

Mathematics

Curriculum Grade One



Approved by Instructional Council on March 27, 2013

Grade 1 Mathematics

Overview:

This curriculum is aligned to the Common Core State Standards for Mathematics.

Standards are coded (see below). For each standard, or cluster of standards, activities are listed that are specific to those standards. Extensions, technology and other support materials (including those found in the teachers' manuals) are listed to help with differentiation of math instruction.

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. The Mathematical Practices should be used when planning lessons. (See Appendix A for a full description of each standard with explanations and examples for your grade level.)

Standards for Mathematical Content: Examples and Explanations of each content standard can be found within this document. These examples were adapted from a document titled *MATHEMATICS: Arizona Academic Content Standards*.

Glossary of Terms: key terms needed to understand the units of study can be found in Appendix A.

Vocabulary:

A list of important mathematical vocabulary can be found at the end of each unit. Students need to become fluent with vocabulary so that they can communicate effectively in mathematics. It is suggested that math vocabulary be posted for each unit, and that students have opportunities to “define” terms using words, numbers, pictures, examples and by making connections to their lives or other areas of mathematics.

Pacing Guide: Refer to the pacing guide for a sequence of units of study.

21st Century Skills: skills needed to be prepared for 21st century life, work and citizenship. An overview of these skills and Outcomes for 21st Century Skills in Math can be found in Appendix A.

Key to Coding:

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.

Example:

CC.1.NBT.1 refers to Common Core, Grade 1, Number and Operations in Base 10, standard 1.

Domain and clusters for Grade 1 can be found on the next page. Standards are listed in the text of the curriculum.

Grade 1 Mathematics
Common Core State Standards for Mathematics
Grade 1

Domains	Operations and Algebraic Thinking	Number & Operations in Base Ten	Measurement and Data	Geometry
Clusters	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Extend the counting sequence • Understand place value • Use place value understanding and properties of operations to add and subtract 	<ul style="list-style-type: none"> • Measure lengths indirectly and by iterating length units • Tell and write time • Represent and interpret data 	<ul style="list-style-type: none"> • Reason with shapes and their attributes
Mathematical Practices	1. Make sense of problems and persevere in solving them.	3. Construct viable arguments and critique the reasoning of others.	5. Use appropriate tools strategically.	7. Look for and make use of structure.
	2. Reason abstractly and quantitatively.	4. Model with mathematics.	6. Attend to precision.	8. Look for and express regularity in repeated reasoning.

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

- 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. Developing understanding of whole number relationship and place value, including grouping in tens and ones

- 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. Developing understanding of linear measurement and measuring lengths as iterating length units

- 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. (Note: students should apply the principle of transitivity of measurement to make direct comparisons, but they need not use this technical term.)

4. Reasoning about attributes of, and composing and decomposing geometric shapes

- 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.

Grade 1 Mathematics

Unit of Study 1: Numbers to 20, Addition

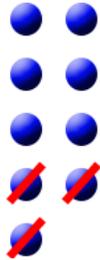
Pacing: 15 days + 2 days for reteaching/enrichment

This unit provides preparation for counting, reading, writing, representing, and comparing numbers to 120. Students use addition within 20 to solve word problems and use an equal sign in equations to show balance.

DOMAINS and standards: Number and Operations in Base Ten and Algebraic Thinking

Priority and Supporting Common Core State Standards	Explanation and Examples
<p>The student will extend the counting sequence.</p> <p>CC.1.NBT.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.</p>	<p>Students use objects, words, and/or symbols to express their understanding of numbers. They extend their counting beyond 100 to count up to 120 by counting by 1s. Some students may begin to count in groups of 10 (while other students may use groups of 2s or 5s to count). Counting in groups of 10 as well as grouping objects into 10 groups of 10 will develop students understanding of place value concepts.</p> <p>Students extend reading and writing numerals beyond 20 to 120. After counting objects, students write the numeral or use numeral cards to represent the number. Given a numeral, students read the numeral, identify the quantity that each digit represents using numeral cards, and count out the given number of objects.</p> <p>Students should experience counting from different starting points (e.g., start at 83; count to 120). To extend students' understanding of counting, they should be given opportunities to count backwards by ones and tens. They should also investigate patterns in the base 10 system.</p>

Grade 1 Mathematics

Priority and Supporting Common Core State Standards	Explanation and Examples
<p style="background-color: yellow;">The student will represent and solve problems involving addition and subtraction.</p> <p>CC1.OA.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.</p> <ul style="list-style-type: none"> • e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem. 	<p>Contextual problems that are closely connected to students' lives should be used to develop fluency with addition and subtraction. Table 1 describes the four different addition and subtraction situations and their relationship to the position of the unknown. Students use objects or drawings to represent the different situations.</p> <ul style="list-style-type: none"> • <i>Take-from</i> example: Abel has 9 balls. He gave 3 to Susan. How many balls does Abel have now? <div style="text-align: center; margin: 10px 0;">  </div> • <i>Compare</i> example: Abel has 9 balls. Susan has 3 balls. How many more balls does Abel have than Susan? A student will use 9 objects to represent Abel's 9 balls and 3 objects to represent Susan's 3 balls. Then they will compare the 2 sets of objects. <p>Note that even though the modeling of the two problems above is different, the equation, $9 - 3 = ?$, can represent both situations yet the compare example can also be represented by $3 + ? = 9$ (How many more do I need to make 9?)</p> <p>It is important to attend to the difficulty level of the problem situations in relation to the position of the unknown.</p> <ul style="list-style-type: none"> • <i>Result Unknown</i> problems are the least complex for students followed by <i>Total Unknown</i> and <i>Difference Unknown</i>. • The next level of difficulty includes <i>Change Unknown</i>, <i>Addend</i> • The <i>Unknown</i>, followed by <i>Bigger Unknown</i>. • The most difficult are <i>Start Unknown</i>, <i>Both Addends Unknown</i>, and <i>Smaller Unknown</i>. <p>Students may use document cameras to display their combining or separating strategies. This gives them the opportunity to communicate and justify their thinking.</p>

Grade 1 Mathematics

Priority and Supporting Common Core State Standards	Explanation and Examples
<p style="background-color: yellow;">The student will work with addition and subtraction equations.</p> <p>CC.1.OA.7 UNDERSTAND the meaning of the equal sign, and DETERMINE if equations involving addition and subtraction are true or false.</p> <p>Examples of true and false statements:</p> <ul style="list-style-type: none"> • $9 + 3 = 10$ • $8 = 8$ • $1 + 1 + 3 = 7$ • $4 + 3 = 3 + 4$ • $13 = 10 + 4$ • $10 + 9 + 1 = 19$ 	<p>Interchanging the language of “equal to” and “the same as” as well as “not equal to” and “not the same as” will help students grasp the meaning of the equal sign. Students should understand that “equality” means “the same quantity as”. In order for students to avoid the common pitfall that the equal sign means “to do something” or that the equal sign means “the answer is,” they need to be able to:</p> <ul style="list-style-type: none"> • Express their understanding of the meaning of the equal sign • Accept sentences other than $a + b = c$ as true ($a = a$, $c = a + b$, $a = a + 0$, $a + b = b + a$) • Know that the equal sign represents a relationship between two equal quantities • Compare expressions without calculating <p>These key skills are hierarchical in nature and need to be developed over time.</p> <p>Experiences determining if equations are true or false help student develop these skills. Initially, students develop an understanding of the meaning of equality using models. However, the goal is for students to reason at a more abstract level. At all times students should justify their answers, make conjectures (e.g., if you add a number and then subtract that same number, you always get zero), and make estimations.</p> <p>Once students have a solid foundation of the key skills listed above, they can begin to rewrite true/false statements using the symbols, $<$ and $>$.</p> <p>Examples of true and false statements:</p> <ul style="list-style-type: none"> • $7 = 8 - 1$ • $8 = 8$ • $1 + 1 + 3 = 7$ • $4 + 3 = 3 + 4$ • $6 - 1 = 1 - 6$ • $12 + 2 - 2 = 12$ • $9 + 3 = 10$ • $5 + 3 = 10 - 2$ • $3 + 4 + 5 = 3 + 5 + 4$ • $3 + 4 + 5 = 7 + 5$ • $13 = 10 + 4$ • $10 + 9 + 1 = 19$

TABLE 1. Common addition and subtraction situations.⁶

	Result Unknown	Change Unknown	Start Unknown
Add to	Two bunnies sat on the grass. Three more bunnies hopped there. How many bunnies are on the grass now? $2 + 3 = ?$	Two bunnies were sitting on the grass. Some more bunnies hopped there. Then there were five bunnies. How many bunnies hopped over to the first two? $2 + ? = 5$	Some bunnies were sitting on the grass. Three more bunnies hopped there. Then there were five bunnies. How many bunnies were on the grass before? $? + 3 = 5$
Take from	Five apples were on the table. I ate two apples. How many apples are on the table now? $5 - 2 = ?$	Five apples were on the table. I ate some apples. Then there were three apples. How many apples did I eat? $5 - ? = 3$	Some apples were on the table. I ate two apples. Then there were three apples. How many apples were on the table before? $? - 2 = 3$
	Total Unknown	Addend Unknown	Both Addends Unknown ¹
Put Together/ Take Apart²	Three red apples and two green apples are on the table. How many apples are on the table? $3 + 2 = ?$	Five apples are on the table. Three are red and the rest are green. How many apples are green? $3 + ? = 5, 5 - 3 = ?$	Grandma has five flowers. How many can she put in her red vase and how many in her blue vase? $5 = 0 + 5, 5 = 5 + 0$ $5 = 1 + 4, 5 = 4 + 1$ $5 = 2 + 3, 5 = 3 + 2$
	Difference Unknown	Bigger Unknown	Smaller Unknown
Compare³	(“How many more?” version): Lucy has two apples. Julie has five apples. How many more apples does Julie have than Lucy? (“How many fewer?” version): Lucy has two apples. Julie has five apples. How many fewer apples does Lucy have than Julie? $2 + ? = 5, 5 - 2 = ?$	(Version with “more”): Julie has three more apples than Lucy. Lucy has two apples. How many apples does Julie have? (Version with “fewer”): Lucy has 3 fewer apples than Julie. Lucy has two apples. How many apples does Julie have? $2 + 3 = ?, 3 + 2 = ?$	(Version with “more”): Julie has three more apples than Lucy. Julie has five apples. How many apples does Lucy have? (Version with “fewer”): Lucy has 3 fewer apples than Julie. Julie has five apples. How many apples does Lucy have? $5 - 3 = ?, ? + 3 = 5$

¹These take apart situations can be used to show all the decompositions of a given number. The associated equations, which have the total on the left of the equal sign, help children understand that the = sign does not always mean makes or results in but always does mean is the same number as.

²Either addend can be unknown, so there are three variations of these problem situations. Both Addends Unknown is a productive extension of this basic situation, especially for small numbers less than or equal to 10.

³For the Bigger Unknown or Smaller Unknown situations, one version directs the correct operation (the version using more for the bigger unknown and using less for the smaller unknown). The other versions are more difficult.

Grade 1 Mathematics

Concepts What Students Need to Know	Skills What Students Need To Be Able To Do	Bloom's Taxonomy Levels
Numbers <ul style="list-style-type: none"> • To 120 	COUNT (to 120)	1
Addition <ul style="list-style-type: none"> • Word problems • Unknowns • Symbols • Equations 	READ/WRITE (numerals to 120)	2
	REPRESENT (objects with numeral)	2
	USE (addition within 20)	3
	SOLVE (word problems with addition)	4
	UNDERSTAND (meaning of =)	3
Meaning of equal sign	DETERMINE (if addition equations are true or false)	4

Essential Questions	Big Ideas
How can I use words and symbols to show how many?	Numbers can be represented using objects, words and symbols.
What words and symbols can I use to compare numbers?	Numbers can be compared using greater than (>), less than (<) or equal (=)
How can I use object, drawings and equations to solve problems?	Some real-world problems involving joining, separating, part-part-whole, or comparison can be solved using addition; others can be solved using subtraction.

Mathematical Practices UNIT 1
<p><i>Practices in bold are to be emphasized in the unit.</i></p> <ol style="list-style-type: none"> 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.

Grade 1 Mathematics

Optional assessments:

- **Am I Ready?** (found at the beginning of the chapter – identifies foundational skills needed to be successful in this unit)
- **Curriculum-based assessment: Ledyard End of Unit 1 assessment** (found in Unit 1 appendix)

Learning Activities:

Teacher notes:

- Prepare a chart similar to the one below. Teach the meaning of the word symbol (a sign used instead of a word). Continue to add math symbols to the chart throughout the year. Symbols for unit 1 are listed in the chart.

Math Symbols		
symbol	meaning	example
+	plus (put together)	$5 + 3 = 8$
=	equal (is the same as)	$3 + 7 = 10$
<input type="checkbox"/>	unknown number	<input type="checkbox"/> = $2 + 3$

1. Students tell and model addition stories to find how many in all. MM 1-1
2. Students use counters and a part/part/whole mat to model and solve addition problems. MM 1-2
3. Students join items by adding them together and fill in numbers to make an addition equation using the symbols + and = MM 1-3

Teacher notes:

- Use the terms addition number sentence and addition equation interchangeably.
- Demonstrate understanding of balance (equivalence) by using an arm balance showing the same amount on each side.
For example: $4 = 2+2$, therefore the scale balances.

Alternate activities to show balance:

- Play pretend “seesaw” to demonstrate equivalence. For example, using the teacher as the middle of a seesaw, have four children come and stand on one side, then have two children stand on the other side. Discuss what would happen to the seesaw and why. Invite children to show and explain how to balance the seesaw. Provide numerous opportunities using a variety of numbers, as the children’s sense of number increases.
 - If children are having difficulty with the “seesaw” representation of equivalence, use actual balance scales with objects or weights to show balance or equivalence.
4. Students add zero to a number and a number to zero. MM 1-4

Grade 1 Mathematics

5. Students add numbers vertically and horizontally. MM 1-5
6. Students learn and apply the 4 step plan for problem solving. MM 1-6
7. Students use counters to make sums of 4 and 5 in different ways. MM 1-7
8. Students use counters to make sums of 6 and 7 in different ways. MM 1-8
9. Students use counters to make sums of 8 in different ways. MM 1-9
10. Students use counters to make sums of 9 in different ways. MM 1-10
11. Students use counters to make sums of 10 in different ways. MM 1-11

Teacher note: you may wish to add ten frames and a number line to calendar activities so that students see groups of 10 in multiple ways.

12. Students use counters and part/part/whole mat to find missing parts of ten. MM 1-12

13. Students determine if an addition math statement is true or false. MM 1-13

Teacher note: some students may first need to draw a picture of the statement (such as $8=3+5$) before determining if it is true or false.

UNIT 1 VOCABULARY:

add, addend, addition equation, after, before, between, combine, equals, in all, is equal to, false, is greater than, is less than, join, number, number line, order, part-part-whole, plus, put together, sum, symbols, total, true, zero

Teacher note: <http://www.graniteschools.org/depart/teachinglearning/curriculuminstruction/math/Pages/MathematicsVocabulary.aspx> - illustrated vocabulary cards

Grade 1 Mathematics

Differentiated Instruction:

Refer to suggestions and leveled lesson resources at the beginning of each lesson in *My Math*.

Instructional Strategies: See appendix A for research-based Instructional and Differentiated Strategies

21st Century Learning Skills: See appendix A for explanations.

Technology and Electronic Resources:

SuccessMaker

Math Connects online learning center for tools, activities and “learn more” experiences.

- Lets Count to 20! <http://illuminations.nctm.org/LessonDetail.aspx?id=U153>- 6 lessons for counting to 20. Includes interactive ten frame tool.
- Toy Shop Numbers! <http://illuminations.nctm.org/LessonDetail.aspx?ID=L216> - Students use examples from a toy-shop to identify real-world uses of numbers and to write stories about those numbers.
- Ten Frame <http://illuminations.nctm.org/ActivityDetail.aspx?ID=75> Student interactive site for using a 10-frame to learn basic facts.
- Center for Distance and Online Learning <http://teams.lacoe.edu/teachers/index.asp> - source of lesson plans for all areas of math, also includes links to other math sites.
- Abouteducation.com <http://math.about.com/library/blone.htm> - covers basic concepts for grade 1
- National Library of Virtual Manipulatives http://nlvm.usu.edu/en/nav/grade_g_1.html - interactive online manipulatives listed by grade and topic
- Resource for teachers to successfully implement CCSS. Includes lesson plans, resources and professional development opportunities. www.ctcore.org

Grade 1 Mathematics

Unit of Study 2: Subtraction

Students use subtraction within 20 to solve word problems..

Pacing: 10 days + 3 days for reteaching/enrichment

DOMAIN and standards: Number and Operations in Base Ten

Priority and Supporting Common Core State Standards	Explanation and Examples
<p>The student will represent and solve problems involving addition and subtraction.</p> <p>CC.1.OA.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</p> <ul style="list-style-type: none"> e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem. 	<p>Table 1 (found in the previous unit) describes the four different addition and subtraction situations and their relationship to the position of the unknown. Students use objects or drawings to represent the different situations.</p>
<p>The student will work with addition and subtraction equations.</p> <p>CC.1.OA.7 UNDERSTAND the meaning of the equal sign, and DETERMINE if equations involving addition and subtraction are true or false.</p> <p>Examples of true and false statements:</p> <ul style="list-style-type: none"> $7 = 8 - 1$ $6 - 1 = 1 - 6$ $12 + 2 - 2 = 12$ $5 + 3 = 10 - 2$ 	<p>Interchanging the language of “equal to” and “the same as” as well as “not equal to” and “not the same as” will help students grasp the meaning of the equal sign. Students should understand that “equality” means “the same quantity as”. In order for students to avoid the common pitfall that the equal sign means “to do something” or that the equal sign means “the answer is,” they need to be able to:</p> <ul style="list-style-type: none"> Express their understanding of the meaning of the equal sign Accept sentences other than $a + b = c$ as true ($a = a$, $c = a + b$, $a = a + 0$, $a + b = b + a$) Know that the equal sign represents a relationship between two equal quantities Compare expressions without calculating

Grade 1 Mathematics

Concepts What Students Need to Know	Skills What Students Need To Be Able To Do	Bloom's Taxonomy Levels
Subtraction <ul style="list-style-type: none"> • Word problems • Unknowns • Symbols • Equations 	USE (subtraction within 20) SOLVE (word problems with subtraction) UNDERSTAND (meaning of =) DETERMINE (if subtraction equations are true or false)	3 4 3 4
Meaning of equal sign		

Essential Questions	Big Ideas
How can I use objects, drawings and equations to solve problems?	Some real-world problems involving joining, separating, part-part-whole, or comparison can be solved using addition; others can be solved using subtraction.

Mathematical Practices UNIT 2
<p><i>Practices in bold are to be emphasized in the unit.</i></p> <ol style="list-style-type: none"> 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.

Grade 1 Mathematics

Optional assessments:

- **Am I Ready?** (found at the beginning of the chapter – identifies foundational skills needed to be successful in this unit)
- **Curriculum-based assessment: Ledyard End of Unit 2 assessment** (found in Unit 2 appendix)

Teacher note: add to symbol chart

Math Symbols		
symbol	meaning	example
—	minus (take away)	$7 - 5 = 2$

Learning Activities:

1. Students use models to represent and solve subtraction stories. MM 2-1
2. Students use models to subtract when given the whole and the part. MM 2-2
3. Students write subtraction equations for pictures using the symbols - and = . MM 2-3

Teacher note: use the terms subtraction number sentence and subtraction equation interchangeably.

4. Students subtract zero and subtract the number itself. MM 2-4
5. Students subtract using both a vertical and horizontal format. MM 2-5
6. Students can draw a diagram to solve a problem. MM 2-6
7. Students write a subtraction equation to find how many more or fewer.. MM 2-7
- 8.. Students use models to subtract from 4 and 5. MM 2-8
9. Students use models to subtract from 6 and 7. MM 2-9
10. Students use models to subtract from 8. MM 2-10
11. Students use models to subtract from 9. MM 2-11
12. Students use models to subtract from 10 . MM 2-12
13. Given an addition fact, students write a related subtraction fact. MM 2-13
14. Students determine if a subtraction sentence is true or false. MM 2-14

Grade 1 Mathematics

UNIT 2 VOCABULARY: difference, false, minus, part-part-whole, subtract, separate, subtraction equation, take away, true

Teacher note: <http://www.graniteschools.org/depart/teachinglearning/curriculuminstruction/math/Pages/MathematicsVocabulary.aspx> - illustrated vocabulary cards

Differentiated Instruction:

Refer to suggestions and leveled lesson resources at the beginning of each lesson in *My Math*.

Instructional Strategies: See appendix A for research-based Instructional and Differentiated Strategies

21st Century Learning Skills: See appendix A for explanations.

Technology and Electronic Resources:

SuccessMaker

Math Connects online learning center for tools, activities and “learn more” experiences.

- Toy Shop Numbers! <http://illuminations.nctm.org/LessonDetail.aspx?ID=L216> - Students use examples from a toy-shop to identify real-world uses of numbers and to write stories about those numbers.
- Abouteducation.com <http://math.about.com/library/blone.htm> - covers basic concepts for grade 1
- Resource for teachers to successfully implement CCSS. Includes lesson plans, resources and professional development opportunities. www.ctcore.org

Grade 1 Mathematics

Unit of Study 3: Working with Data

Pacing: 5 days + 2 days for reteaching/enrichment

In this unit, students collect, sort, organize and answer questions about data in graphs.

DOMAIN and standards: Measurement and Data

Priority and Supporting Common Core State Standards	Explanation and Examples
<p>The students will represent and interpret data.</p> <p>CC.1.MD.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.</p>	<p>Students create object graphs and tally charts using data relevant to their lives (e.g., favorite ice cream, eye color, pets, etc.). Graphs may be constructed by groups of students as well as by individual students.</p> <p>Counting objects should be reinforced when collecting, representing, and interpreting data.</p>

Concepts What Students Need to Know	Skills What Students Need To Be Able To Do	Bloom's Taxonomy Levels
<p>Count</p> <ul style="list-style-type: none"> • interpret data 	<p>ORGANIZE</p> <p>REPRESENT } (data with up to 3 categories)</p> <p>INTERPRET }</p> <p>ASK / ANSWER (questions about data)</p>	<p>4</p> <p>2</p> <p>2</p> <p>4</p>

Essential Questions	Big Ideas
How can I organize data?	Data can be represented using tables and graphs.
What are some of the ways you can describe data in a table or graph?	Some questions can be answered by collecting and analyzing data.

Mathematical Practices UNIT 3
<p><i>Practices in bold are to be emphasized in the unit.</i></p> <ol style="list-style-type: none"> 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.

Grade 1 Mathematics

Optional assessments:

- **Am I Ready?** (found at the beginning of the chapter – identifies foundational skills needed to be successful in this unit)
- **Curriculum-based assessment: Ledyard End of Unit 3 assessment** (found in Unit 3 appendix)

Teacher note: Graphing and data collection activities should be ongoing all year and can be used in various subject areas. These activities provide students with opportunities to communicate orally and in writing and to justify their statements.

Learning Activities:

1. Students can ask a question for a survey and record data using tally marks. MM 7-1
2. Students solve problems using the make a table strategy. MM 7-2
3. Students organize data in picture graphs. MM 7-3
4. Students interpret information from a picture graph. MM 7-4

Teacher note:

Have students answer the following types of questions about data in graphs.

- How many books did Nancy read?
- How many books did Juan read?
- How many books were read *altogether*?
- *How many more* books did Juan read than Marie?
- Who read the *most* books?
- Who read the *least* books?

Number of Books Read	
Nancy	☆ ☆ ☆ ☆ ☆
Juan	☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆
☆ = 1 Book	

4. Students collect data and make a bar graph. MM 7-5
5. Students interpret information from a bar graph. MM 7-6

UNIT 3 VOCABULARY

bar graph, data, graph, picture graph, sort, survey, tally marks, tally chart

Teacher note: <http://www.graniteschools.org/depart/teachinglearning/curriculuminstruction/math/Pages/MathematicsVocabulary.aspx> - illustrated vocabulary cards

Grade 1 Mathematics

Differentiated Instruction:

Refer to suggestions and leveled lesson resources at the beginning of each lesson in *My Math*.

Instructional Strategies: See appendix A for research-based Instructional and Differentiated Strategies

21st Century Learning Skills: See appendix A for explanations.

Technology and Electronic Resources:

SuccessMaker

Math Connects online learning center for tools, activities and “learn more” experiences.

- Eye to Eye: <http://illuminations.nctm.org/LessonDetail.aspx?ID=L169> students collect data on eye color
- A Shoe In: <http://illuminations.nctm.org/WebResourceReview.aspx?ID=5> – lesson using a Venn diagram to classify shoes
- Resource for teachers to successfully implement CCSS. Includes lesson plans, resources and professional development opportunities.
www.ctcore.org

Grade 1 Mathematics

Unit of Study 4: Basic addition and subtraction facts.

Pacing: 20 days + 5 days for reteaching/enrichment

In this unit students learn basic math facts (through 20) by using strategies, manipulatives and through practice.

DOMAIN and standards: Operations and Algebraic Thinking

Priority and Supporting Common Core State Standards	Explanation and Examples
<p>The student will represent and solve problems involving addition and subtraction. CC.1.OA.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.</p>	<p>Students create word problems with three addends. They use properties of operations and different strategies to find the sum of three whole numbers such as:</p> <ul style="list-style-type: none"> Counting on and counting on again (e.g., to add $3 + 2 + 4$ a student writes $3 + 2 + 4 = ?$ and thinks, "3, 4, 5, that's 2 more, 6, 7, 8, 9 that's 4 more so $3 + 2 + 4 = 9$." Making tens (e.g., $4 + 8 + 6 = 4 + 6 + 8 = 10 + 8 = 18$) Using "plus 10, minus 1" to add 9 (e.g., $3 + 9 + 6$ A student thinks, "9 is close to 10 so I am going to add 10 plus 3 plus 6 which gives me 19. Since I added 1 too many, I need to take 1 away so the answer is 18.) Decomposing numbers between 10 and 20 into 1 ten plus some ones to facilitate adding the ones
<p>The student will understand and apply properties of operations and the relationship between addition and subtraction. CC1.OA.3 APPLY properties of operations as strategies to add and subtract.</p>	<p>Students should understand the important ideas of the following properties:</p> <ul style="list-style-type: none"> Identity property of addition (e.g., $6 = 6 + 0$) Identity property of subtraction (e.g., $9 - 0 = 9$) Commutative property of addition (e.g., $4 + 5 = 5 + 4$) Associative property of addition (e.g., $3 + 9 + 1 = 3 + 10 = 13$) <p>(Students need not use formal terms for these properties.)</p>
<p>CC.1.OA.4 UNDERSTAND subtraction as an unknown-addend problem.</p> <ul style="list-style-type: none"> e.g., subtract $10 - 8$ by finding the number that makes 10 when added to 8. 	<p>When determining the answer to a subtraction problem, $12 - 5$, students think, "If I have 5, how many more do I need to make 12?" Encouraging students to record this symbolically, $5 + ? = 12$, will develop their understanding of the relationship between addition and subtraction. Some strategies they may use are counting objects, creating drawings, counting up, using number lines or 10 frames to determine an answer.</p>
<p>The student will add and subtract within 20. CC.1.OA.5 RELATE counting to addition and subtraction (e.g., by counting on 2 to add 2).</p>	<p>Students' multiple experiences with counting may hinder their understanding of counting on and counting back as connected to addition and subtraction. To help them make these connections when students count on 3 from 4, they should write this as $4 + 3 = 7$. When students count back (3) from 7, they should connect this to $7 - 3 = 4$. Students often have difficulty knowing where to begin their count when counting backward.</p>

Grade 1 Mathematics

<p>CC.1.OA.6 ADD and SUBTRACT within 20, demonstrating fluency for addition and subtraction within 10. USE strategies such as:</p> <ul style="list-style-type: none"> • 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 $12 - 8 = 4$) • creating equivalent but easier or known sums (e.g., adding $6 + 7$ by creating the known equivalent $6 + 6 + 1 = 12 + 1 = 13$). 	<p>This standard focuses on students being able to fluently add and subtract numbers to 10 and having experiences adding and subtracting within 20. By studying patterns and relationships in addition facts and relating addition and subtraction, students build a foundation for fluency with addition and subtraction facts. Adding and subtracting fluently refers to knowledge of procedures, knowledge of when and how to use them appropriately, and skill in performing them flexibly, accurately, and efficiently. The use of objects, diagrams, or interactive whiteboards and various strategies will help students develop fluency.</p>
<p style="background-color: yellow;">The student will work with addition and subtraction equations.</p> <p>CC.1.OA.8 DETERMINE the unknown number in an addition or subtraction equation relating three whole numbers.</p>	<p>For example, determine the unknown number that makes the equation true in each of the equations:</p> $8 + ? = 11$ $5 = \square - 3$ $6 + 6 = ?$

Concepts What Students Need to Know	Skills What Students Need To Be Able To Do	Bloom's Taxonomy Levels
<p>Addition and Subtraction</p> <ul style="list-style-type: none"> • Equations • Word problems • Unknowns (missing numbers) • Symbols <p>Properties of Operations</p> <ul style="list-style-type: none"> • Addition • Subtraction <p>Add and Subtract within twenty using strategies</p> <p>Fluency with facts to ten</p> <p>Meaning of the equals sign</p>	<p>USE addition and subtraction (to SOLVE word problems within twenty)</p> <p>USE addition and subtraction (with unknowns in all positions)</p> <p>APPLY properties of operations as strategies (to add and subtract)</p> <p>ADD and SUBTRACT (using strategies)</p> <ul style="list-style-type: none"> • Counting on • Making ten • Decomposing • Inverse operations • Creating equivalent sums • <p>UNDERSTAND (subtraction as unknown addend problem)</p> <p>DETERMINE (unknown number)</p>	<p>3, 4</p> <p>3</p> <p>3</p> <p>3</p> <p>2</p> <p>4</p>

Grade 1 Mathematics

Essential Questions	Big Ideas
What addition strategies can I use to add?	Two numbers can be added in any order. Numbers can be broken apart and grouped in different ways to make calculations simpler.
How can I use an addition fact to help me solve a subtraction fact?	Subtraction facts can be found by thinking of the related addition fact.

Mathematical Practices UNIT 4
<p><i>Practices in bold are to be emphasized in the unit.</i></p> <ol style="list-style-type: none"> 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.

Optional assessments:

- **Am I Ready?** (found at the beginning of the chapter – identifies foundational skills needed to be successful in this unit)
- **Curriculum-based assessment: Ledyard End of Unit 4 assessment** (found in Unit 4 appendix)

Teacher notes:

- This unit introduces strategies for learning basic addition and subtraction facts .

Although students in Grade 1 will work with number facts within 20, students **will demonstrate fluency for addition and subtraction facts within 10.** Students need time to practice applying these strategies to facts. *Helping Children Master the Basic Facts* by John Van de Walle (see appendix) lists strategies with activities to practice each. Additional materials can be found in *My Math*. These pages are listed in parentheses.

Create a chart similar to the one below and add to it as students learn different strategies.

Addition Fact Strategies	
strategy	example
facts with zero	$0 + 2 = 2$
doubles	$4 + 4 = 8$

- Flashcards and math drills can be found in *One-Minute Math drills Level A* (Carson Dellosa Publishing) for addition and subtraction.

Grade 1 Mathematics

Learning Activities:

1. Students learn the strategy one-more-than and two-more-than. See Van de Walle pg. 99
 2. Students learn the strategy facts with zero. See Van de Walle pg. 100
 3. Students learn the strategy, using doubles, to find a sum. See Van de Walle pg. 101
 4. Students learn the strategy, doubles plus one, to find a sum. See Van de Walle pg. 101
 5. Students solve problems using the Act It Out strategy MM 3-6
 6. Students make a ten. MM 3-7
 7. Students add in any order. MM 3-8
 8. Students add three numbers by looking for doubles or make a ten. MM 3-9
- Teacher note:** Students master addition facts before moving to subtraction.
9. Students learn the strategy, Think-Addition, to find a difference. See Van de Walle pg. 106
 10. Students relate addition and subtraction facts. MM 4-6
 11. Students write fact families. MM 4-7
 12. Students apply problem solving strategies to solve a problem. *Cows and Chickens* (M. Burns) (see Appendix)

Additional materials:

(MM 3-1 Count on 1, 2,3)
(MM 3-2 Count on using pennies)*

(MM 3-4 Doubles)

(MM 3-5 Doubles+1, Doubles-1)

(MM 4-1 Count back)

(MM 4-2 Use number line)

(MM 4-8 Missing Addends)

*MM 3-2 uses pennies to count on. Although coins are not included in the standards for grade 1, connecting pennies and counting by ones will help students see this relationship. Coins will not be assessed in our end of unit assessments.

The focus of Unit 4 is on learning strategies for basic addition and subtraction facts.

More time will be provided in Unit 7 to develop fluency for addition and subtraction facts within 10.

Grade 1 Mathematics

UNIT 4 VOCABULARY

addend, count back, difference, doubles, fact family, facts with zero, make-ten, near-doubles, one-more-than, strategy, sum, think addition, two-more-than

Teacher note: <http://www.graniteschools.org/depart/teachinglearning/curriculuminstruction/math/Pages/MathematicsVocabulary.aspx> - illustrated vocabulary cards

Differentiated Instruction:

Refer to suggestions and leveled lesson resources at the beginning of each lesson in *Math Connects*.

Instructional Strategies: See appendix A for research-based Instructional and Differentiated Strategies

21st Century Learning Skills: See appendix A for explanations.

Technology and Electronic Resources:

SuccessMaker

Math Connects online learning center for tools, activities and “learn more” experiences.

- http://www.montgomeryschoolsmd.org/schools/thurgoodmarshalles/java-applets/Mathflash/Mathflash_small.html - basic fact practice
- <http://tux4kids.alieth.debian.org/tuxmath/> - downloadable game for basic fact practice
- Resource for teachers to successfully implement CCSS. Includes lesson plans, resources and professional development opportunities. www.ctcore.org

Grade 1 Mathematics

Unit of Study 5: Time and Length Pacing: 10 days + 5 days for reteaching/enrichment In this unit, students measure time to the hour and half-hour, and order and compare lengths.	
DOMAINS and standards: : Measurement and Data	
Priority and Supporting Standards	Explanation and Examples
The students will tell and write time. CC.1.MD.3 TELL and WRITE time in hours and half-hours using analog and digital clocks.	Ideas to support telling time: <ul style="list-style-type: none"> • within a day, the hour hand goes around a clock twice (the hand moves only in one direction) • when the hour hand points exactly to a number, the time is exactly on the hour • time on the hour is written in the same manner as it appears on a digital clock • the hour hand moves as time passes, so when it is half way between two numbers it is at the half hour • there are 60 minutes in one hour; so halfway between an hour, 30 minutes have passed • half hour is written with “30” after the colon The idea of 30 being “halfway” is difficult for students to grasp. Students can write the numbers from 0 - 60 counting by tens on a sentence strip. Fold the paper in half and determine that halfway between 0 and 60 is 30.
The students will measure lengths indirectly and by iterating length units. CC.1.MD.1 ORDER three objects by length; COMPARE the lengths of two objects indirectly by using a third object.	In order for students to be able to compare objects, students need to understand that length is measured from one end point to another end point. They determine which of two objects is longer, by physically aligning the objects. Some objects may have more than one measurement of length, so students identify the length they are measuring. Both the length and the width of an object are measurements of length. <p>Examples for ordering:</p> <ul style="list-style-type: none"> • Order three students by their height • Order pencils, crayons, and/or markers by length • Build three towers (with cubes) and order them from shortest to tallest <p>Example for comparing indirectly:</p> <ul style="list-style-type: none"> • Two students each make a dough “snake.” Given a tower of cubes, each student compares his/her snake to the tower. Then students make statements such as, “My snake is longer than the cube tower and your snake is shorter than the cube tower. So, my snake is longer than your snake.”
CC.1.MD.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.)	Students use their counting skills while measuring with non-standard units. While this standard limits measurement to whole numbers of length, in a natural environment, not all objects will measure to an exact whole unit. When students determine that the length of a pencil is six to seven paperclips long, they can state that it is about six paperclips long.

Grade 1 Mathematics

Concepts What Students Need to Know	Skills What Students Need To Be Able To Do	Bloom's Taxonomy Levels
Time <ul style="list-style-type: none"> • Hours • Half hours 	TELL (time)	1
	WRITE (time)	2
Clocks <ul style="list-style-type: none"> • Analog • Digital 	USE (clocks)	3
	ORDER (3 objects by length)	4
	COMPARE (lengths of objects)	2
Measure <ul style="list-style-type: none"> • Length • non-standard units • process of measuring 	EXPRESS (lengths in units of measure)	2
	UNDERSTAND (length measurement)	2

Essential Questions	Big Ideas
How can I use an analog clock to tell time? How can I use a digital clock to tell time?	A given time of day can be represented in more than one way.
How do I measure an object?	Measurement involves a selected attribute of an object and a comparison of the object being measured against a unit of the same attribute.

Mathematical Practices UNIT 5
<p><i>Practices in bold are to be emphasized in the unit.</i></p> <ol style="list-style-type: none"> 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.

Grade 1 Mathematics

Optional assessments:

- **Am I Ready?** (found at the beginning of the chapter – identifies foundational skills needed to be successful in this unit)
- **Curriculum-based assessment: Ledyard End of Unit 5 assessment** (found in Unit 5 appendix)

Learning Activities :

1. Students compare the length of two objects indirectly by using a third object. MM 8-1

Alternate activities:

- Have students make a snake from clay. Given a tower of unifix cubes, each student compares his/her snake to the tower. Then students make statements such as, “My snake is longer than the cube tower and your snake is shorter than the cube tower. So, my snake is longer than your snake.”
 - Have students cut a piece of string to match their height. Each student compares his/her string to a given object in the room (such as a bookcase.) Then, students make statements such as, “My string is taller than the bookcase and your string is shorter than the bookcase. So, I am taller than you.
2. Students compare and order common objects by length. They use comparative language (ex. short, shorter, shortest) to describe the items. MM 8-2
 3. Students measure length using non-standard units. MM 8-3
 4. Students solve problems using the Guess and Check strategy. MM8-4
 5. Students read and write time to the hour using an analog clock. MM 8-5
 6. Students read and write time to the hour using a digital clock. MM 8-6
 7. Students read and write time to the half hour using an analog clock. MM 8-7
 8. Students read and write time to the half hour using a digital clock. MM8-8
Alternate activity: see appendix for poem and “30 minutes later” activity
 9. Students tell time to nearest hour and half-hour using both an analog and digital clock. MM 8-9

UNIT 5 VOCABULARY: after, analog clock, before, compare, digital clock, half-hour, hour, hour hand, length, measure, minute hand, o'clock

Teacher note: <http://www.graniteschools.org/depart/teachinglearning/curriculuminstruction/math/Pages/MathematicsVocabulary.aspx> - illustrated vocabulary cards

Grade 1 Mathematics

Differentiated Instruction:

Refer to suggestions and leveled lesson resources at the beginning of each lesson in *Math Connects*.

Instructional Strategies: See appendix A for research-based Instructional and Differentiated Strategies

21st Century Learning Skills: See appendix A for explanations.

Technology and Electronic Resources:

SuccessMaker

Math Connects online learning center for tools, activities and “learn more” experiences.

- http://www.internet4classrooms.com/skill_builders/telling_time_math_first_1st_grade.htm - links to many time related interactive sites
- Learning to Measure with Ladybug: <http://illuminations.nctm.org/LessonDetail.aspx?ID=L69>
- Resource for teachers to successfully implement CCSS. Includes lesson plans, resources and professional development opportunities. www.ctcore.org

Grade 1 Mathematics

Unit of Study 6: Number Sense

Pacing: 10 days + 2 days for reteaching/enrichment

In this unit, students work with numbers to 120. Mentally or using a hundreds chart, they find 10 more or less than a given number.

DOMAIN and standards: : Number and Operations in Base Ten

Priority and Supporting Common Core State Standards	Explanation and Examples
<p>The student will extend the counting sequence. CC.1.NBT.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.</p>	<p>Students use objects, words, and/or symbols to express their understanding of numbers. They extend their counting beyond 100 to count up to 120 by counting by 1s. Some students may begin to count in groups of 10 (while other students may use groups of 2s or 5s to count). Counting in groups of 10 as well as grouping objects into 10 groups of 10 will develop students understanding of place value concepts. Students extend reading and writing numerals beyond 20 to 120. After counting objects, students write the numeral or use numeral cards to represent the number. Given a numeral, students read the numeral, identify the quantity that each digit represents using numeral cards, and count out the given number of objects.</p>
<p>The student will use place value understandings and properties of operations to add and subtract. CC.1.NBT.5 Given a two-digit number, mentally FIND 10 more or 10 less than the number, without having to count; EXPLAIN the reasoning used.</p>	<p>This standard requires students to understand and apply the concept of 10 which leads to future place value concepts. It is critical for students to do this without counting. Prior use of models such as base ten blocks, number lines, and 100s charts helps facilitate this understanding. It also helps students see the pattern involved when adding or subtracting 10.</p> <p>Examples:</p> <ul style="list-style-type: none"> • 10 more than 43 is 53 because 53 is one more 10 than 43 • 10 less than 43 is 33 because 33 is one 10 less than 43 <p>Students may use interactive versions of models (base ten blocks, 100s charts, number lines, etc) to develop prior understanding.</p>

Grade 1 Mathematics

Concepts What Students Need to Know	Skills What Students Need To Be Able To Do	Bloom's Taxonomy Levels
Numbers to 120	COUNT to 120	1
Numerals	READ and WRITE numerals (to 120)	1, 2
Number of objects	REPRESENT (a number of objects with numerals)	2
Place value: Find 10 more or less than a given number using place value strategies	FIND (10 more or less)	1
	EXPLAIN (reasoning)	2

Essential Questions	Big Ideas
How can I find a number 10 more/less than another number without having to count?	Number relationships can be used to mentally calculate 10 more or less.

Mathematical Practices UNIT 6
<p><i>Practices in bold are to be emphasized in the unit.</i></p> <ol style="list-style-type: none"> 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.

Grade 1 Mathematics

Optional assessments:

- **Am I Ready?** (found at the beginning of the chapter – identifies foundational skills needed to be successful in this unit)
- **Curriculum-based assessment: Ledyard End of Unit 6 assessment** (found in Unit 6 appendix)

Learning Activities:

1. Students write numbers 11-19 and see that they are composed of tens and ones. MM 5-1
2. Students count groups of tens and write how many in all. MM 5-2
3. Students count by tens using dimes. MM 5-3

Teacher note: Although coins are not included in the standards for grade 1, connecting dimes and counting by tens will help students see this relationship. Coins will not be assessed in our end of unit assessments.

4. Students represent two-digit numbers as tens and ones. MM 5-4
5. Students solve problems by making a table. MM 5-6
6. Students find ten more or ten less than a number. MM 5-8
7. Using a number chart, students count and identify any number to 120 MM 5-13
8. Students read and write numbers to 120. MM 5-14

Teacher note: estimation jar activities are appropriate for students to estimate numbers to 120. Students should predict the number of items in the jar, and then be allowed to adjust their estimate based on taking out a group of 10 items.

UNIT 6 VOCABULARY: ones, skip count, estimate, tens

Teacher note: <http://www.graniteschools.org/depart/teachinglearning/curriculuminstruction/math/Pages/MathematicsVocabulary.aspx> - illustrated vocabulary cards

Grade 1 Mathematics

Differentiated Instruction:

Refer to suggestions and leveled lesson resources at the beginning of each lesson in *Math Connects*.

Instructional Strategies: See appendix A for research-based Instructional and Differentiated Strategies

21st Century Learning Skills: See appendix A for explanations.

Technology and Electronic Resources:

SuccessMaker

Math Connects online learning center for tools, activities and “learn more” experiences.

- www.mathwire.com
- Apples 4 the teacher <http://www.apples4theteacher.com/math/games/100-number-chart-one.html> - interactive Hundreds Chart, use for coloring patterns, skip counting, etc.
- Resource for teachers to successfully implement CCSS. Includes lesson plans, resources and professional development opportunities. www.ctcore.org

Grade 1 Mathematics

Unit of Study 7: Addition and Subtraction Facts Pacing: 10 days + 5 days for reteaching/enrichment	
In this unit, students learn basic math facts (through 20), by using strategies, manipulatives and through practice.	
DOMAIN and standards: Operations and Algebraic Thinking	
Priority and Supporting Common Core State Standards	Explanation and Examples
<p style="background-color: yellow; margin: 0;">The student will add and subtract within 20.</p> <p>CC.1.OA.5 RELATE counting to addition and subtraction</p> <ul style="list-style-type: none"> (e.g., by counting on 2 to add 2). 	
<p>CC.1.OA.6 ADD and SUBTRACT within 20, demonstrating fluency for addition and subtraction within 10.</p> <p>USE strategies such as</p> <ul style="list-style-type: none"> 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 $12 - 8 = 4$) creating equivalent but easier or known sums (e.g., adding $6 + 7$ by creating the known equivalent $6 + 6 + 1 = 12 + 1 = 13$). 	<p>This standard focuses on students being able to fluently add and subtract numbers to 10 and having experiences adding and subtracting within 20. By studying patterns and relationships in addition facts and relating addition and subtraction, students build a foundation for fluency with addition and subtraction facts. Adding and subtracting fluently refers to knowledge of procedures, knowledge of when and how to use them appropriately, and skill in performing them flexibly, accurately, and efficiently. The use of objects, diagrams, or interactive whiteboards and various strategies will help students develop fluency.</p>

Concepts What Students Need to Know	Skills What Students Need To Be Able To Do	Bloom's Taxonomy Levels
Add and Subtract within twenty using strategies Fluency with facts to ten	RELATE (counting) ADD and SUBTRACT (within 20 using strategies) <ul style="list-style-type: none"> COUNTING on MAKING ten DECOMPOSING (USING) Inverse operations CREATING equivalent sums 	1 2

Grade 1 Mathematics

Essential Questions	Big Ideas
What strategies can I use to become fluent with my addition and subtraction facts?	Basic facts use concepts of equivalence to make calculations simpler. Numbers can be broken apart and grouped in different ways to make calculations simpler. Subtraction facts can be found by thinking of related addition facts.

Mathematical Practices UNIT 7
<p><i>Practices in bold are to be emphasized in the unit.</i></p> <ol style="list-style-type: none">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.

Pre-assessment for Unit 7

Teacher note: In unit 4, students learned strategies for basic addition and subtraction facts through 20. Although students in Grade 1 will work with number facts within 20, students **will demonstrate fluency for addition and subtraction facts within 10.** Fluency with facts can be defined as knowing them with speed and accuracy OR having an **efficient** strategy to find an unknown fact. This unit can be spent practicing the basic facts through the use of games, online fact acquisition activities, use of flashcards, etc.

Teacher note: <http://www.graniteschools.org/depart/teachinglearning/curriculuminstruction/math/Pages/MathematicsVocabulary.aspx> - illustrated vocabulary cards

Optional assessments:

- **Curriculum-based assessment: Ledyard End of Unit 7 assessment** (found in Unit 7 appendix)

Grade 1 Mathematics

Differentiated Instruction:

Refer to suggestions and leveled lesson resources at the beginning of each lesson in *Math Connects*.

Instructional Strategies: See appendix A for research-based Instructional and Differentiated Strategies

21st Century Learning Skills: See appendix A for explanations.

Technology and Electronic Resources:

SuccessMaker

Math Connects online learning center for tools, activities and “learn more” experiences.

- http://www.montgomeryschoolsmd.org/schools/thurgoodmarshalles/java-applets/Mathflash/Mathflash_small.html - basic fact practice
- <http://tux4kids.alioth.debian.org/tuxmath/> - downloadable game for basic fact practice
- Resource for teachers to successfully implement CCSS. Includes lesson plans, resources and professional development opportunities.
www.ctcore.org

Grade 1 Mathematics

Unit of Study 8: Geometry

Pacing: 15 days + 5 days for reteaching/enrichment

In this unit, students identify and classify 2D and 3D figures. They partition circles and rectangles into equal parts.

DOMAIN and standards: Geometry

Priority and Supporting Common Core State Standards	Explanation and Examples
<p style="background-color: yellow;">The students will reason with shapes and their attributes.</p> <p>CC.1.G.1 DISTINGUISH between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size) for a wide variety of shapes; BUILD and DRAW shapes to possess defining attributes.</p>	<p>Attributes refer to any characteristic of a shape. Students use attribute language to describe a given two-dimensional shape: number of sides, number of vertices/points, straight sides, closed. A child might describe a triangle as “right side up” or “red.” These attributes are not defining because they are not relevant to whether a shape is a triangle or not. Students should articulate ideas such as, “A triangle is a triangle because it has three straight sides and is closed.” It is important that students are exposed to both regular and irregular shapes so that they can communicate defining attributes. Students should use attribute language to describe why these shapes are not triangles.</p> <div style="text-align: center; margin: 10px 0;">  </div> <p>Students should also use appropriate language to describe a given three-dimensional shape: number of faces, number of vertices/points, number of edges.</p> <p>Example: A cylinder would be described as a solid that has two circular faces connected by a curved surface (which is not considered a face). Students may say, “It looks like a can.”</p> <p>Students should compare and contrast two-and three-dimensional figures using defining attributes.</p> <p>Examples:</p> <ul style="list-style-type: none"> • List two things that are the same and two things that are different between a triangle and a cube. • Given a circle and a sphere, students identify the sphere as being three-dimensional but both are round. • Given a trapezoid, find another two-dimensional shape that has two things that are the same.

Grade 1 Mathematics

Priority and Supporting Common Core State Standards	Explanation and Examples
<p>CC.1.G.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.</p>	<p>Example:</p> <ul style="list-style-type: none">• What shapes can be made from four squares? <div style="display: flex; justify-content: space-around; align-items: center;"></div> <p>Students can make three-dimensional shapes with clay or dough, slice into two pieces (not necessarily congruent) and describe the two resulting shapes. For example, slicing a cylinder will result in two smaller cylinders.</p>

Grade 1 Mathematics

Priority and Supporting Common Core State Standards	Explanation and Examples
<p>CC.1.G.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.</p>	<p>Students need experiences with different sized circles and rectangles to recognize that when they cut something into two equal pieces, each piece will equal one half of its original whole. Children should recognize that halves of two different wholes are not necessarily the same size.</p> <p>Examples:</p> <ul style="list-style-type: none">• Student partitions a rectangular candy bar to share equally with one friend and thinks “I cut the rectangle into two equal parts. When I put the two parts back together, they equal the whole candy bar. One half of the candy bar is smaller than the whole candy bar.”  <ul style="list-style-type: none">• Student partitions an identical rectangular candy bar to share equally with 3 friends and thinks “I cut the rectangle into four equal parts. Each piece is one fourth of or one quarter of the whole candy bar. When I put the four parts back together, they equal the whole candy bar. I can compare the pieces (one half and one fourth) by placing them side-by-side. One fourth of the candy bar is smaller than one half of the candy bar.”  <ul style="list-style-type: none">• Students partition a pizza to share equally with three friends. They recognize that they now have four equal pieces and each will receive a fourth or quarter of the whole pizza. 

Grade 1 Mathematics

Concepts What Students Need to Know	Skills What Students Need To Be Able To Do	Bloom's Taxonomy Levels
Shapes <ul style="list-style-type: none"> • Defining attributes • Non-defining attributes 	DISTINGUISH (between defining and non-defining attributes)	4
Two and three dimensional shapes	BUILD (shapes with defining attributes)	6
Composite shapes	DRAW (shapes with defining attributes)	3
Circles and Rectangles	COMPOSE (two and three dimensional shapes)	6
Shares (of circles and rectangles)	CREATE (a composite shape)	6
Wholes Words (<i>halves, fourths, quarters</i>)	COMPOSE a new shape (from a composite shape)	6
Phrases (<i>half of, fourth of, quarter of</i>)	PARTITION (circles, rectangles)	3
Decomposing (creates smaller, equal shares)	DESCRIBE (halves, fourths, quarters)	1
	USE (phrases: half of, quarter of, fourth of)	3
	DESCRIBE (whole in fractions)	1
	UNDERSTAND (more equal shares, smaller the share)	2

Essential Questions	Big Ideas
What words can I use to describe a geometric shape?	Polygons can be described by their sides and angles.
How can I make a new shape from several other shapes?	Polygons can be constructed from or decomposed into other polygons.
How can I divide whole circles and rectangles two or four equal parts? How can I describe those parts?	A fraction describes the division of a whole into equal parts.

Grade 1 Mathematics

Mathematical Practices UNIT 8

Practices in bold are to be emphasized in the unit.

- 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.

Optional assessments:

- **Am I Ready?** (found at the beginning of the chapter – identifies foundational skills needed to be successful in this unit)
- **Curriculum-based assessment: Ledyard End of Unit 8 assessment** (found in Unit 8 appendix)

Learning Activities:

1. Students can identify squares and rectangles and describe their attributes. MM 9-1
2. Students can identify triangles and trapezoids and describe their attributes. MM 9-2
3. Students can identify a circle and describe its attributes MM 9-3
4. Students compare 2D shapes by their attributes. MM 9-4
5. Students combine 2D shapes to make a composite shape. MM 9-5
6. Students explore shapes made from paper triangles. *The Four-Triangle Problem* (M. Burns) (see Appendix)
7. Students use a composite shape to make a new shape. MM 9-6
8. Students solve problems using Logical Reasoning MM 9-7
9. Students determine the number of equal parts in a whole. MM 9-8

Grade 1 Mathematics

10. Students identify halves and cut a whole into two equal parts. MM 9-9

Teacher note:

- provide students with paper circles, all the same size. Have students fold into halves, cut on the fold line, label each piece $\frac{1}{2}$ one-half and glue the two pieces onto a sheet of paper. Repeat with rectangles. Discuss the different ways a rectangle can be cut in half.
- Provide students with paper circles *of different sizes*. Discuss the difference in the size of the whole. Cut circles in half. Children should recognize that halves of two different wholes are not necessarily the same size.

11. Students identify fourths (quarters) and cut a whole into four equal parts. MM 9-10

Teacher note:

- repeat activity above with same size shapes, this time dividing the circles and rectangles into 4 equal pieces. Compare the size of $\frac{1}{2}$ to $\frac{1}{4}$ and have students discover that the more pieces the shape is divided into, the smaller the pieces become. Relate to real world situations such as pizza or brownies.

12. Students identify cubes and rectangular prisms and count and write the number of faces and vertices. MM10-1

13. Students identify cones and cylinders and count and write the number of faces and vertices MM 10-2

14. Student solve problems by using the strategy Look for a Pattern. MM 10-3

15. Students combine 3D shapes to make a composite shape. MM10-4

UNIT 8 VOCABULARY

attribute, circle, composite, cone, corner, cube, cylinder, equal parts, face, fraction, half of, one-half, one-third, one-fourth, quarter of, rectangle, rectangular prism, side, sphere, square, triangle.

Teacher note: <http://www.graniteschools.org/depart/teachinglearning/curriculuminstruction/math/Pages/MathematicsVocabulary.aspx> - illustrated vocabulary cards

Grade 1 Mathematics

Differentiated Instruction:

Refer to suggestions and leveled lesson resources at the beginning of each lesson in *Math Connects*.

Instructional Strategies: See appendix A for research-based Instructional and Differentiated Strategies

21st Century Learning Skills: See appendix A for explanations.

Technology and Electronic Resources:

SuccessMaker

Math Connects online learning center for tools, activities and “learn more” experiences.

- <http://illuminations.nctm.org/ActivityDetail.aspx?ID=70> – interactive site where students can manipulate various geometric solids and color the solid to investigate properties such as the number of faces, edges, and vertices.
- Color & Shapes of Animals: <http://school.discovery.com/lessonplans/programs/animalColorsShapes/>
- My Favorite Place: <http://artsedge.kennedy-center.org/content/3809/>
- Shape Hunt Chant: http://www.readwritethink.org/lesson_images/lesson776/chant.pdf
- <http://math.about.com/library/shapebook.pdf> - printable My Shape Book, corners, sides
- Resource for teachers to successfully implement CCSS. Includes lesson plans, resources and professional development opportunities. www.ctcore.org

Grade 1 Mathematics

Unit of Study 9: Place Value Pacing: 10 days + 5 days for reteaching/enrichment In this unit, students learn about place value to hundreds. They will compare two-digit numbers and use the symbols $>$, $<$, $=$.	
DOMAIN and standards: Number and Operations in Base Ten	
Priority and Supporting Common Core State Standards	Explanation and Examples
The student will extend the counting sequence. CC.1.NBT.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.	Students should experience counting from different starting points (e.g., start at 83; count to 120). To extend students' understanding of counting, they should be given opportunities to count backwards by ones and tens. They should also investigate patterns in the base 10 system.
The student will understand place value. CC.1.NBT.2 UNDERSTAND that the two digits of a two-digit number represent amounts of tens and ones. UNDERSTAND the following as special cases: <ul style="list-style-type: none"> 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). 	Understanding the concept of 10 is fundamental to children's mathematical development. Students need multiple opportunities counting 10 objects and "bundling" them into one group of ten. They count between 10 and 20 objects and make a bundle of 10 with or without some left over (this will help students who find it difficult to write teen numbers). Finally, students count any number of objects up to 99, making bundles of 10s with or without leftovers. As students are representing the various amounts, it is important that an emphasis is placed on the language associated with the quantity. For example, 53 should be expressed in multiple ways such as 53 ones or 5 groups of ten with 3 ones leftover. When students read numbers, they read them in standard form as well as using place value concepts. For example, 53 should be read as "fifty-three" as well as five tens, 3 ones. Reading 10, 20, 30, 40, 50 as "one ten, 2 tens, 3 tens, etc." helps students see the patterns in the number system.
CC.1.NBT.3 COMPARE two two-digit numbers based on meanings of the tens and ones digits, RECORDING the results of comparisons with the symbols $>$, $=$, and $<$.	Students use models that represent two sets of numbers. To compare, students first attend to the number of tens, then, if necessary, to the number of ones. Students may also use pictures, number lines, and spoken or written words to compare two numbers. Comparative language includes but is not limited to more than, less than, greater than, most, greatest, least, same as, equal to and not equal to.

Grade 1 Mathematics

Concepts What Students Need to Know	Skills What Students Need To Be Able To Do	Bloom's Taxonomy Levels
Numbers to 120	COUNT to 120	1
Numerals	READ and WRITE numerals (to 120)	1, 2
Number of objects	REPRESENT (a number of objects with numerals)	2
Symbols (> <)		
Place value: Two-digit numbers represent amounts of tens and ones (place value)	UNDERSTAND (tens and ones)	2
	COMPARE (two two-digit numbers)	2
	RECORD (result using > <)	1

Essential Questions	Big Ideas
How does making groups of tens and ones help me to create a two-digit number?	The place of a digit tells how many ones, tens, and hundreds are represented by that digit.
What words and symbols can I use to compare numbers?	Numbers can be compared using greater than (>), less than (<) or equal (=).

Mathematical Practices UNIT 9
<p><i>Practices in bold are to be emphasized in the unit.</i></p> <ol style="list-style-type: none"> 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.

Grade 1 Mathematics

Optional assessments:

- **Am I Ready?** (found at the beginning of the chapter – identifies foundational skills needed to be successful in this unit)
- **Curriculum-based assessment: Ledyard End of Unit 9 assessment** (found in Unit 9 appendix)

Teacher note: Add the following symbols to the Math Symbol chart:

Math Symbols		
symbol	meaning	example
>	greater than	$4 > 3$
<	less than	$5 < 2$

Learning Activities:

1. Using unifix cubes or other suitable manipulatives, students show a number as tens and ones using regrouping. MM 5-5
2. Using a place value chart, students show numbers to 99. MM 5-7
3. Students learn about the usefulness of place value. *Making Tens and Ones* (M. Burns) (see Appendix)
9. Using models, students compare two two-digit numbers. MM 5-10
5. Students use symbols $<$, $.$, $=$ to compare two two-digit numbers. MM 5-11
6. Using a place value chart, students count hundreds, tens and ones and write the number. MM 5-12

UNIT 9 VOCABULARY: after, before, between, digit, estimate, equal to, greater than, less than, ones, place value, regroup, tens

Teacher note: <http://www.graniteschools.org/depart/teachinglearning/curriculuminstruction/math/Pages/MathematicsVocabulary.aspx> - illustrated vocabulary cards

Grade 1 Mathematics

Technology and Electronic Resources:

SuccessMaker

Math Connects online learning center for tools, activities and “learn more” experiences.

- Resource for teachers to successfully implement CCSS. Includes lesson plans, resources and professional development opportunities.
www.ctcore.org

Differentiated Instruction:

Refer to suggestions and leveled lesson resources at the beginning of each lesson in *Math Connects*.

Instructional Strategies: See appendix A for research-based Instructional and Differentiated Strategies

21st Century Learning Skills: See appendix A for explanations.

Grade 1 Mathematics

Unit of Study 10: Addition and Subtraction of Two-digit Numbers

Pacing: 20 days + 5 days for reteaching/enrichment

In this unit, students add within 100. They subtract multiples of 10.

DOMAIN and standards: Number and Operations in Base Ten

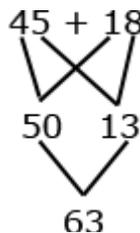
Priority and Supporting Common Core State Standards	Explanation and Examples
<p>The student will use place value understandings and properties of operations to add and subtract.</p> <p>CC.1.NBT.4 ADD within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number 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;</p> <p style="padding-left: 40px;">RELATE the strategy to a written method and</p> <p style="padding-left: 40px;">EXPLAIN the reasoning used.</p> <p style="padding-left: 40px;">UNDERSTAND that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.</p>	<p>Students extend their number fact and place value strategies to add within 100. They represent a problem situation using any combination of words, numbers, pictures, physical objects, or symbols. It is important for students to understand if they are adding a number that has 10s to a number with 10s, they will have more tens than they started with; the same applies to the ones. Also, students should be able to apply their place value skills to decompose numbers. For example, $17 + 12$ can be thought of 1 ten and 7 ones plus 1 ten and 2 ones. Numeral cards may help students decompose the numbers into 10s and 1s.</p> <p>Students should be exposed to problems both in and out of context and presented in horizontal and vertical forms. As students are solving problems, it is important that they use language associated with proper place value (see example). They should always explain and justify their mathematical thinking both verbally and in a written format. Estimating the solution prior to finding the answer focuses students on the meaning of the operation and helps them attend to the actual quantities. <u>This standard focuses on developing addition - the intent is not to introduce traditional algorithms or rules.</u></p> <p>Examples:</p> <ul style="list-style-type: none"> • $43 + 36$ Student counts the 10s (10, 20, 30...70 or 1, 2, 3...7 tens) and then the 1s. <div style="text-align: center; margin-top: 20px;"> </div> <p>(continued on next page)</p>

Grade 1 Mathematics

- 28
 $+34$ Student thinks: 2 tens plus 3 tens is 5 tens or 50. S/he counts the ones and notices there is another 10 plus 2 more. 50 and 10 is 60 plus 2 more or 62.



- 45 + 18 Student thinks: Four 10s and one 10 are 5 tens or 50. Then 5 and 8 is 5 + 5 + 3 (or 8 + 2 + 3) or 13. 50 and 13 is 6 tens plus 3 more or 63.



- 29
 $+14$ Student thinks: "29 is almost 30. I added one to 29 to get to 30. 30 and 14 is 44. Since I added one to 29, I have to subtract one so the answer is 43."

CC.1.NBT.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.

This standard is foundational for future work in subtraction with more complex numbers. Students should have multiple experiences representing numbers that are multiples of 10 (e.g. 90) with models or drawings. Then they subtract multiples of 10 (e.g. 20) using these representations or strategies based on place value. These opportunities develop fluency of addition and subtraction facts and reinforce counting up and back by 10s.

Examples:

- 70 - 30: Seven 10s take away three 10s is four 10s
- 80 - 50: 80, 70 (one 10), 60 (two 10s), 50 (three 10s), 40 (four 10s), 30 (five 10s)
- 60 - 40: I know that 4 + 2 is 6 so four 10s + two 10s is six 10s so 60 - 40 is 20

The student will work with addition and subtraction equations.

CC.1.OA.7 UNDERSTAND the meaning of the equal sign, and DETERMINE if equations involving addition and subtraction are true or false.

Grade 1 Mathematics

Concepts What Students Need to Know	Skills What Students Need To Be Able To Do	Bloom's Taxonomy Levels
<p>Addition</p> <ul style="list-style-type: none"> • Two-digit number to a one-digit number • Two-digit number to a multiple of ten <p>Addition with two-digit numbers using place value strategies</p> <ul style="list-style-type: none"> • Add tens and tens • Add ones and ones • When is it necessary to compose a ten <p>Subtraction (multiples of 10 only)</p> <ul style="list-style-type: none"> • Ten – ninety range • Concrete models/ drawings <p>Meaning of equal sign</p>	ADD (within 100)	2
	USE (concrete models/ drawings)	3
	USE (strategies)	3
	<ul style="list-style-type: none"> • Place value • Properties of operations • Relationship between addition and subtraction 	
	RELATE (strategy to written method)	1
	EXPLAIN (reasoning)	2
	UNDERSTAND (process of adding)	2
	<ul style="list-style-type: none"> • Addition • Place value 	
	SUBTRACT (multiples of 10)	2
	USE (concrete models/drawings)	3
	USE (strategies)	3
	<ul style="list-style-type: none"> • Place value • Properties of operations • Relationship between addition and subtraction 	
	RELATE (strategy to written method)	1
	EXPLAIN (reasoning)	2
UNDERSTAND (meaning of =)	2	
DETERMINE (if equations are true or false)	4	

Grade 1 Mathematics

Essential Questions	Big Ideas
How can I add or subtract two-digit numbers?	Numbers can be broken apart and grouped in different ways to make calculations simpler.

Mathematical Practices UNIT 10
<p><i>Practices in bold are to be emphasized in the unit.</i></p> <ol style="list-style-type: none">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.

Optional assessments:

- **Am I Ready?** (found at the beginning of the chapter – identifies foundational skills needed to be successful in this unit)
- **Curriculum-based assessment: Ledyard End of Unit 10 assessment** (found in Unit 10 appendix)

Teacher note: This standard focuses on developing addition and subtraction of two-digit numbers - the intent is not to introduce traditional algorithms or rules.

Learning Activities:

1. Working in groups and using unifix cubes, students solve $43 + 36$. (See Explanations and Examples above). Have students explain how they solved the problem.
2. Students add groups of tens to find a sum. MM6-1
Teacher note: Model using unifix sticks of 10 or power of ten rods.
3. Given a two-digit number, students count on to find the sum. MM 6-2
4. Using a place value chart, students add a two-digit number and a one-digit number. MM 6-3
10. Students solve problems using the Guess and Check strategy. MM 6-4
6. Students subtract multiples of ten. MM 6-6

Grade 1 Mathematics

7. Students count back by tens using a number line. MM 6-7
8. Students relate addition and subtraction of tens. MM 6-8
9. Students work with true/false statements, such as $70 - 20 = 40$, etc.

UNIT 10 Vocabulary: add, compose a ten, ones, place value chart, subtract, tens, two-digit number

Teacher note: <http://www.graniteschools.org/depart/teachinglearning/curriculuminstruction/math/Pages/MathematicsVocabulary.aspx> - illustrated vocabulary cards

Differentiated Instruction:

Refer to suggestions and leveled lesson resources at the beginning of each lesson in *Math Connects*.

Instructional Strategies: See appendix A for research-based Instructional and Differentiated Strategies

21st Century Learning Skills: See appendix A for explanations.

Technology and Electronic Resources:

SuccessMaker

Math Connects online learning center for tools, activities and “learn more” experiences.

- Resource for teachers to successfully implement CCSS. Includes lesson plans, resources and professional development opportunities.
www.ctcore.org

K-2 Domain Progressions

Domain: Counting and Cardinality		
Kindergarten	Grade 1	Grade 2
<p><u>Know number names and the count sequence.</u></p> <p>K.CC.1: Count to 100 by ones and by tens.</p> <p>K.CC.2: Count forward beginning from a given number within the known sequence (instead of having to begin at 1).</p> <p>K.CC.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).</p> <p><u>Counting to tell the number of objects.</u></p> <p>K.CC.4: Understand the relationship between numbers and quantities; connect counting to cardinality.</p> <p style="padding-left: 20px;">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.</p> <p style="padding-left: 20px;">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.</p> <p style="padding-left: 20px;">c. Understand that each successive number name refers to a quantity that is one larger.</p> <p>K.CC.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.</p> <p><u>Comparing numbers.</u></p> <p>K.CC.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. (Note: Include groups with up to ten objects.)</p>	None	None

Grade 1 Mathematics

K.CC.7: Compare two numbers between 1 and 10 presented as written numerals.

Domain: Operations and Algebraic Thinking		
Kindergarten	Grade 1	Grade 2
<p><u>Understanding addition as putting together and adding to, and adding to, and understanding subtraction as taking apart and taking from.</u></p> <p>K.OA.1: Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations. (Note: Drawings need not show details, but should show the mathematics in the problem – this applies wherever drawings are mentioned in the Standards.)</p> <p>K.OA.2: Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.</p> <p>K.OA.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 $5=4+1$).</p> <p>K.OA.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.</p>	<p><u>Represent and solve problems involving addition and subtraction.</u></p> <p>1.OA.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. (Note: See Glossary, Table 1.)</p> <p>1.OA.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.</p> <p><u>Understand and apply properties of operations and the relationship between addition and subtraction.</u></p> <p>1.OA.3: Apply properties of operations as strategies to add and subtract. (Note: Students need not use formal terms for these properties.) <i>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.)</i></p> <p>1.OA.4: Understand subtraction as an unknown-addend problem. <i>For example, subtract $10-8$ by finding the number that makes 10 when added to 8.</i></p> <p><u>Add and subtract within 20.</u></p> <p>1.OA.5: Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).</p> <p>1.OA.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 $6+6+1=12+1=13$).</p> <p><u>Work with addition and subtraction equations.</u></p> <p>1.OA.7: Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. <i>For example, which of the following equations are true and which are false? $6=6$, $7=8-1$, $5+2=2+5$, $4+1=5+2$.</i></p> <p>1.OA.8: Determine the unknown whole number in an addition or subtraction equation relating to three whole numbers. <i>For example, determine the unknown number that makes the equation true in each of the equations $8+?=11$, $5=\square-3$, $6+6=\square$.</i></p>	<p><u>Represent and solve problems involving addition and subtraction.</u></p> <p>2.OA.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. (Note: See Glossary, Table 1.)</p> <p><u>Add and subtract within 20.</u></p> <p>2.OA.2: Fluently add and subtract within 20 using mental strategies. (Note: See standard 1.OA.6 for a list of mental strategies). By end of Grade 2, know from memory all sums of two one-digit numbers.</p> <p><u>Work with equal groups of objects to gain foundations for multiplication.</u></p> <p>2.OA.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.</p> <p>2.OA.4: Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5</p>

Grade 1 Mathematics

K.OA.5: Fluently add and subtract within 5.		columns; write an equation to express the total as a sum of equal addends.
---	--	--

Domain: Number and Operations in Base Ten

Kindergarten	Grade 1	Grade 2
<p><u>Working with numbers 11-19 to gain foundations for place value.</u></p> <p>K.NBT.1: Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations. (Note: Drawings need not show details, but should show the mathematics in the problem – this applies wherever drawings are mentioned in the Standards.)</p>	<p><u>Extend the counting sequence.</u></p> <p>1.NBT.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.</p> <p><u>Understand place value.</u></p> <p>1.NBT.2: Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:</p> <ul style="list-style-type: none"> 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). <p>1.NBT.3: Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols $>$, $=$, and $<$.</p> <p><u>Use place value understanding and properties of operations to add and subtract.</u></p> <p>1.NBT.4: Add within 100, including adding a two-digit number and 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.</p> <p>1.NBT.5: Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.</p> <p>1.NBT.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</p>	<p><u>Understand place value.</u></p> <p>2.NBT.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:</p> <ul style="list-style-type: none"> 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). <p>2.NBT.2: Count within 1000; skip-count by 5s, 10s, and 100s.</p> <p>2.NBT.3: Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.</p> <p>2.NBT.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.</p> <p><u>Use place value understanding and properties of operations to add and subtract.</u></p> <p>2.NBT.5: Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.</p> <p>2.NBT.6: Add up to four two-digit numbers using strategies based on place value and properties of operations.</p> <p>2.NBT.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, and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.</p> <p>2.NBT.8: Mentally add 10 or 100 to a given number 100-900, and mentally subtract 10 or 100 from a given number 100-900.</p>

Grade 1 Mathematics

	value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.	2.NBT.9: Explain why addition and subtraction strategies work, using place value and the properties of operations. (Note: Explanations may be supported by drawings or objects.)
Domain: Measurement and Data		
Kindergarten	Grade 1	Grade 2
<p><u>Describe and compare measurable attributes.</u></p> <p>K.MD.1: Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.</p> <p>K.MD.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. <i>For example, directly compare the heights of two children and describe one child as taller/shorter.</i></p> <p><u>Classify objects and count the number of objects in each category.</u></p> <p>K.MD.3: Classify objects or people into given categories; count the numbers in each category and sort the categories by count. (Note: Limit category counts to be less than or equal to 10.)</p>	<p><u>Measure lengths indirectly and by iterating length units.</u></p> <p>1.MD.1: Order three objects by length; compare the lengths of two objects indirectly by using a third object.</p> <p>1.MD.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.</p> <p><u>Tell and write time.</u></p> <p>1.MD.3: Tell and write time in hours and half-hours using analog and digital clocks.</p> <p><u>Represent and interpret data.</u></p> <p>1.MD.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.</p>	<p><u>Measure and estimate lengths in standard units.</u></p> <p>2.MD.1: Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.</p> <p>2.MD.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.</p> <p>2.MD.3: Estimate lengths using units of inches, feet, centimeters, and meters.</p> <p>2.MD.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.</p> <p>2.MD.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.</p> <p>2.MD.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.</p> <p><u>Work with time and money.</u></p> <p>2.MD.7: Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.</p> <p>2.MD.8: Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using \$ and ¢ symbols appropriately. <i>Example: If you have 2 dimes and 3 pennies, how many cents do you have?</i></p> <p><u>Represent and interpret data.</u></p> <p>2.MD.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.</p> <p>2.MD.10: Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put together, take-apart, and compare problems using information presented in a bar graph. (Note: See Glossary, Table 1.)</p>

Grade 1 Mathematics

--	--	--

Grade 1 Mathematics

Domain: Geometry		
Kindergarten	Grade 1	Grade 2
<p><u>Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).</u></p> <p>K.G.1: Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as <i>above</i>, <i>below</i>, <i>beside</i>, <i>in front of</i>, <i>behind</i>, and <i>next to</i>.</p> <p>K.G.2: Correctly name shapes regardless of their orientations or overall size.</p> <p>K.G.3: Identify shapes as two-dimensional (lying in a plane, “flat”) or three-dimensional (“solid”).</p> <p><u>Analyze, compare, create, and compose shapes.</u></p> <p>K.G.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).</p> <p>K.G.5: Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.</p> <p>K.G.6: Compose simple shapes to form larger shapes. For example, “<i>Can you join these two triangles with full sides touching to make a rectangle?</i>”</p>	<p><u>Reason with shapes and their attributes.</u></p> <p>1.G.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.</p> <p>1.G.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. (Note: Students do not need to learn formal names such as “right rectangular prism.”)</p> <p>1.G.3: Partition circles and rectangles into two and four equal shares, describe the shares using the words <i>halves</i>, <i>fourths</i>, and <i>quarters</i>, and use the phrases <i>half of</i>, <i>fourth of</i>, and <i>quarter of</i>. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.</p>	<p>Reason with shapes and their attributes.</p> <p>2.G.1: Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. (Note: Sizes are compared directly or visually, not compared by measuring.) Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.</p> <p>2.G.2: Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.</p> <p>2.G.3: Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words <i>halves</i>, <i>thirds</i>, <i>half of</i>, <i>a third of</i>, 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.</p>