Regional

Mathematics

Curriculum Guide

Kindergarten – Grade 2

Developed By and For:

The Regional Districts of

Frankford, Lafayette, and Sussex-Wantage Schools

2011

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Credits

Grateful recognition is made to their following individuals for their level of expertise and dedicated work.

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Appreciation to the following members for their organization and guidance:

Susan Petrick Sussex Wantage

Genene Pagliaro Lafayette & Frankford

PHILOSOPHY

All students should be afforded the opportunity to achieve mathematics proficiency through an integration of understanding, comprehending, applying, reasoning, and analyzing. The math opportunity for students must be rich and complex and connected to real life experiences. Through a specific math language, students will be able to communicate comprehension in both oral and written form.

We must enable all of our children to acquire math skills, understanding, and attitudes that they will need to be successful in their careers and daily lives. We believe all students can learn math and all students need to learn math.

The local community, educators, parents, and students shall work together to make the revision of the Common Core State Standards in Mathematics a reality.

The regional curriculum envelops the premise of understanding mathematics, as stated in the Common Core State Standards for Mathematics introduction (2010, http://www.corestandards.org/assets/CCSSI_Math%20Standards.pdf).

> "These Standards define what students should understand and be able to do in their study of mathematics. Asking a student to understand something means asking a teacher to assess whether the student has understood it. But what does mathematical understanding look like? One hallmark of mathematical understanding is the ability to justify, in a way appropriate to the student's mathematical maturity, *why* a particular mathematical statement is true or where a mathematical rule comes from. There is a world of difference between a student who can summon a mnemonic device to expand a product such as $(a + b)(x + y)$ and a student who can explain where the mnemonic comes from. The student who can explain the rule understands the mathematics, and may have a better chance to succeed at a less familiar task such as expanding $(a + b + c)(x + y)$. Mathematical understanding and procedural skill are equally important, and both are assessable using mathematical tasks of sufficient richness."

Calculator Use in the Classroom

Points to Ponder

The calculator, similar to the use of a protractor, ruler and other classroom manipulatives, is not a substitute for thinking but needs to be utilized as a classroom tool on a daily basis to enhance appropriate subject matter. Students need to understand basic math computations and processes and need to use paper pencil, mental math and calculators in a balanced approach to mathematical instruction. Authentic problems which are in the conceptual grasp of children provide opportunities for students to utilize realistic data. The use of calculators allows for the manipulation and computation of this data.

Calculators should be available on a daily basis to all students, kindergarten through eighth grade and used in other academic areas through cross- curricular application of data analysis and data interpretation. Students need to be at ease with the use of calculators and be able to make educationally sound decisions on when to use a calculator. Students will use calculators on summative state assessments and need to feel comfortable with its use.

The focus on procedure and the sequence of mathematical processes through paper and pencil or mental math techniques are significant. As students understand the procedures the applications the use of calculators should be allowed to check work and ease the labor of complicated and large computational processes. This practice allows students to gain self esteem through mathematical success and releases students to test out conjectures and theories about math and assists in the development of problem solving and critical thinking skills.

ASSESSMENT

THE ASSESSMENT PROCESS: Assessment is a way of providing feedback to the various stakeholders in the educational system, and of communicating the outcomes to all concerned. The data provide feedback to:

- students on how well they are meeting expectations
- teachers with how well students are learning
- districts on the effectiveness of their programs
- policy makers on how well policies are working.

CLASSROOM ASSESSMENT: Classroom teachers should utilize a variety of assessment tools designed to provide information on student comprehension and progress toward learning objectives. Assessment should be based upon, but not limited to, the following:

1. Open-ended problems
2. Teacher interviews
3. Portfolios
4. Mathematical journals
5. Formative and summative assessments
6. Completion of assignments, both in and out of the classroom
7. Oral contribution in class
8. Rubrics

K-3 Scope and Sequence Mathematics Common Core State Standards 2011

Domain	Kindergarten	First	Second	Third
Counting and Cardinality	• Know number names and the count sequence. • Count to tell the number of objects. • Compare numbers			
Operations and Algebraic Thinking	• Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.	• Represent and solve problems involving addition and subtraction. • Understand and apply properties of operations and the relationship between addition and subtraction. • Add and subtract within 20. • Work with addition and subtraction equations.	• Represent and solve problems involving addition and subtraction. • Add and subtract within 20. • Work with equal groups of objects to gain foundations for multiplication.	• Represent and solve problems involving multiplication and division. • Understand properties of multiplication and the relationship between multiplication and division. • Multiply and divide within 100. • Solve problems involving the four operations, and identify and explain patterns in arithmetic.
Number and Operations in Base Ten	• Work with numbers 11–19 to gain foundations for place value.	• Extend the counting sequence. • Understand place value. • Use place value understanding and properties of operations to add and subtract	• Understand place value. • Use place value understanding and properties of operations to add and subtract.	• Use place value understanding and properties of operations to perform multi-digit arithmetic.
Number and Operations Fractions				• Develop understanding of fractions as numbers.
Measurement and Data	• Describe and compare measurable attributes. • Classify objects and count the number of objects in categories.	• Measure lengths indirectly and by iterating length units. • Tell and write time. • Represent and interpret data.	• Measure and estimate lengths in standard units. • Relate addition and subtraction to length. • Work with time and money. • Represent and interpret data.	• Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects. • Represent and interpret data. • Geometric measurement: understand concepts of area and relate area to multiplication and to addition. • Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.
Geometry	• Identify and describe shapes. • Analyze, compare, create, and compose shapes.	• Reason with shapes and their attributes.	• Reason with shapes and their attributes.	• Reason with shapes and their attributes.

Grade Level: Kindergarten **Subject Area:** Math **Big Idea:** Counting and Cardinality

Domain: Counting and Cardinality
Domain Objectives:
Know the number names and the count sequence.
Count to tell the number of objects
Compare numbers

Rationale: CCSS Content Statement:	**Essential Questions**	**Enduring Understanding**
Know number names and the count sequence. 1. Count to 100 by ones and by tens. 2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1). 3. Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects). **Count to tell the number of objects.** 4. Understand the relationship between numbers and quantities; connect counting to cardinality. a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. b. Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted. c. Understand that each successive number name refers to a quantity that is one larger. 5. Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects. **Compare numbers.**	How do you show and count numbers? How many objects are in this set? How do we use numbers to compare objects in a set?	Rote count to 100. Write numerals to 20. Understand relationship between numbers and quantities. Compare numbers.

6. Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies 7. Compare two numbers between 1 and 10 presented as written numerals.		

Kindergarten Mathematical Practices: 2. Reason abstractly and quantitatively. 4. Model with mathematics. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.

Assessments: **What are you teaching toward?** Class discussions Teacher observations Projects Teacher made	**Suggested Activities:** **Lesson Plans/Daily Activities** Counting objects Hundred chart activities Comparing sets Calendar Writing numbers Estimate	**Resources:** **To work toward assessment goal** Manipulatives Calendar Hundred chart Number lines

21st Century Themes				
Global Awareness Literacy	**Financial, Economic, Business and Entrepreneurial Literacy**	**Civil Literacy**	**Health Literacy**	**Environmental Literacy**

21st Century Skills

Creativity and Innovation	**Critical Thinking and Problem Solving**	**Communication and Collaboration**	**Information Literacy**
Think Creatively • Use a wide range of idea creation techniques (such as brainstorming) • Create new and worthwhile ideas (both incremental and radical concepts) • Elaborate, refine, analyze and evaluate their own ideas in order to improve and maximize creative efforts *Work Creatively with Others* • Develop, implement and communicate new ideas to others effectively • Be open and responsive to new and diverse perspectives; incorporate group input and feedback into the work • Demonstrate originality and inventiveness in work and understand the real world limits to adopting new ideas • View failure as an opportunity to learn; understand that creativity and innovation is a long-term,	*Reason Effectively* • Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation *Use Systems Thinking* • Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems *Make Judgments and Decisions* • Effectively analyze and evaluate evidence, arguments, claims and beliefs • Analyze and evaluate major alternative points of view • Synthesize and make connections between information and arguments • Interpret information and draw conclusions based on the best analysis	*Communicate Clearly* • Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts • Listen effectively to decipher meaning, including knowledge, values, attitudes and intentions • Use communication for a range of purposes (e.g. to inform, instruct, motivate and persuade) • Utilize multiple media and technologies, and know how to judge their effectiveness a priori as well as assess their impact • Communicate effectively in diverse environments (including multi-lingual) *Collaborate with Others* • Demonstrate ability to work	*Access and Evaluate Information* • Access information efficiently (time) and effectively (sources) • Evaluate information critically and competently *Use and Manage Information* • Use information accurately and creatively for the issue or problem at hand • Manage the flow of information from a wide variety of sources • Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information

cyclical process of small successes and frequent mistakes *Implement Innovations* • Act on creative ideas to make a tangible and useful contribution to the field in which the innovation will occur	• Reflect critically on learning experiences and processes *Solve Problems* • Solve different kinds of non-familiar problems in both conventional and innovative ways • Identify and ask significant questions that clarify various points of view and lead to better solutions	effectively and respectfully with diverse teams • Exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal • Assume shared responsibility for collaborative work, and value the individual contributions made by each team member	
Information, Communication and Technology Literacy	**Life and Career Skills** **Flexibility And Adaptability** • adapt to change • be flexible **Initiative And Self-Direction** • work independently • be self-directed learners **Social And Cross-Cultural Skills** • interact effectively with others • work effectively in diverse teams **Productivity And Accountability** • manage projects • produce results **Leadership And Responsibility** • guide and lead others • be responsible to others • act responsibly with the interests of the larger community in mind	**Interdisciplinary Connections**	**Media Literacy**

Grade Level: Kindergarten **Subject Area:** Math **Big Idea:** Measurement and Data

Doman: Measurement and Data

Domain Objectives:

Describe & compare measurable attributes

Classify objects and count the number of objects in each category

Rationale: CCSS Content Statement	**Essential Questions**	**Enduring Understanding**
Describe and compare measurable attributes. 1. Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. 2. Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter.* **Classify objects and count the number of objects in each category.** 3. Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.3	How can measurement be used to compare objects? How can objects be classified into different categories?	Describe attributes and compare objects with measurable attributes. Categorize objects by their attributes. Count and compare them.

Mathematical Practices: #1,2,3,4,5,6,7

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.

Assessments: **What are you teaching toward?** Class discussions Teacher observations Projects Teacher made	**Suggested Activities:** **Lesson Plans/Daily Activities** Standard and non-standard measuring Graphing Sorting/classifying	**Resources:** **To work toward assessment goal** Manipulatives Measurement tools Assorted graphs Internet

21st Century Themes				
Global Awareness Literacy	**Financial, Economic, Business and Entrepreneurial Literacy**	**Civil Literacy**	**Health Literacy**	**Environmental Literacy**
21st Century Skills				
Creativity and Innovation *Think Creatively* • Use a wide range of idea creation techniques (such as brainstorming) • Create new and worthwhile ideas (both incremental and radical concepts) • Elaborate, refine, analyze and evaluate their own ideas in order to improve and maximize creative efforts *Work Creatively with Others* • Develop, implement and communicate new ideas to others effectively • Be open and responsive to new and diverse perspectives; incorporate group input and feedback into the work • Demonstrate originality and inventiveness in work and understand the real world limits to adopting new ideas • View failure as an opportunity to learn; understand that creativity and innovation is a	**Critical Thinking and Problem Solving** *Reason Effectively* • Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation *Use Systems Thinking* • Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems *Make Judgments and Decisions* • Effectively analyze and evaluate evidence, arguments, claims and beliefs • Analyze and evaluate major alternative points of view • Synthesize and make connections between information and arguments • Interpret information and draw conclusions based on the best analysis • Reflect critically on learning	**Communication and Collaboration** *Communicate Clearly* • Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts • Listen effectively to decipher meaning, including knowledge, values, attitudes and intentions • Use communication for a range of purposes (e.g. to inform, instruct, motivate and persuade) • Utilize multiple media and technologies, and know how to judge their effectiveness a priori as well as assess their impact • Communicate effectively in diverse environments (including multi-lingual) *Collaborate with Others* • Demonstrate ability to work effectively and respectfully	**Information Literacy** *Access and Evaluate Information* • Access information efficiently (time) and effectively (sources) • Evaluate information critically and competently *Use and Manage Information* • Use information accurately and creatively for the issue or problem at hand • Manage the flow of information from a wide variety of sources • Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information

long-term, cyclical process of small successes and frequent mistakes *Implement Innovations* • Act on creative ideas to make a tangible and useful contribution to the field in which the innovation will occur	experiences and processes *Solve Problems* • Solve different kinds of non-familiar problems in both conventional and innovative ways • Identify and ask significant questions that clarify various points of view and lead to better solutions	with diverse teams • Exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal • Assume shared responsibility for collaborative work, and value the individual contributions made by each team member	
Information, Communication and Technology Literacy	**Life and Career Skills** **Flexibility And Adaptability** • adapt to change • be flexible **Initiative And Self-Direction** • work independently • be self-directed learners **Social And Cross-Cultural Skills** • interact effectively with others • work effectively in diverse teams **Productivity And Accountability** • manage projects • produce results **Leadership And Responsibility** • guide and lead others • be responsible to others • act responsibly with the interests of the larger community in mind	**Interdisciplinary Connections**	**Media Literacy**

Grade Level: Kindergarten **Subject Area:** Math **Big Idea:** Geometry

Domain: Geometry

Domain Objectives:

Identify & describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders and spheres.

Analyze, compare, create and compose shapes.

Rationale: CCSS Content Statement	**Essential Questions**	**Enduring Understanding**
Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres). 1. Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as *above*, *below*, *beside*, *in front of*, *behind*, and *next to*. 2. Correctly name shapes regardless of their orientations or overall size. 3. Identify shapes as two-dimensional (lying in a plane, "flat") or three dimensional ("solid"). **Analyze, compare, create, and compose shapes.** 4. Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/"corners") and other attributes (e.g., having sides of equal length). 5. Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes. 6. Compose simple shapes to form larger shapes. *For example, "Can you join these two triangles with full sides touching to make a rectangle?"*	What is the name of this shape? How do you know what shape an object is? How is a shape like something you see every day? What position is the object in? How would you build with this	Identify shapes correctly. Shapes are classified according to their attributes. Use directional and positional vocabulary**.**

Mathematical Practices: #1,2,3,4,5,6,7

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.

Assessments: **What are you teaching toward?** Class discussions Teacher observations Projects Teacher made	**Suggested Activities:** **Lesson Plans/Daily Activities** Sort/classify shapes Build shapes with sticks, clay, etc. Draw or model shapes in the world using varied materials. Play Simon Says using positional words. Positional word booklets.	**Resources:** **To work toward assessment goal** Shapes (2D and 3D) Building materials Pattern blocks Blocks Booklets Geoboards Internet

21st Century Themes				
Global Awareness Literacy	**Financial, Economic, Business and Entrepreneurial Literacy**	**Civil Literacy**	**Health Literacy**	**Environmental Literacy**
21st Century Skills				
Creativity and Innovation *Think Creatively* • Use a wide range of idea creation techniques (such as brainstorming) • Create new and worthwhile ideas (both incremental and radical concepts) • Elaborate, refine, analyze and evaluate their own ideas in order to improve and maximize creative efforts *Work Creatively with Others* • Develop, implement and communicate new ideas to others effectively • Be open and responsive to new and diverse perspectives; incorporate group input and feedback into the work • Demonstrate originality and inventiveness in work and understand the real world limits to adopting new ideas • View failure as an opportunity to learn;	**Critical Thinking and Problem Solving** *Reason Effectively* • Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation *Use Systems Thinking* • Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems *Make Judgments and Decisions* • Effectively analyze and evaluate evidence, arguments, claims and beliefs • Analyze and evaluate major alternative points of view • Synthesize and make connections between	**Communication and Collaboration** *Communicate Clearly* • Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts • Listen effectively to decipher meaning, including knowledge, values, attitudes and intentions • Use communication for a range of purposes (e.g. to inform, instruct, motivate and persuade) • Utilize multiple media and technologies, and know how to judge their effectiveness a priori as well as assess their impact • Communicate effectively in diverse environments (including multi-lingual) *Collaborate with Others* • Demonstrate ability to work effectively and respectfully with diverse teams • Exercise flexibility and willingness to be helpful in	**Information Literacy** *Access and Evaluate Information* • Access information efficiently (time) and effectively (sources) • Evaluate information critically and competently *Use and Manage Information* • Use information accurately and creatively for the issue or problem at hand • Manage the flow of information from a wide variety of sources • Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information

understand that creativity and innovation is a long-term, cyclical process of small successes and frequent mistakes *Implement Innovations* • Act on creative ideas to make a tangible and useful contribution to the field in which the innovation will occur	information and arguments • Interpret information and draw conclusions based on the best analysis • Reflect critically on learning experiences and processes *Solve Problems* • Solve different kinds of non-familiar problems in both conventional and innovative ways • Identify and ask significant questions that clarify various points of view and lead to better solutions	making necessary compromises to accomplish a common goal • Assume shared responsibility for collaborative work, and value the individual contributions made by each team member	
Information, Communication and Technology Literacy	**Life and Career Skills** **Flexibility And Adaptability** • adapt to change • be flexible **Initiative And Self-Direction** • work independently • be self-directed learners **Social And Cross-Cultural Skills** • interact effectively with others • work effectively in diverse teams **Productivity And Accountability** • manage projects • produce results **Leadership And Responsibility** • guide and lead others • be responsible to others • act responsibly with the interests of the larger community in mind	**Interdisciplinary Connections**	**Media Literacy**

Grade Level: Kindergarten **Subject Area:** Math **Big Idea:** Number and Operations in Base Ten

Domain: Number and Operations in Base Ten

Domain Objectives:

Work with numbers 11-19 to gain foundations for place value

Rationale: **CCSS Content Statement**	**Essential Questions**	**Enduring Understanding**
Work with numbers 11–19 to gain foundations for place value. 1. Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (e.g., 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.	How many tens/ones are in a given number?	Numbers are composed of tens and ones.

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.

Assessments: **What are you teaching toward?** Class discussions Teacher observations Projects Teacher made	**Suggested Activities:** **Lesson Plans/Daily Activities** Number line activities Regrouping activities	**Resources:** **To work toward assessment goal** Manipulatives Number line Unifix cubes Base ten blocks Place value chart Internet Ten Frames

21st Century Themes				
Global Awareness Literacy	**Financial, Economic, Business and Entrepreneurial Literacy**	**Civil Literacy**	**Health Literacy**	**Environmental Literacy**
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frequent mistakes *Implement Innovations* • Act on creative ideas to make a tangible and useful contribution to the field in which the innovation will occur	experiences and processes *Solve Problems* • Solve different kinds of non-familiar problems in both conventional and innovative ways • Identify and ask significant questions that clarify various points of view and lead to better solutions	• Demonstrate ability to work effectively and respectfully with diverse teams • Exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal • Assume shared responsibility for collaborative work, and value the individual contributions made by each team member	
Information, Communication and Technology Literacy	**Life and Career Skills** **Flexibility And Adaptability** • adapt to change • be flexible **Initiative And Self-Direction** • work independently • be self-directed learners **Social And Cross-Cultural Skills** • interact effectively with others • work effectively in diverse teams **Productivity And Accountability** • manage projects • produce results **Leadership And Responsibility** • guide and lead others • be responsible to others • act responsibly with the interests of the larger community in mind	**Interdisciplinary Connections**	**Media Literacy**

Grade Level: Kindergarten **Subject Area:** Math **Big Idea:** Operations and Algebraic Thinking

Domain: Operations and Algebraic Thinking

Domain Objectives:

Understand concepts of addition and subtraction

Rationale: CCSS Content Statement	**Essential Questions**	**Enduring Understanding**
Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from. 1. Represent addition and subtraction with objects, fingers, mental images, drawings2, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations. 2. Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem. 3. Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1). 4. For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation. 5. Fluently add and subtract within 5.	How does addition change the amount? How does subtraction change the amount?	Addition will increase the amount. Subtraction will decrease the amount.

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.

Assessments: **What are you teaching toward?** Class discussions Teacher observations Projects Teacher made	**Suggested Activities:** **Lesson Plans/Daily Activities** Write/draw number sentences Number lines Touch math Solve addition/subtraction word problems Bowling	**Resources:** **To work toward assessment goal** Manipulatives Number lines Touch math Internet

21st Century Themes				
Global Awareness Literacy	**Financial, Economic, Business and Entrepreneurial Literacy**	**Civil Literacy**	**Health Literacy**	**Environmental Literacy**

21st Century Skills

Creativity and Innovation

Think Creatively

- Use a wide range of idea creation techniques (such as brainstorming)
- Create new and worthwhile ideas (both incremental and radical concepts)
- Elaborate, refine, analyze and evaluate their own ideas in order to improve and maximize creative efforts

Work Creatively with Others

- Develop, implement and communicate new ideas to others effectively
- Be open and responsive to new and diverse perspectives; incorporate group input and feedback into the work
- Demonstrate originality and inventiveness in work and understand the real world limits to adopting new ideas
- View failure as an opportunity to learn; understand that

Critical Thinking and Problem Solving

Reason Effectively

- Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation

Use Systems Thinking

- Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems

Make Judgments and Decisions

- Effectively analyze and evaluate evidence, arguments, claims and beliefs
- Analyze and evaluate major alternative points of view
- Synthesize and make connections between information and arguments
- Interpret information and draw conclusions based on

Communication and Collaboration

Communicate Clearly

- Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts
- Listen effectively to decipher meaning, including knowledge, values, attitudes and intentions
- Use communication for a range of purposes (e.g. to inform, instruct, motivate and persuade)
- Utilize multiple media and technologies, and know how to judge their effectiveness a priori as well as assess their impact
- Communicate effectively in diverse environments (including multi-lingual)

Collaborate with Others

- Demonstrate ability to work effectively and respectfully

Information Literacy

Access and Evaluate Information

- Access information efficiently (time) and effectively (sources)
- Evaluate information critically and competently

Use and Manage Information

- Use information accurately and creatively for the issue or problem at hand
- Manage the flow of information from a wide variety of sources
- Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information

creativity and innovation is a long-term, cyclical process of small successes and frequent mistakes *Implement Innovations* • Act on creative ideas to make a tangible and useful contribution to the field in which the innovation will occur	the best analysis • Reflect critically on learning experiences and processes *Solve Problems* • Solve different kinds of non-familiar problems in both conventional and innovative ways • Identify and ask significant questions that clarify various points of view and lead to better solutions	with diverse teams • Exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal • Assume shared responsibility for collaborative work, and value the individual contributions made by each team member	
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Grade Level: First **Subject:** Math **Big Idea:** Geometry		
Domain: Geometry **Domain Objectives:** Reason with shapes and their attributes		
Rationale: CCSS Content Standard	**Essential Questions**	**Enduring Understanding**
Reason with shapes and their attributes.		
1. Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.	How can you distinguish geometric properties?	Objects can be described and compared using their geometric attributes.
2. Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.4	How are geometric figures constructed?	Composing two and three dimensional shapes to create a composite shape
3. Partition circles and rectangles into two and four equal shares, describe the shares using the words *halves*, *fourths*, and *quarters*, and use the phrases *half of*, *fourth of*, and *quarter of*. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.	How can shapes be divided into equal parts?	Dividing and names equal parts of the whole
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.		

Assessments: **What are you teaching toward?** -class discussions -teacher observations - end of unit assessments -textbook -math journal -identification of shapes	**Suggested Activities:** **Lesson Plans/Daily Activities** **-**using manipulatives to model concepts -use technology (Smartboard/ACTIVBoard) -word problems -recognition of and drawing shapes -equal parts of shapes	**Resources:** **To work toward assessment goal** -math tools- two dimensional and three dimensional shapes, clay

21st Century Themes

Global Awareness Literacy

Financial, Economic, Business and Entrepreneurial Literacy

Knowing how to make appropriate personal economic choices

Civil Literacy

Exercising the rights and obligations of citizenship at local, state, national and global levels

Health Literacy

Environmental Literacy

• Demonstrate knowledge and understanding of the environment and the circumstances and conditions affecting it, particularly as relates to air, climate, land, food, energy, water and ecosystems
• Demonstrate knowledge and understanding of society's impact on the natural world

21st Century Skills

Creativity and Innovation

• Use a wide range of idea creation techniques (such as brainstorming)
• Create new and worthwhile ideas (both incremental and radical concepts)
• Elaborate, refine, analyze and evaluate their own ideas in order to improve and maximize creative efforts
• Develop, implement and communicate new ideas to others effectively
• Be open and responsive to new and diverse perspectives; incorporate group input and feedback into the work
• Demonstrate originality and inventiveness in work and understand the real world limits to adopting new ideas
• View failure as an opportunity to learn; understand that creativity and innovation is a long-term, cyclical process of small successes and frequent mistakes

Critical Thinking and Problem Solving

• Use various types of reasoning (inductive, deductive, etc.) as appropriate the situation
• Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems
• Interpret information and draw conclusions based on the best analysis
• Reflect critically on learning experiences and processes

Communication and Collaboration

• Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts
• Listen effectively to decipher meaning, including knowledge, values, attitudes and intentions
• Use communication for a range of purposes (e.g. to inform, instruct, motivate and persuade) • Demonstrate ability to work effectively and respectfully with diverse teams
• Exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal
• Assume shared responsibility for collaborative work, and value the individual contributions made by each team member

Information Literacy

Access and Evaluate Information

- Access information efficiently (time) and effectively (sources)
- Evaluate information critically and competently

Use and Manage Information

- Use information accurately and creatively for the issue or problem at hand
- Manage the flow of information from a wide variety of sources
- Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information

Information, Communication and Technology Literacy

- Use technology as a tool to research, organize, evaluate and communicate information
• Use digital technologies (computers, PDAs, media players, GPS, etc.), communication/networking tools and social networks appropriately to access, manage, integrate, evaluate and create information to successfully function in a knowledge economy

Life and Career Skills

Flexibility And Adaptability

- adapt to change
- be flexible

Initiative And Self-Direction

- work independently
- be self-directed learners

Social And Cross-Cultural Skills

- interact effectively with others
- work effectively in diverse teams

Productivity And Accountability

- manage projects
- produce results

Leadership And Responsibility

- guide and lead others
- be responsible to others
- act responsibly with the interests of the larger community in mind

Interdisciplinary Connections

Media Literacy

Grade Level: First **Subject:** Math **Big Idea:** Measurement and Data		
Domain: Measurement and Data **Domain Objectives:** Measure lengths indirectly and by iterating length units		
Rationale: CCSS Content Statement	**Essential Questions**	**Enduring Understanding**
Measure lengths indirectly and by iterating length units. 1. Order three objects by length; compare the lengths of two objects indirectly by using a third object.	How can you compare the length of objects?	Standard and non-standard units of measurement
2. Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. *Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.*	What are different ways to measure objects?	Understand that the length measurement of an object is the number of same size length units that span it.
Tell and write time		
3. Tell and write time in hours and half-hours using analog and digital clocks.	How do units within a system relate to each other?	Telling time hour and half hour using analog and digital clocks.
Represent and interpret data		
4. Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.	How can information be gathered, recorded, and organized?	Graphs convey data in a concise way
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.		

Assessments: **What are you teaching toward?** - class discussions -teacher observations -time tasks - end of unit assessments -textbook -math journal	**Suggested Activities:** **Lesson Plans/Daily Activities** using manipulatives to model concepts -use technology (Smartboard/ACTIVBoard) -word problems -standard and non-standard measurement tools	**Resources:** **To work toward assessment goal** Tools- rulers, non-standard measuring items, clocks, graphs,

21st Century Themes

Global Awareness Literacy	Financial, Economic, Business and Entrepreneurial Literacy	Civil Literacy	Health Literacy	Environmental Literacy
	• Knowing how to make appropriate personal economic choices	• Exercising the rights and obligations of citizenship at local, state, national and global levels	None applicable	• Demonstrate knowledge and understanding of the environment and the circumstances and conditions affecting it, particularly as relates to air, climate, land, food, energy, water and ecosystems • Demonstrate knowledge and understanding of society's impact on the natural world

21st Century Skills

Creativity and Innovation

• Use a wide range of idea creation techniques (such as brainstorming)
• Create new and worthwhile ideas (both incremental and radical concepts)
• Elaborate, refine, analyze and evaluate their own ideas in order to improve and maximize creative efforts
• Develop, implement and communicate new ideas to others effectively
• Be open and responsive to new and diverse perspectives; incorporate group input and feedback into the work
• Demonstrate originality and inventiveness in work and understand the real world limits to adopting new ideas
• View failure as an opportunity to learn; understand that creativity and innovation is a long-term, cyclical process of small successes and frequent mistakes

Critical Thinking and Problem Solving

• Use various types of reasoning (inductive, deductive, etc.) as appropriate the situation
• Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems
• Interpret information and draw conclusions based on the best analysis
• Reflect critically on learning experiences and processes

Communication and Collaboration

• Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts
• Listen effectively to decipher meaning, including knowledge, values, attitudes and intentions
• Use communication for a range of purposes (e.g. to inform, instruct, motivate and persuade) • Demonstrate ability to work effectively and respectfully with diverse teams
• Exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal
• Assume shared responsibility for collaborative work, and value the individual contributions made by each team member

Information Literacy

Access and Evaluate Information

- Access information efficiently (time) and effectively (sources)
- Evaluate information critically and competently

Use and Manage Information

- Use information accurately and creatively for the issue or problem at hand
- Manage the flow of information from a wide variety of sources
- Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information

Information, Communication and Technology Literacy

• Use technology as a tool to research, organize, evaluate and communicate information
• Use digital technologies (computers, PDAs, media players, GPS, etc.), communication/networking tools and social networks appropriately to access, manage, integrate, evaluate and create information to successfully function in a knowledge economy

Life and Career Skills

- Adapt to Change
- Be Flexible
- Manage Goals and Time
- Work Independently
- Be Self-directed Learners
- Interact Effectively with Others
- Work Effectively in Diverse Teams
- Manage Projects
- Produce Results
- Guide and Lead Others
- Be Responsible to Others

Interdisciplinary Connections

Media Literacy

None applicable

Grade Level: First **Subject:** Math **Big Idea:** Numbers and Operations in Base Ten		
Domain: Numbers and Operations in Base Ten **Domain Objectives:** Extend the counting sequence		
Rationale: CCSS Content Statement	**Essential Questions**	**Enduring Understanding**
Extend the counting sequence. 1. Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.	What are different ways to count and represent numerals to 120?	Counting and writing numbers to 120 starting at any number less than 120.
Understand place value		
2. Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases: a. 10 can be thought of as a bundle of ten ones — called a "ten." b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones. c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).	What are tens and ones?	Understanding the values of numbers in the place value positions of tens and ones
3. Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.	How can use symbols to compare two, two-digit numbers?	Using symbols >,<, = to show comparison of digits
Use place value understanding and properties of operations to add and subtract.		
4. Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction;	How can you add a two digit number and a one digit number within one hundred?	By using concrete models or drawing or strategies based on place value.

relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.		
5. Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.	What are efficient ways to count?	Mentally find 10 more or 10 less than the number.
6. Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), 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 and explain the reasoning used.	How can you use subtract multiples of 10 in the range 10-90?	Be able to write and explain the reasoning method using words, pictures and symbols.
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.		

Assessments: **What are you teaching toward?** -class discussions -teacher observations -time tasks - end of unit assessments -textbook -math journal	**Suggested Activities:** **Lesson Plans/Daily Activities** **-**using manipulatives to model concepts -use technology (Smartboard/ACTIVBoard) -word problems -computation	**Resources:** **To work toward assessment goal** -math tools- cubes, dice, counters, math boards, base ten blocks, 100 chart,

21st Century Themes

Global Awareness Literacy

Financial, Economic, Business and Entrepreneurial Literacy

• Knowing how to make appropriate personal economic choices

Civil Literacy

• Exercising the rights and obligations of citizenship at local, state, national and global levels

Health Literacy

None applicable

Environmental Literacy

• Demonstrate knowledge and understanding of the environment and the circumstances and conditions affecting it, particularly as relates to air, climate, land, food, energy, water and ecosystems
• Demonstrate knowledge and understanding of society's impact on the natural world

21st Century Skills

Creativity and Innovation

• Use a wide range of idea creation techniques (such as brainstorming)
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Critical Thinking and Problem Solving

• Use various types of reasoning (inductive, deductive, etc.) as appropriate the situation
• Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems
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• Demonstrate ability to work effectively and respectfully with diverse teams
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Information Literacy

Access and Evaluate Information

- Access information efficiently (time) and effectively (sources)
- Evaluate information critically and competently

Use and Manage Information

- Use information accurately and creatively for the issue or problem at hand
- Manage the flow of information from a wide variety of sources
- Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information

Information, Communication and Technology Literacy

- Use technology as a tool to research, organize, evaluate and communicate information

• Use digital technologies (computers, PDAs, media players, GPS, etc.), communication/networking tools and social networks appropriately to access, manage, integrate, evaluate and create information to successfully function in a knowledge economy

Life and Career Skills

- Adapt to Change
- Be Flexible
- Manage Goals and Time
- Work Independently
- Be Self-directed Learners
- Interact Effectively with Others
- Work Effectively in Diverse Teams
- Manage Projects
- Produce Results
- Guide and Lead Others
- Be Responsible to Others

Interdisciplinary Connections

Media Literacy

None applicable

Grade Level: First **Subject:** Math **Big Idea:** Operations and Algebraic Thinking

Domain: Operations and Algebraic Thinking

Domain Objectives:

Represent and solve problems involving addition and subtraction

Rationale: CCSS Content Statement	**Essential Questions**	**Enduring Understanding**
Represent and solve problems involving addition and subtraction.		
1. Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.	What strategies can be used to solve for unknowns within 20?	Use a variety of objects, drawings and equations with symbols for unknown numbers to represent the problem.
2. Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.	What strategies can be used to solve word problems of three whole numbers whose sum is equal to or less than 20?	Use drawings, objects, and equations with a symbol
Understand and apply properties of operations and the relationship between addition and subtraction		
3. Apply properties of operations as strategies to add and subtract.[3] *Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known. (Commutative property of addition.) To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12. (Associative property of addition.)*	How are addition and subtraction related to one another?	Computation involves taking apart and combining numbers using a variety of approaches. (Associative/commutative properties)
4. Understand subtraction as an unknown-addend problem. *For example, subtract 10 – 8 by finding the number that make 10 when added to 8.*	How can you use the identity property of addition and subtraction?	Proficiency of basic facts aids computation of numbers (related facts) Fact Families
Add and subtract within 20		
5. Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).	What are different ways to count?	By counting on we can solve addition and subtraction problems.
6. Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 – 4 = 13 – 3 – 1 = 10 – 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 – 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13).	What are efficient methods for finding sums and differences fluently within 20?	By counting on, making ten, decomposing a number leading to a ten, relating facts, and creating equivalent sums.

Work with addition and subtraction equations		
7. Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. *For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 – 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2.*	Why does an equation need an equal sign?	An equal sign is need to show the equivalence of both sides of an equation
8. Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations 8 +? = 11, 5 = □ – 3, 6 + 6 = □.*	How can you find the missing numbers in 3 whole number equation?	Determine that unknown numbers that make the equation true.
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.		

Assessments: **What are you teaching toward?** -class discussions -teacher observations -time tasks - end of unit assessments -textbook -math journal	**Suggested Activities:** **Lesson Plans/Daily Activities** **-**using manipulatives to model concepts -use technology (Smartboard/ACTIVBoard) -word problems -computation	**Resources:** **To work toward assessment goal** -math tools- cubes, dice, counters, math boards, etc..

21st Century Themes

Global Awareness Literacy	Financial, Economic, Business and Entrepreneurial Literacy	Civil Literacy	Health Literacy	Environmental Literacy
	• Knowing how to make appropriate personal economic choices	• Exercising the rights and obligations of citizenship at local, state, national and global levels	None applicable	• Demonstrate knowledge and understanding of the environment and the circumstances and conditions affecting it, particularly as relates to air, climate, land, food, energy, water and ecosystems • Demonstrate knowledge and understanding of society's impact on the natural world

21st Century Skills

Creativity and Innovation

• Use a wide range of idea creation techniques (such as brainstorming)
• Create new and worthwhile ideas (both incremental and radical concepts)
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Critical Thinking and Problem Solving

• Use various types of reasoning (inductive, deductive, etc.) as appropriate the situation
• Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems
• Interpret information and draw conclusions based on the best analysis
• Reflect critically on learning experiences and processes

Communication and Collaboration

• Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts
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• Demonstrate ability to work effectively and respectfully with diverse teams
• Exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal
• Assume shared responsibility for collaborative work, and value the individual contributions made by each team member

Information Literacy

Access and Evaluate Information

- Access information efficiently (time) and effectively (sources)
- Evaluate information critically and competently

Use and Manage Information

- Use information accurately and creatively for the issue or problem at hand
- Manage the flow of information from a wide variety of sources
- Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information

Information, Communication and Technology Literacy

- Use technology as a tool to research, organize, evaluate and communicate information

• Use digital technologies (computers, PDAs, media players, GPS, etc.), communication/networking tools and social networks appropriately to access, manage, integrate, evaluate and create information to successfully function in a knowledge economy

Life and Career Skills

- Adapt to Change
- Be Flexible
- Manage Goals and Time
- Work Independently
- Be Self-directed Learners
- Interact Effectively with Others
- Work Effectively in Diverse Teams
- Manage Projects
- Produce Results
- Guide and Lead Others
- Be Responsible to Others

Interdisciplinary Connections

Media Literacy

None applicable

Grade Level: Second **Subject Area:** Math **Big Idea:** Number and Operations in Base Ten

Domain: Number and Operations in Base Ten

Domain Objectives:

Understand place value.

Use place value understanding and properties of operations to add and subtract

Rationale: CCSS Content Statement

	Essential Questions	**Enduring Understanding**
Use place value understanding and properties of operations to add and subtract. 5. Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.	How does the position of a digit in a number affect its value? How are place value patterns repeated in numbers? How can place value properties aid in computation?	Place value is based on groups of ten.
6. Add up to four two-digit numbers using strategies based on place value and properties of operations.	How does the position of a digit in a number affect its value? How can place value properties aid in computation? What are efficient methods of finding sums and differences?	Place value is based on groups of ten. Computation involves taking apart and combining numbers using a variety of approaches. Flexible methods of computation involve grouping numbers in strategic ways Proficiency with basic facts aids estimation and computation of larger and smaller numbers.
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. 8. Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900. 9. Explain why addition and subtraction strategies work, using place value and the properties of operations.[3]	What are different methods of and models for addition and subtraction? What problems can be answered using addition and/or subtraction?	Computation involves taking apart and combining numbers using a variety of approaches. Flexible methods of computation involve grouping numbers in strategic ways Proficiency with basic facts aids estimation and computation of larger and smaller numbers

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.

Assessments: **What are you teaching toward?** Class Projects Performance Tasks Tests Teacher-Generated Written Response Tasks	**Suggested Activities:** **Lesson Plans/Daily Activities**	**Resources:** **To work toward assessment goal** Scott Foresman Mathematics 2nd Grade Houghton Mifflin Mathematics 2nd grade Touch Money Touch Math Website List: www.abcya.com www.aplusmath.com www.brainpopjr.com www.coolmath.com www.coolmath4kids.com www.cool-mathgames.com www.funbrain.com www.fuelthebrain.com www.gamepuzzles.com www.kidsnumbers.com www.primarygames.com

21st Century Themes					
Global Awareness Literacy Using 21st century skills to understand and address global issues	**Financial, Economic, Business and Entrepreneurial Literacy**	**Civil Literacy**	**Health Literacy**	**Environmental Literacy**	**Global Aware**

21st Century Skills			
Creativity and Innovation Think Creatively Work Creatively with Others	**Critical Thinking and Problem Solving** Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation	**Communication and Collaboration** Communicate Clearly Collaborate with Others	**Information Literacy**
Information, Communication and Technology Literacy Accessing and managing information. Evaluating, managing, and analyzing information. Understanding, managing, and creating effective communication; orally, written, or using multimedia.	**Life and Career Skills** Interact Effectively with Others	**Interdisciplinary Connections**	**Media Literacy** Accessing and managing information. Evaluating, managing, and analyzing information. Understanding, managing, and creating effective communication; orally, written, or using multimedia.

Grade Level: Second **Subject Area:** Math **Big Idea:** Geometry

Domain: Geometry
Domain Objective:
Reason with shapes and their attributes.

Rationale: CCSS Content Standard		
Reason with shapes and their attributes. 1. Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.5 Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. 2. Partition a rectangle into rows and columns of same-size squares and count to find the total number of them. 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.	**Essential Questions** How are geometric properties used to solve problems in everyday life? How can plane and solid shapes be described? How are geometric figures constructed? How can fractions be modeled?	**Enduring Understanding** Objects can be described and compared using their geometric attributes. Points, lines, and planes are the foundations of geometry. Fractions express a relationship between two numbers.

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.

Assessments: **What are you teaching toward?** Class Projects Performance Tasks Tests Teacher-Generated Written Response Tasks	**Suggested Activities:** **Lesson Plans/Daily Activities**	**Resources:** **To work toward assessment goal** Scott Foresman Mathematics 2nd Grade Houghton Mifflin Mathematics 2nd grade Touch Money Touch Math Website List: www.abcya.com www.aplusmath.com www.brainpopjr.com www.coolmath.com www.coolmath4kids.com www.cool-mathgames.com www.funbrain.com www.fuelthebrain.com www.gamepuzzles.com www.kidsnumbers.com www.primarygames.com

21st Century Themes				
Global Awareness Literacy Using 21st century skills to understand and address global issues	**Financial, Economic, Business and Entrepreneurial Literacy**	**Civil Literacy**	**Health Literacy**	**Environmental Literacy**

21st Century Skills			
Creativity and Innovation Think Creatively Work Creatively with Others	**Critical Thinking and Problem Solving** Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation	**Communication and Collaboration** Communicate Clearly Collaborate with Others	**Information Literacy**
Information, Communication and Technology Literacy Accessing and managing information. Evaluating, managing, and analyzing information. Understanding, managing, and creating effective communication; orally, written, or using multimedia.	**Life and Career Skills** Interact Effectively with Others	**Interdisciplinary Connections**	**Media Literacy** Accessing and managing information. Evaluating, managing, and analyzing information. Understanding, managing, and creating effective communication; orally, written, or using multimedia.

Grade Level: Second **Subject Area:** Math **Big Idea:** Number and Operations in Base Ten

Domain: Number and Operations in Base Ten

Domain Objectives:

Understand place value.

Use place value understanding and properties of operations to add and subtract

Rationale: CCSS Content Statement

Understand place value.	**Essential Questions**	**Enduring Understanding**
1. Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases: a. 100 can be thought of as a bundle of ten tens — called a "hundred." b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).	How does the position of a digit in a number affect its value?	Place value is based on groups of ten.
	How does the position of a digit in a number affect its value?	Place value is based on groups of ten.
	In what ways can numbers be composed and decomposed?	Numbers can be expanded or renamed.
2. Count within 1000; skip-count by 5s, 10s, and 100s. 3. Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.	What are different ways to count within 1000?	Counting all, counting on, skip-counting, and counting groups are ways to count within 1000.
4. Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.	How can number relationships of three-digit numbers be expressed symbolically?	Symbols (<, >, =) can be used to record the results of comparisons.

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.

Assessments: **What are you teaching toward?** Class Projects Performance Tasks Tests Teacher-Generated Written Response Tasks	**Suggested Activities:** **Lesson Plans/Daily Activities**	**Resources:** **To work toward assessment goal** Scott Foresman Mathematics 2nd Grade Houghton Mifflin Mathematics 2nd grade Touch Money Touch Math Website List: www.abcya.com www.aplusmath.com www.brainpopjr.com www.coolmath.com www.coolmath4kids.com www.cool-mathgames.com www.funbrain.com www.fuelthebrain.com www.gamepuzzles.com www.kidsnumbers.com www.primarygames.com

21st Century Themes					
Global Awareness Literacy Using 21st century skills to understand and address global issues	**Financial, Economic, Business and Entrepreneurial Literacy**	**Civil Literacy**	**Health Literacy**	**Environmental Literacy**	**Global Aware**

21st Century Skills			
Creativity and Innovation Think Creatively Work Creatively with Others	**Critical Thinking and Problem Solving** Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation	**Communication and Collaboration** Communicate Clearly Collaborate with Others	**Information Literacy**
Information, Communication and Technology Literacy Accessing and managing information. Evaluating, managing, and analyzing information. Understanding, managing, and creating effective communication; orally, written, or using multimedia.	**Life and Career Skills** Interact Effectively with Others	**Interdisciplinary Connections**	**Media Literacy** Accessing and managing information. Evaluating, managing, and analyzing information. Understanding, managing, and creating effective communication; orally, written, or using multimedia.

Grade Level: Second **Subject Area:** Math **Big Idea:** Operations and Algebraic Thinking		
Domain: Operations and Algebraic Thinking **Domain Objectives:** Represent and solve problems involving addition and subtraction. Add and subtract within 20. Work with equal groups of objects to gain foundations for multiplication.		
Rationale: CCSS Content Standards		
Represent and solve problems involving addition and subtraction.	**Essential Questions**	**Enduring Understanding**
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.	What strategies can be used to solve addition and subtraction problems for unknowns within 100?	Drawings and equations can be used to solve addition and subtraction problems for unknowns within 100.
Add and subtract within 20. 2. Fluently add and subtract within 20 using mental strategies.2 By end of Grade 2, know from memory all sums of two one-digit numbers.	What are efficient methods for finding sums and differences within 20?	Know from memory the all sums of two one-digit numbers.
Work with equal groups of objects to gain foundations for multiplication. 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.	What are strategies for determining whether a number is odd or even? When will the sum of two addends always equal an even number?	Pairing objects or counting them by 2's can be used to determine whether a number is odd or even. Adding two equal addends will always equal an even number.
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.	What model can be used to find a total number of objects to 25?	A rectangular array with up to 5 rows and 5 columns can be used to find the total number objects and to write an equation to express the total as a sum.

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Creativity and Innovation *Think Creatively* *Work Creatively with Others*	**Critical Thinking and Problem Solving** Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation	**Communication and Collaboration** *Communicate Clearly* *Collaborate with Others*	**Information Literacy**
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Grade Level: Second **Subject Area:** Math **Big Idea:** Measurement and Data

Domain: Measurement and Data

Domain Objectives:

Measure and estimate lengths in standard units.
Relate addition and subtraction to length.
Work with time and money.
Represent and interpret data.

Rationale: CCSS Content Statement

<table>
<tr><th>Measure and estimate lengths in standard units.</th><th>Essential Questions</th><th>Enduring Understanding</th></tr>
<tr><td rowspan="4">1. Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
2. Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.
3. Estimate lengths using units of inches, feet, centimeters, and meters.
4. Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.</td><td>What types of problems are solved with measurement?</td><td rowspan="8">Objects have distinct attributes that can be measured.

Standard units provide common language for communication measurements.

The choice of measurement tools depends on the measurable attribute and the degree of precision required.

The quality of the question used impacts the data collected and the validity of the results.

Graphs convey data in a concise way.</td></tr>
<tr><td>What are tools of measurement and how are they used?</td></tr>
<tr><td>What is the purpose of standard units of measurement?</td></tr>
<tr><td></td></tr>
<tr><td>Relate addition and subtraction to length.
5. Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.

6. Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, and represent whole-number sums and differences within 100 on a number line diagram.</td><td>How do units within a system relate to each other?</td></tr>
<tr><td>Represent and interpret data.
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</td><td>When is an estimate more appropriate than a measurement?

What strategies help estimate measurements?</td></tr>
</table>

making a line plot, where the horizontal scale is marked off in whole number units.		
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 problems4 using information presented in a bar graph.	How can information be gathered, recorded, and organized?	
	How does the type of data influence the choice of display?	
	What aspects of a graph help people understand and interpret the data easily?	
	What kind of questions can and cannot be answered from a graph?	

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Grade Level: Second **Subject Area:** Math **Big Idea:** Measurement and Data

Domain: Measurement and Data
Domain Objectives:
Work with time and money.

Rationale: CCSS Content Statement

	Essential Questions	**Enduring Understanding**
Work with time and money 7. Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.	What types of problems are solved with measurement? What are tools of measurement and how are they used? How do units within a system relate to each other?	Objects have distinct attributes that can be measured Standard units provide common language for communication measurements The choice of measurement tools depends on the measurable attribute and degree of precision desired.
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?*	What types of problems are solved with measurement? What are tools of measurement and how are they used? How do units within a system relate to each other?	Objects have distinct attributes that can be measured Standard units provide common language for communication measurements The choice of measurement tools depends on the measurable attribute and degree of precision desired.

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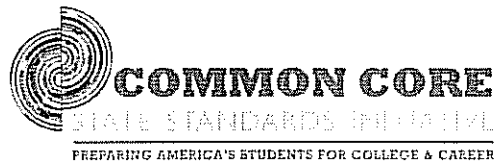
COMMON CORE STATE STANDARDS FOR

Mathematics



Introduction

Toward greater focus and coherence

> *Mathematics experiences in early childhood settings should concentrate on (1) number (which includes whole number, operations, and relations) and (2) geometry, spatial relations, and measurement, with more mathematics learning time devoted to number than to other topics. Mathematical process goals should be integrated in these content areas.*
>
> — Mathematics Learning in Early Childhood, National Research Council, 2009

> *The composite standards [of Hong Kong, Korea and Singapore] have a number of features that can inform an international benchmarking process for the development of K–6 mathematics standards in the U.S. First, the composite standards concentrate the early learning of mathematics on the number, measurement, and geometry strands with less emphasis on data analysis and little exposure to algebra. The Hong Kong standards for grades 1–3 devote approximately half the targeted time to numbers and almost all the time remaining to geometry and measurement.*
>
> — Ginsburg, Leinwand and Decker, 2009

> *Because the mathematics concepts in [U.S.] textbooks are often weak, the presentation becomes more mechanical than is ideal. We looked at both traditional and non-traditional textbooks used in the US and found this conceptual weakness in both.*
>
> — Ginsburg et al., 2005

> *There are many ways to organize curricula. The challenge, now rarely met, is to avoid those that distort mathematics and turn off students.*
>
> — Steen, 2007

For over a decade, research studies of mathematics education in high-performing countries have pointed to the conclusion that the mathematics curriculum in the United States must become substantially more focused and coherent in order to improve mathematics achievement in this country. To deliver on the promise of common standards, the standards must address the problem of a curriculum that is "a mile wide and an inch deep." These Standards are a substantial answer to that challenge.

It is important to recognize that "fewer standards" are no substitute for focused standards. Achieving "fewer standards" would be easy to do by resorting to broad, general statements. Instead, these Standards aim for clarity and specificity.

Assessing the coherence of a set of standards is more difficult than assessing their focus. William Schmidt and Richard Houang (2002) have said that content standards and curricula are coherent if they are:

> *articulated over time as a sequence of topics and performances that are logical and reflect, where appropriate, the sequential or hierarchical nature of the disciplinary content from which the subject matter derives. That is, what and how students are taught should reflect not only the topics that fall within a certain academic discipline, **but also the key ideas** that determine how knowledge is organized and generated within that discipline. This implies*

> *that to be coherent, a set of content standards must evolve from particulars (e.g., the meaning and operations of whole numbers, including simple math facts and routine computational procedures associated with whole numbers and fractions) to deeper structures inherent in the discipline. These deeper structures then serve as a means for connecting the particulars (such as an understanding of the rational number system and its properties).* (emphasis added)

These Standards endeavor to follow such a design, not only by stressing conceptual understanding of key ideas, but also by continually returning to organizing principles such as place value or the properties of operations to structure those ideas.

In addition, the "sequence of topics and performances" that is outlined in a body of mathematics standards must also respect what is known about how students learn. As Confrey (2007) points out, developing "sequenced obstacles and challenges for students...absent the insights about meaning that derive from careful study of learning, would be unfortunate and unwise." In recognition of this, the development of these Standards began with research-based learning progressions detailing what is known today about how students' mathematical knowledge, skill, and understanding develop over time.

Understanding mathematics

These Standards define what students should understand and be able to do in their study of mathematics. Asking a student to understand something means asking a teacher to assess whether the student has understood it. But what does mathematical understanding look like? One hallmark of mathematical understanding is the ability to justify, in a way appropriate to the student's mathematical maturity, *why* a particular mathematical statement is true or where a mathematical rule comes from. There is a world of difference between a student who can summon a mnemonic device to expand a product such as $(a + b)(x + y)$ and a student who can explain where the mnemonic comes from. The student who can explain the rule understands the mathematics, and may have a better chance to succeed at a less familiar task such as expanding $(a + b + c)(x + y)$. Mathematical understanding and procedural skill are equally important, and both are assessable using mathematical tasks of sufficient richness.

The Standards set grade-specific standards but do not define the intervention methods or materials necessary to support students who are well below or well above grade-level expectations. It is also beyond the scope of the Standards to define the full range of supports appropriate for English language learners and for students with special needs. At the same time, all students must have the opportunity to learn and meet the same high standards if they are to access the knowledge and skills necessary in their post-school lives. The Standards should be read as allowing for the widest possible range of students to participate fully from the outset, along with appropriate accommodations to ensure maximum participaton of students with special education needs. For example, for students with disabilities reading should allow for use of Braille, screen reader technology, or other assistive devices, while writing should include the use of a scribe, computer, or speech-to-text technology. In a similar vein, speaking and listening should be interpreted broadly to include sign language. No set of grade-specific standards can fully reflect the great variety in abilities, needs, learning rates, and achievement levels of students in any given classroom. However, the Standards do provide clear signposts along the way to the goal of college and career readiness for all students.

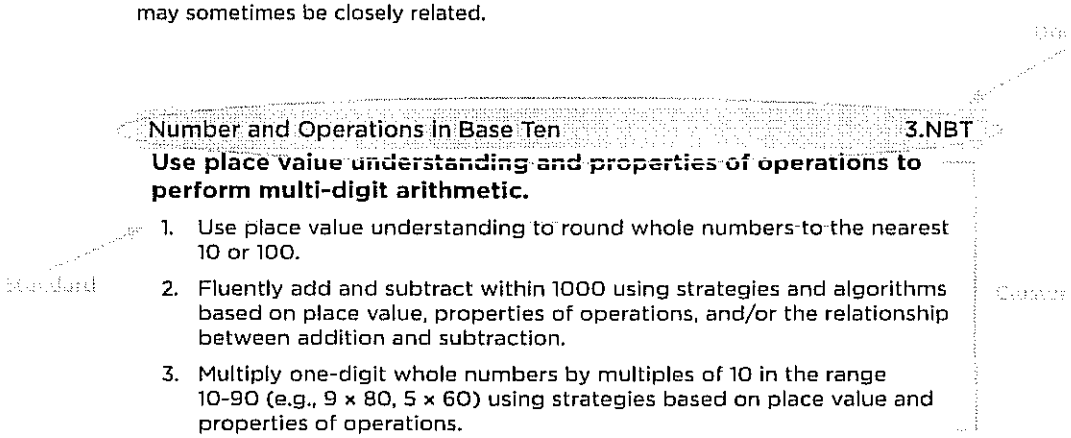
The Standards begin on page 6 with eight Standards for Mathematical Practice.

How to read the grade level standards

Standards define what students should understand and be able to do.

Clusters are groups of related standards. Note that standards from different clusters may sometimes be closely related, because mathematics is a connected subject.

Domains are larger groups of related standards. Standards from different domains may sometimes be closely related.



These Standards do not dictate curriculum or teaching methods. For example, just because topic A appears before topic B in the standards for a given grade, it does not necessarily mean that topic A must be taught before topic B. A teacher might prefer to teach topic B before topic A, or might choose to highlight connections by teaching topic A and topic B at the same time. Or, a teacher might prefer to teach a topic of his or her own choosing that leads, as a byproduct, to students reaching the standards for topics A and B.

What students can learn at any particular grade level depends upon what they have learned before. Ideally then, each standard in this document might have been phrased in the form, "Students who already know ... should next come to learn ...." But at present this approach is unrealistic—not least because existing education research cannot specify all such learning pathways. Of necessity therefore, grade placements for specific topics have been made on the basis of state and international comparisons and the collective experience and collective professional judgment of educators, researchers and mathematicians. One promise of common state standards is that over time they will allow research on learning progressions to inform and improve the design of standards to a much greater extent than is possible today. Learning opportunities will continue to vary across schools and school systems, and educators should make every effort to meet the needs of individual students based on their current understanding.

These Standards are not intended to be new names for old ways of doing business. They are a call to take the next step. It is time for states to work together to build on lessons learned from two decades of standards based reforms. It is time to recognize that standards are not just promises to our children, but promises we intend to keep.

Mathematics | Standards for Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council's report *Adding It Up*: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy).

1 Make sense of problems and persevere in solving them.
Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

2 Reason abstractly and quantitatively.
Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to *contextualize*, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

3 Construct viable arguments and critique the reasoning of others.
Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions,

communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

4 Model with mathematics.
Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

5 Use appropriate tools strategically.
Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

6 Attend to precision.
Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.

7 Look for and make use of structure.
Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7×8 equals the well remembered $7 \times 5 + 7 \times 3$, in preparation for learning about the distributive property. In the expression $x^2 + 9x + 14$, older students can see the 14 as 2×7 and the 9 as $2 + 7$. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 - 3(x - y)^2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y.

8 Look for and express regularity in repeated reasoning.
Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation $(y - 2)/(x - 1) = 3$. Noticing the regularity in the way terms cancel when expanding $(x - 1)(x + 1)$, $(x - 1)(x^2 + x + 1)$, and $(x - 1)(x^3 + x^2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

Connecting the Standards for Mathematical Practice to the Standards for Mathematical Content
The Standards for Mathematical Practice describe ways in which developing student practitioners of the discipline of mathematics increasingly ought to engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle and high school years. Designers of curricula, assessments, and professional development should all attend to the need to connect the mathematical practices to mathematical content in mathematics instruction.

The Standards for Mathematical Content are a balanced combination of procedure and understanding. Expectations that begin with the word "understand" are often especially good opportunities to connect the practices to the content. Students who lack understanding of a topic may rely on procedures too heavily. Without a flexible base from which to work, they may be less likely to consider analogous problems, represent problems coherently, justify conclusions, apply the mathematics to practical situations, use technology mindfully to work with the mathematics, explain the mathematics accurately to other students, step back for an overview, or deviate from a known procedure to find a shortcut. In short, a lack of understanding effectively prevents a student from engaging in the mathematical practices.

In this respect, those content standards which set an expectation of understanding are potential "points of intersection" between the Standards for Mathematical Content and the Standards for Mathematical Practice. These points of intersection are intended to be weighted toward central and generative concepts in the school mathematics curriculum that most merit the time, resources, innovative energies, and focus necessary to qualitatively improve the curriculum, instruction, assessment, professional development, and student achievement in mathematics.

Mathematics | Kindergarten

In Kindergarten, instructional time should focus on two critical areas: (1) representing, relating, and operating on whole numbers, initially with sets of objects; (2) describing shapes and space. More learning time in Kindergarten should be devoted to number than to other topics.

(1) Students use numbers, including written numerals, to represent quantities and to solve quantitative problems, such as counting objects in a set; counting out a given number of objects; comparing sets or numerals; and modeling simple joining and separating situations with sets of objects, or eventually with equations such as 5 + 2 = 7 and 7 − 2 = 5. (Kindergarten students should see addition and subtraction equations, and student writing of equations in kindergarten is encouraged, but it is not required.) Students choose, combine, and apply effective strategies for answering quantitative questions, including quickly recognizing the cardinalities of small sets of objects, counting and producing sets of given sizes, counting the number of objects in combined sets, or counting the number of objects that remain in a set after some are taken away.

(2) Students describe their physical world using geometric ideas (e.g., shape, orientation, spatial relations) and vocabulary. They identify, name, and describe basic two-dimensional shapes, such as squares, triangles, circles, rectangles, and hexagons, presented in a variety of ways (e.g., with different sizes and orientations), as well as three-dimensional shapes such as cubes, cones, cylinders, and spheres. They use basic shapes and spatial reasoning to model objects in their environment and to construct more complex shapes.

Grade K Overview

Counting and Cardinality

- Know number names and the count sequence.
- Count to tell the number of objects.
- Compare numbers.

Operations and Algebraic Thinking

- Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

Number and Operations in Base Ten

- Work with numbers 11–19 to gain foundations for place value.

Measurement and Data

- Describe and compare measurable attributes.
- Classify objects and count the number of objects in categories.

Geometry

- Identify and describe shapes.
- Analyze, compare, create, and compose shapes.

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.

Counting and Cardinality — K.CC

Know number names and the count sequence.

1. Count to 100 by ones and by tens.
2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).
3. Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).

Count to tell the number of objects.

4. Understand the relationship between numbers and quantities; connect counting to cardinality.
   a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.
   b. Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.
   c. Understand that each successive number name refers to a quantity that is one larger.
5. Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects.

Compare numbers.

6. Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.[1]
7. Compare two numbers between 1 and 10 presented as written numerals.

Operations and Algebraic Thinking — K.OA

Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

1. Represent addition and subtraction with objects, fingers, mental images, drawings[2], sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.
2. Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.
3. Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).
4. For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.
5. Fluently add and subtract within 5.

[1]Include groups with up to ten objects.
[2]Drawings need not show details, but should show the mathematics in the problem. (This applies wherever drawings are mentioned in the Standards.)

Number and Operations in Base Ten — K.NBT

Work with numbers 11–19 to gain foundations for place value.

1. Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (e.g., 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.

Measurement and Data — K.MD

Describe and compare measurable attributes.

1. Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.
2. Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter.*

Classify objects and count the number of objects in each category.

3. Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.[3]

Geometry — K.G

Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).

1. Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as *above*, *below*, *beside*, *in front of*, *behind*, and *next to*.
2. Correctly name shapes regardless of their orientations or overall size.
3. Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").

Analyze, compare, create, and compose shapes.

4. Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/"corners") and other attributes (e.g., having sides of equal length).
5. Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.
6. Compose simple shapes to form larger shapes. *For example, "Can you join these two triangles with full sides touching to make a rectangle?"*

[3]Limit category counts to be less than or equal to 10.

Mathematics | Grade 1

In Grade 1, instructional time should focus on four critical areas: (1) developing understanding of addition, subtraction, and strategies for addition and subtraction within 20; (2) developing understanding of whole number relationships and place value, including grouping in tens and ones; (3) developing understanding of linear measurement and measuring lengths as iterating length units; and (4) reasoning about attributes of, and composing and decomposing geometric shapes.

(1) Students develop strategies for adding and subtracting whole numbers based on their prior work with small numbers. They use a variety of models, including discrete objects and length-based models (e.g., cubes connected to form lengths), to model add-to, take-from, put-together, take-apart, and compare situations to develop meaning for the operations of addition and subtraction, and to develop strategies to solve arithmetic problems with these operations. Students understand connections between counting and addition and subtraction (e.g., adding two is the same as counting on two). They use properties of addition to add whole numbers and to create and use increasingly sophisticated strategies based on these properties (e.g., "making tens") to solve addition and subtraction problems within 20. By comparing a variety of solution strategies, children build their understanding of the relationship between addition and subtraction.

(2) Students develop, discuss, and use efficient, accurate, and generalizable methods to add within 100 and subtract multiples of 10. They compare whole numbers (at least to 100) to develop understanding of and solve problems involving their relative sizes. They think of whole numbers between 10 and 100 in terms of tens and ones (especially recognizing the numbers 11 to 19 as composed of a ten and some ones). Through activities that build number sense, they understand the order of the counting numbers and their relative magnitudes.

(3) Students develop an understanding of the meaning and processes of measurement, including underlying concepts such as iterating (the mental activity of building up the length of an object with equal-sized units) and the transitivity principle for indirect measurement.[1]

(4) Students compose and decompose plane or solid figures (e.g., put two triangles together to make a quadrilateral) and build understanding of part-whole relationships as well as the properties of the original and composite shapes. As they combine shapes, they recognize them from different perspectives and orientations, describe their geometric attributes, and determine how they are alike and different, to develop the background for measurement and for initial understandings of properties such as congruence and symmetry.

[1]Students should apply the principle of transitivity of measurement to make indirect comparisons, but they need not use this technical term.

Grade 1 Overview

Operations and Algebraic Thinking

- Represent and solve problems involving addition and subtraction.
- Understand and apply properties of operations and the relationship between addition and subtraction.
- Add and subtract within 20.
- Work with addition and subtraction equations.

Number and Operations in Base Ten

- Extend the counting sequence.
- Understand place value.
- Use place value understanding and properties of operations to add and subtract.

Measurement and Data

- Measure lengths indirectly and by iterating length units.
- Tell and write time.
- Represent and interpret data.

Geometry

- Reason with shapes and their attributes.

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.

Operations and Algebraic Thinking 1.OA

Represent and solve problems involving addition and subtraction.

1. Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.[2]
2. Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

Understand and apply properties of operations and the relationship between addition and subtraction.

3. Apply properties of operations as strategies to add and subtract.[3] *Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known. (Commutative property of addition.) To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12. (Associative property of addition.)*
4. Understand subtraction as an unknown-addend problem. *For example, subtract 10 - 8 by finding the number that makes 10 when added to 8.*

Add and subtract within 20.

5. Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).
6. Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 - 4 = 13 - 3 - 1 = 10 - 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 - 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13).

Work with addition and subtraction equations.

7. Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. *For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 - 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2.*
8. Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations 8 + ? = 11, 5 = □ - 3, 6 + 6 = □.*

Number and Operations in Base Ten 1.NBT

Extend the counting sequence.

1. Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.

Understand place value.

2. Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:
   a. 10 can be thought of as a bundle of ten ones — called a "ten."
   b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
   c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

[2]See Glossary, Table 1.
[3]Students need not use formal terms for these properties.

3. Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.

Use place value understanding and properties of operations to add and subtract.

4. Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, 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 and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.
5. Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.
6. Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), 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 and explain the reasoning used.

Measurement and Data - 1.MD

Measure lengths indirectly and by iterating length units.

1. Order three objects by length; compare the lengths of two objects indirectly by using a third object.
2. Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. *Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.*

Tell and write time.

3. Tell and write time in hours and half-hours using analog and digital clocks.

Represent and interpret data.

4. Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

Geometry 1.G

Reason with shapes and their attributes.

1. Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.
2. Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.[4]
3. Partition circles and rectangles into two and four equal shares, describe the shares using the words *halves*, *fourths*, and *quarters*, and use the phrases *half of*, *fourth of*, and *quarter of*. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.

[4]Students do not need to learn formal names such as "right rectangular prism."

Mathematics | Grade 2

In Grade 2, 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.

Grade 2 Overview

Operations and Algebraic Thinking

- Represent and solve problems involving addition and subtraction.
- Add and subtract within 20.
- Work with equal groups of objects to gain foundations for multiplication.

Number and Operations in Base Ten

- Understand place value.
- Use place value understanding and properties of operations to add and subtract.

Measurement and Data

- Measure and estimate lengths in standard units.
- Relate addition and subtraction to length.
- Work with time and money.
- Represent and interpret data.

Geometry

- Reason with shapes and their attributes.

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.

Operations and Algebraic Thinking 2.OA

Represent and solve problems involving addition and subtraction.

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.[1]

Add and subtract within 20.

2. Fluently add and subtract within 20 using mental strategies.[2] By end of Grade 2, know from memory all sums of two one-digit numbers.

Work with equal groups of objects to gain foundations for multiplication.

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.
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.

Number and Operations in Base Ten 2.NBT

Understand place value.

1. Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:
   a. 100 can be thought of as a bundle of ten tens — called a "hundred."
   b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).
2. Count within 1000; skip-count by 5s, 10s, and 100s.
3. Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.
4. Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.

Use place value understanding and properties of operations to add and subtract.

5. Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
6. Add up to four two-digit numbers using strategies based on place value and properties of operations.
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.
8. Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.
9. Explain why addition and subtraction strategies work, using place value and the properties of operations.[3]

[1]See Glossary, Table 1.
[2]See standard 1.OA.6 for a list of mental strategies.
[3]Explanations may be supported by drawings or objects.

Measurement and Data 2.MD

Measure and estimate lengths in standard units.

1. Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
2. Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.
3. Estimate lengths using units of inches, feet, centimeters, and meters.
4. Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.

Relate addition and subtraction to length.

5. Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.
6. Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.

Work with time and money.

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

Represent and interpret data.

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.
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[4] using information presented in a bar graph.

Geometry 2.G

Reason with shapes and their attributes.

1. Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.[5] Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.
2. Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.
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.

[4]See Glossary, Table 1.
[5]Sizes are compared directly or visually, not compared by measuring.