Grade 2: Unit 2
Place Value Strategies for Addition and Subtraction
Course Philosophy/Description

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

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

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

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

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

4) Students describe and analyze shapes by examining their sides and angles. Students investigate, describe, and reason about decomposing and combining shapes to make other shapes. Through building, drawing, and analyzing two- and three-dimensional shapes, students develop a foundation for understanding area, volume, congruence, similarity, and symmetry in later grades.
ESL Framework

This ESL framework was designed to be used by bilingual, dual language, ESL and general education teachers. Bilingual and dual language programs use the home language and a second language for instruction. ESL teachers and general education or bilingual teachers may use this document to collaborate on unit and lesson planning to decide who will address certain components of the SLO and language objective. ESL teachers may use the appropriate leveled language objective to build lessons for ELLs which reflects what is covered in the general education program. In this way, whether it is a pull-out or push-in model, all teachers are working on the same Student Learning Objective connected to the New Jersey Student Learning Standards. The design of language objectives are based on the alignment of the World-Class Instructional Design Assessment (WIDA) Consortium’s English Language Development (ELD) standards with the New Jersey Student Learning Standards (NJSLS). WIDA’s ELD standards advance academic language development across content areas ultimately leading to academic achievement for English learners. As English learners are progressing through the six developmental linguistic stages, this framework will assist all teachers who work with English learners to appropriately identify the language needed to meet the requirements of the content standard. At the same time, the language objectives recognize the cognitive demand required to complete educational tasks. Even though listening and reading (receptive) skills differ from speaking and writing (expressive) skills across proficiency levels the cognitive function should not be diminished. For example, an Entering Level One student only has the linguistic ability to respond in single words in English with significant support from their home language. However, they could complete a Venn diagram with single words which demonstrates that they understand how the elements compare and contrast with each other or they could respond with the support of their home language (L1) with assistance from a teacher, para-professional, peer or a technology program.

http://www.state.nj.us/education/modelcurriculum/ela/ELLOverview.pdf
<table>
<thead>
<tr>
<th>#</th>
<th>Student Learning Objective</th>
<th>NJSLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Add and subtract within 100 to solve 1- and 2-step word problems with unknowns in any position.</td>
<td>2.OA.A.1*</td>
</tr>
<tr>
<td>2</td>
<td>Fluently add and subtract within 10 using mental strategies.</td>
<td>2.OA.B.2*</td>
</tr>
<tr>
<td>3</td>
<td>Write an equation to express an even number as a sum of two equal addends.</td>
<td>2.OA.C.3</td>
</tr>
<tr>
<td>4</td>
<td>Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.</td>
<td>2.OA.C.4</td>
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<tr>
<td>5</td>
<td>Partition a rectangle into rows and columns of same-size squares and count to find the total number.</td>
<td>2.G.A.2</td>
</tr>
<tr>
<td>6</td>
<td>Use a variety of strategies (place value, properties of operation, and/or the relationship between addition and subtraction) to add and subtract within 50.</td>
<td>2.NBT.B.5*</td>
</tr>
<tr>
<td>7</td>
<td>Add up to four two-digit numbers using strategies based on place value and properties of operations.</td>
<td>2.NBT.B.6</td>
</tr>
<tr>
<td>8</td>
<td>Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method.</td>
<td>2.NBT.B.7*</td>
</tr>
<tr>
<td>9</td>
<td>After applying addition and subtraction strategies based on place value and the properties of operations, explain why these strategies work using drawings or objects [for example, 37 + 12 equals 30 + 7 + 10 + 2 (place value) which equals 30 + 10 + 7 + 2 (property of operations)].</td>
<td>2.NBT.B.9</td>
</tr>
<tr>
<td>10</td>
<td>Count within 1000 by ones, fives, tens, and hundreds beginning at any multiple of 1, 5, 10, or 100 (e.g. begin at 505 and skip count by 5 up to 605, or begin at 600 and skip count by 100 up to 1000)</td>
<td>2.NBT.A.2*</td>
</tr>
</tbody>
</table>
Research about Teaching and Learning Mathematics

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

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

Students should be:
  - Actively engaging in “doing” mathematics
  - Solving challenging problems
  - Investigating meaningful real-world problems
  - Making interdisciplinary connections
  - Developing an understanding of mathematical knowledge required to “do” mathematics and connect the language of mathematical ideas with numerical representations
  - Sharing mathematical ideas, discussing mathematics with one another, refining and critiquing each other’s ideas and understandings
  - Communicating in pairs, small group, or whole group presentations
  - Using multiple representations to communicate mathematical ideas
  - Using connections between pictures, oral language, written symbols, manipulative models, and real-world situations
  - Using technological resources and other 21st century skills to support and enhance mathematical understanding
Mathematics is not a stagnant 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)

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)

Teacher and students practice mathematics processes together through interactive activities, problem solving, and discussion. (whole group or small group instruction)
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<td><strong>Collaborative Problem Solving</strong></td>
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<td>Connect Previous Knowledge to New Learning</td>
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<td>Making Thinking Visible</td>
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<td><strong>Develop and Demonstrate Mathematical Practices</strong></td>
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<td>Inquiry-Oriented and Exploratory Approach</td>
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<td>Multiple Solution Paths and Strategies</td>
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<td>Use of Multiple Representations</td>
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<td><strong>Explain the Rationale of your Math Work</strong></td>
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<td>Quick Writes</td>
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<td><strong>Analyze Student Work</strong></td>
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<td>Identify Student’s Mathematical Understanding</td>
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<td>Identify Student’s Mathematical Misunderstandings</td>
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<td>Interviews</td>
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<td>Diagrams, Charts, Tables, and Graphs</td>
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<td>Anticipate Likely and Possible Student Responses</td>
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<td>Collect Different Student Approaches</td>
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<td>Challenging</td>
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<td>Pressing for Accuracy and Reasoning</td>
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<td>Maintain the Cognitive Demand</td>
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Educational Technology

Standards

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

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

➢ Research and Information Fluency
  • Use digital tools and online resources to explore a problem or issue.
  Example: Students will access on-line interactive resources to gain understanding of using concrete models and place value to add and subtract within 1000.
    https://www.mathlearningcenter.org/resources/apps
    http://nlvm.usu.edu/en/nav/grade_g_1.html

➢ The Nature of Technology: Creativity and Innovation
  • Describe how designed products and systems are useful at school, home, and work.
  Example: Students will explain how tools such as ten frames, number lines, part-part-whole mats, hundreds chart, and arrays are useful for addition, subtraction and skip-counting.

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

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

➢ Computational Thinking: Programming
  • Create algorithms (a sets of instructions) using a pre-defined set of commands (e.g., to move a student or a character through a maze).
  Example: Students will explain why an even number can be expressed as the sum of two equal addends.

Link: http://www.state.nj.us/education/cccs/2014/tech/
Career Ready Practices

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

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

  **Example:** Students will apply prior knowledge when solving real world problems. Students will make sound judgements about the use of specific tools, such as ten frames, number lines, part-part-whole mats, or base ten blocks. Students choose appropriate tools to explore and deepen understanding of addition and subtraction 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 to solve one and two step word problems involving addition or subtraction. Students will monitor and evaluate progress and change course as necessary.

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

  **Example:** Students will work collaboratively in groups to solve mathematical tasks. Students will listen to or read the arguments of others and ask probing questions to clarify or improve arguments. They will be able to explain why strategies based on place value and properties of operations work.
## WIDA Proficiency Levels

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

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
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</table>
| **6- Reaching** | - Specialized or technical language reflective of the content areas at grade level  
- A variety of sentence lengths of varying linguistic complexity in extended oral or written discourse as required by the specified grade level  
- Oral or written communication in English comparable to proficient English peers |
| **5- Bridging** | - Specialized or technical language of the content areas  
- A variety of sentence lengths of varying linguistic complexity in extended oral or written discourse, including stories, essays or reports  
- Oral or written language approaching comparability to that of proficient English peers when presented with grade level material. |
| **4- Expanding** | - Specific and some technical language of the content areas  
- A variety of sentence lengths of varying linguistic complexity in oral discourse or multiple, related sentences or paragraphs  
- Oral or written language with minimal phonological, syntactic or semantic errors that may impede the communication, but retain much of its meaning, when presented with oral or written connected discourse, with sensory, graphic or interactive support |
| **3- Developing** | - General and some specific language of the content areas  
- Expanded sentences in oral interaction or written paragraphs  
- Oral or written language with phonological, syntactic or semantic errors that may impede the communication, but retain much of its meaning, when presented with oral or written, narrative or expository descriptions with sensory, graphic or interactive support |
| **2- Beginning** | - General language related to the content area  
- Phrases or short sentences  
- Oral or written language with phonological, syntactic, or semantic errors that often impede 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
Teachers modify techniques and methods to facilitate the academic achievement of students from diverse backgrounds.

The instruction has been modified to meet the needs of each student.
Students feel respected and their cultural identities are valued.
Additional supports have been provided for students to become successful and independent learners.
Opportunities are provided for student to reflect on their learning and provide feedback.

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

There are opportunities for students to connect with the community.
My classroom is welcoming and supportive for all students?
I am aware of and sensitive to the needs of my students and their families.
There are effective parent communication systems established. Parents can talk to me about issues as they arise in my classroom.

**Culturally Relevant Pedagogy Examples**

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

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

- **Run Problem Based Learning Scenarios:** Encourage mathematical discourse among students by presenting problems that are relevant to them, the school and/or the community.
  
  **Example:** The teacher will introduce the history of quilts and the use of shapes and family traditions in the construction of the quilts. The class will discuss the use of quilts in various cultures. The teacher will show students various examples of quilts and question students about the use of geometry/shapes and family traditions in quilts. Students will create a quilt square, using pattern blocks and knowledge from their culture, which will then be used to make a class quilt.

  Provide students with pattern blocks and one sheet of white paper to be folded into four sections. Allow students to discuss their ideas about their contributions to the quilt. Students will then use various shapes to draw a representation of their family in the first section. Students will share and discuss with the class their quilt square and the use of their culture and shapes in the design. Students will copy their design on other squares and cut out the sections. Students keep one square for themselves and take three different squares from their classmates. They will then take paste their four squares onto a piece of construction paper, spacing them out to represent a quilt. Students will share and discuss with the group their newly constructed quilts. The class will close the lesson by discussing the variations of shapes and geometric patterns used throughout the quilts. Use addition to find the total number of quilt squares arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total number of quilt squares as a sum of equal addends.

- **Use Learning Stations:** Provide a range of material by setting up learning stations.
  
  **Example:** Reinforce understanding of concepts and skills by promoting the learning through student interests and modalities, experiences and/or prior knowledge. Encourage the students to make choices in content based upon their strengths, needs, values and experiences. Providing students with choice boards will give them a sense of ownership to their learning and understanding.
## 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>
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</thead>
<tbody>
<tr>
<td>• Extra time for assigned tasks</td>
<td>• Extra Response time</td>
<td>• Precise processes for balanced math instructional model</td>
<td>• Teacher-made checklist</td>
</tr>
<tr>
<td>• Adjust length of assignment</td>
<td>• Have students verbalize steps</td>
<td>• Short manageable tasks</td>
<td>• Use visual graphic organizers</td>
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<tr>
<td>• Timeline with due dates for reports and projects</td>
<td>• Repeat, clarify or reword directions</td>
<td>• Brief and concrete directions</td>
<td>• Reference resources to promote independence</td>
</tr>
<tr>
<td>• Communication system between home and school</td>
<td>• Mini-breaks between tasks</td>
<td>• Provide immediate feedback</td>
<td>• Visual and verbal reminders</td>
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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>
</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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<tr>
<td>• Computer/whiteboard</td>
<td>• Extended time</td>
<td>• Consistent daily structured routine</td>
<td>• Individual daily planner</td>
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<td>• Tape recorder</td>
<td>• Study guides</td>
<td>• Simple and clear classroom rules</td>
<td>• Display a written agenda</td>
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<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>
</tr>
</tbody>
</table>
### Differentiated Instruction

**Accommodate Based on Content Specific Needs**

- Teacher modeling

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

- Use drawings to represent problems involving addition or subtraction.

- Use manipulatives such as counters, color tiles, unifix cubes or base ten blocks to assist in solving addition or subtraction problems, understanding place value, and exploring odd/even numbers.

- Use hundred charts, ten frames, number lines, and part-part-whole mats for addition and subtraction.

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

- Use arrays to demonstrate the connection between repeated addition and multiplication, and to begin foundational skills for finding area.

- Chart academic vocabulary with visual representations.
Interdisciplinary Connections

Model interdisciplinary thinking to expose students to other disciplines.

Social Studies Connection: Social Studies Standard 6.1.4.C.15
Research the history of the first automobile being built. Think about how it changed our lives and how travel became easier and faster.
Note: The first automobile built in large numbers was the Oldsmobile. In 1901 the Olds company built 425 cars, in 1902 it built 3,750 cars. How many cars did the company build in those two years? Which number is even, which is odd? Select a number and skip count backwards from 2014 to 1901. Skip count backwards from the current year 2014 back to 1901 and 1902. Extend: When was the first bicycle invented? About how long ago was it invented?

Social Studies Connection: Social Studies Standard 6.1.4.A.1; 6.3.4.A.1
Many board games use boards that are divided into same-size squares. (Example: Checkerboard). Display a checkerboard and have children count the rows and the columns, and then talk about how to find the total number of squares in the board. Ask students to tell about other board games that they may have played in which the board is made up of the same-size squares.

Literature Connection: Language Arts Standard RL.2.5
Ask students to create a story that uses skip-counting. Guide them to see that, as they tell their stories, they will need to add equal groups of an object. Their story needs to have a beginning, a middle, and an end. Invite children to share their stories with the class.

Science Connection: Science Standard K-2-ETS1-3
Some measurement devices used in science have scales that allow for skip-counting. Give students an assortment of measuring tools, such as a metric ruler, measuring tape, beaker, or graduated cylinder. Encourage students to examine the labeling scales on the measuring tools. Have students write down examples of how they might skip-count along the scales. Ask for volunteers to share the examples that they found.

Math-to-Home Connection: Life Skills Career Ready Practice Standard CRP2
Explain that many people use square tiles to cover some of the floors in their homes. When they shop for tiles, they must know how many they will need, so they do not buy too few tiles or too many. Provide a simple floor plan or have them measure their classroom on grid paper. Have children identify the number of rows, the number of columns, and the total number of tiles needed to cover the floor.

Math-to-Real World Science Connection: Science Standards 5.3.4.A.1; 5.3.2.B.1; 5.3.2.C.2
Designing a Garden. Explain that people who want to plant a garden may first draw an outline of the garden on paper and draw lines inside the outline to show small garden plots. A garden plan can help the gardener decide which plots to use for planting each type of vegetable, fruit, or flower. Divide the class into groups. Provide each group with grid paper on which you have outlined a large rectangular area. Have students talk about how they could draw small garden plots inside the outline to make a garden plan. Allow groups time to draw their plots. Then tell them to use the words row and column as they describe their plans to the class.
## Enrichment

### What is the purpose of Enrichment?

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

### Enrichment is…

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

### Enrichment is not…

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

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

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

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

2.OA.B.2
Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.
*(benchmarked)

2.OA.C.3
Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.

2.OA.C.4
Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.

2.G.A.2
Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.

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

2.NBT.B.6
Add up to four two-digit numbers using strategies based on place value and properties of operations.

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

2.NBT.B.9
Explain why addition and subtraction strategies work, using place value and the properties of operations.

2.NBT.A.2
Count within 1000; skip-count by 5s, 10s, and 100s. *(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.
<table>
<thead>
<tr>
<th>Grade: Two</th>
<th>Unit: 2 (Two)</th>
<th>Topic: Place Value Strategies for Addition and Subtraction</th>
</tr>
</thead>
</table>

**NJSLS:**
2.OA.A.1, 2.OA.B.2, 2.OA.C.3, 2.OA.C.4, 2.G.A.2, 2.NBT.B.5, 2.NBT.B.6, 2.NBT.B.7, 2.NBT.B.9, 2.NBT.A.2

**Unit Focus:**
- Represent and solve problems involving addition and subtraction
- Add and subtract within 20
- Work with equal groups of objects to gain foundations for multiplication
- Reason with shapes and their attributes
- Use place value understanding and properties of operations to add and subtract
- Understand place value

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

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

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

<table>
<thead>
<tr>
<th>MPs</th>
<th>Evidence Statement Key/Clarifications</th>
<th>Skills, Strategies &amp; Concepts</th>
<th>Essential Understandings/Questions (Accountable Talk)</th>
<th>Tasks/Activities</th>
</tr>
</thead>
</table>
| MP 1 MP 2 MP 3 MP 4 MP 5 MP 8 | 2.OA.1-1 | Students are able to:
- count on and put together to add to solve one- and two-step word problems.
- take from or take apart to subtract to solve one- and two-step word problems. | Mapping devices and tools can help you gain a sense of the quantities involved, to notice increases and decreases, and consider the doing and undoing related to addition and subtraction. | IFL Task(s) - “Addition: Flexible Thinking and Problem Solving Strategies.”

**Additional Tasks:**
difficult problem subtypes and language variants.
- Addition and subtraction is emphasized beyond 20 but within 100

2.OA.1-2
- The majority of problems (75%) involve single-digit addends.
- The most difficult problem subtypes and language variants should not be included in these problems.
- For more information see CCSS Table 1, p. 88 and the OA Progression.

| use drawings and equations to represent the problem. Use Counting on/Counting back strategies. Use a part-part-whole mat. Draw a diagram. Start with context and ask students to construct a model or use the part-part-whole mat to show the part-part-whole relationship and write addition and subtraction equations. **SPED Strategies:**
  - Use counters (color counters, links).
  - Provide models and teacher modeling for student.
  - Use number line.
  - Explain orally using pictures and gestures. **ELL Strategies:**
  Introduce and chart academic vocabulary with visuals: add, subtract, solve, unknown, more, remaining, left, in all. Problems can be solved by counting all, counting on from a quantity, counting on from the largest set, or using derived facts when solving for the whole amount or the missing part of the whole. Addition and subtraction are inverse operations because two or more quantities can come together and then the whole amount of objects can be taken apart, but the composition of the whole quantity remains the same. (doing and undoing, inverse operations) |

OA Task 1a
OA Task 5a
Pencil and a Sticker
Saving Money 2
Sheep and Ducks
Puppet Task
Cookie Count
Colored Tiles
The teacher models, using gestures, pictures, counters and selected technical words, how to describe and explain orally and in writing the solution to one and two-step word problems.

Utilize sentence frames to support students in speaking and writing their explanations.

Students work with a partner and utilize manipulatives, such as counters, and drawings to solve one and two-step word problems.

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

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

| 2.OA.B.2 | Fluently add and subtract within 20 using mental strategies. *By end of Grade 2, know from memory all sums of two one-digit numbers.* *(benchmarked)* |

**Student Learning Objective 2:** Fluently add and subtract within 10 using mental strategies.

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

<table>
<thead>
<tr>
<th>MP 2</th>
<th>Evidence Statement Key/Clarifications</th>
<th>Skills, Strategies &amp; Concepts</th>
<th>Essential Understandings/Questions (Accountable Talk)</th>
<th>Tasks/Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP 7</td>
<td>2.OA.2</td>
<td>Students are able to:</td>
<td>What are strategies for finding addition and subtraction facts?</td>
<td>Formative Assessment Task</td>
</tr>
<tr>
<td>MP 8</td>
<td>Tasks do not have a context.</td>
<td>• add within 10 using mental strategies with accuracy and efficiency.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Only the answer is required (strategies, representations, etc. are not assessed here).</td>
<td>subtract within 10 using mental strategies with accuracy and efficiency.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tasks require fluent (fast and accurate) finding of sums and related differences.</td>
<td>How can you use double facts to find sums for near doubles facts?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>What are some ways to remember sums?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>How is the make a ten strategy used to find sums?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>How can different combinations of numbers and operations be used to represent the same quantity?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>How are addition and subtraction related?</td>
<td></td>
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<tr>
<td></td>
<td>Students are given opportunities to model their understanding of adding and subtracting relationships. They create representations using cubes.</td>
<td></td>
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</tr>
</tbody>
</table>

**Addition Strategies:**
- One More/Two More Than
- Facts with Zero
- Doubles
- Doubles Plus One
- Make Ten
- Doubles Plus Two

Students will be able to recognize the relationship between addition and subtraction.

Students will be able use the make ten strategy fluently.

**SPED Strategies:**
Use the following:
- Counting on
- Fact families (3 + 5 = 8 is the same as (8 - 5 = 3)
- Doubles (3 + 3 = 6)
- Doubles plus one (3 + 4 = 3 + 3 + 1)

**ELL Strategies:**
Introduce and chart academic vocabulary with visuals: add, subtract, subtract,
number facts, answer, draw, line, match, left, right.

Teachers use gestures, counters, and addition table to model how to fluently add and subtract using mental math.

Use number cards to have student name the numbers and operation on the card and then state the answer using mental math.

New Jersey Student Learning Standard(s):
2.OA.C.3: Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.

Student Learning Objective 3: Write an equation to express an even number as a sum of two equal addends.

Modified Student Learning Objectives/Standards:
M.EE.2.OA.C.3: Equally distribute even numbers of objects between two groups.

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<thead>
<tr>
<th>MPs</th>
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<th>Tasks/Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP 2</td>
<td>N/A</td>
<td>Concept(s):</td>
<td>How can you tell if a number is odd or even?</td>
<td>Buttons Odd and Even</td>
</tr>
<tr>
<td>MP 3</td>
<td></td>
<td>• Even: groups having even numbers of objects will pair up evenly.</td>
<td>If you add even addends, will your sum be odd or even?</td>
<td>Formative Assessment</td>
</tr>
<tr>
<td>MP 7</td>
<td></td>
<td>• Odd: groups having odd numbers of objects will not pair up evenly.</td>
<td>If you add odd addends, will your sum be odd or even?</td>
<td>Task Gr. 2</td>
</tr>
<tr>
<td>MP 8</td>
<td></td>
<td></td>
<td></td>
<td>OA Task 16a</td>
</tr>
</tbody>
</table>

OA Task 16b
Red and Blue Tiles
<table>
<thead>
<tr>
<th>Students are able to:</th>
<th>Can you skip count by 2’s to determine if a number is even or odd?</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Pair up to 20 objects, count by 2’s and determine whether the group contains an even or odd number of objects.</td>
<td>Can you think of another strategy to determine if a number is even or odd?</td>
</tr>
<tr>
<td>• Write an equation to express an even number as a sum of two equal addends.</td>
<td>If you start with zero and skip count by 2 will your number always be even?</td>
</tr>
</tbody>
</table>

Students will understand that an even amount of objects makes pairs.

Students will be able to write an equation to show that even numbers make two equal groups.

Students will be able to explain different strategies to identify even or odd numbers.

Students will be able to make a connection to a real life concept of even or odd numbers.

**Example:**

- There are 61 students in second grade. Each student will be given a pair (even) of tickets for a football game. There are 123 tickets in all. Are there enough tickets to give each student a pair of tickets? How do you know?
**SPED Strategies:**
Students can determine if the number of objects can be divided into two equal sets, arranged into pairs or counted by twos.

If a number is even it will always split into two even groups.

Students need opportunities writing equations representing sums of two equal addends, such as: 2 + 2 = 4, 3 + 3 = 6, 5 + 5 = 10, 6 + 6 = 12, or 8 + 8 =16.

**ELL Strategies:**
Introduce and chart academic vocabulary with visuals: even, odd, pair, pair up, rows, count by 2’s.

Use gestures, drawings and selected technical words to recognize and explain orally that in groups of even numbers objects can be counted by twos and groups of odd numbers will not pair up evenly.

Utilize connecting cubes or counters to recognize and explain orally that in groups of even numbers objects can be counted by twos and groups of odd numbers objects will not pair up evenly.
Work with a peer to discuss even and odd numbers when participating in a task.

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

2.OA.C.4: Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.

**Student Learning Objective 4:** Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.

**Modified Student Learning Objectives/Standards:**

M.EE.2.OA.C.4: Use addition to find the total number of objects arranged within equal groups up to a total of 10.

<table>
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<tr>
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<th>Tasks/Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP 2</td>
<td>N/A</td>
<td>Concept(s): Array(s) as arrangements of objects. Students are able to:</td>
<td>What is an array?</td>
<td>Cereal Arrays</td>
</tr>
<tr>
<td>MP 3</td>
<td></td>
<td>• with objects arranged in an array, use repeated addition to find the total.</td>
<td>What is repeated addition?</td>
<td>Seating the Class</td>
</tr>
<tr>
<td>MP 7</td>
<td></td>
<td>• with objects arranged in an array, write an equation to express repeated addition.</td>
<td>How can rectangular arrays help us with repeated addition?</td>
<td>The Candy Box</td>
</tr>
<tr>
<td>MP 8</td>
<td></td>
<td>Rectangular arrays are used for students to work with repeated addition, a building block for multiplication in 3rd grade. A rectangular array is any arrangement of things in rows and columns, such as a rectangle of square tiles. Students explore this concept with concrete</td>
<td>How are arrays and repeated addition related?</td>
<td>No You Can’t</td>
</tr>
<tr>
<td></td>
<td></td>
<td>What is an array?</td>
<td>How can you find how many objects are in an array?</td>
<td>OA Task 17a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>What is repeated addition?</td>
<td>How does skip counting help us solve repeated addition problems?</td>
<td>OA Task 17b</td>
</tr>
<tr>
<td></td>
<td></td>
<td>How can rectangular arrays help us with repeated addition?</td>
<td>How can we model repeated addition equation with an array?</td>
<td>Roll an Array</td>
</tr>
<tr>
<td></td>
<td></td>
<td>How are arrays and repeated addition related?</td>
<td></td>
<td>Counting Dots in Arrays</td>
</tr>
</tbody>
</table>
objects (e.g., counters, bears, square tiles, etc.) as well as pictorial representations on grid paper or other drawings.

Teacher provides opportunities for children to create their own arrays from practical resources for example ask them to count out 10 counters and then arrange them in rows of 2. Then encourage them to count the counters in twos and in fives.

Due to the commutative property of multiplication, students can use repeated addition to add either the rows or the columns and still arrive at the same solution.

Example: What is the total number of circles below?

3 counters in each column and there are 4 columns.
3 + 3 + 3 + 3 = 12,
or 4 counters in each row and there are 3 rows.
4 + 4 + 4 = 12.

To help children move away from counting the number of objects in an array in ones, create an array and then cover everything except the

Students partition rectangles into rows and columns to create arrays. They practice drawing arrays to determine equal groups when representing a number.

http://www.onlinemathlearning.com/partition-rectangles.html

https://learnzillion.com/lessons/3500-partition-a-rectangle-into-rows

Students draw arrays to find the total number of objects.

Students use a variety of methods to create arrays to find the total number of objects.

They can use grid paper and crayons, geo-boards, square tiles, cubes, or any other identical objects.

Students write an equation to represent and solve for the number of objects shown in an array.
first row and first column. Ask the children to work out how many rows and columns are in the array and how many objects there are altogether.

Students will understand that an array has equal rows and equal columns.

Students will be able to create an equation to show how many objects are in an array.

Students will understand that adding the same number repeatedly is the underlying skill needed for multiplication.

**SPED Strategies:**
Students should have multiple opportunities to arrange any set of objects into a rectangular array. Objects can be cubes, buttons, counters, etc.

Objects do not have to be square to make an array.

Students then write equations that represent the total as the sum of equal addends.
Geoboards can also be used to demonstrate rectangular arrays.

**ELL Strategies:**
Introduce and chart academic vocabulary with visuals: array, arranged, rectangle/rectangular, rows, columns, tables, sum(s), equal sums.

Use gestures, pictures and select illustrated technical words to explain orally and in writing an addition equation with repeated equal addends from a rectangular array to solve and find the total number.

Use technical vocabulary in phrases or short sentences to explain an addition equation with repeated equal addends from a rectangular array to solve and find the total number.

Students maintain a math journal to demonstrate growth in math writing and reasoning.
New Jersey Student Learning Standard(s):
2.G.A.2: Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.

Student Learning Objective 5: Partition a rectangle into rows and columns of same-size squares and count to find the total number.

Modified Student Learning Objectives/Standards: N/A

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<thead>
<tr>
<th>MPs</th>
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<th>Tasks/Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP 2</td>
<td>Students are able to: partition a rectangle into rows and columns of same-size squares and count to find the total number.</td>
<td>Students are provided opportunities to discover that rows and columns are made up of straight lines that form the squares that are equal in size and that rows and columns together form the rectangle.</td>
<td>G Task 2a</td>
<td></td>
</tr>
<tr>
<td>MP 6</td>
<td></td>
<td>Teacher engages students in activities where they partition a rectangle into squares (or square-like regions) and then determine the total number of squares. This relates to the standard 2.OA.4 where students are arranging objects in an array of rows and columns.</td>
<td>G Task 2b</td>
<td></td>
</tr>
<tr>
<td>MP 8</td>
<td>N/A</td>
<td>Students create a square, partition it into equal squares of their choice (Example: 2 rows by 6 columns) then switch with another classmate and identify how many rows and columns. They also find the total number of equal parts by either numbering each small square to count total, or by first counting the number of squares in one row, or column. Finally, they write an addition sentence to solve.</td>
<td>Grandma’s Quilts</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Rectangle Riddles</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Partitioning a Rectangle Into Unit Squares</td>
</tr>
</tbody>
</table>
can be used to help students partition rectangles.

Teacher makes sure that students understand that rows are horizontal and columns are vertical.

**SPED Strategies:**
An interactive whiteboard or manipulatives such as square tiles, cubes, or other square shaped objects can be used to help students partition rectangles.

Rows are horizontal and columns are vertical.

**ELL Strategies:**
Introduce and chart academic vocabulary with visuals: array, rectangle, square, row(s), column (s), total, tiles, same-size.

Use gestures, pictures and selected, illustrated words to describe and explain orally and in writing how to partition a rectangle into rows and columns of same size squares and count to find the total number.

Use selected vocabulary in phrases and short sentences with illustrations to describe and explain orally and in writing how to
partition a rectangle into rows and columns of same size squares and count to find the total number.

Use manipulations, such as square tiles or square cm graph paper, to partition rectangles into rows and columns and count to find the total number. Students can then state their steps using sentence frames (First, I __. Then, I __. Finally, I ___. There are ___ squares.).

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

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

Student Learning Objective 6: Use a variety of strategies (place value, properties of operation, and/or the relationship between addition and subtraction) to add and subtract within 50.

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

<table>
<thead>
<tr>
<th>MPs</th>
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<th>Tasks/Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP 2</td>
<td>2.NBT.5</td>
<td>Students are able to: • with accuracy and efficiency, add and subtract within 50 using strategies based on place value. How do you use the place value strategy to add 2-digit numbers?</td>
<td>Peanuts and Ducks</td>
<td></td>
</tr>
</tbody>
</table>
- Sums and differences beyond 20 but within 100 should be emphasized in 75% of the tasks.
- Only the answer is required (strategies representations, etc. are not assessed here).

- with accuracy and efficiency, add and subtract within 50 using strategies based on properties of operations.
- with accuracy and efficiency, add and subtract within 50 using strategies based on the relationship between addition and subtraction.

Students will be able to use properties of operations and place-value to add and subtract.

https://www.teachingchannel.org/videos/second-grade-math-lesson

Examples:
- 12 + 22
- 10 + 2 + 20 + 2
- 10 + 20 = 30
- 2 + 2 = 4
- 30 + 4 = 34

Place value
- 12 = 1 ten + 2 ones
- 22 = 2 tens + 2 ones
- 3 tens + 4 ones = 30 + 4 = 34

- **Commutative property of addition** (Example: 3 + 5 = 5 + 3)
- **Associative property of addition** (Example: (2 + 7) + 3 = 2 + (7 + 3))

How do you record the steps when adding 2-digit numbers?

What are two different ways to write addition problems?

How does using 10 as a benchmark number help us add or subtract?

Practice with number bonds to understand addition/subtraction relationships assists in mastering fluency.

### Add Four Single-digit Numbers

### Subtracting 2-digit Numbers
- **Identity property of 0**  
  (Example: $8 + 0 = 8$)

Students will practice with number bonds to understand addition and subtraction relationships.

**SPED Strategies:**
Addition strategies based on place value for $28 + 17$ may include:
- Adding by place value: $20 + 10 = 30$ and $8 + 7 = 15$ and $30 + 15 = 45$.
- Incremental adding (breaking one number into tens and ones); $28 + 10 = 38$, $38 + 7 = 45$
- Compensation (making a friendly number): $28 + 2 = 30$, $17 - 2 = 15$, $30 + 15 = 45$

Subtraction strategies based on place value for $41 - 27$ may include:
- Adding up (from smaller number to larger number): $27 + 3 = 30$, $30 + 10 = 40$, $40 + 1 = 41$, and $3 + 10 + 1 = 14$.
- Incremental subtracting:
  $41 - 10 = 31$, $31 - 10 = 21$, $21 - 7 = 14$
- Subtracting by place value:
  $41 - 20 = 21$, $21 - 7 = 14$
Properties that students should know and use are:

- **Commutative property of addition** (Example: 3 + 5 = 5 + 3)
- **Associative property of addition** (Example: (2 + 7) + 3 = 2 + (7+3))
- **Identity property of 0** (Example: 8 + 0 = 8)

**ELL Strategies:**
Introduce and chart academic vocabulary with visuals: minus, subtract, add, check, check mark.
Use gestures, pictures and selected technical words to describe and explain orally and in writing a variety of strategies to add and subtract within 50.

Use manipulatives, such as a number line and counters, to add and subtract within 50 and be able to describe and explain the strategies they used with sentence frames.
New Jersey Student Learning Standard(s):
2.NBT.B.6: Add up to four two-digit numbers using strategies based on place value and properties of operations.

Student Learning Objective 7: Add up to four two-digit numbers using strategies based on place value and properties of operations.

Modified Student Learning Objectives/Standards:
M.EE.2.NBT.B.6: Use objects, representations, and numbers (0-20) to add and subtract.

<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>
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<tbody>
<tr>
<td>MP 2</td>
<td>2.NBT.6</td>
<td>Students are able to:</td>
<td>How can you add three or four 2-digit numbers using place value?</td>
<td>IFL Task(s) - “Addition: Flexible Thinking and Problem Solving Strategies.”</td>
</tr>
<tr>
<td>MP 7</td>
<td>- Tasks do not have a context.</td>
<td>• add three two digit numbers using place value strategies and properties of operations.</td>
<td>How can you decompose the numbers to help you arrive at the correct answer?</td>
<td></td>
</tr>
<tr>
<td>MP 8</td>
<td>- Only the answer is required (strategies, representation, etc. are not assessed here).</td>
<td>• add four two digit numbers using place value strategies and properties of operations.</td>
<td>Explain how you would begin to solve a problem with multiple addends? Why?</td>
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<td>Students will understand how to use place value to decompose numbers.</td>
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<td>Students will understand whole numbers and how to use them in flexible ways, including relating,</td>
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<td>composing and decomposing them.</td>
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<td>Demonstrate fluency in adding whole numbers when four addends are involved.</td>
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<td>Students will be able to use multiple strategies and be able to explain their thinking, i.e.,</td>
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<td>first starting out using the place value manipulatives,</td>
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<td>Additional Tasks</td>
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<td>Perfect 500</td>
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<td>Toll Bridge Puzzle</td>
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<td>2.NBT.6 Formative Assessment Task</td>
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then moving to pictorial models, then to abstract equation models, as well as using properties.

**Example:**
Solve the following using place-value and properties strategy:
43 + 34 + 57 + 24 = __

**Associative Property**
43 and 57 were added first, since 3 plus 7 equals 10. When added, the sum is 100. Then 34 was added and subtotal = 134. Lastly, 24 was added and the total = 158.

**Place Value Strategies**
Break all of the numbers into tens and ones. Begin by adding the tens, 40 + 30 + 50 + 20 = 140. Then adding the ones. 3 + 4 + 7 + 4 = 18. Then combining the tens and ones giving 158 as the total sum.

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

Provide large grid paper and place numbers in each box to have students see how to line up their
numbers and then add or subtract as needed using place value.

**ELL Strategies:**
Introduce and chart academic vocabulary with visuals: tens, ones, find, work, correct, incorrect, first, then, together.

Use gestures, examples and selected technical words to demonstrate and explain orally addition of up to four two-digit numbers based on place value and properties of operation.

Use key, technical vocabulary in simple sentences to demonstrate and explain orally addition of up to four two-digit numbers based on place value and properties of operation.

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

Student Learning Objective 8: Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method.

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

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<th>Tasks/Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP 2</td>
<td>2.NBT.7</td>
<td>Concept(s):</td>
<td>Mapping devices and tools can help you gain a sense of the quantities involved, to notice increases and decreases, and consider the doing and undoing related to addition and subtraction.</td>
<td>IFL Task(s) - “Addition: Flexible Thinking and Problem Solving Strategies.”</td>
</tr>
<tr>
<td>MP 4</td>
<td></td>
<td>In adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones. Sometimes it is necessary to compose or decompose tens or hundreds. Students are able to:</td>
<td>Addition and subtraction are inverse operations because two or more quantities can come together and then the whole amount of objects can be taken apart, but the composition of the whole quantity remains the same. (doing and undoing, inverse operations)</td>
<td></td>
</tr>
<tr>
<td>MP 5</td>
<td></td>
<td>add and subtract within 1000, using concrete models or drawings.</td>
<td>How can we subtract three-digit numbers?</td>
<td></td>
</tr>
<tr>
<td>MP 7</td>
<td></td>
<td>add and subtract within 1000 using strategies based on place value.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MP 8</td>
<td></td>
<td>add and subtract within 1000 using properties of</td>
<td></td>
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</tr>
</tbody>
</table>

Additional Tasks:
- How Many Days Until Summer Vacation?
- NBT Task 4a
- NBT Task 4b
- NBT Task 4c
- NBT Task 4d
operations or the relationship between addition and subtraction.
- relate the strategies to a written method.

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

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

**Example:**
354 + 287 = __

Use a place-value chart to review subtracting 2 digit numbers with and without regrouping and encourage students to relate this concept and discover how to subtract 3 digit numbers.

Provide practice to help students arrive at the understanding that the greater number in a situation is the total, and the other number is how many are taken away.

**What is regrouping?**

Students work in pairs to share their ideas about regrouping and explain how they know when they need to regroup and “why?”.

Students use place value charts, place value models, and linking blocks to subtract. They show their work, stay organized and explain their thinking.

**Example:** 354 + 287 = __

Student 1 uses a number line. —I started at 354 and jumped 200. I landed on 554. I then made 8 jumps of 10 and landed on 634. I then jumped 7 and landed on 641.

Student 2 uses base ten blocks & mat. —I broke all of the numbers up by place using a place value chart. I first added the ones (4+7), then the tens (50+80) and then the hundreds (300+200=500). I then combined my answers: 500+130=630. 630+11=641.

Student 3 uses place value blocks. —I made a pile of 354. I then added 287. That gave me 5 hundreds, 13 tens and 11 ones. I noticed that I could trade some pieces. I had 11 ones, and traded 10 ones for a ten. I then had 14 tens, so I traded 10 tens.
Encourage students to realize that subtraction does not follow the commutative property by working with manipulatives.

**Counting on/Counting back**

Use a part-part-whole mat.

**Draw diagrams.**

**Use comparison models.**

Start with a story problem and two diagrams and equations and ask students to select equations that describe the diagram. Then ask students to solve a series of situational problems and make noticing about the structure of the problems.

Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.

**SPED Strategies:**

Provide manipulatives, such as base ten blocks, and models for students.

for a hundred I ended up with 6 hundreds, 4 tens and 11 ones.

**Example:** 483 - 251?
Provide grid paper to line up numbers.

Provide drawings to help visual learners understand the relationship between addition and subtraction.

**ELL Strategies:**
Introduce and chart academic vocabulary with visuals: Amount, total, hundreds, tens, ones, single, together, each, included, above, below.

Use gestures, pictures and selected, illustrated single words to describe and explain orally and in writing how to add and subtract within 1000.

Describe and explain orally and in writing how to add and subtract within 1000 in L1 (student’s native language) and/or use selected technical vocabulary in phrases and short sentences with illustrations.

Students use strategies and key technical vocabulary to describe, explain orally and in writing, and using sentence frames how to add and subtract within 1000.
Students maintain a math journal to demonstrate growth in math writing and reasoning.

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

2.NBT.B.9: Explain why addition and subtraction strategies work, using place value and the properties of operations.

**Student Learning Objective 9:** After applying addition and subtraction strategies based on place value and the properties of operations, explain why these strategies work using drawings or objects [for example, 37 + 12 equals 30 + 7 + 10 + 2 (place value) which equals 30 + 10 + 7 + 2 (property of operations)].

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

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<th>Tasks/Activities</th>
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<tbody>
<tr>
<td>MP 2</td>
<td>N/A</td>
<td>Students are able to:</td>
<td>Students should be able to connect different representations and explain the connections. Representations can include numbers, words (including mathematical language), pictures, number lines, and/or physical objects. Students should be able to use any/all of these representations as needed. An interactive whiteboard or document camera can be used to help students develop and explain their thinking.</td>
<td>Shake, Rattle, and Roll Revisited</td>
</tr>
<tr>
<td>MP 3</td>
<td></td>
<td>explain, using objects and drawings, why addition and subtraction strategies based on place value work.</td>
<td></td>
<td>Two-Digit Computation</td>
</tr>
<tr>
<td>MP 4</td>
<td></td>
<td>explain, using objects and drawings, why addition and subtraction strategies based on properties of operations work.</td>
<td></td>
<td>Peyton and Presley Discuss Addition</td>
</tr>
<tr>
<td>MP 5</td>
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<tr>
<td>MP 7</td>
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<tr>
<td>MP 8</td>
<td></td>
<td>Teacher sets the expectation that students apply their knowledge of place value and the properties of operations in their explanation when solving word problems.</td>
<td></td>
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</tbody>
</table>

**Example:**
There are 36 birds in the park. 25 more birds arrive. How many birds are there? Solve the problem and show your work.
<table>
<thead>
<tr>
<th>Students could examine strategies and explain why they work.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher may include incorrect examples for students to examine.</td>
</tr>
<tr>
<td>Operations embedded within meaningful context promote development of reasoning and justification.</td>
</tr>
</tbody>
</table>

**SPED Strategies:**
Representations can include numbers, words (including mathematical language), pictures, number lines, and/or physical objects.

**Example:**
Mason read 473 pages in June. He read 227 pages in July. How many pages did Mason read altogether?
Karla’s explanation: $473 + 227 = \_\_\_\_$. I added the ones together ($3 + 7$) and got 10. Then I added the tens together ($70 + 20$) and got 90. I knew that 400 + 200 was 600. So I added 10 + 90 for 100 and added 100 + 600 and found out that Mason had read 700 pages altogether.

**Student 1**
I broke 36 and 25 into tens and ones and then added them. $30 + 6 + 20 + 5$. I can change the order of my numbers, so I added 30+20 and got 50. Then I added on 6 to get 56. Then I added 5 to get 61. This strategy works because I broke all the numbers up by their place value.

**Student 2**
I used place value blocks and made a pile of 36. Then I added 25. I had 5 tens and 11 ones. I had to trade 10 ones for a 10. Then I had 6 tens and 1 one. That makes 61. This strategy works because I added up the tens and then added up the ones and traded if I had more than 10 ones.
**ELL Strategies:**
Introduce and chart academic vocabulary with visuals: method, solve, equation, place value, property of operation, explain, correct.

Use gestures, pictures and selected, illustrated single words to present an explanation orally and in writing why and how to apply addition and subtraction strategies.

Using key, technical vocabulary in simple sentences, present an explanation orally and in writing explaining why and how to apply addition and subtraction strategies.

Sentence frames may be provided for language support.

The use of manipulatives, base-ten blocks and number lines, may be used to model the strategy used.

Students maintain a math journal to demonstrate growth in math writing and reasoning.
New Jersey Student Learning Standard(s):
2.NBT.A.2: Count within 1000; skip-count by 5s, 10s, and 100s. *(benchmarked)

Student Learning Objective 10: Count within 1000 by ones, fives, tens, and hundreds beginning at any multiple of 1, 5, 10, or 100 (e.g. begin at 505 and skip count by 5 up to 605, or begin at 600 and skip count by 100 up to 1000).

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

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>MP 2</td>
<td>2.NBT.2</td>
<td>Students are able to:</td>
<td>How can you count by 5’s, 10’s and 100’s?</td>
<td>Counting Collections</td>
</tr>
<tr>
<td>MP 7</td>
<td>Skip-counting may start at any multiple of 5, 10, or 100 within 1000.</td>
<td>• count within 1000 by ones.</td>
<td>What pattern do you notice when you skip count by 5’s, 10’s 100’s? Are there any similarities in the patterns when you skip count by 5’s, 10’s, and 100’s?</td>
<td>Number Hop Grade 2</td>
</tr>
<tr>
<td>MP 8</td>
<td></td>
<td>• count within 1000 by fives, tens, and hundreds beginning at any multiple of 5, 10, or 100.</td>
<td>Students will understand that skip counting is counting by a number other than one. Students work with counters.</td>
<td>Skip Counting Grade 2</td>
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<td>Students will recognize when they skip count by 5’s there will be a pattern of 0 and 5.</td>
<td>Example: 6 groups of 5 counters in each group. They skip count by 5’s to find the total number of counters. They discover that the last number tells how many in all.</td>
<td>Skip Counting up to 1,000</td>
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<td></td>
<td>Students relate what they know about place value to the numbers that form the pattern.</td>
<td>Skip counting using a number line or chart can demonstrate the relationship</td>
<td>Skip-Count by 5s, 10s, and 100s</td>
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<td>Teacher empowers students to discover what skipping means by providing a set of 20 pencils and asking students to touch every 5th pencil. Example: they would touch the 5th, 10th, 15th, and 20th. Students are able to visualize and understand the pencils that were</td>
<td></td>
<td>Formal Assessment Task- 2.NBT.A.2</td>
</tr>
</tbody>
</table>
There is a pattern to how many you pass over when you skip count. **SPED Strategies:**

Students should skip count by 5s, 10s, and 100s to develop the concept of place value.

- Use the 100 chart to identify the counting patterns.
- Use money (nickels, dimes, dollars) or base ten blocks to help with visual cues.
- The use of an interactive whiteboard may also be used to develop counting skills.

**ELL Strategies:**

Introduce and chart academic vocabulary with visuals: Count, skip-count, start, from, to.

- Use gestures, pictures and selected, technical words to demonstrate and explain orally and in writing how to count within 1000 including skip-counting by 5s, 10s, and 100s.
- Using key, technical vocabulary in simple sentence, demonstrate and explain orally and in writing how to count within 1000 including skip-counting by 5s, 10s, and 100s.

Students need many opportunities to count up to 1000 from different starting points. They should also have many experiences skip counting by 5s, 10s, and 100s to develop the concept of place value.

**Examples:**

- The use of the 100 chart may be helpful for students to identify the counting patterns.
- The use of money (nickels, dimes, dollars) or base ten blocks may be helpful visual cues.
- The use of an interactive whiteboard may also be used to develop counting skills.
explain orally and in writing how to count within 1000 including skip-counting by 5s, 10s, and 100s.

Utilize sentences frames for support in explaining orally or in writing.

Use number lines, base-ten blocks and charts with gestures to demonstrate and explain skip-counting.

Students maintain a math journal to demonstrate growth in math writing and reasoning.
# Unit 2 Vocabulary

- add
- addend
- array
- Associative Property
- Base-ten
- change
- column
- compose
- count on
- Commutative Property
- decompose
- difference
- digit
- dollar
- doubles
- equal
- equal addends
- equation
- even
- growing pattern
- hundreds
- Identity Property

- less
- mental strategies
- more
- number line
- odd
- ones
- part-part-whole
- pair
- place value
- Properties of Operations
- putting together
- rectangular array
- repeated pattern
- row
- skip count
- subtract
- sum
- taking apart
- taking from
- tens
- total
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<th>References &amp; Suggested Instructional Websites</th>
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<td>Georgia Department of Education</td>
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<td>Inside Mathematics</td>
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<td>Illustrative Mathematics</td>
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<td>North Carolina Department of Education</td>
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<td>Thurmont Primary School On Line Games</td>
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<td>K-5 Math Teaching Resources</td>
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<td>Fact Fluency</td>
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Field Trip Ideas

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

LIBERTY SCIENCE CENTER (Jersey City, NJ) - An interactive science museum and learning center with math connections. There is a math guidebook for teachers to make connections with math: https://lsc.org/wp-content/uploads/2012/04/MATH-CONNECTIONS-Final.pdf
http://lsc.org/plan-your-visit/

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

ALSTEDE FARMS Chester, NJ - Let us teach you about farming in the most fun way! We open our doors to groups of all ages and sizes because we understand the importance of hands-on education. We personalize each farm tour and field trip, depending on the group’s interests. You will navigate our farm by taking hayrides out to the beautiful fields and orchards, greenhouses, school classroom, our friendly animals and last but not least – having a great outdoor day at our family owned farm. You choose the other activities- climb the giant hay pyramid, have lunch and refreshing lemonade or take a self-guided tour of our animals.
http://alstedefarms.com/group-events-and-tours/group-farm-tours/?gclid=C1jzn-W4lMYCFQgUHwodK1oAxA

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

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

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

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

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