MATHEMATICS

Grade 2: Unit 4
Reason With Shapes and Represent Data
Course Philosophy/Description

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

http://www.state.nj.us/education/modelcurriculum/ela/ELLOverview.pdf
<table>
<thead>
<tr>
<th>#</th>
<th>Student Learning Objective</th>
<th>NJSLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.</td>
<td>2.G.A.1</td>
</tr>
<tr>
<td>2</td>
<td>Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc. and describe the whole as two halves, three thirds, and four fourths.</td>
<td>2.G.A.3</td>
</tr>
<tr>
<td>3</td>
<td>Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using the $ and ¢ symbols appropriately.</td>
<td>2.MD.C.8</td>
</tr>
<tr>
<td>4</td>
<td>Use tools of measurement to measure lengths of several objects to the nearest whole unit and represent the data on a line plot with appropriate whole number units on the horizontal scale.</td>
<td>2.MD.D.9</td>
</tr>
<tr>
<td>5</td>
<td>Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in the graph.</td>
<td>2.MD.D.10</td>
</tr>
<tr>
<td>6</td>
<td>Fluently add and subtract within 20 using mental strategies.</td>
<td>2.OA.B.2*</td>
</tr>
<tr>
<td>7</td>
<td>Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.</td>
<td>2.NBT.B.5*</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 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)

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)
### Effective Pedagogical Routines/Instructional Strategies

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

## Standards

<table>
<thead>
<tr>
<th>8.1.2.A.4, 8.1.2.E.1, 8.2.2.A.2, 8.2.2.A.3, 8.2.2.C.1, 8.2.2.E.3</th>
</tr>
</thead>
</table>

- **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 solve problems involving money.
  

- **The Nature of Technology: Creativity and Innovation**
  - Describe how designed products and systems are useful at school, home, and work.

  **Example:** Students will take surveys or measure several objects and create computer generated bar graphs based on data.

  - 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 problems involving money.

- **Computational Thinking: Programming**
  - Create algorithms (a sets of instructions) using a pre-defined set of commands (e.g., to move a student or a character through a maze).

  **Example:** Students will explain how to sort and classify shapes based on attributes.

**Link:** [http://www.state.nj.us/education/cccs/2014/tech/](http://www.state.nj.us/education/cccs/2014/tech/)
Career Ready Practices describe the career-ready skills that all educators in all content areas should seek to develop in their students. They are practices that have been linked to increase college, career, and life success. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

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

  **Example:** Students will apply prior knowledge when solving real world problems. Students will make sound judgements about the use of specific tools, such as ten frames, number lines, part-part-whole mats, base ten blocks, non-standard units of measure, rulers and on-line interactive resources. Students will choose and use appropriate tools to explore and deepen understanding of mathematical operations and measurement.

- **CRP4. Communicate clearly and effectively and with reason.**
  Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others’ time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.

  **Example:** Students will communicate precisely using clear definitions and provide carefully formulated explanations when constructing arguments. Students will communicate and defend mathematical reasoning using objects, drawings, diagrams, and/or actions. Students will ask probing questions to clarify or improve arguments.
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 measurement and mathematical operations. Students will monitor and evaluate progress and change course as necessary.

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

  **Example:** Students will work collaboratively in groups to solve mathematical tasks. Students will listen to or read the arguments of others and ask probing questions to clarify or improve arguments. They will be able to explain why strategies based on place value and properties of operations work and relate the strategy to a written method. They will be able to explain how to classify and sort geometric shapes.
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>Proficiency Description</th>
</tr>
</thead>
</table>
| 6- Reaching | - Specialized or technical language reflective of the content areas at grade level  
- A variety of sentence lengths of varying linguistic complexity in extended oral or written discourse as required by the specified grade level  
- Oral or written communication in English comparable to proficient English peers |
| 5- Bridging | - Specialized or technical language of the content areas  
- A variety of sentence lengths of varying linguistic complexity in extended oral or written discourse, including stories, essays or reports  
- Oral or written language approaching comparability to that of proficient English peers when presented with grade level material. |
| 4- Expanding | - Specific and some technical language of the content areas  
- A variety of sentence lengths of varying linguistic complexity in oral discourse or multiple, related sentences or paragraphs  
- Oral or written language with minimal phonological, syntactic or semantic errors that may impede the communication, but retain much of its meaning, when presented with oral or written connected discourse, with sensory, graphic or interactive support |
| 3- Developing | - General and some specific language of the content areas  
- Expanded sentences in oral interaction or written paragraphs  
- Oral or written language with phonological, syntactic or semantic errors that may impede the communication, but retain much of its meaning, when presented with oral or written, narrative or expository descriptions with sensory, graphic or interactive support |
| 2- Beginning | - General language related to the content area  
- Phrases or short sentences  
- Oral or written language with phonological, syntactic, or semantic errors that often impede of the communication when presented with one to multiple-step commands, directions, or a series of statements with sensory, graphic or interactive support |
| 1- Entering | - Pictorial or graphic representation of the language of the content areas  
- Words, phrases or chunks of language when presented with one-step commands directions, WH-, choice or yes/no questions, or statements with sensory, graphic or interactive support |
Language Development Supports For English Language Learners
To Increase Comprehension and Communication Skills

**Environment**
- Welcoming and stress-free
- Respectful of linguistic and cultural diversity
- Honors students' background knowledge
- Sets clear and high expectations
- Includes routines and norms
- Is thinking-focused vs. answer-seeking
- Offers multiple modalities to engage in content learning and to demonstrate understanding
- Includes explicit instruction of specific language targets
- Provides participation techniques to include all learners
- Integrates learning centers and games in a meaningful way
- Provides opportunities to practice and refine receptive and productive skills in English as a new language
- Integrates meaning and purposeful tasks/activities that:
  - Are accessible by all students through multiple entry points
  - Are relevant to students' lives and cultural experiences
  - Build on prior mathematical learning
  - Demonstrate high cognitive demand
  - Offer multiple strategies for solutions
  - Allow for a language learning experience in addition to content

<table>
<thead>
<tr>
<th>Sensory Supports*</th>
<th>Graphic Supports*</th>
<th>Interactive Supports*</th>
<th>Verbal and Textual Supports</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Real life objects (realia) or concrete objects</td>
<td>• Graphs</td>
<td>• In a whole group</td>
<td>• Labeling</td>
</tr>
<tr>
<td>• Physical models</td>
<td>• Charts</td>
<td>• In a small group</td>
<td>• Students' native language</td>
</tr>
<tr>
<td>• Manipulatives</td>
<td>• Timelines</td>
<td>• With a partner such as <em>Turn-and-Talk</em></td>
<td>• Modeling</td>
</tr>
<tr>
<td>• Pictures &amp; photographs</td>
<td>• Number lines</td>
<td>• In pairs as a group (first, two pairs work independently, then they form a group of four)</td>
<td>• Repetitions</td>
</tr>
<tr>
<td>• Visual representations or models such as diagrams or drawings</td>
<td>• Graphic organizers</td>
<td>• In triads</td>
<td>• Paraphrasing</td>
</tr>
<tr>
<td>• Videos &amp; films</td>
<td>• Graphing paper</td>
<td>• Cooperative learning structures such as <em>Think-Pair-Share</em></td>
<td>• Summarizing</td>
</tr>
<tr>
<td>• Newspapers or magazines</td>
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<td>• Interactive websites or software</td>
<td>• Guiding questions</td>
</tr>
<tr>
<td>• Gestures</td>
<td></td>
<td>• With a mentor or coach</td>
<td>• Clarifying questions</td>
</tr>
<tr>
<td>• Physical movements</td>
<td></td>
<td></td>
<td>• Probing questions</td>
</tr>
</tbody>
</table>
| • Music & songs | | | • Leveled questions such as *What? When? Where? How? Why?*
| | | | • Questioning prompts & cues |

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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 encourages discussion and understanding about the groups of people being represented.
- This unit / lesson challenges dominant perspectives.

## Equitable Pedagogy
Teachers modify techniques and methods to facilitate the academic achievement of students from diverse backgrounds.

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

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Culturally Relevant Pedagogy Examples

- **Integrate Relevant Word Problems:** Contextualize equations using word problems that reference student interests and cultures.  
  **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.

- **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.

- **Problem-Based Learning Scenarios:** Present relatable real-world problems for your students to solve, explicitly referencing cultures and communities when applicable.  
  **Example:** Bring in various food and department store circulars. Have the students choose a circular they would like to work with. Ask the students to find items with prices and have the students model the amount with play money.

- **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

<table>
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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>

<table>
<thead>
<tr>
<th>Assistive Technology</th>
<th>Tests/Quizzes/Grading</th>
<th>Behavior/Attention</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Computer/whiteboard</td>
<td>- Extended time</td>
<td>- Consistent daily structured routine</td>
<td>- Individual daily planner</td>
</tr>
<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>
<tr>
<td></td>
<td>- Read directions aloud</td>
<td></td>
<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, place value, units of measure, skip counting.
- Use hundred charts, ten frames, number lines, or part-part-whole mats for solving addition or subtraction problems.
- Use drawings to represent and solve word problems involving addition and subtraction.
- Use interactive technology to create graphs.
- Use manipulatives such as counters, color tiles, unifix cubes, rulers, yard sticks, or paper clips to reinforce measurement concepts.
- Have students devise a plan for determining the longest/shortest of three crooked paths that have been created with masking tape.
- Students use non-standard and standard units of measure to justify their reasoning.
- Use manipulatives such as coins and dollar bills to solve word problems involving money.
- Use fraction bars or fraction circles to reinforce the concept of equal shares.
- Use pattern blocks to assist with recognizing shapes and identifying attributes.
- Chart academic vocabulary with visual representations.
Interdisciplinary Connections

Model interdisciplinary thinking to expose students to other disciplines.

**Art Connection**  Fine Arts Standard 1.3.2.D.2

Children observe and discuss the geometric shapes found in two pieces of artwork before eventually creating their own mobiles that demonstrate their newly acquired knowledge about shapes. Students should be able to name specific attributes, such as number of angles or number of equal faces.

**Math-to-Sewing Connection:**  Life Skills Career Ready Practice Standard CRP2

Piecing Fabric: Explain that fabric comes in certain widths. People who have fabric that is not wide enough for what they want to sew can put pieces together to make it wider. Help children work in pairs to model this. Give each pair of students or small group four 3 in. by 8 in. strips of paper, four 3 in. squares of paper, a ruler, and tape. Tell children to pretend that the paper is their fabric for making a placemat. Direct them to arrange the pieces and (sew) tape them together to form a rectangle that is 12 in. long and 11 in. wide. Have volunteers explain how they arranged the pieces to form a placemat.

**Social Studies Connection:**  Social Studies Standard 6.1.4.A.4-8

Students identify and research the person who appears on a dollar bill, quarter, dime, nickel and penny. Then provide each student with one plastic bag containing an assortment of coins. Have each student find the one other student in the class whose coins total value matches the value of the coins in his or her own bag. Have each pair of students with bags that contain the same amount of money create a chart to show the number of each type of coin they have. Then have that pair of students come up with a third combination of coins that would add up to the same total and add that combination to their chart. Their completed chart should show three different ways of representing the same total amount. Students may also create a graph showing the total number of coins of each denomination in their bags.
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.G.A.1
Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.

## 2.G.A.3
Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

## 2.MD.C.8
Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately.
- **Example:** If you have 2 dimes and 3 pennies, how many cents do you have?

## 2.MD.D.9
Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.

## 2.MD.D.10
Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put together, take-apart, and compare problems using information presented in a bar graph.

## 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.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)*
## 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: 4 (Four)</th>
<th>Topic: Reason with Shapes and Represent Data</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NJSLS:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.G.A.1, 2.G.A.3, 2.MD.C.8, 2.MD.D.9, 2.MD.D.10, 2.OA.B.2, 2.NBT.B.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Unit Focus:**
- Reason with shapes and their attributes
- Work with money
- Represent and interpret data
- Add and subtract within 20
- Use place value understanding and properties of operations to add and subtract

**New Jersey Student Learning Standard(s):**
2.G.A.1: Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.

**Student Learning Objective 1:** Draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.

**Modified Student Learning Objectives/Standards:**
M.EE.2.G.A.1: Identify common two-dimensional shapes; square, circle, triangle, and rectangle.

<table>
<thead>
<tr>
<th>MPs</th>
<th>Evidence Statement Key/Clarifications</th>
<th>Skills, Strategies &amp; Concepts</th>
<th>Essential Understandings/Questions (Accountable Talk)</th>
<th>Tasks/Activities</th>
</tr>
</thead>
</table>
| MP 2 MP 6 MP 8 | N/A | Students are able to:  
- draw shapes having specified attributes (e.g. number of equal faces, number of angles)  
- identify triangles, quadrilaterals, pentagons, hexagons, and cubes  
Teacher empowers children to begin forming a more organized manner of | How do you identify and draw shapes?  
How can objects be represented and compared using attributes? | Don’s Shapes  
Polygon Riddles and Fun  
[https://www.youtube.com/watch?v=aE0yle-z5uE](https://www.youtube.com/watch?v=aE0yle-z5uE)  
Shape Robot |
categorizing shapes according to their attributes, and be able to articulate more clearly the attributes that define shapes.

Rich experiences with shape and spatial relationships help develop students’ spatial sense. As students look at how shapes are alike and different, they begin to see the properties of shapes. Students need to see shapes in different sizes and orientations.

Pattern blocks or cutouts are provided for students to explore, identify, and draw shapes on white boards or use elastic bands on geoboards.

Students identify the number of angles and edges in a shape.

Teacher: Draw a closed shape that has five sides. What is the name of the shape?

Teacher: I have 3 sides and 3 angles. What am I?

Students will have ample opportunity to explore a variety of shapes and begin classifying them according to specific attributes (e.g., sides, angles, vertices, edges, and faces). For reinforcement have students number the number of sides.

Students create a chart with the name of the shape and number of sides and number of angles.

Students work in pairs to select 10 pattern blocks from a container provided by teacher and they examine all the shapes. They decide on a way that they can be grouped together.

Example: by number of angles, edges.

Once they have grouped their shapes they trace them and they explain why they sorted them that way.

They create flat shapes using toothpicks, string, straws, and jump ropes, then they count the angles and sides.

Students understand that special shapes have opposite sides that are equal.

Can students identify polygons correctly even if they are oddly
### SPED Strategies:
Provide opportunities for tactile learners trace the shapes.

Model how to determine the angle and faces on the actual shape and have students follow/repeat.

Students recognize all four sided shapes as quadrilaterals. Students use the vocabulary word “angle” in place of “corner” but they do not need to name angle types.

<table>
<thead>
<tr>
<th>triangle</th>
<th>quadrilaterals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>pentagons</th>
<th>hexagons</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### ELL Strategies:
Introduce and chart academic vocabulary with visuals: figure(s), shape(s), angle(s), face(s), quadrilateral(s), pentagon(s), hexagon(s), cube(s), shade.

proportioned? For instance, if a quadrilateral is very long and skinny, will students still identify it as a quadrilateral?
Recognize and draw shapes using gestures and illustrations having specified attributes to demonstrate comprehension of oral and written directions.

Demonstrate comprehension of oral and written directions by using technical vocabulary in phrases and simple sentences to draw shapes having specified attributes.

Discuss multiple meanings of words such as “face” using gestures and solid figures.

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

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

2.G.A.3: Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

**Student Learning Objective 2:** Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc. and describe the whole as two halves, three thirds, and four fourths.

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

<table>
<thead>
<tr>
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<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>N/A</td>
<td>Concept(s):</td>
<td>Students practice making equal shares of rectangle and or a circle.</td>
<td>Fraction Flowers</td>
</tr>
</tbody>
</table>
MP 7

- Equal shares of identical wholes need not have the same shape.

Students are able to:
- partition rectangles into two, three, or four equal shares
- partition two same-sized rectangles to show that equal shares of identical wholes need not have the same shape
- describe the shares using the words halves, thirds, fourths, half of, a third of, a fourth of, etc.
- recognize and then describe the whole as two halves, three thirds, four fourths

Build a rectangle and describe it to the students. As you describe it trace each row and each column with your hand. Students can do the same. Ask them what they notice about how we counted. Point out that the first tile is in the first row and also in the first column.

Have students find columns in their environment to create a mental image to understand that columns go up and down.

Children cut a circle into 3 equal shares (thirds) and same idea with halves.

Students create equal shares of a shape and then, write an equation to represent the total number of equal shares.

Recognize that equal shares of identical wholes need not have the same shape.

www.illustrativemathematics.org/illustrations/827

G Task 3a
G Task 3b
G Task 3c
G Task 3d
Half and Half Task
Sharing Equally
Teacher ensures student understanding concerning the meaning of shares, which in this case means parts or pieces.

Teacher explains that four equal shares are called fourths.

Teacher promotes writing an equation to tell the total number of squares (or square-like sections) in a rectangle as a sum of equal addends.

**SPED Strategies:**
Provide students with fraction circles and fraction bars to show different parts or equal shares.

Students need experiences with different sized circles and rectangles. For example, students should recognize that when they cut a circle into three equal pieces, each piece will equal one third of its original whole. In this case, students should describe the whole as three thirds. If a circle is cut into four equal pieces, each piece will equal one fourth of its original whole and the whole is described as four fourths.
Students should see circles and rectangles partitioned in multiple ways so they learn to recognize that equal shares can be different shapes within the same whole.

**ELL Strategies:**
Introduce and chart academic vocabulary with visuals: fractions,
<table>
<thead>
<tr>
<th>whole, equal shares, halves/half of, thirds/a third of, fourths/a quarter of, circles, squares, rectangles, left over, different, same.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use gestures, pictures and selected, illustrated single words to describe orally and in writing how to partition circles and rectangles into two, three, or four equal shares.</td>
</tr>
<tr>
<td>Use key vocabulary in phrases, short sentences with illustrations or simple sentences to describe orally and in writing how to partition circles and rectangles into two, three, or four equal shares.</td>
</tr>
<tr>
<td>• Use fraction tiles to demonstrate partitioning into equal shares with a partner or peer coach.</td>
</tr>
<tr>
<td>• Students maintain a math journal to demonstrate growth in math writing and reasoning.</td>
</tr>
</tbody>
</table>
**New Jersey Student Learning Standard(s):**

2.MD.C.8: Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately.

*Example:* If you have 2 dimes and 3 pennies, how many cents do you have?

**Student Learning Objective 3:** Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using the $ and ¢ symbols appropriately.

**Modified Student Learning Objectives/Standards:**

M.EE.2.MD.C.8: Recognize that money has value.

<table>
<thead>
<tr>
<th>MPs</th>
<th>Evidence Statement Key/Clarifications</th>
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<th>Essential Understandings/Questions (Accountable Talk)</th>
<th>Tasks/Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP 1</td>
<td>N/A</td>
<td>Concept(s):</td>
<td>Students examine play money, coins and dollar bills. They identify each coin and its value.</td>
<td>Delayed Gratification</td>
</tr>
<tr>
<td>MP 2</td>
<td>N/A</td>
<td>• Know the value of dollar bills, quarters, dimes, nickels, and pennies.</td>
<td>They role play using cash registers and word problems to strengthen their skill.</td>
<td>Desktop Basketball-Money Version</td>
</tr>
<tr>
<td>MP 4</td>
<td>N/A</td>
<td>Students are able to:</td>
<td>Examples:</td>
<td>Pocket Money</td>
</tr>
<tr>
<td>MP 5</td>
<td>N/A</td>
<td>• identify dollar bills, quarters, dimes, nickels, and pennies</td>
<td>Sandra went to the store and received 76¢ in change. What are three different sets of coins she could have received?</td>
<td>Saving Money</td>
</tr>
<tr>
<td>MP 8</td>
<td>N/A</td>
<td>• using dollar bills, quarters, dimes, nickels, and pennies</td>
<td>Jordan has three $5 dollar bills, two $10 dollar bills, and two $1 dollar bills. How many dollars does Jordan have in all?</td>
<td>Shopping for School Supplies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• count to determine the total amount of money</td>
<td>Students explain their thinking and record their answers, which must include the appropriate money symbols.</td>
<td>Tokens to Spend</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• solve word problems involving dollar bills, quarters, dimes, nickels, and pennies</td>
<td></td>
<td>What I Have and What I Need</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Opportunities are provided for students to solve word problems involving either dollars or cents. Since students have not been introduced to decimals, problems should either have only dollars or only cents.</td>
<td></td>
<td>2.NBT.5 Assessment Task</td>
</tr>
</tbody>
</table>

30 | Page
Example:
What are some possible combinations of coins (pennies, nickels, dimes, and quarters) that equal 37 cents?

Students should have multiple opportunities to identify, count, recognize, and use coins and bills and their values in and out of context. They should also experience making equivalent amounts using both coins and bills. Dollar bills should include denominations up to one hundred ($1.00, $5.00, $10.00, $20.00, $100.00).

Teacher observes students to identify and correct and misconceptions.

Students should solve story problems connecting the different representations. These representations may include objects, pictures, charts, tables, words, and/or numbers. Students should communicate their mathematical thinking and justify their answers.

Teacher points out that solving begins by grouping the bills according to their values from greatest to least, which is the best way to find the total amounts of money.
**SPED Strategies:**
Provide manipulatives, such as coins and dollar bills for students to visually see and touch.

Provide a place mat which has each coin, its name and the correct symbol, or provide an anchor chart for students to use.

Give student multiple opportunities to identify, count, recognize, and use coins and bills in and out of context.

Students should be making equivalent amounts using both coins and bills. Students should solve story problems connecting the different representations. These representations may include objects, pictures, charts, tables, words, and/or numbers.

**Example:**
Sandra went to the store and received $0.76 in change. What are three different sets of coins she could have received?

Katie spent $3.45 at the store. She gave the cashier a $5 bill. How much change should Katie get?
**ELL Strategies:**
Introduce and chart academic vocabulary with visuals: money, amount, pay, dollar bills, $, quarters, dimes, nickels, pennies, ¢.

Use gestures, pictures and selected, illustrated single words to describe and explain orally and in writing how to identify, recognize, and solve word problems with U.S. money.

Use selected key, technical vocabulary in phrases or simple sentences to describe and explain orally and in writing using provided sentence frames how to identify, recognize, and solve word problems with U.S. money.

Use money to provide the student with a manipulatives relating to money since many ELL’s have not had experience with U.S. coins and bills.

Students maintain a math journal to demonstrate growth in math writing and reasoning.
New Jersey Student Learning Standard(s):
2.MD.D.9: Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.

Student Learning Objective 4: Use tools of measurement to measure lengths of several objects to the nearest whole unit and represent the data on a line plot with appropriate whole number units on the horizontal scale.

Modified Student Learning Objectives/Standards:
M.EE.2.MD.D.9: Create picture graphs from collected measurement data.

<table>
<thead>
<tr>
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<th>Tasks/Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP 4</td>
<td>N/A</td>
<td>Concept(s):</td>
<td>Students practice how to create a line plot.</td>
<td>Growing Bean Plants</td>
</tr>
<tr>
<td>MP 5</td>
<td></td>
<td>Generate data.</td>
<td>Convert a standard number line into a line plot by displaying data on top of each number.</td>
<td>Hand Span Measures</td>
</tr>
<tr>
<td>MP 6</td>
<td></td>
<td>Students are able to:</td>
<td>Use rulers to measure classroom objects, recording the data, and displaying data on a line plot.</td>
<td>Lizards, Lizards, Everywhere</td>
</tr>
<tr>
<td>MP 8</td>
<td></td>
<td>• generate measurement data by measuring lengths, to the nearest whole unit, of several objects or by making repeated measurements of the same object</td>
<td>Review pre-existing line plots to check for rationality.</td>
<td>MD Task 9a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• record the measurements in a line plot having a horizontal scale in whole number units</td>
<td>Create an “L” to represent the first quadrant, showing groups in pictures and bars up to the given quantity.</td>
<td>MD Task 9b</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Teacher helps students represent the length of several objects by making a line plot.</td>
<td>Evaluate data displayed in graphs and respond to questions based upon the given graph.</td>
<td>MD Task 9c</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Students are directed to round their lengths to the nearest whole unit.</td>
<td></td>
<td>The Longest Walk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Teacher directs students to measure objects in their desk to the nearest</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tasks/Activities: Growing Bean Plants, Hand Span Measures, Lizards, Lizards, Everywhere, MD Task 9a, MD Task 9b, MD Task 9c, The Longest Walk.
inch, and models how to display data collected on a line plot.

Teacher asks how many objects measured 2 inches, 3 inches, etc. Which length had the most number of objects? How do you know?

This standard emphasizes representing data using a line plot. Students will use the measurement skills learned in earlier standards to measure objects.

Line plots are first introduced in this grade level. A line plot can be thought of as plotting data on a number line.

![Line Plot Example]

An interactive whiteboard or chart paper may be used to create and/or model line-plots to keep as an anchor chart to be used as a visual.

**SPED Strategies:**
Provide students with ruler, yard stick or measuring tape if available.

Provide students with graph paper to set up a line plot correctly.

Students practice creating a line plot on an interactive whiteboard.

Students use anchor charts to check the accuracy of their own created line plot.
Line plots are first introduced in this grade level. A line plot can be thought of as plotting data on a number line.

ELL Strategies:
Introduce and chart academic vocabulary with visuals: measure, length, nearest, inch, centimeter, plot(v), horizontal, line plot.

Use selected vocabulary illustrations and gestures to demonstrate comprehension on how to measure lengths of several objects to nearest whole unit.

Use key, technical vocabulary in phrases or simple sentences to demonstrate comprehension on how to measure lengths of several objects to nearest whole unit. Students maintain a math journal to demonstrate growth in math writing and reasoning.
New Jersey Student Learning Standard(s):
2.MD.D.10: Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put together, take-apart, and compare problems using information presented in a bar graph.

Student Learning Objective 5: Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in the graph.

Modified Student Learning Objectives/Standards:
M.EE.2.MD.D.10: Create picture graphs from collected measurement data.

<table>
<thead>
<tr>
<th>MPs</th>
<th>Evidence Statement Key/Clarifications</th>
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<th>Essential Understandings/Questions (Accountable Talk)</th>
<th>Tasks/Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP 1</td>
<td>N/A</td>
<td>Students are able to:</td>
<td>Students learn how to conduct a survey, use tally marks, ask questions about the data, and display data in a graph.</td>
<td>Favorite Ice Cream Flavor</td>
</tr>
<tr>
<td>MP 2</td>
<td></td>
<td>● draw a picture graph to represent a data set with up to four categories</td>
<td>Students should have experiences posing a question with 4 possible responses and then work with the data that they collect.</td>
<td>MD Task 10a</td>
</tr>
<tr>
<td>MP 4</td>
<td></td>
<td>● draw a bar graph to represent a data set with up to four categories</td>
<td>In second grade, picture graphs (pictographs) include symbols that represent single units. Pictographs should include a title, categories, category label, key, and data.</td>
<td>MD Task 10b</td>
</tr>
<tr>
<td>MP 5</td>
<td></td>
<td>● use information in a bar graph to solve simple put together, take apart, and compare problems</td>
<td></td>
<td>Our Pets</td>
</tr>
<tr>
<td>MP 6</td>
<td></td>
<td></td>
<td></td>
<td>Through the Grapevine</td>
</tr>
<tr>
<td>MP 8</td>
<td></td>
<td>Example:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Students pose a question and 4 possible responses. Which is your favorite flavor of ice cream: chocolate, vanilla, strawberry, or cherry? Students collect their data by using tallies or another way of keeping track. Students organize their data by totaling each category in a chart.

<table>
<thead>
<tr>
<th>Number of Books Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nancy</td>
</tr>
<tr>
<td>Juan</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>= 1 Book</td>
</tr>
</tbody>
</table>
or table. Picture and bar graphs are introduced in Second Grade.

<table>
<thead>
<tr>
<th>Flavor</th>
<th>Number of People</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chocolate</td>
<td>12</td>
</tr>
<tr>
<td>Vanilla</td>
<td>5</td>
</tr>
<tr>
<td>Strawberry</td>
<td>6</td>
</tr>
<tr>
<td>Cherry</td>
<td>9</td>
</tr>
</tbody>
</table>

Students display their data using a picture graph or bar graph using a single unit scale. Students answer simple problems related to addition and subtraction that ask them to put together, take apart, and compare numbers from their graph.

**SPED Strategies:**
Provide picture graphs (pictographs) include symbols that represent single units. Pictographs should include a title, categories, category label, key, and data.

Second graders should draw both horizontal and vertical bar graphs. Bar graphs include a title, scale, scale label, categories, category label, and data.
scale label, categories, category label, and data.

**ELL Strategies:**
Introduce and chart academic vocabulary with visuals: table, picture graph, bar graph, information, favorite, most favorite, combined.

Use gestures, pictures and selected, illustrated single words to describe and explain orally and in writing how to draw a picture/bar graph to represent and to solve simple problems.

Use phrases and provided sentence frames with illustrations to describe and explain orally and in writing how to draw a picture/bar graph to represent and to solve simple 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 6:

Fluently add and subtract within 20 using mental strategies.

### Modified Student Learning Objectives/Standards:

<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 2</td>
<td>2.NBT.5</td>
<td>Students are able to:</td>
<td>Students exercise mental strategies to make sense of number relationships as they are adding and subtracting within 20. The ability to calculate mentally with efficiency is very important for all students. Mental strategies may include the following:</td>
<td></td>
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<tr>
<td>MP 7</td>
<td></td>
<td>• add within 20 using mental strategies with accuracy and efficiency.</td>
<td>Counting on</td>
<td></td>
</tr>
<tr>
<td>MP 8</td>
<td></td>
<td>• subtract within 20 using mental strategies with accuracy and efficiency.</td>
<td>Making tens (9 + 7 = 10 + 6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Teacher supports students’ understanding and fluency of sums and differences within 20, through varied experiences: making 10, breaking numbers apart and working on mental strategies.</td>
<td>Decomposing a number leading to a ten (14 – 6 = 14 – 4 – 2 = 10 – 2 = 8) - Number Bonds (8 + 5 = 13 is the same as 13 - 8 = 5)</td>
<td></td>
</tr>
</tbody>
</table>

**SPED Strategies:**

Mental strategies may include the following:

- Counting on
- Making tens (9 + 7 = 10 + 6)
- Decomposing a number leading to a ten (14 – 6 = 14 – 4 – 2 = 10 – 2 = 8) - Number Bonds (8 + 5 = 13 is the same as 13 - 8 = 5)
- Doubles
- Doubles plus one (7 + 8 = 7 + 7 + 1)

### Additional Activities:

- Addition Math Facts
- Building Toward Fluency
- Hitting the Target Number
- Incredible Equations
- Order in Important
- Our Number Riddles

Additional Activities: [http://www.sheppardsoftware.com/mathgames/popup_addition.htm](http://www.sheppardsoftware.com/mathgames/popup_addition.htm)
- Making tens (9 + 7 = 10 + 6)
- Decomposing a number leading to a ten (14 – 6 = 14 – 4 – 2 = 10 – 2 = 8)
- Fact families (8 + 5 = 13 is the same as 13 - 8 = 5)
- Doubles
- Doubles plus one (7 + 8 = 7 + 7 + 1)

**ELL Strategies:**
Introduce and chart academic vocabulary with visuals: add, 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.

The use of objects, diagrams, or interactive whiteboards, and various strategies will help students develop fluency.
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 7:** Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

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

M.EE.2.NBT.B.5.b: Using concrete examples compose and decompose numbers up to 10 in more than one way.

<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>
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</tr>
</thead>
<tbody>
<tr>
<td>MP 2</td>
<td>2.NBT.5</td>
<td>Students are able to:</td>
<td>How do you use the place value strategy to add 2 digit numbers?</td>
<td>Different Paths Same Destination</td>
</tr>
<tr>
<td>MP 7</td>
<td></td>
<td></td>
<td>How do you record the steps when adding 2-digit numbers?</td>
<td>Mental Mathematics</td>
</tr>
<tr>
<td>MP 8</td>
<td></td>
<td>Students will be able to use properties of operations and place value to add and subtract.</td>
<td>What are two different ways to write addition problems?</td>
<td>Multi-Digit Addition Strategies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example:</td>
<td>How does using 10 as a benchmark number help us add or subtract?</td>
<td>Roll Away</td>
</tr>
<tr>
<td></td>
<td></td>
<td>42+22</td>
<td></td>
<td>Sale Flyer Shopping</td>
</tr>
<tr>
<td></td>
<td></td>
<td>40+2+20+2</td>
<td></td>
<td>Saving Money 1</td>
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<tr>
<td></td>
<td></td>
<td>40+20=60</td>
<td></td>
<td>Saving Money 2</td>
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<tr>
<td></td>
<td></td>
<td>2+2=4</td>
<td></td>
<td>Take 100</td>
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<tr>
<td></td>
<td></td>
<td>60+4=64</td>
<td></td>
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</tbody>
</table>
Example:
Place value
4 tens + 2 ones
2 tens + 2 ones
6 tens + 4 ones
64

Students will understand the relationship between addition and subtraction.

**SPED Strategies:**
Addition strategies based on place value for 48 + 37 may include:
- Adding by place value:
  40 + 30 = 70 and 8 + 7 = 15 and 70 + 15 = 85
- Incremental adding (breaking one number into tens and ones)
  48 + 10 = 58, 58 + 10 = 68, 68 + 10 = 78, 78 + 7 = 85
- Compensation (making a friendly number): 48 + 2 = 50, 37 – 2 = 35, 50 + 35 = 85

Subtraction strategies based on place value for 81 - 37 may include:
- Adding up (from smaller number to larger number):
  37 + 3 = 40, 40 + 40 = 80, 80 + 1 = 81, and 3 + 40 + 1 = 44
- Incremental subtracting:
  81 - 10 = 71, 71 – 10 = 61, 61 – 10 = 51, 51 – 7 = 44
Subtracting by place value:
81 – 30 = 51, 51 – 7 = 44

**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 100.

Use manipulatives, such as number lines and counters, to add and subtract within 100 and be able to describe and explain the strategies they used with sentence frames.
<table>
<thead>
<tr>
<th>Unit 4 Vocabulary</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>• add</td>
<td>• Identity Property</td>
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<tr>
<td>• addend</td>
<td>• inch</td>
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<tr>
<td>• angle</td>
<td>• length</td>
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<tr>
<td>• Associative Property</td>
<td>• less</td>
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<td>• attributes</td>
<td>• line plot</td>
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<td>• bar graph</td>
<td>• meter</td>
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<td>• base-ten</td>
<td>• more</td>
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<tr>
<td>• centimeter</td>
<td>• nickel</td>
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<tr>
<td>• circle</td>
<td>• ones</td>
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<tr>
<td>• Commutative Property</td>
<td>• penny</td>
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<tr>
<td>• cube</td>
<td>• pentagon</td>
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<tr>
<td>• data</td>
<td>• picture graph</td>
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<tr>
<td>• dime</td>
<td>• place value</td>
</tr>
<tr>
<td>• dollar</td>
<td>• Properties of Operations</td>
</tr>
<tr>
<td>• equal</td>
<td>• putting together</td>
</tr>
<tr>
<td>• equal addends</td>
<td>• quadrilateral</td>
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<tr>
<td>• equal shares</td>
<td>• quarter</td>
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<tr>
<td>• equation</td>
<td>• rectangle</td>
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<td>• faces</td>
<td>• scale</td>
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<tr>
<td>• feet</td>
<td>• subtract</td>
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<td>• fourths</td>
<td>• sum</td>
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<tr>
<td>• half</td>
<td>• tens</td>
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<td>• hexagon</td>
<td>• thirds</td>
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<tr>
<td>• hundreds</td>
<td>• triangle</td>
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<tr>
<td></td>
<td>• unknown</td>
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<tr>
<td>References &amp; Suggested Instructional Websites</td>
<td></td>
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<td>-----------------------------------------------</td>
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<tr>
<td>Georgia Department of Education  <a href="https://www.georgiastandards.org/common-core/pages/math-k-5.aspx">https://www.georgiastandards.org/common-core/pages/math-k-5.aspx</a></td>
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<td>Inside Mathematics  <a href="http://www.insidemathematics.org">www.insidemathematics.org</a></td>
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<td>Illustrative Mathematics  <a href="https://www.illustrativemathematics.org">https://www.illustrativemathematics.org</a></td>
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<td>Thurmont Primary School On Line Games  <a href="http://education.fcps.org/tps/SecondGradeOnlineMathGames">http://education.fcps.org/tps/SecondGradeOnlineMathGames</a></td>
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<td>K-5 Math Teaching Resources  <a href="http://www.k-5mathteachingresources.com/2nd-grade-number-activities.html">http://www.k-5mathteachingresources.com/2nd-grade-number-activities.html</a></td>
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<td>Fact Fluency  <a href="http://www.k-5mathteachingresources.com/computational-fluency.html">http://www.k-5mathteachingresources.com/computational-fluency.html</a></td>
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<td>Interactive Resources  <a href="http://interactivesites.weebly.com/math.html">http://interactivesites.weebly.com/math.html</a></td>
<td></td>
</tr>
</tbody>
</table>
Field Trip Ideas

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


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

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