Grade 3: Unit 1
Multiplication, Division and Concepts of Area
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.

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 New Jersey Student Learning Standards (NJSLS). WIDA’s ELD standards advance academic language development across content areas ultimately leading to academic achievement for English learners. As English learners are progressing through the six developmental linguistic stages, this framework will assist all teachers who work with English learners to appropriately identify the language needed to meet the requirements of the content standard. At the same time, the language objectives recognize the cognitive demand required to complete educational tasks. Even though listening and reading (receptive) skills differ from speaking and writing (expressive) skills across proficiency levels the cognitive function should not be diminished. For example, an Entering Level One student only has the linguistic ability to respond in single words in English with significant support from their home language. However, they could complete a Venn diagram with single words which demonstrates that they understand how the elements compare and contrast with each other or they could respond with the support of their home language (L1) with assistance from a teacher, para-professional, peer or a technology program.

http://www.state.nj.us/education/modelcurriculum/ela/ELLOverview.pdf
<table>
<thead>
<tr>
<th>#</th>
<th>Student Learning Objective</th>
<th>NJSLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Interpret products of whole numbers as repeated addition and as the total number of objects (up to 100) in equal groups or arrays.</td>
<td>3.OA.A.1*</td>
</tr>
<tr>
<td>2</td>
<td>Interpret the quotient as a set of objects (up to 100) partitioned equally into a number of shares and as the number of equal shares.</td>
<td>3.OA.A.2</td>
</tr>
<tr>
<td>3</td>
<td>Use multiplication and division within 100 to solve word problems by modeling equal groups or arrays and by writing equations to represent equal groups or arrays.</td>
<td>3.OA.A.3*</td>
</tr>
<tr>
<td>4</td>
<td>Determine the unknown in a division or multiplication equation relating 3 whole numbers (within 100).</td>
<td>3.OA.A.4</td>
</tr>
<tr>
<td>5</td>
<td>Solve division of whole numbers by representing the problem as an unknown factor problem.</td>
<td>3.OA.B.6</td>
</tr>
<tr>
<td>6</td>
<td>Recognize area as an attribute of plane figures and understand concepts of area measurement.</td>
<td>3.MD.C.5a,5b</td>
</tr>
<tr>
<td>7</td>
<td>Measure areas by counting unit squares (cm², m², in², ft², and improvised units).</td>
<td>3.MD.C.6</td>
</tr>
<tr>
<td>8</td>
<td>Tile a rectangle to find its area and explain the relationship between tiling and multiplying side lengths to find the area of rectangles; solve real world problems by multiplying side lengths to find areas of rectangles.</td>
<td>3.MD.C.7a,7b</td>
</tr>
<tr>
<td>9</td>
<td>Round whole numbers to the nearest 10 or 100.</td>
<td>3.NBT.A.1</td>
</tr>
<tr>
<td>10</td>
<td>Multiply one digit whole numbers by multiples of 10 (10-90)</td>
<td>3.NBT.A.3</td>
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</tbody>
</table>

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

Structure teaching of mathematical concepts and skills around problems to be solved (Checkly, 1997; Wood & Sellars, 1996; Wood & Sellars, 1997)
Encourage students to work cooperatively with others (Johnson & Johnson, 1975; Davidson, 1990)
Use group problem-solving to stimulate students to apply their mathematical thinking skills (Artzt & Armour-Thomas, 1992)
Students interact in ways that support and challenge one another’s strategic thinking (Artzt, Armour-Thomas, & Curcio, 2008)
Activities structured in ways allowing students to explore, explain, extend, and evaluate their progress (National Research Council, 1999)
There are three critical components to effective mathematics instruction (Shellard & Moyer, 2002):
- Teaching for conceptual understanding
- Developing children’s procedural literacy
- Promoting strategic competence through meaningful problem-solving investigations

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

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

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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<tr>
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<th>Analyze Student Work</th>
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<tr>
<td>Connect Previous Knowledge to New Learning</td>
<td>Identify Student’s Mathematical Understanding</td>
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<td>Making Thinking Visible</td>
<td>Identify Student’s Mathematical Misunderstandings</td>
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<td>Develop and Demonstrate Mathematical Practices</td>
<td>Interviews</td>
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<td>Inquiry-Oriented and Exploratory Approach</td>
<td>Role Playing</td>
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<td>Multiple Solution Paths and Strategies</td>
<td>Diagrams, Charts, Tables, and Graphs</td>
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<tr>
<td>Use of Multiple Representations</td>
<td>Anticipate Likely and Possible Student Responses</td>
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<tr>
<td>Explain the Rationale of your Math Work</td>
<td>Collect Different Student Approaches</td>
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<td>Quick Writes</td>
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<td>Pair/Trio Sharing</td>
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<td>Turn and Talk</td>
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<td>Student Modeling</td>
<td>Pressing for Accuracy and Reasoning</td>
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<td></td>
<td>Maintain the Cognitive Demand</td>
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</tbody>
</table>
# 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 arrays, addition properties, exploring multiplication, multiplication and division tables, and various ways to organize data.
    - http://www.kidport.com/Grade3/Math/MathIndex.htm
    - http://illuminations.nctm.org/Activity.aspx?id=4196

- **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.
    - https://www.mathlearningcenter.org/resources/apps

- **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 arrays, addition properties, exploring multiplication, multiplication, and division tables, and various ways to organize data.
    - http://www.kidport.com/Grade3/Math/MathIndex.htm
# 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.
Career Ready Practices

- **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. 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

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

To Increase Comprehension and Communication Skills

## Environment

- Welcoming and stress-free
- Respectful of linguistic and cultural diversity
- Honors students’ background knowledge
- Sets clear and high expectations
- Includes routines and norms
- Is thinking-focused vs. answer-seeking
- Offers multiple modalities to engage in content learning and to demonstrate understanding
- Includes explicit instruction of specific language targets
- Provides participation techniques to include all learners

- Integrates learning centers and games in a meaningful way
- Provides opportunities to practice and refine receptive and productive skills in English as a new language
- Integrates meaning and purposeful tasks/activities that:
  - Are accessible by all students through multiple entry points
  - Are relevant to students’ lives and cultural experiences
  - Build on prior mathematical learning
  - Demonstrate high cognitive demand
  - Offer multiple strategies for solutions
  - Allow for a language learning experience in addition to content

## Sensory Supports*

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

## Graphic Supports*

- Graphs
- Charts
- Timelines
- Number lines
- Graphic organizers
- Graphing paper

## Interactive Supports*

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

## Verbal and Textual Supports

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

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*from *Understanding the WIDA English Language Proficiency Standards. A Resource Guide. 2007 Edition*. Board of Regents of the University of Wisconsin System, on behalf of the WIDA Consortium—www.wida.us.*
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 and 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, and 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 and improve intergroup relations.

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

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

- Students feel respected and their cultural identities are valued.
- Additional supports have been provided for students to become successful and independent learners.
- Opportunities are provided for 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.

Culturally Relevant Pedagogy Examples

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

- **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 boards will give them a sense of ownership to their learning and understanding. Students in each station collaborate to choose an item that is of interest to the group. After choosing the item, students will find the area by multiplying length times width. Each group will present their results to 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:** The comedy team of **Bud Abbott** and **Lou Costello** performed at Hinchliffe Stadium prior to boxing matches (Abbott was from the coastal New Jersey city of Asbury Park, but Costello was a Paterson native). Hinchliffe is one of only three **Negro League** stadiums left standing in the United States and is on the **National Register of Historic Places**. In 1963 the Paterson Public Schools acquired the stadium and used it for public school events until 1997, but it is currently in a state of disrepair. Have students view the Abbott and Costello clip of “7 x 13 = 28” and identify the misconceptions.  
  [https://www.youtube.com/watch?v=lzxVyO6cpos](https://www.youtube.com/watch?v=lzxVyO6cpos)
# Differentiated Instruction

## Accommodate Based on Students Individual Needs: Strategies

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<tr>
<th>Time/General</th>
<th>Processing</th>
<th>Comprehension</th>
<th>Recall</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Extra time for assigned tasks</td>
<td>• Extra response time</td>
<td>• Precise processes for balanced math instructional model</td>
<td>• Teacher-made checklist</td>
</tr>
<tr>
<td>• Adjust length of assignment</td>
<td>• Have students verbalize steps</td>
<td>• Short manageable tasks</td>
<td>• Use visual graphic organizers</td>
</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>
</tr>
<tr>
<td>• Communication system between home and school</td>
<td>• Mini-breaks between tasks</td>
<td>• Provide immediate feedback</td>
<td>• Visual and verbal reminders</td>
</tr>
<tr>
<td>• Provide lecture notes/outline</td>
<td>• Provide a warning for transitions</td>
<td>• Small group instruction</td>
<td>• Graphic organizers</td>
</tr>
<tr>
<td>• Partnering</td>
<td>• Partnering</td>
<td>• Emphasize multi-sensory learning</td>
<td></td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>Assistive Technology</th>
<th>Tests/Quizzes/Grading</th>
<th>Behavior/Attention</th>
<th>Organization</th>
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<tbody>
<tr>
<td>• Computer/whiteboard</td>
<td>• Extended time</td>
<td>• Consistent daily structured routine</td>
<td>• Individual daily planner</td>
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<tr>
<td>• Tape recorder</td>
<td>• Study guides</td>
<td>• Simple and clear classroom rules</td>
<td>• Display a written agenda</td>
</tr>
<tr>
<td>• Video Tape</td>
<td>• Shortened tests</td>
<td>• Frequent feedback</td>
<td>• Note-taking assistance</td>
</tr>
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<td></td>
<td>• Read directions aloud</td>
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<td>• Color code materials</td>
</tr>
</tbody>
</table>
Differentiated Instruction

Accommodate Based on Content Specific Needs:

- Teacher will model and review addition of double facts.
- Use pictorial representations to show the definition of an array and repeated addition.
- Use sets of colored counters or number lines to skip count and relate to multiplication.
- Arrays and area models will aid students in solving problems.
- Explain orally and in writing how to determine the product of whole numbers using precise vocabulary.
- Students will verbally explain the process of how to solve multiplication word problems.
- Students will solve multiplication word problems through the use of arrays, drawings, and equations.
- Provide manipulatives such as base ten blocks, and/or hundreds charts to multiply one-digit numbers by multiples of 10-90.
- Students may use manipulatives, drawings, document camera, or interactive whiteboard to demonstrate their understanding.
- Compose two or three digit numbers by their place values using base ten materials such as layered place value cards or flip books.
- Teacher will chart and model how to determine the unknown number in multiplication and division problems using key technical vocabulary.
- Provide manipulatives such as area tiles.
Interdisciplinary Connections

Model interdisciplinary thinking to expose students to other disciplines.

Language Arts Connection: NJSLSA.W2

Talking, Writing, and Reasoning: Making Thinking Visible with Math Journals

Students explore how their problem-solving strategies work by writing in math journals as they work in small groups to solve a math puzzle with multiple solutions. Learn more information about story problems at:

http://www.readwritethink.org/classroom-resources/lesson-plans/talking-writing-reasoning-making-820.html

Language Arts Connection: NJSLSA.W2 & NJSLSA.SL4

Math Curse

Students utilize the four modalities of reading (reading, writing, listening, and speaking) on a math word problem to bridge the gap between reading and math. Students solve each other's problems to solve the Math Curse. Learn more information about story problems at:


Science Connection: 3-ESS2-1

Earth Day Project:

Students will learn about recycling and Earth Day. They will discuss different ways to recycle and activities that can be done for Earth Day. Learn more information about recycling and Earth Day at: http://www.earthday.org/ or choose a video to watch at

http://www.bing.com/videos/search?q=earth+day&qvt=earth+day&FORM=VDRE
The purpose of enrichment is to provide extended learning opportunities and challenges to students who have already mastered, or can quickly master, the basic curriculum. Enrichment gives the student more time to study concepts with greater depth, breadth, and complexity. Enrichment also provides opportunities for students to pursue learning in their own areas of interest and strengths. Enrichment keeps advanced students engaged and supports their accelerated academic needs. Enrichment provides the most appropriate answer to the question, “What do you do when the student already knows it?”

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

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

**Required District/State Assessments**
Unit Assessments
PARCC
SGO Assessments

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

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<th>Standard</th>
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<tr>
<td><strong>3.OA.A.1</strong></td>
<td>Interpret products of whole numbers, e.g., interpret $5 \times 7$ as the total number of objects in 5 groups of 7 objects each. For example, describe and/or represent a context in which a total number of objects can be expressed as $5 \times 7$.</td>
</tr>
<tr>
<td><strong>3.OA.A.2</strong></td>
<td>Interpret whole-number quotients or whole numbers, e.g., interpret $56 \div 8$ as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe and/or represent a context in which a number of shares or a number of groups can be expressed as $56 \div 8$.</td>
</tr>
<tr>
<td><strong>3.OA.A.3</strong></td>
<td>Use multiplication and division within 100 to solve word problems by modeling equal groups or arrays and by writing equations to represent different groups or arrays.</td>
</tr>
<tr>
<td><strong>3.OA.A.4</strong></td>
<td>Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations $8 \times ? = 48$, $5 = \div 3$, $6 \times 6 = ?$.</td>
</tr>
<tr>
<td><strong>3.OA.B.6</strong></td>
<td>Understand division as an unknown-factor problem. For example, find $32 \div 8$ by finding the number that makes 32 when multiplied by 8.</td>
</tr>
<tr>
<td><strong>3.MD.C.5a,5b</strong></td>
<td>Recognize area as an attribute of plane figures and understand concepts of area measurement.</td>
</tr>
<tr>
<td><strong>3.MD.C.6</strong></td>
<td>Measure areas by counting unit squares (square cm, square m, square in, square ft, and non-standard units).</td>
</tr>
<tr>
<td><strong>3.MD.C.7</strong></td>
<td>Relate area to the operations of multiplication and addition.</td>
</tr>
<tr>
<td></td>
<td>• <strong>3.MD.C.7a</strong> Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.</td>
</tr>
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</table>
New Jersey Student Learning Standards

- **3.MD.C.7b.** Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.

**3.NBT.A.1**
Use place value understanding to round whole numbers to the nearest 10 or 100.

**3.NBT.A.3**
Multiply one-digit whole numbers by multiples of 10 in the range 10-90. (e.g. 9x80, 5x60) using strategies based on place value and properties of operations.
<table>
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<td>1. Make sense of problems and persevere in solving them.</td>
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<td>2. Reason abstractly and quantitatively.</td>
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<tr>
<td>3. Construct viable arguments and critique the reasoning of others.</td>
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<td>4. Model with mathematics.</td>
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<td>5. Use appropriate tools strategically.</td>
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<tr>
<td>6. Attend to precision.</td>
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<tr>
<td>7. Look for and make use of structure.</td>
</tr>
<tr>
<td>8. Look for and express regularity in repeated reasoning.</td>
</tr>
<tr>
<td>Grade: Three</td>
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</table>

**NJSLS:**

**Unit Focus:**
- Represent and solve problems involving multiplication and division
- Understand properties of multiplication and the relationship between multiplication and division
- Understand concepts of area and relate area to multiplication and addition (Geometric measurement)
- Use place value understanding and properties of operations to perform multi-digit arithmetic

**New Jersey Student Learning Standard:**
3.OA.A.1 : Interpret products of whole numbers, e.g., interpret 5 x 7 as the total number of objects in 5 groups of 7 objects each. For example, describe and/or represent a context in which a total number of objects can be expressed as 5 x 7.

**Student Learning Objective 1:** Interpret products of whole numbers as repeated addition and as the total number of objects (up to 100) in equal groups or arrays.

**Modified Student Learning Objectives/Standards:**
M.EE.3.OA.A.1 Use repeated addition to find the total number of objects and determine the sum.

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<tr>
<td>MP 2 MP 4</td>
<td>3.OA.A.1</td>
<td>Students should relate multiplicative reasoning to iterating (making multiple copies and partitioning sets of objects). Mathematical expression: 4 x 5</td>
<td>In a multiplicative expression A x B, A can be defined as a scaling factor. Making multiplicative units with objects or units of</td>
<td>Base Ten Multiplication Egg Tower</td>
</tr>
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</table>
area, and/or measurement quantities and division situations). For example, “the total number of books if 5 shelves each have 7 books” can be represented by the expression 5x7 rather than “Marcie placed 7 books on each of 5 shelves. How many books does she have?”

• Tasks do not require students to interpret products in terms of repeated addition, skip counting, or jumps on the number line.

• The italicized example refers to describing a real-world context, but describing a context is not the only way to meet the standard. For example, another way to meet the standard would be to identify contexts in which a total can be expressed as a specified product.

Students should be able to view 5 as the multiplicative unit (multiplicand) and 4 as the scaling factor (number of multiplicative unit multiplier) for that multiplicative unit; 4 copies of 5; 4 groups of 5; 5 + 5 + 5 + 5 = 20. The multiplier, or scale factor, represents the number of iterations.

Address symbolic and pictorial representations for multiplication and their connections.

Emphasize drawing and interpretation of diagrams.

Have students wonder, ask questions (Why? What if?) and notice patterns.

Have students analyze responses from fictitious students to agree or disagree with conjectures/claims about a multiplicative scenario.

Example: Use the model below to find 3 × 4.

```
  __________
  |   |   |
  |   |   |
  |   |   |
  |   |   |
  __________
```

A. 11  B. 8  C. 15  D. 12

Explanation: measure as well as viewing the number of and number within multiplicative units is an indispensable foundational step that supports multiplicative reasoning.

A situation that can be represented by multiplication has an element that represents the scalar and an element that represents the quantity to which the scalar applies.

What does it mean to multiply?

Why do you think the product and the sum are the same?

How can you find the total number of objects in equal groups?

What are arrays, and how do they show multiplication?

How can you write a story to describe a multiplication fact?

One Hundred Hungry Ants!

What’s My Product

Zeke’s Dog

Additional Tasks:

PBA: Donuts Multiplication Task
Look at the model to solve the multiplication problem. One way to solve it is to look at multiplication as repeated addition.
The model has 3 rows and 4 columns (3 × 4). Multiplying 3 × 4 is equal to adding together three 4's:
4 + 4 + 4 = 12 Counting the squares in the model, there are 12 squares. This shows that 3 × 4 = 12

Diagrams of groups will be used to solve a story problem.
Draw a diagram of 7 groups of 3 circles.
Draw a diagram to represent 7 x 3.
How are these two diagrams similar? Different?
What is 7 x 3?

Write a word problem that you could solve by computing 7 x 9.

**SPED Strategies:**
Teacher will model and review addition of double facts.

Use pictorial representations to show the definition of an array and repeated addition.

Use sets of colored counters or number lines to skip count and relate to multiplication.

One factor in a multiplication problem represents the number of groups/rows or columns and the other factor in a multiplication problem represents the number of items in each group.
Arrays and area models will aid students in solving problems.

Explain orally and in writing how to determine the product of whole numbers using precise vocabulary.

**ELL Strategies:**
Explain orally and in writing how to determine the product of whole numbers in L1 (student’s native language) and/or use gestures, drawings, equations and selected words.

Use pictorial representations to show the definition of an array and repeated addition.

Use sets of colored counters, number lines to skip count and relate to multiplication.

Arrays and area models will aid students in solving problems.

In native language, explain orally and in writing how to determine the product of whole numbers using key vocabulary in a series of simple sentences.
New Jersey Student Learning Standard:

3.OA.A.2: Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.

Student Learning Objective 2:

Interpret the quotient as a set of objects (up to 100) partitioned equally into a number of shares and as the number of equal shares.

Modified Student Learning Objectives/Standards:

M.EE.3.OA.A.2 Use repeated addition to find the total number of objects and determine the sum.

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<tr>
<td>MP 2</td>
<td>3.OA.A.2</td>
<td>Teacher focuses students on two distinct models of division: partition models and measurement (repeated subtraction) models. Partition models provide students with a total number and the number of groups. These models focus on the question, “How many objects are in each group so that the groups are equal?” A context for partition models would be: There are 12 cookies on the counter. If you are sharing the cookies equally among three bags, how many cookies will go in each bag? For 56 ÷ 8, students should be able to interpret the quotient as representing either the number of equal-sized groups into which 56 has been fair-shared or measured out or the size of each equal-sized group formed by partitioning 56 into 8 such groups.</td>
<td>How can you think of division as sharing? How can you think of division as repeated subtraction? What kinds of stories involve division situations? Division is defined by its inverse relationship with multiplication. How is the relationship between multiplication and division similar to the relationship between addition and subtraction?</td>
<td>Bike Race Ray’s Hamster Run Sherrin’s Breakfast Melon Shake, Rattle and Roll Revisited Stuck on Division The Door Bell Rang Performance Task 1-1 Performance Task 2-1</td>
</tr>
<tr>
<td>MP 4</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
books did she place on each shelf?’

- Tasks do not require students to interpret quotients in terms of repeated subtraction, skip counting, or jumps on the number line.
- The italicized example refers to describing a real-world context, but describing a context is not the only way to meet the standard. For example, another way to meet the standard would be to identify contexts in which a number of objects can be expressed as a specified quotient. Half the tasks require interpreting quotients as a number of objects in each share and half require interpreting quotients as a number of equal shares.

Build an understanding of the meaning of two different problem types: measurement division and partitive division. Students use a variety of representations for creating and solving one step word problems, i.e., numbers, words, pictures, physical objects, or equations. They use multiplication and division of whole numbers within 100. Students explain their thinking, show their work by using at least one representation, and verify that their answer is reasonable. Word problems may be represented in multiple ways:

- **Equations:** $3 \times 4 = ?, 4 \times 3 = ?, 12 \div 4 = ?$ and $12 \div 3 = ?$

- **Array:**

```
  O O O O
  O O O O
  O O O O
```

- **Equal groups:**

```
  O O O O
  O O O O
```

- **Repeated addition:** $4 + 4 + 4$ or repeated subtraction.

How do we use multiplication and division to solve problems?

How can using objects and drawing pictures help in solving a problem?

Tabitha’s Bananas:
Tabitha has 40 bananas. She wants to put the bananas into 5 bundles with the same number of bananas in each bundle. How many bananas should Tabitha put in each bundle?

Marcia’s Bananas:
Marcia has 40 bananas. She wants to put the bananas into bundles with 5 bananas in each bundle. How many bundles can she make?
• Three equal jumps forward from 0 on the number line to 12 or three equal jumps backwards from 12 to 0.

![Number line diagram]

Have students model multiplicative situations and make sense of them through the use of diagrams.

Have students create their own problem situations to assess their understanding of critical features of division situations.

**SPED Strategies:**

Use pictorial representations to show the definition of a quotient.

Use sets of colored counters, number lines to skip count and relate to multiplication and arrays/area models will aid students in solving problems.

Explain orally and in writing how to determine the product of whole numbers using precise vocabulary in multiple sentences.

**ELL Strategies:**

Explain orally and in writing how to determine the product of whole numbers in L1 (student’s native language) and/or use
New Jersey Student Learning Standard:
3.OA.A.3: Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

Student Learning Objective 3: Use Multiplication and division within 100 to solve word problems by modeling equal groups or arrays and by writing equations to represent equal groups or arrays.

Modified Student Learning Objectives/Standards: N/A

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<tbody>
<tr>
<td>MP 1</td>
<td>3.OA.3-1</td>
<td>Model division as the unknown factor in multiplication in multiple ways (for example, bar modeling, number line, arrays, etc.)</td>
<td>How can the same array model represent multiplication and division?</td>
<td>Ice Cream Scoops</td>
</tr>
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</table>
| MP 4 | • All products come from the harder three quadrants of the times table (a × b where a > 5 and/or b > 5).  
• 75% of tasks involve multiplying to find the total number (equal groups, arrays); 25% involve multiplying to find the area. | Model problems using pictorial representations and manipulatives.  
Use manipulatives, pictures, words, and/or equations to represent the problem and explain the thinking process. | How can I use the array model to explain multiplication and division?  
How can I model division?  
How are multiplication and division alike and different? | Raking Leaves  
Seeing Arrays As Equal Groups  
Skittles Cupcake Combos |
| • For more information see NJSLS Table 2, Common multiplication and division situations, p. 94 and the OA Progression. | Students use a variety of representations for creating and solving one-step word problems (i.e., numbers, words, pictures, physical objects, arrays, equal shares, or equations). They use multiplication and division of whole numbers within 100. Students explain their thinking, show their work by using at least one representation, and verify that their answer is reasonable. Teacher engages students in a variety of strategies that can be used to solve word problems involving multiplication & division. **Examples:** If 18 plums are shared equally into 3 bags, then how many plums will be in each bag?

Measurement example: You have 18 inches of string, which you will cut into 3 equal pieces. How long will each piece of string be? Teacher divides students into small collaborative groups and engages them in problem solving, using manipulatives, as well as writing equations. | How can I use known facts to find unknown facts? | **PBA:**

**Three Problems** |
<table>
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<tr>
<th>SPED Strategies:</th>
<th>ELL Strategies:</th>
</tr>
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<tbody>
<tr>
<td>Using sentence frames students will explain the process of how to solve multiplication word problems. Students will solve multiplication word problems through the use of arrays drawings and equations.</td>
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</tr>
<tr>
<td>Multiplication fact sheet distributed to students.</td>
<td>Provide students with manipulatives such as counters, colored chips, and area tiles.</td>
</tr>
<tr>
<td>Provide students with manipulatives such as counters, colored chips, and area tiles.</td>
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</table>
New Jersey Student Learning Standard:

3.OA.A.4: Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations $8 \times ? = 48$, $5 = ? \div 3$, $6 \times 6 = ?$.

Student Learning Objective 4: Determine the unknown in a division or multiplication equation relating 3 whole numbers (within 100).

Modified Student Learning Objectives/Standards:

M.EE.3.OA.4: Solve addition and subtraction problems when result is unknown, limited to operands and results within 20.

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<tbody>
<tr>
<td>MP 2</td>
<td>3.OA.A.4</td>
<td>Teacher focuses students on the heart of 3.OA.4, which goes beyond the traditional notion of fact families, by having students explore the inverse relationship of multiplication and division. Use of 3 types of models: linear models (number lines, ribbons, and line segments), arrays, and discrete sets of objects. Make connections among these 3 types of models Vary problem types so that students can see connections between multiplication and division problems. Solve for a missing factor of a given product (divisor, dividend, or quotient) with a symbol for the unknown.</td>
<td>The term multiplicative describes situations that lead to either multiplication or division. Students apply their understanding of the meaning of the equal sign as the same as, to interpret an equation with an unknown. When given $4 \times ? = 40$, they might think: 4 groups of some number is the same as 40, 4 times some number is the same as 40. I know that 4 groups of 10 is 40 so the unknown number is 10. The missing factor is 10 because 4 times 10 equals 40. Every multiplication situation can lead to various division problems.</td>
<td>Chairs for a Party Crackers for All Glue for Tables Making Cards What Comes First</td>
</tr>
<tr>
<td>MP 7</td>
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</table>

Chairs for a Party
Crackers for All
Glue for Tables
Making Cards
What Comes First
### SPED Strategies:
Teacher will chart and model how to determine the unknown number in multiplication and division problems using key, technical vocabulary in expanded and some complex sentences.

Provide manipulatives such as area tiles

### ELL Strategies:
Students will explain how to determine the unknown number in multiplication and division problems in L1 (student’s native language) and/or use gestures, drawings, equations and selected technical words.

Provide manipulatives such as area tiles and sentence frames.

| How can you use multiplication and division equations to find an unknown number? |
| How can you find the value of an unknown number in a division equation? |
| Is there more than one way to represent an unknown number in an equation? |
| Describe two ways to find the unknown number. |
| How can you use multiplication to help you divide? |

### New Jersey Student Learning Standard:
3.OA.B.6: Understand division as an unknown-factor problem. For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.

### Student Learning Objective 5:
Solve division of whole numbers by representing the problem as an unknown factor problem.

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

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<tbody>
<tr>
<td>MP 3</td>
<td>3.OA.B.6</td>
<td>Teacher engages students in revisiting their understanding of multiplication and division as inverse operations.</td>
<td>Multiplication and division are inverse operations and that</td>
<td>Array-ning Our Fact Families</td>
</tr>
<tr>
<td>MP 6</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>MP 7</td>
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harder three quadrants of the times table (a × b where a > 5 and/or b > 5).

Students are expected to solve problems and explain their processes of solving division problems that can also be represented as an unknown factor in multiplication problems.

**Example:**
A student knows that 2×9 = 18. How can they use that fact to determine the answer to the following question? 18 people are divided into pairs in P.E. class. How many pairs are there? Write a division equation and explain your reasoning.

**SPED Strategies:**
Demonstrate understanding of a dictated equation problem by drawing the picture of the answer and then explain the reasoning orally and in writing using arrays, and technical vocabulary in complex sentences.

Provide students manipulatives such as area tiles.

**ELL Strategies:**
Demonstrate understanding of a dictated equation problem by drawing the picture of the answer and then explain the reasoning orally and in writing in L1 and(student’s native language) or use arrays, illustrations and single technical words.

understanding can be used to find the unknown.

Fact family triangles demonstrate the inverse operations of multiplication and division by showing the two factors and how those factors relate to the product and/or quotient.

**Example:**
• 3 × 5 = 15 & 5 × 3 = 15
• 15 ÷ 3 = 5 & 15 ÷ 5 = 3

Students understand that multiplication and division are inverse operations and that understanding can be used to find the unknown.

Number Bonds demonstrate the inverse operations of multiplication and division by showing the two factors and how those factors relate to the product and/or quotient.

**Examples:**
5 × 9 = 45 & 9 × 5 = 45
45 ÷ 5 = 9 & 45 ÷ 9 = 5

Family Reunion
Use What You Know
Fair Tickets
Sharing Pencils
New Jersey Student Learning Standards:
3.MD.C.5: Recognize area as an attribute of plane figures and understand concepts of area measurement.
   3.MD.C.5a. A square with side length 1 unit, called “a unit square,” is said to have “one square unit” of area, and can be used to measure area.
   3.MD.C.5b. A plane figure which can be covered without gaps or overlaps by \( n \) unit squares is said to have an area of \( n \) square units.

Student Learning Objective 6: Find the area of a plane figure understanding that unit squares are used to measure area of a rectilinear drawing.

Modified Student Learning Objectives/Standards: N/A

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<tr>
<td>MP 7</td>
<td>3.MD.5</td>
<td>Students solve for the total area of figures by counting square units, repeated addition, or by multiplication to determine the area of figures. A story situation that requires students to cover figures with square tiles that represent square units and to write</td>
<td>The area of a figure is the amount of space taken up by the figure and area is measured in square units that have no overlaps. A square with side length 1 unit, called “a unit square,” is said to have “one square unit” of area, and can be used to measure area.</td>
<td>IFL Task(s): “Measurement: Solving for Area of Figures.” Additional Task(s):</td>
</tr>
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repeated addition equations or multiplication equations.

**SPED Strategies:**
Provide students with a video about identifying area.

Demonstrate orally, in writing, or with manipulatives how to measure the area of a shape or flat surface in square units using key vocabulary in expanded sentences.

Create an interactive notebook with samples and key vocabulary words. Provide graph paper to help in understanding square units.

**ELL Strategies:**
Demonstrate orally, in writing, or with manipulatives how to measure the area of a shape or flat surface in L1 (student’s native language) and/or use equations, pictures, gestures, and illustrated single words.

Make use of choice questions for students.

The number that represents the area of a figure is the count of the number of square units (all of the same size and shape) that fit into the figure with no overlaps or gaps.

Area can be measured in unit squares of assorted size. The names and abbreviations for these units, for example, are: square feet (ft²), square centimeters (cm²), square inches (in²), etc.

In a rectangular array, one of the factors tells about the rows/number of units wide the figure is and the other factor tells about the number of square units in each row/length of the figure. Either factor (the number of rows or number of square units in each row) can be worked with separately to determine the area of a portion of the figure.

A product can be written as two or more different but equivalent expressions as long as the area of the total figure has been accounted for.

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<td><strong>Pool Party</strong></td>
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<td><strong>Vegetable Garden Plan</strong></td>
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New Jersey Student Learning Standard:
3.MD.C.6. Measure areas by counting unit squares (square cm, square m, square in, square ft, and non-standard units).

**Student Learning Objective 7:** Measure areas by counting unit squares (cm², m², in², ft², and improvised units).

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

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</tr>
</thead>
<tbody>
<tr>
<td>MP 7</td>
<td>3.MD.6</td>
<td>Students solve for the area of figures by using multiplication. Use a story situation that requires students to cover figures with square tiles that represent square units, and to write multiplication equations. <strong>SPED Strategies:</strong> Provide students with the opportunity to measure objects found in the classroom. Partition a rectangle into rows and columns of same-size squares and count to find the total number. Find the area of a rectangle by tiling an area and counting unit squares using manipulatives, technology, or visual models. Provide manipulatives/tools such as hundreds charts, colored counters, area tiles, place-value charts, and/or number line.</td>
<td>The area of a figure is the amount of space taken up by the figure. Area is measured in square units that have no overlaps. A square with side length 1 unit, called “a unit square,” is said to have “one square unit” of area, and can be used repeatedly to measure area. The number that represents the area of a figure is the count of the number of square units (all of the same size and shape) that fit into the figure with no overlaps or gaps. In a rectangular array, one of the factors tells about the rows (number of units wide the figure is) and the other factor tells about the number of square units in each row (the length of the figure). Either factor (the number of rows or columns)</td>
<td>IFL Task(s): “Measurement: Solving for Areas of Figures.” PBA: Garden Design Additional Tasks: Garden Design Raging Racetrack Playground Counting unit squares</td>
</tr>
<tr>
<td>ELL Strategies: Provide students with the opportunity to measure objects found in the classroom. Partition a rectangle into rows and columns of same-size squares and count to find the total number. Find the area of a rectangle by tiling an area and counting unit squares using manipulatives, technology, or visual models. Provide manipulatives/ tools such as hundreds charts, colored counters, area tiles, place-value charts, and/or number line. number of square units in each row) can be worked with separately to determine the area of a portion of the figure. A product can be written as two or more different but equivalent expressions as long as the area of the total figure has been accounted for. Area can be measured in unit squares of assorted size. The names and abbreviations for these units, for example, are: square feet (ft²), square centimeters (cm²), square inches (in²), non-standard units.</td>
<td></td>
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</table>
### New Jersey Student Learning Standards:

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

**3.MD.C.7a**: Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.

**3.MD.C.7b**: Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.

### Student Learning Objective 8:
Tile a rectangle to find its area and explain the relationship between tiling and multiplying side lengths to find the area of rectangles; solve real world problems by multiplying side lengths to find areas of rectangles.

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

<table>
<thead>
<tr>
<th>MPs</th>
<th>Evidence Statement Key/Clarifications</th>
<th>Skills, Strategies &amp; Concepts</th>
<th>Essential Understandings/Questions (Accountable Talk)</th>
<th>Tasks/Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP 4</td>
<td>3.MD.7b-1</td>
<td>Students use division or known multiplication facts to determine an unknown factor. Use the known dimension of figures to determine the area of figures or the dimensions of figures to determine the unknown areas. Construct a figure from given dimensions. Write multiplication equations to represent the area of the figures. Students work in pairs or in small groups to create arrays, draw shapes and proceed to solve the problem. They discuss answers and share their thinking. They practice using grid paper, online, and with manipulatives.</td>
<td>In a rectangular array, one of the factors tells about the rows (number of units wide the figure is) and the other factor tells about the number of square units in each row (the length of the figure). Either factor (the number of rows or number of square units in each row) can be worked with separately to determine the area of a portion of the figure. Multiplication and division are related because multiplication involves counting groups of like size and determining how many in all and division involves...</td>
<td>IFL Task(s): Measurement: Solving for Areas of Figures.” PBAs: Finding Area Area of Square Additional Tasks: All Areas Micah and Nina’s Rectangle</td>
</tr>
</tbody>
</table>
3.OA.3-1 is restricted to word problems.
- Allows for factors less than or equal to 5 while the factors used in 3.OA.3-1 are restricted to the harder three quadrants.

There are many ways to find the area of this figure:

Teacher challenges students to find, record, and share all the ways they solved this problem.

**SPED Strategies:**
Read, listen to and demonstrate understanding of real world problems involving finding area of 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.

<table>
<thead>
<tr>
<th>Grandma and Grandpa’s Pool</th>
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</thead>
<tbody>
<tr>
<td>Baseball Area Task &amp; Extension</td>
</tr>
<tr>
<td>Baseball Infield Area</td>
</tr>
<tr>
<td>City Farmers</td>
</tr>
<tr>
<td>Garden Task</td>
</tr>
</tbody>
</table>
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.
New Jersey Student Learning Standard:
3.NBT.A.1: Round whole numbers to the nearest 10 or 100.

Student Learning Objective 9: Round whole numbers to the nearest 10 or 100.

Modified Student Learning Objectives/Standards:
M.EE.3.NBT.A.1: Use decade numbers (10, 20, 30) as benchmarks to demonstrate understanding of place value for numbers 0-30.

<table>
<thead>
<tr>
<th>MPs</th>
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<th>Tasks/Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP 4</td>
<td>N/A</td>
<td>Teacher allows opportunities for students to gain a deep understanding of place value and number sense, so that they can explain and reason about the answers they get when they round. Students should have numerous experiences using a number line and a hundreds chart as tools to support their work with rounding. Students learn when and why to round numbers. They identify possible answers and halfway points. Then they narrow where the given number falls between the possible answers and halfway points. They also understand that by convention if a number is exactly at the halfway point of the two possible answers the number is rounded up. Use place value to round numbers.</td>
<td>How can we determine the value of a digit in relation to its place value? How can we effectively estimate numbers? How can we use a number line to show estimation and rounding? Is there a rule you can make up? How can we use rounding to estimate products? Quotients? Explain why an exact number is not always needed to solve real life problems. Write a story problem in which an exact answer is not needed.</td>
<td>Buses for Field Trip Grocery Store Rounding Task Pencil Task The Great Round Up The Island Hop The Perfect Party Three Other Ways Winner Winner Puppies Wonka Treats</td>
</tr>
</tbody>
</table>
The three numbers are plotted on the number line below: Students explain their reasoning and are encouraged to create a rule for rounding.

<table>
<thead>
<tr>
<th>80</th>
<th>328</th>
<th>791</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>100</td>
<td>200</td>
</tr>
</tbody>
</table>

For rounding to the nearest 100 we find which two hundreds the number lies between and round to the nearer of the two. Similarly, for rounding to the nearest 1000, we find the two thousands the number lies between (0 and 1000 for all of these numbers) and round to the nearer of the two.

Use number lines and hundreds charts.

Use dice to play rounding games.

**SPED Strategies:**
Teacher plans opportunities for students to investigate place value prior to implementing rules of rounding.

Build on previous understandings of the place value of digits in multi-digit numbers.

<table>
<thead>
<tr>
<th>How does rounding allow you to use mental math to estimate?</th>
</tr>
</thead>
<tbody>
<tr>
<td>How can we learn about the value of a number by examining its digits?</td>
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<tr>
<td>With teacher assistance, students will practice rounding three-digit numbers to the nearest 100 using place value materials such as color coded hundreds charts, color coded place-value charts, and/or number line. <strong>ELL Strategies:</strong> Teacher plans opportunities for students to investigate place value prior to implementing rules of rounding. Build on previous understandings of the place value of digits in multi-digit numbers. With teacher assistance, students will practice rounding three-digit numbers to the nearest 100 using place value materials such as color coded hundreds charts, color coded place-value charts, and/or number line.</td>
</tr>
</tbody>
</table>
New Jersey Student Learning Standard:
3.NBT.A.3: Multiply one-digit whole numbers by multiples of 10 in the range 10 to 90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.

Student Learning Objective 10: Multiply one digit whole numbers by multipliers of 10 (10-90)

Modified Student Learning Objectives/Standards:
M.EE.3.NBT.A.3: Count by tens using models such as objects, base ten blocks, or money.

<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 7</td>
<td>3.NBT.3</td>
<td>Skip counting by tens.</td>
<td>Multiples of ten can be represented as a specific number of groups of ten.</td>
<td>Skittles Task</td>
</tr>
<tr>
<td></td>
<td>Tasks have no context.</td>
<td>Model multiplication by ten.</td>
<td>Recognize that when you multiply a one digit factor by ten, the tens digit of the product is the same as that factor.</td>
<td>A Family Trip to Lagoon</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Teacher expects that students go beyond tricks that hinder understanding such as just adding zeros and requires them to explain and reason about their products. For example, for the problem 50 x 4, students should think of this as 4 groups of 5 tens or 20 tens. Twenty tens equals 200.</td>
<td>What are the multiples of ten?</td>
<td>Box Top Bonanza</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Build arrays using a variety of manipulatives (tiles, connecting cubes, base ten materials, and graph paper)</td>
<td>How can you multiply a number by a multiple of ten?</td>
<td>How Many Colored Pencils</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Use mental math to multiply single-digit whole numbers by multiples of 10.</td>
<td>What patterns do you find when you multiply by ten?</td>
<td>School Shopping</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Students use base ten blocks, diagrams, or hundreds charts to multiply one-digit numbers by multiples of 10 from 10-90. Students apply their understanding of</td>
<td>How is place value related to multiples of ten?</td>
<td></td>
</tr>
</tbody>
</table>
multiplication and the meaning of the multiples of 10. For example, 30 is 3 tens and 70 is 7 tens. They can interpret 2 x 40 as 2 groups of 4 tens or 8 groups of ten. They understand that 5 x 60 is 5 groups of 6 tens or 30 tens and know that 30 tens is 300. After developing this understanding they begin to recognize the patterns in multiplying by multiples of 10.

Students may use manipulatives, drawings, or interactive whiteboard to demonstrate their understanding.

**SPED Strategies:**
Provide manipulatives such as base ten blocks, diagrams, and/or hundreds charts to multiply one-digit numbers by multiples of 10-90.

Students may use manipulatives, drawings, document camera, or interactive whiteboard to demonstrate their understanding.

Compose two or three digit numbers by their place values using base ten materials such as layered place value cards or flip books.

**ELL Strategies:**
Provide manipulatives such as base ten blocks, diagrams, and/or hundreds charts to multiply one-digit numbers by multiples of 10-90.
Students may use manipulatives, drawings, document camera, or interactive whiteboard to demonstrate their understanding.

Compose two or three digit numbers by their place values using base ten materials such as layered place value cards or flip books.
## Integrated Evidence Statements

### 3.Int.1: Given a two-step problem situation with the four operations, round the values in the problem, then use the rounded values to produce an approximate solution. **Content Scope:** 3.OA.8, 3.NBT.1, 3.NBT.2, 3.NBT.3

- Tasks must be aligned to the first standard and 1 or more of the subsequent standards listed in the content scope.
- Tasks do not require computations beyond the grade 3 expectations.
- Tasks do not require a student to write a single equation with a letter standing for the unknown quantity in a two-step problem, and then solve that equation.
- Tasks may require students to write an equation as part of their work to find a solution, but students are not required to use a letter for the unknown.
- Addition, subtraction, multiplication and division situations in these problems may involve any of the basic situation types with unknowns in various positions.

### 3.Int.2: Solve two-step word problems using the four operations requiring a substantial addition, subtraction, or multiplication step, drawing on knowledge and skills articulated in 3.NBT. **Content Scope:** 3.OA.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.
- Tasks do not require a student to write a single equation with a letter standing for the unknown quantity in a two-step problem, and then solve that equation.
- Tasks may require students to write an equation as part of their work to find a solution, but students are not required to use a letter for the unknown.
- Addition, subtraction, multiplication and division situations in these problems may involve any of the basic situation types with unknowns in various positions. **Substantial (def.) – Values should be towards the higher end of the numbers identified in the standards.**

### 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.4: Use information presented in a scaled bar graph to solve a two-step “how many more” or “how many less” problem requiring a substantial addition, subtraction, or multiplication step, drawing on knowledge and skills articulated in 3.NBT. **Content Scope:** 3.MD.3, 3.NBT.2, and 3.NBT.3
Integrated Evidence Statements

- 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.C.5-2: Present solutions to multi-step problems in the form of valid chains of reasoning, using symbols such as equals signs appropriately (for example, rubrics award less than full credit for the presence of nonsense statements such as $1 + 4 = 5 + 7 = 12$, even if the final answer is correct), or identify or describe errors in solutions to multi-step problems and present corrected solutions. Content Scope: Knowledge and skills articulated in 3.MD.7b, 3.MD.7d
  - Tasks may include those with and without real-world contexts.
  - Multi-step problems have at least 3 steps.

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

<table>
<thead>
<tr>
<th>Algorithm</th>
<th>Measure</th>
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<tbody>
<tr>
<td>Associative Property of Multiplication</td>
<td>Mental Math/ Mental Calculation</td>
</tr>
<tr>
<td>Array</td>
<td>Model/ Visual Model</td>
</tr>
<tr>
<td>Column</td>
<td>Multiples</td>
</tr>
<tr>
<td>Commutative Property of Multiplication</td>
<td>Multiplicative Identity Property of 1</td>
</tr>
<tr>
<td>Compare</td>
<td>Partial Product</td>
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<tr>
<td>Decompose</td>
<td>Partial Quotient</td>
</tr>
<tr>
<td>Distributive Property</td>
<td>Pattern</td>
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<tr>
<td>Divisibility Rules</td>
<td>Place Value</td>
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<tr>
<td>Division</td>
<td>Product</td>
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<tr>
<td>Divisor</td>
<td>Quotient</td>
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<tr>
<td>Dividend</td>
<td>Reasonableness</td>
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<tr>
<td>Equal groups</td>
<td>Related Facts</td>
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<tr>
<td>Equation</td>
<td>Remainder</td>
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<tr>
<td>Estimate</td>
<td>Round</td>
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<tr>
<td>Fact Family</td>
<td>Row</td>
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<tr>
<td>Factors</td>
<td>Sequence</td>
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<tr>
<td>Factor Pairs</td>
<td>Variable</td>
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<tr>
<td>Greatest Common Factor</td>
<td>Width</td>
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<tr>
<td>Identity Property of Multiplication</td>
<td>Whole Number</td>
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<tr>
<td>Inverse Operations</td>
<td>Zero Property of Multiplication</td>
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<tr>
<td>Interpret</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td></td>
</tr>
</tbody>
</table>
# References & Suggested Instructional Websites

- [www.insidemathematics.org](http://www.insidemathematics.org)
- [http://maccss.ncdpi.wikispaces.net/Third+Grade](http://maccss.ncdpi.wikispaces.net/Third+Grade)
- [http://nlvm.usu.edu/](http://nlvm.usu.edu/)
- [http://mrsgebauer.com/mathsites.html](http://mrsgebauer.com/mathsites.html)
- [https://www.teachingchannel.org](https://www.teachingchannel.org)
- [www.illustrativemathematics.org/](http://www.illustrativemathematics.org/)
- [https://illuminations.nctm.org/](https://illuminations.nctm.org/)
- [www.k-5mathteachingresources.com/](http://www.k-5mathteachingresources.com/)
- [www.georgiastandards.org/Common-Core/Pages/Math-K-5.aspx](http://www.georgiastandards.org/Common-Core/Pages/Math-K-5.aspx)
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. 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.