Standards for Mathematical Practice in First Grade

The Common Core State Standards for Mathematical Practice are practices expected to be integrated into every mathematics lesson for all students Grades K-12. Below are a few examples of how these Practices may be integrated into tasks that students complete.

Mathematical Practice	Explanations and Examples
1) Make Sense and Persevere in Solving Problems.	Mathematically proficient students in First Grade continue to develop the ability to focus attention, test hypotheses, take reasonable risks, remain flexible, try alternatives, exhibit self-regulation, and persevere (Copley, 2010). As the teacher uses thoughtful questioning and provides opportunities for students to share thinking, First Grade students become conscious of what they know and how they solve problems. They make sense of task-type problems, find an entry point or a way to begin the task, and are willing to try other approaches when solving the task. They ask themselves, "Does this make sense?" First Grade students' conceptual understanding builds from their experiences in Kindergarten as they continue to rely on concrete manipulatives and pictorial representations to solve a problem, eventually becoming fluent and flexible with mental math as a result of these experiences.
2) Reason abstractly and quantitatively.	Mathematically proficient students in First Grade recognize that a number represents a specific quantity. They use numbers and symbols to represent a problem, explain thinking, and justify a response. For example, when solving the problem: "*There are 60 children on the playground. Some children line up. There are 20 children still on the playground. How many children lined up?"* first grade students may write 20 + 40 = 60 to indicate a Think-Addition strategy. Other students may illustrate a counting-on by tens strategy by writing 20 + 10 + 10 + 10 + 10 = 60. The numbers and equations written illustrate the students' thinking and the strategies used, rather than how to simply compute, and how the story is decontextualized as it is represented abstractly with symbols.
3) Construct viable arguments and critique the reasoning of others	Mathematically proficient students in First Grade continue to develop their ability to clearly express, explain, organize and consolidate their math thinking using both verbal and written representations. Their understanding of grade appropriate vocabulary helps them to construct viable arguments about mathematics. For example, when justifying why a particular shape isn't a square, a first grade student may hold up a picture of a rectangle, pointing to the various parts, and reason, "It can't be a square because, even though it has 4 sides and 4 angles, the sides aren't all the same size." In a classroom where risk-taking and varying perspectives are encouraged, mathematically proficient students are willing and eager to share their ideas with others, consider other ideas proposed by classmates, and question ideas that don't seem to make sense.
4) Model with mathematics.	Mathematically proficient students in First Grade model real-life mathematical situations with a number sentence or an equation, and check to make sure that their equation accurately matches the problem context. They also use tools, such as tables, to help collect information, analyze results, make conclusions, and review their conclusions to see if the results make sense and revising as needed.

5) Use appropriate tools strategically.	Mathematically proficient students in First Grade have access to a variety of concrete (e.g. 3-dimensional solids, ten frames, number balances, number lines) and technological tools (e.g., virtual manipulatives, calculators, interactive websites) and use them to investigate mathematical concepts. They select tools that help them solve and/or illustrate solutions to a problem. They recognize that multiple tools can be used for the same problem- depending on the strategy used. For example, a child who is in the counting stage may choose connecting cubes to solve a problem. While, a student who understands parts of number, may solve the same problem using ten-frames to decompose numbers rather than using individual connecting cubes. As the teacher provides numerous opportunities for students to use educational materials, first grade students' conceptual understanding and higher-order thinking skills are developed.
6) Attend to precision.	Mathematically proficient students in First Grade attend to precision in their communication, calculations, and measurements. They are able to describe their actions and strategies clearly, using grade-level appropriate vocabulary accurately. Their explanations and reasoning regarding their process of finding a solution becomes more precise. In varying types of mathematical tasks, first grade students pay attention to details as they work. For example, as students' ability to attend to position and direction develops, they begin to notice reversals of numerals and self-correct when appropriate. When measuring an object, students check to make sure that there are not any gaps or overlaps as they carefully place each unit end to end to measure the object (iterating length units). Mathematically proficient first grade students understand the symbols they use (=, >,<) and use clear explanations in discussions with others. For example, for the sentence 4 > 3, a proficient student who is able to attend to precision states, "Four is more than 3" rather than "The alligator eats the four. It's bigger."
7) Look for and make use of structure.	Mathematically proficient students in First Grade carefully look for patterns and structures in the number system and other areas of mathematics. For example, while solving addition problems using a number balance, students recognize that regardless whether you put the 7 on a peg first and then the 4, or the 4 on first and then the 7, they both equal 11 (commutative property). When decomposing two-digit numbers, students realize that the number of tens they have constructed 'happens' to coincide with the digit in the tens place. When exploring geometric properties, first graders recognize that certain attributes are critical (number of sides, angles), while other properties are not (size, color, orientation).
8) Look for and express regularity in repeated reasoning.	Mathematically proficient students in First Grade begin to look for regularity in problem structures when solving mathematical tasks. For example, when adding three one-digit numbers and by making tens or using doubles, students engage in future tasks looking for opportunities to employ those same strategies. Thus, when solving 8+7+2, a student may say, "I know that 8 and 2 equal 10 and then I add 7 more. That makes 17. It helps to see if I can make a 10 out of 2 numbers when I start." Further, students use repeated reasoning while solving a task with multiple correct answers. For example, in the task "There are 12 crayons

	in the box. Some are red and some are blue. How many of each could there be?" First Grade students realize that the 12 crayons could include 6 of each color (6+6 = 12), 7 of one color and 5 of another (7+5 = 12), etc. In essence, students repeatedly find numbers that add up to 12.

Grade 1 Critical Areas

The Critical Areas are designed to bring focus to the standards at each grade by describing the big ideas that educators can use to build their curriculum and to guide instruction.

The Critical Areas for First Grade can be found on page 13 in the *Common Core State Standards for Mathematics*.

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 addto, 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 relationships 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.

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.

Operations and Algebraic Thinking

• Represent and solve problems involving addition and subtraction.

Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking fro
taking apart, and comparing, with unknowns in all positions, *e.g., by using objects, drawings, and equations wi*
number to represent the problem.

Student Friendly/"I Can" statements	Resources	A
1. Use a symbol for an unknown number in an addition or subtraction problem within 20 2. Add and subtract to solve word problems within 20. 3. Interprets situations to solve word problems with unknowns in all positions within 20 using addition and subtraction 4. Determines appropriate representations for solving word problems involving different situations using addition and subtraction	http://nlvm.usu.edu	

Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, *drawings, and equations with a symbol for the unknown number to represent the problem.*

Student Friendly/"I Can" statements	Resources	A
1. Add three whole numbers whose sum is less than or equal to 20. 2. Solve addition word problems that require adding three whole numbers whose sum is less than or equal to 20.		

• Understand and apply properties of operations and the relationship between addition a

Apply properties of operations as strategies to add and subtract. *Examples: If 8 + 3 = 11 is known, then 3 + 8 =*
(Commutative property of addition.) To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 +
(Associative property of addition.)

Student Friendly/"I Can" statements	Resources	A
1. Know the commutative property. 2. Know the associative property. 3. Understand subtraction as the unknown addend. 4. Explain how properties of operation strategies work. 5. Apply strategies using properties of operations to solve addition and subtraction problems	http://nlvm.usu.edu	

Understand subtraction as an unknown-addend problem. *For example, subtract 10 – 8 by finding the number t*
8.

Student Friendly/"I Can" statements	Resources	A
1. Identify the unknown in a subtraction problem 2. Understand subtraction as the unknown addend. 3. Solve subtraction problems to find the missing addend. 4. Explain the relationship of addition and subtraction.		

• Add and subtract within 20.

Relate counting to addition and subtraction *(e.g., by counting on 2 to add 2).*

Student Friendly/"I Can" statements	Resources	A
1. Know how to count on and count back. 2. Explain how counting on and counting back relate to addition and subtraction.	http://nlvm.usu.edu	

Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies s
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 –*
relationship between addition and subtraction *(e.g., knowing that 8 + 4 = 12, one knows 12 – 8= 4)*; and creatin
known sums *(e.g., adding 6 +7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13).*

Student Friendly/"I Can" statements	Resources	A
1. Add fluently within 10. 2. Subtract fluently within 10. 3. Apply strategies to add and subtract within 20.	http://nlvm.usu.edu	

• Work with addition and subtraction equations.

Understand the meaning of the equal sign, and determine if equations involving addition and subtraction a
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.

Student Friendly/"I Can" statements	Resources	A
1. Explain the meaning of an equal sign (the quantity on each side of the equality symbol is the same). 2. Compare the values on each side of an equal sign. 3. Determine if the equation is true or false.	http://nlvm.usu.edu	

Determine the unknown whole number in an addition or subtraction equation relating to three whole num
determine the unknown number that makes the equation true in each of the equations 8 +? = 11, 5 = □ – 3, 6 + 6 = □

Student Friendly/"I Can" statements	Resources	A
1. Recognize part-part-whole relationships of three whole numbers Example: □ + 5 = 8 5 = □ - 3 In each instance the 3 and 5 represent the parts and the 8 would be representative of the whole. 2. Determine the missing value in an addition or subtraction equation by using a variety of strategies.		

Number and Operations in Base Ten

• Extend the counting sequence.

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

Student Friendly/"I Can" statements	Resources	A
1. Write numerals up to 120. 2. Represent a number of objects up to 120 with a written numeral. 3. Count (saying the number sequence) to 120, starting at any number less than 120 4. Read the numerals up to 120.	http://nlvm.usu.edu	

• Understand place value.

Understand that the two digits of a two-digit number represent amounts of tens and ones.

Student Friendly/"I Can" statements	Resources	A
1. Explain what each digit of a two-digit number represents	http://nlvm.usu.edu	

Understand the following as special cases:

a. 10 can be thought of as a bundle of ten ones — called a "ten."

Student Friendly/"I Can" statements	Resources	A
1. Identify a bundle of 10 ones as a "ten".		

b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or ni

Student Friendly/"I Can" statements	Resources	A
1. Represent numbers 11 to 19 as composed of a ten and correct number of ones.		

c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nin

Student Friendly/"I Can" statements	Resources	A
1. Represent the numbers 20, 30, 40, 50, 60, 70, 80, and 90 as composed of the correct number of tens.		

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

Student Friendly/"I Can" statements	Resources	A
1. Identity the value of each digit represented in the two-digit number. 2. Know what each symbol represents >, <, and =. 3. Compare two two-digit numbers based on meanings of the tens and ones digits.		

4. Use >, =, and < symbols to record the results of comparisons.		

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

Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit numb
using concrete models or drawings and strategies based on place value, properties of operations, and/or t
addition and subtraction; relate the strategy to a written method and explain the reasoning used. Underst
digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.

Student Friendly/"I Can" statements	Resources	A
1. Identify the value of each digit of a number within 100. 2. Decompose any number within one hundred into ten(s) and one(s). 3. Choose an appropriate strategy for solving an addition or subtraction problem within 100. 4. Relate the chosen strategy (using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction) to a written method (equation) and explain the reasoning used. 5. Use composition and decomposition of tens when necessary to add and subtract within 100.	http://nlvm.usu.edu	

Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; exp

Student Friendly/"I Can" statements	Resources	A
1. Identify the value of each digit in a number within 100. 2. Apply knowledge of place value to mentally add or subtract 10 to/from a given two digit number. 3. Explain how to mentally find 10 more or 10 less than the given two-digit number.		

Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 *(positive or zero differenc*
or drawings and strategies based on place value, properties of operations, and/or the relationship betwee
subtraction; relate the strategy to a written method and explain the reasoning used.

Student Friendly/"I Can" statements	Resources	A
1. Identify the value of each digit of a number within 100. 2. Subtract multiples of 10 in the range of 10-90 from multiples of 10 in the range of		

10-90 (positive or zero differences). 3. Choose appropriate strategy (concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction) for solving subtraction problems with multiples of 10. 4. Relate the chosen strategy to a written method (equation) and explain the reasoning used.		

Measurement and Data

• Measure lengths indirectly and by iterating length units.

Order three objects by length; compare the lengths of two objects indirectly by using a third object.

Student Friendly/"I Can" statements	Resources	A
1. Identify the measurement known as the length of an object 2. Directly compare the length of three objects. 3. Order three objects by length 4. Compare the lengths of two objects indirectly by using a third object to compare them (e.g., if the length of object A is greater than the length of object B, and the length of object B is greater than the length of object C, then the length of object A is greater than the length of object C.)	http://nlvm.usu.edu	

Express the length of an object as a whole number of length units, by laying multiple copies of a shorter ob
end; understand that the length measurement of an object is the number of same-size length units that sp
overlaps. *Limit to contexts where the object being measured is spanned by a whole number of length units*

Student Friendly/"I Can" statements	Resources	A
1. Knows to use the same size non-standard objects as iterated (repeating) units 2. Know that length can be measured with various units 3. Compare a smaller unit of measurement to a larger object 4. Determine the length of the measured object to be the number of smaller iterated (repeated) objects that equal its length 5. Demonstrate the measurement of an object using non-standard units (e.g. paper clips, unifix cubes, etc.) by laying the units of measurement end to end with no gaps or overlaps		

•Tell and write time.

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

Student Friendly/"I Can" statements	Resources	A
1. Recognize that analog and digital clocks		

are objects that measure time. 2. Know hour hand and minute hand and distinguish between the two. 3. Determine where the minute hand must be when the time is to the hour (o'clock). 4. Determine where the minute hand must be when the time is to the half hour (thirty). 5. Tell/Write the time to the hour and half hour correctly using analog and digital clocks – for instance when it is 3:30 the hour hand is between the 3 and the 4; the minute hand is on the 6.	http://nlvm.usu.edu	

•Represent and interpret data.

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

Student Friendly/"I Can" statements	Resources	A
1. Recognize different methods to organize data 2. Recognize different methods to represent data 3. Organize data with up to three categories 4. Represent data with up to three categories 5. Interpret data representation by asking and answering questions about the data.	http://nlvm.usu.edu	

Geometry

• Reason with shapes and their attributes.

Distinguish between defining attributes *(e.g., triangles are closed and three-sided)* versus non-defining attribu
overall size); build and draw shapes to possess defining attributes.

Student Friendly/"I Can" statements	Resources	As
1. Identify defining attributes of shapes. 2. Identify non-defining attributes of shapes. 3. Distinguish between (compare/contrast) defining and non-defining attributes of shapes. 4. Build shapes to show defining attributes. 5. Draw shapes to show defining attributes.	http://nlvm.usu.edu	

Compose two-dimensional shapes *(rectangles, squares, trapezoids, triangles, half-circles, and quarter-circl*
shapes *(cubes, right rectangular prisms, right circular cones, and right circular cylinders)* to create a compo
new shapes from the composite shape.

Student Friendly/"I Can" statements	Resources	A
1. Know that shapes can be composed and decomposed to make new shapes 2. Describe properties of original and composite shapes 3. Determine how the original and created composite shapes are alike and different 4. Create composite shapes 5. Compose new shapes from a composite shape		

Partition circles and rectangles into two and four equal shares, describe the shares using the words *halves*,
and use the phrases *half of*, *fourth of*, and *quarter of*. Describe the whole as two of, or four of the shares. U
examples that decomposing into more equal shares creates smaller shares.

Student Friendly/"I Can" statements	Resources	A
1. Identify when shares are equal 2. Identify two and four equal shares 3. Describe equal shares using vocabulary: halves, fourths and quarters, half of, fourth of, and quarter of 4. Describe the whole as two of two or four		

of four equal shares		