

Common Core Mathematics Curriculum - Grade 3

- The following is an annotated curriculum for teaching the Grade 3 Common Core State Standards (CCSS) for Math. Both instruction and content are provided on the Internet, accessed using the links provided. Specific links are provided for each topic. Additionally, there are several general links that teachers may wish to access for additional: background material, audio-visual aids and materials for students.

Content Standards: Kindergarten Through Grade Eight

<http://illustrativemathematics.org/standards/k8>

Common Core Standards Illustrations

<http://www.mathscore.com/math/standards/Common%20Core/3rd%20Grade/>

Interactive games and lesson; large number of printables

<http://www.helpingwithmath.com/>

Standards Progression for Grades K-5 Operations and Algebraic Thinking; See pages 1-5 and 22-28

http://commoncoretools.files.wordpress.com/2011/05/ccss_progression_cc_0a_k5_2011_05_302.pdf

Standards Progression for Grades K-5 Number and Operations in Base Ten; See pages 1-4 and page 11.

http://commoncoretools.files.wordpress.com/2011/04/ccss_progression_nbt_2011_04_073.pdf

Standards Progression for Grades 3-5 in Number and Operations (Fractions): See pages 1-4

http://commoncoretools.files.wordpress.com/2012/02/ccss_progression_nf_35_2011_08_12.pdf

Standards Progression for Grades 2-5 in Measurement and Data: See pages 1-4 and 7-8

http://commoncoretools.files.wordpress.com/2011/06/ccss_progression_md_k5_2011_06_20.pdf

- Curriculum tasks are presented in a logical sequence, rather than in the order in which the Common Core Standards are listed. The intent is that each task builds on the previous.
- The list of tasks presented is in no way implies that each math concept is a separate isolated topic or that each topic should only be taught only once.
- It is extremely important that students verbalize the reasoning they use while thinking about math problems. Verbalization is not only valuable to the student solving the problem but to the rest of the class as well. This is clearly demonstrated in the following video recommended to all teachers:

An example of verbalization in the classroom. (3:09)

http://mathsolutions.com/MathTalk/videos/CRD_Gr1.html

Problems for which verbalization is especially valuable are marked by with the notation **< Verbalize >**.

- Math Concepts 1 through 12 address both the Operations and Algebraic Thinking and the Number Base Ten Domains of the Third Grade Curriculum. Students are expected to understand models of multiplication and division and to solve multiplication and division problems. Students are expected to understand arrays and their relationship to multiplication and to area.
- Math Concepts 13 through 16 address the Fractions Domain of the standard. Students are expected to develop an understanding of fractions as numbers. Students are expected to understand the relative sizes of unit fractions, be able to order fractions on a number line and understand the concept of fraction equivalences. In this grade the range of fraction denominators is limited to 2,3,4,6 and 8.
- Math Concepts 17 through 22 address the Measurement and Data Domain of the standard. Students are expected to solve problems involving measurement and estimation of time, liquid volumes and masses of objects. Students are expected to represent data graphically and interpret data. Students are expected to understand the concept of area and relate the measurement of area to multiplication and addition. Students are expected to recognize perimeter as an attribute of plane figures and understand and distinguish between linear measurement and the measurement of area.
- Math Concepts 23 and 24 address the Geometry Domain of the standard. Students are expected to reason with shapes and their attributes.

Common Core Mathematics Curriculum - Grade 3

Number	Math Concept	Standards and References
OPERATIONS AND ALGEBRAIC THINKING - ALGEBRAIC THINKING AND THE NUMBER BASE TEN Students are expected to understand models of multiplication and division and to solve multiplication and division problems. Students are expected to understand arrays and their relationship to multiplication and to area.		
1	Fluently add and subtract within 1000 <verbalize>	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.
	SUGGESTED ACTIVITY: Teaching Mental Math strategies	Teach mental math addition and subtraction strategies individually. The link below is to a video (13:22) that provides an overview of each strategy. After learning each strategy, students should practice that strategy and previously learned strategies for several minutes on a daily basis sharing their reasoning with classmates. The video provides classroom procedure suggestions and strategy information. http://www.youtube.com/watch?v=wZmIDfRekpU
	TEACHER RESOURCE: Classroom example of mental math practice encouraging class participation and multiple solutions. Scroll page down to 2nd video lesson titled: Common Core Math – Video of mental math lesson (5:57) [RECOMMENDED]	http://mathcoachinteractive.com/blog/archives/category/grade-3-math
	TEACHER RESOURCE VIDEO: Addition strategies explained (13:22)	http://www.youtube.com/watch?v=wZmIDfRekpU&feature=relmfu
	TEACHER RESOURCE VIDEO: Subtraction strategies explained (13:22)	http://www.youtube.com/watch?v=5X8L8v7o4YU
	TEACHER RESOURCE VIDEO: "Using Ten" Subtraction strategy (6:04)	http://www.youtube.com/watch?v=ctwbm1Z6TfA
	ADDITION NUMBER LINE WORKSHEETS	http://www.math-aids.com/Number_Lines/Adding_Number_Lines.html
	INTERACTIVE NUMBER LINE: Marks start, stop and the distance between	http://www.eduplace.com/cgi-bin/schtemplate.cgi?template=/kids/mw/manip/mn_popup.shtml&filename=nmb1_int&ti
	TEACHER RESOURCE VIDEO: Teaching children to create word problems by sharing stories about a given topic such as the date of the month (#8 AMAZING EQUATIONS) (16:17)	http://www.learner.org/resources/series32.html?pop=yes&pid=877#
2	Use place value understanding to round whole numbers	3.NBT.1. Use place value understanding to round whole numbers to the nearest 10 or 100.

Common Core Mathematics Curriculum - Grade 3

	TEACHER NOTE:	The use of memorized slogans such as "five or more, make it soar" and algorithms such as "circle and underline" are to be avoided in favor of teaching the concept of "halfway between" the relevant distances on a number line.
	INTERACTIVE ACTIVITY: Round numbers for different place values using a number line.	http://www.studyzone.org/testprep/math4/d/roundingp.cfm
	ROUNDING GAME	http://www.softschools.com/math/practice/rounding_numbers.jsp
	ROUNDING QUIZ	http://www.softschools.com/math/rounding/game/
	ROUNDING WORKSHEETS	http://www.superteacherworksheets.com/rounding.html
	SUGGESTED ACTIVITY	Students practice describing situations where estimation is useful and appropriate. Have students check the accuracy of their answers using estimation when doing their daily mental math strategy practice. Students should discuss the usefulness of estimating before they add or subtract to get a "guesstimate" and after they add or subtract to check their answer.
	ESTIMATION QUIZ	http://www.softschools.com/quizzes/math/estimation_word_problems/quiz2066.html
3	Interpret products of whole numbers	3.OA.1. Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5×7 .
	TEACHER RESOURCE: Overview of how to teach multiplication	http://www.mathcats.com/grownupcats/ideabankmultiplication.html
	INTRODUCTION TO NEXT VIDEO: Understanding Multiplication (3:34)	http://www.teachertube.com/viewVideo.php?video_id=47472
	INTERACTIVE VIDEO LESSON: Understanding Multiplication - Parts 1 and 2	www.amphimath.com
	WORKSHEET: Multiplication - Counting Equal Groups	http://www.worksheetsplus.com/Multiplication%20Worksheets.html
	WORKSHEETS: Multiplication using Repeated Addition	http://www.homeschoolmath.net/teaching/md/multiplication-repeated-addition.php
	TEACHER RESOURCE: Using arrays to introduce multiplication (Smart Board Notebook)	http://express.smarttech.com/?url=http://exchangedownloads.smarttech.com/public/content/ac/acf5f123-dcfd-4500-9170-72ba01166c8a/Arrays.notebook#
	PRACTICE WITH ARRAYS (Smart Board Notebook)	http://express.smarttech.com/?url=http://exchangedownloads.smarttech.com/public/content/2f/2fa54628-bf78-45af-bcc9-e7ea992a8a9c/Array.notebook#
	WORKSHEET: "Third grade parade"	http://mathwire.com/problemsolving/thirdgrade-parade.pdf

Common Core Mathematics Curriculum - Grade 3

	<p>TEACHER RESOURCE: Arrays to show Commutative and Distributive multiplication properties plus division</p>	<p>http://nrich.maths.org/2469</p>
	<p>WORKSHEET: Commutative, Associative, and Distributive Multiplication Properties (with answers)</p>	<p>http://www.worksheetsplus.com/Multiplication%20Properties%20Worksheet.html</p>
	<p>VIDEO LESSON: Multiply 1-digit numbers by multiples of ten in the range 10-90 (2:57)</p>	<p>http://www.teachingvideos.co.uk/index.php/videos/viewvideo/560/number-operations/multiplying-multiples-of-10-by-a-single-digit</p>
	<p>WORKSHEET: Use the first half (must join TES - FREE)</p>	<p>http://www.tes.co.uk/ResourceDetail.aspx?storyCode=3008334</p>
<p>4</p>	<p>Recognize the concepts of area measurement <verbalize></p>	<p>3.MD.5. Recognize area as an attribute of plane figures and understand concepts of area measurement. a. A square with side length 1 unit, called “a unit square,” is said to have “one square unit” of area, and can be used to measure area. b. A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.</p> <p>3.MD.7. Relate area to the operations of multiplication and addition. a. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths. b. Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning. c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area</p> <p>Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.</p>
	<p>SUGGESTED ACTIVITY: A square unit as a unit of measurement</p>	<ul style="list-style-type: none"> ● Students should draw rectangles of varying sizes using an exact number of inches for each side of each rectangle on 1-inch grid paper. Students should then be asked about the comparative sizes of the rectangles and how they could determine which rectangle is the biggest or smallest. ● When the students are asked to specifically draw a rectangle that is 1 X 6 inches and a rectangle that is 2 X 3 inches, students should discuss which is the biggest rectangle of the two. Can the biggest of these two rectangles be determined by comparing the lengths of just the horizontal sides or just the vertical sides? This should lead to a discussion of which rectangle has the most space inside it and how that space could be measured. ● At this point, students should “tile” their rectangles with 1-inch square tiles. Now, observe that the tiles can be “counted” efficiently by viewing them as squares in an array and asking “how many rows?” and “how many square tiles in each row?” The numbers can be multiplied to find out how many squares big each rectangle is. ● Thus, the space (area) in any rectangle can be thought of as the number of square tiles that fit into that rectangle. Squares can be a unit of measurement—just like feet, or centimeters or inches are units of measurement. Refer the link amphimath.com (Multiplication Part 2) to reinforces that contiguous squares form an array and that the number of squares in the array can be found by multiplying the number of rows times the number in each row. The “Array Maker” tool in amphimath.com can be used interactively by the class to reinforce this activity.

Common Core Mathematics Curriculum - Grade 3

	SUGGESTED ACTIVITY: Floor tiles as an area array	<p>If there is anywhere in your school building that has linoleum floor tiles (12" X 12"), you can use that space to reinforce the previous suggested activity. (Or, alternatively, you can purchase 12 linoleum or foam tiles and use them on any other flooring surface).</p> <ul style="list-style-type: none"> •Children can mark off rectangles of various sizes with masking tape, count the squares inside, and relate the number of squares to the dimensions of the rectangular array they form. Then, they can (1) visualize the amount of space (area) taken up by a particular rectangle and learn the concept of area as it relates to any array of same-sized squares, and (2) realize that the squares in the array can be efficiently counted by multiplying the number of rows of tiles X the number of tiles per row. • Students should conclude that the space is bigger when more same-sized squares fit inside it.
	INTERACTIVE TEACHER RESOURCE: Array Maker - Can make arrays of various objects including squares with borders (show area as an array and squares without borders (show area as a solid)	www.amphimath.com
	INTERACTIVE ARRAY QUIZ Gives student an array problem and then checks for a correct solution.	http://www.haelmedia.com/OnlineActivities_txh/mc_txh3_002.html
	TEACHER RESOURCE: Exercises using tile arrays	http://www2.edc.org/thinkmath/lib/samples/G3C2L2TG_Sample.pdf
5	Identify patterns in the multiplication and addition tables <verbalize>	3.OA.9. Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.
	TEACHER RESOURCE: How to teach multiplication facts;	http://www.mathsisfun.com/tables.html
	VIDEO TEACHER RESOURCE: See Part 2 of the linked video for discussion of multiplication patterns and properties	www.amphimath.com
	SUGGESTED ACTIVITY: Fluently multiply within 100	On a daily basis, students should write and practice multiplication facts. A short-timed test each day allows students (and teachers) to track progress daily. Students should write the facts they miss on each daily test and move on, only when they score 100% on a given test within 5 seconds per fact.
	GAME: Fun timed game requiring group number recognition	http://gotkidsgames.com/ft/
	MULTIPLICATION WORKSHEETS	http://www.busyteacherscafe.com/printables/math.html
	ACTIVITY WORKSHEETS: Multiplication wheel for multiplication practice	http://www.superteacherworksheets.com/multiplication/circle-multiplication_TWZFT.pdf
	GAME: Game for class multiplication practice	http://www.superteacherworksheets.com/multiplication/multiplication-ihavewhohas_TWZDR.pdf
	GAME: Game for partner multiplication practice	http://www.superteacherworksheets.com/multiplication/multiplication-9s-matching-game_TWZDW.pdf

Common Core Mathematics Curriculum - Grade 3

6	Determine unknown in a multiplication equation <verbalize>	3.OA.4. Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations $8 \times ? = 48$, $5 =$
	INTERACTIVE ACTIVITY: Multiplication practice using groups, repeated addition, multiplication facts (0, 1, 2, 6, 12)	http://www.kidport.com/grade3/Math/lessons/understandMult9.htm
	TEACHER RESOURCE: Multiplication Worksheet maker	http://www.worksheetworks.com/math/beginning/visualmult.html
	INTERACTIVE ACTIVITY: Create multiplication sentences	http://www.ixl.com/math/grade-3/multiplication-sentences
7	Solve multiplication word problems <verbalize>	3.OA.3. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. (See Table 2.)
	TEACHER RESOURCE: information on types and construction of multiplication /division word problems	www.math.lsu.edu/~kurtz/multdivwp.pdf
	TEACHER VIDEO RESOURCE: Model Multiplication/Division Word Problems	http://www.youtube.com/watch?v=OyvgHvDXStQ
	INTERACTIVE ACTIVITY: Uses Thinking Blocks to generate 6 different types of problems.	http://www.mathplayground.com/ThinkingBlocks/thinking_blocks_modeling%20_tool.html
	ACTIVITY: Multiplication and division practice problems with solutions	http://www.illustrativemathematics.org/illustrations/365
	ACTIVITY: Multiplication and division practice problems with solutions	http://www.illustrativemathematics.org/illustrations/262
	INTERACTIVE ACTIVITY: Problems requiring answers using both multiplication and repeated addition	http://www.worksheetsplus.com/Multiplication%20Applications%20Worksheets.html
	TEACHER RESOURCE: Large number of multiplication worksheets	http://www.worksheetsplus.com/
	INTERACTIVE ACTIVITY: Using the Fundamental Counting Principle	http://www.aaamath.com/sta-basic-cntg.htm
8	Interpret whole number quotients as the number of objects in each fair share <verbalize>	3.OA.2. Interpret whole-number quotients of whole numbers, e.g., interpret $56 \div 8$ as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as $56 \div 8$.
	VIDEO LESSON: Khan Academy showing division as the inverse of multiplication.	http://www.khanacademy.org/math/arithmetic/multiplication-division/v/division-1
	ACTIVITY: Division as Equal Sharing or Dealing Out	http://express.smarttech.com/?url=http://exchangedownloads.smarttech.com/public/content/68/68992ac4-4e8b-4423-815e-b9b018f2e5ce/Division%20Intro.notebook#
	ACTIVITY: Division exercise cutting a rope into equal pieces plus a remainder	http://mypages.iit.edu/~smile/ma9119.html

Common Core Mathematics Curriculum - Grade 3

	VIDEO LESSON: Division by Repeated Subtraction (2:51)	http://www.youtube.com/watch?v=L2fBSfiEO6M
	VIDEO LESSON: Dividing using a number line (1:56)	http://www.youtube.com/watch?v=5JmqLM9Tkbs
	TEACHER RESOURCE: Division using a Number Line	http://www.primaryresources.co.uk/maths/powerpoint/division_numberline.ppt#258,4,Slide 4
	TEACHER RESOURCE: Multiplication is shown to be the inverse of Division using a Number Line, Equal Groups, Math Facts	http://www.eduplace.com/math/mw/background/3/08/te_3_08_overview.html
	DIVISION WORKSHEET	http://www.superteacherworksheets.com/division/equal-groups_TZNTM.pdf
	TEACHER RESOURCE: Information constructing multiplication /division word problems	www.math.lsu.edu/~kurtz/multdivwp.pdf
	VIDEO DIVISION LESSON: Applies math bar model approach using Thinking Blocks modeling tool (3:39)	http://www.youtube.com/watch?v=Zfe2U0gxSEI
	TEACHER RESOURCE: provides Thinking Blocks (i.e., math blocks) Interactive Manipulative to use for many types of math problem which can be selected.	http://www.mathplayground.com/ThinkingBlocks/thinking_blocks_modeling%20_tool.html
	TEACHER RESOURCE: Division Word Problems	http://www.worksheetsplus.com/DivisionWordProblems.html
9	Solve division word problems	See 3.OA.3 above
	INTERACTIVE ACTIVITY: Practice division game testing basic division facts	http://www.kidsnumbers.com/apple-baskets-division.php
	DIVISION WORKSHEETS	http://www.math-aids.com/Division/
	DIVISION GAME: Tests knowledge of basic division facts	http://www.aplusmath.com/Games/HiddenPicture/HiddenPicture.php?gametype=Division
10	3.OA.6 Understand division as an unknown factor problem <verbalize>	3.OA.6. Understand division as an unknown-factor problem. For example, find $32 \div 8$ by finding the number that makes 32 when multiplied by 8.
	VIDEO GAME: With missing divisors	http://www.kidsnumbers.com/division_missing_number.php
	TEACHER RESOURCE: Division problems asked in two ways, solved by using diagrams and number lines.	http://www.illustrativemathematics.org/illustrations/344
	DIVISION WORKSHEETS: Using arrays	http://www.worksheetsplus.com/Multiplication%20and%20Division%20Relationship%20Worksheet.html

Common Core Mathematics Curriculum - Grade 3

11	Determine unknown in a division equation <verbalize>	See 3.OA.4. above
	INTERACTIVE ACTIVITY: Complete the division sentence to 10	http://www.ixl.com/math/grade-3/complete-the-division-sentence-facts-to-10
	DIVISION WORKSHEETS: With separate answer key	http://www.kidslearningstation.com/math/simple-division.asp
12	Solve 2-step word problems using 4 operations <verbalize>	3.OA.8. Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (This standard is limited to problems posed with whole numbers and having whole-number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order (Order of Operations)).
	INTERACTIVE LESSON #1: 2-step multiplication and division problems with math bar models. An introductory video is provided to show the math bar model approach [NOTE: Excellent learning activity]	http://www.mathplayground.com/TB_MD/tb_md2_iFrame.html
	INTERACTIVE LESSON #2: 2-step multiplication and division problems with math bar models.	http://www.mathplayground.com/TB_MD/tb_md4_iFrame.html
	TEACHER RESOURCE: provides Thinking Blocks (i.e., math blocks) Interactive Manipulative to use for many types of math problem which can be selected.	http://www.mathplayground.com/ThinkingBlocks/thinking_blocks_modeling%20_tool.html
	INTERACTIVE LESSON: 2-step word problem practice	http://www.ixl.com/math/grade-3/multi-step-word-problems
FRACTIONS Students are expected to develop an understanding of fractions as numbers. Students are expected to understand the relative sizes of unit fractions, be able to order fractions on a number line and understand the concept of fraction equivalences. In this grade, the range of fraction denominators is limited to 2,3,4,6 and 8.		
13	Understand a fraction 1/b <verbalize>	3.NF.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 $1/b$.
	UNDERSTAND THE DENOMINATOR IN THE FRACTION A/B	Understand that the denominator represents the total number of equal-sized parts (b) that make one whole of a fraction
	UNDERSTAND THE NUMERATOR IN THE FRACTION A/B	Understand that the numerator represents the number of parts (a) of one whole that the fraction contains
	SUGGESTED ACTIVITY:	Give each child four rectangular pieces of paper - each a different color. Each child should fold their Color 1 paper into halves and cut the halves. They should label the denominator and the numerator and state how many pieces make a whole: two halves make a whole. Repeat with $1/3$, $1/4$, $1/6$, $1/8$. Repeat vocabulary with each discussion. This activity can be repeated with colored circles to indicate that the shape of the whole does not matter.

Common Core Mathematics Curriculum - Grade 3

INTERACTIVE LESSON ON FRACTIONS #1	http://www.beaconlearningcenter.com/WebLessons/IWantMyHalf/iwantmyhalf.htm#page3
INTERACTIVE LESSON ON FRACTIONS #2	http://www.beaconlearningcenter.com/WebLessons/FloweringFractions/page7.htm
INTERACTIVE PRACTICE: Label the numerator and denominator	http://visualfractions.com/IdentifyCircles/identifycircles.html
TEACHER VIDEO RESOURCE: Creating a Fraction Museum activity (10:15)	http://www.youtube.com/watch?v=lizNJthlpr8
SUGGESTED ACTIVITY:	Give each child a red and a black "twizzler" stick. The black stick should be half the length of the red stick. Have students cut each of their sticks into the same number of pieces (each student can choose a number of pieces from 1 to 6). Discussion: If b is the size of the denominator, is the fraction $1/b$ of the stick the same size for the black stick as the red stick?
TEACHER VIDEO RESOURCE: Students make fraction pieces from paper strips and play a game that involves covering a whole strip with fractional pieces Select topic #33 - Fraction Strips (17:08)	http://www.learner.org/vod/vod_window.html?pid=901
TEACHER VIDEO RESOURCE: Students investigate fractional parts of a set by building arrays that represent wholes of different sizes. Select topic #34 - Arrays and Fractions (15:03)	http://www.learner.org/vod/vod_window.html?pid=902
PUZZLE WORKSHEET ACTIVITY: Students solve a puzzle about fractions of a pizza.	http://www.edhelper.com/math/fractionsfq1513.htm
WORKSHEET: Coloring fractions	http://www.education.com/files/61601_61700/61608/color-fractions-second.pdf
INTERACTIVE LESSON: Fraction lesson using Smart Board Notebook (partially interactive)	http://express.smarttech.com/?url=http://exchangedownloads.smarttech.com/public/content/44/44964ccf-af62-4c30-ad2c-99ef2e05f50f/fractions-rodgers.notebook#
INTERACTIVE LESSON: Using Smart Board Notebook	http://express.smarttech.com/?url=http://exchangedownloads.smarttech.com/public/content/dc/dc11df59-08ce-48bc-8d6c-cf7cb40d948f/misterteacher_fractions.notebook#
INTERACTIVE LESSON: Create fraction by dividing a circle into segments	http://nlvm.usu.edu/en/nav/frames_asid_102_g_2_t_1.html?from=category_g_2_t_1.html
INTERACTIVE QUIZ: Divide circle into segments in the denominator of a given fraction; color the segments to match the numerator of the fraction.	http://nlvm.usu.edu/en/nav/frames_asid_103_g_2_t_1.html?from=category_g_2_t_1.html
TEACHER RESOURCE: 8 different fraction exercises	http://www.superteacherworksheets.com/fraction-cont.html
INTERACTIVE LESSON: Basic Fraction lessons	http://www.coolmath.com/prealgebra/01-fractions/fractions-03-magic-one-01.htm
INTERACTIVE VIDEO LESSON: Fractions on a number line. (2:08)	http://www.youtube.com/watch?v=XZRrQhhRPvg
SUGGESTED ACTIVITY:	Students should be given written fractions (denominators of 2,3,4,6,8) and asked to model using drawings. Student should explain their drawings to their classmates. Fractions that equal one and zero should be included and discussed specifically.

Common Core Mathematics Curriculum - Grade 3

	<p>SUGGESTED ACTIVITY:</p>	<p>Students should have an opportunity to review the concept of equal shares with the following problem type: There are 6 cookies and 3 siblings. If they share the cookies equally or fairly, how many cookies will each sibling get? This should be viewed as a simple division problem as taught in Concept 8. This should begin a progression to problems of this sort: If there are 8 children and 4 cookies, how many cookies will each child get? Manipulatives (paper cookies) can be used and children should work in groups to solve the problem. For example, each cookie can be cut into 8 parts (1 for each child) and then the 32 pieces can be shared so that each child gets 4 pieces. Since each piece represents 1/8 of a cookie, each child would get 4/8 or 1/2 of a cookie. This is a good time to explain that the fraction 4/8 means 4 wholes (cookies) divided by 8 children.</p>
	<p>TEACHER RESOURCE: Description of fair share situations</p>	<p>http://www.mathgamesandactivities.com/tag/fair-share-fractions/</p>
	<p>INTERACTIVE ACTIVITY: Game for sharing cookies: NOTE TO TEACHER - You do NOT need to download--just Click and Enter. Put cookies on the cutting board to cut - click on cutter</p>	<p>http://www.teacherlink.org/content/math/interactive/flash/kidsandcookies/kidcookie.php</p>
<p>14</p>	<p>Understand fraction on number line <verbalize></p>	<p>3.NF.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.</p>
	<p>LESSON ON FRACTIONS: Relating fractions to a ruler [LESSON 5]</p>	<p>http://illuminations.nctm.org/LessonDetail.aspx?ID=L545</p>
	<p>INTERACTIVE EXERCISE: Five different exercises which test basic understanding of fractions [RECOMMENDED]</p>	<p>http://www.bgfl.org/bgfl/custom/resources_fbp/client_fbp/ks2/maths/fractions/index.htm</p>
	<p>INTERACTIVE VIDEO GAMES - Understanding of fractions</p>	<p>http://visualfractions.com/FindGrampy/findgrampy.html</p>
	<p>ACTIVITY: Locating Fractions Greater than One on the Number Line.</p>	<p>http://www.illustrativemathematics.org/illustrations/173</p>
	<p>ACTIVITY: Which is closer to 1 on the number line, $4/5$ or $5/4$</p>	<p>http://www.illustrativemathematics.org/illustrations/172</p>
	<p>ACTIVITY: Use number line to determine which of 4 fractions is closest to $1/2$?</p>	<p>http://www.illustrativemathematics.org/illustrations/171</p>
	<p>ACTIVITY: Given $1/4$ marked on a number line, find $2/3$.</p>	<p>http://www.illustrativemathematics.org/illustrations/170</p>
	<p>ACTIVITY: Given $1/4$ and $5/3$ on a number line, plot point for 1</p>	<p>http://www.illustrativemathematics.org/illustrations/169</p>
	<p>ACTIVITY: Given a number line with only 0 and 1 labeled, plot the points for $1/2$, $1/3$, $1/4$, $1/5$ and $2/3$.</p>	<p>http://www.illustrativemathematics.org/illustrations/168</p>
	<p>INTERACTIVE EXERCISE: Label the fraction for a point on a number line containing various evenly spaced point between 0 and 1.</p>	<p>http://www.ixl.com/math/grade-3/fractions-on-number-lines</p>
	<p>VIDEO LESSON: How to use a ruler having only inch numbers.</p>	<p>www.amphimath.com</p>
	<p>ACTIVITY: How to read a ruler</p>	<p>http://www.rickyspears.com/rulergame/</p>

Common Core Mathematics Curriculum - Grade 3

15	Equivalence of fractions <verbalize>	<p>3.NF.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.</p>
	TEACHER RESOURCE: Lesson plan for teaching equivalent fractions.	http://mathforum.org/paths/fractions/equiv.fractions.html
	TEACHER VIDEO RESOURCE: Students make fraction pieces from paper strips and play a game that involves covering a whole strip with fractional pieces Select topic #33 - Fraction Strips (17:08)	http://www.learner.org/vod/vod_window.html?pid=901
	ACTIVITY: Order Fractions	http://www.ixl.com/math/grade-3/order-fractions
	TEACHER RESOURCE: Class lesson on the equivalence of fractions using paper chocolate bars	http://www.teachnet-lab.org/miami/2005/linero2/Lesson%20%20Math.htm
	SUGGESTED ACTIVITY:	Students should divide strings, ribbons or string candies of equal length into various fractional pieces ($1/2$; $1/4$; $1/8$; $1/10$) and compare the sizes of the pieces. Which piece of candy would you rather have: $1/2$ or $1/4$? The students should discover the unit fraction rule: The bigger the denominator, the smaller the piece. Licorice works well because the children are interested, wide ribbon works well because the children can write fractions on the pieces.
	ACTIVITY: Comparing sums of unit fractions. Compare the sum of a pair of fractions on the left to a pair on the right. Emphasizes thinking over rote learning [RECOMMENDED]	http://www.illustrativemathematics.org/illustrations/831
	SUGGESTED ACTIVITY:	String a clothesline across the front of the classroom with clothes pins. The beginning of the line should be labeled "zero" and the end should be labeled "one whole". Prepare 30 unit fraction cards with denominators from 1 to 100. Have each child pick a card at random and hang it in the proper order between zero and one whole on the line. Each student should explain his/her placement of the fraction card.
	WORKSHEETS: Equivalent Fractions	http://www.math-aids.com/cgi/pdf_viewer.cgi?script_name=fractions_comparing.pl&denom_6=1&denom_8=1&negative=0&language=0&memo=&answer=1&x=131&y=19

MEASUREMENT AND DATA

Students are expected to solve problems involving measurement and estimation of time, liquid volumes and masses of objects. Students are expected to represent data graphically and interpret data. Students are expected to understand the concept of area and relate the measurement of area to multiplication and addition. Students are expected to recognize perimeter as an attribute of plane figures and understand and distinguish between linear measurement and the measurement of area.

Common Core Mathematics Curriculum - Grade 3

16	Tell time to nearest minute <verbalize>	3.MD.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.
	INTERACTIVE VIDEO LESSON: Learning to tell time	http://www.timemonsters.com/
	INTERACTIVE TIME LESSON Lesson →	http://www.harcourtschool.com/activity/elab2004/gr3/17.html
	Recording sheet needed for Lesson →	http://www.harcourtschool.com/activity/elab2004/G3_PE_PDF/MNL00LBPE3017.pdf
	GAME: To teach time	http://www.mrnussbaum.com/clockworks/index.html
	WORKSHEETS: For telling time	http://www.homeschoolmath.net/worksheets/table-clock.php?op=1&col=3&row=4&type=4&font=Default&FontSize=12pt&pad=10&ptitle=&Submit=Submit
	ACTIVITY: Elapsed time with T-chart (3:41)	http://www.youtube.com/watch?v=0Txk3iuWbTM
	ACTIVITY: Elapsed time using time line (i.e.. Number line) (5:31)	http://www.youtube.com/watch?v=h6uSv5bw-Lw&feature=related
	TEACHER RESOURCE: Time calculations using a number line	http://e2math.wikispaces.com/file/view/Tracking+Time.pdf
	INTERACTIVE ACTIVITY: Elapsed time interactive (good for teaching time line or skip counting concept)	http://www.shodor.org/interactivate/activities/ElapsedTime/?version=1.5.0_06&browser=MSIE
	WORKSHEETS: Elapsed time worksheets	http://www.superteacherworksheets.com/elapsed-time.html
17	Measure and estimate liquid volumes and masses of objects	3.MD.2. Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). (Excludes compound units such as cm^3 and finding the geometric volume of a container.)
	TEACHER RESOURCE	http://www.yale.edu/ynhti/curriculum/units/1989/6/89.06.02.x.html
	INTERACTIVE LESSON: Introduction to <u>metric measures</u>	http://www.bgfl.org/bgfl/custom/resources_fftp/client_fftp/ks2/maths/measures/index.htm
	CAPACITY WORKSHEET	http://www.adaptedmind.com/ps.php?tab=worksheets&sheetNumber=1&tagId=1060
	ACTIVITY: Introduction to <u>metric capacity</u> : cups, liters, and milliliters NOTE: British spelling (4:41)	http://www.youtube.com/watch?v=z_UswOa1WME&feature=related
	VIDEO LESSON ON METRIC MASS	http://stars650.blogspot.com/2011/03/metric-mass-video-4th-grade-math-sol.html
	INTERACTIVE ACTIVITY: Metric Capacity	http://www.adaptedmind.com/p.php?tagId=1076
	INTERACTIVE ACTIVITY: Metric Mass	http://www.adaptedmind.com/p.php?tagId=1046

Common Core Mathematics Curriculum - Grade 3

	MASS WORKSHEET	http://www.adaptedmind.com/ps.php?tab=worksheets&sheetNumber=1&tagId=1046
	SUGGESTED ACTIVITY	Have children weigh various classroom / household items on a metric scale.
	INTERACTIVE ACTIVITY: Metric Mass	http://www.ixl.com/math/grade-1/which-metric-unit-of-weight-is-appropriate
18	Measure and estimate liquid volumes and masses of objects - word problems	3.MD.2. Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). (Excludes compound units such as cm^3 and finding the geometric volume of a container.) Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. Excludes multiplicative comparison problems (problems involving notions of "times as much").
	WORD PROBLEMS - MASS	http://www.angelfire.com/ca5/hwforkids/2ameasure.html
	WORD PROBLEMS - CAPACITY	http://www.angelfire.com/ca5/hwforkids/3ameasure.html
19	Draw scaled pictures and bar graphs <verbalize>	3.MD.3. Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.
	TEACHER RESOURCE: Video on making bar graphs (5:22)	http://www.youtube.com/watch?v=Vmh2-ZKJPJU
	TEACHER RESOURCE: Creating Bar Graphs	http://www.readingrockets.org/article/43814/
	TEACHER RESOURCE: Ideas for Bar Graphs	http://www.kinderpond.com/graphingideas.html
	VIDEO LESSON: Why and how to make Bar Graphs (6:22)	http://www.youtube.com/watch?v=O7VZaoJeY6U
	INTERACTIVE ACTIVITY: Interpreting bar graphs	http://www.ixl.com/math/grade-3/bar-graphs
	ACTIVITY: Interpreting bar graphs	http://www.mathscore.com/math/practice/Bar%20Graphs/
	ACTIVITY: Interpreting pictographs	http://www.ixl.com/math/grade-3/pictographs
	ACTIVITY: Create pictographs	http://www.ixl.com/math/grade-3/create-pictographs
	ACTIVITY: Interpreting bar graphs	http://www.teachervision.fen.com/graphs-and-charts/printable/4323.html

Common Core Mathematics Curriculum - Grade 3

20	Generate measurement data on a line plot	3.MD.4. Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.
	SUGGESTED ACTIVITY	Children need to measure actual objects in customary units (e.g. inches). Objects measured should include objects both bigger and smaller than 1 inch. Objects should be measured with rulers marked in both half and quarter inch increments. Children can work in groups to measure their shoes with the quarter inch ruler to the nearest quarter inch, for example. Students should each be provided with the class data and plot the data on a line chart. Use link below to demonstrate making a line plot. Discuss why a line plot is different from a number line or a ruler.
	ACTIVITY: Measurement accuracy practice	http://www.studyzone.org/testprep/math4/d/inch4p.cfm
	ACTIVITY: Measurement and dot plot of Hand Span size for one or more classes	http://www.illustrativemathematics.org/illustrations/485
	ACTIVITY: Measure and plot the longest distanced measured across the United States in centimeters	http://www.illustrativemathematics.org/illustrations/486
	ACTIVITY- Recognize area as an attribute of plane figures	Review Concept 4 above. Review the lesson at amphimath.com called Understanding Multiplication (Part 2) that uses arrays to understand area.
	ACTIVITY: Square counting short-cut to find the area of irregular arrays	http://www.illustrativemathematics.org/illustrations/516
21	Solve problems involving perimeters of polygons <verbalize>	3.MD.8. Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.
	SUGGESTED ACTIVITY	Perimeter versus Area: Answer the question "About how large is our classroom?". First have children use a ruler (or yardstick) to measure the length of each wall (one across, one down) of the room to the nearest foot. Now they can draw the room on 1-inch grid paper where each square represents 1 foot. Next they can draw the 1-foot square tiles they would need to cover the classroom floor--thereby estimating the area of the classroom. Then , introduce another way to talk about the size of the classroom, and have them label the width and length they measured on their drawings. Then the children should then walk the perimeter of the room and estimate the number of feet. Then , the children should figure out (in discussion groups) how they could get that estimate from their drawings. This should lead to the definition of perimeter as a linear measurement--different from the square measurement of area.
	AREA and PERIMETER SONG (3:08)	http://www.youtube.com/watch?v=D5jTP-q9TqI
	ACTIVITY: Area and perimeter word problems	http://www.lauracandler.com/filecabinet/math/PDF/AreaandPer%20WordProb.pdf
	ACTIVITY: Area and perimeter problems	http://www.lauracandler.com/filecabinet/math/PDF/areaper.pdf
	ACTIVITY: Perimeter problems	http://www.k-5mathteachingresources.com/support-files/perim-word-problems.pdf
	ACTIVITY: Area and perimeter problems	http://illuminations.nctm.org/Lessons/Architect/Architect-AS-PerimArea.pdf

Common Core Mathematics Curriculum - Grade 3

	INTERACTIVE ACTIVITY: Calculate the area and perimeter of regular and irregular polygon shapes created by joining rectangles together.	http://www.bgfl.org/bgfl/custom/resources_ftp/client_ftp/ks2/maths/perimeter_and_area/index.html
	CLASS ACTIVITY: Do this as a class. Calculate the area, perimeter and cost of gardens that the students layout.	http://www.lauracandler.com/filecabinet/math/PDF/fencegarden.pdf
	ACTIVITY: Make a rectangle (using 1" grid paper) with a specified perimeter and maximum area.	http://www.k-5mathteachingresources.com/support-files/theperimeterstayssthesame.pdf
	ACTIVITY: Learn that the perimeter of an object can change even though its area does not.	http://www.k-5mathteachingresources.com/support-files/perimeterwithcolortiles.pdf
	ACTIVITY: Find the missing sides of polygon figures given the perimeter (uses Smartbook Notebook Express application).	http://express.smarttech.com/?url=http://exchangedownloads.smarttech.com/public/content/30/300138c7-f560-4ea0-9311-792200ab4bb1/368-663585-perimeter.notebook
	TEACHER LESSON: Rectangles with constant area but changing perimeter.	Give your students twelve 1"x1" square tiles. Tell the students to put the tiles together to make rectangular shapes and to measure the area and perimeter of each rectangle. They should make several shapes and write down the perimeter they found for each. The area should always be 12 sq. in. (assuming 1 inch square tiles) but the perimeter will change. Have the class report what they found. Make sure that someone makes a 3 x 4 array which will have an area of 12 and a perimeter of 14, the smallest perimeter. Also make sure that someone makes a 1 x 12 array (the 12 squares lying in a single line. This figure will have an area of 12 and a perimeter of 26, the largest perimeter.
	ACTIVITY: Calculate the perimeter	http://www.superteacherworksheets.com/geometry/perimeter-3_TZFFD.pdf

GEOMETRY

Students are expected to reason with shapes and their attributes.

22	Understand properties of a quadrilateral <verbalize>	3.G.1. Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories
	TEACHER ACTIVITY: The attributes of the family of quadrilaterals (uses Smart Notebook Express software).	http://express.smarttech.com/?url=http://exchangedownloads.smarttech.com/public/content/58/58560e12-fd34-4b40-8525-75aab706ed59/321-5206-quadrilaterals.notebook#http://www.k-5mathteachingresources.com/geometry-activities-2.html
	ACTIVITY: Compare quadrilateral shapes	http://www.k-5mathteachingresources.com/support-files/comparingquadrilaterals.pdf
	POLYGON SONG	http://www.youtube.com/watch?v=TTrbT_SSD0U
	TEACHER LESSON PLAN: Download Teacher lesson plan in Word or PDF format. <u>Suggestion:</u> Skip the instructions and only use the materials in the Attachments C and D on pages 9-11. Consider using Attachment B on pages 7-8.	http://dnet01.ode.state.oh.us/ims.itemdetails/lessondetail.aspx?id=0907f84c8053226b
	QUADRILATERAL SORTING GAME [Recommended]	http://teams.lacoe.edu/documentation/classrooms/amy/geometry/6-8/activities/quad_quest/quad_quest.html

Common Core Mathematics Curriculum - Grade 3

23	Express area of a shape as a fraction <verbalize>	3.G.2. Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.
	TEACHER ACTIVITY: Sharing in terms of Fractions	http://mathlearnnc.sharpschool.com/UserFiles/Servers/Server_4507209/File/Instructional%20Resources/K.%20Schwartz%20Fractions%20with%20Area%20Models%20Grades%201_3.pdf
	ACTIVITY: Name the fraction of the polygon that is shaded.	HTTP://teachingimage.com/fractions-worksheets/polygon-fractions.pdf