectilinear figures by arranging them into non-overlapping rectangles and adding the areas of the non-overlapping parts in L1 (student’s native language) and/or use Diagrams, pictures, gestures and illustrated single words.

Provide learning aids, such as calculators and computers, to help students with computations.

Model the process. Talk aloud while solving problems on the smartboard or chalkboard to show the thinking process and common errors.

Have students explain their thinking process aloud in their native language to a classmate while solving a problem.
Integrated Evidence Statements

3.NF.A.Int.1: In a contextual situation involving a whole number and two fractions not equal to a whole number, represent all three numbers on a number line diagram, then choose the fraction closest in value to the whole number.

- Fractions equivalent to whole numbers are limited to 0 through 5.
- Fraction denominators are limited to 2, 3, 4, 6 and 8.

3.Int.3: Solve real world and mathematical problems involving perimeters of polygons requiring a substantial addition, subtraction, or multiplication step, drawing on knowledge and skills articulated in 3.NBT. Content Scope: 3.MD.8, 3.NBT.2, and 3.NBT.3

- Tasks must be aligned to the first standard and 1 or more of the subsequent standards listed in the content scope. Substantial (def.) – Values should be towards the higher end of the numbers identified in the standards.

3.Int.5: Add, subtract, or multiply to solve a one-step word problem involving masses or volumes that are given in the same units, where a substantial addition, subtraction, or multiplication step is required drawing on knowledge and skills articulated in 3.NBT, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. Content Scope: 3.MD.2, 3.NBT.2, and 3.NBT.3

- Tasks must be aligned to the first standard and 1 or more of the subsequent standards listed in the content scope. Substantial (def.) – Values should be towards the higher end of the numbers identified in the standards.

3.C.4-7: 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 2.NBT

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

3.D.1: Solve multi-step contextual word problems with degree of difficulty appropriate to Grade 3, 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.

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

- Tasks may have scaffolding 1, if necessary, in order to yield a degree of difficulty appropriate to Grade 3.
- Multi-step problems must have at least 3 steps.
### Unit 4 Vocabulary

- Algorithm
- A.M.
- Area
- Array
- Associative Property of Multiplication
- Attribute
- Bar Graph
- Column
- Common Denominator
- Common Factor
- Common Multiple
- Commutative Property of Multiplication
- Compare
- Compatible Numbers
- Compose
- Composite Number
- Customary System
- Data
- Decompose
- Denominator
- Difference
- Digit
- Distributive Property
- Divisibility Rules
- Division
- Divisor
- Dividend
- Eighths
- Elapsed Time

- Endpoint
- Expanded Form
- Equation
- Equivalent Fractions
- Equal Parts
- Estimate
- Evaluate
- Expression
- Fact Family
- Factors
- Factor Pairs
- Fractions
- Foot
- Fourths
- Gram
- Greater than
- Graph
- Half hour
- Halves
- Hexagon
- Hour
- Identity Property of Multiplication
- Inch
- Inverse Operations
- Interpret
- Kilogram
- Line
- Line Segment

- Liter
- Length
- Measure
- Mental Math/ Mental Calculation
- Mixed Number
- Model/ Visual Model
- Multiples
- Multiplicative Identity Property of 1
- Numerator
- Partial Product
- Partial Quotient
- Part of a Whole
- Pattern
- Place Value
- Prime Number
- Product
- Quotient
- Reasonableness
- Related Facts
- Remainder
- Round
- Row
- Rule
- Term
- Unit Fraction
- Variable
- Width
- Whole Number
- Zero Property of Multiplication
References & Suggested Instructional Websites

http://www.insidemathematics.org
http://maccss.ncdpi.wikispaces.net/Third+Grade
http://nlvm.usu.edu/
http://mrsgebauer.com/?reqp=1&reqr=
https://www.teachingchannel.org/
www.illustrativemathematics.org/
www.k-5mathteachingresources.com/
www.georgiastandards.org/Common-Core/Pages/Math-K-5.aspx
**Field Trip Ideas**

**ALSTEDE FARMS** – Students can learn about farming in the most fun way! Alstede Farms personalizes each farm tour and field trip, depending on the group’s interests. You can navigate the farm by taking hayrides out to the beautiful fields and explore the orchards, greenhouses, school classroom, pet friendly animals and last but not least – having a great outdoor day at their family owned farm. You can also choose the other activities- climb the giant hay pyramid or take a self-guided tour of our animals.

http://alstedefarms.com/group-events-and-tours/group-farm-tours/?gclid=C1jzn-W4lMYCFQgUHwodK1oAxA

**Math Connection:** Students can navigate the hay stakes and fields to create and solve problems involving addition, subtraction, multiplication, and division.

**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.

http://www.bouncefactorynj.com/

**Math Connection:** The students can 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

**DAVID BRADLEY CHOCOLATES** - Watch Fresh Chocolates being made through our observation window. Taste free samples of chocolate daily. Share your ideas for the perfect chocolate combination. Learn how to temper chocolate at home with our instructions.


**Math Connection:** Teachers can engage students in finding the area of a box of chocolates. Students can calculate sums and differences as chocolates move on the conveyor belt. A delicious box of chocolates can be divided so that every child has an assortment of about the same amount of items that can be sorted by different attributes (color, size, shape). Students can also use the box of chocolates to define rectangular areas.
Field Trip Ideas

ELLIS ISLAND/STATUE OF LIBERTY - Today the Ellis Island Immigration Museum is part of the Statue of Liberty National Monument and is under the care of the National Parks Service. It is a place where visitors can spend hours learning about Ellis Island's history before, during, and after its use as America's immigration station. The museum also tells the stories of why so many people immigrated to America and what became of them after they arrived.
http://www.statueoflibertytickets.com/Ellis-Island/

Math Connection: Students can analyze immigration data to create and solve problems involving addition, subtraction, multiplication, and division.

LIBERTY SCIENCE CENTER - An interactive science museum and learning center located in Liberty State Park. The center, which first opened in 1993 as New Jersey's first major state science museum, has science exhibits, the largest IMAX Dome theater in the United States, numerous educational resources, and the original Hoberman sphere.
http://lsc.org/plan-your-visit/

Math Connection: Students will be able to use measurement, estimation, and computational skills in a multi-step word problem and students will be able to collect data, estimate insect and animal population growth over a specified timeframe.

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/

Math Connection: The 30-plus stations let kids design 3-D images in a Colosseum-inspired computer studio, scatter across a digital floor that lights the shortest distance between each person, and glide a Plexiglas cart over acorn-shaped rubber balls (matching diameters make for a surprisingly smooth ride) and so much more.
Field Trip Ideas

**LEGO LAND DISCOVERY CENTER** - LEGOLAND® Discovery Center and LEGO Education work in partnership to deliver high quality educational experiences that will prepare today’s students for tomorrow’s world. **Requires approval from Unit Superintendent**

https://www.legolanddiscoverycenter.com/

Math Connection: LEGOLAND DISCOVERY CENTERS offer hands-on learning across curriculum, including science, mathematics, language arts, technology, and engineering design, while building and reinforcing collaboration, creativity, critical thinking, and problem solving.

**HEALTH BARN USA** - Students are busy in the organic garden composting and tempting their taste buds with fresh food and herbs, in the making and tasting the Rainbow Swirly Smoothie, and getting smart about produce by playing the seasonal food game with their classmates for stickers! Goodie bags are included. *School Assemblies: The wildly popular "Try it, You'll Like" and "Super Salad Bar" assemblies are guaranteed to have students requesting healthy foods at school and at home. These WOW programs are also supported by grants available from Life n' Sync 501C3. **Requires approval from Unit Superintendent**

www.healthbarnusa.com

Math Connection: Students can navigate the hay stakes and fields to create and solve problems involving addition, subtraction, multiplication, and division.