CCSS-M Teacher Professional Learning

Session #1, October 2014

Grade 3

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(Selected pages relevant to session work)

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3 Grade 3

Number and Operations in Base Ten — 3.NBT

Use place value understanding and properties of operations to perform multi-digit arithmetic.[4]

1. Use place value understanding to round whole numbers to the nearest 10 or 100.
2. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
3. Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.

Number and Operations—Fractions[5] — 3.NF

Develop understanding of fractions as numbers.

1. Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by *a* parts of size 1/*b*.
2. Understand a fraction as a number on the number line; represent fractions on a number line diagram.
    a. Represent a fraction 1/*b* on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that each part has size 1/*b* and that the endpoint of the part based at 0 locates the number 1/*b* on the number line.
    b. Represent a fraction *a*/*b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a*/*b* and that its endpoint locates the number *a*/*b* on the number line.
3. Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.
    a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.
    b. Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model.
    c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.
    d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

Measurement and Data — 3.MD

Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.

1. Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.
2. Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l).[6] Add, subtract, multiply, or divide to solve one-step word problems

[4] A range of algorithms may be used.
[5] Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.
[6] Excludes compound units such as cm^3 and finding the geometric volume of a container.

Common Core State Standards - Mathematics
Standards for Mathematical Practices – 3rd Grade

Standard for Mathematical Practice	3rd Grade
1: Make sense of problems and persevere in solving them. Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.	In third grade, students know that doing mathematics involves solving problems and discussing how they solved them. Students explain to themselves the meaning of a problem and look for ways to solve it. Third graders may use concrete objects or pictures to help them conceptualize and solve problems. They may check their thinking by asking themselves, - Does this make sense? They listen to the strategies of others and will try different approaches. They often will use another method to check their answers.

2: Reason abstractly and quantitatively. Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*-to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents-and the ability to *contextualize*, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.	Third graders should recognize that a number represents a specific quantity. They connect the quantity to written symbols and create a logical representation of the problem at hand, considering both the appropriate units involved and the meaning of quantities.
3: Construct viable arguments and critique the reasoning of others. Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and-if there is a flaw in an argument-explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.	In third grade, students may construct arguments using concrete referents, such as objects, pictures, and drawings. They refine their mathematical communication skills as they participate in mathematical discussions involving questions like -How did you get that? and -Why is that true? They explain their thinking to others and respond to others' thinking.

4: Model with mathematics. Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.	Students experiment with representing problem situations in multiple ways including numbers, words (mathematical language), drawing pictures, using objects, acting out, making a chart, list, or graph, creating equations, etc. Students need opportunities to connect the different representations and explain the connections. They should be able to use all of these representations as needed. Third graders should evaluate their results in the context of the situation and reflect on whether the results make sense.
5: Use appropriate tools strategically. Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose	Third graders consider the available tools (including estimation) when solving a mathematical problem and decide when certain tools might be helpful. For instance, they may use graph paper to find all the possible rectangles that have a given perimeter. They compile the possibilities into an organized list or a table, and determine whether they have all the possible rectangles.

6: Attend to precision. Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.	As third graders develop their mathematical communication skills, they try to use clear and precise language in their discussions with others and in their own reasoning. They are careful about specifying units of measure and state the meaning of the symbols they choose. For instance, when figuring out the area of a rectangle they record their answers in square units.
7: Look for and make use of structure. Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7×8 equals the well remembered $7 \times 5 + 7 \times 3$, in preparation for learning about the distributive property. In the expression $x2 + 9x + 14$, older students can see the 14 as 2×7 and the 9 as $2 + 7$. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 - 3(x - y)2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers *x* and *y*.	In third grade, students look closely to discover a pattern or structure. For instance, students use properties of operations as strategies to multiply and divide (commutative and distributive properties).

8: Look for and express regularity in repeated reasoning. Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation $(y – 2)/(x – 1) = 3$. Noticing the regularity in the way terms cancel when expanding $(x – 1)(x + 1)$, $(x – 1)(x2 + x + 1)$, and $(x – 1)(x3 + x2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.	Students in third grade should notice repetitive actions in computation and look for more shortcut methods. For example, students may use the distributive property as a strategy for using products they know to solve products that they don't know. For example, if students are asked to find the product of 7 x 8, they might decompose 7 into 5 and 2 and then multiply 5 x 8 and 2 x 8 to arrive at 40 + 16 or 56. In addition, third graders continually evaluate their work by asking themselves, -Does this make sense?

mathematically and how they are related to properties of operations (e.g., why is the multiplication table symmetric about its diagonal?) (**MP.3**)
(Adapted from N. Carolina 2011 and the Kansas Association of Teachers of Mathematics [KATM] 3rd FlipBook 2012)

Domain: Number and Operations in Base Ten

Number and Operations in Base Ten 3.NBT

Use place value understanding and properties of operations to perform multi-digit arithmetic.[7]

1. Use place value understanding to round whole numbers to the nearest 10 or 100.
2. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
3. Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g. 9 × 80, 5 × 60) using strategies based on place value and properties of operations.

In grade three, students are introduced to the concept of rounding whole numbers to the nearest 10 or 100 **(3.NBT.1)**, an important prerequisite for working with estimation problems. Students can use a number line or a hundreds chart as tools to support their work with rounding. They learn when and why to round numbers and extend their understanding of place value to include whole numbers with four digits.

Third grade students continue adding and subtracting within 1000 and achieve fluency with strategies and algorithms that are based on place value, properties of operations, and/or the relationship between addition and subtraction **(3.NBT.2)**.

Grade three students continue to add and subtract using methods they developed in grade two and their understanding of place value and the properties of operations Students in grade two were already adding and subtracting within 1000 (without the expectation of full fluency) and using at least one method that generalizes readily to larger numbers, so this is a relatively small and incremental expectation for third graders. Such methods will continue to be the focus in grade three so the extension at

[7] A range of algorithms may be used.

grade four to generalize these methods to larger numbers (up to 1,000,000) should also be relatively easy and rapid.

Third grade students also multiply one-digit whole numbers by multiples of 10 (**3.NBT.3**) in the range 10–90, using strategies based on place value and properties of operations (e.g., "I know 5 × 90 = 450 because 5 × 9 = 45 and so 5 × 90 should be ten times as much."). Students also interpret 2 × 40 as 2 groups of 4 tens or 8 groups of ten. They understand 5 × 60 is 5 groups of 6 tens or 30 tens, and they know 30 tens is 300. After developing this understanding students begin to recognize the patterns in multiplying by multiples of 10 (Adapted from Arizona 2012). The skill of multiplying one-digit numbers by multiples of 10 can support later student learning of standard algorithms for multiplication of multi-digit numbers.

Domain: Number and Operations—Fractions

In grade three students develop an understanding of fractions as numbers, beginning with unit fractions by building on the idea of partitioning a whole into equal parts. Student proficiency with fractions is essential for success in more advanced mathematics such as percentages, ratios and proportions, and in algebra at later grades.

Number and Operations—Fractions[8] 3.NF

Develop understanding of fractions as numbers.

1. Understand a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size $1/b$.
2. Understand a fraction as a number on the number line; represent fractions on a number line diagram.
    a. Represent a fraction $1/b$ on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size $1/b$ and that the endpoint of the part based at 0 locates the number $1/b$ on the number line.
    b. Represent a fraction a/b on a number line diagram by marking off a lengths $1/b$ from 0.

[8] Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.

Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.

In grades one and two, students partitioned circles and rectangles into two, three, and four equal shares and used fraction language (e.g., halves, thirds, half of, a third of). In grade three, students begin to enlarge their concept of number by developing an understanding of fractions as numbers (Adapted from PARCC 2012).

Grade three students understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts and the fraction *a/b* as the quantity formed by *a* parts of size 1/*b*. **(3.NF.1▲).**

[Note: Sidebar]

Focus, Coherence, and Rigor:
When working with fractions, two main ideas should be emphasized:

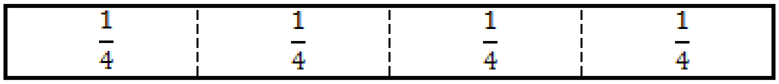
- Specifying the whole
- Explaining what is meant by “equal parts”

Student understanding of fractions hinges on understanding these ideas.

Students build on the idea of *partitioning* or dividing a whole into equal parts to understand fractions. Students start with unit fractions (fractions with numerator 1), which are formed by partitioning a whole into equal parts (the number of equal parts becomes the denominator) and taking one of those parts. An important goal is for students to see unit fractions as the basic building blocks of fractions, in the same sense that the number 1 is the basic building block of the whole numbers. Students make the connection that just as every whole number is obtained by combining a sufficient number of 1s; every fraction is obtained by combining a sufficient number of unit fractions (Adapted from Progressions 3-5 NF 2012). They explore fractions first using concrete models such as fraction bars and geometric shapes, which will culminate in understanding fractions on the number line.

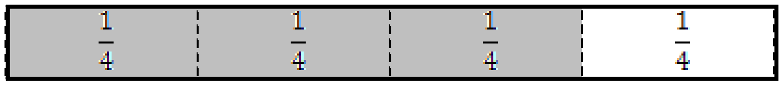
Examples:
Show the fraction $\frac{1}{4}$ by folding the piece of paper into equal parts.

"I know that when the number on the bottom is 4, I need to make four equal parts. By folding the paper in half once and then again, I get four parts and each part is equal. Each part is worth $\frac{1}{4}$."



Shade 3/4 using the fraction bar you created.

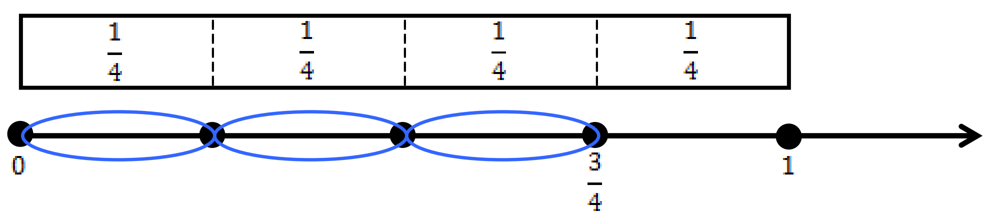
"My fraction bar shows fourths. The 3 tells me I need three of them, so I'll shade them. I could have shaded any three of them and I would still have 3/4."



Eventually, students represent fractions by dividing a number line from 0 to 1 into equal parts and recognize that each segmented part represents the same length **(MP.2, MP.4, MP.7)**. Stacking fraction bars and number lines can help students see how the unit length has been divided into equal parts. Important is that students "mark off" lengths of 1/*b* when locating fractions on the number line. Notice the difference between how the fraction bar and number line are labeled in the example shown below **(3.NF.2a-b)**.

Example (Representing Fractions on the Number Line): Use your fraction bar and the number line given to locate the fraction $\frac{3}{4}$. Explain how you know your mark is in the right place.

Solution: "When I use my fraction strip as a measuring tool, it shows me how to divide the unit interval into four equal parts (since the denominator is 4). Then I start from the mark that has '0' and I measure off three pieces of $\frac{1}{4}$ each. I circled the pieces to show that I marked three of them. This is how I know I have marked $\frac{3}{4}$."

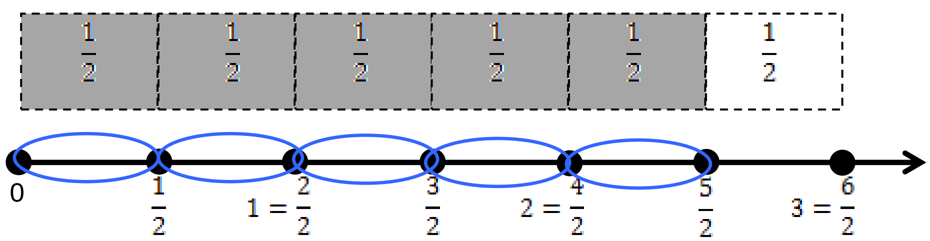


Third grade students need opportunities to place fractions on a number line and understand fractions as a related component of the ever-expanding number system. The number line reinforces the analogy between fractions and whole numbers. Just as

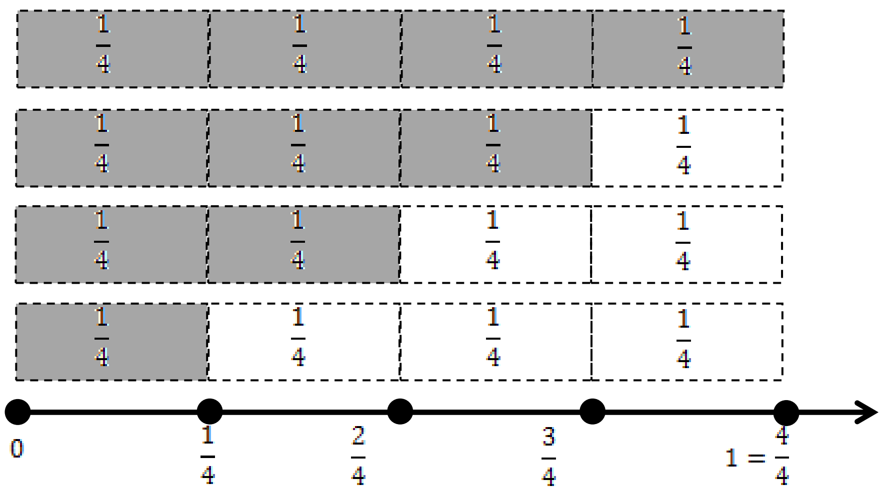
5 is the point on the number line reached by marking off 5 times the length of the unit interval from 0, so is $\frac{5}{3}$ the point obtained by marking off 5 times the length of a different interval as the basic unit of length, namely the interval from 0 to $\frac{1}{3}$.

Fractions Greater Than One. Note that the standards do not distinguish fractions greater than one as being "improper fractions." Fractions greater than one, such as $\frac{5}{2}$, are simply numbers in themselves and are constructed in the same way as other fractions.

Thus, to construct $\frac{5}{2}$, we might use a fraction strip as a measuring tool to mark off lengths of $\frac{1}{2}$. Then we count five of those halves, to get $\frac{5}{2}$.



Students recognize that when examining fractions with common denominators, the wholes have been divided into the same number of equal parts, so the fraction with the larger numerator has the larger number of equal parts. Students develop an understanding of the numerator and denominator as they label each fractional part based on how far it is from zero to the endpoint. (**MP.7**)



Number and Operations—Fractions[9] 3.NF

Develop understanding of fractions as numbers.

3. Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.
   a. Understand two fractions as equivalent (equal) if they are the same size, or the same end point on a number line.
   b. Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model.
   c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 =6; locate 4/4 and 1 at the same point on a number line diagram.*
   d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a fraction model.

Students develop an understanding of fractions as they use visual models and a number line to represent, explain, and compare unit fractions, equivalent fractions (e.g., $\frac{1}{2}=\frac{2}{4}$), whole numbers as fractions (e.g., $3=\frac{3}{1}$), and fractions with the same numerator (e.g., $\frac{4}{3}$ and $\frac{4}{6}$) or the same denominator (e.g., $\frac{4}{8}$ and $\frac{5}{8}$. **(NF.2-3▲**).

[9] Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.

Domain: **Number and Operations in Base Ten (NBT)**

Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic. (A range of algorithms may be used.)

Standard: **3.NBT.1.** Use place value understanding to round whole numbers to the nearest 10 or 100.

Standards for Mathematical Practices to be emphasized:

MP.5. Use appropriate tools strategically.
MP.7. Look for and make use of structure.
MP.8. Look for and express regularity in repeated reasoning.

Connections: **(3.NBT.1-3)**

This cluster is connected to the Third Grade Critical Area of Focus #1**, Developing understanding of multiplication and division and strategies for multiplication and division within 100**. Additionally, the content in this cluster goes beyond the critical areas to address solving multi-step problems.

The rounding strategies developed in third grade will be expanded in grade four with larger numbers. Additionally, students will formalize the rules for rounding numbers with the expansion of numbers in fourth grade.

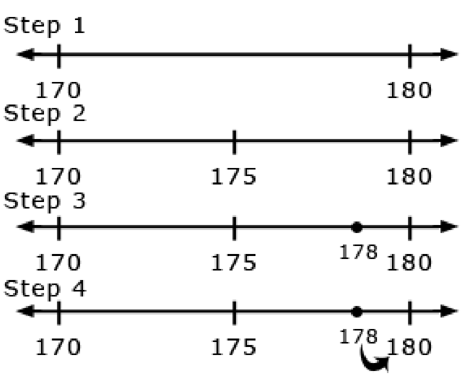
In fourth grade the place value concepts developed in grades K-3 will be expanded to include decimal notation. Understand place value. (Grade 2 NBT 1 – 4 and Grade 2 NBT 5 – 9)

Explanations and Examples:

This standard refers to place value understanding, which extends beyond an algorithm or procedure for rounding.
The expectation is that students have a deep understanding of place value and number sense and can explain and reason about the answers they get when they round. Students should have numerous experiences using a number line and a hundreds chart as tools to support their work with rounding.

Students learn when and **why** to round numbers. They identify possible answers and halfway points. Then they narrow where the given number falls between the possible answers and halfway points. They also understand that by convention if a number is exactly at the halfway point of the two possible answers, at this level the number is rounded up.

Example: Round 178 to the nearest 10.



Step 1: The answer is either 170 or 180.

Step 2: The halfway point is 175.

Step 3: 178 is between 175 and 180.

Step 4: Therefore, the rounded number is 180.

Instructional Strategies next page

Instructional Strategies
Prior to implementing rules for rounding students need to have opportunities to investigate place value. A strong understanding of place value is essential for the developed number sense and the subsequent work that involves rounding numbers.

Building on previous understandings of the place value of digits in multi-digit numbers, place value is used to round whole numbers. Dependence on learning rules can be eliminated with strategies such as the use of a number line to determine which multiple of 10 or of100, a number is nearest (5 or more rounds up, less than 5 rounds down). As students' understanding of place value increases, the strategies for rounding are valuable for estimating, justifying and predicting the reasonableness of solutions in problem-solving.

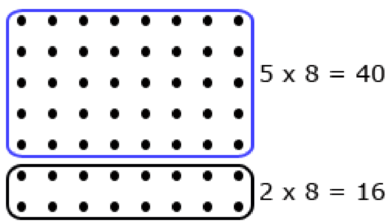
Strategies used to add and subtract two-digit numbers are now applied to fluently add and subtract whole numbers within 1000. These strategies should be discussed so that students can make comparisons and move toward efficient methods.

Number sense and computational understanding is built on a firm understanding of place value.

Understanding what each number in a multiplication expression represents is important. Multiplication problems need to be modeled with pictures, diagrams or concrete materials to help students understand what the factors and products represent. The effect of multiplying numbers needs to be examined and understood.

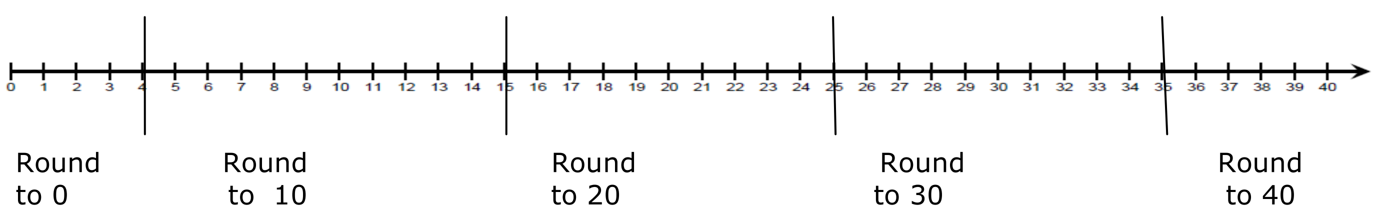
The use of area models is important in understanding the properties of operations of multiplication and the relationship of the factors and its product. Composing and decomposing area models is useful in the development and understanding of the distributive property in multiplication.

$$\begin{array}{r} 40 \\ +\underline{16} \\ 56 \end{array}$$



Continue to use manipulative like hundreds charts and place-value charts. Have students use a number line or a roller coaster example to block off the numbers in different colors.

For example this chart show what numbers will round to the tens place.



Common Misconceptions: (3.NBT.1-3)
The use of terms like "round up" and "round down" confuses many students. For example, the number 37 would round to 40 or they say it "rounds up". The digit in the tens place is changed from 3 to 4 (rounds up). This misconception is what causes the problem when applied to rounding down. The number 32 should be rounded (down) to 30, but using the logic mentioned for rounding up, some students may look at the digit in the tens place and take it to the previous number, resulting in the incorrect value of 20. To remedy this misconception, students need to use a number line to visualize the placement of the number and/or ask questions such as: "What tens are 32 between and which one is it closer to?" Developing the understanding of what the answer choices are before rounding can alleviate much of the misconception and confusion related to rounding.

3.NBT.1

Domain: **Number and Operations in Base Ten (NBT)**

Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic. (A range of algorithms may be used.)

Standard: **3.NBT.2.** Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

Standards for Mathematical Practices to be emphasized:

MP.2. Reason abstractly and quantitatively.
MP.7. Look for and make use of structure.
MP.8. Look for and express regularity in repeated reasoning.

Connections:

See 3.NBT.1

Explanations and Examples:

This standard refers to fluently, which means accuracy, efficiency (using a reasonable number of steps and time), and flexibility (using strategies such as the distributive property). The word algorithm refers to a procedure or a series of steps. There are other algorithms other than the standard/traditional algorithm. Third grade students should have experiences beyond the standard/traditional algorithm.

Problems should include both vertical and horizontal forms, including opportunities for students to apply the commutative and associative properties. Students explain their thinking and show their work by using strategies and algorithms, and verify that their answer is reasonable.

Example:
There are 178 fourth graders and 225 fifth graders on the playground. What is the total number of students on the playground?

Student 1
100 + 200 = 300
70 + 20 = 90
8 + 5 = 13
300 + 90 + 13 =
403 students

Student 2
I added 2 to 178 to get 180. I added 220 to get 400. I added the 3 left over to get 403.

Student 3
I know the 75 plus 25 equals 100. I then added
1 hundred from 178 and
2 hundreds from 275. I had a total of 4 hundreds and I had 3 more left to add. So I have 4 hundreds plus 3 more which is 403.

Student 4
178+225=?
178+200=378
378+20+398
398+5=403

Problems should include both vertical and horizontal forms, including opportunities for students to apply the commutative and associative properties. 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. Students explain their thinking and show their work by using strategies and algorithms, and verify that their answer is reasonable. An interactive whiteboard or document camera may be used to show and share student thinking.

Example:

- Mary read 573 pages during her summer reading challenge. She was only required to read 399 pages. How many extra pages did Mary read beyond the challenge requirements?

Students may use several approaches to solve the problem including the traditional algorithm. Examples of other methods students may use are listed below:

- 399 + 1 = 400, 400 + 100 = 500, 500 + 73 = 573, therefore 1+ 100 + 73 = 174 pages (Adding up strategy)
- 400 + 100 is 500; 500 + 73 is 573; 100 + 73 is 173 plus 1 (for 399, to 400) is 174 (Compensating strategy)
- Take away 73 from 573 to get to 500, take away 100 to get to 400, and take away 1 to get to 399. Then 73 +100 + 1 = 174 (Subtracting to count down strategy)
- 399 + 1 is 400, 500 (that's 100 more). 510, 520, 530, 540, 550, 560, 570, (that's 70 more), 571, 572, 573 (that's 3 more) so the total is 1 + 100 + 70 + 3 = 174 (Adding by tens or hundreds strategy)

	3.NBT.2				

SCUSD 3rd Grade Learning Outcomes - Curriculum Map

Unit 2: Place Value and Problem Solving with Units of Measure
Sequence of Learning Outcomes **3.NBT.1, 3.NBT.2**
1) Use place value to round numbers to the nearest 10 on a number line.
2) Use place value to round numbers to the nearest 100 on a number line.
3) Estimate to solve one-step addition and subtraction problems using rounding strategies
4) Solve word problems involving three digit numbers using estimation to check for reasonableness in the solution. Use strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

Grade 3 enVision Math Topics

Topics 1-3
Sequence of Learning Objectives
1) Lesson 1-4: Finding the Halfway Number In this lesson, you will • find the halfway number between two consecutive tens, two consecutive hundreds and two consecutive thousands.
2) Lesson 1-5: Rounding In this lesson, you will • round two-digit and three-digit whole numbers to the nearest ten or hundred, by comparing to the number hallway between or by using place value.
3) Lesson 1-6 : More Rounding In this lesson, you will • round 3- and 4-digit whole numbers to the nearest ten or hundred by using place value.
4) Lesson 1-8: Problem Solving: Make an Organized List In this lesson, you will • make an organized list to represent information given in a problem
5) Lesson 2-1: Addition Meaning and Properties In this lesson, you will • use concrete materials and concepts of addition to model the Commutative, Associative, and Identity Properties of Addition.
6) Lesson 2-2: Subtraction Meanings In this lesson, you will • recognize situations when subtraction is used to solve a problem and write number sentences.
7) Lesson 2-3: Using Mental Math to Add In this lesson, you will • solve problems by adding with mental math.
8) Lesson 2-4: Using Mental Math to Subtract In this lesson, you will • solve problems by subtracting with mental math.
9) Lesson 2-5: Estimating Sums In this lesson, you will • solve problems by estimating sums.
10) Lesson 2-6: Estimating Differences In this lesson, you will • solve problems by estimating differences.
11) Lesson 2-7: Problem Solving: Reasonableness In this lesson, you will • solve word problems and check their answers for reasonableness.

Topics 1-3
Sequence of Learning Objectives
12) Lesson 3-1: Adding with an Expanded Algorithm In this lesson, you will • solve 3-digit addition problems using an expanded algorithm.
13) Lesson 3-2: Models for Adding 3-Digit Numbers In this lesson, you will • add 3-digit numbers using place-value blocks or pictures and record the results using the standard algorithm.
14) Lesson 3-3: Adding 3-Digit Numbers In this lesson, you will • add 3-digit numbers using paper-and-pencil methods and use addition to solve problems.
15) Lesson 3-4: Adding 3 or More Numbers In this lesson, you will • add 3 or more 2-and/3-digit numbers using paper-and-pencil methods and use addition to solve problems.
16) Lesson 3-5: Problem Solving: Draw a Picture In this lesson, you will • draw a picture to solve a problem.
17) Lesson 3-6: Subtracting with an Expanded Algorithm In this lesson, you will • solve 3-digit subtraction problems by breaking them into smaller, easier subtraction problems.
18) Lesson 3-7: Models for Subtracting 3-Digit Numbers In this lesson, you will • subtract 3-digit numbers using place value blocks or pictures and record the results using the standard subtraction algorithm.
19) Lesson 3-8: Subtracting 3-Digit Numbers In this lesson, you will • subtract 3-digits numbers using paper-and-pencil methods and use subtraction to solve problems.
20) Lesson 3-9: Subtracting Across Zero In this lesson, you will • subtract 3-digit numbers using paper-and-pencil methods and use subtraction to solve problems.
21) Lesson 3-10: Making Sense of Addition Equations In this lesson, you will • decide whether both sides of an addition equation are equal and they will determine the value of an unknown number in an addition equation.
22) Lesson 3-11: Making Sense of Subtraction Equations In this lesson, you will • decide whether both sides of an subtraction equation are equal and they will determine the value of an unknown number in an subtraction equation.

Topics 1-3
Sequence of Learning Objectives
23) Lesson 3-12: adding and Subtracting In this lesson, you will • use operations with an inverse relationship to check subtraction and addition.
24) Lesson 3-13: Problem Solving: Draw a Picture and Write a Number Sentence In this lesson, you will • solve problems by writing a number sentence based on a picture they have drawn describing the problem.

Name ______________________________

Mark the best answer.

1. Garden Club members want to plant 620 maple seedlings. They have planted 492 seedlings so far. Which number sentence can be used to find how many more seedlings they need to plant to reach their goal? (3-12)

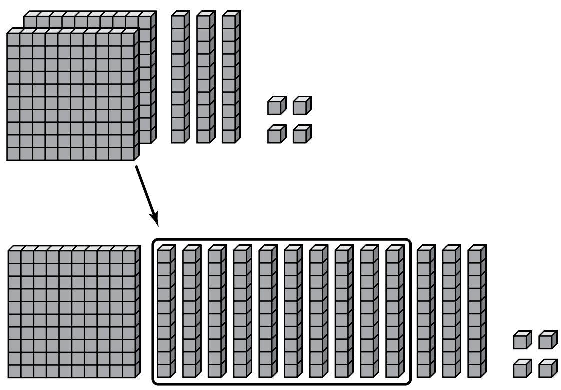
A 620 − 492 = ■

B 620 + 492 = ■

C 620 − 128 = ■

D 492 − 128 = ■

2. What regrouping is shown? (3-7)



A 3 hundreds 3 tens 4 ones as 3 hundreds 13 tens 4 ones

B 3 hundreds 3 tens 4 ones as 2 hundreds 13 tens 4 ones

C 2 hundreds 3 tens 4 ones as 2 hundreds 2 tens 14 ones

D 2 hundreds 3 tens 4 ones as 1 hundred 13 tens 4 ones

3. Glacier Park has 276 different plant species. Jefferson Park has 169 different plant species. How many more plant species does Glacier Park have than Jefferson Park? (3-8)

A 107

B 113

C 117

D 445

4. Which diagram shows the problem? Byron read 42 books. Shawna read 28 books. How many more books did Byron read than Shawna? (3-13)

A

?	
28	42

B

42 books	
28	?

C

42
28

D

28	
42	?

5. Jared had 400 marbles in a bag. He moved 321 marbles into a box. How many marbles were left in the bag? (3-9)

A 179 marbles

B 89 marbles

C 81 marbles

D 79 marbles

Name ______________________________

6. Janika drove 417 miles on the first part of her trip. Then she flew another 277 miles. Which is a reasonable total number of miles she traveled in all? (3-3)

A 694, because 417 + 277 is about 300 + 200 = 500

B 694, because 417 + 277 is about 400 + 200 = 600

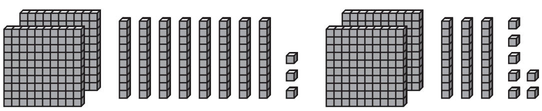
C 694, because 417 + 277 is about 400 + 300 = 700

D 694, because 417 + 277 is about 400 + 400 = 800

7. Write the sum of the hundreds, tens, and ones for 326 + 253. (3-1)

____

8. Write the addition sentence that is shown by the blocks. (3-2)



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9. A supermarket has 337 cans of soup and 478 packages of instant soup. How many containers of soup are there in all? (3-3)

____

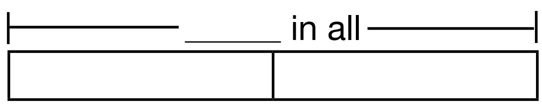
10. Each day for four days, Terry went jogging. He jogged for 35 minutes, 112 minutes, 45 minutes, and 67 minutes. How many minutes did Terry jog in all? (3-4)

____

11. The chart shows the number of books in a classroom.

Kind of Book	Number
Math	23
Science	18
Music	15
Social Studies	32

Complete the diagram to find out how many books are math and science. (3-5)



Name ____________________

12. Circle all of the addition sentences for which you would use regrouping to find the sum. (3-4)

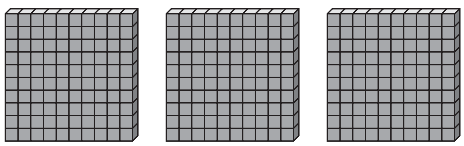
542 + 910

207 + 368

802 + 59

148 + 230 + 101

13. Roland started with the number 213 and ended with the number shown below.



What number did Roland add to reach his final number? (3-10)

____

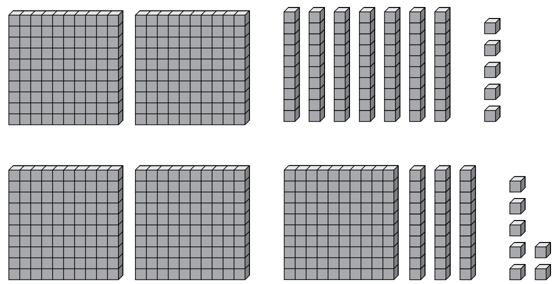
14. Jeff wants to find the difference of 125−113. He has subtracted the hundreds and tens so far. What is the sum of the two numbers he has subtracted? How much does he still need to subtract? (3-6)

____

15. There are 34 species of animals in a forest preserve of which 15 are not mammals. Write a subtraction sentence to show how many species are mammals. Then solve. (3-11)

____

16. Write the two numbers shown below with place-value blocks. Explain what regroupings you will need to do to find the sum of the two numbers. (3-2)



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17. Celine had 123 stickers in her sticker book. She added 112 stickers to her book on Wednesday and another 34 on Friday. How many stickers in all did Celine have in her book at the end of the week? (3-4)

____

Formative Instructional and Assessment Tasks
Toys for Us

trampoline
$184

mountain bike
$240

scooter
$449

roller blades
$58

board game
$19

puzzle
$6

hand-held game
$72

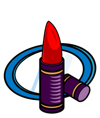
gaming system
$225

remote control car
$39

remote control airplane
$44

giant gumball machine
$95

art set
$47



make-up kit
$31

spy kit
$51

science kit
$46

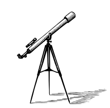
MP3 player
$152

CD boom box
$52

electric guitar
$210

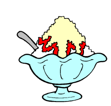
trumpet
$180

basketball
$15

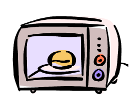


telescope
$99

snow cone machine
$32

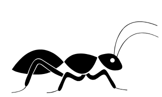


ice cream maker
$50



easy make oven
$56

frog tank with live frogs
$34



ant farm
$23

Formative Instructional and Assessment Tasks
Toys for Us Recording Sheet

Congratulations! You just won a $1,000 gift card to Toys for US. Look at the Toys for Us flier and make a list of what you will buy. Be sure to spend as close as possible to $1,000 without going over.

list of items you will purchase

Use your list of items to answer each question.

1. What was the total cost of your items?
2. How much money will be left on your gift card?
3. What strategies did you use to get as close to $1,000 as possible?
4. Is it possible to spend exactly $1,000? Explain.